SP

COMMONWEALTH OF MASSACHUSETTS

CONTRACT DOCUMENTS AND SPECIAL PROVISIONS

PROPOSAL NO.	608762-124916
P.V. =	$6,573,000.00
PLANS	YES

FOR

Federal Aid Project Nos. HIP(BR)-0036(018)X
Bridge Preservation of B-16-246=C-01-029,
Eliot Street over the Charles River

in the Cities of

BOSTON-CAMBRIDGE

In accordance with the STANDARD SPECIFICATIONS
for HIGHWAYS and BRIDGES dated 2023

This Proposal to be opened and read: **TUESDAY, MARCH 12, 2024 at 2:00 P.M.**

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DOCUMENT 00104

NOTICE TO CONTRACTORS

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

TUESDAY, MARCH 12, 2024 at 2:00 P.M. **
BOSTON-CAMBRIDGE
Federal Aid Project Nos. HIP(BR)-0036(018)X
Bridge Preservation of B-16-246=C-01-029,
Eliot Street over the Charles River

****Date Subject to Change**

PROJECT VALUE = $6,573,000.00

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

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

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

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

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

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

NOTICE TO CONTRACTORS (Continued)

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

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

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

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

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 $637.50 per ton, Portland cement $181.15 per ton, diesel fuel $3.167 per gallon, and gasoline $2.483 per gallon, and Steel Base Price Index 448.0. MassDOT posts the **Price Adjustments** on their Highway Division's website at
https://www.mass.gov/massdot-contract-price-adjustments

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

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

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

BY: Monica G. Tibbits-Nutt, Secretary and CEO, MassDOT
Jonathan L. Gulliver, Administrator, MassDOT Highway Division
SATURDAY, DECEMBER 30, 2023

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DOCUMENT 00210

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

July 1, 1981, updated October 2016

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(2) transactions are recorded as necessary

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

ii. to maintain accountability for assets;

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

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

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

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

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

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

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

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

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

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

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

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

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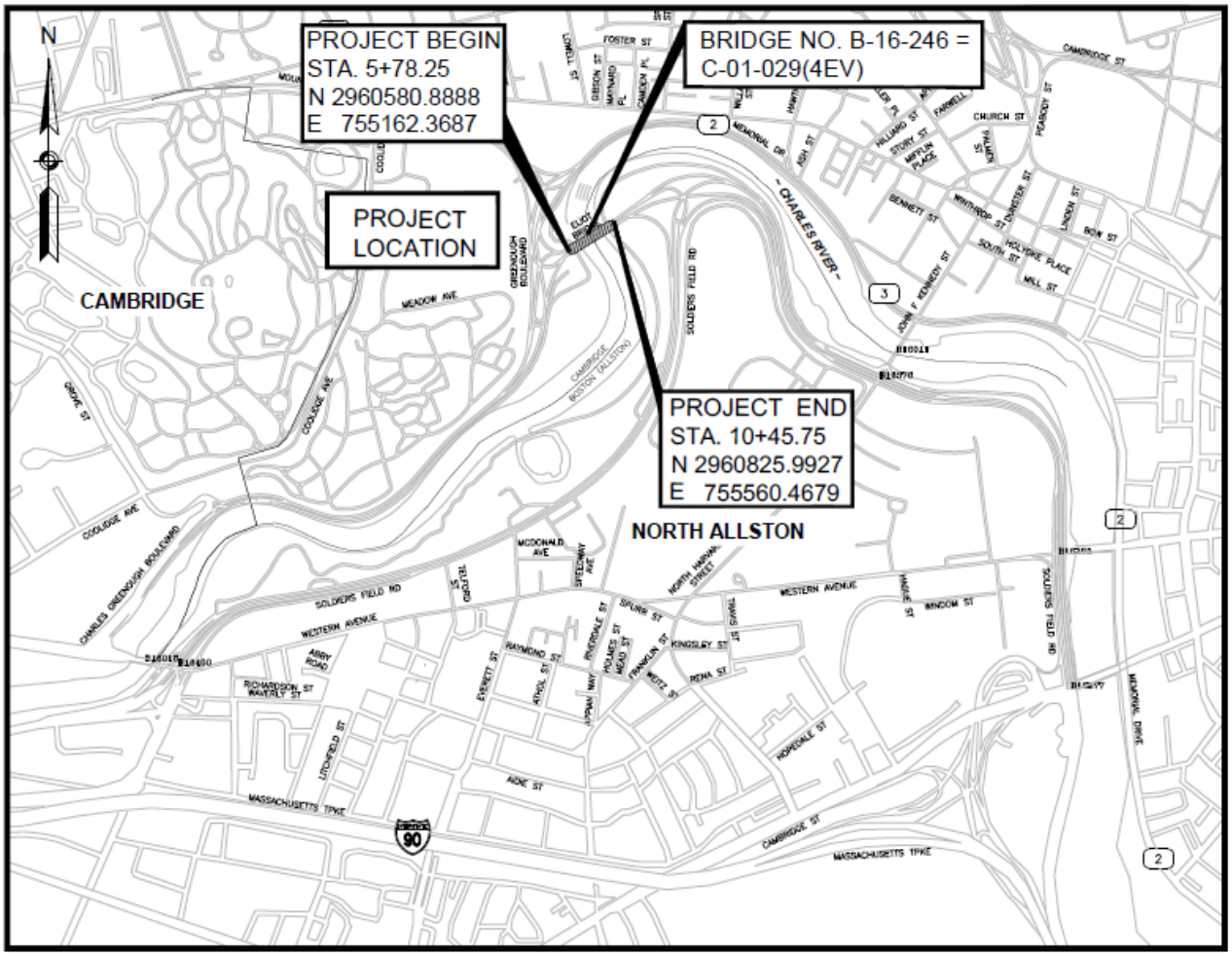
DOCUMENT 00331

LOCUS MAP

BOSTON-CAMBRIDGE
Federal Aid Project Nos. HIP(BR)-0036(018)X
Bridge Preservation of B-16-246=C-01-029,
Eliot Street over the Charles River



0 1000 2000 3000 4000
SCALE: 1" = 1000'

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DOCUMENT 00439

Final Report ☐

Interim Report ☐

CONTRACTOR PROJECT EVALUATION FORM

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

Date: _____

City/Town: _____ Contractor:_____

Project: _____ Address:_____

F.A. No. _____ Contract Number: _____

Bid Price: _____ Notice to Proceed: _____

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

Date Work Started: _____ Date Work Completed*: _____

Contractor's Superintendent: _____

Division: (indicates class of work) Highway:_____Bridge:_____Maintenance: _____

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

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

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

_____ _____

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

_____

Contractor's Signature Acknowledging Report/Date

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

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

_____

_____

CONTRACTOR PROJECT EVALUATION FORM (Continued)

Date: _____ Contract Number:_____

INFORMATION FOR DISTRICT HIGHWAY DIRECTORS RELATING TO PREQUALIFICATION

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

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

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

I recommend a deduction for project completed late:_____

Signed: _____
District Highway Director

EXPLANATION OF RATINGS 1 – 9:_____

_____

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WORK NOT COMPLETED WITHIN SPECIFIED TIME: _____

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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: _____

_____

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WORK NOT COMPLETED WITHIN SPECIFIED TIME: _____

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Revised: 04/28/17

*** END OF DOCUMENT ***

DOCUMENT 00710
GENERAL CONTRACT PROVISIONS
Revised: 04/24/23

NOTICE OF AVAILABILITY

The STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES dated 2023, the SUPPLEMENTAL SPECIFICATIONS, the 1996 METRIC CONSTRUCTION AND TRAFFIC STANDARD DETAILS, the 1990 STANDARD DRAWINGS FOR SIGNS AND SUPPORTS; the 1968 STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING and the 2017 CONSTRUCTION STANDARD DETAILS are available online at https://www.mass.gov/massdot-highway-division-manuals-and-publications

SPECIAL PROVISIONS FOR RIGHT-TO-KNOW ACT REQUIREMENTS

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

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

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

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

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

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

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

ALTERNATIVE DISPUTE RESOLUTION
Forum, Choice of Law and Mediations:

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

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DOCUMENT 00713

Subsection 701

Cement Concrete Sidewalks, Pedestrian Curb Ramps, and Driveways
and
Guide to the Interim Subsection 701
Cement Concrete Sidewalk Specification

(March 31, 2022)

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SUSECTION 701: CEMENT CONCRETE SIDEWALKS, PEDESTRIAN CURB RAMPS, AND DRIVEWAYS
Replace this Subsection with the following:

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 (≥ 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	–	

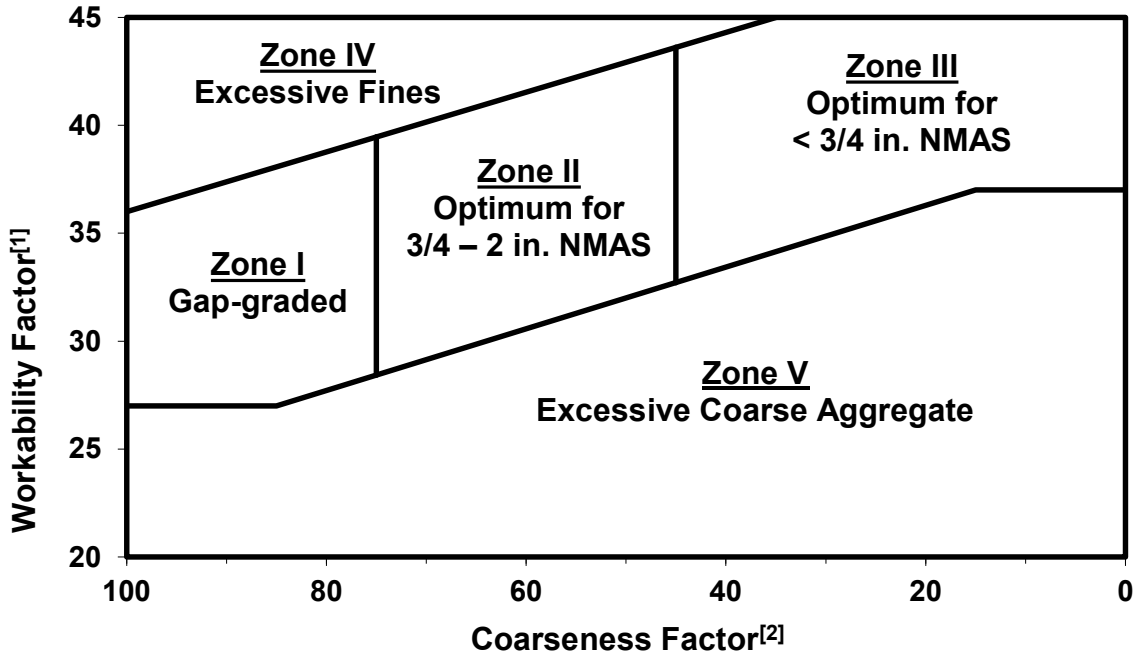
2. Shilstone Workability-Coarseness Chart.

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 increasers. 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 Requirement
F3	Very Severe	Exposed to freezing and thawing cycles and accumulation of snow, ice, and de-icing chemicals; Frequent exposure to water	≤ 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	7.0
			1	6.5
			1 1/2	6.5

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 (≤ 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).

$V_{CEMENT} = W_{CEMENT} / SG_{CEMENT} * D_{WATER}$

$V_{SCM} = W_{SCM} / SG_{SCM} * D_{WATER}$

$V_{ADMIXTURE} = V_{ADMIXTURE}$ in oz. / 957.5 oz. per cf

$V_{WATER} = V_{WATER}$ in gal. / 7.48 gal. per cf

$V_{COARSE} = W_{COARSE} / SG_{COARSE} * D_{WATER}$

$V_{FINE} = W_{FINE} / SG_{FINE} * D_{WATER}$

$V_{CONCRETE} = V_{CEMENT} + V_{SCM} + V_{ADMIXTURE} + V_{WATER} + V_{COARSE} + V_{FINE} + V_{AIR}$

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

$V_{PASTE} = V_{CEMENT} + V_{SCM} + V_{ADMIXTURE} + V_{WATER}$

$PC_{CONCRETE} = V_{PASTE} / V_{CONCRETE}$

[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.

$VC_{COARSE} = SG_{COARSE} * D_{WATER} - BD_{COARSE} / D_{COARSE}$

$VC_{FINE} = SG_{FINE} * D_{WATER} - BD_{FINE} / D_{FINE}$

$VC_{AGGREGATE} = [(V_{COARSE} / (V_{COARSE} + V_{FINE})) * VC_{COARSE} + (V_{FINE} / (V_{COARSE} + V_{FINE})) * VC_{FINE}]$

$AVC_{CONCRETE} = [VC_{AGGREGATE} * ((V_{COARSE} + V_{FINE}) / V_{CONCRETE})]$

$R_{PC\text{-}AVC} = PC_{CONCRETE} / AVC_{CONCRETE}$

[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 (%).

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

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. Applicating 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 ($lb/ft^2/hr$), T_c = concrete temperature of the evaporating surface (°F), r = relative humidity of air surrounding the evaporating surface (%), T_a = temperature of the air surrounding the evaporative surface (°F), and V = average wind speed 20 inches above the evaporating surface. The air surrounding the evaporating surface shall be defined as the air approximately 4 to 6 feet above the evaporating surface on the windward side and shielded from the sun's rays.

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	≥ 70% f'_c
		Compressive Strength at 28 Days (psi)[3]	100 cy	1 per Sublot	Point of Discharge	≥ 100% f'_c
		Compressive Strength at 56 Days (psi)[3][4]	100 cy	1 per Sublot	Point of Discharge	≥ 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
	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	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**	
	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	Requirement

DOCUMENT 00715

SUPPLEMENTAL SPECIFICATIONS

(English Units)

SEPTEMBER 30, 2023

The 2023 *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 Specifications Committee has issued these Supplemental Specifications for inclusion into each proposal until such time as they are updated or incorporated into the next Standard Specifications.

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

DIVISION I

GENERAL REQUIREMENTS AND COVENANTS

SECTION 1: DEFINITION OF TERMS

Subsection 1.02: References, Abbreviations, Acronyms, Measurement Units and Symbols
Under B. Abbreviations and Acronyms delete the line containing NTPEP.

SECTION 2.00: PROPOSAL REQUIREMENTS AND CONDITIONS

Subsection 2.04: Preparation of Proposals
Replace the fourth paragraphs with the following:

At the designated time of the bid opening the Department will accept as the official bid, the set of proposal forms generated from the electronic proposal which includes the bid item sheets, bid bond, addendum acknowledgement, and affidavit of non-collusion.

SECTION 4: SCOPE OF WORK

Subsection 4.03: Extra Work
Replace the third and fourth paragraphs with the following:

Payment for extra work will be as provided in Subsection 9.03: Payment for Extra Work.

The determination of the Engineer shall be final upon all questions concerning the amount and value of Extra Work (except as provided in Subsection 7.16: Claims of Contractor for Compensation.

If the Contractor disputes the scope, cost or time associated with the executed Extra Work Order or the determination by the Engineer for requested extra work, then the Contractor must deliver to the Department written notice of a claim in accordance with Subsection 7.16: Claims of Contractor for Compensation.

Subsection 4.04: Changed Conditions
Add new paragraph (b) and re-letter existing paragraphs (b) through (e) to (c) through (f):

(b) In the event the Engineer's report finds no material or substantial change in conditions, the Contractor may file a Notice of Claim in accordance with Subsection 7.16: Claims of Contractor for Compensation.

SECTION 5: CONTROL OF WORK

Subsection 5.02: Plans and Detail Drawings
Replace the 7th paragraph from the top with the following:

The title block of shop drawings shall include, at a minimum, the following information: fabricator's name and address; city(ies) or town(s) where the project is located; location(s) where the material is to be used; MassDOT contract number; Federal aid project number, when applicable; MassDOT Project Number; name of the contractor, the subcontractor; date of drawing and date of all revisions. The title block for shop drawings of bridge projects shall also include: the bridge number and BIN; facility on the bridge; the feature under the bridge.

Subsection 5.09: Inspection of Work
Replace the first paragraph of this subsection the following:

All materials and each part or detail of the work shall be subject to inspection by the Engineer. The Engineer shall be allowed access to all parts of the work and shall be furnished with such information and assistance by the Contractor as is required to make a complete and detailed inspection; such assistance may include furnishing labor, boats, tools, equipment, and personal protective equipment at no expense to the Department.

SECTION 6: CONTROL OF MATERIALS

Subsection 6.01: Source of Supply and Quality
Replace this subsection with the following:

The Engineer may approve material at the source of supply before delivery to the project.

The Department reserves the right to require approval of the source of supply for any material to be incorporated into the work prior to delivery or manufacture.

The Engineer reserves the right to prohibit the use of materials, products, or components which, in their opinion, may be supplied in a manner not reasonably consistent with contract requirements.

The determination of the Engineer shall be final upon all questions which pertain to supplier approval.

Fabricators of structural steel, miscellaneous steel and aluminum products, and producers of precast concrete and prestressed concrete must be on the Department's approved fabricators list on the date the bids are opened. Only approved fabricators will be allowed to perform work for the Department.

The Contractor shall furnish all materials required for the work specified in the Contract. Said materials shall meet the requirements of the specifications for the kind of work involving their use. For any materials named or described in these specifications, an approved equivalent to that named or described in the said specifications, may be furnished.

Chapter 7, Section 22, Clause 17, of the General Laws, as amended, shall apply to the purchase by the Contractor of supplies and materials to be used in the execution of this Contract.

The rules referred to require a preference in the purchase of supplies and materials, other considerations being equal, in favor first, of supplies and materials manufactured and sold within the Commonwealth, and second, of supplies and materials manufactured and sold within the United States.

All iron and steel products, manufactured products, and construction materials shall comply with all Federal Buy America and Federal Build America Buy America (BABA) requirements, where applicable.

In Contracts requiring structural steel, precast, or prestress concrete, the Contractor shall furnish approved shop drawings, and fabrication procedures to the Department's inspector at the supply source or fabrication site.

Materials for permanent construction shall be new, shall conform to the requirements of these specifications, and shall be approved by the Engineer.

Materials for temporary structures or supports adjacent to traveled ways, the failure of which would compromise the safety of the public or the traveled ways, need not be new but the Contractor shall be required to submit certification by a Structural Professional Engineer that the material meets the requirements for the intended use and shall be approved by the Engineer. Any fabrication shall conform to the requirements of these specifications. These requirements shall not apply to gantry systems and supports as well as other mechanized systems.

If testing finds that an approved supplier does not furnish a uniform product, or if the product from such source proves unacceptable at any time, the Contractor shall, at their own expense, take any and all steps necessary to furnish approved materials.

The Contractor shall submit to the Department for approval a notarized Certificate of Compliance (COC) from the Manufacturer or Supplier for each kind of manufactured or fabricated material furnished.

The COC shall certify compliance with the specifications and shall contain the following information:

1. Contract Number, City or Town, Name of Road and Federal Aid Number;
2. Name of the Contractor to which the material is supplied;
3. Kind of material supplied;
4. Quantity of material represented by the certificate;
5. Means of definitively identifying the consignment, such as invoice number, lot number, bill of lading number, label, marking, etc.;
6. Date and method of shipment;
7. Statement indicating that the material has been tested and found in conformity with the pertinent parts of the Contract;
8. Statement indicating that the material meets the requirements of Buy America and BABA, where applicable;
9. Results of all required tests including the chemical analysis in the case of metal: or in lieu of furnishing the results a statement that results of all required tests pertinent to the certificate and not submitted shall be maintained available by the undersigned for a period of not less than three years from date of final acceptance or not less than three years from date of final payment (whichever period is the longest shall apply).
10. Signature of a person having legal authority to bind the supplier.

These COCs shall be delivered to the contract site at the same time that the materials are delivered and before such materials are incorporated into the work. The Contractor shall attach to the COC a document listing the contract bid item number(s), sub item(s), or lump sum breakdown item number(s), as applicable, under which the material will be compensated. Payment for the item in which the materials are incorporated may be withheld until these COCs are received in a form that meets the contract requirements.

If the Contractor has new materials purchased for use on a previous Department Contract which have never been used and which comply with the specifications, these materials may be furnished and used. The Contractor shall submit their own sworn statement certifying that such materials were purchased for use on a previous Contract (naming and identifying such Contract) and shall attach the original COC.

Any cost involved in furnishing the certificate shall be borne by the Contractor.

Subsection 6.03: Delivery and Storage of Materials
Replace this subsection with the following:

Materials and equipment shall be progressively delivered to or removed from the site so that there will be neither delay in the progress of the work nor an accumulation of materials that are not to be used or removed within a reasonable time. All materials shall be stored in pre-approved locations per the conditions of the property owner.

Delivered materials and materials originating from the site shall be stored to assure the preservation of their quality and fitness for the work. Stored materials, even though approved before storage, may again be inspected prior to their use in the work. Stored materials shall be located to facilitate their prompt inspection.

Approved portions of the State Highway Layout (SHLO) may be used for storage of project materials and for the placing of the Contractor's plant and equipment upon obtaining a state highway access permit. All storage sites shall be restored to their original condition by the Contractor. No additional compensation shall be given for the design, construction, preparation, or restoration of the storage site(s) or obtaining the access permit which may include but is not limited to a Traffic Management Plan (TMP), utilities, and lighting.

The application for a permit shall contain a locus map identifying the proposed location, a description of the specific activities and uses of the staging area, a TMP in accordance with Subsection 7.10 depicting minimum setbacks from the roadway and any existing structures for stored materials and equipment and how equipment will safely access and exit the staging area.

Any additional space required must be provided by the Contractor at their expense. Municipal, private, or other state-owned property shall not be used for storage purposes without written permission of the owner or lessee, and copies of such written permission shall be furnished to the Engineer.

SECTION 7: LEGAL RELATIONS AND RESPONSIBILITY TO (THE) PUBLIC

Subsection 7.09: Public Safety and Convenience
Delete the word Prime.

Subsection 7.10: Barricades and Warning Signs
Replace the entire subsection with the following:

Subsection 7.10: Traffic Management Plan

The Contractor shall submit a Traffic Management Plan to the Department This Plan shall include:

- Contact information for the person(s) responsible for the implementation, oversight, and quality control of the Traffic Management Plan.
- Temporary Traffic Control Plans for all phases of construction.
- Detour Plans (if applicable).
- Public Involvement and Communication Plan (if required by Special Provision).

No work impacting traffic shall commence until the Traffic Management Plan has been approved by the Department.

Temporary Traffic Control Plans (TTCP)

The TTCP shall consist of plans depicting the location of all temporary traffic control devices, including but not limited to: channelization devices, barricades, signs, pavement markings, lighting, traffic signals, flashing lights, temporary barrier, temporary attenuators, truck or trailer mounted attenuators, flashing arrow boards, portable changeable message signs, work zone ITS equipment, temporary portable rumble strips, Roadway Flaggers, and Traffic Officers. Specialized short-term conditions such as rolling roadblocks or road/ramp closures lasting for less than 24 hours will also require individual TTCPs.

The TTCP shall also include, as needed, a description or plan of Contractor access and egress to and from the work zones, staging areas and material stockpile and equipment laydown areas. See Subsection 6.03 for material stockpile requirements.

For each phase of construction, the Contractor may choose to use:

- the TTCPs included in the Contract Documents (if provided),
- MassDOT Construction Standards,
- a separate TTCP design from the Contractor,
- or a combination thereof.

The Contractor shall identify the TTCPs they will use in their project TMP Submission, including the use of the Contract specified TTCPs or Construction Standards. All Contractor proposed TTCPs must be approved by MassDOT prior to implementation.

Any TTCP design that varies from the Contract Documents or the Construction Standards shall be stamped and signed by a Professional Engineer registered in Massachusetts.

Detour Plans

Detour Plans shall be required if access for motor vehicles, heavy vehicles, bicyclists, or pedestrians is temporarily restricted and an alternate route is necessary. Detour plans shall show locations of barricades, signs, portable changeable message signs, and other temporary traffic control devices that are needed to provide directional information to the affected road user(s).

All pedestrian detours shall be on ADA and AAB compliant routes. Any pedestrian detour plans shall be stamped and signed by a Professional Engineer registered in Massachusetts.

Public Involvement and Communication Plans

Public Involvement and Communication Plans shall be required as noted in the contract Special Provisions. These plans shall include outreach measures and notification to the public to increase awareness of pending traffic impacts.

Additional Contractor Duties

The Contractor shall maintain all temporary traffic control devices erected or installed as a part of the approved Traffic Management Plan. The Contractor shall furnish staff that will oversee all components of the approved Traffic Management Plan.

All costs associated with the development, submission and implementation of the Traffic Management Plan shall be incidental to the Contract.

Subsection 7.16: Claims of the Contractor for Compensation
Replace this subsection with the following:

No person or corporation, other than the signer of the Contract as Contractor, now has any interest hereunder, and no claim shall be made or be valid; and neither the Department nor any member, agent or employee thereof, shall be liable for, or be held to pay, any money except as provided in Subsections 4.02: Alterations, 4.03: Extra Work, 4.04: Changed Conditions, 4.06: Increased or Decreased Contract Quantities and 9.02: Scope of Payments of these Specifications and Clause 3 of the Contract.

All disputes between the Contractor and the Department shall be resolved as provided by this subsection.

At all times during the claims review process or any subsequent administrative or court proceeding, the Contractor shall proceed with the Work diligently, without delay, in accordance with the Contract, and as directed by the Department. In addition, all parties shall continue to comply with all provisions of the Contract documents.

A. Contractor Claims Submission to the Department (Step 1)

Notice of Claim

All claims of the Contractor for compensation other than as provided for in the Contract on account of any act of omission or commission by the Department or its agents must be made in writing to the Engineer within seven (7) days after the beginning of any work or the sustaining of any damage on account of such act.

The Contractors written notice to the Engineer shall contain the following:

1) a description of the nature of the work performed or damage sustained
2) the time and date the event was first identified
3) the location of the impacted work
4) the Contractual basis for the Contractor's claim

Itemized Statement of Claim

The Contractor shall within thirty (30) days after the beginning of any work or the sustaining of any damage on account of such act shall submit to the Engineer an itemized statement containing the following:

1) a detailed description of the Work claimed and sequence of events and location
2) a breakdown of actual costs and damages sustained including all supporting documentation
3) a Time Entitlement Analysis, if the Contractor is claiming for an extension of Contract time

If the work to be claimed is not completed within the initial thirty (30) days, the Contractor shall submit on a monthly basis the actual costs to-date and an estimated cost to complete. Upon completion of the work a final actual cost shall be submitted in thirty (30) days.

All costs shall be prepared and submitted in accordance with Subsection 9.03: Payment for Extra Work. Any costs associated with the preparation, negotiation, litigation and/or settlement of the claim are not allowable.

Unless such notice and statement shall be made as required, any claim for compensation or additional time shall be forfeited and invalidated, and the Contractor shall not be entitled to payments on account of any such work or damage.

Such notice by the Contractor and the keeping of costs by the Engineer shall not in any way be construed as providing the validity of the claim. The provisions of this paragraph shall not apply to changes in quantities as provided under Subsection 4.06: Increased or Decreased Contract Quantities or to Extra Work ordered by the Engineer in writing.

On the basis of information provided in writing by their own employees, servants, or agents the Contractor will be required to certify, in writing, that the work for which the Contractor is claiming payment, other than as provided for in the Contract, is work actually performed, and the costs as shown are the amounts legally due for performing such work for which payment is claimed.

Upon receipt of a Notice of Claim and itemized statement of costs, the Department and Contractor shall attempt to resolve the issue(s) presented through a review of the materials submitted, and an evaluation of the contract documents. After a complete review, the Department will issue a written decision on the Contractor's claim.

B. Construction Claims Committee Determination (Step 2)

Within fourteen (14) Days after the receipt date of the Department's written decision denying a claim, the Contractor may file a request with the Chief Engineer for a hearing before the Department's Claims Committee. The Contractor shall also provide any additional information, at the Department's request, that the Department's Claims Committee determines is necessary for its evaluation of the claim. The Contractor's claim information must be enhanced to include sufficient description and information to enable understanding by a third party who has no knowledge of the dispute or familiarity with the Project and this documentation must also include a description of the efforts undertaken to resolve the dispute.

The Contractor shall present the claim to the Claims Committee at a meeting to be scheduled after the filing of the request. After the meeting, the Chief Engineer will provide to the Contractor a written determination on each claim.

C. Appeal to the Administrative Law Judge (Step 3)

The determination of the Engineer may be appealed to the Department's Administrative Law Judge as established in MGL Ch.6c, s.40, as amended.

The appeal shall set forth the contract number, city or town project is in, the name and address of the Contractor, the amount of the claim (and breakdown of how the amount was computed), a clear, concise statement of the specific determination being appealed, including the reasons for appealing the determination and shall be signed by the Contractor. The Office of the Administrative Law Judge shall record the date and time any such appeal is received, shall keep the appeal on record, and schedule the appeal for a hearing before the Administrative Law Judge.

At any time after the determination by the Claims Committee, the Contractor at its sole discretion may appeal the Claims Committee's determination to the Superior Court Department of the Commonwealth of Massachusetts in the County of Suffolk for further consideration. The Contractor agrees that either on appeal of a decision from the Department's Administrative Law Judge or on direct appeal, the exclusive jurisdiction and venue for any legal action or proceeding, at Law or in equity, arising out of or relating to the Contract Documents or the Project, shall be the Superior Court Department of the Commonwealth of Massachusetts in the County of Suffolk. The Contractor waives all objections it might have to the jurisdiction or venue of such court and hereby consents to such jurisdiction, regardless of the Contractor's residence or domicile, for any such action or proceeding. This subsection does not relieve the Contractor's obligation to submit the Dispute to Superior Court within the applicable statutes of limitations or repose and the Department does not hereby waive its rights to assert defenses based upon such statutes.

Interest on judgments for Contractor claims filed with the Superior Court of Massachusetts shall be calculated pursuant to the provisions of MGL c. 231, s.6I from the date of the breach or demand. If the date of the breach or demand is not established, such interest shall be calculated from the date of the commencement of the action.

Throughout the course of any work that is the subject of any claim the Contractor shall keep complete records of the extra costs and time incurred related to the claim. These records shall be retained for a period of not less than seven (7) years from the date of resolution of the claim.

The acceptance by the Contractor of the final payment made under the provisions of Subsection 9.05: Final Acceptance and Final Payment shall operate as and shall be a release to the Department and every member, agent and employee thereof, from all claim and liability to the Contractor for anything done or furnished for, or relating to, the work, or for any act or neglect of the Department or of any person relating to or affecting the work, except the claim against the Department for the remainder, if any there be, of the amounts kept or retained as provided in Subsection 7.15: Claims Against Contractors for Payment of Labor, Materials and Other Purposes. For claims for extensions of time see Subsection 8.10: Determination and Extension of Contract Time for Completion (Time Extensions).

SECTION 8: PROSCECUTION AND PROGRESS

Subsection 8.05: Claim for Delay or Suspension of the Work
Replace the second paragraph with the following:

Provided, however, that if the Engineer determines that the performance of all or any major portion of the work is suspended, delayed, or interrupted for an unreasonable period of time by an act of the Department in the administration of the Contract, or by the Department's failure to act as required by the Contract within the time specified in the Contract (or if no time is specified, within a reasonable time) and without the fault or negligence of the Contractor, an adjustment shall be made by the Department for any increase in the actual cost of performance of the Contract (excluding profit and overhead) necessarily caused by the period of such suspension, delay or interruption. No adjustment shall be made if the performance by the Contractor would have been prevented by other causes even if the work had not been so suspended, delayed, or interrupted by the department. The Contractor has an obligation to mitigate costs associated with any delay or suspension.

Replace the fifth paragraph with the following:

Any dispute concerning whether the delay or suspension is unreasonable or any other question of fact arising under this paragraph shall be determined by the Engineer, and such determination and decision, in case any question shall arise, shall be a condition precedent to the right of the Contractor to receive any money hereunder. The determination by the Engineer shall be in accordance with Subsection 7.16 Claims of Contractor for Compensation.

Subsection 8.10: Determination and Extension of Contract Time for Completion (Time Extensions)
Under D. Disputes, replace the second paragraph with the following:

The Contractor may dispute a determination by the Engineer by filing a claim notice within seven (7) calendar days after the Contractor's request for additional time has been denied or if the Contractor does not accept the number of days granted in a time extension. A determination on the Contractor's claim shall be in accordance with Subsection 7.16 Claims of Contractor for Compensation. The Contractor's claim notice shall include a revised time entitlement analysis that sufficiently explains the basis of the time-related claim. Failure to submit the required time entitlement analysis with the claim notice shall result in denial of the Contractor's claim.

DIVISION II

CONSTRUCTION DETAILS

SUBSECTION 430: CEMENT CONCRETE BASE COURSE

Subsection 430.40: General
Revise this subsection to read as follows:

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

Cement Concrete	M4
Preformed Joint Filler	M9.14.0
Hot Applied Crack Sealer	M3.05.2

SUBSECTION 450: HOT MIX ASPHALT PAVEMENT

Subsection 450.61: Contractor Quality Control Plan
Replace the fourth sentence in the first paragraph with the following:

The QC Plan shall sufficiently document the QC processes of all Contractor parties (i.e. Contractor, Subcontractors, Producers) performing work required under this specification.

SUBSECTION 460: HOT MIX ASPHALT PAVEMENT FOR LOCAL STREETS

Subsection 460.61: Contractor Quality Control Plan
Replace the fourth sentence in the first paragraph with the following:

The QC Plan shall sufficiently document the QC processes of all Contractor parties (i.e., Contractor, Subcontractors, Producers) performing work required under this specification.

SUBSECTION 466: STRESS ABSORBING MEMBRANE & STRESS ABSORBING MEMBRANE INTERLAYER

Subsection 466.61: Contractor Quality Control Plan
Replace the second sentence in the first paragraph with the following:

The QC Plan shall sufficiently document the QC processes of all Contractor parties (i.e. Contractor, Subcontractors, Producers) performing work required under this specification.

SUBSECTION 476: CEMENT CONCRETE PAVEMENT

Subsection 476.64: Placing Concrete
Delete the third paragraph from the bottom of this subsection.

Subsection 476.81: Basis of Payment
Delete the last paragraph of this subsection.

SUBSECTION 480: PAVEMENT CRACK SEALING

Subsection 480.61: Contractor Quality Control Plan
Replace the first paragraph with the following:

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

SUBSECTION 629: CONCRETE BARRIER

SECTION 629: Concrete Barrier
Replace this subsection with the following:

DESCRIPTION

629.20: General

This item shall consist of furnishing and placing Portland cement concrete barrier on an accepted prepared subgrade or sub-base in accordance with these specifications and in reasonably close conformity with the lines, grades and dimensions shown on the plans.

MATERIALS

629.40: General

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

Cement and Cement Concrete Materials	M4
Precast Concrete Highway Units	M4.02.14
Cement Concrete Blocks	M4.05.1
High Performance Concrete	M4.06.1
Steel Reinforcement	M8.01.0
Epoxy Coated Reinforcing Bars	M8.01.7
Preformed Joint Filler	M9.14.0
Demountable Reflectorized Delineators	M9.30.7

Plain dowel bars shall conform to ASTM A36 and shall be galvanized according to AASHTO M 111M/M 111.

CONSTRUCTION METHODS

629.60: General

Concrete barrier shall be either precast or cast-in-place and conform to M4: Cement and Cement Concrete Materials.

The subgrade shall be properly shaped and compacted as specified in Subsection 170: Grading.

629.61: Precast Barrier

Precast barrier shall meet M4.02.14 Precast Concrete Highway Units.

629.62: Cast-in-Place Barrier

A. Conventionally Formed Barrier.

Forms shall be accurately set to the required line and grade, secured by a method not detrimental to the roadway pavement and maintained in a true position during concrete placement.

Form removal shall meet M4.02.14: Precast Concrete Highway Units.

B. Slipformed Barrier.

Concrete traffic barriers may be constructed by the use of slipform equipment provided that the finished barrier is true to the specified line and grade within a tolerance of ±¼ in. in 10 ft.

The barrier shall present a smooth, uniform appearance in its final position, and shall conform to the horizontal and vertical lines shown on the plans or as directed by the Engineer. Any unsatisfactory section of the barrier shall be removed and replaced at the Contractor's expense.

The concrete shall be vibrated and worked until adequately consolidated and free of honeycomb. The concrete shall be of such consistency after slipforming that it will maintain the shape of the barrier without support. Prior to the beginning of operations, the Contractor shall ensure that a continuous supply of concrete is available to the slipform machine to minimize starting and stopping. The slump of concrete shall not exceed 1.5 in.

The slipform machine shall be guided by vertical and horizontal sensors that ride along a wire line. A grade line gauge or pointer shall be attached to the machine in such a manner that a continual comparison can be made between the barrier being placed and the established grade line. The slipform machine shall not exceed the speed recommended by the manufacturer. In lieu of sensor controls, the slipform machine may be operated on rails or supports set at the required grade.

629.63: Concrete Median Barrier Cap

The work consists of constructing a 4-in.-thick cast-in-place cap between the single face median barriers as shown on the plans.

The cap shall be cast in place on a gravel foundation with the length of each section being 30 ft. A ½-in. premolded joint filler will be placed between these 30-ft sections. A ½-in. premolded joint filler will be placed around bridge pier columns and along the joints between the barrier and the cap where required.

629.64: Placement of Barriers

Precast concrete barrier units shall be placed on a previously compacted gravel foundation utilizing 24-in. by 24–in. by 8-in. concrete leveling blocks conforming to the provisions of M4.05.1 set flush with the top of the gravel to control setting of the unit to the proper grade.

The Contractor shall schedule their operation and sequence of installation of the barriers so that a minimum amount of closure pieces will be required.

Expansion and construction joints shall be as shown on the Construction Standards.

Any units showing cracks or other damages due to curing, transportation, installation or other acts of the Contractor shall be removed and replaced by the Contractor at no additional compensation.

629.65: Finishing, Curing, and Protective Sealing

Cast-in-place barrier shall be finished, cured, and sealed according to the applicable specifications of M4.02.14: Precast Concrete Highway Units.

629.66: Delineators

Delineators shall be installed in conformance with manufacturer's recommendations at beginnings and ends of each continuous run of barrier with intermediate placement at intervals shown on the Plans.

Delineators shall be mounted at appropriate angles to provide maximum retroreflectivity.

COMPENSATION

629.80: Method of Measurement

Concrete barrier will be measured by the foot along the center line of top of barrier.

Cast-in-place median barrier cap concrete will be measured by the cubic yard in place.

629.81: Basis of Payment

Concrete Barrier will be paid for at the contract unit price per foot which includes full compensation for all labor, equipment; materials including finishing, curing, protective sealing, delineators, reinforcing steel, premolded filler, concrete leveling blocks and all incidental work necessary to complete the work as specified.

Cast-in-place Concrete Median Barrier Cap will be paid for at the contract unit bid price per cubic yard. This unit price shall include full compensation for all labor, tools, equipment, materials, including reinforcing steel, finishing, curing, protective sealing, premolded joint filler, and all incidental work necessary to complete the work as specified.

Gravel borrow for the foundation of the barriers and between the sections will be paid for under Item 151; Gravel Borrow.

629.82: Payment Items

629 .1	Precast Concrete Barrier - Single Faced	Foot
629.2	Precast Concrete Median Barrier - Double Faced	Foot
629.3	Cast-in-Place Concrete Barrier - Single Faced	Foot
629.4	Cast-in-Place Concrete Median Barrier - Double Faced	Foot
629.5	Cast-in-Place Median Barrier Cap	Cubic Yard
629.11	32-in. Concrete Barrier, TL-3	Foot
629.12	36-in. Concrete Barrier, TL-4	Foot
629.13	42-in. Concrete Barrier with Highway Light, TL-4	Each
629.14	42-in. Concrete Barrier, TL-5	Foot
629.15	54-in. Concrete Barrier, TL-5	Foot
629.21	32- to 36-in. Concrete Barrier Transition	Each
629.22	36- to 42-in. Concrete Barrier Transition	Each
629.23	42- to 54-in. Concrete Barrier Transition	Each

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

Subsection 701.61: Contractor Quality Control Plan

Replace the second sentence with the following:

The QC Plan shall sufficiently document the QC processes of all Contractor parties (i.e., Contractor, Subcontractors, Producers) performing work required under this specification.

SUBSECTION 702: HOT MIX ASPHALT SIDEWALKS AND DRIVEWAYS

Subsection 702.61: Contractor Quality Control Plan
Replace the second sentence with the following:

The QC Plan shall sufficiently document the QC processes of all Contractor parties (i.e. Contractor, Subcontractors, Producers) performing work required under this specification.

SUBSECTION 717: METAL BIN-TYPE RETAINING WALL

Subsection 717: METAL BIN-TYPE RETAINING WALL
Delete this subsection.

SUBSECTION 820: HIGHWAY LIGHTING

Subsection 820.20: General
Replace the last paragraph of this subsection with the following:

It is not intended that every fitting, minor detail or feature be shown and described, as the Contractor or the Subcontractor is assumed to be an expert in the particular area of responsibility and is capable of interpreting the Plans, Specifications and Special Provisions so that the bid shall include all items required and that they shall be provided and installed in a neat and workmanlike manner.

SUBSECTION 945: DRILLED SHAFTS

Subsection 945.61: Drilled Shafts and Load Tests
Delete the last sentence of paragraph B., 2., c.

Delete the last sentence in the fourth paragraph under B., 4.

SUBSECTION 965: MEMBRANE WATERPROOFING FOR NEW BRIDGE DECKS

Subsection 965.61: Contractor Quality Control Plan

Change the word should to shall and delete the word Prime in the first paragraph.

DIVISION III

MATERIALS SPECIFICATIONS

SECTION M1: SOILS AND BORROW MATERIALS

Subsection M1.06.0: Organic Soils Additives
Replace this subsection with the following:

M1.06.0: Compost

The Contractor shall submit for approval a written list of all vendors of manufactured compost that will be used on the project, including locations of compost facilities and feedstock materials. All vendors shall submit certified results of regular periodic testing per US Compost Council Seal of Testing Assurance (STA) Program.

In addition, the Contractor shall provide representative 1-gallon samples from each proposed source for testing and analysis. The Contractor shall deliver samples to testing laboratories and shall have the testing report sent directly to the Engineer. Compost tests shall be performed by STA-certified laboratory.

(https://www.compostingcouncil.org/page/CertifiedLabs)

Compost shall be a well-decomposed humus material derived from the aerobic decomposition of biodegradable matter, free of viable weed seeds and other plant propagules (except airborne weed species), foreign debris such as glass, plastic, etcetera and substances toxic to plants. Compost shall be suitable for use as a soil amendment and shall support the growth of ornamental nursery stock and turf establishment. Compost shall be in a shredded or granular form and free from hard lumps.

Food and agriculture residues are acceptable source materials. Biosolids and peat are not acceptable source materials.

Composted material with an unpleasant odor, such as that of ammonia or fecal material shall be rejected by the Engineer.

Compost shall have the following properties:

Table M1.06-1: Compost Properties by Type of Compost

Parameter	Units	**Type 1** Organic Amendment to Loam	**Type 2** Compost Blanket and Compost for Modified Rock	**Type 3** Compost Filter Berm	**Type 4** Sediment Barrier Media
pH	pH units	6.0-8.5	6.0–8.5	6.0-8.5	5.0–8.5
Soluble Salt Concentration (Electrical Conductivity)	dS/m	Max 10	Max 5	Max 5	Max 10
Moisture Content	%, wet weight	30-60	30–60	30–60	< 60
Organic Matter Content	%, dry weight	30-65	25–65	25–65	25–100
Particle Size % passing a selected mesh size, dry weight basis	3 inch	-	100% passing	100% passing	2 inch, 99% to 100% passing
Particle Size % passing a selected mesh size, dry weight basis	1 inch	-	90% to 100% passing	90% to 100% passing	-
	3/4 inch	-	65% to 100% passing	70% to 100% passing	3/8 inch, max of 50% passing
	3/8 inch	95% passing	-	-	-
	1/4 inch	95% passing	0% to 75% passing	30% to 75% passing (no more than 60% passing 1/4 inch in high rainfall/flow rate situations)	-
	Particle length	Max. 6 inch	Max. 6 inch	Max. 6 inch	Max. 2 inch
Stability					
Carbon Dioxide Evolution Rate	mg CO2-C per g OM per day	< 4	< 4	< 4	< 8
Maturity (plant bioassay)	%, germination and vigor	> 80 / 80	> 80 / 80	N/A	N/A
Physical Contaminants (Man-made inert materials)	%, dry weight	< 0.5% (0.25% film plastic)	< 0.5 (0.25 film plastic)	< 0.5 (0.25 film plastic)	< 0.5 (0.25) film plastic)

SECTION M3: ASPHALTIC MATERIALS

Subsection M3.01.6: Asphalt Release Agents
Replace this subsection with the following:

Approved asphalt release agents shall be tested in accordance with AASHTO T 383 and be listed on the 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.

Subsection M3.06.4: Hot Mix Asphalt Mixture Design
Replace the first sentence in paragraph G. OGFC Design Requirements with the following:

Each OGFC asphalt mixture shall be designed in accordance with AASHTO R 113, as modified herein.

In Table 3.06.4-7, OGFC Mixture Requirements, Note 2, replace TP 108 with T 401.

Subsection M3.06.5: Verification of Laboratory Trial Mix Formula
In Table 3.06.5-2 OGFC LTMF Verification Limits, replace TP 108 with T 401.

SECTION M4 CEMENT AND CEMENT CONCRETE MATERIALS

Subsection M4.02.00: Cement Concrete
Replace this subsection with the following:

Producers shall report proposed mix design formulations onto the Department issued mix design sheet in its entirety and submit to the Department for review. Mix design formulations shall meet the requirements specified in the construction standard specifications, contract document special provisions, design plans, and herein. Mix design formulations shall be approved by the Department prior to construction.

Mix design formulations shall be designed with precise proportions of constituent materials, yielding 27.0 ft^3 (1 cubic yard) of cement concrete. All required mix design targets shall be reported on the Department issued mix design sheet for each proposed mix design. Mill certifications and technical data sheets of the constituent materials incorporated into the proposed mix design formulation shall accompany the mix design formulation submission.

Cement concrete shall be classified and reported according to the mix design formulation's 28-day compressive strength (f'_c), nominal maximum aggregate size (NMAS), total cementitious content (lb), air content (%), water-cementitious (w/cm) ratio, paste content (%), paste content-void content (PC/VC) ratio, slump (in.), unit weight (lb/ft^3), and mix type. Nominal maximum aggregate size (NMAS) shall be determined from the combined aggregate system of the proposed mix design formulation, and is defined as the sieve size immediately above the first sieve size that cumulatively retains more than 10% by mass.

Table M4.02.00-1: Classifications of Concrete Mixes

Class 28-Day Compressive Strength	Minimum Total Cementitious Content (Pounds per Cubic Yard of Concrete)		
	1 ½ in.	¾ in.	⅜ in.
2,500 psi	425	470	520
3,000 psi	470	520	565
3,500 psi	520	565	610
4,000 psi	565	610	660
5,000 psi	660	705	760

Subsection M4.02.01: Cement
Delete the second paragraph.

Subsection M4.02.14: Precast Units
Replace this subsection with the following:

M4.02.14: Precast Concrete Highway Units

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

(a) Standard Temporary Barriers
(b) Standard Permanent Barriers
(c) Box Culverts (Spans ≤ 10 ft)
(d) Catch Basins
(e) Drainage Pipes (Non-Dry Cast)
(f) Manholes
(g) Retaining Wall Systems
(h) Traffic Light Pole Bases
(i) Luminaire Bases

A. Materials.

Materials shall meet the requirements specified in Section M4: Cement and Cement Concrete Materials, the following Subsections of Division III, Materials, and specified herein:

Self-Consolidating Concrete for Precast Products M4.02.17
High Performance Cement Concrete M4.06.1
Reinforcing Bars M8.01.0
Epoxy Coated Reinforcing Bars M8.01.7
Galvanized Reinforcing Bars M8.01.8
Primer and Damp-Proofing M9.09.0
Liquid Penetrant/Sealant M9.15.0

1. Cement Concrete Mix Design Formulation.

Fabricators shall report proposed mix design formulations onto the Department issued mix design sheet in its entirety and submit to the Department for evaluation. Mix design formulations shall be designed with precise proportions of constituent materials, yielding 27.0 ft^3 (1 cubic yard) of cement concrete. All required mix design targets shall be reported on the Department issued mix design sheet for each proposed mix design.

Cement concrete mix designs shall be classified and reported according to the specified compressive strength of the concrete structure (f'_c), nominal maximum aggregate size (NMAS), and mix type. The specified compressive strength of the concrete structure (f'_c) shall be identified from the construction standard specifications, contract document special provisions, and design plans. Nominal maximum aggregate size (NMAS) shall be determined from the combined aggregate system of the proposed mix design formulation, and is defined as the sieve size immediately above the first sieve size that cumulatively retains more than 10% by mass.

Proposed mix design formulations will be evaluated for quality and conformance to the requirements specified herein.

a. High Performance Cement Concrete for Precast Concrete Barrier.

Precast concrete barrier shall be fabricated with cement concrete meeting Section M4.06.1: High Performance Cement Concrete.

b. Self-Consolidating Concrete.

Precast concrete highway units fabricated with self-consolidating concrete shall meet Section M4.02.17: Self-Consolidating Concrete for Precast Products.

2. Cement Concrete Mix Design Verification Testing.

Upon Department Acceptance of the mix design evaluation, Fabricators proposing new mix design formulations shall select an AASHTO accredited independent laboratory to conduct mix design verification testing. The sampling and testing conducted by the independent laboratory shall be witnessed by the Department. Fabricators shall report the source, type, quantity, and design target for each constituent material incorporated into the proposed mix design onto batch tickets meeting AASHTO M 157 Standard Specification for Ready-Mixed Concrete. Fabricators shall provide Batch tickets to the Department for review. Mix design verification test results shall be within the limits specified in Table M4.02.14-1. Proposed mix design formulations for high performance concrete shall meet the additional requirements specified in Section M4.06.1: High Performance Cement Concrete and self-consolidating concrete shall meet the additional requirements specified in Section M4.02.17: Self-Consolidating Concrete for Precast Concrete Products.

Table M4.02.14-1: Mix Design Verification Testing Requirements

Property	Method	Quality Characteristic		Limits	
				Min.	Max.
Uniformity	T 119[1]	Slump (in.)	< 4 in.	Target -1.0	Target +1.0
			4 – 8 in.	Target -1.5	Target +1.5
	T 121[1]	Unit Weight (lb/ft^3)		For Information	
Workability	T 119[2]	Segregation Resistance		Pass	
Thermal	T 309	Concrete Temperature (°F)		50	90
Strength	T 22[1][3][4]	Compressive Strength (psi)	3 Days	–	–
			7 Days	–	–
			28 Days	f'_c	–
			56 Days	–	–
Durability	T 358[3]	Surface Chloride Ion Penetration Resistance (kΩ-cm)	7 Days	–	–
			28 Days	15	–
	T 121[1] T 152[1] T 196[1]	Freezing, Thawing, and De-Icing Resistance: Air Content (%)		Target -1.0	Target +1.0
	C 1567	Alkali Silica Reaction Resistance: Expansion of Accelerated Mortar Bar (%)	14 Days	M4.02.00	

[1] Prior to mix design verification testing, the Cement Concrete Producer shall identify and report the proposed mix design targets onto the Department issued cement concrete mix design sheet. Any adjustments made to the proposed mix design targets shall be based on the verification test results, and are subject to Department approval and the requirements specified herein.

[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. cylinders shall be cast for each set specified for maximum aggregate size less than 1-1/2 inches. Two (2) 6 x 12 in. cylinders shall be cast for each set specified for maximum aggregate size greater than 1 inch.

3. Reinforcement for Precast Concrete Barrier.

Reinforcement for precast concrete barrier shall meet Section M8.01.7: Epoxy Coated Reinforcing Bars or Section M8.01.8: Galvanized Reinforcing Bars, and Grade 60 of the AASHTO M 31 Standard Specification for Deformed and Plain Carbon and Low-Alloy Steel Bars for Concrete Reinforcement. The 1-in. plain dowel bars shall conform to ASTM A36 and shall be galvanized according to AASHTO M 111M/M 111.

B. Fabrication Methods.

Precast Concrete Highway Units shall be fabricated by a Department approved precast or prestressed concrete Fabricator, under the controlled settings of the approved Fabricator's facility, with a Department approved mix design formulation, as specified herein. Fabricators and concrete mix design formulations shall maintain valid listing on the MassDOT Qualified Construction Materials List (QCML). Precast Concrete Highway Units shall be fabricated in conformance with:

(a) MassDOT Standard Details and Drawings
(b) Approved Shop Drawings
(c) Latest edition of the American Association of State Highway and Transportation Officials (AASHTO) LRFD Bridge Construction Specifications
(d) Latest edition of the National Precast Concrete Association (NPCA) Quality Control Manual for Precast Concrete Plants
(e) Latest edition of the Precast Concrete Institute (PCI) MNL-116 Manual for Quality Control for Plants and Production of Structural Precast Concrete Products
(f) Requirements specified herein

Circular vertical precast reinforced concrete manholes and structures used in sewer, drainage, and water works shall meet AASHTO M 199 Standard Specification for Precast Reinforced Concrete Manhole Sections. Reinforced concrete draingage pipes intended to be used for the conveyance of sewage, industrial wastes, and storm water shall meet AASHTO M 170 Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.

1. Standard Drawings and Details.

Prior to fabrication of precast concrete highway units, the Fabricator shall prepare shop drawings in accordance with:

(a) MassDOT Construction Standard Details
(b) Traffic Standard Drawings for Traffic Signals and highway Lighting
(c) Signal Structure and Foundation Standard Drawings
(d) Standard Drawings for Signs and Supports

2. Shop Drawings.

Prior to fabrication of non-standard precast concrete highway units, the Fabricator shall prepare shop drawings in accordance with the relevant provisions of Subsection 5.02 and shall, at a minimum, contain the following, where applicable:

(a) Fabricator's name and address on each sheet
(b) Category and Type of Product, Unit Identification Number
(c) Overall length, width, and height
(d) Location, size, and geometry of all steel reinforcement, including mechanical reinforcing bar splicers to be used for connecting products together in the field (if called for on plans).
(e) Location and details of all inserts, anchors, vertical adjustment assemblies, and any other items required to be cast into the product (whether detailed on the plans by the Engineer of Record or provided for the Contractor's convenience).
(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 the latest edition of the PCI Design Handbook.
(g) The minimum concrete compressive strength required prior to handling the product.
(h) Specified concrete design compressive strength (f'_c), Nominal Maximum Aggregate Size (NMAS), and Mix Type.

Proposed shop drawings shall be drawn to scale and submitted to the Engineer of Record for review and approval. The shop drawings shall not include procedures for placement, finishing, and curing of concrete. These details shall be included in the Fabricator's Quality Control Plan as specified herein.

3. Control, Handling, and Storage of Constituent Materials

Fabricators shall verify the conformance of the constituent materials to specifications from Quality Control testing and Manufacturer certificates of compliance and meet the control, handling, and storage of constituent materials requirements specified herein.

a. Hydraulic Cement and Supplementary Cementitious Materials.

Hydraulic cement and supplementary cementitious materials shall be sufficiently controlled, handled, and stored through prevention of moisture absorption, cement caking, and contamination. Hydraulic cement and supplementary cementitious materials shall be stored in weathertight, sufficiently ventilated structures to prevent absorption of moisture. The interior of a cement silo shall be smooth, with a minimum bottom slope of 50 degrees from the horizontal for a circular silo and 55 to 60 degrees for a rectangular silo. Silos shall be equipped with non-clogging air-diffuser flow pads through which small quantities of dry, oil-free, low-pressure air can be introduced intermittently at approximately 3 to 5 psi to loosen cement that has settled tightly in the silos. Storage silos shall be drawn down once per month to prevent cement caking. Each bin compartment from which cement is batched shall include a separate gate, screw conveyor, air slide, rotary feeder, or other conveyance that allows both constant flow and precise cutoff to obtain accurate batching of cement.

Sources of contamination include incorrect sources placed into storage structures and dust contaminants. Storage structures shall be sufficiently labeled to avoid contamination. Contamination shall be sufficiently monitored and controlled during loading and transferring.

b. Aggregate.

Aggregate shall be sufficiently controlled, handled, and stored through prevention of gradation variation due to segregation and undersized particles, moisture content variation, contamination, degradation, and fracture.

(1) Variation in Gradation.

Aggregate gradation shall be sufficiently monitored to maintain control of the mix design. Aggregate shall be stockpiled in thin horizontal layers of uniform thickness to limit segregation. Storing aggregate in large conical stockpiles causes segregation and shall be prohibited. Segregation is limited when the coarse aggregate is further divided into several different sized sub-groupings with smaller ranges to be batched separately. Segregation in the coarse aggregate is controlled when the maximum aggregate size to the minimum aggregate size for a given aggregate size grouping is limited to a 4 to 1 ratio for maximum aggregate size less than 1 in. and is limited to a 2 to 1 ratio for maximum aggregate size greater than or equal to 1 in.

Undersized particles for a given coarse aggregate size grouping is defined as material passing the sieve size with an opening 5/6 of the nominal minimum size of the coarse aggregate size grouping. Coarse aggregate shall be rescreened as it is charged to the bins to remove undersized particles and undesirable fines if handling and storage methods are unsatisfactory and variations in gradation exceed allowable tolerances.

Storage bins (hoppers) shall be circular or nearly square and their bottoms shall slope more than 50 degrees from the horizontal on all sides to a center outlet. During bin loading, the aggregate shall be discharged directly above and fall vertically into the center of the bin. Discharging aggregate against the side of the bin or baffle wall causes segregation and shall be prohibited. Baffle plates or dividers can minimize segregation. Bins shall be filled to limit variation in gradation caused by withdrawal of material, segregation, and breakage of aggregate particles. Dry fine aggregate when dropped from buckets or conveyors shall be sufficiently shielded from wind and other external forces to prevent loss of fines. Fine aggregate may require dampening to prevent segregation of material.

(2) Variation in Moisture Content.

Aggregate moisture content shall be sufficiently monitored to maintain control of the mix design. Coarse aggregate shall be wetted to keep the aggregate in a constantly saturated condition, to compensate for aggregate absorption, and to provide cooling. Aggregate shall be sufficiently dewatered and drained to form a uniform moisture content and to prevent transfer of excessive free water to the bins. Fine aggregate, due to its surface area, contributes the largest amount of free water added to the mix design. Moisture meters can indicate variations in the moisture of aggregate and moisture compensators can be used for rapid batch weight adjustments, to limit moisture variations in the aggregate. Aggregates washed to remove contaminants shall be stockpiled well before use so that they can drain to a uniform moisture content.

(3) Contamination.

Sources of contamination include overlapping of different aggregate sizes from adjacent stockpiles, aggregate leakage through or around bulkheads in storage bins, underlying soil, dislodged clay lumps and other contaminants from transporting unit, leaves and vegetation, freezing aggregate, incorrect delivery from aggregate manufacturer, and incorrect aggregate size placed into a bin or stockpile. Stockpiles shall be placed on a hard base with sufficient drainage to prevent contamination from underlying material. Bulkheads, dividers, and partitions with sufficient height and ample spacing between piles shall be utilized to avoid cross-contamination and overlapping of different aggregate sources, types, and size groupings between stockpiles. Storage areas shall be sufficiently labeled to avoid contamination. Clay lumps or clay balls shall be removed from the aggregate by placing a scalping screen over the batch plant bin. Aggregate may require washing to remove contaminants. During cold temperatures, bins shall be covered or underground to prevent the freezing of aggregate. Frozen aggregate shall be prohibited from use. Aggregates may require heating to maintain an acceptable aggregate temperature and prevent freezing. Trucks, loaders, dozers, and other heavy transport equipment shall not be operated on the stockpiles due to the potential for aggregate particle fracture and contamination of track dirt onto the piles. Additional measures, including storage area coverings, shall be instituted in cases where storage areas are subject to other sources of contamination.

c. Mixing Water.

Mixing water shall be sufficiently controlled, handled, and stored through prevention of contamination.

d. Chemical Admixtures.

Chemical admixtures shall be sufficiently controlled, handled, and stored through prevention of contamination. Sources of contamination include freezing, evaporation, sunlight, and incorrect chemical admixture sources placed into chemical admixture tanks. Chemical admixtures shall be stored in heated environments to prevent freezing. Frozen chemical admixtures shall be reblended. Long-term storage of liquid admixtures in vented tanks shall be prohibited due to evaporation of the liquid negatively affecting the performance of the mix design. Certain chemical admixtures are prone to sunlight and shall be sufficiently protected in the storage tanks. Storage tanks shall be sufficiently labeled to avoid contamination. Chemical admixtures shall be stored in accordance to the chemical admixture manufacturer's recommendations.

4. Temperature Control.

Concrete shall be batched, mixed, delivered, placed, finished, and cured with ambient temperatures greater than or equal to 40°F and less than or equal to 85°F. The temperature of plastic concrete shall be greater than or equal to 50°F and less than or equal to 90°F. At no point shall the temperature of the concrete exceed 158°F.

Temperature measuring devices shall record and report to the nearest 1°F. The Fabricator shall continuously monitor, record, and report the ambient temperatures surrounding the concrete without interruption, at a minimum frequency of once per hour, until 100% of f'c is attained. The Fabricator shall confirm all temperature requirements meet the specifications herein. Fabricator temperature monitoring records shall be provided to the Department upon request.

5. Protection from Adverse Conditions.

The concrete shall be protected from all adverse conditions, including precipitation, cold conditions, and hot conditions, until 100% of f'_c is attained, as specified Section 901.64: Protection from Adverse Weather.

6. Batching and Mixing.

Equipment, measurement, tolerances, procedures, sequencing, and batch ticketing used for the batching and mixing of cement concrete shall meet the applicable standards of AASHTO M 157 Standard Specification for Ready-Mixed Concrete, Concrete Plant Manufacturers Bureau (CPMB), Truck Mixer Manufacturers Bureau (TMMB), National Institute of Standards and Technology (NIST), and the requirements specified herein.

Weigh batch equipment shall be categorized as manual, partially automatic, semiautomatic, and fully automatic. Scales and volumetric devices for measuring quantities of constituent materials shall be calibrated for accuracy through certified field standard weights and product substitute loading. Scales shall be accurate to the greater of ±0.15% of the scale capacity or ±0.4% of the applied test load in all quarters of the scale capacity through its range of use. The accuracy of scales and batching equipment shall be inspected routinely and adjusted when necessary. Equipment shall be isolated from plant vibration. Automatic controls shall be protected from dust and weather. Scale and beam pivot points shall be routinely inspected and cleaned. Equipment shall operate within the specified batch-weight tolerances specified in Table M4.02.14-2. Equipment shall be made accessible to the Department for inspection.

Table M4.02.14-2: Allowable Batching Tolerances of Mix Design Target Weights

Specification	Constituent Material	Batch Weights > 30% of Scale Capacity		Batch Weights ≤ 30% of Scale Capacity	
		Individual Batching Tolerances	Cumulative Batching Tolerances	Individual Batching Tolerances	Cumulative Batching Tolerances
M 157	Hydraulic Cement (%)	±1.0 or ±0.3% of scale capacity, whichever is greater		Not less than required weight or 4% more than required weight	
	Hydraulic Cement + Supplementary Cementitious Materials (%)	±1.0 or ±0.3% of scale capacity, whichever is greater		Not less than required weight or 4% more than required weight	
	Aggregate (%)	±2.0	±1.0	±2.0	±3.0 or ±0.3% of scale capacity whichever is less
	Mixing Water (%)	±1.0	Prohibited	±1.0	Prohibited
	Chemical Admixtures (%)	±3.0	Prohibited	±3.0	Prohibited

Cement concrete shall be mixed by stationary mixers, truck mixers, volumetric (continuous) mixers, or portable mixers. Cement concrete shall be mixed thoroughly until the constituent materials are uniformly distributed. Mixers shall be adequately designed with blade or fin arrangements and drum shapes that ensure an end-to-end exchange of materials parallel to the axis of rotation or a rolling, folding, and spreading movement of the batch over itself as it is being mixed. Mixing blades shall be free of wear and hardened concrete.

Modifications to Department approved mix design formulations, including source of constituent materials, design quantities, mix type, combined aggregate system targets, paste system targets, slump targets, air content targets, and compressive strength targets shall be prohibited. However, if slump or air content test results are not within the specified design target ranges, the Fabricator is permitted to submit to the Department a request to review and approve proposed adjustments of chemical admixture dosages. At no point shall the total water or water-cementitious (w/cm) ratio exceed the approved mix design formulation targets. The Producer shall report the adjustments onto the batch ticket. Chemical admixture adjustments without Department approval shall be prohibited. Department approval is subject to performance at the plant, as well as conformance to the requirements specified herein.

7. Formwork.

Precast Concrete Highway Units shall meet Section 901.61: Forms, Falsework, and Centering and PCI Manual 116-21, Section 2.4 Forms/Molds. Precast concrete barrier shall be cast with the forms in a 180° inverted position and compacted with an approved vibrator.

8. Reinforcement.

Precast Concrete Highway Units shall meet Section 901.62: Reinforcement and the reinforcement materials requirements specified herein.

9. Handling and Placing of Concrete.

Precast Concrete Highway Units shall meet Section 901.63: Handling and Placing Concrete.

10. Finishing.

As-cast formed surface finishes shall be acceptable in appearance, color, and texture. Exposed unformed surface finishes shall be finished by screeding or floating, unless otherwise noted. Under no circumstances shall bleed water or initial curing materials be worked into the surface. The addition of water, spreading of cement, or the use of unacceptable tools, including steel trowels and fresnos to the surface of the concrete shall be prohibited. The concrete shall not be overworked, to prevent premature degradation from excess water and fine material rising to surface. Defects shall be addressed per Section M4.02.14,B.,15: Repairs and Replacement.

11. Final Curing.

Final curing materials, methods, and procedures shall be applied to all exposed cement concrete surfaces immediately after the completion of finishing operations and final set to prevent the loss of moisture and surface drying. Exposed surfaces from form removal shall be wetted immediately and kept moist until final curing materials are applied.

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. 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 US Army Corps of Engineers CRD-C401 Method of Test For The Staining Properties of Water for instances where curing water quality is questioned.

The Fabricator shall maintain a continuous application of moisture or moisture retention throughout the entire duration of the final curing method cycle and meet the minimum sustained ambient temperature, concrete temperature, duration, and strength requirements as specified herein. Controlled, gradual, and uniform termination of the final curing method cycle shall begin only 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.

Termination of final curing methods shall not occur until both the duration and compressive strength requirements are met, as specified in Table M4.02.14-2.

Table M4.02.14-3: Termination of Final Curing Method

Product Categories	Methods	Duration	Compressive Strength
Precast Concrete Highway Products (Excluding Barrier)	Form Cure[1]	–	≥ 70% of f'_c
Precast Concrete Barrier	Liquid Membrane-Forming Compounds[2] Saturated Covers Sheet Materials	≥ 3 Days	≥ 80% of f'_c
	Curing Water Nozzles	≥ 5 Days	

[1] Final curing materials, methods, and procedures shall be applied to all exposed surfaces not being cured by the form.

[2] If the liquid membrane-forming compound is to be removed due to compatibility or bonding concerns, removal shall not take place until the specified application duration is met.

Concrete cured by way of curing water nozzles, saturated covers, sheet materials, or liquid membrane-forming compounds shall be cured with sustained ambient temperatures greater than or equal to 40°F and less than or equal to 85°F.

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. Compressive strength cylinders for termination of curing cycle shall be cast and field cured with the same environmental conditions that the concrete is subjected to throughout the entire duration of the curing cycle.

All procedures, operations, materials, and equipment required for adequate curing shall be present and ready for use prior to concrete production.

a. Curing Water Nozzles.

Curing water nozzles shall provide the surface of cement concrete with a continuous fine spray of water.

b. Saturated Covers.

Saturated covers shall meet AASHTO M 182, Class 3. Saturated covers shall be in good condition, free from holes, tears, or other defects that would render it unsuitable for curing cement concrete. Saturated covers shall be dried to prevent mildew when storing. Saturated covers shall be of sufficient thickness to maximize moisture retention. Saturated covers shall be free of harmful substances that are deleterious or cause discoloration to cement concrete and cementitious materials. Saturated covers shall have the ability to retain sufficient moisture from continuous watering so that a film of water remains on the surface of cement concrete.

Prior to application, saturated covers shall be thoroughly rinsed in water and free of harmful substances that are deleterious or cause discoloration to cement concrete. The Fabricator shall maintain sufficient moisture with continuous watering so that a film of water remains on the surface of the cement concrete throughout the entire duration of the final curing method cycle. Saturated covers shall be properly positioned, secured, and maintained on the surface of the concrete to maximize moisture retention and to prevent moisture loss. The Fabricator shall prohibit saturated covers from drying out and prevent the absorption of curing water from the surface of the concrete. Polyethylene film may be applied over the saturated cover to limit the amount of continuous watering required for sufficient moisture retainage.

c. Sheet Materials.

Sheet materials shall meet ASTM C171 Standard Specification for Sheet Materials for Curing Concrete. Sheet materials shall inhibit moisture loss and reduce temperature rise in concrete exposed to radiation from the sun. Adjoining sheet materials shall overlap not less than 12 inches. All edges of the sheet materials shall be secured to maintain a moist environment.

(1) Polyethylene Film.

Polyethylene film shall be clear, white, or black in color and consist of a single sheet manufactured from polyethylene resins, be free of visible defects, including tears, wrinkles, and discontinuity. The film shall prohibit mottling and uneven spots from appearing on the surface of concrete, due to variations in temperature, moisture content, or both. Polyethylene film shall accommodate concrete surfaces with constant contact without damage. White polyethylene film shall minimize heat gain caused by absorption of solar radiation. Clear and black polyethylene films shall inhibit absorption of solar radiation and be exclusively applied during cold conditions.

The Fabricator shall prohibit mottling and uneven spots from appearing on the surface of concrete, due to variations in temperature, moisture content, or both. Application of additional curing water under the film or application of a polyethylene film bonded to absorbent fabric to the concrete surface may be required to prevent mottling and to retain and evenly distribute the moisture. The Polyethylene film shall be applied to concrete surfaces with constant contact without damage. The film shall extend beyond the edges of the concrete surface. Edges of adjacent polyethylene film shall overlap a minimum of 6 inches and be tightly sealed with the use of sand, wood planks, pressure-sensitive tape, mastic, or glue to maintain close contact with the concrete surface, retain moisture, and prevent the formation of air pockets.

(2) White Burlap-Polyethylene Sheeting.

White burlap-polyethylene sheeting shall be securely bonded to the burlap so to avoid separation of the materials during handling and curing of the concrete.

(3) Reinforced Impervious Paper.

Reinforced impervious paper shall be white in color, consist of two sheets of kraft paper cemented together with a bituminous adhesive, and reinforced with embedded cords or strands of fiber running in both directions. Reinforced impervious paper shall be free of holes, tears, and pin holes from deterioration of the paper through repeated use. Reinforced impervious paper shall be treated to prevent tearing when wetted and dried. Reuse of reinforced impervious paper shall be permitted so long as it is able to retain moisture on the surface of concrete. The paper shall be discarded and prohibited from use when moisture is no longer retained in the material.

d. Liquid Membrane-Forming Compounds.

Liquid membrane-forming compounds, including compounds with curing properties and compounds with both curing and sealing properties, shall maintain valid listing on the Department Qualified Construction Materials List (QCML) and meet the requirements specified herein.

Compounds shall form a continuous, non-yellowing, and durable film with quality moisture-retention properties. Compounds shall maintain the relative humidity of the concrete surface above 80% for greater than or equal to three (3) 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.

Liquid membrane-forming compounds shall be applied per the Manufacturer's instructions and recommendations as specified herein. Prior to use, compounds shall be thoroughly mixed, stirred, and agitated. Compounds shall be applied immediately after final finishing and the disappearance of the surface water sheen, but before the free water on the surface has evaporated, to prevent the formation of cracks and loss of moisture at the surface. Careful considerations shall be made by the 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. 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. 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.

When using compounds to reduce moisture loss from formed surfaces, the exposed surface shall be wetted immediately after form removal and kept moist until the compound is applied. The concrete shall be allowed to reach a uniformly damp appearance with no free water on the surface, and then application of the compound shall begin at once. Delayed application resulting in surface drying, absorption of the compound into the concrete, and forming of a discontinuous membrane shall be prohibited.

The concrete surface shall be damp when the compound is applied. Power-driven spray equipment shall be used for uniform application of compounds on large paving projects. Spray nozzles recommended by the compound Manufacturer and use of windshields shall be arranged by the Fabricator 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 Fabricator 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 Fabricator shall verify the application rate and procedures are in accordance with the Manufacturer's instructions and recommendations. At least one uniform coat shall be applied at a rate of 150 to 200 ft^2/gallon. On very deeply textured surfaces, the surface area to be treated shall be at least twice the surface area of the surface. In such cases, two separate applications may be needed, each at 200 ft^2/gallon or greater if specified by the Manufacturer to achieve the desired moisture retention rate, with the first being allowed to become tacky before the second is applied. If two coats are necessary to ensure complete coverage, for effective protection the second coat should be applied at right angles to the first. Complete coverage of the surface shall be attained due to the potential for formation of small pinholes in the membrane, which will result in loss of moisture from the concrete. Compounds shall not sag, run off peaks, or collect in grooves.

Compounds and procedures shall be compatible with concrete surfaces receiving subsequent applications or placements of concrete, overlays, coatings, paints, sealers, finishes or other toppings to ensure acceptable bonding to the concrete. Testing to establish compatibility among the curing compound, subsequent surface treatments, concrete moisture content and the actual finished surface texture of the concrete shall be conducted when compatibility is not known. The compound Manufacturer shall be consulted by the Fabricator 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.

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.

(1) Liquid Membrane-Forming Compounds for Curing.

Liquid membrane-forming compounds for curing shall meet ASTM C309 Standard Specifications for Liquid Membrane Forming Compounds for Curing Concrete and the requirements specified herein.

Table M4.02.14-4: Types

Type	Description
Type 1	Clear or translucent without dye
Type 1-D	Clear or translucent with fugitive dye
Type 2	White pigmented

Table M4.02.14-5: Composition Classification

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

(2) Liquid Membrane-Forming Compounds for Curing and Sealing.

Liquid membrane-forming compounds for curing and sealing shall meet ASTM C1315 Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete and the requirements specified herein. The protective sealing requirements specified in M4.02.14, .B.16 do not apply to cement concrete surfaces previously applied with liquid membrane-forming compounds for curing and sealing.

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 M4.02.14-6: Types

Type	Description
Type I	Clear or translucent
Type II	White pigmented

Table M4.02.14-7: Classification

Type	Description
Class A	Non-yellowing

12. Form Removal.

The Fabricator shall not remove forms from the concrete until compressive strength cylinders attain 70% of f'_c. Compressive strength cylinders for removal of forms shall be cast and field cured with the same environmental conditions that the concrete is subjected to throughout the entire duration of the operation. Immediately following form removal, all exposed concrete surfaces shall be prepared and cured per the requirements specified in.

13. Handling and Storage of Concrete Products.

Precast Concrete Highway Units shall not be handled until form removal strength has been attained. Concrete products 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. Concrete products shall be supported on the ground by means of continuous blocking, in conformance with the approved dunnage plan. The concrete shall be protected from all adverse conditions, including precipitation, cold conditions, and hot conditions, until 100% of f'_c is attained, as specified Section 901.64: Protection from Adverse Weather.

14. Primer and Damp-Proofing of Precast Concrete Drainage Structures.

The Fabricator shall apply primer and damp-proofing materials, methods, and procedures to the outside surface of the tapered or cone section of precast concrete drainage structures. Precast concrete drainage structures shall be damp-proofed in accordance with Section 970: Damp-Proofing.

15. Repairs and Replacement.

Defects identified during inspection shall be classified in the following categories and a non-conformance report (NCR) shall be initiated if required. The NCR shall be submitted to the Department for review and approval of the Fabricator's proposed NCR disposition. Defects shall be repaired per the approved NCR disposition, with approved materials listed on the MassDOT Qualified Construction Materials List (QCML), according to the PCI Northeast Region Guidelines for Resolution of Non-Conformances in Precast Concrete Bridge Elements, Report Number PCINE-18-RNPCBE, at the expense of the Contractor. Defects requiring Non-Conformance Report (NCR) submission shall be repaired in the presence of Department personnel. All defects regardless of category shall be documented by Quality Control personnel and made available to the Department upon request.

a. Category 1 Surface Defects.

Category 1 defects do not require repair or Non-Conformance Report (NCR) submission. However, documentation of the identified defects is required by the Fabricator. Surface defects are defined as the following:

(a) Surface voids or bug holes that are less than 0.625 inches in diameter and less than 0.250 inches in depth, except when classified as Category 3
(b) Cracks less than or equal to 0.006 inches in width

b. Category 2 Minor Defects.

Category 2 defects shall be documented. Repairs shall be documented, however, NCR submission is not required by the Fabricator. Minor defects are defined as the following:

(a) Spalls, honeycombing, surface voids that are less than 2 inches in depth and have no dimension greater than 12 inches
(b) Cracks greater than 0.006 inches and less than or equal to 0.060 inches in width (cracks shall be sealed according to the PCI Repair Procedure #14 in PCINE-18-RNPCBE)
(c) Broken or spalled corners without exposed reinforcing steel

c. Category 3 Rejectable Defects.

Category 3 defects may be cause for rejection, as determined by the Engineer. Category 3 defects shall be documented and reported on the NCR and submitted to the Department. The Fabricator may include proposed repair procedures on the submitted NCR for Department review. However, if the proposed repair procedures are not accepted by the Department, the Precast Concrete Highway Unit shall be rejected. If accepted, proposed repair procedures shall not takeplace prior to Department approval. Rejectable defects are defined as the following, including, but not limited to:

(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 f'_c

16. Protective Sealing Compounds for Precast Concrete Barrier.

The protective sealing requirements specified herein do not apply to cement concrete surfaces previously applied with liquid membrane-forming compounds for curing and sealing.

Protective sealing compounds meeting Section M9.15.0: Liquid Penetrant/Sealant shall be applied to precast concrete barrier per the Manufacturer's instructions and recommendations as specified herein. Protective sealing compounds shall not be applied to concrete while conditions meeting Section 901.64: Protection from Adverse Weather are present.

Curing materials, methods, and procedures shall be applied to the concrete prior to the application of protective sealing compounds. The surface shall be sufficiently prepared, clean, and dry for at least 24 hours with ambient temperatures exceeding 60°F. Protective sealing compounds shall not be applied to the concrete for a minimum of 28 days after the concrete is poured, unless otherwise noted in the manufacturer's instructions and recommendations. Periodic re-application shall be required for protective sealing compounds requiring multiple applications and for concrete surfaces exhibiting wear to ensure long-term protection of the concrete surface.

17. Prior to Loading.

Prior to the loading the concrete product on to the truck for shipping, the Fabricator shall provide the MassDOT Plant Inspector and RMS a minimum seven-day notice of the Fabricator's intent to load the concrete product. Inspection by the MassDOT Plant Inspector shall take place while the element is still on dunnage in the yard. The unit shall not be loaded onto the truck until the MassDOT Plant Inspector has performed the inspection.

18. Loading.

Concrete products shall be loaded on a trailer with continuous blocking, in accordance with the approved dunnage plan. Shock-absorbing cushioning material shall be used at all bearing points. Blocking shall be provided at all locations of tie-down straps. Concrete products shall not be subjected to damaging torsional or impact stresses.

19. Shipping.

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

(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 Department 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 the Department Inspector and/or MassDOT RMS.
(g) QC Inspection Stamp shall be applied to each unit after loading.

20. Delivery.

Upon Delivery, the following documentation shall be provided to the Engineer:

(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 the concrete product upon receipt at the site. Concrete products damaged during delivery shall be repaired or replaced per the Department direction, at the Contractor's expense.

C. Quality Assurance.

Quality Assurance is the planned and systematic actions necessary to provide confidence that a product or facility will perform satisfactorily in service. The Quality Assurance Program is comprised of the six core elements including Contractor Quality Control, Department Acceptance, Independent Assurance, Dispute Resolution, Laboratory Accreditation and Qualification, Personnel Qualification and Certification. The Fabricator shall conduct Quality Control (QC) and the Department will conduct Acceptance throughout the fabrication process, independently from one another.

The quality of the material or product shall be determined through quality measurements from sampling, testing, and inspection. The sampling population for quality measurements shall be comprised of lots and sublots. A lot shall be defined as a specific quantity of material from a single source which is assumed to be produced or placed by the same controlled process. Lots shall be used to represent the population of the produced material and constructed product. The lot size shall be the specified quantity of material produced and placed. A sublot shall be defined as a subdivision of a lot. Sublots shall be used to assess the inspection attributes and quality characteristics of the lot. The sublot size shall be the specified subdivision of quantity for a given lot.

The sampling population for testing and inspection shall be randomly sampled in accordance with ASTM D3665 Standard Practice for Random Sampling of Construction Materials. Random sampling is defined as a small quantity of material or measurement obtained from a lot or sublot, whereby each sample obtained from the lot or sublot has an equal probability of being selected. Selective (non-random) sampling may also be conducted to provide supplemental information to assist in maintaining control of all production and placement processes. Selective sampling shall not replace random sampling and shall not be used in the Department Acceptance decision.

1. Fabricator Quality Control.

Quality Control (QC) shall be established, maintained, and performed by the Fabricator to monitor, assess, and adjust manufacturing, production, fabrication, and construction processes, to maintain continuous control of the process, and to ensure that the final material or product will meet the specified level of quality, through:

(a) Implementation of the Department approved Quality System Manual (QSM)
(b) Proper Quality Control organization
(c) Qualified Production Personnel, including equipment operators and craftsmen incorporated into the manufacturing, production, fabrication, and construction operations
(d) Certified Quality Control Technicians and Quality Control Managers
(e) Qualified Quality Control laboratory through the NETTCP Laboratory Qualification Program or accredited through the AASHTO Accreditation Program (AAP)
(f) Routine QC inspection of equipment, environmental conditions, materials, and workmanship
(g) Routine QC sampling and testing of material quality characteristics and properties
(h) Timely analysis of QC results, through statistical analysis (mean, standard deviation, etc), control charts, and conformance to allowable limits
(i) Immediate initiation of non-conformance reporting and corrective action for non-conforming inspection results, uncontrolled processes, and materials with test results not within allowable limits
(j) Retention of QC records
(k) Conformance to specifications

a. Quality Control Operating Documents.

Quality Control operating documents shall be prepared, implemented, and maintained by the Fabricator and submitted to the Department for review and approval prior to the start of fabrication. The Fabricator shall adhere to all policies, practices, procedures, and activities identified in the following Department approved Quality Control operating documents.

(1) Quality System Manual.

The Fabricator shall submit a Quality System Manual (QSM) for Department review and approval. The Quality System Manual (QSM) shall document the overall internal Quality Control operating procedures of the Producer's Quality Control System and meet AASHTO R 18 Standard Recommended Practice for Establishing and Implementing a Quality Management System for Construction Materials Testing Laboratories, AASHTO R 38 Standard Practice for Quality Assurance of Standard Manufactured Materials, and the requirements specified by the Department.

(2) Quality Control Plans for Contract Work Items.

When applicable, a Quality Control Plan (QCP) shall be prepared for each contract work item by the Fabricator to document all Quality Control personnel and procedures utilized to maintain control of all production and placement processes. The Quality Control Plan for each contract work item shall meet the NorthEast Transportation Training and Certification Program (NETTCP) Model Quality Control Plan standard format and requirements specified by the Department.

b. Fabricator Plant Certification.

At a minimum, the Fabricator shall maintain an active National Precast Concrete Association (NPCA) Plant Certification or Precast/Prestressed Concrete (PCI) Plant Certification.

c. Quality Control Laboratory.

The Fabricator shall have all required sampling, testing, and inspection equipment on site and available for use during all phases of fabrication. The equipment shall meet all applicable AASHTO or ASTM standards, maintain required calibration schedules, and be in acceptable working condition.

The Fabricator shall provide a room of sufficient size to house all equipment and to adequately perform all required testing. The room 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.

d. Quality Control Organization.

The Fabricator's Quality Control organization shall be comprised of trained, experienced, and qualified Production Personnel, Quality Control Technicians, and Quality Control Managers at the Fabricator's plant, per NPCA and/or PCI and as specified herein. Production Personnel, Quality Control Technicians, and Quality Control Managers shall maintain continuous communication to ensure conformance to specification requirements and to dictate corrective action for non-conformance.

(1) Production Personnel.

Production Personnel that are directly responsible for the fabrication of Precast Concrete Highway Units shall be comprised of sufficiently trained, qualified, and experienced craftsmen, equipment operators, foremen, and superintendents. Best practices meeting Department recognized standards, organizations, and programs and requirements specified herein shall be performed by Production Personnel throughout the entire fabrication process.

In addition to the fabrication activities, Production Personnel shall perform continuous self-inspection throughout the entire construction operation, to ensure quality workmanship is performed, through observation and verification of:

(a) Proper tools and equipment are utilized to perform the work
(b) Routine maintenance, calibration, and cleaning of tools and equipment is performed
(c) Proper procedures for shipping, handling, and storage of materials are performed
(d) Best practices for workmanship are incorporated throughout the construction operation
(e) Quality appearance of finished material or product

Production Personnel shall be capable of identifying unacceptable materials and products prior to completing the construction operation and shall notify potential non-conformances to the Quality Control Technicians and Quality Control Manager. The Fabricator shall provide continual education, training, and qualification opportunities to Production Personnel to promote quality workmanship practices.

(2) Quality Control Technicians.

Each Quality Control Technician shall be sufficiently trained, qualified, and certified through Department recognized qualification and certification programs or through relevant experience acceptable to the Department.

The Fabricator's Quality Control organization shall include an acceptable number of experienced, trained, and qualified Quality Control Technicians at the Production Facility. The number of Quality Control Technicians shall be determined according to the size of the production operation and the volume of material or product manufactured, produced, or fabricated for each work item. The principle responsibilities of each Production Facility Quality Control Technician include:

(a) Performing Quality Control sampling, testing, and inspection at the production facility
(b) Preparing and signing standard Quality Control test and inspection report forms
(c) Providing routine feedback based on sampling, testing, and inspection results to the Production Personnel, Production Facility Quality Control Manager, and Prime Contractor Quality Control Manager

At a minimum, Quality Control Technicians shall maintain an active American Concrete Institute (ACI) Concrete Field Testing Technician – Grade I certification and Concrete Strength Testing Technician certification. Quality Control Technicians shall be on site and present during all phases of fabrication.

(3) Quality Control Manager.

The principal responsibilities of each Quality Control Manager shall include:

(a) Establishing the Quality Control system in accordance with the company's Quality System Manual (QSM)
(b) Preparing Quality Control Plans (if applicable)
(c) Managing and monitoring the activities of Quality Control technicians
(d) Communicating routinely with production personnel
(e) Initiating work suspension and corrective action in instances where materials or products are non-conforming or a process is not in control.
(f) Ensuring proper Quality Control documentation and records retention

At a minimum, the Fabricator's Quality Control Manager shall meet the following requirements:

(a) Maintain an active ACI Concrete Field Testing Technician – Grade I Certification
(b) Maintain an active NETTCP Quality Assurance Technician Certification
(c) A minimum of six (6) months continuous experience in the fabrication of precast concrete highway products

Quality Control Managers shall be employed full-time (or engaged consultants), on site, and present during all phases of fabrication.

e. Quality Control Inspection.

Quality Control inspection shall be performed by qualified Production Personnel and Quality Control Technicians to visually inspect equipment, environmental conditions, materials, and workmanship, per the Department approved Quality Control documents and specified herein. The results and findings of QC inspection shall be documented on the Fabricator's Inspection Report Forms (IRFs). The Fabricator shall conduct immediate initiation of non-conformance reporting and corrective action for non-conforming inspection results and uncontrolled processes.

f. Quality Control Sampling and Testing.

Quality Control sampling and testing shall be performed and reported by qualified Quality Control Technicians, to provide measurement of properties and quality characteristics of the material, to determine the degree of uniformity or the measured variability of materials or products, to monitor the quality and acceptability of the material or product, and to evaluate the control during the production or placement process, per the Department approved Quality Control documents and specified herein. The minimum QC sampling and testing activities shall be in accordance with the requirements specified herein. The results and findings of QC sampling and testing shall be documented on the Fabricator's Test Report Forms (TRFs). The Fabricator shall conduct immediate initiation of non-conformance reporting and corrective action for materials with test results not within allowable limits.

(1) Aggregate Sampling and Testing.

The Fabricator shall conduct routine Quality Control sampling and testing of aggregate quality characteristics and properties, to ensure uniformity and consistency of the material per the requirements specified herein.

Table M4.02.14-8: QC Sampling and Testing Requirements for Aggregate

Method	Quality Characteristic
T 27	Particle Size Distribution
T 84 T 85	Bulk Specific Gravity Dry
	Bulk Specific Gravity SSD
	Apparent Specific Gravity
	Absorption (%)
T 19	Unit Weight (lb / ft^3)
	Aggregate Void Content (%)
T 255	Moisture Content (%)

(2) Concrete Production Sampling and Testing.

Quality Control sampling and testing shall be conducted during production per the minimum requirements specified herein. Production test results shall be within the limits specified herein.

Table M4.02.14-9: QC Sampling and Testing Frequency During Concrete Production

Lot Size	Sublot Size	Frequency
Total quantity of concrete (cy) produced in a year, per approved mix design formulation	50 cy	One (1) per sublot or fraction thereof, minimum One (1) per day

Table M4.02.14-10: QC Sampling and Testing Requirements During Production

Property	Method	Quality Characteristic		Limits	
				Min.	Max.
Uniformity	M 157[1]	Batching Quantities of Constituent Materials		Table M4.07.0-4	
	T 119[2][3]	Slump (in.)	< 4 in.	Target -1.0	Target +1.0
			4 – 8 in.	Target -1.5	Target +1.5
	T 121[2]	Unit Weight (lb/ft^3)		For Information	
Workability	T 119[4]	Segregation Resistance		Pass	
Filling Ability	T 347[2][5]	Slump Flow (in.)	22.0 – 29.0 in.[6]	Target -2.0	Target +2.0
Thermal	T 309	Concrete Temperature (°F)		50	90
Strength	T 22[2][7]	Compressive Strength (psi)	Form Removal	70% of f'_c[8][9]	–
			Storage in Adverse Conditions	f'_c[8]	–
			28 Days	f'_c[8]	–
			56 Days	f'_c[8][9]	–
Durability	T 121[2] T 152[2] T 196[2]	Air Content (%)		Target -1.5	Target +1.5

[1] Batch tickets shall be provided to the Department by the Producer. Producers shall report the source, type, quantity, and design target for each constituent material incorporated into the proposed mix design onto batch tickets meeting AASHTO M 157 Standard Specification for Ready-Mixed Concrete.

[2] Mix design target shall be identified on the Department issued cement concrete mix design sheet.

[3] Required for non-self-consolidating concrete (SCC).

[4] Required for non-self-consolidating concrete (SCC). 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.

[5] Required for Self-Consolidating Concrete (SCC).

[6] Mix design target and production test results shall meet the specified range.

[7] Three (3) 4 x 8 in. cylinders shall be cast and tested for each set specified for maximum aggregate size less than 1-1/2 inches. Two (2) 6 x 12 in. cylinders shall be cast and tested for each set specified for maximum aggregate size greater than 1 inch.

[8] The specified compressive strength (f'c) is defined as the minimum compressive strength required to be attained at a specified age for a given concrete structure, as specified in construction standard specifications, contract document special provisions, and design plans.

[9] In instances where the 28-Day test results do not meet the specified limits, 56-Day test results shall meet the 28-Day limits.

g. Quality Control Records, Documentation, and Analysis.

The Fabricator shall organize, maintain, and retain Quality Control documentation, including the Quality System Manual, Quality Control Plans for contract work items, plant certification records, personnel qualification and certification records, laboratory accreditation and certification records, daily diaries, record books, databases, Department and Contractor correspondence, random sampling location report forms, test report forms, inspection report forms, certificates of compliance, non-conformance report forms, corrective actions, control charts, quality level analysis, Quality Control test result summary sheets, material quantities produced or placed by lot and sublot, and other Quality Control documentation per the Department Approved Quality System Manual, Quality Control Plan, and specified herein.

At a minimum, the Fabricator shall maintain a filing system for the following QC records and documentation:

(a) Plant Certification
(b) QC Laboratory NETTCP Qualification or AASHTO Accreditation
(c) Qualifications and Certifications for QC Manager(s) and QC Technician(s)
(d) Approved Quality System Manual (QSM)
(e) Approved Quality Control Plan (if applicable)
(f) MassDOT Approved Mix Design Sheet(s) and Approval Letter(s)
(g) MassDOT Standard Shop Drawings
(h) MassDOT Approved Shop Drawings
(i) Manufacturer's Technical Data Sheet for each chemical admixture
(j) Manufacturer's Mill Certification for hydraulic cement, supplementary cementitious materials, and steel reinforcement
(k) Batch tickets
(l) QC Inspection Report Forms (IRFs) for each fabricated concrete product
(m) QC Test Report Forms (TRFs)
(n) Non-Conformance Reports (NCRs)
(o) Documentation of Repairs (if applicable)
(p) Fabricator Certificate of Compliance (Division I, Subsection 6.01) for each fabricated concrete product
(q) QC and Production equipment calibrations, verifications, and maintenance documentation.

All QC records and documentation shall be made available upon the request of the Department.

2. Department Acceptance.

Acceptance shall be performed by the Department, including consultants under direct contract with the Department independent of the Fabricator, to evaluate the degree of compliance with contract requirements, to monitor the Fabricator's Quality Control activities, to determine the corresponding value for a given product and the acceptability of all material produced and placed through Department acceptance sampling, testing, inspection, evaluation, and documentation.

a. Acceptance of Quality Control Operating Documents.

The Department will review all Quality Control operating documents, including the Quality System Manual and Quality Control Plans for contract work items submitted by the Fabricator. Department approval shall be subject to conformance with the requirements specified herein.

b. Monitoring Fabricator Quality Control.

The Department will monitor the adequacy of the Fabricator Quality Control System, to ensure Fabricator compliance to all items identified in Quality Control documents, including the Fabricator Quality System Manual and Quality Control Plans for contract work items. Failure to comply with these Quality Control documents may result in work suspension.

c. Acceptance Inspection.

Acceptance inspection will be performed and reported by qualified Department (or designee) Acceptance Technicians, to visually inspect equipment, environmental conditions, materials, and workmanship, per the requirements specified herein. The results and findings of Acceptance inspection will be documented on the Department's Inspection Report Forms (IRFs). The Department will conduct immediate initiation of non-conformance reporting for non-conforming inspection results and uncontrolled processes.

d. 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. The results and findings of Acceptance sampling and testing will be documented on the Department's Test Report Forms (TRFs). The Department will conduct immediate initiation of non-conformance reporting and corrective action for materials with test results not within allowable limits.

(1) Concrete Production Sampling and Testing.

Acceptance sampling and testing will be conducted during production per the minimum requirements specified herein. Production test results shall be within the limits specified herein.

Table M4.02.14-11: Acceptance Sampling and Testing Frequency During Concrete Production

Lot Size	Sublot Size	Frequency
Total quantity of concrete (cy) produced in a year, per approved mix design formulation	50 cy	One (1) per sublot or fraction thereof, minimum One (1) per day

Table M4.02.14-12: Acceptance Sampling and Testing Requirements During Production

Property	Method	Quality Characteristic		Limits	
				Min.	Max.
Uniformity	M 157[1]	Batching Quantities of Constituent Materials		Table M4.08.0-1	
	T 119[2][3]	Slump (in.)	< 4 in.	Target -1.0	Target +1.0
			4 – 8 in.	Target -1.5	Target +1.5
	T 121[2]	Unit Weight (lb/ft^3)		For Information	
Workability	T 119[4]	Segregation Resistance		Pass	
Filling Ability	T 347[2][5]	Slump Flow (in.)	22.0 – 29.0 in.[6]	Target -2.0	Target +2.0
Thermal	T 309	Concrete Temperature (°F)		50	90
Strength	T 22[2][7]	Compressive Strength (psi)	7 Days	–	–
			28 Days	f'_c[8]	–
			56 Days	f'_c[8][9]	–
Durability	T 121[2] T 152[2] T 196[2]	Air Content (%)		Target -1.5	Target +1.5

[1] Batch tickets shall be provided to the Department by the Cement Concrete Producer. Producers shall report the source, type, quantity, and design target for each constituent material incorporated into the proposed mix design onto batch tickets meeting AASHTO M 157 Standard Specification for Ready-Mixed Concrete.

[2] Mix design target shall be identified on the Department issued cement concrete mix design sheet.

[3] Required for non-self-consolidating concrete (SCC).

[4] Required for non-self-consolidating concrete (SCC). 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.

[5] Required for Self-Consolidating Concrete (SCC).

[6] Mix design target and production test results shall meet the specified range.

[7] Three (3) 4 x 8 in. cylinders shall be cast for each set specified for maximum aggregate size less than 1-1/2 inches. Two (2) 6 x 12 in. cylinders shall be cast for each set specified for maximum aggregate size greater than 1 inch.

[8] The specified compressive strength (f'_c) is defined as the minimum compressive strength required to be attained at a specified age for a given concrete structure, as specified in construction standard specifications, contract document special provisions, and design plans.

[9] In instances where the 28-Day test results do not meet the specified limits, 56-Day test results shall meet the 28-Day limits.

Subsection M4.02.16: Precast Drainage Structures
Delete this subsection.

Subsection M4.06.1: High Performance Cement Concrete
Replace this subsection with the following;

M4.06.1: High Performance Concrete

High Performance (HP) Concrete shall meet the requirements of M4: Cement and Cement Concrete Materials and the requirements specified herein. HP Concrete shall be designed and produced with precise proportions of constituent materials to form a homogenous composition with a well distributed, spaced, and sized air void system and quality concrete properties. HP Concrete shall exhibit acceptable quality characteristics and material properties, including uniformity, workability, bleeding and settlement, setting, thermal effects, shrinkage control, strength, modulus of elasticity, aesthetics, long-term durability, and resistance to premature deterioration due to freezing, thawing, and de-icing cycles, alkali silica reaction, corrosion of steel reinforcement, abrasion, erosion, sulfate reaction, salt crystallization, acid disintegration, carbonation reaction, delayed ettringite formation, and marine environments for the expected service life of the structure.

The Contractor may elect to use fly ash, slag cement, silica fume, or a combination thereof provided that the dosage limits, permeability, and strength provisions contained herein are satisfied and the MassDOT Research and Materials Section (RMS) has approved the trial batches and mix design. Changing the mix design shall not be accepted and approved by RMS without the preparing, testing, and approval of trial batches for the revised mix design. HP Concrete shall meet AASHTO M 157 Standard Specification for Ready-Mixed Concrete.

Table M4.06.1-1: Classifications of HP Concrete

28 Day Compressive Strength	Nominal Maximum Coarse Aggregate Size (in.)	Maximum Total Cementitious Content (lb per yd^3)
4,000 psi	¾	585
4,000 psi	⅜	610
5,000 psi	¾	685
5,000 psi	⅜	710
6,500 psi	⅜, ½, ¾	–
8,000 psi	⅜, ½, ¾	–

Prior to concrete placement, the Contractor shall develop and forward a copy of the HP Concrete design mix to the Department for review and approval. Approval of the design mix must be obtained prior to placement of concrete. The mix design sent to the Department must be accompanied with trial batch information. Trial batches shall be performed in accordance with procedures outlined by the Department.

Trial batch testing will be performed on samples of the same contents and proportions as the HP Concrete to be used in the proposed structures. AASHTO T 358 Standard Method of Test for Surface Resistivity Indication of Concrete's Ability to Resist Chloride Ion Penetration or AASHTO TP 119 Standard Method of Test for Electrical Resistivity of a Concrete Cylinder Tested in a Uniaxial Resistance Test shall be conducted and meet the requirements specified in Table M4.06.1-2.

Table M4.06.1-2: Durability Requirements

Property	Method	Quality Characteristic		Limits	
				Min.	**Max.**
Durability	T 358[1][2][3]	Surface Chloride Ion Penetration Resistance (kΩ-cm)	7 Days	Informational	
			28 Days	21	–
	Or				
	TP 119[1][2][3]	Uniaxial Chloride Ion Penetration Resistance (kΩ-cm)	7 Days	Informational	
			28 Days	10.4	–

[1] Three 4 x 8 in. cylinders shall be cast for each set specified.

[2] This test method has been known to have compatibility issues with mix designs containing calcium nitrite chemical admixtures or steel fibers. As a result, inclusion of these materials into the test specimens may negatively affect test results. An additional set of cylinders shall be cast and tested without the noted materials. The calcium nitrite shall be replaced by an equivalent quantity of water. A correction factor shall be determined by the following equation:

$$CF = PR_{REMOVED} / PR_{MIX\ DESIGN}$$

where $PR_{REMOVED}$ = Penetration Resistivity with noted materials removed, $PR_{MIX\ DESIGN}$ = Penetration Resistivity of original mix design with noted materials included, and CF = Correction Factor. The correction factor established during the mix design verification shall be applied to the penetration resistivity test results to compensate for the noted materials. The corrected penetration resistivity ($PR_{CORRECTED}$) shall be determined by the following equation and meet the specified limits identified in the table:

$$PR_{CORRECTED} = PR_{MIX\ DESIGN} * CF$$

[3] Specimens shall be moist cured in accordance with AASHTO T 22 Standard Method of Test for Compressive Strength of Cylindrical Concrete Specimens and shall be in saturated surface dry (SSD) condition during testing.

A. Supplementary Cementitious Materials.

High Performance Concrete shall meet the supplementary cementitious materials (SCM) requirements specified in Section M4 and the content target requirements specified in Table M4.06.1-3. SCMs shall be incorporated into the mix design formulation to successfully mitigate alkali silica reaction (ASR) without exceeding the SCM content requirements. High Performance Concrete shall meet the ASR requirements specified in Section M4.02.00: Cement Concrete. SCM content is defined as the percent by mass replacement of hydraulic cement.

Table M4.06.1-3: SCM Content Target

Supplementary Cementitious Material	SCM Content
Blended Hydraulic Cement Content[1]	[2]
Fly Ash (Class F) Content	15 – 30
Slag Content	20 – 50
Silica Fume Content	7 – 15
Total Fly Ash and Silica Fume Content	≤ 35
Total SCM Content	≤ 50

[1] The SCM content of blended hydraulic cement shall be identified on the Manufacturer's certified mill test report.

[2] SCMs in blended hydraulic cement shall meet the total cementitious material requirements for fly ash, slag, and silica fume specified in the table.

B. Water-Cementitious Ratio.

The water-cementitious ratio shall be 0.40 maximum. The water content of all additives shall be included in the water-cementitious ratio.

C. Air Content.

Cement concrete shall meet the air content targets specified in Section M4.02.00, Table M4.02.06-1: Air Content Target.

D. Chemical Admixtures.

Chemical admixtures incorporated into cement concrete shall meet Section M4.02.05: Chemical Admixtures and be precisely dosed per admixture manufacturer recommendations to meet the required properties of HP Concrete.

HP Concrete shall be formulated with 3.0 gal of corrosion inhibiting admixture per yd^3 of concrete in order to increase the active corrosion threshold to 9.9 lb of chloride per yd^3 of concrete at the reinforcing bar level. Acceptance will depend upon the material's conformance, as documented by certified test results, to all applicable sections of AASHTO M 194M/M 194. The calcium nitrite solution shall contain 30 ± 2% calcium nitrite by weight. The calcium nitrite material shall have neutral set characteristics.

E. Paste and Void Content.

HP Concrete shall be designed with a paste content that decreases the tendency of shrinkage cracking, while also adequately filling the voids of the concrete to provide sufficient separation and effective bonding between the aggregate particles. HP Concrete shall meet Table M4.06.1-4.

Table M4.06.1-4: Paste and Void Content Target

Property	Design Parameter	Target
Shrinkage Resistance	Paste Content Target (%)	≤ 30[1][2]
Workability	Paste Content to Void Content (PC/VC) Ratio	1.1 – 1.75[2]
[1] Not applicable to mix design formulations incorporating sufficiently designed dosages of S-SRA Shrinkage Reducing or Type S-CRA Crack Reducing chemical admixtures meeting Section M4.05.0. [2] Not applicable to specialized mix design formulations, including self-consolidating concrete.		

Section M4.06.2: High Early Strength Concrete
Add this new subsection:

M4.06.2: High Early Strength Concrete

High Early Strength Concrete shall meet the requirements of Section M4: Cement and Cement Concrete Materials and the requirements specified herein. High Early Strength Concrete shall meet the requirements specified in Table M4.06.2-1.

Table M4.06.2-1: Verification Testing Requirements

Property	Method	Quality Characteristic		Limits	
				Min.	Max.
Strength	AASHTO T 22[1]	Compressive Strength (psi)	12 Hours	Informational	
			24 Hours	2500	–
			3 Days	4000	–
			7 Days	5000	–
			28 Days	Informational	
	AASHTO T 97[2]	Flexural Strength (psi)	12 Hours	Informational	
			24 Hours	400	–
			3 Days	550	–
			7 Days	650	–
			28 Days	Informational	
	ASTM C882[3]	Slant Sheared Bond Strength (psi)	24 Hours	1200	–
			7 Days	1900	–
			28 Days	2200	–
Setting	AASHTO T 197	Initial Set (min.)		Informational	
		Final Set (min.)		Informational	
Shrinkage Cracking Resistance [5]	AASHTO T 160[4]	Unrestrained Volume Change (με)	28 Days	–	420
	ASTM C1581[6]	Restrained Shrinkage	28 Days	No Cracking[7]	
	Or				
	AASHTO T 363[8]	Restrained Shrinkage (psi)	7 Days	–	0.6T[9]
Durability	AASHTO T 358[1][10]	Surface Chloride Ion Penetration Resistance (kΩ-cm)	7 Days	Informational	
			28 Days	21	–
	Or				
	AASHTO TP 119[1][10]	Uniaxial Chloride Ion Penetration Resistance (kΩ-cm)	7 Days	Informational	
			28 Days	10.4	–

[1] Three (3) 4 x 8 in. cylinders shall be cast and tested for each age specified for maximum aggregate size less than 1-1/2 inches. Two (2) 6 x 12 in. cylinders shall be cast and tested for each age specified for maximum aggregate size greater than 1 inch.

[2] For applications where the concrete is subject to flexural stresses: Two (2) 6 x 6 x 20 in. beams shall be cast for each age specified.

[3] For applications where bond strength is desired.

[4] For applications where the concrete is not subject to restraining stresses.

[5] Not applicable to mix design formulations incorporating sufficiently designed dosages of Type S-SRA Shrinkage Reducing or Type S-CRA Crack Reducing chemical admixtures meeting Section M4.02.05.

[6] For nominal maximum aggregate sizes less than or equal to 1/2 in and for applications where the concrete is subject to restraining stresses.

[7] Cracking is defined as the sudden decrease in compressive strain greater than 30 με.

[8] For any nominal maximum aggregate size and for applications where the concrete is subject to restraining stresses. The circumferential residual stress in the specimen at the inner face of the specimen (σθ(RIC)) shall be calculated according to AASHTO T 363.

[9] The splitting tensile strength (T) at 28 days shall be determined by AASHTO T 198 Standard Method of Test for Splitting Tensile Strength of Cylindrical Concrete Specimens.

[10] Specimens shall be moist cured in accordance with AASHTO T 22 Standard Method of Test for Compressive Strength of Cylindrical Concrete Specimens and shall be in saturated surface dry (SSD) condition during testing.

Section M4.06.3: Rapid Hardening Concrete
Add this new subsection:

M4.06.3: Rapid Hardening Concrete

Rapid Hardening Concrete shall meet the requirements of M4: Cement and Cement Concrete Materials and the requirements specified herein. Rapid Hardening Concrete shall meet the requirements specified in Table M4.06.3-1.

Table M4.06.3-1: Verification Testing Requirements

Property	Method	Quality Characteristic		Limits	
				Min.	Max.
Strength	AASHTO T 22[1]	Compressive Strength (psi)	2 Hours	Informational	
			4 Hours	2500	–
			6 Hours	Informational	
			24 Hours	4000	–
			7 Days	5000	–
			28 Days	Informational	
	AASHTO T 97[2]	Flexural Strength (psi)	2 Hours	Informational	
			4 Hours	400	–
			6 Hours	Informational	
			24 Hours	550	–
			7 Days	650	–
			28 Days	Informational	
	ASTM C882[3]	Slant Sheared Bond Strength (psi)	24 Hours	1200	–
			7 Days	1900	–
			28 Days	2200	–
Setting	AASHTO T 197	Initial Set (min.)		Informational	
		Final Set (min.)		Informational	
Shrinkage Cracking Resistance	AASHTO T 160[4]	Unrestrained Volume Change (με)	28 Days	–	420
	ASTM C1581[5]	Restrained Shrinkage	28 Days	No Cracking[6]	
	Or				

	AASHTO T 363[7]	Restrained Shrinkage (psi)	7 Days	–	0.6T[8
Durability	AASHTO T 358[1][9]	Surface Chloride Ion Penetration Resistance (kΩ-cm)	7 Days	Informational	
			28 Days	21	–
	Or				
	AASHTO TP 119[1][9]	Uniaxial Chloride Ion Penetration Resistance (kΩ-cm)	7 Days	Informational	
			28 Days	10.4	–

[1] Three (3) 4 x 8 in. cylinders shall be cast and tested for each age specified for maximum aggregate size less than 1-1/2 inches. Two (2) 6 x 12 in. cylinders shall be cast and tested for each age specified for maximum aggregate size greater than 1 inch.

[2] For applications where the concrete is subject to flexural stresses: Two (2) 6 x 6 x 20 in. beams shall be cast for each age specified.

[3] For applications where bond strength is desired.

[4] For applications where the concrete is not subject to restraining stresses.

[5] For nominal maximum aggregate sizes less than or equal to 1/2 in and for applications where the concrete is subject to restraining stresses.

[6] Cracking is defined as the sudden decrease in compressive strain greater than 30 με.

[7] For any nominal maximum aggregate size and for applications where the concrete is subject to restraining stresses. The circumferential residual stress in the specimen at the inner face of the specimen (σθ(RIC)) shall be calculated according to AASHTO T 363.

[8] The splitting tensile strength (T) at 28 days shall be determined by AASHTO T 198 Standard Method of Test for Splitting Tensile Strength of Cylindrical Concrete Specimens.

[9] Specimens shall be moist cured in accordance with AASHTO T 22 Standard Method of Test for Compressive Strength of Cylindrical Concrete Specimens and shall be in saturated surface dry (SSD) condition during testing.

Section M4.06.2: Lightweight High Early Strength Concrete
Add this new subsection:

M4.06.4: Lightweight Concrete

Lightweight Concrete shall meet the requirements of Section M4: Cement and Cement Concrete Materials and the requirements specified herein. Lightweight Concrete shall be formulated with lightweight aggregate meeting Section M4.02.03: Lightweight Aggregates. Lightweight Concrete shall meet the requirements specified in Table M4.06.4-1.

Table M4.06.4-1: Verification Testing Requirements

Property	Method	Quality Characteristic	Limits	
			Min.	Max.
Unit Weight	ASTM C567	Calculated Equilibrium Density, E_c (lb/ft^3)[1]	–	115.0
[1] Measured Oven Dry Density (O_m) shall be used for Calculated Equilibrium Density (E_c).				

SECTION M7: PAINTS, PROTECTIVE COATINGS AND PAVEMENT MARKINGS

Section M7.00.0: General Requirements for Paints and Protective Coatings
Replace this subsection with the following:

All paint shall conform to the following general requirements.

1. Materials.

The raw materials used in the following specifications for paints and protective coatings shall conform to the ASTM or AASHTO specifications.

2. Proportions.

Paint proportions and percentages given in the following specification are expressed by weight.

3. Condition in the container.

Paint and protective coatings shall be homogeneous, free of contaminant and of a consistency suitable for use in the capacity for which it is specified. The finished product shall be well ground and the pigment shall be properly dispersed and suspended in the vehicle according to the requirements of the paint or protective coating. The dispersion shall be of such nature that the pigment does not settle badly, does not cake or thicken in the container, and does not become granular, jelled or curdled. Any settlement of pigment in the paint or protective coating shall be a thoroughly wetted soft mushy mass permitting the complete and easy vertical penetration of a paddle. Settled pigment shall be easily dispersed, with a minimum resistance to the sidewise manual motion of the paddle across the bottom of the container, to form a smooth uniform product of the proper consistency.

4. Packaging.

The finished paint or protective coating shall be furnished in new 5-gal, round, non-tapered containers. The containers shall meet U.S. Department of Transportation Hazardous Materials Shipping Regulations.

The following information shall be labeled on each container in a clear legible manner:

a) Name of Manufacturer
b) Place of Manufacture
c) Manufacturer's Batch Number
d) MassDOT Specification Number
e) Date of Manufacture

Precautions concerning the handling and the application of the paint or protective coating shall be shown on the label.

5. Testing.

Testing of paints will be done by the Department in accordance with the methods of Federal Test Method Standard Number 141, AASHTO and ASTM methods described below.

In addition, the Department reserves the right to make use of any information or methods of testing to determine the quality of paint and paint materials.

M7.01.3: Liquid Thermoplastic Striping Material
In the first paragraph of B. Sampling and Testing, 2. Testing replace AASHTO M 249 with AASHTO T 250.

M7.01.07: Glass Beads
Replace this subsection with the following:

This specification covers the requirements for glass beads which are to be dropped or sprayed on pavement markings. Glass bead suppliers and approved batch numbers are listed on the QCML.

All glass beads shall meet the requirements of AASHTO M 247, and be tested in accordance with AASHTO T 346 and the following:

1. A minimum of 80% of the glass beads shall be true spheres when tested in accordance with ASTM D1155, Procedure A.
2. The glass beads shall be manufactured from commercial grade soda lime glass cullet and shall meet the AASHTO concentration for heavy metals, 200 ppm maximum, as tested in accordance with EPA test methods 3052, 6010B and 6010c, or AASHTO T 392. The silica content shall be 60% minimum (ASTM C169).
3. Moisture Resistance - The Type 1 and Type 4 glass beads shall be treated with a moisture proof coating and be moisture resistant as tested by AASHTO T 346, Referee Method.
4. Adherence - The Type 4 glass beads shall be coated with a silane-type adherence coating to enhance embedding in, and adherence to, the applied binder film. The coated beads shall emit a yellow-green fluorescence when tested by the Dansyl Chloride test procedure.
5. Intermix glass beads used in the manufacture of thermoplastic pavement markings shall meet the requirements of AASHTO M 247, Type 1 glass beads. A moisture proof coating is optional.

A. Gradation.

The glass beads shall be tested in accordance with ASTM D1214 (By use of U.S. Standard Sieves).

Standard gradation beads shall meet the requirements of AASHTO M 247, Type 1.

Large gradation beads shall meet the requirements of AASHTO M 247, Type 4.

B. Packaging.

The beads shall be packaged in 50-lb or greater polyethylene-lined burlap paper bags or equal container; such containers guaranteed to furnish dry and undamaged beads. The following information shall be indelibly labeled in a clear and legible manner on each container:

(a) The name of the manufacturer.
(b) The place of manufacture.
(c) The words: "Glass Beads-Traffic".
(d) Size/Type/Coating.
(e) Materials Specification Number.
(f) The date of shipment (month and year).
(g) The batch number.
(h) Net weight.

C. Approval Procedure.

Requests for approval shall be submitted to the Department accompanied by:

a. Certificate of Compliance stating that the material complies with AASHTO M 247, and tested in accordance with AASHTO T 346 and all applicable MassDOT requirements;
b. Independent lab test results; and
c. One bag of glass beads per batch in sample bags meeting the specifications above for verification testing.

M7.02.: Structural Paint
Replace this subsection with the following:

1. General

New coatings systems shall be a low VOC that meets current VOC regulations. Coating systems shall be selected from the MassDOT QCML-NEPCOAT Qualified Products List “B”. Structural paint will be tested according to the following:

- ASTM D 562 Consistency,
- ASTM D 1475 Density,
- ASTM D3723 Pigment
- ASTM D 2369 Volatile Content
- AMS STD 595 Federal color Index

2. Sampling

a. QCML

Each year manufacturers shall send samples of each product for each color to be used to The Department for testing. Approved paint products and colors will be posted on the QCML. If Paint products are not listed on QCML but are Nepcoat qualified products, samples shall be obtained from the project site. Samples must be taken in clean, dry, airtight, widemouthed metal quart cans. The sample container must be filled within 2 in. from the top of the can and sealed properly. Each sample must be labeled with the name of the manufacturer, brand, coat, and color prior to shipping to The Department.

b. Project Site samples

Samples from project sites are not required if the paint to be used on the project is on the QCML. If samples are obtained from the project, paint must be agitated by the contractor before sampling. Contractors shall not combine individual paint components prior to sampling. One quart sample shall be taken in containers described below. All samples shall be from the same batch.

Samples must be taken in clean, dry, airtight, widemouthed metal quart cans. The sample container must be filled within 2 in. from the top of the can and sealed properly. Each sample must be labeled with the name of the manufacturer, brand, coat, and color prior to shipping to The Department.

Project paint quantities of 40 total gallons or less shall not require sampling and testing. In lieu of sampling and testing, the contractor shall submit a letter stating the total amount of paint to be used on the project will be 40 gallons or less. A manufacturer's certificate of compliance shall be submitted with the letter.

SECTION M8: METALS AND RELATED MATERIALS

M8.07.0: Guardrail
Replace the first two paragraphs with the following:

The materials for this work shall conform to AASHTO M 180 and the suppliers/manufacturers of guardrail and guardrail components shall be listed on the QCML.

<<<<<<<<<<>>>>>>>>>>

END OF SUPPLEMENTAL SPECIFICATIONS

DOCUMENT 00719

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

SPECIAL PROVISIONS FOR PARTICIPATION BY DISADVANTAGED BUSINESS ENTERPRISES

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

Section: Page 00719-

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POLICY

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

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

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

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

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

1. DEFINITIONS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

2. DBE PARTICIPATION

a. Goal

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

☒ Design-Bid-Build Projects: DBE Participation Goal **14 %**
(*One half of this goal shall be met in the form of Subcontractor construction activity*)

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

b. Bidders List

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

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

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

3. CONTRACTOR ASSURANCES

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

4. REQUIRED SUBCONTRACT PROVISIONS

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

5. ELIGIBILITY OF DBES

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

a. Massachusetts DBE Directory

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

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

b. DBE Certification

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

c. Joint Venture Approval

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

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

6. COUNTING DBE PARTICIPATION TOWARDS DBE PARTICIPATION GOALS

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

a. Commercially Useful Function

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

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

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

b. Counting Participation Toward The Contract Participation Goal

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

c. Joint Check Policy

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

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

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

Other factors MassDOT may consider:

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

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

d. Joint Check Procedure(s)

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

7. AWARD DOCUMENTATION AND PROCEDURES

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

8. COMPLIANCE

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

m. Termination of DBE by Prime Contractor

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

n. Prompt Payment.

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

9. SANCTIONS

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

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

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

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

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

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

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

10. FURTHER INFORMATION; ENFORCEMENT, COOPERATION AND CONFIDENTIALITY.

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

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

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

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

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

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

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

(1) Availability of records.

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

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

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

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

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

11. LIST OF ADDITIONAL DOCUMENTS.

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

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

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

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

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

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

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

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

*** END OF DOCUMENT ***

DOCUMENT 00760

FHWA-1273 – Revised October 23, 2023

REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS

I. General
II. Nondiscrimination
III. Non-segregated 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. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion
XI. Certification Regarding Use of Contract Funds for Lobbying
XII. Use of United States-Flag Vessels:

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, United States Code, as required in 23 CFR 633.102(b) (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services). 23 CFR 633.102(e).

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

6. Training and Promotion:

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

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

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

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

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

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

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

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

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

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

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

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

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

10. Assurances Required:

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

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

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

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

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

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

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

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

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

III. NONSEGREGATED FACILITIES

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

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

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

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

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

1. Minimum wages (29 CFR 5.5)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

2. Withholding (29 CFR 5.5)

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

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

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

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

(2) A contracting agency for its reprocurement costs;

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

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

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

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

3. Records and certified payrolls (29 CFR 5.5)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

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

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

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

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

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

3. Withholding for unpaid wages and liquidated damages

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

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

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

(2) A contracting agency for its reprocurement costs;

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

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

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

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

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

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

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

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

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

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

VI. SUBLETTING OR ASSIGNING THE CONTRACT

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

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

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

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

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

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

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

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

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

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

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

VII. SAFETY: ACCIDENT PREVENTION

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

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

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

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

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

* * * * *

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

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

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

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

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

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

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

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

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

* * * * *

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

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

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

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

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

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

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

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

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

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

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

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

* * * * *

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

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

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

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

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

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

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

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

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

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

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

XII. USE OF UNITED STATES-FLAG VESSELS:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

DOCUMENT 00811

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

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

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

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

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

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

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

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

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

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

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

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DOCUMENT 00812

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

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

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

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

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

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

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

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

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

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

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DOCUMENT 00813

SPECIAL PROVISIONS

PRICE ADJUSTMENTS FOR STRUCTURAL STEEL AND REINFORCING STEEL

January 18, 2024

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

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

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

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

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

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

Base Prices and Period Prices are defined as follows:

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

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

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

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

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

Period Prices are determined as follows:

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

Example of a Period Price Calculation:

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

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

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

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

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

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

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

End of example.

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

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

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

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

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

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

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

TABLE

Steel Type		Price per Pound
1	ASTM A615/A615M Grade 60 (AASHTO M31 Grade 60 or 420) Reinforcing Steel	$0.70
2	ASTM A27 (AASHTO M103) Steel Castings, H-Pile Points & Pipe Pile Shoes (See Note below.)	$0.95
3	ASTM A668 / A668M (AASHTO M102) Steel Forgings	$0.95
4	ASTM A108 (AASHTO M169) Steel Forgings for Shear Studs	$0.99
5	ASTM A709/A709M Grade 36 / AASHTO M270M/M270 Grade 36 or 250 Structural Steel Plate	$1.05
6	ASTM A709/A709M Grade 36 / AASHTO M270M/M270 Grade 36 or 250 Structural Steel Shapes	$0.98
7	ASTM A709/A709M Grade 50 / AASHTO M270M/M270 Grade 50 or 345 Structural Steel Plate	$1.05
8	ASTM A709/A709M Grade 50 / AASHTO M270M/M270 Grade 50 or 345 Structural Steel Shapes	$0.98
9	ASTM A709/A709M Grade 50WT / AASHTO M270M/M270 Grade 50WT or 345WT Structural Steel Plate	$1.09
10	ASTM A709/A709M Grade 50WT / AASHTO M270M/M270 Grade 50WT or 345WT Structural Steel Shapes	$0.99
11	ASTM A709/A709M Grade 50W / AASHTO M270M/M270 Grade 50W 345W Structural Steel Plate	$1.09
12	ASTM A709/A709M Grade 50W / AASHTO M270M/M270 Grade 50W or 345W Structural Steel Shapes	$0.99
13	ASTM A709/A709M Grade HPS 50W / AASHTO M270M/M270 Grade HPS 50W or 345W Structural Steel Plate	$1.15
14	ASTM A709/A709M Grade HPS 70W / AASHTO M270M/M270 Grade HPS 70W or 485W Structural Steel Plate	$1.22
15	ASTM A514/A514M-05 Grade HPS 100W / AASHTO M270M/M270 Grade HPS 100W or 690W Structural Steel Plate	$1.86
16	ASTM A992/A992M Grade 50S / AASHTO M270M/M270 Grade 50S or 345S Structural Steel Plate	$1.09
17	ASTM A992/A992M Grade 50S / AASHTO M270M/M270 Grade 50S or 345S Structural Steel Shapes	$0.99
18	ASTM A276 Type 316 Stainless Steel	$5.57
19	ASTM A240 Type 316 Stainless Steel	$5.57
20	ASTM A148 Grade 80/50 Steel Castings (See Note below.)	$1.92
21	ASTM A53 Grade B Structural Steel Pipe	$1.23
22	ASTM A500 Grades A, B, 36 & 50 Structural Steel Pipe	$1.23
23	ASTM A252, Grades 240 (36 KSI) & 414 (60 KSI) Pipe Pile	$0.97
24	ASTM 252, Grade 2 Permanent Steel Casing	$0.97
25	ASTM A36 (AASHTO M183) for H-piles, steel supports and sign supports	$1.04
26	ASTM A328 / A328M, Grade 50 (AASHTO M202) Steel Sheetpiling	$1.83
27	ASTM A572 / A572M, Grade 50 Sheetpiling	$1.83
28	ASTM A36/36M, Grade 50	$1.05
29	ASTM A570, Grade 50	$1.04
30	ASTM A572 (AASHTO M223), Grade 50 H-Piles	$1.05
31	ASTM A1085 Grade A (50 KSI) Steel Hollow Structural Sections (HSS), heat-treated per ASTM A1085 Supplement S1	$1.23
32	AREA 140 LB Rail and Track Accessories	$0.63

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

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DOCUMENT 00814

SPECIAL PROVISIONS
PRICE ADJUSTMENT FOR PORTLAND CEMENT CONCRETE MIXES

January 12, 2009

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

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

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

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

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

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

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

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

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

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DOCUMENT 00820

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

I. Definitions

For purposes of this contract,

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

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

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

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

II. Equal Opportunity, Non-Discrimination and Affirmative Action

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

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

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

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

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

III. Minority and Women Workforce Participation

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

IV. Liaison Committee

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

V. Reports and Records

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

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

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

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

VI. Access to Work Site

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

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

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

VIII. Sanctions

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

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

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

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

IX. Severability

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

X. Contractor's Certification

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

XI. Subcontractor Requirements

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

Rev'd 03/07/14

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DOCUMENT 00821

ELECTRONIC REPORTING REQUIREMENTS
CIVIL RIGHTS PROGRAMS AND CERTIFIED PAYROLL

Implemented on March 2, 2009 Revised June 04, 2019

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

Contractor and Sub-Contractor EBO User Certification

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

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

Vetting of Firms and Designated Firm Individuals

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

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

Interim Reporting Requirements

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

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DOCUMENT 00859

CONTRACTOR/SUBCONTRACTOR CERTIFICATION FORM ‡

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

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

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

Contract No: 124916 **Project No.** 608762 **Federal Aid No.:** HIP(BR)-0036(018)X

Location: BOSTON-CAMBRIDGE

Project Description: Bridge Preservation of B-16-246=C-01-029, Eliot Street over the Charles River

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

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

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

Document #

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

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

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

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

Document #

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

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

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

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

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

PART 2

PART 2 SUBCONTRACTOR CERTIFICATION: I hereby certify, as an authorized official of this company, that the required documents in Part 1 above were physically incorporated in our Agreement/Subcontract with the Contractor and give assurance that this company will fully comply or make every good faith effort to comply with the same. I further certify that:

1. This company recognizes that if this is a Federal-Aid Project, then this Contract is covered by the equal employment opportunity laws administered and enforced by the United States Department of Labor ("USDOL"), Office of Federal Contract Compliance Programs ('OFCCP"). By signing below, we acknowledge that this company has certain reporting obligations to the OFCCP, as specified by 41 CFR Part 60-4.2.
2. This company further acknowledges that any contractor with fifty (50) or more employees on a Federal-aid Contract with a value of fifty-thousand ($50,000) dollars or more must annually file an EEO-1 Report (SF 100) to the EEOC, Joint Reporting Committee, on or before September 30th, each year, as specified by 41 CFR Part 60-1.7a.
3. For more information regarding the federal reporting requirements, please contact the USDOL, OFCCP Regional Office, at 1-646-264-3170 or EEO-1, Joint Reporting Committee at 1-866-286-6440. You may also find guidance at: http://www.dol.gov/ofccp/TAguides/consttag.pdf or http://www.wdol.gov/dba.aspx#0.
4. This company ☐ has, ☐ has not, participated in a previous contract or subcontract subject to the Equal Opportunity clauses set forth in 41 CFR Part 60-4 and Executive Order 11246, and where required, has filed with the Joint Reporting Committee, the Director of the Office of Federal Contract Compliance Programs or the EEO Commission all reports due under the applicable filing requirements.
5. This company is in full compliance with applicable Federal and Commonwealth of Massachusetts laws, rules, and regulations and is not currently debarred or disqualified from bidding on or participating in construction contracts in any jurisdiction of the United States. See : https://www.mass.gov/service-details/contractors-and-vendors-suspended-or-debarred-by-massdot
6. This company is properly registered and in good standing with the Office of the Secretary of the Commonwealth.

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

Firm: _____
Address: _____
_____
_____
Telephone Number:_____
Federal I.D. Number:_____
Estimated Start Date:_____
Estimated Completion Date:_____
Estimated Dollar Amount:_____

_____
(Print Name and Title)

_____
(Authorized Signature)

_____
(Date)

Rev'd 09/02/22

*** END OF DOCUMENT ***

DOCUMENT 00860

COMMONWEALTH OF MASSACHUSETTS PUBLIC EMPLOYMENT LAWS

Revised February 20, 2019

The Contractor's attention is directed to Massachusetts General Laws, Chapter 149, Sections 26 through 27H, and 150A. This contract is considered to fall within the ambit of that law, which provides that in general, the Prevailing Rate or Total Rate must be paid to employees working on projects funded by the Commonwealth of Massachusetts or any political subdivision including Massachusetts Department of Transportation (MassDOT).

A Federal Aid project is also subject to the Federal Minimum Wage Rate law for construction. When comparing a state minimum wage rate, monitored by the Massachusetts Attorney General, versus federal minimum wage rate, monitored by the U.S. Department of Labor Wage and Hour Division, for a particular job classification the higher wage is at all times to be paid to the affected employee.

Every contractor or subcontractor engaged in this contract to which sections twenty-seven and twenty-seven A apply will keep a true and accurate record of all mechanics and apprentices, teamsters, chauffeurs and laborers employed thereon, showing the name, address and occupational classification of each such employee on this contract, and the hours worked by, and the wages paid to, each such employee, and shall furnish to the MassDOT's Resident Engineer, on a weekly basis, a copy of said record, in a form approved by MassDOT and in accordance with M.G.L. c. 149, § 27B, signed by the employer or his/her authorized agent under the penalties of perjury.

Each such contractor or subcontractor shall preserve its payroll records for a period of three years from the date of completion of the contract.

The Prevailing Wage Rate generally includes the following:

> Minimum Hourly Wage + Employer Contributions to Benefit Plans = Prevailing Wage Rate or Total Rate
>
> Any employer who does not make contributions to Benefit Plans must pay the total Prevailing Wage Rate directly to the employee.

Any deduction from the Prevailing Wage Rate or Total Rate for contributions to benefit plans can only be for a Health & Welfare, Pension, or Supplementary Unemployment plan meeting the requirements of the Employee Retirement Income Security Act (ERISA) of 1974. The maximum allowable deduction for these benefits from the prevailing wage rate cannot be greater than the amount allowed by Executive Office of Labor (EOL) for the specified benefits. Any additional expense of providing benefits to the employees is to be borne by the employer and cannot be deducted from the Minimum Hourly Wage. If the employer's benefit expense is less than that so provided by EOL the difference will be paid directly to the employee. The rate established must be paid to all employees who perform work on the project.

When an employer makes deductions from the Minimum Hourly Wage for an employee's contribution to social security, state taxes, federal taxes, and/or other contribution programs, allowed by law, the employer shall furnish each employee a suitable pay slip, check stub or envelope notifying the employee of the amount of the deductions.

No contractor or subcontractor contracting for any part of the contract week shall require or permit any laborer or mechanic to be employed on such work in excess of forty hours in any workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times his basic rate of pay for all hours worked in excess of forty hours in such workweek, whichever is the greater number of overtime hours.

Apprentice Rates are permitted only when there is an Apprentice Agreement registered with the Massachusetts Division of Apprentice Training in accordance with M.G.L. c. 23, § 11E-11L.

The Prevailing Wage Rates issued for each project shall be the rates paid for the entire project. The Prevailing Wage Rates must be posted on the job site at all times and be visible from a public way.

In addition, each such contractor and subcontractor shall furnish to the MassDOT's Resident Engineer, within fifteen days after completion of its portion of the work, a statement, executed by the contractor or subcontractor or by any authorized officer or employee of the contractor or subcontractor who supervises the payment of wages, in the following form:

STATEMENT OF COMPLIANCE

Date: _____

I , _____do hereby state:
(Name of signatory party) (Title)

That I pay or supervise the payment of the persons employed by:

_____
(Contractor or Subcontractor)

on the _____
(MassDOT Project Location and Contract Number)

and that all mechanics and apprentices, teamsters, chauffeurs and laborers employed on said project have been paid in accordance with wages determined under the provisions of sections twenty-six and twenty-seven of chapter one hundred and forty-nine of the General Laws.

Signature _____

Title _____

The above-mentioned copies of payroll records and statements of compliance shall be available for inspection by any interested party filing a written request to the MassDOT's Resident Engineer for such inspection and copying.

Massachusetts General Laws c. 149, §27, requires annual updates to prevailing wage schedules for all public construction contracts lasting longer than one year. MassDOT will request the required updates and furnish them to the Contractor. The Contractor is required to pay no less than the wage rates indicated on the annual updated wage schedules.

MassDOT will request the updates no later that two week before the anniversary of the Notice to Proceed date of the contract to allow for adequate processing by the Department of Labor Standards (DLS). The effective date for the new rates will be the anniversary date of the contract (i.e. the notice to proceed date), regardless of the date of issuance on the schedule from DLS.

All bidders are cautioned that the aforementioned laws require that employers pay to covered employees no less than the applicable minimum wages. In addition, the same laws require that the applicable prevailing wages become incorporated as part of this contract. The prevailing minimum wage law establishes serious civil and criminal penalties for violations, including imprisonment and exclusion from future public contracts. Bidders are cautioned to carefully read the relevant sections of the Massachusetts General Laws.

*** END OF DOCUMENT ***

DOCUMENT 00861

STATE PREVAILING WAGE RATES

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MAURA HEALEY
Governor

KIM DRISCOLL
Lt. Governor

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT
DEPARTMENT OF LABOR STANDARDS

Prevailing Wage Rates

As determined by the Director under the provisions of the Massachusetts General Laws, Chapter 149, Sections 26 to 27H

LAUREN JONES
Secretary

MICHAEL FLANAGAN
Director

Awarding Authority: MassDOT Highway

Contract Number: 124916 **City/Town:** CAMBRIDGE

Description of Work: BOSTON-CAMBRIDGE: FAP No. HIP(BR)-0036(018)X Bridge Preservation of B-16-246=C-01-029, Eliot Street over the Charles River

Job Location: Elliot Street over the Charles River

Information about Prevailing Wage Schedules for Awarding Authorities and Contractors

- **The wage rates will remain in effect for the duration of the project, except in the case of multi-year public construction projects. For construction projects lasting longer than one year, awarding authorities must request an updated wage schedule no later than two weeks before the anniversary of the date the contract was executed by the awarding authority and the general contractor.** For multi-year CM AT RISK projects, the awarding authority must request an annual update no later than two weeks before the anniversary date, determined as the earlier of: (a) the execution date of the GMP Amendment, or (b) the execution date of the first amendment to permit procurement of construction services. The annual update requirement is not applicable to 27F "rental of equipment" contracts. **The updated wage schedule must be provided to all contractors, including general and sub-contractors, working on the construction project.**
- This wage schedule applies only to the specific project referenced at the top of this page and uniquely identified by the "Wage Request Number" on all pages of this schedule.
- An Awarding Authority must request an updated wage schedule if it has not opened bids or selected a contractor 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 a sub-contractor.
- Apprentices working on the project are required to be registered with the Massachusetts Division of Apprentice Standards (DAS). Apprentices must keep their apprentice identification card on their persons during all work hours on the project. An apprentice registered with DAS may be paid the lower apprentice wage rate at the applicable step as provided on the prevailing wage schedule. **Any apprentice not registered with DAS regardless of whether they are registered with another federal, state, local, or private agency must be paid the journeyworker's rate.**
- Every contractor or subcontractor working on the construction project must submit weekly payroll reports and a Statement of Compliance directly to the awarding authority by mail or email and keep them on file for three years. Each weekly payroll report must contain: the employee's name, address, occupational classification, hours worked, and wages paid. Do not submit weekly payroll reports to DLS. For a sample payroll reporting form go to http://www.mass.gov/dols/pw.
- Contractors with questions about the wage rates or classifications included on the wage schedule have an affirmative obligation to inquire with DLS at (617) 626-6953.
- Contractors must obtain the wage schedules from awarding authorities. Failure of a contractor or subcontractor to pay the prevailing wage rates listed on the wage schedule to all employees who perform construction work on the project is a violation of the law and subjects the contractor or subcontractor to civil and criminal penalties.
- Employees not receiving the prevailing wage rate set forth on the wage schedule may file a complaint with the Fair Labor Division of the office of the Attorney General at (617) 727-3465.

Issue Date: 01/11/2024 **Wage Request Number:** 20240111-015-2

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Construction						
(2 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE A*	12/01/2023	$40.05	$14.41	$18.67	$0.00	$73.13
	06/01/2024	$41.05	$14.41	$18.67	$0.00	$74.13
	08/01/2024	$41.05	$14.91	$18.67	$0.00	$74.63
	12/01/2024	$41.05	$14.91	$20.17	$0.00	$76.13
	06/01/2025	$42.05	$14.91	$20.17	$0.00	$77.13
	08/01/2025	$42.05	$15.41	$20.17	$0.00	$77.63
	12/01/2025	$42.05	$15.41	$21.78	$0.00	$79.24
	06/01/2026	$43.05	$15.41	$21.78	$0.00	$80.24
	08/01/2026	$43.05	$15.91	$21.78	$0.00	$80.74
	12/01/2026	$43.05	$15.91	$23.52	$0.00	$82.48
(3 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE A*	12/01/2023	$40.12	$14.41	$18.67	$0.00	$73.20
	06/01/2024	$40.88	$14.41	$18.67	$0.00	$73.96
	08/01/2024	$40.88	$14.91	$18.67	$0.00	$74.46
	12/01/2024	$40.88	$14.91	$20.17	$0.00	$75.96
	06/01/2025	$41.12	$14.91	$20.17	$0.00	$76.20
	08/01/2025	$41.12	$15.41	$20.17	$0.00	$76.70
	12/01/2025	$41.12	$15.41	$21.78	$0.00	$78.31
	06/01/2026	$43.12	$15.41	$21.78	$0.00	$80.31
	08/01/2026	$43.12	$15.91	$21.78	$0.00	$80.81
	12/01/2026	$43.12	$15.91	$23.52	$0.00	$82.55
(4 & 5 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE A*	12/01/2023	$40.24	$14.41	$18.67	$0.00	$73.32
	06/01/2024	$41.24	$14.41	$18.67	$0.00	$74.32
	08/01/2024	$41.24	$14.91	$18.67	$0.00	$74.82
	12/01/2024	$41.24	$14.91	$20.17	$0.00	$76.32
	06/01/2025	$42.24	$14.91	$20.17	$0.00	$77.32
	08/01/2025	$42.24	$15.41	$20.17	$0.00	$77.82
	12/01/2025	$42.24	$15.41	$21.78	$0.00	$79.43
	06/01/2026	$43.24	$15.41	$21.78	$0.00	$80.43
	08/01/2026	$43.24	$15.91	$21.78	$0.00	$80.93
	12/01/2026	$43.24	$15.91	$23.52	$0.00	$82.67
ADS/SUBMERSIBLE PILOT *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2020	$103.05	$9.40	$23.12	$0.00	$135.57
For apprentice rates see "Apprentice- PILE DRIVER"						
AIR TRACK OPERATOR *LABORERS - ZONE 1*	12/01/2023	$45.08	$9.65	$18.07	$0.00	$72.80
For apprentice rates see "Apprentice- LABORER"						
AIR TRACK OPERATOR (HEAVY & HIGHWAY) *LABORERS - ZONE 1 (HEAVY & HIGHWAY)*	12/01/2023	$45.08	$9.65	$18.07	$0.00	$72.80
	06/01/2024	$46.56	$9.65	$18.07	$0.00	$74.28
	12/01/2024	$48.03	$9.65	$18.07	$0.00	$75.75
	06/01/2025	$49.53	$9.65	$18.07	$0.00	$77.25
	12/01/2025	$51.03	$9.65	$18.07	$0.00	$78.75
	06/01/2026	$52.58	$9.65	$18.07	$0.00	$80.30
	12/01/2026	$54.08	$9.65	$18.07	$0.00	$81.80
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
ASBESTOS REMOVER - PIPE / MECH. EQUIPT. *HEAT & FROST INSULATORS LOCAL 6 (BOSTON)*	12/01/2023	$40.80	$14.50	$11.05	$0.00	$66.35
	06/01/2024	$41.80	$14.50	$11.05	$0.00	$67.35
	12/01/2024	$42.80	$14.50	$11.05	$0.00	$68.35
	06/01/2025	$43.80	$14.50	$11.05	$0.00	$69.35
	12/01/2025	$44.80	$14.50	$11.05	$0.00	$70.35
ASPHALT RAKER *LABORERS - ZONE 1*	12/01/2023	$44.58	$9.65	$18.07	$0.00	$72.30
For apprentice rates see "Apprentice- LABORER"						
ASPHALT RAKER (HEAVY & HIGHWAY) *LABORERS - ZONE 1 (HEAVY & HIGHWAY)*	12/01/2023	$44.58	$9.65	$18.07	$0.00	$72.30
	06/01/2024	$46.06	$9.65	$18.07	$0.00	$73.78
	12/01/2024	$47.53	$9.65	$18.07	$0.00	$75.25
	06/01/2025	$49.03	$9.65	$18.07	$0.00	$76.75
	12/01/2025	$50.53	$9.65	$18.07	$0.00	$78.25
	06/01/2026	$52.08	$9.65	$18.07	$0.00	$79.80
	12/01/2026	$53.58	$9.65	$18.07	$0.00	$81.30
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
ASPHALT/CONCRETE/CRUSHER PLANT-ON SITE *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$55.03	$15.00	$16.40	$0.00	$86.43
	06/01/2024	$56.33	$15.00	$16.40	$0.00	$87.73
	12/01/2024	$57.78	$15.00	$16.40	$0.00	$89.18
	06/01/2025	$59.08	$15.00	$16.40	$0.00	$90.48
	12/01/2025	$60.53	$15.00	$16.40	$0.00	$91.93
	06/01/2026	$61.83	$15.00	$16.40	$0.00	$93.23
	12/01/2026	$63.28	$15.00	$16.40	$0.00	$94.68
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BACKHOE/FRONT-END LOADER *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$55.03	$15.00	$16.40	$0.00	$86.43
	06/01/2024	$56.33	$15.00	$16.40	$0.00	$87.73
	12/01/2024	$57.78	$15.00	$16.40	$0.00	$89.18
	06/01/2025	$59.08	$15.00	$16.40	$0.00	$90.48
	12/01/2025	$60.53	$15.00	$16.40	$0.00	$91.93
	06/01/2026	$61.83	$15.00	$16.40	$0.00	$93.23
	12/01/2026	$63.28	$15.00	$16.40	$0.00	$94.68
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BARCO-TYPE JUMPING TAMPER *LABORERS - ZONE 1*	12/01/2023	$44.58	$9.65	$18.07	$0.00	$72.30
For apprentice rates see "Apprentice- LABORER"						
BLOCK PAVER, RAMMER / CURB SETTER *LABORERS - ZONE 1*	12/01/2023	$45.08	$9.65	$18.07	$0.00	$72.80
For apprentice rates see "Apprentice- LABORER"						
BLOCK PAVER, RAMMER / CURB SETTER (HEAVY & HIGHWAY) *LABORERS - ZONE 1 (HEAVY & HIGHWAY)*	12/01/2023	$45.08	$9.65	$18.07	$0.00	$72.80
	06/01/2024	$46.56	$9.65	$18.07	$0.00	$74.28
	12/01/2024	$48.03	$9.65	$18.07	$0.00	$75.75
	06/01/2025	$49.53	$9.65	$18.07	$0.00	$77.25
	12/01/2025	$51.03	$9.65	$18.07	$0.00	$78.75
	06/01/2026	$52.58	$9.65	$18.07	$0.00	$80.30
	12/01/2026	$54.08	$9.65	$18.07	$0.00	$81.80
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
BOILER MAKER *BOILERMAKERS LOCAL 29*	01/01/2024	$48.12	$7.07	$20.60	$0.00	$75.79

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *BOILERMAKER - Local 29*

Effective Date - 01/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	$31.28	$7.07	$13.22	$0.00	$51.57
2	65	$31.28	$7.07	$13.22	$0.00	$51.57
3	70	$33.68	$7.07	$14.23	$0.00	$54.98
4	75	$36.09	$7.07	$15.24	$0.00	$58.40
5	80	$38.50	$7.07	$16.25	$0.00	$61.82
6	85	$40.90	$7.07	$17.28	$0.00	$65.25
7	90	$43.31	$7.07	$18.28	$0.00	$68.66
8	95	$45.71	$7.07	$19.32	$0.00	$72.10

Notes:

Apprentice to Journeyworker Ratio:1:4

BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY WATERPROOFING) *BRICKLAYERS LOCAL 3 (BOSTON)*	08/01/2023	$62.40	$11.49	$22.34	$0.00	$96.23
	02/01/2024	$63.65	$11.49	$22.34	$0.00	$97.48
	08/01/2024	$65.75	$11.49	$22.34	$0.00	$99.58
	02/01/2025	$67.05	$11.49	$22.34	$0.00	$100.88
	08/01/2025	$69.20	$11.49	$22.34	$0.00	$103.03
	02/01/2026	$70.55	$11.49	$22.34	$0.00	$104.38
	08/01/2026	$72.75	$11.49	$22.34	$0.00	$106.58
	02/01/2027	$74.15	$11.49	$22.34	$0.00	$107.98

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *BRICK/PLASTER/CEMENT MASON - Local 3 Boston*

Effective Date - 08/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$31.20	$11.49	$22.34	$0.00	$65.03
2	60	$37.44	$11.49	$22.34	$0.00	$71.27
3	70	$43.68	$11.49	$22.34	$0.00	$77.51
4	80	$49.92	$11.49	$22.34	$0.00	$83.75
5	90	$56.16	$11.49	$22.34	$0.00	$89.99

Effective Date - 02/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$31.83	$11.49	$22.34	$0.00	$65.66
2	60	$38.19	$11.49	$22.34	$0.00	$72.02
3	70	$44.56	$11.49	$22.34	$0.00	$78.39
4	80	$50.92	$11.49	$22.34	$0.00	$84.75
5	90	$57.29	$11.49	$22.34	$0.00	$91.12

Notes:

Apprentice to Journeyworker Ratio:1:5

BULLDOZER/GRADER/SCRAPER *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$54.43	$15.00	$16.40	$0.00	$85.83
	06/01/2024	$55.71	$15.00	$16.40	$0.00	$87.11
	12/01/2024	$57.15	$15.00	$16.40	$0.00	$88.55
	06/01/2025	$58.43	$15.00	$16.40	$0.00	$89.83
	12/01/2025	$59.87	$15.00	$16.40	$0.00	$91.27
	06/01/2026	$61.15	$15.00	$16.40	$0.00	$92.55
	12/01/2026	$62.59	$15.00	$16.40	$0.00	$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
CAISSON & UNDERPINNING BOTTOM MAN *LABORERS - FOUNDATION AND MARINE*	12/01/2023	$45.48	$9.65	$18.22	$0.00	$73.35
	06/01/2024	$46.96	$9.65	$18.22	$0.00	$74.83
	12/01/2024	$48.43	$9.65	$18.22	$0.00	$76.30
	06/01/2025	$49.93	$9.65	$18.22	$0.00	$77.80
	12/01/2025	$51.43	$9.65	$18.22	$0.00	$79.30
	06/01/2026	$52.98	$9.65	$18.22	$0.00	$80.85
	12/01/2026	$54.48	$9.65	$18.22	$0.00	$82.35
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING LABORER *LABORERS - FOUNDATION AND MARINE*	12/01/2023	$44.33	$9.65	$18.22	$0.00	$72.20
	06/01/2024	$45.81	$9.65	$18.22	$0.00	$73.68
	12/01/2024	$47.28	$9.65	$18.22	$0.00	$75.15
	06/01/2025	$48.78	$9.65	$18.22	$0.00	$76.65
	12/01/2025	$50.28	$9.65	$18.22	$0.00	$78.15
	06/01/2026	$51.83	$9.65	$18.22	$0.00	$79.70
	12/01/2026	$53.33	$9.65	$18.22	$0.00	$81.20
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
CAISSON & UNDERPINNING TOP MAN *LABORERS - FOUNDATION AND MARINE*	12/01/2023	$44.33	$9.65	$18.22	$0.00	$72.20
	06/01/2024	$45.81	$9.65	$18.22	$0.00	$73.68
	12/01/2024	$47.28	$9.65	$18.22	$0.00	$75.15
	06/01/2025	$48.78	$9.65	$18.22	$0.00	$76.65
	12/01/2025	$50.28	$9.65	$18.22	$0.00	$78.15
	06/01/2026	$51.83	$9.65	$18.22	$0.00	$79.70
	12/01/2026	$53.33	$9.65	$18.22	$0.00	$81.20
For apprentice rates see "Apprentice- LABORER"						
CARBIDE CORE DRILL OPERATOR *LABORERS - ZONE 1*	12/01/2023	$44.58	$9.65	$18.07	$0.00	$72.30
For apprentice rates see "Apprentice- LABORER"						
CARPENTER *CARPENTERS -ZONE 1 (Metro Boston)*	03/01/2023	$54.96	$9.33	$19.97	$0.00	$84.26

Apprentice - *CARPENTER - Zone 1 Metro Boston*

Effective Date - 03/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$27.48	$9.33	$1.73	$0.00	$38.54
2	60	$32.98	$9.33	$1.73	$0.00	$44.04
3	70	$38.47	$9.33	$14.78	$0.00	$62.58
4	75	$41.22	$9.33	$14.78	$0.00	$65.33
5	80	$43.97	$9.33	$16.51	$0.00	$69.81
6	80	$43.97	$9.33	$16.51	$0.00	$69.81
7	90	$49.46	$9.33	$18.24	$0.00	$77.03
8	90	$49.46	$9.33	$18.24	$0.00	$77.03

Notes:

% Indentured After 10/1/17; 45/45/55/55/70/70/80/80
Step 1&2 $35.03/ 3&4 $42.20/ 5&6 $63.53/ 7&8 $70.74

Apprentice to Journeyworker Ratio:1:5

CARPENTER WOOD FRAME *CARPENTERS -ZONE 1 (Wood Frame)*	04/01/2023	$35.12	$7.23	$9.47	$0.00	$51.82
All Aspects of New Wood Frame Work						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *CARPENTER (Wood Frame) - Zone 1*

Effective Date - 04/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$17.56	$7.23	$0.00	$0.00	$24.79
2	50	$17.56	$7.23	$0.00	$0.00	$24.79
3	55	$19.32	$7.23	$2.00	$0.00	$28.55
4	55	$19.32	$7.23	$2.00	$0.00	$28.55
5	70	$24.58	$7.23	$7.47	$0.00	$39.28
6	70	$24.58	$7.23	$7.47	$0.00	$39.28
7	80	$28.10	$7.23	$8.47	$0.00	$43.80
8	80	$28.10	$7.23	$8.47	$0.00	$43.80

Notes:

% Indentured After 10/1/17; 45/45/55/55/70/70/80/80
Step 1&2 $22.75/ 3&4 $28.21/ 5&6 $38.19/ 7&8 $42.64

Apprentice to Journeyworker Ratio:1:5

CEMENT MASONRY/PLASTERING *BRICKLAYERS LOCAL 3 (BOSTON)*	01/01/2024	$49.33	$13.00	$23.57	$1.30	$87.20

Apprentice - *CEMENT MASONRY/PLASTERING - Eastern Mass (Boston)*

Effective Date - 01/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.67	$13.00	$15.93	$0.00	$53.60
2	60	$29.60	$13.00	$18.57	$1.30	$62.47
3	65	$32.06	$13.00	$19.57	$1.30	$65.93
4	70	$34.53	$13.00	$20.57	$1.30	$69.40
5	75	$37.00	$13.00	$21.57	$1.30	$72.87
6	80	$39.46	$13.00	$22.57	$1.30	$76.33
7	90	$44.40	$13.00	$23.57	$1.30	$82.27

Notes:

Steps 3,4 are 500 hrs. All other steps are 1,000 hrs.

Apprentice to Journeyworker Ratio:1:3

CHAIN SAW OPERATOR *LABORERS - ZONE 1*	12/01/2023	$44.58	$9.65	$18.07	$0.00	$72.30

For apprentice rates see "Apprentice- LABORER"

CLAM SHELLS/SLURRY BUCKETS/HEADING MACHINES *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$56.13	$15.00	$16.40	$0.00	$87.53
	06/01/2024	$57.45	$15.00	$16.40	$0.00	$88.85
	12/01/2024	$58.93	$15.00	$16.40	$0.00	$90.33
	06/01/2025	$60.26	$15.00	$16.40	$0.00	$91.66
	12/01/2025	$61.73	$15.00	$16.40	$0.00	$93.13
	06/01/2026	$63.06	$15.00	$16.40	$0.00	$94.46
	12/01/2026	$64.54	$15.00	$16.40	$0.00	$95.94

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
COMPRESSOR OPERATOR *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$35.62	$15.00	$16.40	$0.00	$67.02
	06/01/2024	$36.47	$15.00	$16.40	$0.00	$67.87
	12/01/2024	$37.42	$15.00	$16.40	$0.00	$68.82
	06/01/2025	$38.27	$15.00	$16.40	$0.00	$69.67
	12/01/2025	$39.22	$15.00	$16.40	$0.00	$70.62
	06/01/2026	$40.08	$15.00	$16.40	$0.00	$71.48
	12/01/2026	$41.03	$15.00	$16.40	$0.00	$72.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DELEADER (BRIDGE) *PAINTERS LOCAL 35 - ZONE 1*	01/01/2024	$56.06	$9.95	$23.95	$0.00	$89.96
	07/01/2024	$57.26	$9.95	$23.95	$0.00	$91.16
	01/01/2025	$58.46	$9.95	$23.95	$0.00	$92.36

Apprentice - *PAINTER Local 35 - BRIDGES/TANKS*

Effective Date - 01/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$28.03	$9.95	$0.00	$0.00	$37.98
2	55	$30.83	$9.95	$6.66	$0.00	$47.44
3	60	$33.64	$9.95	$7.26	$0.00	$50.85
4	65	$36.44	$9.95	$7.87	$0.00	$54.26
5	70	$39.24	$9.95	$20.32	$0.00	$69.51
6	75	$42.05	$9.95	$20.93	$0.00	$72.93
7	80	$44.85	$9.95	$21.53	$0.00	$76.33
8	90	$50.45	$9.95	$22.74	$0.00	$83.14

Effective Date - 07/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$28.63	$9.95	$0.00	$0.00	$38.58
2	55	$31.49	$9.95	$6.66	$0.00	$48.10
3	60	$34.36	$9.95	$7.26	$0.00	$51.57
4	65	$37.22	$9.95	$7.87	$0.00	$55.04
5	70	$40.08	$9.95	$20.32	$0.00	$70.35
6	75	$42.95	$9.95	$20.93	$0.00	$73.83
7	80	$45.81	$9.95	$21.53	$0.00	$77.29
8	90	$51.53	$9.95	$22.74	$0.00	$84.22

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

DEMO: ADZEMAN *LABORERS - ZONE 1*	12/01/2023	$44.48	$9.65	$18.07	$0.00	$72.20
For apprentice rates see "Apprentice- LABORER"						
DEMO: BACKHOE/LOADER/HAMMER OPERATOR *LABORERS - ZONE 1*	12/01/2023	$45.48	$9.65	$18.07	$0.00	$73.20
For apprentice rates see "Apprentice- LABORER"						
DEMO: BURNERS *LABORERS - ZONE 1*	12/01/2023	$45.23	$9.65	$18.07	$0.00	$72.95

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- LABORER"						
DEMO: CONCRETE CUTTER/SAWYER *LABORERS - ZONE 1*	12/01/2023	$45.48	$9.65	$18.07	$0.00	$73.20
For apprentice rates see "Apprentice- LABORER"						
DEMO: JACKHAMMER OPERATOR *LABORERS - ZONE 1*	12/01/2023	$45.23	$9.65	$18.07	$0.00	$72.95
For apprentice rates see "Apprentice- LABORER"						
DEMO: WRECKING LABORER *LABORERS - ZONE 1*	12/01/2023	$44.48	$9.65	$18.07	$0.00	$72.20
For apprentice rates see "Apprentice- LABORER"						
DIRECTIONAL DRILL MACHINE OPERATOR *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$54.43	$15.00	$16.40	$0.00	$85.83
	06/01/2024	$55.71	$15.00	$16.40	$0.00	$87.11
	12/01/2024	$57.15	$15.00	$16.40	$0.00	$88.55
	06/01/2025	$58.43	$15.00	$16.40	$0.00	$89.83
	12/01/2025	$59.87	$15.00	$16.40	$0.00	$91.27
	06/01/2026	$61.15	$15.00	$16.40	$0.00	$92.55
	12/01/2026	$62.59	$15.00	$16.40	$0.00	$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DIVER *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2020	$68.70	$9.40	$23.12	$0.00	$101.22
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER TENDER *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2020	$49.07	$9.40	$23.12	$0.00	$81.59
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER TENDER (EFFLUENT) *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2020	$73.60	$9.40	$23.12	$0.00	$106.12
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER/SLURRY (EFFLUENT) *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2020	$103.05	$9.40	$23.12	$0.00	$135.57
For apprentice rates see "Apprentice- PILE DRIVER"						
DRAWBRIDGE OPERATOR (Construction) *DRAWBRIDGE - SEIU LOCAL 888*	07/01/2020	$26.77	$6.67	$3.93	$0.16	$37.53
ELECTRICIAN *ELECTRICIANS LOCAL 103*	09/01/2023	$61.39	$13.00	$21.69	$0.00	$96.08
	03/01/2024	$61.86	$13.00	$22.21	$0.00	$97.07
	09/01/2024	$63.78	$13.00	$22.26	$0.00	$99.04
	03/01/2025	$64.98	$13.00	$22.30	$0.00	$100.28
	09/01/2025	$66.89	$13.00	$22.36	$0.00	$102.25
	03/01/2026	$68.09	$13.00	$22.39	$0.00	$103.48
	09/01/2026	$70.00	$13.00	$22.45	$0.00	$105.45
	03/01/2027	$71.19	$13.00	$22.49	$0.00	$106.68
	09/01/2027	$73.11	$13.00	$22.54	$0.00	$108.65
	03/01/2028	$74.31	$13.00	$22.58	$0.00	$109.89

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *ELECTRICIAN - Local 103*

Effective Date - 09/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$24.56	$13.00	$0.74	$0.00	$38.30
2	40	$24.56	$13.00	$0.74	$0.00	$38.30
3	45	$27.63	$13.00	$16.16	$0.00	$56.79
4	45	$27.63	$13.00	$16.16	$0.00	$56.79
5	50	$30.70	$13.00	$16.66	$0.00	$60.36
6	55	$33.76	$13.00	$17.16	$0.00	$63.92
7	60	$36.83	$13.00	$17.67	$0.00	$67.50
8	65	$39.90	$13.00	$18.17	$0.00	$71.07
9	70	$42.97	$13.00	$18.67	$0.00	$74.64
10	75	$46.04	$13.00	$19.18	$0.00	$78.22

Effective Date - 03/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$24.74	$13.00	$0.74	$0.00	$38.48
2	40	$24.74	$13.00	$0.74	$0.00	$38.48
3	45	$27.84	$13.00	$16.67	$0.00	$57.51
4	45	$27.84	$13.00	$16.67	$0.00	$57.51
5	50	$30.93	$13.00	$17.17	$0.00	$61.10
6	55	$34.02	$13.00	$17.67	$0.00	$64.69
7	60	$37.12	$13.00	$18.17	$0.00	$68.29
8	65	$40.21	$13.00	$18.68	$0.00	$71.89
9	70	$43.30	$13.00	$19.18	$0.00	$75.48
10	75	$46.40	$13.00	$19.69	$0.00	$79.09

Notes: :

App Prior 1/1/03; 30/35/40/45/50/55/65/70/75/80

Apprentice to Journeyworker Ratio:2:3***

ELEVATOR CONSTRUCTOR *ELEVATOR CONSTRUCTORS LOCAL 4*	01/01/2022	$65.62	$16.03	$20.21	$0.00	$101.86

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *ELEVATOR CONSTRUCTOR - Local 4*

Effective Date - 01/01/2022

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$32.81	$16.03	$0.00	$0.00	$48.84
2	55	$36.09	$16.03	$20.21	$0.00	$72.33
3	65	$42.65	$16.03	$20.21	$0.00	$78.89
4	70	$45.93	$16.03	$20.21	$0.00	$82.17
5	80	$52.50	$16.03	$20.21	$0.00	$88.74

Notes:
Steps 1-2 are 6 mos.; Steps 3-5 are 1 year

Apprentice to Journeyworker Ratio:1:1

ELEVATOR CONSTRUCTOR HELPER *ELEVATOR CONSTRUCTORS LOCAL 4*	01/01/2022	$45.93	$16.03	$20.21	$0.00	$82.17

For apprentice rates see "Apprentice - ELEVATOR CONSTRUCTOR"

FENCE & GUARD RAIL ERECTOR (HEAVY & HIGHWAY) *LABORERS - ZONE 1 (HEAVY & HIGHWAY)*	12/01/2023	$44.58	$9.65	$18.07	$0.00	$72.30
	06/01/2024	$46.06	$9.65	$18.07	$0.00	$73.78
	12/01/2024	$47.53	$9.65	$18.07	$0.00	$75.25
	06/01/2025	$49.03	$9.65	$18.07	$0.00	$76.75
	12/01/2025	$50.53	$9.65	$18.07	$0.00	$78.25
	06/01/2026	$52.08	$9.65	$18.07	$0.00	$79.80
	12/01/2026	$53.58	$9.65	$18.07	$0.00	$81.30

For apprentice rates see "Apprentice- LABORER (Heavy and Highway)

FIELD ENG.INST.PERSON-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 4*	11/01/2023	$50.30	$14.50	$16.15	$0.00	$80.95
	05/01/2024	$51.54	$14.50	$16.15	$0.00	$82.19
	11/01/2024	$52.83	$14.50	$16.15	$0.00	$83.48
	05/01/2025	$54.27	$14.50	$16.15	$0.00	$84.92
	11/01/2025	$55.56	$14.50	$16.15	$0.00	$86.21
	05/01/2026	$57.00	$14.50	$16.15	$0.00	$87.65
	11/01/2026	$58.29	$14.50	$16.15	$0.00	$88.94
	05/01/2027	$59.72	$14.50	$16.15	$0.00	$90.37

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

FIELD ENG.PARTY CHIEF-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 4*	11/01/2023	$51.87	$14.50	$16.15	$0.00	$82.52
	05/01/2024	$53.12	$14.50	$16.15	$0.00	$83.77
	11/01/2024	$54.42	$14.50	$16.15	$0.00	$85.07
	05/01/2025	$55.87	$14.50	$16.15	$0.00	$86.52
	11/01/2025	$57.17	$14.50	$16.15	$0.00	$87.82
	05/01/2026	$58.62	$14.50	$16.15	$0.00	$89.27
	11/01/2026	$59.92	$14.50	$16.15	$0.00	$90.57
	05/01/2027	$61.37	$14.50	$16.15	$0.00	$92.02

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FIELD ENG.ROD PERSON-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 4*	11/01/2023	$24.93	$14.50	$16.15	$0.00	$55.58
	05/01/2024	$25.66	$14.50	$16.15	$0.00	$56.31
	11/01/2024	$26.42	$14.50	$16.15	$0.00	$57.07
	05/01/2025	$27.27	$14.50	$16.15	$0.00	$57.92
	11/01/2025	$28.03	$14.50	$16.15	$0.00	$58.68
	05/01/2026	$28.88	$14.50	$16.15	$0.00	$59.53
	11/01/2026	$29.64	$14.50	$16.15	$0.00	$60.29
	05/01/2027	$30.49	$14.50	$16.15	$0.00	$61.14
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIRE ALARM INSTALLER *ELECTRICIANS LOCAL 103*	09/01/2023	$61.39	$13.00	$21.69	$0.00	$96.08
	03/01/2024	$61.86	$13.00	$22.21	$0.00	$97.07
	09/01/2024	$63.78	$13.00	$22.26	$0.00	$99.04
	03/01/2025	$64.98	$13.00	$22.30	$0.00	$100.28
	09/01/2025	$66.89	$13.00	$22.36	$0.00	$102.25
	03/01/2026	$68.09	$13.00	$22.39	$0.00	$103.48
	09/01/2026	$70.00	$13.00	$22.45	$0.00	$105.45
	03/01/2027	$71.19	$13.00	$22.49	$0.00	$106.68
	09/01/2027	$73.11	$13.00	$22.54	$0.00	$108.65
	03/01/2028	$74.31	$13.00	$22.58	$0.00	$109.89
For apprentice rates see "Apprentice- ELECTRICIAN"						
FIRE ALARM REPAIR / MAINTENANCE / COMMISSIONING*ELECTRICIANS LOCAL 103*	09/01/2023	$49.11	$13.00	$19.68	$0.00	$81.79
	03/01/2024	$49.49	$13.00	$20.19	$0.00	$82.68
	09/01/2024	$51.02	$13.00	$20.24	$0.00	$84.26
	03/01/2025	$51.98	$13.00	$20.27	$0.00	$85.25
	09/01/2025	$53.51	$13.00	$20.32	$0.00	$86.83
	03/01/2026	$54.47	$13.00	$20.34	$0.00	$87.81
	09/01/2026	$56.00	$13.00	$20.39	$0.00	$89.39
	03/01/2027	$56.95	$13.00	$20.42	$0.00	$90.37
	09/01/2027	$58.49	$13.00	$20.46	$0.00	$91.95
	03/01/2028	$59.45	$13.00	$20.49	$0.00	$92.94
For apprentice rates see "Apprentice- TELECOMMUNICATIONS TECHNICIAN"						
FIREMAN (ASST. ENGINEER) *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$44.47	$15.00	$16.40	$0.00	$75.87
	06/01/2024	$45.53	$15.00	$16.40	$0.00	$76.93
	12/01/2024	$46.71	$15.00	$16.40	$0.00	$78.11
	06/01/2025	$47.77	$15.00	$16.40	$0.00	$79.17
	12/01/2025	$48.94	$15.00	$16.40	$0.00	$80.34
	06/01/2026	$50.00	$15.00	$16.40	$0.00	$81.40
	12/01/2026	$51.18	$15.00	$16.40	$0.00	$82.58
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FLAGGER & SIGNALER (HEAVY & HIGHWAY) *LABORERS - ZONE 1 (HEAVY & HIGHWAY)*	12/01/2023	$25.48	$9.65	$18.07	$0.00	$53.20
	06/01/2024	$26.51	$9.65	$18.07	$0.00	$54.23
	12/01/2024	$26.51	$9.65	$18.07	$0.00	$54.23
	06/01/2025	$27.59	$9.65	$18.07	$0.00	$55.31
	12/01/2025	$27.59	$9.65	$18.07	$0.00	$55.31
	06/01/2026	$28.71	$9.65	$18.07	$0.00	$56.43
	12/01/2026	$28.71	$9.65	$18.07	$0.00	$56.43
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FLOORCOVERER *FLOORCOVERERS LOCAL 2168 ZONE I*	09/01/2023	$53.48	$8.83	$20.27	$0.00	$82.58
	03/01/2024	$54.73	$8.83	$20.27	$0.00	$83.83
	09/01/2024	$56.23	$8.83	$20.27	$0.00	$85.33
	03/01/2025	$57.73	$8.83	$20.27	$0.00	$86.83
	09/01/2025	$59.23	$8.83	$20.27	$0.00	$88.33
	03/01/2026	$60.73	$8.83	$20.27	$0.00	$89.83
	09/01/2026	$62.23	$8.83	$20.27	$0.00	$91.33
	03/01/2027	$63.73	$8.83	$20.27	$0.00	$92.83

Apprentice - *FLOORCOVERER - Local 2168 Zone I*

Effective Date - 09/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$26.74	$8.83	$1.76	$0.00	$37.33
2	55	$29.41	$8.83	$1.76	$0.00	$40.00
3	60	$32.09	$8.83	$3.52	$0.00	$44.44
4	65	$34.76	$8.83	$3.52	$0.00	$47.11
5	70	$37.44	$8.83	$16.75	$0.00	$63.02
6	75	$40.11	$8.83	$16.75	$0.00	$65.69
7	80	$42.78	$8.83	$18.51	$0.00	$70.12
8	85	$45.46	$8.83	$18.51	$0.00	$72.80

Effective Date - 03/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$27.37	$8.83	$1.76	$0.00	$37.96
2	55	$30.10	$8.83	$1.76	$0.00	$40.69
3	60	$32.84	$8.83	$3.52	$0.00	$45.19
4	65	$35.57	$8.83	$3.52	$0.00	$47.92
5	70	$38.31	$8.83	$16.75	$0.00	$63.89
6	75	$41.05	$8.83	$16.75	$0.00	$66.63
7	80	$43.78	$8.83	$18.51	$0.00	$71.12
8	85	$46.52	$8.83	$18.51	$0.00	$73.86

Notes: Steps are 750 hrs.
% After 10/1/17; 45/45/55/55/70/70/80/80 (1500hr Steps)
Step 1&2 $34.65/ 3&4 $41.76/ 5&6 $63.02/ 7&8 $70.12

Apprentice to Journeyworker Ratio:1:1

FORK LIFT/CHERRY PICKER *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$55.03	$15.00	$16.40	$0.00	$86.43
	06/01/2024	$56.33	$15.00	$16.40	$0.00	$87.73
	12/01/2024	$57.78	$15.00	$16.40	$0.00	$89.18
	06/01/2025	$59.08	$15.00	$16.40	$0.00	$90.48
	12/01/2025	$60.53	$15.00	$16.40	$0.00	$91.93
	06/01/2026	$61.83	$15.00	$16.40	$0.00	$93.23
	12/01/2026	$63.28	$15.00	$16.40	$0.00	$94.68

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
GENERATOR/LIGHTING PLANT/HEATERS *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$35.62	$15.00	$16.40	$0.00	$67.02
	06/01/2024	$36.47	$15.00	$16.40	$0.00	$67.87
	12/01/2024	$37.42	$15.00	$16.40	$0.00	$68.82
	06/01/2025	$38.27	$15.00	$16.40	$0.00	$69.67
	12/01/2025	$39.22	$15.00	$16.40	$0.00	$70.62
	06/01/2026	$40.08	$15.00	$16.40	$0.00	$71.48
	12/01/2026	$41.03	$15.00	$16.40	$0.00	$72.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS) *GLAZIERS LOCAL 35 (ZONE 1)*	01/01/2024	$51.35	$9.95	$23.95	$0.00	$85.25
	07/01/2024	$52.55	$9.95	$23.95	$0.00	$86.45
	01/01/2025	$53.75	$9.95	$23.95	$0.00	$87.65

Apprentice - *GLAZIER - Local 35 Zone 1*

Effective Date - 01/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$25.68	$9.95	$0.00	$0.00	$35.63
2	55	$28.24	$9.95	$6.66	$0.00	$44.85
3	60	$30.81	$9.95	$7.26	$0.00	$48.02
4	65	$33.38	$9.95	$7.87	$0.00	$51.20
5	70	$35.95	$9.95	$20.32	$0.00	$66.22
6	75	$38.51	$9.95	$20.93	$0.00	$69.39
7	80	$41.08	$9.95	$21.53	$0.00	$72.56
8	90	$46.22	$9.95	$22.74	$0.00	$78.91

Effective Date - 07/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$26.28	$9.95	$0.00	$0.00	$36.23
2	55	$28.90	$9.95	$6.66	$0.00	$45.51
3	60	$31.53	$9.95	$7.26	$0.00	$48.74
4	65	$34.16	$9.95	$7.87	$0.00	$51.98
5	70	$36.79	$9.95	$20.32	$0.00	$67.06
6	75	$39.41	$9.95	$20.93	$0.00	$70.29
7	80	$42.04	$9.95	$21.53	$0.00	$73.52
8	90	$47.30	$9.95	$22.74	$0.00	$79.99

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

HOISTING ENGINEER/CRANES/GRADALLS *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$55.03	$15.00	$16.40	$0.00	$86.43
	06/01/2024	$56.33	$15.00	$16.40	$0.00	$87.73
	12/01/2024	$57.78	$15.00	$16.40	$0.00	$89.18
	06/01/2025	$59.08	$15.00	$16.40	$0.00	$90.48
	12/01/2025	$60.53	$15.00	$16.40	$0.00	$91.93
	06/01/2026	$61.83	$15.00	$16.40	$0.00	$93.23
	12/01/2026	$63.28	$15.00	$16.40	$0.00	$94.68

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *OPERATING ENGINEERS - Local 4*

Effective Date - 12/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$30.27	$15.00	$0.00	$0.00	$45.27
2	60	$33.02	$15.00	$16.40	$0.00	$64.42
3	65	$35.77	$15.00	$16.40	$0.00	$67.17
4	70	$38.52	$15.00	$16.40	$0.00	$69.92
5	75	$41.27	$15.00	$16.40	$0.00	$72.67
6	80	$44.02	$15.00	$16.40	$0.00	$75.42
7	85	$46.78	$15.00	$16.40	$0.00	$78.18
8	90	$49.53	$15.00	$16.40	$0.00	$80.93

Effective Date - 06/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$30.98	$15.00	$0.00	$0.00	$45.98
2	60	$33.80	$15.00	$16.40	$0.00	$65.20
3	65	$36.61	$15.00	$16.40	$0.00	$68.01
4	70	$39.43	$15.00	$16.40	$0.00	$70.83
5	75	$42.25	$15.00	$16.40	$0.00	$73.65
6	80	$45.06	$15.00	$16.40	$0.00	$76.46
7	85	$47.88	$15.00	$16.40	$0.00	$79.28
8	90	$50.70	$15.00	$16.40	$0.00	$82.10

Notes:

Apprentice to Journeyworker Ratio:1:6

HVAC (DUCTWORK) *SHEETMETAL WORKERS LOCAL 17 - A*	08/01/2023	$56.16	$14.43	$27.07	$2.93	$100.59
	02/01/2024	$57.86	$14.43	$27.07	$2.93	$102.29
	08/01/2024	$59.61	$14.43	$27.07	$2.93	$104.04
	02/01/2025	$61.36	$14.43	$27.07	$2.93	$105.79
	08/01/2025	$63.21	$14.43	$27.07	$2.93	$107.64
	02/01/2026	$65.16	$14.43	$27.07	$2.93	$109.59

For apprentice rates see "Apprentice- SHEET METAL WORKER"

HVAC (ELECTRICAL CONTROLS) *ELECTRICIANS LOCAL 103*	09/01/2023	$61.39	$13.00	$21.69	$0.00	$96.08
	03/01/2024	$61.86	$13.00	$22.21	$0.00	$97.07
	09/01/2024	$63.78	$13.00	$22.26	$0.00	$99.04
	03/01/2025	$64.98	$13.00	$22.30	$0.00	$100.28
	09/01/2025	$66.89	$13.00	$22.36	$0.00	$102.25
	03/01/2026	$68.09	$13.00	$22.39	$0.00	$103.48
	09/01/2026	$70.00	$13.00	$22.45	$0.00	$105.45
	03/01/2027	$71.19	$13.00	$22.49	$0.00	$106.68
	09/01/2027	$73.11	$13.00	$22.54	$0.00	$108.65
	03/01/2028	$74.31	$13.00	$22.58	$0.00	$109.89

For apprentice rates see "Apprentice- ELECTRICIAN"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
HVAC (TESTING AND BALANCING - AIR) *SHEETMETAL WORKERS LOCAL 17 - A*	08/01/2023	$56.16	$14.43	$27.07	$2.93	$100.59
	02/01/2024	$57.86	$14.43	$27.07	$2.93	$102.29
	08/01/2024	$59.61	$14.43	$27.07	$2.93	$104.04
	02/01/2025	$61.36	$14.43	$27.07	$2.93	$105.79
	08/01/2025	$63.21	$14.43	$27.07	$2.93	$107.64
	02/01/2026	$65.16	$14.43	$27.07	$2.93	$109.59
For apprentice rates see "Apprentice- SHEET METAL WORKER"						
HVAC (TESTING AND BALANCING -WATER) *PIPEFITTERS LOCAL 537*	09/01/2023	$63.48	$12.70	$21.50	$0.00	$97.68
	03/01/2024	$65.28	$12.70	$21.50	$0.00	$99.48
	09/01/2024	$67.08	$12.70	$21.50	$0.00	$101.28
	03/01/2025	$68.88	$12.70	$21.50	$0.00	$103.08
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HVAC MECHANIC *PIPEFITTERS LOCAL 537*	09/01/2023	$63.48	$12.70	$21.50	$0.00	$97.68
	03/01/2024	$65.28	$12.70	$21.50	$0.00	$99.48
	09/01/2024	$67.08	$12.70	$21.50	$0.00	$101.28
	03/01/2025	$68.88	$12.70	$21.50	$0.00	$103.08
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HYDRAULIC DRILLS *LABORERS - ZONE 1*	12/01/2023	$45.08	$9.65	$18.07	$0.00	$72.80
For apprentice rates see "Apprentice- LABORER"						
HYDRAULIC DRILLS (HEAVY & HIGHWAY) *LABORERS - ZONE 1 (HEAVY & HIGHWAY)*	12/01/2023	$45.08	$9.65	$18.07	$0.00	$72.80
	06/01/2024	$46.56	$9.65	$18.07	$0.00	$74.28
	12/01/2024	$48.03	$9.65	$18.07	$0.00	$75.75
	06/01/2025	$49.53	$9.65	$18.07	$0.00	$77.25
	12/01/2025	$51.03	$9.65	$18.07	$0.00	$78.75
	06/01/2026	$52.58	$9.65	$18.07	$0.00	$80.30
	12/01/2026	$54.08	$9.65	$18.07	$0.00	$81.80
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
INSULATOR (PIPES & TANKS) *HEAT & FROST INSULATORS LOCAL 6 (BOSTON)*	09/01/2023	$53.50	$14.75	$19.61	$0.00	$87.86
	09/01/2024	$56.92	$14.75	$19.61	$0.00	$91.28
	09/01/2025	$60.34	$14.75	$19.61	$0.00	$94.70
	09/01/2026	$63.76	$14.75	$19.61	$0.00	$98.12

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *ASBESTOS INSULATOR (Pipes & Tanks) - Local 6 Boston*

Effective Date - 09/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$26.75	$14.75	$14.32	$0.00	$55.82
2	60	$32.10	$14.75	$15.37	$0.00	$62.22
3	70	$37.45	$14.75	$16.43	$0.00	$68.63
4	80	$42.80	$14.75	$17.49	$0.00	$75.04

Effective Date - 09/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$28.46	$14.75	$14.32	$0.00	$57.53
2	60	$34.15	$14.75	$15.37	$0.00	$64.27
3	70	$39.84	$14.75	$16.43	$0.00	$71.02
4	80	$45.54	$14.75	$17.49	$0.00	$77.78

Notes:
Steps are 1 year

Apprentice to Journeyworker Ratio:1:4

IRONWORKER/WELDER *IRONWORKERS LOCAL 7 (BOSTON AREA)*	03/16/2023	$52.72	$8.35	$26.70	$0.00	$87.77
	03/16/2024	$53.97	$8.35	$26.70	$0.00	$89.02

Apprentice - *IRONWORKER - Local 7 Boston*

Effective Date - 03/16/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$31.63	$8.35	$26.70	$0.00	$66.68
2	70	$36.90	$8.35	$26.70	$0.00	$71.95
3	75	$39.54	$8.35	$26.70	$0.00	$74.59
4	80	$42.18	$8.35	$26.70	$0.00	$77.23
5	85	$44.81	$8.35	$26.70	$0.00	$79.86
6	90	$47.45	$8.35	$26.70	$0.00	$82.50

Effective Date - 03/16/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$32.38	$8.35	$26.70	$0.00	$67.43
2	70	$37.78	$8.35	$26.70	$0.00	$72.83
3	75	$40.48	$8.35	$26.70	$0.00	$75.53
4	80	$43.18	$8.35	$26.70	$0.00	$78.23
5	85	$45.87	$8.35	$26.70	$0.00	$80.92
6	90	$48.57	$8.35	$26.70	$0.00	$83.62

Notes:

Apprentice to Journeyworker Ratio:1:4

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
JACKHAMMER & PAVING BREAKER OPERATOR *LABORERS - ZONE 1*	12/01/2023	$44.58	$9.65	$18.07	$0.00	$72.30
For apprentice rates see "Apprentice- LABORER"						
LABORER *LABORERS - ZONE 1*	12/01/2023	$44.33	$9.65	$18.07	$0.00	$72.05

Apprentice - *LABORER - Zone 1*

Effective Date - 12/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$26.60	$9.40	$17.82	$0.00	$53.82
2	70	$31.03	$9.40	$17.82	$0.00	$58.25
3	80	$35.46	$9.40	$17.82	$0.00	$62.68
4	90	$39.90	$9.40	$17.82	$0.00	$67.12

Notes:

Apprentice to Journeyworker Ratio:1:5

LABORER (HEAVY & HIGHWAY) *LABORERS - ZONE 1 (HEAVY & HIGHWAY)*	12/01/2023	$44.33	$9.65	$18.07	$0.00	$72.05
	06/01/2024	$45.81	$9.65	$18.07	$0.00	$73.53
	12/01/2024	$47.28	$9.65	$18.07	$0.00	$75.00
	06/01/2025	$48.78	$9.65	$18.07	$0.00	$76.50
	12/01/2025	$50.28	$9.65	$18.07	$0.00	$78.00
	06/01/2026	$51.83	$9.65	$18.07	$0.00	$79.55
	12/01/2026	$53.33	$9.65	$18.07	$0.00	$81.05

Apprentice - *LABORER (Heavy & Highway) - Zone 1*

Effective Date - 12/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$26.60	$9.65	$18.07	$0.00	$54.32
2	70	$31.03	$9.65	$18.07	$0.00	$58.75
3	80	$35.46	$9.65	$18.07	$0.00	$63.18
4	90	$39.90	$9.65	$18.07	$0.00	$67.62

Effective Date - 06/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$27.49	$9.65	$18.07	$0.00	$55.21
2	70	$32.07	$9.65	$18.07	$0.00	$59.79
3	80	$36.65	$9.65	$18.07	$0.00	$64.37
4	90	$41.23	$9.65	$18.07	$0.00	$68.95

Notes:

Apprentice to Journeyworker Ratio:1:5

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
LABORER: CARPENTER TENDER *LABORERS - ZONE 1*	12/01/2023	$44.33	$9.65	$18.07	$0.00	$72.05
For apprentice rates see "Apprentice- LABORER"						
LABORER: CEMENT FINISHER TENDER *LABORERS - ZONE 1*	12/01/2023	$44.33	$9.65	$18.07	$0.00	$72.05
For apprentice rates see "Apprentice- LABORER"						
LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER *LABORERS - ZONE 1*	12/01/2023	$44.48	$9.65	$18.07	$0.00	$72.20
For apprentice rates see "Apprentice- LABORER"						
LABORER: MASON TENDER *LABORERS - ZONE 1*	06/01/2023	$43.83	$9.40	$17.82	$0.00	$71.05
	06/01/2024	$44.58	$9.65	$18.07	$0.00	$72.30
For apprentice rates see "Apprentice- LABORER"						
LABORER: MASON TENDER (HEAVY & HIGHWAY) *LABORERS - ZONE 1 (HEAVY & HIGHWAY)*	12/01/2023	$44.58	$9.65	$18.07	$0.00	$72.30
	06/01/2024	$46.06	$9.65	$18.07	$0.00	$73.78
	12/01/2024	$47.53	$9.65	$18.07	$0.00	$75.25
	06/01/2025	$49.03	$9.65	$18.07	$0.00	$76.75
	12/01/2025	$50.53	$9.65	$18.07	$0.00	$78.25
	06/01/2026	$52.08	$9.65	$18.07	$0.00	$79.80
	12/01/2026	$53.58	$9.65	$18.07	$0.00	$81.30
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)						
LABORER: MULTI-TRADE TENDER *LABORERS - ZONE 1*	12/01/2023	$44.33	$9.65	$18.07	$0.00	$72.05
For apprentice rates see "Apprentice- LABORER"						
LABORER: TREE REMOVER *LABORERS - ZONE 1*	12/01/2023	$44.33	$9.65	$18.07	$0.00	$72.05
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 1*	12/01/2023	$44.58	$9.65	$18.07	$0.00	$72.30
For apprentice rates see "Apprentice- LABORER"						
LASER BEAM OPERATOR (HEAVY & HIGHWAY) *LABORERS - ZONE 1 (HEAVY & HIGHWAY)*	12/01/2023	$44.58	$9.65	$18.07	$0.00	$72.30
	06/01/2024	$46.06	$9.65	$18.07	$0.00	$73.78
	12/01/2024	$47.53	$9.65	$18.07	$0.00	$75.25
	06/01/2025	$49.03	$9.65	$18.07	$0.00	$76.75
	12/01/2025	$50.53	$9.65	$18.07	$0.00	$78.25
	06/01/2026	$52.08	$9.65	$18.07	$0.00	$79.80
	12/01/2026	$53.58	$9.65	$18.07	$0.00	$81.30
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)						
MARBLE & TILE FINISHERS *BRICKLAYERS LOCAL 3 - MARBLE & TILE*	08/01/2023	$47.89	$11.49	$20.37	$0.00	$79.75
	02/01/2024	$48.89	$11.49	$20.37	$0.00	$80.75
	08/01/2024	$50.57	$11.49	$20.37	$0.00	$82.43
	02/01/2025	$51.61	$11.49	$20.37	$0.00	$83.47
	08/01/2025	$53.33	$11.49	$20.37	$0.00	$85.19
	02/01/2026	$54.41	$11.49	$20.37	$0.00	$86.27
	08/01/2026	$56.17	$11.49	$20.37	$0.00	$88.03
	02/01/2027	$57.29	$11.49	$20.37	$0.00	$89.15

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *MARBLE & TILE FINISHER - Local 3 Marble & Tile*

Effective Date - 08/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$23.95	$11.49	$20.37	$0.00	$55.81
2	60	$28.73	$11.49	$20.37	$0.00	$60.59
3	70	$33.52	$11.49	$20.37	$0.00	$65.38
4	80	$38.31	$11.49	$20.37	$0.00	$70.17
5	90	$43.10	$11.49	$20.37	$0.00	$74.96

Effective Date - 02/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.45	$11.49	$20.37	$0.00	$56.31
2	60	$29.33	$11.49	$20.37	$0.00	$61.19
3	70	$34.22	$11.49	$20.37	$0.00	$66.08
4	80	$39.11	$11.49	$20.37	$0.00	$70.97
5	90	$44.00	$11.49	$20.37	$0.00	$75.86

Notes:

Apprentice to Journeyworker Ratio:1:3

MARBLE MASONS,TILELAYERS & TERRAZZO MECH *BRICKLAYERS LOCAL 3 - MARBLE & TILE*	08/01/2023	$62.42	$11.49	$22.31	$0.00	$96.22
	02/01/2024	$63.67	$11.49	$22.31	$0.00	$97.47
	08/01/2024	$65.77	$11.49	$22.31	$0.00	$99.57
	02/01/2025	$67.07	$11.49	$22.31	$0.00	$100.87
	08/01/2025	$69.22	$11.49	$22.31	$0.00	$103.02
	02/01/2026	$70.57	$11.49	$22.31	$0.00	$104.37
	08/01/2026	$72.77	$11.49	$22.31	$0.00	$106.57
	02/01/2027	$74.17	$11.49	$22.31	$0.00	$107.97

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *MARBLE-TILE-TERRAZZO MECHANIC - Local 3 Marble & Tile*

Effective Date - 08/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$31.21	$11.49	$22.31	$0.00	$65.01
2	60	$37.45	$11.49	$22.31	$0.00	$71.25
3	70	$43.69	$11.49	$22.31	$0.00	$77.49
4	80	$49.94	$11.49	$22.31	$0.00	$83.74
5	90	$56.18	$11.49	$22.31	$0.00	$89.98

Effective Date - 02/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$31.84	$11.49	$22.31	$0.00	$65.64
2	60	$38.20	$11.49	$22.31	$0.00	$72.00
3	70	$44.57	$11.49	$22.31	$0.00	$78.37
4	80	$50.94	$11.49	$22.31	$0.00	$84.74
5	90	$57.30	$11.49	$22.31	$0.00	$91.10

Notes:

Apprentice to Journeyworker Ratio:1:5

MECH. SWEEPER OPERATOR (ON CONST. SITES) *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$54.43	$15.00	$16.40	$0.00	$85.83
	06/01/2024	$55.71	$15.00	$16.40	$0.00	$87.11
	12/01/2024	$57.15	$15.00	$16.40	$0.00	$88.55
	06/01/2025	$58.43	$15.00	$16.40	$0.00	$89.83
	12/01/2025	$59.87	$15.00	$16.40	$0.00	$91.27
	06/01/2026	$61.15	$15.00	$16.40	$0.00	$92.55
	12/01/2026	$62.59	$15.00	$16.40	$0.00	$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
MECHANICS MAINTENANCE *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$54.43	$15.00	$16.40	$0.00	$85.83
	06/01/2024	$55.71	$15.00	$16.40	$0.00	$87.11
	12/01/2024	$57.15	$15.00	$16.40	$0.00	$88.55
	06/01/2025	$58.43	$15.00	$16.40	$0.00	$89.83
	12/01/2025	$59.87	$15.00	$16.40	$0.00	$91.27
	06/01/2026	$61.15	$15.00	$16.40	$0.00	$92.55
	12/01/2026	$62.59	$15.00	$16.40	$0.00	$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
MILLWRIGHT (Zone 1) *MILLWRIGHTS LOCAL 1121 - Zone 1*	01/02/2023	$47.27	$8.58	$21.57	$0.00	$77.42

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *MILLWRIGHT - Local 1121 Zone 1*

Effective Date - 01/02/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$26.00	$8.58	$5.72	$0.00	$40.30
2	65	$30.73	$8.58	$17.93	$0.00	$57.24
3	75	$35.45	$8.58	$18.98	$0.00	$63.01
4	85	$40.18	$8.58	$20.01	$0.00	$68.77

Notes: Step 1&2 Appr. indentured after 1/6/2020 receive no pension, but do receive annuity. (Step 1 $5.72, Step 2 $6.66)
Steps are 2,000 hours

Apprentice to Journeyworker Ratio:1:4

MORTAR MIXER *LABORERS - ZONE 1*	12/01/2023	$44.58	$9.65	$18.07	$0.00	$72.30
For apprentice rates see "Apprentice- LABORER"						
OILER (OTHER THAN TRUCK CRANES,GRADALLS) *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$24.41	$15.00	$16.40	$0.00	$55.81
	06/01/2024	$25.01	$15.00	$16.40	$0.00	$56.41
	12/01/2024	$25.67	$15.00	$16.40	$0.00	$57.07
	06/01/2025	$26.27	$15.00	$16.40	$0.00	$57.67
	12/01/2025	$26.93	$15.00	$16.40	$0.00	$58.33
	06/01/2026	$27.52	$15.00	$16.40	$0.00	$58.92
	12/01/2026	$28.19	$15.00	$16.40	$0.00	$59.59
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OILER (TRUCK CRANES, GRADALLS) *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$29.86	$15.00	$16.40	$0.00	$61.26
	06/01/2024	$30.58	$15.00	$16.40	$0.00	$61.98
	12/01/2024	$31.38	$15.00	$16.40	$0.00	$62.78
	06/01/2025	$32.10	$15.00	$16.40	$0.00	$63.50
	12/01/2025	$32.90	$15.00	$16.40	$0.00	$64.30
	06/01/2026	$33.62	$15.00	$16.40	$0.00	$65.02
	12/01/2026	$34.42	$15.00	$16.40	$0.00	$65.82
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OTHER POWER DRIVEN EQUIPMENT - CLASS II *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$54.43	$15.00	$16.40	$0.00	$85.83
	06/01/2024	$55.71	$15.00	$16.40	$0.00	$87.11
	12/01/2024	$57.15	$15.00	$16.40	$0.00	$88.55
	06/01/2025	$58.43	$15.00	$16.40	$0.00	$89.83
	12/01/2025	$59.87	$15.00	$16.40	$0.00	$91.27
	06/01/2026	$61.15	$15.00	$16.40	$0.00	$92.55
	12/01/2026	$62.59	$15.00	$16.40	$0.00	$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PAINTER (BRIDGES/TANKS) *PAINTERS LOCAL 35 - ZONE 1*	01/01/2024	$56.06	$9.95	$23.95	$0.00	$89.96
	07/01/2024	$57.26	$9.95	$23.95	$0.00	$91.16
	01/01/2025	$58.46	$9.95	$23.95	$0.00	$92.36

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 - BRIDGES/TANKS*

Effective Date - 01/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$28.03	$9.95	$0.00	$0.00	$37.98
2	55	$30.83	$9.95	$6.66	$0.00	$47.44
3	60	$33.64	$9.95	$7.26	$0.00	$50.85
4	65	$36.44	$9.95	$7.87	$0.00	$54.26
5	70	$39.24	$9.95	$20.32	$0.00	$69.51
6	75	$42.05	$9.95	$20.93	$0.00	$72.93
7	80	$44.85	$9.95	$21.53	$0.00	$76.33
8	90	$50.45	$9.95	$22.74	$0.00	$83.14

Effective Date - 07/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$28.63	$9.95	$0.00	$0.00	$38.58
2	55	$31.49	$9.95	$6.66	$0.00	$48.10
3	60	$34.36	$9.95	$7.26	$0.00	$51.57
4	65	$37.22	$9.95	$7.87	$0.00	$55.04
5	70	$40.08	$9.95	$20.32	$0.00	$70.35
6	75	$42.95	$9.95	$20.93	$0.00	$73.83
7	80	$45.81	$9.95	$21.53	$0.00	$77.29
8	90	$51.53	$9.95	$22.74	$0.00	$84.22

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (SPRAY OR SANDBLAST, NEW) *	01/01/2024	$52.75	$9.95	$23.95	$0.00	$86.65
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.*PAINTERS LOCAL 35 - ZONE 1*	07/01/2024	$53.95	$9.95	$23.95	$0.00	$87.85
	01/01/2025	$55.15	$9.95	$23.95	$0.00	$89.05

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 Zone 1 - Spray/Sandblast - New*

Effective Date - 01/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$26.38	$9.95	$0.00	$0.00	$36.33
2	55	$29.01	$9.95	$6.66	$0.00	$45.62
3	60	$31.65	$9.95	$7.26	$0.00	$48.86
4	65	$34.29	$9.95	$7.87	$0.00	$52.11
5	70	$36.93	$9.95	$20.32	$0.00	$67.20
6	75	$39.56	$9.95	$20.93	$0.00	$70.44
7	80	$42.20	$9.95	$21.53	$0.00	$73.68
8	90	$47.48	$9.95	$22.74	$0.00	$80.17

Effective Date - 07/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$26.98	$9.95	$0.00	$0.00	$36.93
2	55	$29.67	$9.95	$6.66	$0.00	$46.28
3	60	$32.37	$9.95	$7.26	$0.00	$49.58
4	65	$35.07	$9.95	$7.87	$0.00	$52.89
5	70	$37.77	$9.95	$20.32	$0.00	$68.04
6	75	$40.46	$9.95	$20.93	$0.00	$71.34
7	80	$43.16	$9.95	$21.53	$0.00	$74.64
8	90	$48.56	$9.95	$22.74	$0.00	$81.25

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (SPRAY OR SANDBLAST, REPAINT) *PAINTERS LOCAL 35 - ZONE 1*	01/01/2024	$50.81	$9.95	$23.95	$0.00	$84.71
	07/01/2024	$52.01	$9.95	$23.95	$0.00	$85.91
	01/01/2025	$53.21	$9.95	$23.95	$0.00	$87.11

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 Zone 1 - Spray/Sandblast - Repaint*

Effective Date - 01/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$25.41	$9.95	$0.00	$0.00	$35.36
2	55	$27.95	$9.95	$6.66	$0.00	$44.56
3	60	$30.49	$9.95	$7.26	$0.00	$47.70
4	65	$33.03	$9.95	$7.87	$0.00	$50.85
5	70	$35.57	$9.95	$20.32	$0.00	$65.84
6	75	$38.11	$9.95	$20.93	$0.00	$68.99
7	80	$40.65	$9.95	$21.53	$0.00	$72.13
8	90	$45.73	$9.95	$22.74	$0.00	$78.42

Effective Date - 07/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$26.01	$9.95	$0.00	$0.00	$35.96
2	55	$28.61	$9.95	$6.66	$0.00	$45.22
3	60	$31.21	$9.95	$7.26	$0.00	$48.42
4	65	$33.81	$9.95	$7.87	$0.00	$51.63
5	70	$36.41	$9.95	$20.32	$0.00	$66.68
6	75	$39.01	$9.95	$20.93	$0.00	$69.89
7	80	$41.61	$9.95	$21.53	$0.00	$73.09
8	90	$46.81	$9.95	$22.74	$0.00	$79.50

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER / TAPER (BRUSH, NEW) *	01/01/2024	$51.35	$9.95	$23.95	$0.00	$85.25
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.*PAINTERS LOCAL 35 - ZONE 1*	07/01/2024	$52.55	$9.95	$23.95	$0.00	$86.45
	01/01/2025	$53.75	$9.95	$23.95	$0.00	$87.65

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER - Local 35 Zone 1 - BRUSH NEW*

Effective Date - 01/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$25.68	$9.95	$0.00	$0.00	$35.63
2	55	$28.24	$9.95	$6.66	$0.00	$44.85
3	60	$30.81	$9.95	$7.26	$0.00	$48.02
4	65	$33.38	$9.95	$7.87	$0.00	$51.20
5	70	$35.95	$9.95	$20.32	$0.00	$66.22
6	75	$38.51	$9.95	$20.93	$0.00	$69.39
7	80	$41.08	$9.95	$21.53	$0.00	$72.56
8	90	$46.22	$9.95	$22.74	$0.00	$78.91

Effective Date - 07/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$26.28	$9.95	$0.00	$0.00	$36.23
2	55	$28.90	$9.95	$6.66	$0.00	$45.51
3	60	$31.53	$9.95	$7.26	$0.00	$48.74
4	65	$34.16	$9.95	$7.87	$0.00	$51.98
5	70	$36.79	$9.95	$20.32	$0.00	$67.06
6	75	$39.41	$9.95	$20.93	$0.00	$70.29
7	80	$42.04	$9.95	$21.53	$0.00	$73.52
8	90	$47.30	$9.95	$22.74	$0.00	$79.99

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER / TAPER (BRUSH, REPAINT) *PAINTERS LOCAL 35 - ZONE 1*	01/01/2024	$49.41	$9.95	$23.95	$0.00	$83.31
	07/01/2024	$50.61	$9.95	$23.95	$0.00	$84.51
	01/01/2025	$51.81	$9.95	$23.95	$0.00	$85.71

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 Zone 1 - BRUSH REPAINT*

Effective Date - 01/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.71	$9.95	$0.00	$0.00	$34.66
2	55	$27.18	$9.95	$6.66	$0.00	$43.79
3	60	$29.65	$9.95	$7.26	$0.00	$46.86
4	65	$32.12	$9.95	$7.87	$0.00	$49.94
5	70	$34.59	$9.95	$20.32	$0.00	$64.86
6	75	$37.06	$9.95	$20.93	$0.00	$67.94
7	80	$39.53	$9.95	$21.53	$0.00	$71.01
8	90	$44.47	$9.95	$22.74	$0.00	$77.16

Effective Date - 07/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$25.31	$9.95	$0.00	$0.00	$35.26
2	55	$27.84	$9.95	$6.66	$0.00	$44.45
3	60	$30.37	$9.95	$7.26	$0.00	$47.58
4	65	$32.90	$9.95	$7.87	$0.00	$50.72
5	70	$35.43	$9.95	$20.32	$0.00	$65.70
6	75	$37.96	$9.95	$20.93	$0.00	$68.84
7	80	$40.49	$9.95	$21.53	$0.00	$71.97
8	90	$45.55	$9.95	$22.74	$0.00	$78.24

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER TRAFFIC MARKINGS (HEAVY/HIGHWAY) *LABORERS - ZONE 1 (HEAVY & HIGHWAY)*	12/01/2023	$44.33	$9.65	$18.07	$0.00	$72.05
	06/01/2024	$45.81	$9.65	$18.07	$0.00	$73.53
	12/01/2024	$47.28	$9.65	$18.07	$0.00	$75.00
	06/01/2025	$48.78	$9.65	$18.07	$0.00	$76.50
	12/01/2025	$50.28	$9.65	$18.07	$0.00	$78.00
	06/01/2026	$51.83	$9.65	$18.07	$0.00	$79.55
	12/01/2026	$53.33	$9.65	$18.07	$0.00	$81.05
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)						
PANEL & PICKUP TRUCKS DRIVER *TEAMSTERS JOINT COUNCIL NO. 10 ZONE A*	12/01/2023	$39.88	$14.41	$18.67	$0.00	$72.96
	06/01/2024	$40.88	$14.41	$18.67	$0.00	$73.96
	08/01/2024	$40.88	$14.91	$18.67	$0.00	$74.46
	12/01/2024	$40.88	$14.91	$20.17	$0.00	$75.96
	06/01/2025	$41.88	$14.91	$20.17	$0.00	$76.96
	08/01/2025	$41.88	$15.41	$20.17	$0.00	$77.46
	12/01/2025	$41.88	$15.41	$21.78	$0.00	$79.07
	06/01/2026	$42.88	$15.41	$21.78	$0.00	$80.07
	08/01/2026	$42.88	$15.91	$21.78	$0.00	$80.57
	12/01/2026	$42.88	$15.91	$23.52	$0.00	$82.31

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PIER AND DOCK CONSTRUCTOR (UNDERPINNING AND DECK) *PILE DRIVER LOCAL 56 (ZONE 1)* For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2020	$49.07	$9.40	$23.12	$0.00	$81.59
PILE DRIVER *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2020	$49.07	$9.40	$23.12	$0.00	$81.59

Apprentice - *PILE DRIVER - Local 56 Zone 1*

Effective Date - 08/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.54	$9.40	$23.12	$0.00	$57.06
2	60	$29.44	$9.40	$23.12	$0.00	$61.96
3	70	$34.35	$9.40	$23.12	$0.00	$66.87
4	75	$36.80	$9.40	$23.12	$0.00	$69.32
5	80	$39.26	$9.40	$23.12	$0.00	$71.78
6	80	$39.26	$9.40	$23.12	$0.00	$71.78
7	90	$44.16	$9.40	$23.12	$0.00	$76.68
8	90	$44.16	$9.40	$23.12	$0.00	$76.68

Notes:

% Indentured After 10/1/17; 45/45/55/55/70/70/80/80

Step 1&2 $34.01/ 3&4 $41.46/ 5&6 $62.80/ 7&8 $69.25

Apprentice to Journeyworker Ratio:1:5

PIPEFITTER & STEAMFITTER *PIPEFITTERS LOCAL 537*	09/01/2023	$63.48	$12.70	$21.50	$0.00	$97.68
	03/01/2024	$65.28	$12.70	$21.50	$0.00	$99.48
	09/01/2024	$67.08	$12.70	$21.50	$0.00	$101.28
	03/01/2025	$68.88	$12.70	$21.50	$0.00	$103.08

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PIPEFITTER - Local 537*

Effective Date - 09/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$25.39	$12.70	$9.05	$0.00	$47.14
2	45	$28.57	$12.70	$21.50	$0.00	$62.77
3	60	$38.09	$12.70	$21.50	$0.00	$72.29
4	70	$44.44	$12.70	$21.50	$0.00	$78.64
5	80	$50.78	$12.70	$21.50	$0.00	$84.98

Effective Date - 03/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$26.11	$12.70	$9.05	$0.00	$47.86
2	45	$29.38	$12.70	$21.50	$0.00	$63.58
3	60	$39.17	$12.70	$21.50	$0.00	$73.37
4	70	$45.70	$12.70	$21.50	$0.00	$79.90
5	80	$52.22	$12.70	$21.50	$0.00	$86.42

Notes:

** 1:3; 3:15; 1:10 thereafter / Steps are 1 yr.

Refrig/AC Mechanic **1:1;1:2;2:4;3:6;4:8;5:10;6:12;7:14;8:17;9:20;10:23(Max)

Apprentice to Journeyworker Ratio:**

PIPELAYER *LABORERS - ZONE 1*	12/01/2023	$44.58	$9.65	$18.07	$0.00	$72.30
For apprentice rates see "Apprentice- LABORER"						
PIPELAYER (HEAVY & HIGHWAY) *LABORERS - ZONE 1 (HEAVY & HIGHWAY)*	12/01/2023	$44.58	$9.65	$18.07	$0.00	$72.30
	06/01/2024	$46.06	$9.65	$18.07	$0.00	$73.78
	12/01/2024	$47.53	$9.65	$18.07	$0.00	$75.25
	06/01/2025	$49.03	$9.65	$18.07	$0.00	$76.75
	12/01/2025	$50.53	$9.65	$18.07	$0.00	$78.25
	06/01/2026	$52.08	$9.65	$18.07	$0.00	$79.80
	12/01/2026	$53.58	$9.65	$18.07	$0.00	$81.30
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
PLUMBERS & GASFITTERS *PLUMBERS & GASFITTERS LOCAL 12*	09/03/2023	$66.44	$14.07	$18.86	$0.00	$99.37
	03/03/2024	$68.24	$14.07	$18.86	$0.00	$101.17
	09/01/2024	$70.04	$14.07	$18.86	$0.00	$102.97
	03/02/2025	$71.34	$14.32	$19.11	$0.00	$104.77

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PLUMBER/GASFITTER - Local 12*

Effective Date - 09/03/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	$23.25	$14.07	$6.80	$0.00	$44.12
2	40	$26.58	$14.07	$7.72	$0.00	$48.37
3	55	$36.54	$14.07	$10.51	$0.00	$61.12
4	65	$43.19	$14.07	$12.36	$0.00	$69.62
5	75	$49.83	$14.07	$14.22	$0.00	$78.12

Effective Date - 03/03/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	$23.88	$14.07	$6.80	$0.00	$44.75
2	40	$27.30	$14.07	$7.72	$0.00	$49.09
3	55	$37.53	$14.07	$10.51	$0.00	$62.11
4	65	$44.36	$14.07	$12.36	$0.00	$70.79
5	75	$51.18	$14.07	$14.22	$0.00	$79.47

Notes:
** 1:2; 2:6; 3:10; 4:14; 5:19/Steps are 1 yr
Step4 with lic$69.00, Step5 with lic$76.87

Apprentice to Journeyworker Ratio:**

PNEUMATIC CONTROLS (TEMP.) *PIPEFITTERS LOCAL 537*	09/01/2023	$63.48	$12.70	$21.50	$0.00	$97.68
	03/01/2024	$65.28	$12.70	$21.50	$0.00	$99.48
	09/01/2024	$67.08	$12.70	$21.50	$0.00	$101.28
	03/01/2025	$68.88	$12.70	$21.50	$0.00	$103.08
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
PNEUMATIC DRILL/TOOL OPERATOR *LABORERS - ZONE 1*	12/01/2023	$44.58	$9.65	$18.07	$0.00	$72.30
For apprentice rates see "Apprentice- LABORER"						
PNEUMATIC DRILL/TOOL OPERATOR (HEAVY & HIGHWAY) *LABORERS - ZONE 1 (HEAVY & HIGHWAY)*	12/01/2023	$44.58	$9.65	$18.07	$0.00	$72.30
	06/01/2024	$46.06	$9.65	$18.07	$0.00	$73.78
	12/01/2024	$47.53	$9.65	$18.07	$0.00	$75.25
	06/01/2025	$49.03	$9.65	$18.07	$0.00	$76.75
	12/01/2025	$50.53	$9.65	$18.07	$0.00	$78.25
	06/01/2026	$52.08	$9.65	$18.07	$0.00	$79.80
	12/01/2026	$53.58	$9.65	$18.07	$0.00	$81.30
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
POWDERMAN & BLASTER *LABORERS - ZONE 1*	12/01/2023	$45.33	$9.65	$18.07	$0.00	$73.05
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
POWDERMAN & BLASTER (HEAVY & HIGHWAY) *LABORERS - ZONE 1 (HEAVY & HIGHWAY)*	12/01/2023	$45.33	$9.65	$18.07	$0.00	$73.05
	06/01/2024	$46.81	$9.65	$18.07	$0.00	$74.53
	12/01/2024	$48.28	$9.65	$18.07	$0.00	$76.00
	06/01/2025	$49.78	$9.65	$18.07	$0.00	$77.50
	12/01/2025	$51.28	$9.65	$18.07	$0.00	$79.00
	06/01/2026	$52.83	$9.65	$18.07	$0.00	$80.55
	12/01/2026	$54.33	$9.65	$18.07	$0.00	$82.05
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)						
POWER SHOVEL/DERRICK/TRENCHING MACHINE *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$55.03	$15.00	$16.40	$0.00	$86.43
	06/01/2024	$56.33	$15.00	$16.40	$0.00	$87.73
	12/01/2024	$57.78	$15.00	$16.40	$0.00	$89.18
	06/01/2025	$59.08	$15.00	$16.40	$0.00	$90.48
	12/01/2025	$60.53	$15.00	$16.40	$0.00	$91.93
	06/01/2026	$61.83	$15.00	$16.40	$0.00	$93.23
	12/01/2026	$63.28	$15.00	$16.40	$0.00	$94.68
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (CONCRETE) *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$54.43	$15.00	$16.40	$0.00	$85.83
	06/01/2024	$55.71	$15.00	$16.40	$0.00	$87.11
	12/01/2024	$57.15	$15.00	$16.40	$0.00	$88.55
	06/01/2025	$58.43	$15.00	$16.40	$0.00	$89.83
	12/01/2025	$59.87	$15.00	$16.40	$0.00	$91.27
	06/01/2026	$61.15	$15.00	$16.40	$0.00	$92.55
	12/01/2026	$62.59	$15.00	$16.40	$0.00	$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (DEWATERING, OTHER) *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$35.62	$15.00	$16.40	$0.00	$67.02
	06/01/2024	$36.47	$15.00	$16.40	$0.00	$67.87
	12/01/2024	$37.42	$15.00	$16.40	$0.00	$68.82
	06/01/2025	$38.27	$15.00	$16.40	$0.00	$69.67
	12/01/2025	$39.22	$15.00	$16.40	$0.00	$70.62
	06/01/2026	$40.08	$15.00	$16.40	$0.00	$71.48
	12/01/2026	$41.03	$15.00	$16.40	$0.00	$72.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
READY MIX CONCRETE DRIVERS after 4/30/12 (Drivers Hired After 4/30/2012)*TEAMSTERS 25 (Metro) - Aggregate*	08/01/2022	$30.40	$11.91	$15.25	$0.00	$57.56
READY-MIX CONCRETE DRIVER *TEAMSTERS 25 (Metro) - Aggregate*	08/01/2022	$34.41	$11.91	$15.25	$0.00	$61.57
RECLAIMERS *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$54.43	$15.00	$16.40	$0.00	$85.83
	06/01/2024	$55.71	$15.00	$16.40	$0.00	$87.11
	12/01/2024	$57.15	$15.00	$16.40	$0.00	$88.55
	06/01/2025	$58.43	$15.00	$16.40	$0.00	$89.83
	12/01/2025	$59.87	$15.00	$16.40	$0.00	$91.27
	06/01/2026	$61.15	$15.00	$16.40	$0.00	$92.55
	12/01/2026	$62.59	$15.00	$16.40	$0.00	$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
RIDE-ON MOTORIZED BUGGY OPERATOR *LABORERS - ZONE 1*	12/01/2023	$44.58	$9.65	$18.07	$0.00	$72.30
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
ROLLER/SPREADER/MULCHING MACHINE *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$54.43	$15.00	$16.40	$0.00	$85.83
	06/01/2024	$55.71	$15.00	$16.40	$0.00	$87.11
	12/01/2024	$57.15	$15.00	$16.40	$0.00	$88.55
	06/01/2025	$58.43	$15.00	$16.40	$0.00	$89.83
	12/01/2025	$59.87	$15.00	$16.40	$0.00	$91.27
	06/01/2026	$61.15	$15.00	$16.40	$0.00	$92.55
	12/01/2026	$62.59	$15.00	$16.40	$0.00	$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
ROOFER (Inc.Roofer Waterproofng &Roofer Damproofg) *ROOFERS LOCAL 33*	08/01/2023	$50.03	$12.78	$20.20	$0.00	$83.01
	02/01/2024	$51.28	$12.78	$20.20	$0.00	$84.26
	08/01/2024	$52.78	$12.78	$20.20	$0.00	$85.76
	02/01/2025	$54.03	$12.78	$20.20	$0.00	$87.01
	08/01/2025	$55.53	$12.78	$20.20	$0.00	$88.51
	02/01/2026	$56.78	$12.78	$20.20	$0.00	$89.76

Apprentice - *ROOFER - Local 33*

Effective Date - 08/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$25.02	$12.78	$5.59	$0.00	$43.39
2	60	$30.02	$12.78	$20.20	$0.00	$63.00
3	65	$32.52	$12.78	$20.20	$0.00	$65.50
4	75	$37.52	$12.78	$20.20	$0.00	$70.50
5	85	$42.53	$12.78	$20.20	$0.00	$75.51

Effective Date - 02/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$25.64	$12.78	$5.59	$0.00	$44.01
2	60	$30.77	$12.78	$20.20	$0.00	$63.75
3	65	$33.33	$12.78	$20.20	$0.00	$66.31
4	75	$38.46	$12.78	$20.20	$0.00	$71.44
5	85	$43.59	$12.78	$20.20	$0.00	$76.57

Notes: ** 1:5, 2:6-10, the 1:10; Reroofing: 1:4, then 1:1
Step 1 is 2000 hrs.; Steps 2-5 are 1000 hrs.
(Hot Pitch Mechanics' receive $1.00 hr. above ROOFER)

Apprentice to Journeyworker Ratio:**

ROOFER SLATE / TILE / PRECAST CONCRETE *ROOFERS LOCAL 33*	08/01/2023	$50.28	$12.78	$20.20	$0.00	$83.26
	02/01/2024	$51.53	$12.78	$20.20	$0.00	$84.51
	08/01/2024	$53.03	$12.78	$20.20	$0.00	$86.01
	02/01/2025	$54.28	$12.78	$20.20	$0.00	$87.26
	08/01/2025	$55.78	$12.78	$20.20	$0.00	$88.76
	02/01/2026	$57.03	$12.78	$20.20	$0.00	$90.01
For apprentice rates see "Apprentice- ROOFER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
SHEETMETAL WORKER *SHEETMETAL WORKERS LOCAL 17 - A*	08/01/2023	$56.16	$14.43	$27.07	$2.93	$100.59
	02/01/2024	$57.86	$14.43	$27.07	$2.93	$102.29
	08/01/2024	$59.61	$14.43	$27.07	$2.93	$104.04
	02/01/2025	$61.36	$14.43	$27.07	$2.93	$105.79
	08/01/2025	$63.21	$14.43	$27.07	$2.93	$107.64
	02/01/2026	$65.16	$14.43	$27.07	$2.93	$109.59

Apprentice - *SHEET METAL WORKER - Local 17-A*

Effective Date - 08/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	42	$23.59	$14.43	$6.13	$0.00	$44.15
2	42	$23.59	$14.43	$6.13	$0.00	$44.15
3	47	$26.40	$14.43	$12.11	$1.59	$54.53
4	47	$26.40	$14.43	$12.11	$1.59	$54.53
5	52	$29.20	$14.43	$13.09	$1.70	$58.42
6	52	$29.20	$14.43	$13.34	$1.70	$58.67
7	60	$33.70	$14.43	$14.75	$1.89	$64.77
8	65	$36.50	$14.43	$15.73	$2.00	$68.66
9	75	$42.12	$14.43	$17.69	$2.23	$76.47
10	85	$47.74	$14.43	$19.15	$2.44	$83.76

Effective Date - 02/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	42	$24.30	$14.43	$6.13	$0.00	$44.86
2	42	$24.30	$14.43	$6.13	$0.00	$44.86
3	47	$27.19	$14.43	$12.11	$1.61	$55.34
4	47	$27.19	$14.43	$12.11	$1.61	$55.34
5	52	$30.09	$14.43	$13.09	$1.73	$59.34
6	52	$30.09	$14.43	$13.34	$1.73	$59.59
7	60	$34.72	$14.43	$14.75	$1.92	$65.82
8	65	$37.61	$14.43	$15.73	$2.03	$69.80
9	75	$43.40	$14.43	$17.69	$2.27	$77.79
10	85	$49.18	$14.43	$19.15	$2.48	$85.24

Notes:
Steps are 6 mos.

Apprentice to Journeyworker Ratio:1:4

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
SPECIALIZED EARTH MOVING EQUIP < 35 TONS *TEAMSTERS JOINT COUNCIL NO. 10 ZONE A*	12/01/2023	$40.34	$14.41	$18.67	$0.00	$73.42
	06/01/2024	$41.34	$14.41	$18.67	$0.00	$74.42
	08/01/2024	$41.34	$14.91	$18.67	$0.00	$74.92
	12/01/2024	$41.34	$14.91	$20.17	$0.00	$76.42
	06/01/2025	$42.34	$14.91	$20.17	$0.00	$77.42
	08/01/2025	$42.34	$15.41	$20.17	$0.00	$77.92
	12/01/2025	$42.34	$15.41	$21.78	$0.00	$79.53
	06/01/2026	$43.34	$15.41	$21.78	$0.00	$80.53
	08/01/2026	$43.34	$15.91	$21.78	$0.00	$81.03
	12/01/2026	$43.34	$15.91	$23.52	$0.00	$82.77
SPECIALIZED EARTH MOVING EQUIP > 35 TONS *TEAMSTERS JOINT COUNCIL NO. 10 ZONE A*	12/01/2023	$40.63	$14.41	$18.67	$0.00	$73.71
	06/01/2024	$41.63	$14.41	$18.67	$0.00	$74.71
	08/01/2024	$41.63	$14.91	$18.67	$0.00	$75.21
	12/01/2024	$41.63	$14.91	$20.17	$0.00	$76.71
	06/01/2025	$42.63	$14.91	$20.17	$0.00	$77.71
	08/01/2025	$42.63	$15.41	$20.17	$0.00	$78.21
	12/01/2025	$42.63	$15.41	$21.78	$0.00	$79.82
	06/01/2026	$43.63	$15.41	$21.78	$0.00	$80.82
	08/01/2026	$43.63	$15.91	$21.78	$0.00	$81.32
	12/01/2026	$43.63	$15.91	$23.52	$0.00	$83.06
SPRINKLER FITTER *SPRINKLER FITTERS LOCAL 550 - (Section A) Zone 1*	10/01/2023	$67.95	$10.90	$23.20	$0.00	$102.05
	03/01/2024	$69.75	$10.90	$23.20	$0.00	$103.85
	10/01/2024	$71.55	$10.90	$23.20	$0.00	$105.65
	03/01/2025	$73.35	$10.90	$23.20	$0.00	$107.45

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *SPRINKLER FITTER - Local 550 (Section A) Zone 1*

Effective Date - 10/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	$23.78	$10.90	$12.80	$0.00	$47.48
2	40	$27.18	$10.90	$13.60	$0.00	$51.68
3	45	$30.58	$10.90	$14.40	$0.00	$55.88
4	50	$33.98	$10.90	$15.20	$0.00	$60.08
5	55	$37.37	$10.90	$16.00	$0.00	$64.27
6	60	$40.77	$10.90	$16.80	$0.00	$68.47
7	65	$44.17	$10.90	$17.60	$0.00	$72.67
8	70	$47.57	$10.90	$18.40	$0.00	$76.87
9	75	$50.96	$10.90	$19.20	$0.00	$81.06
10	80	$54.36	$10.90	$20.00	$0.00	$85.26

Effective Date - 03/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	$24.41	$10.90	$12.80	$0.00	$48.11
2	40	$27.90	$10.90	$13.60	$0.00	$52.40
3	45	$31.39	$10.90	$14.40	$0.00	$56.69
4	50	$34.88	$10.90	$15.20	$0.00	$60.98
5	55	$38.36	$10.90	$16.00	$0.00	$65.26
6	60	$41.85	$10.90	$16.80	$0.00	$69.55
7	65	$45.34	$10.90	$17.60	$0.00	$73.84
8	70	$48.83	$10.90	$18.40	$0.00	$78.13
9	75	$52.31	$10.90	$19.20	$0.00	$82.41
10	80	$55.80	$10.90	$20.00	$0.00	$86.70

Notes: Apprentice entered prior 9/30/10:
40/45/50/55/60/65/70/75/80/85
Steps are 850 hours

Apprentice to Journeyworker Ratio:1:3

STEAM BOILER OPERATOR *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$54.43	$15.00	$16.40	$0.00	$85.83
	06/01/2024	$55.71	$15.00	$16.40	$0.00	$87.11
	12/01/2024	$57.15	$15.00	$16.40	$0.00	$88.55
	06/01/2025	$58.43	$15.00	$16.40	$0.00	$89.83
	12/01/2025	$59.87	$15.00	$16.40	$0.00	$91.27
	06/01/2026	$61.15	$15.00	$16.40	$0.00	$92.55
	12/01/2026	$62.59	$15.00	$16.40	$0.00	$93.99

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TAMPERS, SELF-PROPELLED OR TRACTOR DRAWN *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$54.43	$15.00	$16.40	$0.00	$85.83
	06/01/2024	$55.71	$15.00	$16.40	$0.00	$87.11
	12/01/2024	$57.15	$15.00	$16.40	$0.00	$88.55
	06/01/2025	$58.43	$15.00	$16.40	$0.00	$89.83
	12/01/2025	$59.87	$15.00	$16.40	$0.00	$91.27
	06/01/2026	$61.15	$15.00	$16.40	$0.00	$92.55
	12/01/2026	$62.59	$15.00	$16.40	$0.00	$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TELECOMMUNICATION TECHNICIAN *ELECTRICIANS LOCAL 103*	09/01/2023	$49.11	$13.00	$19.68	$0.00	$81.79
	03/01/2024	$49.49	$13.00	$20.19	$0.00	$82.68
	09/01/2024	$51.02	$13.00	$20.24	$0.00	$84.26
	03/01/2025	$51.98	$13.00	$20.27	$0.00	$85.25
	09/01/2025	$53.51	$13.00	$20.32	$0.00	$86.83
	03/01/2026	$54.47	$13.00	$20.34	$0.00	$87.81
	09/01/2026	$56.00	$13.00	$20.39	$0.00	$89.39
	03/01/2027	$56.95	$13.00	$20.42	$0.00	$90.37
	09/01/2027	$58.49	$13.00	$20.46	$0.00	$91.95
	03/01/2028	$59.45	$13.00	$20.49	$0.00	$92.94

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *TELECOMMUNICATION TECHNICIAN - Local 103*

Effective Date - 09/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	$22.10	$13.00	$0.66	$0.00	$35.76
2	45	$22.10	$13.00	$0.66	$0.00	$35.76
3	50	$24.56	$13.00	$15.66	$0.00	$53.22
4	50	$24.56	$13.00	$15.66	$0.00	$53.22
5	55	$27.01	$13.00	$16.06	$0.00	$56.07
6	60	$29.47	$13.00	$16.46	$0.00	$58.93
7	65	$31.92	$13.00	$16.87	$0.00	$61.79
8	70	$34.38	$13.00	$17.27	$0.00	$64.65
9	75	$36.83	$13.00	$17.67	$0.00	$67.50
10	80	$39.29	$13.00	$18.07	$0.00	$70.36

Effective Date - 03/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	$22.27	$13.00	$0.67	$0.00	$35.94
2	45	$22.27	$13.00	$0.67	$0.00	$35.94
3	50	$24.75	$13.00	$16.16	$0.00	$53.91
4	50	$24.75	$13.00	$16.16	$0.00	$53.91
5	55	$27.22	$13.00	$16.57	$0.00	$56.79
6	60	$29.69	$13.00	$16.97	$0.00	$59.66
7	65	$32.17	$13.00	$17.38	$0.00	$62.55
8	70	$34.64	$13.00	$17.78	$0.00	$65.42
9	75	$37.12	$13.00	$18.18	$0.00	$68.30
10	80	$39.59	$13.00	$18.58	$0.00	$71.17

Notes:

Apprentice to Journeyworker Ratio:1:1

TERRAZZO FINISHERS *BRICKLAYERS LOCAL 3 - MARBLE & TILE*	08/01/2023	$61.34	$11.49	$22.34	$0.00	$95.17
	02/01/2024	$62.59	$11.49	$22.34	$0.00	$96.42
	08/01/2024	$64.69	$11.49	$22.34	$0.00	$98.52
	02/01/2025	$65.99	$11.49	$22.34	$0.00	$99.82
	08/01/2025	$68.14	$11.49	$22.34	$0.00	$101.97
	02/01/2026	$69.49	$11.49	$22.34	$0.00	$103.32
	08/01/2026	$71.69	$11.49	$22.34	$0.00	$105.52
	02/01/2027	$73.09	$11.49	$22.34	$0.00	$106.92

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *TERRAZZO FINISHER - Local 3 Marble & Tile*

Effective Date - 08/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$30.67	$11.49	$22.34	$0.00	$64.50
2	60	$36.80	$11.49	$22.34	$0.00	$70.63
3	70	$42.94	$11.49	$22.34	$0.00	$76.77
4	80	$49.07	$11.49	$22.34	$0.00	$82.90
5	90	$55.21	$11.49	$22.34	$0.00	$89.04

Effective Date - 02/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$31.30	$11.49	$22.34	$0.00	$65.13
2	60	$37.55	$11.49	$22.34	$0.00	$71.38
3	70	$43.81	$11.49	$22.34	$0.00	$77.64
4	80	$50.07	$11.49	$22.34	$0.00	$83.90
5	90	$56.33	$11.49	$22.34	$0.00	$90.16

Notes:

Apprentice to Journeyworker Ratio:1:3

TEST BORING DRILLER *LABORERS - FOUNDATION AND MARINE*	12/01/2023	$48.33	$9.65	$18.22	$0.00	$76.20
	06/01/2024	$49.81	$9.65	$18.22	$0.00	$77.68
	12/01/2024	$51.28	$9.65	$18.22	$0.00	$79.15
	06/01/2025	$52.78	$9.65	$18.22	$0.00	$80.65
	12/01/2025	$54.28	$9.65	$18.22	$0.00	$82.15
	06/01/2026	$55.83	$9.65	$18.22	$0.00	$83.70
	12/01/2026	$57.33	$9.65	$18.22	$0.00	$85.20
For apprentice rates see "Apprentice- LABORER"						
TEST BORING DRILLER HELPER *LABORERS - FOUNDATION AND MARINE*	12/01/2023	$44.45	$9.65	$18.22	$0.00	$72.32
	06/01/2024	$45.93	$9.65	$18.22	$0.00	$73.80
	12/01/2024	$47.40	$9.65	$18.22	$0.00	$75.27
	06/01/2025	$48.90	$9.65	$18.22	$0.00	$76.77
	12/01/2025	$50.40	$9.65	$18.22	$0.00	$78.27
	06/01/2026	$51.95	$9.65	$18.22	$0.00	$79.82
	12/01/2026	$53.45	$9.65	$18.22	$0.00	$81.32
For apprentice rates see "Apprentice- LABORER"						
TEST BORING LABORER *LABORERS - FOUNDATION AND MARINE*	12/01/2023	$44.33	$9.65	$18.22	$0.00	$72.20
	06/01/2024	$45.81	$9.65	$18.22	$0.00	$73.68
	12/01/2024	$47.28	$9.65	$18.22	$0.00	$75.15
	06/01/2025	$48.78	$9.65	$18.22	$0.00	$76.65
	12/01/2025	$50.28	$9.65	$18.22	$0.00	$78.15
	06/01/2026	$51.83	$9.65	$18.22	$0.00	$79.70
	12/01/2026	$53.33	$9.65	$18.22	$0.00	$81.20
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TRACTORS/PORTABLE STEAM GENERATORS *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$54.43	$15.00	$16.40	$0.00	$85.83
	06/01/2024	$55.71	$15.00	$16.40	$0.00	$87.11
	12/01/2024	$57.15	$15.00	$16.40	$0.00	$88.55
	06/01/2025	$58.43	$15.00	$16.40	$0.00	$89.83
	12/01/2025	$59.87	$15.00	$16.40	$0.00	$91.27
	06/01/2026	$61.15	$15.00	$16.40	$0.00	$92.55
	12/01/2026	$62.59	$15.00	$16.40	$0.00	$93.99
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TRAILERS FOR EARTH MOVING EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE A*	12/01/2023	$40.92	$14.41	$18.67	$0.00	$74.00
	06/01/2024	$41.92	$14.41	$18.67	$0.00	$75.00
	08/01/2024	$41.92	$14.91	$18.67	$0.00	$75.50
	12/01/2024	$41.92	$14.91	$20.17	$0.00	$77.00
	06/01/2025	$42.92	$14.91	$20.17	$0.00	$78.00
	08/01/2025	$42.92	$15.41	$20.17	$0.00	$78.50
	12/01/2025	$42.92	$15.41	$21.78	$0.00	$80.11
	06/01/2026	$43.92	$15.41	$21.78	$0.00	$81.11
	08/01/2026	$43.92	$15.91	$21.78	$0.00	$81.61
	12/01/2026	$43.92	$15.91	$23.52	$0.00	$83.35
TUNNEL WORK - COMPRESSED AIR *LABORERS (COMPRESSED AIR)*	12/01/2023	$56.56	$9.65	$18.67	$0.00	$84.88
	06/01/2024	$58.04	$9.65	$18.67	$0.00	$86.36
	12/01/2024	$59.51	$9.65	$18.67	$0.00	$87.83
	06/01/2025	$61.01	$9.65	$18.67	$0.00	$89.33
	12/01/2025	$62.51	$9.65	$18.67	$0.00	$90.83
	06/01/2026	$64.06	$9.65	$18.67	$0.00	$92.38
	12/01/2026	$65.56	$9.65	$18.67	$0.00	$93.88
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE) *LABORERS (COMPRESSED AIR)*	12/01/2023	$58.56	$9.65	$18.67	$0.00	$86.88
	06/01/2024	$60.04	$9.65	$18.67	$0.00	$88.36
	12/01/2024	$61.51	$9.65	$18.67	$0.00	$89.83
	06/01/2025	$63.01	$9.65	$18.67	$0.00	$91.33
	12/01/2025	$64.51	$9.65	$18.67	$0.00	$92.83
	06/01/2026	$66.06	$9.65	$18.67	$0.00	$94.38
	12/01/2026	$67.56	$9.65	$18.67	$0.00	$95.88
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR *LABORERS (FREE AIR TUNNEL)*	12/01/2023	$48.63	$9.65	$18.67	$0.00	$76.95
	06/01/2024	$50.11	$9.65	$18.67	$0.00	$78.43
	12/01/2024	$51.58	$9.65	$18.67	$0.00	$79.90
	06/01/2025	$53.08	$9.65	$18.67	$0.00	$81.40
	12/01/2025	$54.58	$9.65	$18.67	$0.00	$82.90
	06/01/2026	$56.13	$9.65	$18.67	$0.00	$84.45
	12/01/2026	$57.63	$9.65	$18.67	$0.00	$85.95
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TUNNEL WORK - FREE AIR (HAZ. WASTE) *LABORERS (FREE AIR TUNNEL)*	12/01/2023	$50.63	$9.65	$18.67	$0.00	$78.95
	06/01/2024	$52.11	$9.65	$18.67	$0.00	$80.43
	12/01/2024	$53.58	$9.65	$18.67	$0.00	$81.90
	06/01/2025	$55.08	$9.65	$18.67	$0.00	$83.40
	12/01/2025	$56.58	$9.65	$18.67	$0.00	$84.90
	06/01/2026	$58.13	$9.65	$18.67	$0.00	$86.45
	12/01/2026	$59.63	$9.65	$18.67	$0.00	$87.95
For apprentice rates see "Apprentice- LABORER"						
VAC-HAUL *TEAMSTERS JOINT COUNCIL NO. 10 ZONE A*	12/01/2023	$40.34	$14.41	$18.67	$0.00	$73.42
	06/01/2024	$41.34	$14.41	$18.67	$0.00	$74.42
	08/01/2024	$41.34	$14.91	$18.67	$0.00	$74.92
	12/01/2024	$41.34	$14.91	$20.17	$0.00	$76.42
	06/01/2025	$42.34	$14.91	$20.17	$0.00	$77.42
	08/01/2025	$42.34	$15.41	$20.17	$0.00	$77.92
	12/01/2025	$42.34	$15.41	$21.78	$0.00	$79.53
	06/01/2026	$43.34	$15.41	$21.78	$0.00	$80.53
	08/01/2026	$43.34	$15.91	$21.78	$0.00	$81.03
	12/01/2026	$43.34	$15.91	$23.52	$0.00	$82.77
WAGON DRILL OPERATOR *LABORERS - ZONE 1*	12/01/2023	$44.58	$9.65	$18.07	$0.00	$72.30
For apprentice rates see "Apprentice- LABORER"						
WAGON DRILL OPERATOR (HEAVY & HIGHWAY) *LABORERS - ZONE 1 (HEAVY & HIGHWAY)*	12/01/2023	$44.58	$9.65	$18.07	$0.00	$72.30
	06/01/2024	$46.06	$9.65	$18.07	$0.00	$73.78
	12/01/2024	$47.53	$9.65	$18.07	$0.00	$75.25
	06/01/2025	$49.03	$9.65	$18.07	$0.00	$76.75
	12/01/2025	$50.53	$9.65	$18.07	$0.00	$78.25
	06/01/2026	$52.08	$9.65	$18.07	$0.00	$79.80
	12/01/2026	$53.58	$9.65	$18.07	$0.00	$81.30
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
WASTE WATER PUMP OPERATOR *OPERATING ENGINEERS LOCAL 4*	12/01/2023	$55.03	$15.00	$16.40	$0.00	$86.43
	06/01/2024	$56.33	$15.00	$16.40	$0.00	$87.73
	12/01/2024	$57.78	$15.00	$16.40	$0.00	$89.18
	06/01/2025	$59.08	$15.00	$16.40	$0.00	$90.48
	12/01/2025	$60.53	$15.00	$16.40	$0.00	$91.93
	06/01/2026	$61.83	$15.00	$16.40	$0.00	$93.23
	12/01/2026	$63.28	$15.00	$16.40	$0.00	$94.68
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
WATER METER INSTALLER *PLUMBERS & GASFITTERS LOCAL 12*	09/03/2023	$66.44	$14.07	$18.86	$0.00	$99.37
	03/03/2024	$68.24	$14.07	$18.86	$0.00	$101.17
	09/01/2024	$70.04	$14.07	$18.86	$0.00	$102.97
	03/02/2025	$71.34	$14.32	$19.11	$0.00	$104.77
For apprentice rates see "Apprentice- PLUMBER/PIPEFITTER" or "PLUMBER/GASFITTER"						
Marine Drilling						
BLASTER *MARINE DRILLING*	01/01/2018	$41.82	$7.63	$3.60	$0.00	$53.05
BOAT CAPTAIN *MARINE DRILLING*	01/01/2018	$33.87	$7.63	$3.30	$0.00	$44.80

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
BOAT CAPTAIN / Over 1,000 hp *MARINE DRILLING*	01/01/2018	$38.06	$7.63	$3.60	$0.00	$49.29
CORE DRILLER *MARINE DRILLING*	01/01/2018	$31.43	$7.63	$2.90	$0.00	$41.96
CORE DRILLER HELPER *MARINE DRILLING*	01/01/2018	$28.47	$7.63	$3.00	$0.00	$39.10
DRILLER *MARINE DRILLING*	01/01/2018	$39.70	$7.63	$3.60	$0.00	$50.93
ENGINEER *MARINE DRILLING*	01/01/2018	$39.69	$7.63	$3.50	$0.00	$50.82
HELPER *MARINE DRILLING*	01/01/2018	$34.24	$7.63	$3.00	$0.00	$44.87
MACHINIST *MARINE DRILLING*	01/01/2018	$38.88	$7.63	$3.30	$0.00	$49.81
OILER - MARINE DRILLING *MARINE DRILLING*	01/01/2018	$34.24	$7.63	$3.00	$0.00	$44.87
TUG DECKHAND *MARINE DRILLING*	01/01/2018	$27.61	$7.63	$3.00	$0.00	$38.24
WELDER *MARINE DRILLING*	01/01/2018	$38.88	$7.63	$3.30	$0.00	$49.81
Op Eng Marine (Dredging Work)						
BOAT OPERATOR *OPERATING ENGINEERS - MARINE DIVISION*	10/01/2017	$29.26	$7.63	$3.30	$0.00	$40.19
CERTIFIED WELDER *OPERATING ENGINEERS - MARINE DIVISION*	10/01/2017	$31.09	$7.63	$3.60	$0.00	$42.32
CHIEF WELDER/ CHIEF MATE *OPERATING ENGINEERS - MARINE DIVISION*	10/01/2017	$33.02	$7.63	$3.60	$0.00	$44.25
DERRICK / SPIDER / SPILLBARGE OPERATOR *OPERATING ENGINEERS - MARINE DIVISION*	10/01/2017	$33.02	$7.63	$3.60	$0.00	$44.25
DRAG BARGE OPERATOR / WELDER / MATE *OPERATING ENGINEERS - MARINE DIVISION*	10/01/2017	$30.24	$7.63	$3.30	$0.00	$41.17
ENGINEER / ELECTRICIAN *OPERATING ENGINEERS - MARINE DIVISION*	10/01/2017	$33.02	$7.63	$3.60	$0.00	$44.25
LICENSED BOAT OPERATOR *OPERATING ENGINEERS - MARINE DIVISION*	10/01/2017	$33.02	$7.63	$3.60	$0.00	$44.25
LICENSED TUG OPERATOR OVER 1000HP *OPERATING ENGINEERS - MARINE DIVISION*	10/01/2017	$38.18	$7.63	$3.60	$0.00	$49.41
MAINTENANCE ENGINEER *OPERATING ENGINEERS - MARINE DIVISION*	10/01/2017	$33.03	$7.63	$3.60	$0.00	$44.26
OILER - MARINE DIVISION *OPERATING ENGINEERS - MARINE DIVISION*	10/01/2017	$24.30	$7.63	$3.00	$0.00	$34.93
OPERATOR / LEVERMAN *OPERATING ENGINEERS - MARINE DIVISION*	10/01/2017	$38.18	$7.63	$3.60	$0.00	$49.41
RODMAN / SCOWMAN *OPERATING ENGINEERS - MARINE DIVISION*	10/01/2017	$24.30	$7.63	$3.00	$0.00	$34.93
SHOREMAN / DECKHAND *OPERATING ENGINEERS - MARINE DIVISION*	10/01/2017	$24.30	$7.63	$3.00	$0.00	$34.93

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Additional Apprentice Information:

Minimum wage rates for apprentices employed on public works projects are listed above as a percentage of the pre-determined hourly wage rate established by the Commissioner under the provisions of the M.G.L. c. 149, ss. 26-27D. Apprentice ratios are established by the Division of Apprenticeship Training pursuant to M.G.L. c. 23, ss. 11E-11L.

All apprentices must be registered with the Division of Apprenticeship Training in accordance with M.G.L. c. 23, ss. 11E-11L.

All steps are six months (1000 hours.)
Ratios are expressed in allowable number of apprentices to journeymen or fraction thereof, unless otherwise specified.

** Multiple ratios are listed in the comment field.
*** APP to JM; 1:1, 2:2, 2:3, 3:4, 4:4, 4:5, 4:6, 5:7, 6:7, 6:8, 6:9, 7:10, 8:10, 8:11, 8:12, 9:13, 10:13, 10:14, etc.
**** APP to JM; 1:1, 1:2, 2:3, 2:4, 3:5, 4:6, 4:7, 5:8, 6:9, 6:10, 7:11, 8:12, 8:13, 9:14, 10:15, 10:16, etc.

DOCUMENT 00870

STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS
(EXECUTIVE ORDER 11246)
Revised April 9, 2019

1. As used in these specifications:

   a. "Covered area" means the geographical area described in the solicitation from which this contract resulted:

   b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority.

   c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.

   d. "Minority" includes:

      (i) Black (all persons having origins in any of the black African racial groups not of Hispanic origin);
      (ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
      (iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
      (iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of $ 10,000 the provisions of the specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in Paragraphs 7a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. The Contractor is expected to make substantially uniform progress toward its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

    a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

    b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

    c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.

    d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

    e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.

    f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

    g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

    h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment efforts both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisor's adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these Specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female work force participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).

10. The Contractor shall not use the goals and timetables of affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

11 The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as many be required by the Government and keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

APPENDIX A

The following goals and timetables for female utilization shall be included in all Federal and federally assisted construction contracts and subcontracts in excess of $ 10,000. The goals are applicable to the Contractor's aggregate on-site construction workforce whether or not part of that workforce is performing work on a Federal or federally-assisted construction contract or subcontract.

Area covered: Goal for Women apply nationwide

Goals and Timetables

Timetable	Goals (percent)
From Apr. 1, 1980 until further notice	6.9

APPENDIX B-80

Until further notice, the following goals for minority utilization in each construction craft and trade shall included in all Federal or federally assisted construction contracts and subcontracts in excess of $ 10,000 to be performed in the respective geographical areas. The goals are applicable to each nonexempt contractor's total on- site construction workforce, regardless of whether or not part of that workforce is performing work on a Federal, federally assisted or nonfederally related project, contract or subcontract.

Construction contractors participating in an approved Hometown Plan (see 41 CFR 6-4.5) are required to comply with the goals of the Hometown Plan with regard to construction work they perform in the area covered by the Hometown Plan. With regard to all their other covered construction work, such contractors are required to comply with the applicable SMSA or EA goal contained in this Appendix B-80.

Economic Areas

STATE:	Goals (percent)
MASSACHUSETTS	
004 Boston MA: SMSA Counties: 1123 Boston-Lowell-Brockton-Lawrence-Haverhill, MA-NH	4.0
MA Essex, MA Middlesex, MA Norfolk, MA Plymouth, MA Suffolk, NH Rockingham.	
5403 Fall River- New Bedford MA, Bristol	1.6
9243 Worcester-Fitchburg-Leominster, MA	1.6
6323 Springfield-Chicopee-Holyoke MA-CT MA Hampden, MA Hampshire	4.8
Non-SMSA Counties: MA Barnstable, MA Dukes, MA Nantucket	3.6
Non-SMSA Counties: MA Franklin	5.9

APPENDIX C

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

1. **Compliance with Regulations:** The contractor (hereinafter includes consultants) will comply with the Acts and Regulations relative to Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, Federal Highway Administration (FHWA), as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.

2. **Non-discrimination:** The contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, national origin (including limited English proficiency), age, sex, disability, or low-income status in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor will not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.

3. **Solicitations for Subcontractors, including Procurements of Materials and Equipment:** In all solicitations, either by competitive bidding, or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the contractor of the contractor's obligations under this contract and the Acts and the Regulations relative to nondiscrimination on the grounds of race, color, national origin (including limited English proficiency), age, sex, disability, or low-income status.

4. **Information and Reports:** The contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto, and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Massachusetts Department of Transportation (MassDOT) or FHWA to be pertinent to ascertain compliance with such Acts, Regulations, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, the contractor will so certify to MassDOT or FHWA, as appropriate, and will set forth what efforts it has made to obtain the information.

5. **Sanctions for Noncompliance:** In the event of a contractor's noncompliance with the Nondiscrimination provisions of this contract, MassDOT will impose such contract sanctions as it or FHWA may determine to be appropriate, including, but not limited to:

    a. withholding payments to the contractor under the contract until the contractor complies; and/or
    b. cancelling, terminating, or suspending a control, in whole or in part.

6. **Incorporation of Provisions:** The contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations, and directives issued pursuant thereto. The contractor will take action with respect to any subcontract or procurement as MassDOT or FHWA may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the contractor may request MassDOT to enter into any litigation to protect the interests of MassDOT. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

APPENDIX D

During the performance of this contact, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor," which includes consultants) agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

PERTINENT NON-DISCRIMINATION AUTHORITIES:

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d *et seq.*, 78 stat. 252) (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21

- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 U.S.C. § 4601) (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-Aid programs and projects)

- Federal-Aid Highway Act of 1973 (23 U.S.C. § 324 *et seq.*) (prohibits discrimination on the basis of sex)

- Section 504 of the Rehabilitation Act of 1973 (29 U.S.C. § 794 *et seq.*), as amended (prohibits discrimination on the basis of disability) and 49 CFR Part 27

- The Age Discrimination Act of 1975, as amended (42 U.S.C. § 6101 *et seq.*) (prohibits discrimination on the basis of age)

- Airport and Airway Improvement Act of 1982 (49 U.S.C. § 471, Section 47123), as amended (prohibits discrimination based on race, creed, color, national origin, or sex)

- The Civil Rights Restoration Act of 1987 (PL 100-209) (broadened the scope, coverage, and applicability of Title VI of the Civil Rights Act of 1964, the Age Discrimination Act of 1975, and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of Federal-Aid recipients, sub-recipients, and contractors, whether such programs or activities are Federally funded or not)

- Titles II and III of the Americans with Disabilities Act (42 U.S.C. §§ 12131-12189), as implemented by Department of Transportation regulations at 49 CFR parts 37 and 38 (prohibits discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities)

- The Federal Aviation Administration's Non-Discrimination Statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex)

- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (ensures discrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations)

- Executive Order 13166, Improving Access to Services for People with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100)

- Title IX of the Education Amendments Act of 1972, as amended (20 U.S.C. 1681 *et seq*.) (prohibits discrimination on the basis of sex in education programs or activities)

*** END OF DOCUMENT ***

DOCUMENT 00875

TRAINEE SPECIAL PROVISIONS
Revised October, 2016

THE REQUIRED NUMBER OF TRAINEES TO BE TRAINED UNDER THIS CONTRACT WILL BE **1**

The contractor shall provide on-the job training aimed at developing full journeyworkers in the type of trade of job classification involved.

In the event that a contractor subcontracts a portion of the contract work, the General Contractor shall determine how many, if any, of the trainees are to be trained by the subcontractor, provided, however, that the contractor shall retain the primary responsibility for meeting the training requirements imposed by this special provision. The contractor shall also insure that this training special provision is made applicable to such subcontract. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training.

The number of trainees shall be distributed among the work classifications on the basis of the contractor's needs and the availability of journeyworkers in the various classifications within a reasonable area of recruitment. Prior to commencing construction, the contractor shall submit to the Massachusetts Department Of Transportation (MassDOT) for approval the number of trainees to be trained in each selected classification and training program to be used. Furthermore, the contractor shall specify the starting time for training in each of the classifications. The contractor will be credited for each trainee employed on the contract work who is currently enrolled or becomes enrolled in an approved program and will be reimbursed for such trainees as provided hereinafter.

Training and upgrading of minorities and women toward journeyworker status is a primary objective of the Training Special Provision. Accordingly, the contractor shall make every effort to enroll minority and women trainees (e.g., by conducting systematic and direct recruitment through public and private sources likely to yield minority and women trainees) to the extent that such persons are available within a reasonable area of recruitment. The contractor will be responsible for demonstrating the steps that have been taken in pursuance thereof, prior to a determination as to whether the contractor is in compliance with this Training Special Provision. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training.

No employee shall be trained under this Special Provision in any classification in which he or she has successfully completed a training course leading to journeyworker status or in which he or she has been employed as a journeyworker. The contractor should satisfy this requirement by including appropriate questions in the employee application or by other suitable means. Regardless of the method used the contractor's records should document the finding in each case.

The minimum length and type of training for each classification will be as established in the training program selected by the contractor and approved by the Massachusetts Department Of Transportation and the Federal Highway Administration. The Massachusetts Department Of Transportation and the Federal Highway Administration shall approve a program if it is reasonably calculated to meet the equal employment opportunity obligations of the contractor and to qualify the average trainee for journeyworker status in the classification concerned by the end of the training period. Furthermore, apprenticeship programs registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau and training programs approved but not necessarily sponsored by the U.S. Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training shall also be considered acceptable provided it is being administered in a manner consistent with the equal employment obligations of Federal-aid highway construction contracts. Approval or acceptance of a training program shall be obtained from the State prior to commencing work on the classification covered by the program. It is the intention of these provisions that training is to be provided in the construction crafts rather that clerk-typist or secretarial-type positions. Training is permissible in lower level management positions such as office engineers, estimators, timekeepers, etc. where the training is oriented toward construction applications. Training in the laborer classification may be permitted provided that significant and meaningful training is provided and approved by the Federal Highway Administration division office. Some offsite training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

Reimbursement

Under these Training Special Provisions, reimbursement will be as follows:

The Contractor will only be reimbursed 80 cents for each hour of on the job training as specified in the approved Training Program.

The Contractor is advised and encouraged that it may train additional persons in excess of the number specified and will be reimbursed as stated above. Reimbursement will be made even though the contractor receives additional training program funds from other sources, provided such other source does not specifically prohibit the contractor from receiving other reimbursement.

If less than full training specified in the approved training programs is provided, payment to the contractor will be made at a rate of 80 cents for each hour of training completed under this contract. However, no payment shall be made to the contractor if either the failure to provide the required training, or the failure to hire the trainee as a journeyworker, is caused by the contractor and evidences a lack of good faith on the part of the contractor in meeting the requirements of this Training Special Provision.

Payment

Trainees will be paid:

1. Percentage (%) of the journeyworker's rate as provided in the existing programs approved by the Department of Labor or Transportation as of September 15, 1970.

2. For journeyworker programs submitted by the Contractor and approved by Massachusetts Department Of Transportation and the Federal Highway Administration at least 60 percent of the appropriate minimum journeyworker's rate specified in the contract for the first half of the training period, 75 percent for the third quarter if the training period, and 90 percent for the last quarter of the training period.

3. For skilled laborer programs, the minimum starting wage rate of unskilled laborer. At the conclusion of training, he or she will be paid the minimum wage rate of the Classification for programs submitted by the Contractor and approved by the Massachusetts Department Of Transportation and the Federal Highway Administration.

4. For the purposes of meeting the legal requirements of State Prevailing Wage Law, please be advised that no person may be paid the Apprentice wage rate as listed on a MA Prevailing Wage Rates schedule, unless that person and program is registered with the Department of Labor Standards/Division of Apprentice Standards (DLS/DAS). Any person or program not registered with DLS/DAS, regardless of whether or not they are registered with any other federal, state, local, or private entity must be paid the journeyworker’s rate for the trade.

The contractor shall provide each trainee with a certification showing the type and length of training satisfactorily complete.

The contractor will provide for the maintenance of records and furnish periodic reports documenting his performance under this Training Special Provision.

Form FHWA-1409, Federal-aid Highway Construction Contracting Semi Annual Training Report, shall be submitted as per instructions on the Form.

*** END OF DOCUMENT ***

DOCUMENT 00880

Revised January 12, 2022

DEPARTMENT OF LABOR

Employment Standards Administration

MINIMUM WAGES FOR FEDERAL AND FEDERALLY ASSISTED CONTRACTS

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"General Decision Number: MA20240024 01/19/2024

Superseded General Decision Number: MA20230024

State: Massachusetts

Construction Type: Highway

County: Suffolk County in Massachusetts.

HIGHWAY CONSTRUCTION PROJECTS

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	. Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least $17.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2024.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	. Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least $12.90 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2024.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at http://www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/05/2024
1	01/19/2024

ELEC0103-003 09/01/2023

	Rates	Fringes
ELECTRICIAN (Includes Traffic Signalization)	$ 61.39	35.61

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* ENGI0004-020 12/01/2023

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
Group 1	$ 48.73	29.25+A
GROUP 1	$ 55.03	32.45
Group 2	$ 48.23	29.25+A
GROUP 2	$ 54.43	32.45

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: Backhoe/Excavator/Trackhoe; Broom/Sweeper; Crane; Gradall; Loader; Paver (Asphalt, Aggregate, and Concrete); Post Driver (Guardrail/Fences)
Group 2: Bulldozer; Grader/Blade; Milling Machine; Roller

IRON0007-026 09/16/2023

	Rates	Fringes
IRONWORKER (ORNAMENTAL AND STRUCTURAL)	$ 53.70	36.21

LABO0022-008 12/01/2021

	Rates	Fringes
LABORER		
Fence Erection	$ 41.43	27.52
Guardrail Installation	$ 41.43	27.52
Landscape	$ 41.18	27.52

LABO0133-001 06/01/2022

	Rates	Fringes
LABORER (Concrete Surfacer)	$ 36.31	26.64

PAIN0035-023 07/01/2023

	Rates	Fringes
PAINTER (Steel)	$ 55.51	35.10

SUMA2014-014 01/11/2017

	Rates	Fringes
CARPENTER, Includes Form Work....	$ 66.59	15.41
CEMENT MASON/CONCRETE FINISHER...	$ 56.70	21.08
IRONWORKER, REINFORCING.....	$ 57.39	19.17
LABORER: Asphalt, Includes Raker, Shoveler, Spreader and Distributor.....	$ 33.65	17.32
LABORER: Common or General.....	$ 44.97	16.07
LABORER: Concrete Saw (Hand Held/Walk Behind).....	$ 44.43	14.18
LABORER: Jack Hammer.....	$ 38.69	17.33
OPERATOR: Bobcat/Skid Steer/Skid Loader.....	$ 64.67	15.70
OPERATOR: Forklift.....	$ 64.67	0.00
OPERATOR: Mechanic.....	$ 48.74	11.79
OPERATOR: Piledriver.....	$ 42.56	17.34
PAINTER: Spray (Linestriping)....	$ 47.30	6.42
TRAFFIC CONTROL: Flagger.....	$ 23.00	20.44
TRAFFIC CONTROL: Laborer-Cones/ Barricades/Barrels - Setter/Mover/Sweeper.....	$ 53.35	12.78
TRUCK DRIVER: Concrete Truck....	$ 33.69	15.79
TRUCK DRIVER: Dump Truck.....	$ 37.74	11.86
TRUCK DRIVER: Flatbed Truck.....	$ 48.53	0.00

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their

own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at https://www.dol.gov/agencies/whd/government-contracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates

the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request

review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION"

"General Decision Number: MA20240021 01/19/2024

Superseded General Decision Number: MA20230021

State: Massachusetts

Construction Type: Highway

County: Middlesex County in Massachusetts.

HIGHWAY CONSTRUCTION PROJECTS

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Modification Number	Publication Date
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1	01/19/2024

ELEC0103-007 09/01/2023

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ELECTRICIAN	$ 61.39	35.61

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* ENGI0004-026 12/01/2023

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
Group 1	$ 48.73	29.25+A
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Group 2	$ 48.23	29.25+A
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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: Backhoe/Excavator/Trackhoe; Bobcat/Skid Steer/Skid Loader; Broom/Sweeper; Gradall; Loader; Paver (Asphalt, Aggregate, and Concrete)
Group 2: Bulldozer; Grader/Blade; Milling Machine; Roller

IRON0007-031 09/16/2023

	Rates	Fringes
IRONWORKER (ORNAMENTAL, REINFORCING, AND STRUCTURAL)	$ 53.70	36.21

LABO0039-002 06/01/2018

	Rates	Fringes
LABORER		
Asphalt, Includes Raker, Shoveler, Spreader and Distributor	$ 33.50	22.92
Landscape	$ 33.25	22.92

PAIN0035-023 07/01/2023

	Rates	Fringes
PAINTER (Steel)	$ 55.51	35.10

SUMA2014-011 01/11/2017

	Rates	Fringes

CARPENTER, Includes Form Work	$ 47.93	19.46
CEMENT MASON/CONCRETE FINISHER	$ 56.70	21.08
LABORER: Common or General	$ 36.58	19.40
LABORER: Concrete Saw (Hand Held/Walk Behind)	$ 41.78	18.37
LABORER: Guardrail Installation	$ 37.70	15.37
OPERATOR: Crane	$ 57.61	0.00
OPERATOR: Forklift	$ 64.67	0.00
OPERATOR: Mechanic	$ 48.14	17.02
OPERATOR: Piledriver	$ 44.46	16.94
OPERATOR: Post Driver (Guardrail/Fences)	$ 41.49	23.07
PAINTER: Spray (Linestriping)	$ 40.87	13.86
PILEDRIVERMAN	$ 45.65	23.33
TRAFFIC CONTROL: Flagger	$ 23.00	20.44
TRAFFIC CONTROL: Laborer-Cones/ Barricades/Barrels - Setter/Mover/Sweeper	$ 44.49	12.41
TRUCK DRIVER: Concrete Truck	$ 33.69	15.79
TRUCK DRIVER: Dump Truck	$ 38.92	9.73
TRUCK DRIVER: Flatbed Truck	$ 48.53	0.00

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic

violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at https://www.dol.gov/agencies/whd/government-contracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

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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 National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.

Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION"

DOCUMENT A00801

SPECIAL PROVISIONS

BOSTON-CAMBRIDGE
Federal Aid Project Nos. HIP(BR)-0036(018)X
Bridge Preservation of B-16-246=C-01-029, Eliot Street over the Charles River

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 *2023 Standard Specifications for Highways and Bridges*, the *Supplemental Specifications* contained in this book, the *2017 Construction Standard Details*, the *Traffic Management Plans and Detail Drawings*, *MassDOT Work Zone Safety Temporary Traffic Control,* the *1990 Standard Drawings for Signs and Supports*; the *2015 Overhead Signal Structure and Foundation Standard Drawings*, the *2009 Manual on Uniform Traffic Control Devices (MUTCD) with Revisions 1, 2, and 3 and the November 2022 Massachusetts Amendments to the MUTCD*; the *1968 Standard Drawings for Traffic Signals and Highway Lighting*; *The American Standard for Nursery Stock*; the Plans and these Special Provisions.

The scope of work for this project shall consist of bridge preservation of the Eliot Bridge, Bridge B-16-246 (4EV). The bridge is located in Boston / Cambridge and carries four travel lanes over the Charles River. The preservation tasks to be included in this scope are as follows:

All work shall be performed within the limits of the existing State, City, or Town layout lines. No rights to enter on, or occupy, private property have been acquired by this project.

- Partial depth concrete repair to the entire sidewalk to repair existing deterioration and produce a uniform appearance.
- Removal and replacement of deteriorated brick along the bridge parapets.
- Removal and resetting of the granite cap stones with spot repairs and replacements of select stones.
- Sidewalk widening with "shaped curb detail" incorporated.
- Bridge joint replacement at the expansion joints of the piers.
- Reconstruction of the median with concrete barrier.
- Replacement of the median lighting.
- Installation of end treatment for the proposed median railing.
- Complete reconstruction of the brick arch opening at each abutment portal.
- Removal of the existing bridge scuppers and patching of the area with concrete.
- Milling and paving of the bridge deck.
- Replacement of the bridge deck waterproofing membrane.
- Spot deck concrete repair.
- Spot truss concrete encasement repair.
- Traffic management plans.
- Revised pavement marking plans.
- Replace navigation lighting along both bridge elevations.

SUBSECTION 7.05 INSURANCE REQUIREMENTS
B. Public Liability Insurance

The insurance requirements set forth in this subsection are in addition to the requirements of the Standard Specifications and supersede all other requirements.

Paragraphs 1 and 2

The Massachusetts Department of Transportation and applicable railroads shall be named as additional insureds.

CONTRACTOR QUESTIONS AND ADDENDUM ACKNOWLEDGEMENTS

Prospective bidders are required to submit all questions to the Construction Contracts Engineer by 3:00 P.M. on the Tuesday of the previous week before the scheduled bid opening date. Any questions received after this time will not be considered for review by the Department.

Contractors should email questions and addendum acknowledgements to the following email address massdotspecifications@dot.state.ma.us The MassDOT project file number and municipality is to be placed in the subject line.

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: 1-800-375-7405
Customer Support: 1-800-322-3223

EVERSOURCE EMERGENCY TELEPHONE NUMBERS

GAS:
Outage/ Emergency: 800-592-2000
New Service: 866-678-2744
Customer Support: 800-592-2000

ELECTRIC:
Outage/ Emergency: 800-592-2000 or 844-726-7562
New Service: 1-888-633-3797 (1-888-need pwr)
Customer Support: 1-800-340-9822

SECTION 6.00: CONTROL OF MATERIALS

Subsection 6.01: Source of Supply and Quality

Replace this subsection with the following:

The Engineer may approve material at the source of supply before delivery to the project.

The Department reserves the right to require approval of the source of supply for any material to be incorporated into the work prior to delivery or manufacture.

The Engineer reserves the right to prohibit the use of materials, products, or components which, in their opinion, may be supplied in a manner not reasonably consistent with contract requirements.

The determination of the Engineer shall be final upon all questions which pertain to supplier approval.

Fabricators of structural steel, miscellaneous steel and aluminum products, and producers of precast concrete and prestressed concrete must be on the Department's approved fabricators list on the date the bids are opened. Only approved fabricators will be allowed to perform work for the Department.

The Contractor shall furnish all materials required for the work specified in the Contract. Said materials shall meet the requirements of the specifications for the kind of work involving their use. For any materials named or described in these specifications, an approved equivalent to that named or described in the said specifications, may be furnished.

Chapter 7, Section 22, Clause 17, of the General Laws, as amended, shall apply to the purchase by the Contractor of supplies and materials to be used in the execution of this Contract.

The rules referred to require a preference in the purchase of supplies and materials, other considerations being equal, in favor first, of supplies and materials manufactured and sold within the Commonwealth, and second, of supplies and materials manufactured and sold within the United States.

All iron and steel products, manufactured products, and construction materials shall comply with all Federal Buy America and Federal Build America Buy America (BABA) requirements, where applicable.

In Contracts requiring structural steel, precast, or prestress concrete, the Contractor shall furnish approved shop drawings, and fabrication procedures to the Department’s inspector at the supply source or fabrication site. Materials for permanent construction shall be new, shall conform to the requirements of these specifications, and shall be approved by the Engineer.

SECTION 6.00 (Continued)

Materials for temporary structures or supports adjacent to traveled ways, the failure of which would compromise the safety of the public or the traveled ways, need not be new but the Contractor shall be required to submit certification by a Structural Professional Engineer that the material meets the requirements for the intended use and shall be approved by the Engineer. Any fabrication shall conform to the requirements of these specifications. These requirements shall not apply to gantry systems and supports as well as other mechanized systems.

If testing finds that an approved supplier does not furnish a uniform product, or if the product from such source proves unacceptable at any time, the Contractor shall, at their own expense, take any and all steps necessary to furnish approved materials.

The Contractor shall submit to the Department for approval a notarized Certificate of Compliance (COC) from the Manufacturer or Supplier for each kind of manufactured or fabricated material furnished.

The COC shall certify compliance with the specifications and shall contain the following information:

1. Contract Number, City or Town, Name of Road and Federal Aid Number;

2. Name of the Contractor to which the material is supplied;

3. Kind of material supplied;

4. Quantity of material represented by the certificate;

5. Means of definitively identifying the consignment, such as invoice number, lot number, bill of lading number, label, marking, etc.;

6. Date and method of shipment;

7. Statement indicating that the material has been tested and found in conformity with the pertinent parts of the Contract;

8. Statement indicating that the material meets the requirements of Buy America and BABA, where applicable;

9. Results of all required tests including the chemical analysis in the case of metal: or in lieu of furnishing the results a statement that results of all required tests pertinent to the certificate and not submitted shall be maintained available by the undersigned for a period of not less than three years from date of final acceptance or not less than three years from date of final payment (whichever period is the longest shall apply).
10. Signature of a person having legal authority to bind the supplier.

SECTION 6.00 (Continued)

These COCs shall be delivered to the contract site at the same time that the materials are delivered and before such materials are incorporated into the work. The Contractor shall attach to the COC a document listing the contract bid item number(s), sub item(s), or lump sum breakdown item number(s), as applicable, under which the material will be compensated. Payment for the item in which the materials are incorporated may be withheld until these COCs are received in a form that meets the contract requirements.

If the Contractor has new materials purchased for use on a previous Department Contract which have never been used and which comply with the specifications, these materials may be furnished and used. The Contractor shall submit their own sworn statement certifying that such materials were purchased for use on a previous Contract (naming and identifying such Contract) and shall attach the original COC.

Any cost involved in furnishing the certificate shall be borne by the Contractor.

Subsection 6.03: Delivery and Storage of Materials
Replace this Subsection with the following:

Materials and equipment shall be progressively delivered to or removed from the site so that there will be neither delay in the progress of the work nor an accumulation of materials that are not to be used or removed within a reasonable time. All materials shall be stored in pre-approved locations per the conditions of the property owner.

Delivered materials and materials originating from the site, shall be stored to assure the preservation of their quality and fitness for the work. Stored materials, even though approved before storage, may again be inspected prior to their use in the work. Stored materials shall be located to facilitate their prompt inspection.

Approved portions of the State Highway Layout (SHLO) may be used for storage of project materials and for the placing of the Contractor's plant and equipment upon obtaining a state highway access permit. All storage sites shall be restored to their original condition by the Contractor. No additional compensation shall be given for the design, construction, preparation, or restoration of the storage site(s) or obtaining the access permit which may include but is not limited to a Traffic Management Plan (TMP), utilities, and lighting.

The application for a permit shall contain a locus map identifying the proposed location, a description of the specific activities and uses of the staging area, a TMP in accordance with Subsection 7.10 depicting minimum setbacks from the roadway and any existing structures for stored materials and equipment and how equipment will safely access and exit the staging area.

Any additional space required must be provided by the Contractor at their expense. Municipal, private, or other state-owned property shall not be used for storage purposes without written permission of the owner or lessee, and copies of such written permission shall be furnished to the Engineer.

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.

HOLIDAY WORK RESTRICTIONS (Continued)

Bunker Hill Day (Suffolk County State Holiday)
No work restrictions due to traffic concerns.

Juneteenth
No work restrictions due to traffic concerns, however work on local roadways requires permission by the DHD and local police chief.

Independence Day (Federal Holiday)
No work on major arterial roadways from 5:00 AM on the day before until the normal start of business on the next subsequent business day. No work on local roadways on the holiday without permission by the DHD and the local police chief.

Labor Day (Federal Holiday)
No work on major arterial roadways from 5:00 AM on the Friday before, until the normal start of business on the following day.

Columbus Day (Federal Holiday)
No work on major arterials from 5:00 AM on the Friday before, until the normal start of business on the following day

Veterans' Day (Federal Holiday)
No work restrictions due to traffic concerns.

Thanksgiving Day (Federal Holiday)
No work on major arterials from 5:00 AM two days before until the normal start of business on the following Monday.

Christmas Day (Federal Holiday)
No work on major arterial roadways from 5:00 AM on the day before until the normal start of business on the next subsequent business day.

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.

SUBSECTION 8.14 UTILITY COORDINATION, DOCUMENTATION, AND MONITORING RESPONSIBILITIES

A. GENERAL

In accordance with the provisions of Section 8.00 Prosecution and Progress, utility coordination is a critical aspect to this Contract. This section defines the responsibility of the Contractor and MassDOT, with regard to the initial utility relocation plan and changes that occur as the prosecution of the Work progresses. The Engineer, with assistance from the Contractor shall coordinate with Utility companies that are impacted by the Contractor's operations. To support this effort, the Contractor shall provide routine and accurate schedule updates, provide notification of delays, and provide documentation of the steps taken to resolve any conflicts for the temporary and/or permanent relocations of the impacted utilities. The Contractor shall provide copies to the Engineer of the Contractor communication with the Utility companies, including but not limited to:

- Providing advanced notice, for all utility-related meetings initiated by the Contractor.
- Providing meeting minutes for all utility-related meetings that the Contractor attends.
- Providing all test pit records.
- Request for Early Utility work requirements of this section (see below).
- Notification letters for any proposed changes to Utility start dates and/or sequencing.
- Written notification to the Engineer of all apparent utility delays within seven (7) Calendar Days after a recognized delay to actual work in the field – either caused by a Utility or the Contractor.
- Any communication, initiated by the Contractor, associated with additional Right-of-Way needs in support of utility work.
- Submission of completed Utility Completion Forms.

B. PROJECT UTILITY COORDINATION (PUC) FORM

The utility schedule and sequence information provided in the Project Utility Coordination Form (if applicable) is the best available information at the time of the bid and has been considered in setting the contract duration. The Contractor shall use all of this information in developing the bid price and the Baseline Schedule Submission, inclusive of the individual utility durations sequencing requirements, and any work that has been noted as potentially concurrent utility installations.

C. INITIATION OF UTILITY WORK

The Engineer will issue all initial notice-to-proceed dates to each Utility company based on either the:

1) Contractor's accepted Baseline Schedule
2) An approved Early Utility Request in the form of an Early Utility sub-net schedule (in accordance with the requirements of this Subsection)
3) An approved Proposal Schedule

C.1 - BASELINE SCHEDULE – UTILITY BASIS

The Contractor shall provide a Baseline Schedule submission in accordance with the requirements of Subsection 8.02 and inclusive of all of the information provided in the PUC Form that has been issued in the Contract documents. This is to include the utility durations, sequencing of work, allowable concurrent work, and all applicable considerations that have been depicted on the PUC Form.

SUBSECTION 8.14 (Continued)

C.2 – EARLY UTILITY REQUEST – (aka SUBNET SCHEDULE) PRIOR TO THE BASELINE

All early utility work is defined as any anticipated/required utility relocations that need to occur prior to the Baseline Schedule acceptance. In all cases of proposed early utility relocation, the Contractor shall present all known information at the pre-construction conference in the form of a 'sub-net' schedule showing when each early utility activity needs to be issued a notice-to-proceed. The Contractor shall provide advance notification of this intent to request early utility work in writing at or prior to the Pre-Construction meeting. Prior to officially requesting approval for early utility work, the Contractor shall also coordinate with MassDOT and all utility companies (private, state or municipal) which may be impacted by the Contract. If this request is acceptable to the Utilities and to MassDOT, the Engineer will issue a notice-to-proceed to the affected Utilities, based on these accepted dates.

C.3 – PROPOSAL SCHEDULE - CHANGES TO THE PUC FORM

If the Contractor intends to submit a schedule (in accordance with MassDOT Standard Specifications, Division I, Subsection 8.02) that contains durations or sequencing that vary from those provided in the Project Utility Coordination (PUC) Form, the Contactor must submit this as an intended change, in the form of a Proposal Schedule and in accordance with MassDOT Standard Specifications, Division I, Subsection 8.02. These proposed changes are subject to the approval of the Engineer and the impacted utilities, in the form of this Proposal Schedule and a proposed revision to the PUC form. The Contractor shall not proceed with any changes of this type without written authorization from the Engineer, that references the approved Proposal Schedule and PUC form changes. The submission of the Baseline Schedule should not include any of these types of proposed utility changes and should not delay the submission of the Baseline Schedule. As a prerequisite to the Proposal Schedule submission, and in advance of the utility notification(s) period, the Contractor shall coordinate the proposed utility changes with the Engineer and the utility companies, to develop a mutually agreed upon schedule, prior to the start of construction.

D. UTILITY DELAYS

The Contractor shall notify the Engineer upon becoming aware that a Utility owner is not advancing the work in accordance with the approved utility schedule. Such notice shall be provided to the Engineer no later than seven (7) calendar days after the occurrence of the event that the Contractor believes to be a utility delay. After such notice, the Engineer and the Contractor shall continue to diligently seek the Utility Owner's cooperation in performing their scope of Work.

In order to demonstrate that a critical path delay has been caused by a third-party Utility, the Contractor must demonstrate, through the requirements of the monthly Progress Schedule submissions and the supporting contract records associated with Subsection 8.02, 8.10 and 8.14, that the delays were beyond the control of the Contractor.

SUBSECTION 8.14 (Continued)

All documentation provided in this section is subject to the review and verification of the Engineer and, if required, the Utility Owner. In accordance with MassDOT Specifications, Division I, Subsection 8.10, a Time Extension will be granted for a delay caused by a Utility, only if the actual duration of the utility work is in excess of that shown on the Project Utility Coordination Form, and only if;

1) proper Notification of Delay was provided to MassDOT in accordance with the time requirements that are specified in this Section
2) the utility delay is a critical path impact to the Baseline Schedule (or most recently approved Progress Schedule)

E. LOCATION OF UTILITIES

The locations of existing utilities are shown on the Contract drawings as an approximation only. The Contractor shall perform a pre-construction utility survey, including any required test pits, to determine the location of all known utilities no later than thirty (30) calendar days before commencing physical site work in the affected area.

F. POST UTILITY SURVEY – NOTIFICATION

Following completion of a utility survey of existing locations, the Contractor will be responsible to notify the Engineer of any known conflicts associated with the actual location of utilities prior to the start of the work. The Engineer and the Contractor will coordinate with any utility whose assets are to be affected by the Work of this Contract. A partial list of utility contact information is provided in the Project Utility Coordination Form.

G. MEETINGS AND COOPERATION WITH UTILITY OWNERS

The Contractor shall notify the Engineer in advance of any meeting they initiate with a Utility Owner's representative to allow MassDOT to participate in the meeting if needed.

Prior to the Pre-Construction Meeting, the Contractor should meet with all Utility Owners who will be required to perform utility relocations within the first 6 months of the project, to update the affected utilities of the Project Utility Coordination Form and all other applicable Contract requirements that impact the Utilities. The Contractor shall copy the Engineer on any correspondence between the Utility Owner and the Contractor.

H. FORCE ACCOUNT / UTILITY MONITORING REQUIREMENTS

The Engineer will be responsible for recording daily Utility work force reports. The start, suspension, re-start, and completion dates of each of the Utilities, within each phase of the utility relocation work, will be monitored and agreed to by the Engineer and the Contractor as the work progresses.

I. ACCESS AND INSPECTION

The Contractor shall be responsible for allowing Utility owners access to their own utilities to perform the relocations and/or inspections. The Contractor shall schedule their work accordingly so as not to delay or prevent each utility from maintaining their relocation schedule.

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.

BIDDERS LIST

Pursuant to the provisions of 49 CFR Part 26.11 all official bidders will be required to report the names, addresses and telephone numbers of all firms that submitted bids or quotes in connection with this project. Failure to comply with a written request for this information within 15 business days may result in a recommendation to the Prequalification Committee that prequalification status be suspended until the information is received.

The Department will survey all firms that have submitted bids or quotes during the previous year prior to setting the annual goal and shall request that each firm report its age and gross receipts for the year.

BUILD AMERICA BUY AMERICA PREFERENCE

On Federally-aid projects the Buy America (23.CFR § 635.410) and Build America, Buy America Act (Pub. L. No. 117-58, §§ 70901-52). requires the following,

(1) all iron and steel used in the project are produced in the United States--this means all manufacturing processes, from the initial melting stage through the application of coatings, must occur in the United States. Foreign steel and iron can be used if the cost of the materials does not exceed 0.1% of the total Contract cost or $2,500, whichever is greater. The action of applying a coating to a covered material (i.e., steel and iron) is deemed a manufacturing process subject to Buy America. Coating includes epoxy coating, galvanizing, painting and any other coating that protects or enhances the value of a material subject to requirements of Build America, Buy America. Steel used for temporary support of excavation, including H piles, soldier piles, and sheeting when the steel is required to be left in place is subject to requirements of Build America, Buy America. Temporary steel, shall remain in place when it falls within the influence zone of the soil supporting any structure or railroad tracks.

(2) all manufactured products used in the project are produced in the United States—this means the manufactured product was manufactured in the United States; and the cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55 percent of the total cost of all components of the manufactured product, unless another standard for determining the minimum amount of domestic content of the manufactured product has been established under applicable law or regulation; and

(3) all construction materials are manufactured in the United States—this means that all manufacturing processes for the construction material occurred in the United States. "Construction materials" includes an article, material, or supply—other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives—that is or consists primarily of:
- non-ferrous metals,
- plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables),
- glass (including optic glass),
- lumber; or
- drywall.

The Buy America preference only applies to articles, materials, and supplies that are consumed in, incorporated into, or affixed to an infrastructure project. As such, it does not apply to tools, equipment, and supplies, such as temporary scaffolding, brought to the construction site and removed at or before the completion of the infrastructure project. Nor does a Buy America preference apply to equipment and furnishings, such as movable chairs, desks, and portable computer equipment, that are used at or within the finished infrastructure project but are not an integral part of the structure or permanently affixed to the infrastructure project.

NOTE: The requirements for manufactured products indicated in paragraph (2) above are not in effect for this contract.

NORTHERN LONG-EARED BAT PROTECTION

The U.S. Fish and Wildlife Service 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 reviewed by MassDOT Highway Division's Environmental Services Section and has been determined to have "No Effect" to the northern long-eared bat (See Document USFWS No Effect). No time of year restrictions are required for the project at this time. If additional cutting is proposed by the Contractor that is outside the scope of this contract, additional review is required by the MassDOT Highway Division's Environmental Services Section, and time of year restrictions may apply to such tree cutting.

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.

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.

VALUE ENGINEERING CHANGE PROPOSAL

This Subsection defines the conditions and requirements which apply to Value Engineering Change Proposals ("VECPs"). The purpose of this provision is to encourage the Contractor to propose changes in certain project requirements that will maintain the project's functional requirements at a savings in contract time, contract price, or both. The net savings obtained by using a VECP that meets the conditions and requirements set forth here will be shared by the Contractor and MassDOT.

VECP's under this provison are to be initiated, developed and submitted to MassDOT by the Contractor. The VECP must show the contemplated changes to the Drawings, Specifications and other requirements in the Contract. When a VECP submitted pursuant to this section is fully accepted by MassDOT, the VECP will be implemented by the Contractor and paid using the current cost and resource loaded schedule. Contractor shall demonstrate that the VECP is equal to, or better than, the original design or material; that there is an interest in public safety within the VECP; that there is a life-cycle cost benefit; and/or that end users will benefit from the shortened schedule. VECPs shall be consistent with the MassHighway/MassDOT Standard Specifications for Highways and Bridges and other applicable reference documents and directives. Any proposed deviation from these documents will need to be clearly identified in the VECP Proposal Documents, and must be approved by MassDOT's Chief Engineer before accepting this VECP.

A. In order to be considered for MassDOT review each VECP shall:

1. Be clearly labeled pursuant to this Subsection;

2. Yield a net savings at least two hundred and fifty thousand (250,000.00) Dollars and/or a net saving of contract completion duration of at least three (3) months;

3. The proposed changes to contract items must:

    a. maintain the specified items' required functions (service life, reliability);

    b. meet applicable safety regulations and codes;

    c. material substitutions must be in accordance with DOT prequalified/preapproved products and must be tested in accordance with standard material specs/testing methods (and considering all relevant environmental, load, and other relevant factors);

    d. show economy of operation, ease of maintenance, ease of construction, and necessary standardized features and appearance; and

4. Shall not require an extension of Contract Time or Contract Milestones, with the exception of cases when there are anticipated significant cost saving.

VALUE ENGINEERING CHANGE PROPOSAL (Continued)

The thresholds above are considered to be a general guideline. MassDOT will consider VECPs outside of these thresholds if a significant benefit is demonstrated. Additionally, notwithstanding this VECP process, MassDOT will consider minor revisions in the form of a Contract Modification.

Further, any VECP submitted shall be in sufficient detail to clearly define the proposed change. The Contractor's failure to provide information of the type, detail and in a format to facilitate the MassDOT's review, may be grounds for rejection of the VECP. Additionally, the Contractor will not be entitled to any equitable adjustment or increased Time, due to any aspect of any of the proposed VECP including permitting, right of way, utility coordination or delayed responses by MassDOT. If, after the progression of the work associated with the executed Contract Modification for the VECP, any additional costs are realized by the Contractor or any of the sub-consultants, sub-contractors, or suppliers, the Contractor shall be obligated to pay for any and all costs.

B. The following initial items shall be provided by the Contractor for MassDOT's review. *Items 1-6 need to be submitted prior to the start of MassDOT's review of the VECP and item 7 is an important consideration for the pricing of the VECP and the timeline of the proposed VECP schedule.*

1. ***VECP Description***: A description of the difference between the existing and the proposed Contract requirements, and the comparative advantages and disadvantages of each;

2. ***VECP Change Listing***: A listing of the Contract requirements that will need to be changed, modified, or reviewed as well as the proposed Contract document changes in the Instructions to Bidders, Contract, Standard Specifications, General Requirements and Special Provisions required by the VECP.

3. ***Construction Schedule Update*:** Any changes in the Contract Time(s) or Contract Milestone(s), that will result from acceptance of the VECP, shall be accompanied by a contemporaneous schedule analysis *(i.e, the Contractor's baseline schedule submission, all past/required monthly schedule updates, a detailed assessment of all past delays, and a resource loaded Crticial Path Method schedule as specified in Section 8.0 / Subsection 8.02 of this Contract)* of the projected Work that remains including the proposed VECP related schedule changes *(inclusive of the timeline to review accept the VECP and the timeline for implementing the design changes)* in the remaining work. This shall be submitted in the form of a Proposal Schedule until the VECP has been formally accepted. Note: All of this information is to be updated, recertified, and formally accepted by MassDOT before final acceptance of this this VECP is issued.

VALUE ENGINEERING CHANGE PROPOSAL (Continued)

4. ***Date for MassDOT's Acceptance***: A statement that clearly justifies the date by which the VECP must be accepted to obtain the maximum price reduction, noting any effect upon the Contract Time(s) and/or Contract Milestone(s). This statement must include a narrative that demonstrates the most recent construction schedule has been utilized to justify that proposed acceptance date *(e.g. "in order to start to fabricate critical materials, authorization must be provided to work on the shop drawings by no later than [date]").* The Contractor should allow for at least sixty (60) to ninety (90) days for acceptance by MassDOT once all of the VECP documentation has been provided. Acceptance shall mean that MassDOT has received a finalized and executed contract modification. However, this is a proposed Contract change.

   The Contractor is fully obligated to progress the Work of the original Contract and MassDOT is not liable for any delays or costs that may occur in the review phase of any VECP proposal.

5. ***Cost and Savings Estimates***: A detailed estimate of the anticipated net savings, calculated as follows:

   a. ***Original Scope:*** Isolate the cost of performing the original contract construction activities, in accordance with the original Contract Documents, as originally bid by the Contractor, that are anticipated to be superseded by the VECP. *This cost is to include any original contract scope that is anticipated to be altered or eliminated by the VECP such as, shop drawing preparation, inspection work, testing, maintenance of traffic, or any other original contract costs, that have yet to have been performed at the time of this VECP submission.*

   b. ***New VECP Scope:*** Calculate the cost of performing the comparable construction activities associated with the VECP.

   c. ***Contractor's Engineer & Inspection***: Calculate the cost of engineering, inspection, and design work by the Contractor's Engineer/Designer. This should be a realistic estimate of the costs of any required engineering, design and review work by the Contractor's Engineer.

   d. ***MassDOT's Costs:*** MassDOT's estimate of costs to perform engineering/design reviews, cost estimate reviews, schedule reviews, and any other administrative costs to review and recommend implementation of the proposed VECP. *(including all anticipated increased costs to MassDOT on other Contracts and all anticipated follow-on increased costs to MassDOT, if any)* as provided by MassDOT. MassDOT's estimated costs must be included the VECP calculation and will be provided by MassDOT in support of the VECP evaluation process.

   e. ***Other Costs:*** Estimated costs associated with any revisions to other project related costs, such as Environmental Permits or Right of Way acquisitions, including other agency or municipality costs, as provided by MassDOT.

VALUE ENGINEERING CHANGE PROPOSAL (Continued)

Net Savings:

The net savings to be split between MassDOT and the Contractor shall be calculated using the items above as follows: a - (b+c+d+e) = net savings

6. *The Contractor shall also provide:*

   a. A proposed Change Order, which explains and justifies any required Equitable Adjustment in the Contract Price.

   b. The Contractor's actual costs expended for developing the VECP as of the date of the VECP submission;

7. ***Design Changes and Drawings*:** The costs that are outlined above should be inclusive of the following design and engineering responsibilities.

   a. Design changes shall be prepared and stamped by the Contractor's professional designer and/or engineer. In addition, in the development of the VECP; the Contractor is responsible for anticipating and managing all aspects associated with any VECP design work that must be performed by a licensed Engineer.

   b. The Contractor's engineer must analyze and stamp all components of any aspect of the project that has been redesigned, changed, or altered as a result of this VECP.

   c. The Contractor's engineer shall provide all calculations and supporting design/engineering documentation that was utilized to develop the changes and stamped drawings. These will be used by MassDOT's Designer-of-Record to review the VECP changes. The Contractor is limited to selecting only those engineer's that have been pre-qualified by MassDOT's A&E Board.

   d. MassDOT's Designer-of-Record will review and respond to all completed design submissions related to this VECP within thirty (30) calendar days, unless determined to be a non-critical path item.

   e. MassDOT will be responsible for estimating and managing MassDOT's Designer-of-Record during the VECP review and implementation. Should any significant conflicts arise, between the Contractor's Engineer and MassDOT's Designer-of-Record, the DOT and the Contractor will work expeditiously to resolve the conflict. Should this type of conflict continue for greater than five (5) days, the Contractor is to bear all financial and time related impacts of such delay and must seek to resolve the design conflict, in an acceptable manner to MassDOT. The resolution of this conflict will be funded at the Contractor's expense – exclusive of the net saving that was agreed to at the execution of the contract modification for this VECP.

   f. The Contractor's Engineer may also be required to inspect the construction work. The Contractor is to include such anticipated inspection costs in the initial VECP.

VALUE ENGINEERING CHANGE PROPOSAL (Continued)

g. MassDOT's Designer of Record will remain the Designer-of-Record for the entire Project. Any costs incurred in the use of MassDOT's Designer-of-Record by MassDOT or Contractor associated with the review of a VECP are to be included in the calculated net savings.

C. Approval of the VECP shall not occur until a Contract Modification, incorporating the VECP, is issued by MassDOT and properly executed by the Contractor. MassDOT may accept or reject part or all of any VECP at any time prior to an executed Contract Modification for the applicable VECP. The decision of MassDOT, concerning acceptance or rejection of any VECP, shall be final and shall not be subject to dispute resolution.

It is expected that several weeks may go by before the final VECP documentation has been executed with a Contract Modification. Therefore, MassDOT intends to make certain that the initial cost estimate information has not changed before entering into a Contract Modification. As the VECP evaluation process is finalized, and prior to the signed Contract Modification for the VECP, the Contractor and MassDOT must re-certify the current status of the originally proposed cost and/or schedule savings.

Until a contract modification is issued and schedule and cost/savings re-certification is complete and accepted by MassDOT, the Contractor shall remain obligated to perform the Work in accordance with the terms and conditions of the original Contract Documents.

Upon completion of the work associated with the VECP, MassDOT may require verification that the VECP savings has been achieved.

D. VECPs will be processed (distributed, reviewed, commented upon, accepted or rejected) expeditiously (pursuant to M.G.L. c. 30, § 39R); however, as this is an elective modification to the contract, MassDOT shall not be liable for any delay or cost in the review and acceptance of the VECP. During the review of the VECP, the Contractor remains obligated to progress the original Contract scope, and schedule, as planned; until a Contract Modification, accepting the Contractor re-certified VECP, has been executed by MassDOT.

The Contractor has the right to withdraw part, or all of any VECP, prior to acceptance by MassDOT. Such withdrawal shall be made in writing to the Engineer. The Contractor shall state the period of time, from the date of the initial VECP submittal, that the VECP shall remain valid and feasible. Revision of this validity and feasibility period shall be allowed only by mutual agreement of the Contractor and the Engineer in writing.

If the Contractor desires to withdraw the proposal prior to the expiration of this period for non-technical reason, MassDOT reserves the right to recover all actual costs that have been incurred to MassDOT.

VALUE ENGINEERING CHANGE PROPOSAL (Continued)

If the Contractor withdraws the VEC Proposal, MassDOT reserves the right to proceed with the VECP or any portion of the VECP as a normal change and the Contractor waives any right it may have had to share in net savings thereunder.

For purposes of this provision, expiration of the time established by the Contractor for approval shall be considered as withdrawal by the Contractor if MassDOT requests an extension of that time and the Contractor does not provide a written extension.

E. With regard to unknown conditions or sub-surface work, in general, the expectation is that the Contractor and MassDOT will strive to gain enough knowledge about the risks in order to provide a forward-priced Change Proposal. Therefore, any costs to fully evaluate the proposal, such as additional borings and/or test pits, must be considered in the cost evaluation of whether the VECP is worth pursuing. However, if it is impractical to gather conclusive exploratory information, before the VECP is executed, MassDOT may consider provisions in the VECP that clearly identifies the risk sharing (cost and time) related specifically to the unknown/sub-surface conditions. If these VECP provisions are acceptable to MassDOT they are to include supplemental language to provide a determination of the final savings/cost, and time impacts, no later than 45 days after the sub-surface work is completed. All other aspects of the VECP, unrelated to these Provisions, will be binding upon execution of the VECP.

DEPARTMENT OF CONSERVATION AND RECREATION TEMPORARY OCCUPANCY PERMIT

This project is subject to oversight by the Department of Conservation and Recreation. A sign shall be placed along the entrance of the staging area in accordance with the latest MassDOT Construction Standards. All costs for the manufacture, erection, maintenance, moving, and removal of the signs shall be absorbed by the Contractor with no additional compensation other than the contract unit prices. DCR Construction Access Permit - see Document A00848.

CDF – WAIVER

For all work in DCR roadways and sidewalks, the applicant needs to adhere to the following conditions.

In non-trench areas of parkways or sidewalks requiring repairs, MassDOT-"Type C" Gravel (2" max aggregate size) shall be the subgrade material, and it shall be mechanically compacted in six-inch (6") lifts.

DEPARTMENT OF CONSERVATION AND RECREATION TEMPORARY OCCUPANCY PERMIT (Continued)

CDF WAIVER FOR TRENCHES

Conventional Backfilling Method for work within the hardened surface (parkways, parking lots & sidewalks)

(PLEASE NOTE: This waiver from C.D.F. is only valid if the applicant receives prior approval of a waiver request from the OCR Permits). Also. if using this CDF waiver, the applicant agrees to return after one full winter season has elapsed to overcut & repave the trench (see "PAVEMENT TRIMMING" above)

The hardened surface of the parkway may be opened for the proposed installation, however, only one-half may be opened at one time, and the flow of traffic must be maintained at all times in accordance with the Traffic Management Plan (TMP).

The use of previously excavated material as backfill is acceptable, providing that the previously excavated material is suitable for sub-base, with no stones larger than 3" in diameter, and is free of all clay, debris and organic/plant matter.

If previously excavated material is unacceptable to OCR Permits Inspectors, then trenches and other excavations shall be back-filled with MassDOT #Ml.03.0 - Type "C" (2" max. stone size)) gravel borrow, in six inch (6") lifts. (NOTE: Dense Graded Crushed Stone (DOCS) may be substituted for gravel borrow if the applicant uses OCR-approved DOCS. (see attached OCR DOCS spec.). Each layer, if dry, shall be wetted and mechanically compacted. Under the haunches of pipe or conduit, the backfill material must be carefully and thoroughly hand-tamped until the backfilling is level with the top of the pipe or conduit. The remainder of the trench backfilling shall take place to a compacted depth three inches (3") below the existing surface.

The remainder of the trench backfilling shall take place to a compacted elevation that is four inches (4") below the existing PARKWAY surface. (2-1/2" below existing SIDEWALK surface).

TEMPORARY PATCH in PARKWAY: The trench will then be temporarily paved to a depth of four inches (4"), in two, 2"-deep courses, with "State Dense Binder" ("SIC-19") asphalt, so that the patch is flush with surrounding pavement.

TEMPORARY PATCH in SIDEWALK: The trench will then be temporarily paved to a depth of two and a half (2-1/2"), in one course of "State Dense Binder" ("SIC-19") asphalt, so that the patch is flush with surrounding pavement.

The applicant shall field-verify compaction using approved methods (e.g. dynamic cone penetrometer, DCP). For longer trenches, exceeding three hundred feet (300') in length, a third party testing firm shall be utilized at the applicant's expense, to perform nuclear density testing.

DEPARTMENT OF CONSERVATION AND RECREATION TEMPORARY OCCUPANCY PERMIT (Continued)

PAVEMENT TRIMMING:

Only sawcutting (without overcuts) shall be allowed as a means of creating the final/"permanent" edge between existing and new hot-mix asphalt or cement concrete on any parkway or sidewalk. All accidental overcuts shall be filled with bituminous joint sealer. The standard "cutback" for all permanent pavement patches shall be 12" beyond the original pavement cuts made to performs the Contractor's work. If, upon completion of the permanent patch, there would be less than twenty-four inches (24") as measured front the nearest granite curbing (or berm), to the nearest parallel edge of the final trench patch (including overcut), then the trench-patch shall be expanded, and the lace of curbing/berm shall serve as one edge of the permanent pavement patch.

TYPICAL PERMANENT PAVEMENT PATCH DESIGN:

After the temporary PARKWAY pavement patch has been in place for a full winter season, and verified with the DCR Permits Inspector, the Grantee(s) shall excavate a trench, (with 12" overcuts of the original trench) to a minimum depth of seven and a half inches (7-1/2") below the existing surface. Then the Grantee(s) shall replace the paved surface in three courses

- 4" of Base (SBC-3 7.5)
- 2" of State Dense Binder (SIC-19)
- 1 - I /2" of Modified State Top (SSC- 12.5)

(For course-thicknesses of permanent paving in SI DEWALK AREAS. the Grantee(s) can refer to the DCR's "Typical Repair Methods" (attached))
(*Example: If the original trench is 36" wide, and curb is not a limiting factor, then the hot-mix asphalt bituminous portion of the permanent pavement patch shall be 60" wide and at least 7-1/2" deep* (see next paragraph, "THICKNESSES")

THICKNESSES:

Pavement replacement thickness must match the existing pavement thickness or conform to Attachment #1 "Typical Repair Methods", whichever pavement depth is DEEPER. However, the applicant can request from DCR Permits, permission to pave a total thickness of 7-1/2", as outlined above, if the existing asphalt layer is inordinately thick.

All abutting edges of existing pavement (vertical and horizontal) shall be coated with Bitumen for Tack Coat RS-1 Emulsion immediately prior to the placement of the permanent patch.

All hot-mix asphalt surfaces (vertical and horizontal) shall be coated with emulsion tack coat immediately prior to placing any new hot-mix asphalt layer.

REFLECTORIZED DRUMS WITH FLASHERS:

All flasher's and "steady-burn" lights on drums must be in good working order, and drums need to have reflectorized strips around them to increase their visibility.

DEPARTMENT OF CONSERVATION AND RECREATION TEMPORARY OCCUPANCY PERMIT (Continued)

TRENCHING NOTE:

Wherever a trench is to be dug to a depth of five feet or more, that trench shall be sheeted and braced in conformity with the rules and regulations for the prevention of accidents in construction operations pursuant to Section 129A of Chapter 149 of the Massachusetts General Laws. It may be possible to substitute sheeting/bracing with a trench box on a case-by-case basis, but only with prior written approval front the DCR Permits Section.

STEEL PLATES:

Note: Steel plates create a slippery surface and should only be used when necessary. Steel plates may need to be recessed, so that they are flush with the parkway surface. Steel plates must not remain over the weekend. The Grantee(s) should schedule the work accordingly.

Any steel plates used shall not be vulnerable to flexing (or lateral movement due to vehicular traffic) during non-work hours

Where any gaps exist between the plate and the roadway surface, “cold-patch” asphalt mix shall be used to fill those voids.

The 2 main reasons for this are as follows:

1. Plates are less likely to flex and move laterally overnight
2. Abutters will be subjected to the least amount of noise pollution during non-work hours

PAVEMENT MARKINGS:

All pavement markings removed/damaged during the course of construction must be replaced with markings snatching the configuration, color, width and type (thermoplastic, paint. etc.) of the markings removed within 5 working days of the damage occurring.

PAVEMENT PATCH QUALITY CONTROL:

All trenches and affected curbing shall be maintained by the Grantee(s) from the inception of this project until the affected property has been restored to “equal or better” condition.

SIDEWALK & CURBING REPAIR CONDITIONS:

- Any sidewalk replacement shall conform to the most recent A.D.A. or A.A.B. handicapped accessibility standards, whichever is more stringent.
- Any fine-grading of subgrade soils required before sidewalk installation, shall be accomplished with MassDOT-MI.03.0 “Type C”
- Gravel Borrow (2” = max. stone size)

DEPARTMENT OF CONSERVATION AND RECREATION TEMPORARY OCCUPANCY PERMIT (Continued)

- Any sidewalk damaged must be replaced with a material matching the existing sidewalk surface (hot-mix asphalt or cement concrete), and the replacement shall conform with the following:
  - Cement Concrete Sidewalks (with OR without driveways) Please see DCR — "Typical Repair Methods" (Note # 4.)
  - Six-Inch (6") thick cement concrete (4.000 psi, ¾" aggregate) shall be used. All concrete sidewalks shall include 6" x 6" welded-wire mesh throughout
    - Mesh shall be Gage No. 10 wire per ASTM Specification A185.
    - Only sheet thresh shall be used. **(Rolled mesh shall not be permitted.)**
    - Mesh shall rest on reinforcement "chairs" or concrete bricks, spaced at 36" maximum in every direction to keep the mesh from deforming during cement concrete placement.
    - Mesh shall be installed at mid-depth in the concrete (i.e. 3" down).

The limits of the sidewalk repair shall include the entire work area and extend to the nearest sidewalk control joint. Sawcuts shall be made along those joints and only full, complete concrete sidewalk panels shall be removed. All demolished concrete walkway shall be removed from DCR property and legally disposed off of DCR property.

Winter Concrete Note

If applicant is placing cement concrete sidewalk between November 15 & April 15, then the concrete repair must be coveted completely with insulated blankets, and protected from all vehicle traffic and pedestrian traffic for a minimum of forty-eight (48) hours after placement***

Hot-Mix Asphalt Sidewalks (at driveways)

1-1/4" Mass DOT-Type "I"-"Dense Top" (w/ 3/8" aggregate) surface course, minimum 3".

MassDOT- Type "I" binder course, in minimum over well compacted gravel

Hot-Mix Asphalt Sidewalks (without driveways)

1-1/4" Mass DOT-Type "1"-"Dense Top" (w/ 3/8" aggregate) surface course, minimum 2"
MassDOT- Type "I" binder course, minimum over well compacted gravel

Concrete In Front Of And In Brick Of Curbing:

For all edgestone/ curbing being reset or replaced:

On both the front and back of curbing/edgestone, 2,000 psi cement concrete (worth a 6" x 6" profile) shall be installed for the entire length of curbing/ edgestone being reset or replaced, and the top surface of both front and back sections of this cement concrete shall be 1-1/2" lower than the finished roadway elevation.

DEPARTMENT OF CONSERVATION AND RECREATION TEMPORARY OCCUPANCY PERMIT (Continued)

Detectable Warning Panels

Detectable Warning Panels are required for all pedestrian ramp.

DCR Policy on Detectable Warning Panel COLOR:

The detectable warning panels shall be surface-mount-type (& not cast-in-place) and shall be "safety yellow" in color, for both cement concrete and hot-mix asphalt pedestrian ramps. Exceptions to this would be possible, subject to the approval of the Chief Engineer, if, for example, the Engineer is trying to match the color of existing, nearby pedestrian ramp warning panels.

As-Built Plan(s):

The DCR requires a copy of as-built plan(s) for this work, so that we can update our records.

AIR EXCAVATION AND ROOT PRUNING

Air Excavation and Root Pruning is for the services of excavating soil with an air pressure tool in order to expose tree roots, and for associated services and materials necessary to complete the work of pruning, backfilling with existing soil, watering, mulching, and fertilizing. This item shall include the furnishing and operating the air excavating tool.

Associated Item: All references to Arborist herein shall refer to the Arborist heading. Arborist shall meet the requirements as specified under that heading.

Trees to be air spaded shall be those shown on the plans and/or as determined necessary by the DCR per the recommendations of either the DCR Arborist, or an independent Arborist engaged by the Contractor.

References

The standards from American National Standards Institute (ANSI): A300 (Part 8)-2013 Root Management with special attention to Section 84 shall apply to this work. If requested, the Contractor shall provide to the Engineer one copy of this reference. Provision of reference shall be incidental to this item.

Method Of Work

Air excavation and pruning work shall be performed by or overseen by the Arborist.

Air excavation of soil and root pruning shall occur any time prior to equipment work within the root zone of trees to be protected.

DEPARTMENT OF CONSERVATION AND RECREATION TEMPORARY OCCUPANCY PERMIT (Continued)

Air excavation shall be done along the limit of proposed excavation. Trench shall be of sufficient width to observe and cut roots and shall be to the depth of proposed excavation. Immediately following air excavation, roots shall be pruned.

Following pruning, roots shall immediately be fully covered with backfill and immediately watered. Roots shall continue to be watered and fertilized as directed by the Arborist.

TREE AND PLANT PROTECTION FENCE

Work under this heading consists of furnishing, installing, removing, resetting, and 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 DCR Arborist and Landscape Architect, 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 barrier that remains vertical and effective (not sagging) for the duration of period required. Fence shall be one or more of the following, as directed by DCR or shown on the plans:

- Plastic orange safety fence (recommended where high visibility is necessary), wooden snow fencing, or other approved material: minimum height of four feet. Per the 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.
- Chain Link Fence shall be six-foot-tall metal chain link set in metal frame panels on movable core-drilled concrete blocks of sufficient size to hold the fence erect in areas of existing paving to remain. Alternatively, the posts may be in-ground mounted, per the direction of the Engineer. Unless otherwise indicated, the following types of chain link fence are acceptable:
  - New materials or previously used salvaged chain link fencing in good condition, subject to inspection and approval by the Engineer.
  - Posts: Galvanized steel pipe of diameter to provide rigidity
  - Fabric: Woven galvanized steel wire mesh. Provide in continuous lengths to be wire-tied to fence posts or prefabricated into modular pipe-framed fence panels.
  - Panels shall be such that they create a barrier to encompass the entire root zone are to the extent possible.

DEPARTMENT OF CONSERVATION AND RECREATION TEMPORARY OCCUPANCY PERMIT (Continued)

The installed tree protections shall be reviewed in place by DCR, before any work begins.

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.

The Contractor shall not engage in any construction activity within the TPPZ, 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.

After construction activities are completed, or when directed by the DCR, fence, stakes, and other materials shall be removed and disposed off-site by the Contractor.

DEPARTMENT OF CONSERVATION AND RECREATION TEMPORARY OCCUPANCY PERMIT (Continued)

REQUIRED WORK WITHIN THE TPPZ

In the event that grading, trenching, utility work, or storage is unavoidable within the TPPZ, the DCR Arborist shall be notified. Measures may be required for tree protection and preservations, as determined by an Arborist, 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.

Landscaping work specified within the TPPZ shall be accomplished by hand tools. Where hand work is not feasible, with permission of the DCR Arborist, 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 DCR, the Contractor will be required to provide a more durable barrier (e.g., Jersey Barriers) to secure the area.

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 DCR.

In the event of spills, compaction or damage, the Contractor shall take corrective action immediately using methods approved by DCR's Arborist, in coordination with the Contractor's Arborist.

If, based on the recommendations of the Arborist, the DCR Arborist 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, and as approved by the DCR Arborist.

If the Arborist determines, or the DCR Arborist 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 Arborist or DCR Arborist 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 cleanup 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, and as approved by the Landscape Architect. The Landscape Architect will approve the size and quality of the replacement plant. Replacement will include a minimum of one year of watering and care.

DEPARTMENT OF CONSERVATION AND RECREATION TEMPORARY OCCUPANCY PERMIT (Continued)

ARBORIST

Description

The work under this Item is for the services of a Certified Arborist. Arborist shall be an International Society of Arboriculture (ISA) Certified Arborist or a Massachusetts Certified Arborist. The Arborist shall have at least 10 years of experience in tree care, including tree protection during construction, and shall demonstrate a familiarity with the American National Standards Institute (ANSI) A300 Standard Practices for Tree, Shrub, and Other Woody Plant Maintenance Part 1Pruning, Part 5 Construction Management Standards, and Part 9 Tree Risk Assessment.

The Arborist's general responsibilities include protecting trees within and adjacent to the project limits, staging areas, and access routes; recommending removal of diseased, damaged, or otherwise unhealthy trees that pose a potential safety hazard; evaluating effects of construction on future health of trees close to proposed work; and recommending and/or overseeing tree work and care.

The Arborist for this item shall not be from the same company as the company responsible for selective clearing or tree removal work, and their qualifications shall be reviewed, and the Arborist approved by DCR.

For projects with multiple phases, projects where construction activities (work or stockpiling) shifts, or when otherwise directed by DCR, the Arborist shall re-evaluate conditions and provide follow-up recommendations.

Submittals

- Contractor shall submit to DCR for approval the qualifications and experience of the Arborist. Submittal shall include copy of current certification and a resume summarizing specific construction experience (including relevant DCR projects) for a minimum of five projects.
- Arborist's Report documenting recommendations shall be submitted to DCR and an electronic copy forwarded to the DCR Arborist.

Scope Of Work

Prior to the start of any work, the Arborist shall meet on site with the Contractor responsible for the work, and representatives from DCR, including the DCR Arborist and Landscape Architect. The limits of the proposed project area shall be reviewed to determine which trees might be impacted, and what protection measures shall be implemented, and other concerns. Where required for proper assessment of tree impacts, limits of work shall be staked or otherwise marked in the field prior to the site walk.

DEPARTMENT OF CONSERVATION AND RECREATION TEMPORARY OCCUPANCY PERMIT (Continued)

Trees proposed to be removed shall be painted or otherwise marked with temporary markings. DCR must approve any removal of trees and may direct the contractor to propose a revised work scope for the purpose of saving trees.

Trees to be retained shall be marked such that it does not mar or damage the tree and such that marker is not easily removed. As applicable to the work and scope of the project, trees designated for removal or to be retained shall be noted on the plan and/or in the arborist's report and photographed.

Trees designated to remain that are damaged or removed by construction activities shall be noted and photographed for inclusion in inspection reports submitted to DCR, and the contractor shall pay a fine as compensation.

The Arborist shall be responsible for the following tasks; all recommendations and actions are to be approved before any are carried out:

- Initial Evaluation and Report
  - recommend and prioritize trees that require removal as appropriate to contract scope, project limits, and project intent (No trees shall be removed without the express consent of DCR)
  - modify the work scope and plans as needed to protect trees which DCR does not approve for removal
  - review and modify, if necessary, tree protection measures shown on the drawings, and as directed by DCR
  - review and mark limits of protective fencing for trees and groups of trees to be retained;
  - review and recommend protection measures for high priority trees (six-inch dbh and greater)
  - submit a marked-up Construction Plan that summarizes all recommendations and decisions made in the field, for DCR approval
  - submit a corresponding report including photo documentation
- Oversight
  - direct or execute pruning of branches and/or roots, air spading, and/or other tree care operations
- Monitoring and Inspections
  - periodically inspect fencing and ensure root zones are properly protected and clear of equipment and materials as required by the DCR Arborist
  - reevaluate tree protection measures for various phases of a project
  - submit inspection notes with relevant and dated photos to DCR.
- Special Care – proposed work to be approved in advance by the DCR Arborist:
  - oversee tree pruning for health and aesthetics
  - recommend fertilization and amendments
  - recommend and oversee pest control

DEPARTMENT OF CONSERVATION AND RECREATION TEMPORARY OCCUPANCY PERMIT (Continued)

TREE PROTECTION – ARMORING & PRUNING

The work under this heading shall be for furnishing and installing temporary tree trunk protection and for minor limb pruning or removal of lower tree limbs to prevent injury to the tree from construction equipment and activities.

Trunk armoring is for instances where construction activity (the use of heavy equipment) comes close enough to potentially damage the tree trunk or limbs. It is to be used where shown on the plans and as directed by DCR.

References

If requested, the Contractor shall provide to the Engineer one copy of the latest edition 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.

Materials

Trunk armoring shall be such that it prevents damage to the trunk from construction equipment. Selected material shall be such that installation and removal will not damage the trunk.

Acceptable materials include 2x4 wood cladding with wire or metal strapping, or, for instances when duration of construction activities is less than three months, corrugated plastic pipe mounted with duct tape. Height of cladding shall be from base of tree, from just above the root flare, to the bottom of the first branch, eight feet above the ground, or as required by the Engineer. Armoring of the root flare may be required separately, to ensure no damage to the root flare. All materials and methods shall be approved by the DCR Arborist.

Other materials or methods may be acceptable if approved by DCR.

Methods Of Work

Prior to construction activities, the Contractor, and DCR Landscape Architect and Arborist, shall review trees noted on the plans to be protected. Final decision as to trees armored and/or pruned shall be per the DCR Arborist.

Care shall be taken to avoid damage to the bark during installation and removal of armoring. Trunk armoring shall be replaced and maintained such that it is effective for as long as required and shall be removed immediately upon completion of work activities adjacent to trees.

Pruning of limbs shall conform to the techniques and standards of the most recent ANSI A300 standards.

DEPARTMENT OF CONSERVATION AND RECREATION TEMPORARY OCCUPANCY PERMIT (Continued)

DAMAGES

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 DCR.

If, based on the recommendations of the Contractor's Arborist, DCR's Arborist 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 DCR Arborist 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 DCR Arborist 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 cleanup 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.

DEPARTMENT OF CONSERVATION AND RECREATION TEMPORARY OCCUPANCY PERMIT (Continued)

TREE PROTECTIONS: - SITE RESTORATION

Before the completion of the permitted work, the Contractor shall submit to DCR a site restoration plan, for DCR approval, which shall meet the following goals:

1. Removal of temporary protections: tree protection fencing and wrapping shall be removed with care, to ensure no damage to trees.
2. Establishment of healthy soils:
    a. De-compacting, such as with air spades or core aeration, as directed by the DCR Arborist
    b. Top-Dressing with compost, and slice-seeding or hydroseeding, as per DCR direction
    c. Watering as needed to establish healthy growth in seeded areas.
    d. Ensuring no change of grade between pre-construction and post-construction elevations, as documented by pre- and post-construction surveys, stamped by a Massachusetts Licensed Surveyor.
3. Mulching around trees: As directed by the DCR Arborist, provide three inches of aged dark pine bark mulch in a circle with a minimum three-foot radius from the trunk of each tree.

SECTION 722
CONSTRUCTION SCHEDULING

DESCRIPTION

722.20 General

The Contractor's approach to prosecution of the Work shall be disclosed to the Department by submission of a Critical Path Method (CPM) schedule and a cost/resource loaded Construction Schedule when required in this Subsection. These requirements are in addition to, and not in limitation of, requirements imposed in other sections.

The requirements for scheduling submissions are established based on the Project Value at the time of the bid and are designated as Type A, B, C or D. The definitions of these Schedule Requirement Types are summarized below. Complete descriptions of all detailed requirements are established elsewhere in this specification.

Type A – for all Site-Specific Contracts with a Project Value over $20 Million

- Schedule Planning Session
- Baseline CPM Schedule
- Monthly Update CPM Schedule
- Short-term Construction Schedule
- Contract Schedule Update Meeting
- Resource-Loading
- Resources Graphic Reporting
- Cash Flow Projections from the CPM
- Cash Flow Charts
- Cost-loaded CPM
- Contractor-furnished CPM software, computer and training

Type B – for all Site-Specific Contracts with a Project Value between $10 Million and $20 Million

- Schedule Planning Session
- Baseline CPM Schedule
- Monthly Update CPM Schedule
- Short-term Construction Schedule
- Contract Schedule Update Meeting
- Cost-loaded CPM
- Resource-Loading
- Monthly Projected Spending Report (PSR)
- Contractor-furnished CPM software, computer and training

SECTION 722 (Continued)

Type C – for all Site-Specific Contracts with a Project Value between $3 Million and $10 Million

- Schedule Planning Session
- Baseline CPM Schedule
- Monthly Update CPM Schedule
- Short-term Construction Schedule
- Contract Schedule Update Meeting
- Monthly Projected Spending Report (PSR)
- Contractor-furnished CPM software, computer and training

Type D - for all contracts with a Project Value less than $3 Million; various locations contracts of any dollar amount; contracts with durations less than one-hundred and eighty (180) Calendar Days; and other contracts as determined by the Engineer.

- Bar chart schedule updated monthly or at the request of the Engineer (See Section 722.62.B - Bar Charts.)
- Monthly Projected Spending Report (PSR) (See Section 722.62.F - Projected Spending Reports.)

MATERIALS, EQUIPMENT, PERSONNEL

722.40 General

A. Software Requirements (Types A, B and C)

The Contractor shall use Primavera P6 computer scheduling software.

In addition to the requirements of Section 740 – Engineer's Field Office and Equipment, the Contractor shall provide to the Department one (1) copy of the scheduling software, one (1) software license and one (1) computer capable of running the scheduling software for the duration of the Contract. This computer and software shall be installed in the Engineer's Field Office within twenty-eight (28) Calendar Days after Notice to Proceed. The computer and software shall be maintained and serviced as recommended by the computer manufacturer and/or as required by the Engineer during the duration of the Contract at no additional cost to the Department. The Contractor shall provide professional training in the basic use of the software for up to eight (8) Department employees. The trainer shall be approved by the Engineer. This training shall be provided within twenty-eight (28) Calendar Days after Notice to Proceed.

B. Scheduler Requirements

For all schedule types, if the Contractor plans to use outside scheduling services, the scheduler shall be approved as a subcontractor by the Engineer.

For Type A, B and C Schedules the name of the Contractor's Project Scheduler together with his/her qualifications shall be submitted to the Department for approval by the Engineer within seven (7) Calendar Days after NTP. The Project Scheduler shall have a minimum of five [5] years of project CPM scheduling experience, three [3] years of which shall be on projects of similar scope and value as the project for which the Project Scheduler is being proposed. References shall be provided from past projects that can attest to the capabilities of the Project Scheduler.

SECTION 722 (Continued)

CONSTRUCTION METHODS

722.60 General

A. Schedule Planning Session
(Types A, B and C)

The Contractor shall conduct a schedule planning session within seven (7) Calendar Days after the Contractor receives the NTP and prior to submission of the Baseline Schedule. This session will be attended by the Department and its consultants. During this session, the Contractor shall present its planned approach to the project including, but not limited to:

1. the Work to be performed by the Contractor and its subcontractors;
2. the planned construction sequence and phasing; planned crew sizes;
3. summary of equipment types, sizes, and numbers to be used for each work activity;
4. all early work related to third party utilities;
5. identification of the most critical submittals and projected submission timelines;
6. estimated durations of major work activities;
7. the anticipated Critical Path of the project and a summary of the activities on that Critical Path;
8. a summary of the most difficult schedule challenges the Contractor is anticipating and how it plans to manage and control those challenges;
9. a summary of the anticipated quarterly cash flow over the life of the project.

This will be an interactive session and the Contractor shall answer all questions that the Department and its consultants may have. The Contractor shall provide a minimum of five (5) copies of a written summary of the information presented and discussed during the session to the Engineer. The Contractor's Baseline Schedule and accompanying Schedule Narrative shall incorporate the information discussed at this Schedule Planning Session.

B. Schedule Reviews by the Department (All Types)

1. Baseline Schedule Reviews
   The Engineer will respond to the Baseline Schedule Submission within thirty (30) Calendar Days of receipt providing comments, questions and/or disposition that either accepts the schedule or requires revision and resubmittal. Baseline Schedules shall be resubmitted within fifteen (15) Calendar Days after receipt of the Engineer's comments.

2. Contract Progress Schedule / Monthly Update Reviews
   The Engineer will respond to each submittal within twenty one (21) Calendar Days. Schedules shall be resubmitted by the Contractor within five (5) Calendar Days after receipt of the Engineer's comments.

   Failure to submit schedules as and when required could result in the withholding of full or partial pay estimate payments by the Engineer.

SECTION 722 (Continued)

722.61 Schedule Content and Preparation Requirements
(Types A, B and C unless otherwise noted)

Each Contract Progress Schedule shall fully conform to these requirements.

A. LOGIC

The schedules shall divide the Work into activities with appropriate logic ties to show:

1. conformance with the requirements of this Section and Division I, Subsection 8.02 - Schedule of Operations
2. the Contractor's overall approach to the planning, scheduling and execution of the Work
3. conformance with any additional sequences of Work required by the Contract Documents, including, but not limited to, Subsection 8.03 - Prosecution of Work and Subsection 8.06 – Limitations of Operations.

B. ACTIVITIES

The schedules shall clearly define the progression of the Work from NTP to Contractor Field Completion (CFC) by using separate activities for each of the following items:

1. NTP
2. Each component of the Work defined by specific activities
3. Detailed activities to satisfy permit requirements
4. Procurement of fabricated materials and equipment with long lead times, including time for review and approval of submittals required before purchasing
5. The preparation and submission of shop drawings, procedures and other required submittals, with a planned duration that is to be demonstrated to the Engineer as reasonable
6. The review and return of shop drawings, procedures and other required submittals, approved or with comments, the duration of which shall be thirty (30) Calendar Days, unless otherwise specified or as approved by the Engineer
7. Interfaces with adjacent work, utility companies, other public agencies, sensitive abutters, and/or any other third party work affecting the Contract
8. The Critical Path, clearly defined and organized
9. Float shall be clearly identified
10. Access Restraints – restrictions on access to areas of the Work that are defined by the Department in the bid package, in Subsection 8.06 – Limitations of Operations or elsewhere in the Contract
11. Milestones listed in Subsection 8.03 - Prosecution of Work or elsewhere in the Contract Documents
12. Subcontractor approvals at fifteen (15) Calendar Days from submittal to response
13. Full Beneficial Use (FBU) Contract Milestone per the requirements of Subsection 8.03 - Prosecution of Work
14. Contractor’s request for validation of FBU (ready to open to traffic)
15. The Department’s confirmation of completed work to allow for FBU

SECTION 722 (Continued)

16. Substantial Completion Contract Milestone per the requirements of Subsections 7.15 - Claims Against Contractors for Payment of Labor, Materials and Other Purposes and 8.03 - Prosecution of Work
17. Contractor's request for validation of Substantial Completion
18. Punchlist Completion Period of at least thirty (30) Calendar Days per the requirements of Subsections 5.11 - Final Acceptance, 7.15 - Claims Against Contractors for Payment of Labor, Materials and Other Purposes and 8.03 - Prosecution of Work
19. Contractor confirmation that all punchlist work and documentation has been completed
20. Physical Completion of the Work Contract Milestone per the requirements of Subsections 5.11 - Final Acceptance and 8.03 - Prosecution of Work
21. Documentation Completion per the requirements of Subsections 5.11 - Final Acceptance and 8.03 - Prosecution of Work
22. Contractor Field Completion Contract Milestone per the requirements of Subsections 5.11 - Final Acceptance and 8.03 - Prosecution of Work
23. Utility work to be performed in accordance with the Project Utility Coordination (PUC) Form as provided in Section 8.14 - Utilities Coordination, Documentation and Monitoring Responsibilities
24. Traffic work zone set-up and removal, night work and phasing
25. Early Utility Relocation (by others) that has been identified in the Contract
26. Right-of-Way (ROW) takings that have been identified in the Contract
27. Material Certifications
28. Work Breakdown Structure in accordance with the MassDOT-Highway Division Contractor Construction Schedule Toolkit located on the MassDOT-Highway Division website at: https://www.mass.gov/info-details/massdot-highway-contractors-schedule-toolkit
29. For Type A and B Contracts only: All items to be paid, including all Unit Price and Lump Sum pay items, shall be identified by activity. This shall include all non-construction activities such as engineering work; purchase of permanent materials and equipment, purchase of structural steel stock, equipment procurement, equipment delivery to the site or storage location and the representative amount of overhead/indirect costs that was included in the Contractor's Bid Prices.

C. EARLY AND LATE DATES

Early Dates shall be based on proceeding with the Work or a designated part of the Work exactly on the date when the corresponding Contract Time commences. Late Dates shall be based on completing the Work or a designated part of the Work exactly on the corresponding Contract Time, even if the Contractor anticipates early completion.

SECTION 722 (Continued)

D. DURATIONS

Activity durations shall be in Work Days. Planned Original Durations shall be established with consideration to resources and production rates that correspond to the Contractor's Bid Price. Within all of the Department-required schedules, the Contractor shall plan the Work using durations for all physical construction activities of no less than one (1) Work Day and no greater than fourteen (14) Work Days, unless approved by the Engineer as part of the Baseline Schedule Review.

Should there be an activity with a duration that is determined by the Engineer to be unreasonable, the Contractor will be asked to provide a basis of the duration using bid documents, historic production rates for similar work, or other form of validation that is acceptable to the Engineer. Should the Contractor and the Engineer be unable to agree on reasonable activity durations, the Engineer will, at a minimum, note the disagreement in the Baseline Schedule Review along with a duration the Engineer considers reasonable and the basis for that duration. A schedule that contains a substantial number of activities with durations that are deemed unreasonable by the Engineer will not be accepted.

E. MATERIALS ON HAND (for Types A and B only)

The Contractor shall identify in the Baseline Schedule all items of permanent materials (Materials On Hand) for which the Contractor intends to request payment prior to the incorporation of such items into the Work.

F. ACTIVITY DESCRIPTIONS

The Contractor shall use activity descriptions in all schedules that clearly describe the work to be performed using a combination of words, structure numbers, station numbers, bid item numbers, work breakdown structure (WBS) and/or elevations in a concise and compact label as specified in the MassDOT-Highway Division Contractor Construction Schedule Toolkit located on the MassDOT-Highway Division website at:

https://www.mass.gov/info-details/massdot-highway-contractors-schedule-toolkit

G. ACTIVITY IDENTIFICATION NUMBERS

The Contractor shall use the activity identification numbering system specified in the MassDOT-Highway Division Contractor Construction Schedule Toolkit located online at the address above.

H. ACTIVITY CODES

The Contractor shall use the activity codes specified in the MassDOT-Highway Division Contractor Construction Schedule Toolkit located online at the address above.

I. CALENDARS

Different calendars may be created and assigned to all activities or to individual activities. Calendars define the available hours of work in each Calendar Day, holidays and general or project-specific non-Work Days such as Fish Migration Periods, time of year (TOY) restrictions and/or area roadway restrictions.

SECTION 722 (Continued)

Examples of special calendars include, but are not limited to:

- Winter Shutdown Period, specific work is required by separate special provision to be performed during the winter. See Special Provision 8.03 (if applicable)
- Peak traffic hours on heavily traveled roadways. This shall be from 6:30 am to 9:30 am and from 3:30 pm to 7:00 pm, unless specified differently elsewhere in the Contract.
- Special requirements by sensitive abutters, railroads, utilities and/or other state agencies as defined in the Contract.
- Cape Cod and the Islands Summer Roadway Work Restrictions: A general restriction against highway and bridge construction is enforced between Memorial Day and Labor Day, unless otherwise directed by the Engineer. Refer to the Project Special Provisions for specific restrictions.
- Cape Ann Summer Roadway Work Restrictions: While there are no general restrictions for Cape Ann as there are for Cape Cod and the Islands, project-specific restrictions may be enforced. Refer to the Project Special Provisions for specific restrictions.
- Turtle and/or Fish Migration Periods and/or other in-water work restrictions: Refer to the Project Special Provisions for specific restrictions.
- Working over Waterways Restricted Periods: Refer to the Project Special Provisions for specific restrictions.
- Night-time paving and striping operations, traffic and temperature restrictions: Refer to the Project Special Provisions for specific restrictions.
- Utility Restrictions shall be as specified within the Contract.

J. FLOAT

For the calculation of float in the CPM schedule, the setting for *Retained Logic* is required for all schedule submissions, starting with the Baseline Schedule Submission. Should the Contractor have a reason to propose that an alternative calculation setting such as *Progress Override* be used, the Contractor shall obtain the Engineer's approval prior to modifying to this setting.

K. COST AND RESOURCE LOADING (Types A and B only)

For all Type A and B Schedules, the Contractor shall provide a cost and resource-loaded schedule with an accurate allocation of the costs and resources necessary to complete the Work. The costs and resources shall be assigned to all schedule activities in order to enable the Contractor to efficiently execute the Contract requirements and the Engineer to validate the original plan, monitor progress, provide cash flow projections and analyze delays.

1. Each schedule activity shall have an assigned cost that accurately represents the value of the Work. Each schedule activity shall have its resources assigned to it by craft and the anticipated hours to accomplish the work. Each schedule activity's equipment resources shall be assigned to it by equipment type and hours operated. Front-loading or other unbalancing of the cost distribution will not be permitted.
2. The sum of the cost of all schedule activities shall be equal to the Contractor's Bid Price.
3. Indicating the labor hours per individual, per day, by craft and equipment hours/day will be acceptable.

SECTION 722 (Continued)

4. The Engineer reserves the right to use the cost-loading as a means to resolve changes, disputes, time entitlement evaluations, increases or decreases in the scope of Work, unit price renegotiations and/or claims.
5. For all Type A and B Schedules, all subnets, fragnets, Proposal Schedules, and Recovery Schedules shall be cost and resource- loaded to help to quickly validate and monitor the duration of the Work to be performed.
6. For Type A Schedules, cost-loading of the schedule will also be used for cash flow projection purposes.
7. The cost-loading of each activity shall indicate the portion of the cost for that activity that is applicable to a specific bid item (cost account.) The total cost for each cost account must equal the bid item price.
8. For Type A Schedules, each month, the Contractor will be paid using the Cost-loaded CPM activities for Lump Sum payment items. This requirement supersedes any requirements elsewhere in this Contract regarding partial payments of schedule-of-values for all Lump Sum items.

L. NOT TO BE USED IN THE CONTRACTOR'S CPM SCHEDULE

1. Milestones or constraint dates not specified in the Contract
2. Scheduled work not required for the accomplishment of a Contract Milestone
3. Use of activity durations, logic ties and/or sequences deemed unreasonable by the Engineer
4. Delayed starts of follow-on trades
5. Float suppression techniques

722.62 Submittal Requirements

All schedules shall be prepared and submitted in accordance with the requirements listed below.

Each monthly Contract Progress Schedule submittal shall be uniquely identified.

Except as stated elsewhere in this subsection, schedule submittals shall include each of the documents listed below, prepared in two formats, for distribution as follows:

a. four (4) compact discs (CD); one (1) each for the Office of Project Controls and Performance Oversight (O-PC&PO), the Boston Construction Section Office, the District Construction Office and the Resident Engineer's Office. Additional copies shall be required if the work is performed in more than one district.
b. two (2) hard copies plotted in color on 24" X 36" paper; one (1) copy each for the District Construction Office and the Resident Engineer's Office. No copies for the O-PC&PO and the Boston Construction Section Office. Additional copies shall be required if the work is performed in more than one district.

SECTION 722 (Continued)

A. Narratives

A written narrative shall be submitted with every schedule submittal. The narrative shall:

1. itemize and describe the flow of work for all activities on the Critical Path in a format that includes any changes made to the schedule since the previous Contract Progress Schedule / Monthly Update or the Baseline Schedule, whichever is most recent;
2. provide a description of any specification requirements that are not being followed. Identify those that are improvements and those that are not considered to be meeting the requirements;
3. provide all references to any Notice of Delay that has been issued, within the time period of the Contract Progress Schedule Update, by letter to the Engineer. Note that any Notice of Delay that is not issued by letter will not be recognized by the Engineer. See Subsection 722.64.A - Notice of Delay;
4. provide a description of each third-party utility's planned vs. actual progress and note any that are trending late or are late per the durations and commitments as provided in the PUC Form; provide a description of the five (5) most important responses needed from the Department and the need date for the responses in order to maintain the current Schedule of Record;
5. provide a description of all critical issues that are not within the control of the Contractor or the Department (third party) and any impact they had or may have on the Critical Path;
6. provide a description of any possible considerations to improve the probability of completing the project early or on-time;
7. compare Early and Late Dates for activities on the Critical Path and describe reasons for changes in the top three (3) most critical paths ;
8. describe the Contractor's plan, approach, methodologies and resources to be employed for completing the various operations and elements of the Work for the top three (3) most critical paths. For update schedules, describe and propose changes to those plans and verify that a Proposal Schedule is not required;
9. describe, in general, the need for shifts that are not 5 days/week, 8 hours/day, the holidays that are inserted into each calendar and a tabulation of each calendar that has been used in the schedule;
10. describe any out-of-sequence logic and provide an explanation of why each out-of-sequence activity does not require a correction, if one has not been provided, and an adequate demonstration that these changes represent the basis of how these activities will be built, including considerations for resources, dependencies and previously-approved production rates;
11. identify any possible duration increases resulting from actual or anticipated unit price item quantity overruns as compared to the baseline duration, with a corresponding suggestion to mitigate any possible delays to the Critical Path. If the delay is anticipated to impact the Critical Path, refer to Subsections 4.06 - Increased or Decreased Contract Quantities and 8.10 - Determination and Extension of Contract Time for Completion and submit a letter to the Engineer notifying of a potential delay;
12. include a schedule log consisting of the name of the schedule, the data date and the date submitted.

SECTION 722 (Continued)

B. Bar Charts (Types A, B, C and D)

One (1) time-scaled bar chart containing all activities shall be prepared and submitted using a scale that yields readable plots and that meets the requirements of Subsection 722.61 - Schedule Content and Preparation Requirements Activities shall be linked by logic ties and shown on their Early Dates. Critical Paths shall be highlighted and Total Float shall be shown for all activities.

A second time-scaled bar chart shall also be prepared containing only the Critical Path or, if the Critical Path is not the longest path, the Longest Path using a scale that yields readable plots and that meets the requirements of Subsection 722.61 - Schedule Content and Preparation Requirements. Activities shall be linked by logic ties and shown on their Early Dates. Total Float shall be shown for all activities.

Bar Charts shall be printed in color and submitted on 11" X 17" paper or, if approved by the Engineer, as a .pdf file.

C. Detailed Activity Schedule Comparisons

A Detailed Activity Schedule Comparison (DASC) is a simple reporting tool in the format of a graphical report that will provide Resident Engineers with immediate, timely and up-to-date information. The DASC consists of an updated bar chart that overlays the current time period's bar chart onto the previous time period's bar chart for an easily-read comparison of progress during the present and previous reporting periods. The DASC shall be prepared and submitted in accordance with the instructions contained in the Construction Schedule Toolkit located on the MassDOT-Highway Division website at:

https://www.mass.gov/info-details/massdot-highway-contractors-schedule-toolkit

The reports described in Subsections D, E and F below shall be submitted with all of the schedules listed in Subsection722.20 - General:

D. Activity Cost Report and Monthly Cash Flow Projections (Type A only)

With each Contractor Quantity Estimate (CQE), the Contractor shall submit an Activity Cost Report and Cash Flow Projection that includes all activities grouped by Contract Bid Item.

The Activity Cost Report shall be generated from the Schedule of Record and shall be the basis of the Monthly Cash Flow Projection. Within each contract Bid Item, activities shall be sequenced by ascending activity identification number and shall show:

1. activity ID and description,
2. forecast start and finish dates for each activity and,
3. when submitted as a revised schedule, actual start and finish dates for each completed activity.

For Unit Price pay items, in addition to the above, estimates to complete and any variance to the estimated Contract quantity shall be shown.

E. Resource Graphs (Type A only)

Monthly and cumulative resource graphs for the remaining Contract period using the Early Dates and Late Dates in the Contract Progress Schedule shall be included as part of each schedule submittal.

SECTION 722 (Continued)

F. Projected Spending Reports (Types B, C and D)

A Projected Spending Report (PSR) shall be prepared and submitted in accordance with the instructions listed at the end of this section. The PSR shall indicate the monthly spending (cash flow) projection for each month from NTP to Contractor Field Completion (CFC). Each month's actual spending shall be calculated using all CQEs paid during that month. If the difference between the Contractor's monthly projections vs. the actual spending is greater than 10%, the Contractor's monthly spending projection shall be revised and resubmitted within fifteen (15) Calendar Days.

The Projected Spending Report (PSR) shall be depicted in a tabular format and printed in color on 11 x 17-sized paper or larger as approved by the Engineer. For additional instructions and a template for preparing the Projected Spending Report (PSR), refer to the Contractor's Construction Schedule Toolkit located on the MassDOT-Highway Division website at: https://www.mass.gov/info-details/massdot-highway-contractors-schedule-toolkit or consult with the District Construction Scheduler.

722.63. Progress Schedule Requirements

A. Baseline Schedule

The Baseline Schedule shall be due thirty (30) Calendar Days after Notice to Proceed (NTP.) The Baseline Schedule shall only reflect the Work awarded to the Contractor and shall not include any additional work involving Extra Work Orders or any other type of alleged delay. The Baseline Schedule shall be prepared and submitted in accordance with Subsections 722.61 - Schedule Content and Preparation Requirements and 722.62 - Submittal Requirements. Once the Baseline Schedule has been accepted by the Engineer, with or without comments, it shall represent the as-planned schedule for the Work and become the Contract Progress Schedule of Record until such time as the schedule is updated or revised under Subsections 722.63.C - Contract Progress Schedules / Monthly Updates, 722.64.C - Recovery Schedules and 722.64.D - Proposal Schedules.

The Cost and Resource-Loading information (Types A and B only) shall be provided by the Contractor within forty-five (45) Calendar Days after NTP.

The Engineer's review comments on the Baseline Schedule and the Contractor's responses to them will be maintained for the duration of the Contract and will be used by the Engineer to monitor the Contractor's work progress by comparing it to the Contract Progress Schedule / Monthly Update.

B. Interim Progress-Only Schedule Submissions

The first monthly update of the Contract Progress Schedule/Monthly Update is due within seventy (70) Calendar Days after Notice to Proceed (NTP.) The Baseline Schedule review period ends at sixty (60) Calendar Days after NTP, see Subsection 722.60.B - Schedule Reviews by the Department. If the Baseline Schedule has not been accepted within sixty (60) Calendar Days after NTP, an Interim Progress-Only Schedule shall be due within seventy (70) Calendar Days after NTP. The purpose of the Interim Progress-Only Schedule is to document the actual progress of all activities, including non-construction activities, from NTP until the Baseline Schedule is accepted.

SECTION 722 (Continued)

C. Contract Progress Schedules / Monthly Updates (Types A, B, C and D)

The first Contract Progress Schedule shall be submitted by the Contractor no later than seventy (70) Calendar Days after NTP. The data date for this first Progress Schedule shall be sixty (60) Calendar Days after NTP. Subsequent Progress Schedules shall be submitted monthly.

Each Contract Progress Schedule shall reflect progress up to the data date. Updated progress shall be limited to as-built sequencing and as-built dates for completed and in-progress activities. As-built data shall include actual start dates, remaining Work Days and actual finish dates for each activity, but shall not change any activity descriptions, the Original Durations, or the Original Resources (as planned at the time of bid), without the acceptance of the Engineer. If any activities have been completed out-of-sequence, the Contractor shall propose new logic ties for affected in-progress and future activities that accurately reflect the previously-approved sequencing. Alternatively, the Contractor may submit to the Engineer for approval an explanation of why an out-of-sequence activity does not require a correction and an adequate demonstration that the changes accurately represent how the activities will be built, including considerations for resources, dependencies and previously approved production rates. Once approved by the Engineer, the Contractor may incorporate the changes in the next Contract Progress Schedule/Monthly Update with the affected activities clearly identified and explained in the Schedule Narrative.

No revisions to logic ties; sequence, description or duration of future activities; or planned resource costs shall be made without prior approval by the Engineer.

Any proposed logic changes for in-progress or future activities shall be submitted to the Engineer for approval before being incorporated into a Contract Progress Schedule. The logic changes must be submitted using a Proposal Schedule or a schedule fragnet submission. Once approved by the Engineer, the Contractor may incorporate the logic in the next Contract Progress Schedule/Monthly Update with the affected activities clearly identified and explained in the Schedule Narrative.

For any proposed changes to the original sequence, description or duration of future activities, the Contractor shall submit to the Engineer for approval an explanation of how the proposed description or duration change reflects how the activity will be progressed, including considerations for resources and previously approved production rates. Any description or duration change that does not accurately reflect how the activity will be progressed will not be approved by the Engineer. Once approved by the Engineer, the Contractor may incorporate the changes in the next Contract Progress Schedule/Monthly Update with the affected activities clearly identified and explained in the Schedule Narrative.

Except as otherwise designated by a Contract Modification, no Contract Progress Schedule that extends performance beyond the Contract Time and/or beyond any Contract Milestone shall be approved by the Engineer. The Contractor shall submit a Recovery Schedule if any Contract Progress Schedule/Monthly Update indicates a failure to meet the Contract Dates.

D. Short-Term Construction Schedule

The Contractor shall provide a Short-Term Construction Schedule that details daily work activities, including any multiple shift work that the Contractor intends to conduct, in a bar chart format. The daily activities shall directly correspond to the Contract Progress Schedule activities, with a matching reference to the activity identification number in the Contract Progress Schedule, and may be at a greater level of detail.

SECTION 722 (Continued)

The Short-Term Construction Schedule shall be submitted every two weeks. It shall display all work for a thirty-five (35) Calendar Day period consisting of completed work for the two (2) week period prior and all planned work for the following three (3) week period. The initial submission shall be provided no later than thirty (30) Calendar Days after NTP or as required by the Engineer.

The Contractor shall be prepared to discuss the Short-Term Construction Schedule, in detail, with the Engineer in order to coordinate field inspection staff requirements, the schedule of work affecting abutters and any corresponding work with affected utilities. Short-Term Construction Schedules shall be prepared and submitted in accordance with Subsections 722.61 - Schedule Content and Preparation Requirements and 722.62 - Submittal Requirements.

Failure to submit Short-Term Construction Schedules every two (2) weeks may result in withholding of full or partial payments by the Engineer.

722.64 Impacted Schedule Requirements

A. Notice of Delay

The Contractor shall notify the Engineer in writing, with copies to the District and State Construction Engineers, within three (3) Calendar Days of the start of any delays to the Critical Path that are caused by actions or inactions that were not within the control of the Contractor. Delay notifications that are not provided in a letter to the Engineer, such as a delay notification in the schedule narrative, will not be recognized as contractual notice in the determination of any Time Extension related to the impacts to the work associated with this specific alleged delay. Should such delay continue for more than one (1) week, the Contractor shall note it in the Schedule Narrative until the delay is no longer impacting the Critical Path for the completion of the Contract Milestones. The Engineer will evaluate the alleged delay and its impact and will respond to the Contractor within ten (10) Calendar Days after receipt of a notice of delay.

B. Time Entitlement Analysis

A Time Entitlement Analysis (TEA) shall consist of a descriptive narrative, prepared in accordance with Subsection 722.62.A - Narratives, and an as-built CPM schedule, which may be in the form of a schedule fragnet (that has been developed from the project's Contract Progress Schedule of Record, and illustrates the impact of a delay to the Critical Path, Contract Milestones and/or Contract Completion Date as required in Subsection 8.10 - Determination and Extension of Contract Time for Completion. TEAs shall also be used to determine the schedule impact of proposed Extra Work Orders (EWO) as also required in Subsection 8.10.

TEAs shall be prepared and submitted in accordance with the requirements of Subsections 722.61 - Schedule Content and Preparation Requirements and 722.62 - Submittal Requirements and shall be based on the Contract Progress Schedule of Record applicable at the start of the delay or impact from an EWO. A TEA fragnet must start with a specific new activity describing the work contained in either a Notice of Delay previously submitted to the Department per Subsection 722.64.A - Notice of Delay or an EWO.

SECTION 722 (Continued)

TEAs shall be submitted:

1. as part of any Extra Work Order that may impact Contract Time,
2. with a request for a Time Extension,
3. within fourteen (14) Calendar Days after a request for a TEA by the Engineer for any other reason.

A TEA shall be submitted to the Engineer before any Time Extension is granted to the Contractor. Time Extensions will not be granted unless the TEA accurately reflects an evaluation of all past delays and the actual events that occurred that impacted the Critical Path. The TEA must also demonstrate a plan for the efficient completion of all of the remaining work through an optimized CPM Schedule. The analysis shall include all delays, including Contractor-caused delays, and shall be subdivided into timeframes and causes of delays.

TEAs shall incorporate any proposed activities, logic ties, resource considerations, and activity costs required to most efficiently demonstrate the schedule impacts in addition to detailing all impacts to existing activities, logic ties, the Critical Path, Contract Milestones and the Contract Completion Date. In addition, TEAs shall accurately reflect any changes made to activities, logic ties, restraints and activity costs, necessitated by an Extra Work Order or other schedule impact, for the completion of the remaining work. The Contractor shall provide TEAs that demonstrate that all delays have been mitigated to the fullest extent possible without requiring an Equitable Adjustment to the original bid basis.

All TEAs shall clearly indicate any overtime hours, additional shifts and the resource that are proposed to be incorporated in the schedule. The Engineer shall have final discretion over the use of overtime hours and additional shifts. The Engineer shall have the right to require that overtime hours and/or additional shifts be used to minimize the duration of Time Extensions if it is determined to be in the best interest of the Department to do so.

When accepted, the changes included in a TEA shall be incorporated into the next Contract Progress Schedule per the requirements of Subsection 722.63.C - Contract Progress Schedules / Monthly Updates.

During the review of any TEA, all Contract Progress Schedules shall continue to be submitted as required.

The Engineer may request that the Contractor prepare a Proposal Schedule or a Recovery Schedule to further mitigate any delays that are shown in the accepted TEA/Contract Progress Schedule.

C. Recovery Schedules

The Contractor shall promptly report to the Engineer all schedule delays during the prosecution of the Work. Except as otherwise designated by a Contract Modification, no Contract Progress Schedule that extends performance beyond the Contract Time and/or beyond any Contract Milestone shall be approved by the Engineer. The Contractor shall submit a Recovery Schedule within fourteen (14) Calendar Days of a Contract Progress Schedule submission that shows failure to meet the Contract Dates. This requirement is critical to the Department's ability to make informed decisions regarding Contract Time and costs.

SECTION 722 (Continued)

During the prosecution of the Work, should the Contractor's progress on a critical operation clearly not meet anticipated production, without cause by fault of the Department, or should a critical activity or series of activities not be staffed in accordance with the Contractor's approved Baseline Schedule resource planning, the Contractor shall be obligated to recover such delay. Recovery Schedules shall be prepared and submitted in accordance with Subsections 722.61 - Schedule Content and Preparation Requirements and 722.62 - Submittal Requirements within fourteen (14) Calendar Days of any of the cases listed above.

Recovery Schedules shall clearly indicate any proposed overtime hours, additional shifts, and the resources that are proposed to be incorporated in to the schedule. The Engineer shall have final discretion over the use of overtime hours and additional shifts and shall have the right to require that overtime hours and/or additional shifts be used to minimize the duration of Time Extensions, without additional compensation for any Contractor delays, if it is determined to be in the best interest of the Department to do so.

During the review of any Recovery Schedule, all Contract Progress Schedules shall continue to be required every month.

The Engineer may request that the Contractor prepare a Recovery Schedule to further mitigate any delays that are shown in an accepted TEA/Contract Progress Schedule.

Changes represented in accepted Recovery Schedules shall be incorporated into the next Contract Progress Schedule.

D. Proposal Schedules

A Proposal Schedule is an alternative schedule used to evaluate proposed changes to the Contract scope or significant alternatives to previously approved approaches to complete the Work, which may include changes to activity durations, logic and sequence. For Types A and B Schedules, the Proposal Schedule shall be cost and resource-loaded.

A Proposal Schedule may be requested by the Department at any time or may be offered by the Contractor. The Engineer may request that the Contractor prepare a Proposal Schedule to further mitigate any delays that are shown in an accepted TEA/Contract Progress Schedule.

The Contractor shall submit the Proposal Schedule within thirty (30) Calendar Days of a request from the Department.

The Proposal Schedule shall not be considered a Schedule of Record until the logic, durations, narrative and basis of the Proposal Schedule have been accepted by the Engineer. If the Proposal Schedule took the form of a fragnet, it must be incorporated into the Contract Progress Schedule of Record showing the current progress of all other activities and the impacts/results of the changes made by the Proposal Schedule before the Proposal Schedule is accepted by the Department.

Proposal Schedules shall clearly indicate any proposed overtime hours, additional shifts, and the resources that are proposed to be incorporated in the schedule. The Engineer shall have final discretion over the use of overtime hours and additional shifts.

Changes represented in accepted Proposal Schedules shall be incorporated into the next Contract Progress Schedule. During the review of any Proposal Schedule, all Contract Progress Schedules shall continue to be required every month.

SECTION 722 (Continued)

E. Disputes (Types A, B, C and D)

All schedules shall be submitted, reviewed, dispositioned and accepted in the timely manner specified herein so as to provide the greatest possible benefit to the execution of this Contract.

Any dispute concerning the acceptance of a schedule or any other question of fact arising under this subsection shall be determined by the Engineer. Pending resolution of any dispute, the last schedule accepted by the Engineer will remain the Contract Schedule of Record.

COMPENSATION

722.80 Method of Measurement and Basis of Payment (Types A, B, C and D)

The Special Provisions will specify the fixed-price amount to be paid to the Contractor for the Project Schedule requirements contained herein. Each bidder shall include this lump-sum, fixed-price bid item amount in his/her bid. Failure to do so may be grounds for the rejection of the bid.

All required schedule-related work, including, but not limited to computers, computer software, the planning and coordination with utilities, training, schedule preparation and schedule submittals will be paid for under the fixed price amount.

This fixed price amount is for payment purposes only and is separate from what the Department considers to be the Contractor's General Condition costs. If the Contractor deems it necessary to include additional costs to provide all of the requirements of this section, these additional costs shall be included in the Contractor's overall bid price.

Twenty percent (20%) of this pay item will be paid upon the Engineer's acceptance of the Contractor's Baseline Schedule, prepared and submitted in accordance with Subsection 722.63.A.

The remaining eighty percent (80%) of this pay item will be paid in equal monthly installments distributed across the Contract Duration from Notice to Proceed (NTP) to Contractor Field Completion (CFC), less the 2 months required for the submittal and review of the Baseline Schedule in accordance with the following formula:

$$\text{Monthly Payment} = \frac{\text{Remaining Fixed Price amount (80\% of Item 100.)}}{\text{Contract Duration in whole months} - 2 \text{ months}}$$

The timely and accurate submission of the Baseline Schedule is critical to the Contract and the Department's ability to make informed decisions. Only payments under Item 740 - Engineer's Field Office and Item 748 – Mobilization will be made until the Baseline Schedule is accepted by the Engineer.

SECTION 722 (Continued)

No payment for any other pay item will be processed beyond seventy-five (75) Calendar Days from Notice to Proceed (NTP) until the Baseline Schedule is accepted by the Engineer. Until the Engineer's acceptance of the Baseline Schedule, the combined total of all payments made to the Contractor will be limited to an amount no greater than the total price for Item 748 - Mobilization or 3% of the contract price, whichever is less.

All Contract Progress Schedule Updates submitted later than ten (10) Calendar Days after the CQE (Contract Quantity Estimate) completion date, or greater than forty (40) Calendar Days from the Data Date of the previous submission, will be deemed to be no longer useful and will not qualify for payment. Late submittal of missed Contract Progress Monthly Updates will not result in recovery of the previously forfeited portion of the Schedule of Operations Fixed Price Payment Item.

Failure to submit schedules as and when required may result in the forfeiture of that portion of the Schedule of Operations Fixed Price Payment and/or the withholding of the full or partial CQE payments by the Engineer.

Failure to submit schedules that are acceptable to the Engineer may result in the forfeiture of that portion of the Schedule of Operations Fixed Price Payment and/or the withholding of the full or partial CQE payments by the Engineer.

The Schedule of Operations pay item will be adjusted to pay for only the actual quantity of schedules that have been submitted in accordance with this section.

The Contractor's failure or refusal to comply with the requirements of this Section shall be reasonable evidence that the Contractor is not prosecuting the Work with due diligence and may result in the withholding of full or partial payments by the Engineer.

Should there be a Time Extension granted to the Contractor, the Engineer may provide an Equitable Adjustment for additional Contract Progress Schedule Updates at intervals directed by the Engineer. Item 100. will be the basis for this Equitable Adjustment.

722.82 Payment Items

100.	SCHEDULE OF OPERATIONS - FIXED PRICE $_____	LUMP SUM

ITEM 100.711 BRICK VENEER FLASHING, INTERIOR OF PARAPET, SHEET TYPE SQUARE FOOT

ITEM 100.722 GRANITE CAP STONE FLASHING COPPER FLASHING SQUARE FOOT

The work under Item 100.711 and 100.722 shall include the installation of sheet metal flashing along the interior of the parapets, in accordance with the details shown on the Contract Drawings, as specified herein and as required by the Engineer.

The Work included under these Items shall conform to the applicable Items including, but not limited to the following:

Item 127.61 Brick Veneer Removal, Interior of Parapets
Item 706.41 Brick Veneer New, Interior of Parapets
Item 127.5 Granite Cap Stone Remove and Reset

MATERIALS

Copper Flashing:

Copper:

Use individual locking cleats of the same weight as the base material. All sheets shall carry markings of producer, temper, and weight. Copper shall meet ASTM B0370-22.

Weights of all metal flashing shall be 20 oz.

Rivets for Metal Flashing Connections:

Solid copper 3/16 in. dia. flat-head rivets of proper length for the material being fastened. "Pop rivets" are prohibited unless approved in advance for specific applications by the Engineer.

Solder for Tin/Zinc-Coated Copper:

ASTM B32 Bar Form containing not less than 95% tin and less than 0.5% silver and less than 0.05% lead.

Flux for Copper Work:

Conforming to ASTM B813.

Fasteners and Accessories for Copper:

Use copper or brass screws, bolts, and washers as required.

Thimbles:

20 oz tin/zinc-coated copper, equal thickness to adjacent metal flashing.

ITEMS 100.711 and 100.722 (Continued)

Anchors for Attaching Metal Flashing to Masonry:

1/4 in. dia. Nylon-Nailin with stainless-steel drive pin. Provide lengths to obtain 1-1/2 in. penetration minimum into masonry or concrete backup.

Release Tape:

0.060 in. thick polyethylene, adhesive-backed on one side, width as required.

Strip Flashing for Metal Expansion Joints:

0.060 in. thick uncured EPDM; use manufacturer's recommended primers, adhesives, sealants, and solvent cleaners.

SUBMITTALS

The Contractor shall submit for review and approval copper flashing product that meets the above requirements to the Engineer for review and approval prior to the start of work.

INSTALLER QUALIFICATIONS

All bricklayers shall have successfully completed at least 10 project involving brick or masonry work in the last 10 years. The Contractor shall submit the qualifications of the selected applicator to the Engineer for approval.

METHOD OF MEASUREMENT

Item 100.711 will be measured for payment by the Square Foot of brick veneer flashing, interior of parapet, sheet type installed, complete in place.

Item 100.722 will be measured for payment by the Square Foot of granite cap stone flashing copper flashing installed, complete in place.

BASIS OF PAYMENT

Item 100.711 and Item 100.722 will be paid for at the respective Contract unit prices per Square Foot, which price shall include all labor, materials, equipment, and all incidental costs required to complete the work.

ITEM 102.511 TREE PROTECTION – ARMORING & PRUNING EACH

The work under this item shall conform to the relevant provisions of Subsections 771 of the Standard Specifications and the following:

The work under this Item shall consist of furnishing and installing temporary tree trunk protection and minor limb pruning or removal of lower tree limbs to prevent injury to the tree from construction equipment and activities.

Trunk armoring is for instances where construction activity (the use of heavy equipment) comes close enough to potentially damage the tree trunk or limbs. It is to be used where shown on the plans and as directed by the Engineer.

REFERENCES

If requested, the Contractor shall provide to the Engineer one copy of the latest edition 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.

MATERIALS

Trunk armoring shall be such that it prevents damage to the trunk from construction equipment. Selected material shall be such that installation and removal will not damage the trunk.

Acceptable materials include 2x4 wood cladding with wire or metal strapping, or, for instances when duration of construction activities is less than three months, corrugated plastic pipe mounted with duct tape. Height of cladding shall be from base of tree (including root flare) to the bottom of the first branch, eight feet above the ground, or as required by the Engineer. Material and methods shall be approved by the Engineer.

Other materials or methods may be acceptable if approved by MassDOT Landscape Design or by an Arborist (if included in the contract).

METHODS OF WORK

Prior to construction activities, the Engineer, the Contractor, the Town Tree Warden, and the Arborist (if item is included in the contract), shall review trees noted on the plans to be protected. Final decision as to trees armored and/or pruned shall be per the Engineer.

Care shall be taken to avoid damage to the bark during installation and removal of armoring. Trunk armoring shall be replaced and maintained such that it is effective for as long as required and shall be removed immediately upon completion of work activities adjacent to trees.

Pruning of limbs shall conform to the techniques and standards of the most recent ANSI A300 standards.

ITEM 102.511 (Continued)

DAMAGES

If 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.

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.

METHOD OF MEASUREMENT

Item 102.511 will be measured for payment by the Each tree trunk protected and minor limbs pruned or removed.

BASIS OF PAYMENT

Item 102.511 will be paid at the Contract unit price per Each, which price shall include all labor, equipment, materials, subsequent removal and disposal of the protective materials upon completion of the Contract, and all incidental costs required to complete the work.

In the event of tree damage, cost of Arborist services, of remediation measures, and/or tree removal will be borne by the Contractor.

Payment under this item will be scheduled throughout the length of contract:

- 40% of value shall be paid upon installation of trunk armoring and completion of pruning work, if required.
- 60% shall be paid at the end of construction operations that would damage the tree and after protection materials have been removed and properly disposed of by the Contractor. In the event of repairable damages, payment shall be made after the completion of remediation measures.

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 damages.

ITEM 102.522 TREE AND PLANT PROTECTION FENCE - CHAIN LINK 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

Chain Link Fence shall be six-foot tall metal chain link set in metal frame panels on movable core drilled concrete blocks of sufficient size to hold the fence erect in areas of existing paving to remain.

Panels shall be such that they create a barrier to encompass the entire root zone area to the extent possible.

Unless otherwise indicated, the following types of chain link fence are acceptable:

- New materials or previously used salvaged chain link fencing in good condition, subject to inspection and approval by the Engineer.
- Posts: Galvanized steel pipe of diameter to provide rigidity.
- Fabric: Woven galvanized steel wire mesh. Provide in continuous lengths to be wire tied to fence posts or prefabricated into modular pipe-framed fence panels.

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.

ITEM 102.522 (Continued)

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.

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.

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.

ITEM 102.522 (Continued)

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.

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.

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 102.522 will be measured and paid for payment by the foot of Tree and Plant Protection Fence–Chain Link, 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 damages.

ITEM 107.855 PRESSURE INJECTION OF CRACKS FOOT

The work under this Item consists of the repair of cracks equal to or greater than 0.125" (1/8") in width on the existing concrete encased trusses or underside of the deck of the Eliot Bridge at locations shown on the Plans or designated by the Engineer.

All cracks to be repaired shall be measured using a crack gage card in accordance with CRSI to confirm the crack width. Existing cracks to be repaired shall be bonded by penetration with an epoxy adhesive in accordance with the epoxy Manufacturer's recommendations and the requirements of this Special Provision.

The contractor shall comply with the manufacturer's instructions and recommendations regarding safety. The surrounding work, vehicles, planting materials and items of similar nature, shall be protected from damage by epoxy injection materials and operations.

The Contractor shall not perform any repair work without prior approval of the Engineer for locations, limits, and types of repairs.

SUBMITTALS

Prior to starting work, the Contractor shall submit to the Engineer for approval the Manufacturer's literature completely describing products to be utilized and the appropriate materials safety data sheet (MSDS). The materials shall be delivered clearly marked with legible and intact labels containing the Manufacturer's name, brand name, Manufacturer's recommendations and instructions. The materials shall be stored in areas where temperatures conform with the manufacturer's recommendations and instructions.

INSTALLER QUALIFICATIONS

The epoxy injection applicator shall have successfully completed at least 5 epoxy injection projects in the last 5 years. The Contractor shall submit the qualifications of the selected applicator to the Engineer for approval.

MATERIALS

Epoxy adhesive system components shall conform to the following:

Type: Two component high solids, moisture-insensitive, low-viscosity epoxy adhesive system capable of being injected under pressure into cracks as small as 0.0625" (1/16") wide to their full depth.

ITEM 107.855 (Continued)

Physical Characteristics (Material at 73° F, 50% R.H.):

Ratio:	1 part volume Component "B" to 2 parts volume Component "A"
Viscosity:	Similar to a #10 weight oil (175 cps + 25)
Shelf Life:	1 year
Pot Life:	20-25 minutes @ 73° F for neat injection resin
Tack-Free:	(thin film) 3 to 4 hours @ 73° F
Final Cure:	(78% ultimate strength) ASTM D-695, 2 days at 73° F
Compressive Strength:	ASTM D-695 (73° F & 50% R.H.), 8,800 psi
Modulus of Elasticity:	ASTM D-695, 260,000 psi @ 28 days
Tensile Strength:	ASTM D-638 (73° F), 5,400 psi @ 14 days
Tensile Elongation:	ASTM D-638 (73° F), 3.8% @ 14 days
Shear Strength:	ASTM D-732 (73° F), 4,400 psi @ 14 days

Type: Two component high solids, moisture-insensitive, high-modulus, high-strength, paste adhesive for vertical, horizontal, and overhead sealing of cracks prior to pressure injection grouting. Rapid set of adhesive shall allow cracks sealed with it to be pressure injected in a fast as 1 hour.

Physical Characteristics (Material at 73° F, 50% R.H.):

Pot Life:	20 minutes at 90° F Ambient temperature 25 minutes at 73° F Ambient temperature 30 minutes at 40° F Ambient temperature
Tack Free:	35 minutes at 90° F Ambient temperature 45 minutes at 73° F Ambient temperature 2 hours at 40° F Ambient temperature
Final Cure:	ASTM D-695 (73° F), 75% ultimate strength @16 hours
Viscosity:	Heavy paste consistency
Compressive Strength:	(73° F, 50% R.H.): 2 hours – 1,300 psi 8 hours – 3,800 psi 24 hours – 5,600 psi 3 days – 5,900 psi 7 days – 6,200 psi 28 days – 7,000 psi
Modulus of Elasticity:	ASTM D-695 (73° F), 490,000 psi @ 28 days
Tensile Strength:	ASTM D-638 (73° F), 2,400 psi @ 24 hours
Elongation at Break:	ASTM D-638 (73° F), 1.2% @ 24 hours
Flexural Strength:	ASTM D-790 (73° F), 4,000 psi @ 24 hours
Shear Strength:	ASTM D-732 (73° F), 2,900 psi @ 24 hours

ITEM 107.855 (Continued)

CONSTRUCTION METHODS

The Contractor shall comply with all Manufacturer's instructions and recommendations regarding safety. The surrounding work, vehicles, planting materials and items of similar nature shall be protected from damage by the epoxy injection materials and operations.

Equipment For Metering, Mixing, And Injecting

Type: The equipment used to meter and mix the two injection adhesive components and inject the mixed adhesive into the crack shall be portable, positive displacement type pumps with interlock to provide positive ratio control of exact proportions of the two components at the nozzle. The pumps shall be electric, or air powered and shall provide an in-line mixing and metering system, and shall contain drain-back plugs.

Discharge Pressure: The injection equipment shall have the capability of discharging the mixed adhesive at pressures up to 200 psi and maintaining that pressure.

Ratio Tolerance: The equipment shall have the capability of maintaining the mix ratio for the injection adhesive prescribed by the manufacturer of the adhesive within a tolerance of plus or minus 5 percent by volume at any discharge pressure up to 200 psi.

The Contractor shall verify that cracks and adjacent surfaces are dry of dampness, and free of standing water, dirt, dust, paint, grease, oil, rust, efflorescence, or any other foreign matter which would interfere with adhesion of the epoxy materials or would otherwise be detrimental to the application of epoxy injection surface seal system.

Application

Application of Surface Seal

1. Seal cracks to be injected with surface sealer material in such a manner that minimal defacing or discoloration of concrete surfaces shall result.
2. Provide entry ports in surface seals spaced at intervals as recommended by the injection material Manufacturer, but not less than the concrete thickness at that location. Provide additional entry ports spaced as required to accomplish travel of injected material between ports and fill cracks completely with epoxy.

Epoxy Injection

1. Inject epoxy under constant pressure in accordance with procedures as recommended by the Manufacturer or as required to obtain 100 percent penetration of cracks without inclusion of air pockets or voids in epoxy and as required to achieve structural bonding.
2. Begin injection of epoxy at lower entry port and continue until there is an appearance of epoxy at entry port directly adjacent to or above entry port being pumped, thus indicating epoxy travel.

ITEM 107.855 (Continued)

3. When epoxy travel is indicated, discontinue injection on entry port being pumped, seal it, and transfer epoxy injection to the next adjacent port.
4. Perform epoxy injection continuously until cracks are completely filled.
5. Finishing Requirements:
   a. When cracks are completely filled, cure epoxy for sufficient time to allow removal of surface seal without any draining or run-back of epoxy material from cracks.
   b. Modifications to Epoxy Injection Installation Procedures: If, in order to achieve required penetration of areas being injected, epoxy injection installation procedures specified herein require modification, the Contractor shall submit such modification to the Engineer for acceptance prior to recommencing the work.
   c. Filling of Field Control Testing Core Holes. This procedure consists of using two-component bonding agent applied to surfaces of cored holes followed by application of grout mix placed by hand trowel, thoroughly rodded and tamped in place, and finished to match finish and texture of existing concrete. Submit material and procedures required to the Engineer for acceptance before proceeding with the work.

Field Quality Control

The Contractor shall provide at least one 4" diameter core for testing at a crack repair location designated by the Engineer per every 2,000 of linear feet of crack repair paid. The Engineer shall reserve the right to order two additional cores at designated locations per each 2,000 foot measurement (therefore, up to three cores may be required every 2,000 feet of crack repair paid). The cores shall penetrate the full crack depth of the area being restored.

Testing of the epoxy injection repairs shall be comprised of a visual inspection and a bond strength/compression test in accordance with ASTM C42. The visual inspection shall be considered acceptable if upon visual examination of the core the injection has achieved 90 percent penetration of the crack. The bond strength/compression test shall be considered acceptable based on the following: concrete failure before adhesive failure, or 6,500 psi with no failure of either concrete or adhesive. In both tests, the Engineer will determine whether the tests are considered acceptable.

If a core fails either the visual inspection or bond strength/compression test, an evaluation of the methods and materials used must be made before the area represented by the failed test is re-injected and retested. The Contractor will not be permitted to continue injecting cracks until the cause of the failure is determined and the Engineer is satisfied that corrective measures have been taken to prevent additional failures. The Contractor shall make such additional cores as necessary until the work is considered acceptable. The Contractor shall furnish notarized certification that all materials conform to the above requirements.

In the event that the compressive strength of the concrete cannot be determined prior to the bond strength/compression test of the epoxy injected cores, the Engineer reserves the right to order additional cores of the existing concrete in areas without crack repairs present. The Contractor shall provide two additional cores of the existing concrete, to be tested in accordance with ASTM C42, in order to determine the compressive strength of the existing concrete.

ITEM 107.855 (Continued)

Manufacturer's Field Representative

The Contractor shall arrange with the materials Manufacturer or distributor to have the services of a qualified field representative at the work site prior to any mixing of components to instruct the work crews in the proper mixing and application procedures. The representative shall remain at the job site after work commences and continue to instruct until they, the Contractor, Inspector and/or Engineer are satisfied that the crew has mastered the technique of installing the system 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.

METHOD OF MEASUREMENT

Item 107.855 will be measured for payment by the Foot of pressure injection of cracks.

BASIS OF PAYMENT

Item 170.855 will be paid for at the Contract unit price per Foot, which price shall include all labor, materials, equipment, and all incidental costs required to complete the work.

No separate payment will be made for taking, storing, handling, visual examination and bond strength/compression strength testing of the concrete cores and manufacturer's field representative, but all costs in connection therewith shall be included in the Contract unit price bid. (If the Special Provision is for more than one item, include item title and number reference here.)

ITEM 127.1 REINFORCED CONCRETE EXCAVATION CUBIC YARD
ITEM 127.4 REINFORCED CONCRETE EXCAVATION (FULL DEPTH) SQUARE YARD
ITEM 127.41 REINFORCED CONCRETE EXCAVATION (PARTIAL DEPTH) CUBIC YARD

Work under these Items shall conform to the relevant provisions of Subsections 120 and 140 and the following:

The work under these Items includes the removal and satisfactory disposal of all delaminated, loose, deteriorated or otherwise unsatisfactory concrete on the following bridge elements:

1. Concrete encased trusses.
2. Concrete deck.
3. Concrete sidewalks.
4. Bridge parapets.
5. Areas as designated by the Engineer.

The work shall include an existing concrete conditions survey, e.g., hammer sounding, that shall be undertaken by the Contractor of all vertical and horizontal faces of concrete to be repaired, under the direction and to the satisfaction of the Engineer, to determine the exact limits and locations of all areas to be removed and repaired.

Where deteriorated areas are identified by the Contractor and are acknowledged by the Engineer as requiring an engineered repair, the Engineer shall notify the Design Engineer and schedule a site inspection. The Engineer shall provide the Contractor with the necessary repair details following the site inspection by the Design Engineer.

CONSTRUCTION METHODS

The Contractor shall perform their own evaluations of existing concrete conditions and shall mark out areas of unsound concrete. Methods for evaluation shall include non-destructive methods such as visual observations and acoustic impact methods. The Contractor is referred to ACI Report 201.1R-92 "Guide for Making a Condition Survey of Concrete in Service" and ACI Report 364.1R-94 "Guide for Evaluation of Concrete Structures Prior to Rehabilitation" in regards to evaluation methods.

Before any existing concrete is removed, the Contractor shall provide the Engineer clear access to the areas designated for repair. The Engineer will perform an inspection of the areas and will approve and/or designate the areas where concrete removal and repair will be required. It shall be

the Contractor’s responsibility to inform the Engineer, in writing, of the date when the structure will be available for inspection. Notification shall be given to the Engineer at least seven (7) days prior to the date the structure will be ready for inspection.

The Contractor will not be allowed to commence any repair work until all inspection operations have been performed, unless given permission by the Engineer. The costs for all inspection access shall be considered incidental to this item.

ITEMS 127.1, 127.4, and 127.41 (Continued)

Equipment

Surface preparation and concrete removal equipment shall be of the following types:

Pneumatic and Power Driven Chipping Hammers: In no event shall any pneumatic or power hammer weighing in excess of thirty-five (35) pounds be used for the removal of concrete. Pneumatic or power hammers heavier than the nominal fifteen (15) pound class shall not be used for removing concrete from below any reinforcing steel.

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.

Deteriorated Concrete Removal

The lateral limits of each area to be repaired will be marked by the Contractor and subsequently approved by the Engineer. Where several areas to be excavated are very close together, the Engineer may combine these individual repair areas into a single larger area.

The outlines of each repair area shall first be sawcut to a depth of 3/4" with an approved power-saw capable of making straight cuts prior to chipping and excavating. In the event that reinforcing steel is encountered within the outer 3/4" depth during sawing operations, the depth of sawcut shall immediately be adjusted to a shallower depth so as not to damage the steel bars. If so, directed by the Engineer, sawcutting shall again be carried down to the 3/4" depth at other locations of repair provided reinforcing steel is not again encountered. Where over-breakage occurs resulting in a featheredge, the featheredge shall be squared up to a vertical edge in an approved manner. Where sawing is impractical, the area shall be outlined by chisel or other approved means.

Delaminated concrete as well as loose and deteriorated concrete within spalled and scaled areas shall be chipped away back to sound concrete as directed by the Engineer. If no reinforcement is present, deteriorated concrete shall be removed to sound concrete. Where one-half or more of the bar diameter is exposed, the concrete shall be removed to a minimum of one (1) inch behind the innermost layer of exposed reinforcing steel.

The Contractor shall take all measures necessary to protect vehicular, pedestrian, or nautical traffic from construction operations. No debris, tools, or incidental equipment of any kind will be permitted to fall into or occupy areas where vehicular, pedestrian, or nautical traffic exists.

The Contractor shall take all precautions necessary so as not to damage those portions of the structure that are to remain. Exposed reinforcing shall remain in place except where specifically indicated for removal by direction of the Engineer. Extreme care shall be taken where reinforcing steel is uncovered not to damage the steel or its bond in the surrounding concrete. Pneumatic tools shall not be placed in direct contact with reinforcing steel to remain. Any existing reinforcing steel to remain that is damaged as a result of the Contractor's operations shall be repaired to the satisfaction of the Engineer and at no additional cost to the Department.

ITEMS 127.1, 127.4, and 127.41 (Continued)

Any damage to adjacent sound concrete incurred outside the repair area through negligence by the Contractor, and not acknowledged by the Engineer as being an extension of the repair area, shall be repaired by the Contractor at no cost to MassDOT.

After the designated portions of the existing unsound concrete have been removed, the exposed concrete surface shall be cleaned of all loose particles and loose rust by grit blasting, or other approved means, prior to placing the proposed repair materials. Surface preparation should be in accordance with the requirements of the patch material being installed.

Contractor shall have the approval of the Engineer certifying that all spalled and deteriorated concrete has been removed prior to commencing repairs.

The Contractor shall not allow for any grit or dust to escape the work area in a visible cloud or plume. All debris, dust, and grit shall be contained by draping the work area or other approved means and shall be collected and removed from the work area.

The Contractor shall submit, for approval by the Engineer, reinforced concrete excavation procedures that specify equipment, temporary shielding, and scaffolding to be used at each repair location.

METHOD OF MEASUREMENT

Items 127.1 and 127.41 will be measured for payment by the Cubic Yard of reinforced concrete excavated.

Item 127.4 will be measured for payment by the Square Yard of reinforced concrete excavated.

BASIS OF PAYMENT

Items 127.1 and 127.41 will be paid at the respective contract unit price per Cubic Yard, which price shall include all labor, materials, equipment, sawcutting, and all incidental costs required to complete the work.

Item 127.4 will be paid at the Contract unit price per Square Yard, which price shall include all labor, materials, equipment, sawcutting, and all incidental costs required to complete the work.

ITEM 127.5 GRANITE CAP STONE REMOVE AND RESET FOOT

The work under this Item consist of the removal and resetting of all granite cap stones and removal of concrete replacement cap stones, including existing dowels, along the concrete parapets in accordance with the details shown on the Contract Drawings, as specified herein and as required by the Engineer. This Item includes the salvaging and storing of removed granite caps, in addition to the cleaning of the concrete surface exposed by the removal of the granite caps and concrete replacement caps.

The Work included under this Item shall conform to the applicable Specifications including, but not limited to the following:

Item 100.722 Granite Cap Stone Flashing, Copper Flashing
Item 998. Study and Analysis of Masonry Materials and Procedures
Item 685.11 Granite Cap Stone Replacement
Item 960.2 Granite Cap Stone Dowels, SS

SUBMITTALS

The Contractor shall submit for review and approval a salvage report of the granite caps retained. Salvage report shall indicate the quality and quantity of granite caps retained along with an estimate of required granite caps that will need to be procured under Item 685.11.

Salvage report shall include a numbering system on granite caps to ensure caps are installed in the same location as they were prior to removal.

MATERIALS

Granite

Granite shall conform to the requirements of ASTM C615 for Granite Dimension stone and the following: Granite shall be sound and uniform in quality, texture, and strength, and shall be free of flaws, reeds, rifts, laminations, cracks, seams, starts, or other defects that may impair its strength, durability, function, or appearance. Exposed surfaces shall be free from spots, spalls, chips, stains, discoloration, or other defects that would affect its appearance. Dimension and color to match existing granite cap stone. Submit samples for approval.

Cement Mortar

Mortar shall match existing color and comply with M4.02.15 of the standard specifications.

ITEM 127.5 (Continued)

CONSTRUCTION METHODS

Limits Of Work

Removal of the existing granite cap stones and concrete replacement cap stones and reset of the acceptable granite caps will encompass the entire length of both the North and South parapets, as shown on the construction drawings or as directed by the Engineer.

Removal And Reset Procedure

During the prosecution of the work under this item, the Engineer may reject the use of any method or equipment that causes undue vibration or possible damage to adjacent structures.

Granite cap stones and concrete replacement cap stones shall be removed from the masonry using non-destructive means. Chip away any remaining mortar and grout remaining on the concrete parapet. Remove existing dowels and drill grout holes for new dowels per Item 960.2 or as directed by the Engineer. Dowels free of defects may be left in place with approval from the Engineer. Clean the exposed parapet concrete. Retain acceptable granite cap stones and remove and dispose of concrete replacement cap stones. Existing concrete replacement stones in place will be replaced by granite cap stones procured under Item 685.11.

After related parapet work is complete, set new dowels using non-shrink grout in accordance with Item 960.2 Granite Cap Stone Dowels, SS. Install copper flashing under granite cap stones along the entire length of the parapet in accordance with Item 100.72 Granite Cap Stone Flashing, Copper Flashing. Utilize cement mortar to level the granite caps during instillation and allow to cure.

No granite cap stones shall be laid in inclement weather or below 36 degrees Fahrenheit and frozen mortar shall not be used.

The Contractor shall perform all removal in such a manner as to maintain the safety of traffic operating in the vicinity.

Cleaning Exposed Surfaces

After removals and edge conditioning are complete, remove bond inhibiting materials (dirt, grease, loosely bonded aggregate). Micro-abrasive blasting, including sand-blasting, or harsh chemical cleaners shall at no time be used on the bridge's masonry, brick facades, or mortar. Detergents and paint strippers formulated for use on granite and brick masonry shall be used, in conjunction with stiff natural-bristle or nylon-bristle brushing and/or hose stream of water under normal pressure (100 psi or less).

The cleaning material shall consist of potable, clean water free of contaminants. Where water has high iron or other metal content, pre-treat with complexing agents before use to reduce risk of staining. Stone masonry cleaner shall be one of the following products recommended for use on historic stone masonry:

ITEM 127.5 (Continued)

- Restoration Cleaner Detergent, ProSoCo, Inc., South Plainfield, NJ.
- Hydro-Clean HT-626 Brick, Granite, Sandstone & Terra Cotta Cleaner, Hydrochemical Techniques Inc., Hartford, CT.
- Florok HD 900 Restoration Cleaner Chargar Corporation, Hamden, CT.
- Approved equal.

Abrasion blasting or high-pressure water blasting with water that does not contain detergents or any bond inhibiting chemicals is permitted for existing concrete surfaces only. Check the concrete surfaces after cleaning to ensure that the surface is free from additional loose aggregate and that additional delaminations are not present.

Salvage And Storage

Granite cap stones, which are not broken, chipped, nor discolored will be stored for analysis and reinstallation in conjunction with Item 685.11 and Item 998. respectively. Any granite cap stones damaged during transport or storage that were not identified in the salvage report shall be replaced by the Contractor at their own expense.

Handling, And Storage

1. Granite cap stones kept for salvage or analysis shall be carefully packed and banded to be transported to a storage facility. Granite caps shall be stored on wood skids or pallets, covered with non–staining, waterproof membrane and protected from the weather. Skids shall be placed and stacked in such a manner as to evenly distribute the weight of the granite materials to prevent breakage, cracking, and damage to granite pieces. Granite materials shall be stored in such a manner as to allow air to circulate around each piece. Cap stones shall not be permitted to be in direct contact with the ground during storage.
2. Granite cap stones shall be carefully handled to prevent chipping, breakage, soiling, or other damage. Cap stones damaged in any manner will be rejected and shall be replaced with new materials at the expense of the Contractor.

Environmental Compliance

The Contractor shall comply with all rules, regulations, laws, permits and ordinances of all authorities having jurisdiction including, but not limited to, Massachusetts Department of Environmental Protection, the U.S. Environmental Protection Agency, Federal Department of Transportation (DOT), Massachusetts Water Resources Authority (MWRA), the Commonwealth of Massachusetts and other applicable local, state, and federal agencies governing environmental compliance.

The Contractor shall take all necessary precautions to prevent debris, aggregates, cleaners, and wash water from masonry cleaning related activities from entering the water of the Charles River. Any notification and clean-up procedures required to abate contamination in sediments or water shall be the responsibility of the Contractor. The Contractor shall protect all drains to prevent debris, cleaners, ITEM 127.5 (Continued)

ITEM 127.5 (Continued)

and wash water from entering the storm sewer system. All materials must be collected, removed from the site, and disposed of legally.

Whenever there is a conflict or overlap within the regulations, the most stringent provisions are applicable. The Contractor shall reimburse MassDOT for all costs it incurs, including damages and/or for fines, as a result of the Contractor's failure to adhere to the regulations, specifications, recognized. standard practices, etc., that relate to contaminated material handling, transportation, and disposal. In the event of an environmental incident or violation the Contractor shall document the issue, perform emergency remediation, notify the Engineer, and await further direction prior to continuing work.

METHOD OF MEASUREMENT

Item 127.5 will be measured for payment by the Foot of granite cap stone remove and reset.

BASIS OF PAYMENT

Item 127.5 will be paid for at the Contract unit price per Foot, which price shall include all labor, materials, equipment, and all incidental costs required to complete the work.

Procured granite cap stones that will replace existing concrete replacement cap stones during the work will be paid under Item 685.11 Granite Cap Stone Replacement in addition to Item 127.5.

ITEM 127.61 BRICK VENEER REMOVAL, INTERIOR OF PARAPETS SQUARE FOOT

The work under this Item shall include the removal of all brick veneer along the inside face of the brick masonry parapets in accordance with the details shown on the Contract Drawings, as specified herein and as requried by the Engineer. This item includes salvaging and storing of select removed bricks, in addition to cleaning of the concrete surface exposed by the removal of the brick veneer.

The Work included under this Item shall conform to the applicable Specifications including, but not limited to the following:

Item 100.711 Brick Veneer Flashing, Interior of Parapets, Sheet Type
Item 706.41 Brick Veneer New, Interior of Parapets
Item 706.42 Brick Veneer Repair, Exterior Facades
Item 706.43 Brick Masonry/Granite End Pier Reconstruction
Item 706.45 Brick Veneer – Arch Repair
Item 998. Study and Analysis of Masonry Materials and Procedures

SUBMITTALS

The Contractor shall submit for review and approval a salvage report of the bricks retained. Salvage report shall indicate the quality and quantity of bricks retained and an estimate of the quantity that will be used in repairs. The Owner shall determine how to utilize unused salvage materials prior to completion of the work. Disposal of any unused salvaged bricks will be the responsibility of the Contractor and incidental to this Item.

CONSTRUCTION METHODS

Limits of Removal

Removal of the brick veneer shall encompass the entire interior face of both the North and South parapets as defined on the construction drawings, or as directed by the Engineer.

Removal Procedure

During the completion of the work under this item, the Engineer may reject the use of any method or equipment that causes undue vibration or possible damage to adjacent structures.

Brick veneer shall be removed from the concrete parapet using non-destructive means. Chip away any remaining mortar and grout remaining on the concrete parapet and clean the exposed parapet concrete. Retain acceptable brick material.

The Contractor shall perform all removal in such a manner as to maintain the safety of traffic operating in the vicinity.

ITEM 127.61 (Continued)

Cleaning Exposed Surfaces

After removals and edge conditioning are complete, remove bond inhibiting materials (dirt, grease, loosely bonded aggregate). Micro-abrasive blasting, including sand-blasting, or harsh chemical cleaners shall at no time be used on the bridge's masonry, brick facades, or mortar. Detergents and paint strippers formulated for use on granite and brick masonry shall be used, in conjunction with stiff natural-bristle or nylon-bristle brushing and/or hose stream of water under normal pressure (100 psi or less).

The cleaning material shall consist of potable, clean water free of contaminants. Where water has high iron or other metal content, pre-treat with complexing agents before use to reduce risk of staining. Stone masonry cleaner shall be one of the following products recommended for use on historic stone masonry:

- Restoration Cleaner Detergent, ProSoCo, Inc., South Plainfield, NJ.
- Hydro-Clean HT-626 Brick, Granite, Sandstone & Terra Cotta Cleaner, Hydrochemical Techniques Inc., Hartford, CT.
- Florok HD 900 Restoration Cleaner Chargar Corporation, Hamden, CT.
- Approved equal.

Abrasion blasting or high-pressure water blasting with water that does not contain detergents or any bond inhibiting chemicals is permitted for existing concrete surfaces only. Check the concrete surfaces after cleaning to ensure that the surface is free from additional loose aggregate and that additional delaminations are not present.

Salvage and Storage - Brick

Bricks which are not broken, chipped, nor discolored shall be stored for analysis or reinstallation along the bridge, in accordance with Item 706.42, Item 706.43, Item 706.45; and Item 998. respectively.

Salvage and Storage - Joint Mortar

Select samples of joint mortar shall be preserved and stored for further analysis in accordance with Item 998. Samples of joint mortar to be preserved shall be those that provide adequate representation of the color of the joints throughout the bridge. Samples of joint mortar shall be protected from the weather until submitted for analysis.

ITEM 127.61 (Continued)

Delivery, Handling, and Storage

Bricks kept for salvage or analysis shall be carefully packed and banded to be transported to a storage facility or at a location approved by the Engineer. Brick shall be stored on wood skids or pallets, covered with non–staining, waterproof membrane and protected from the weather. Skids shall be placed and stacked in such a manner as to evenly distribute the weight of the brick materials and to prevent breakage, cracking, and damage to the bricks. Brick materials shall be stored in such a manner as to allow air to circulate around the bricks. Brick shall not be permitted to be in direct contact with the ground during storage.

Brick shall be carefully handled to prevent chipping, breakage, soiling, or other damage. Brick damaged in any manner will be rejected and shall be replaced with salvaged brick or new materials.

Environmental Compliance

The Contractor shall comply with all rules, regulations, laws, permits and ordinances of all authorities having jurisdiction including, but not limited to, Massachusetts Department of Environmental Protection, the U.S. Environmental Protection Agency, Federal Department of

Transportation (DOT), Massachusetts Water Resources Authority (MWRA), the Commonwealth of Massachusetts and other applicable local, state and federal agencies governing environmental compliance.

The Contractor shall take all necessary precautions to prevent debris, aggregates, cleaners, and wash water from concrete cleaning related activities from entering the water of the Charles River. Any notification and clean-up procedures required to abate contamination in sediments or water shall be the responsibility of the Contractor. The Contractor shall protect all drains to prevent debris, cleaners, and wash water from entering the storm sewer system. All materials must be collected, removed from the site, and disposed of legally.

Whenever there is a conflict or overlap within the regulations, the most stringent provisions are applicable. The Contractor shall reimburse MassDOT for all costs it incurs, including damages and/or for fines, as a result of the Contractor's failure to adhere to the regulations, specifications, recognized standard practices, etc., that relate to contaminated material handling, transportation and disposal. In the event of an environmental incident or violation the Contractor shall, document the issue, perform emergency remediation, and notify the Engineer and await further direction prior to continuing work.

INSTALLER QUALIFICATIONS

All bricklayers shall have successfully completed at least 10 project involving brick or masonry work in the last 10 years. The Contractor shall submit the qualifications of the selected applicator to the Engineer for approval.

ITEM 127.61 (Continued)

METHOD OF MEASUREMENT

Item 127.6 will be measured for payment by the Square Foot of brick veneer removed.

BASIS OF PAYMENT

Item 127.6 will be paid for at the Contract unit price per Square Foot, which price shall include all labor, materials, equipment, and all incidental costs required to complete the work.

ITEM 127.62 BRICK VENEER REMOVAL, EXTERIOR FACADES SQUARE FOOT

ITEM 127.63 BRICK VENEER REMOVAL, EXTERIOR FACADES, TOOTHING SQUARE FOOT

The work under Item 127.62 shall include the removal of portions of the brick veneer along the bridge exterior façade in accordance with the details shown on the Contract Drawings, as specified herein and as directed by the Engineer.

The Work included under this Item shall conform to the applicable Specifications including, but not limited to the following:

Item 706.42 Brick Veneer Repair, Exterior Facades
Item 998. Study and Analysis of Masonry Materials and Procedures

CONSTRUCTION METHODS

Limits of Removal

The areas with damaged brick veneer along the exterior façade and toothing joints of the bridge that will be removed are indicated in the Contract Drawings but are not limited to Contract Drawings. The Contractor is responsible to identify and remove damaged brick veneer in areas not captured within the Contract Drawings, or as directed by the Engineer.

Removal Procedure

During the prosecution of the work under this item, the Engineer may reject the use of any method or equipment that causes undue vibration or possible damage to adjacent structures.

Damaged brick veneer will be removed from the exterior facades. Chip away any remaining mortar and grout remaining on the concrete parapet and clean the exposed parapet along the repair area in preparation for Item 706.42 Brick Veneer Replacement, Exterior Facades.

The Contractor shall perform all removal in such a manner as to maintain the safety of traffic operating in the vicinity.

Cleaning Exposed Surfaces

After removals and edge conditioning are complete, remove bond inhibiting materials (dirt, grease, loosely bonded aggregate). Micro-abrasive blasting, including sand-blasting, or harsh chemical cleaners shall at no time be used on the bridge's masonry, brick facades, or mortar. Detergents and paint strippers formulated for use on granite and brick masonry shall be used, in conjunction with stiff natural-bristle or nylon-bristle brushing and/or hose stream of water under normal pressure (100 psi or less).

ITEMS 127.62 and 127.63 (Continued)

The cleaning material shall consist of potable, clean water free of contaminants. Where water has high iron or other metal content, pre-treat with complexing agents before use to reduce risk of staining. Stone masonry cleaner shall be one of the following products recommended for use on historic stone masonry:

- Restoration Cleaner Detergent, ProSoCo, Inc., South Plainfield, NJ.
- Hydro-Clean HT-626 Brick, Granite, Sandstone & Terra Cotta Cleaner, Hydrochemical Techniques Inc., Hartford, CT.
- Florok HD 900 Restoration Cleaner Chargar Corporation, Hamden, CT.
- Approved equal.

Abrasion blasting or high-pressure water blasting with water that does not contain detergents or any bond inhibiting chemicals is permitted for existing concrete surfaces only. Check the concrete surfaces after cleaning to ensure that the surface is free from additional loose aggregate and that additional delaminations are not present.

Environmental Compliance

The Contractor shall comply with all rules, regulations, laws, permits and ordinances of all authorities having jurisdiction including, but not limited to, Massachusetts Department of Environmental Protection, the U.S. Environmental Protection Agency, Federal Department of Transportation (DOT), Massachusetts Water Resources Authority (MWRA), the Commonwealth of Massachusetts and other applicable local, state, and federal agencies governing environmental compliance.

The Contractor shall take all necessary precautions to prevent debris, aggregates, cleaners, and wash water from masonry cleaning related activities from entering the water of the Charles River. Any notification and clean-up procedures required to abate contamination in sediments or water shall be the responsibility of the Contractor. The Contractor shall protect all drains to prevent debris, cleaners, and wash water from entering the storm sewer system. All materials must be collected, removed from the site, and disposed of legally.

Whenever there is a conflict or overlap within the regulations, the most stringent provisions are applicable. The Contractor shall reimburse MassDOT for all costs it incurs, including damages and/or for fines, as a result of the Contractor's failure to adhere to the regulations, specifications, recognized standard practices, etc., that relate to contaminated material handling, transportation and disposal. In the event of an environmental incident or violation the Contractor shall, document the issue, perform emergency remediation, and notify the Engineer and await further direction prior to continuing work.

Toothing Joints

At all toothing joints designated for repair, the Contractor shall remove all damaged brick along both sides of the toothing joint prior to the repair and repointing.

ITEMS 127.62 and 127.63 (Continued)

INSTALLER QUALIFICATIONS

All bricklayers shall have successfully completed at least 10 project involving brick or masonry work in the last 10 years. The Contractor shall submit the qualifications of the selected applicator to the Engineer for approval.

METHOD OF MEASUREMENT

Items 127.62 and 127.63 will be measured for payment by the Square Foot of brick veneer removed.

BASIS OF PAYMENT

Items 127.62 and 127.63 will be paid for at the respective Contract unit prices per Square Foot, which price shall include all labor, materials, equipment, and all incidental costs required to complete the work.

ITEM 129.6 BRIDGE PAVEMENT EXCAVATION SQUARE YARD

The work under this Item shall conform to the relevant provisions of Subsection 120 of the Standard Specifications and the following:

The work under Item 129.6 shall include the removal of the bituminous concrete along the sidewalks of the bridge in accordance with the details shown on the Contract Drawings, as specified herein and as reqruied by the Engineer.

CONSTRUCTION METHODS

Limits Of Removal

The existing bituminous concrete will be removed from the North and South sidewalks from approximately STA 6+07.5 to STA 10+20.5 and as indicated in the Contract Drawings.

Removal Procedure

The Contractor shall submit to the Engineer for approval the type of machine that will be used. Any damage to the deck shall be repaired at the Contractor's own expense.

During the prosecution of the work under this item, the Engineer may reject the use of any method or equipment that causes undue vibration or possible damage to adjacent structures.

The edges of all areas where existing asphalt is removed under this Item shall be sawcut to a depth of 1 inch, and all costs in connection with such work shall be considered as incidental to this Item.

The Contractor shall perform all removal in such a manner as to maintain the safety of traffic operating in the vicinity.

The Contractor shall take all necessary precautions to prevent debris, aggregates, cleaners, and wash water from masonry cleaning related activities from entering the water of the Charles River. Any notification and clean-up procedures required to abate contamination in sediments or water shall be the responsibility of the Contractor. The Contractor shall protect all drains to prevent debris, cleaners, and wash water from entering the storm sewer system. All materials must be collected, removed from the site, and disposed of legally.

METHOD OF MEASUREMENT

Item 129.6 will be measured for payment by the Square Yard of actual area of the existing HMA pavement excavated, removed, and properly disposed.

BASIS OF PAYMENT

Item 129.6 will be paid for at the Contract unit price per Square Yard, which price shall include all labor, materials, equipment, sawcutting, and all incidental costs required to complete the work.

ITEM 303.081 8 INCH DUCTILE IRON WATER PIPE (MECHCANICAL JOINT) REMOVAL FOOT

The work under this Item shall conform to the relevant provisions of Subsection 270 of the Standard Specifications and the following:

The work under this Item shall include the removal and disposal of the existing bridge drainage pipes that are no longer in use in accordance with the details shown on the Contract Drawings, as specified herein and as required by the Engineer.

CONSTRUCTION METHODS

Refer to Item 127.1 Construction Methods.

METHOD OF MEASUREMENT

Item 303.081 will be measured for payment by the Foot of pipe removed and discarded.

BASIS OF PAYMENT

Item 303.081 will be paid for at the Contract unit price per Foot, which price shall include all labor, materials, equipment, and all incidental costs required to complete the work.

ITEM 504.21 TRANSITION GRANITE CURB – SPECIAL TYPE EACH

The work under this Item shall conform to the relevant provisions of Subsection 501 of the Standard Specifications and the following:

The work under this Item shall include the procurement and installation of special granite curb transitions at all four corners of the bridge in accordance with the details shown on the Contract Drawings, as specified herein and as required by the Engineer.

MATERIALS

Granite shall conform to the requirements of ASTM C615 for Granite Dimension stone and the following:

Granite shall be sound and uniform in quality, texture, and strength, and shall be free of flaws, reeds, rifts, laminations, cracks, seams, starts, or other defects that may impair its strength, durability, function, or appearance. Exposed surfaces shall be free from spots, spalls, chips, stains, discoloration, or other defects that would affect its appearance. Dimension and color to match existing granite curbs. The Contractor shall submit samples to the Engineer for approval.

SUBMITTALS

Submit shop drawings showing all dimensions of proposed Transition Granite Curbs to be installed for approval by the Engineer.

CONSTRUCTION METHODS

Curb sections shall be carefully packed and banded by the supplier for shipment. Following shipping, curbs shall be stored on wood skids or pallets, covered with non–staining, waterproof membrane and protected from the weather. Skids shall be placed and stacked in such a manner as to evenly distribute the weight of the stone materials and to prevent breakage, cracking, and damage to granite pieces. Granite materials shall be stored in such a manner as to allow air to circulate around the curbs. Cap stones shall not be permitted to be in direct contact with the ground during storage.

Curbs shall be carefully handled to prevent chipping, breakage, soiling, or other damage. Curbs damaged in any manner will be rejected and shall be replaced with new materials.

METHOD OF MEASUREMENT

Item 504.21 will be measured for payment by the Each transition granite curb – special type installed, complete in place.

BASIS OF PAYMENT

Item 504.21 will be paid for at the Contract unit price per Each, which price shall include all labor, materials, equipment, and all incidental costs required to complete the work.

ITEM 685.11 GRANITE CAP STONE REPLACEMENT EACH

The work under Item 685.11 shall include the replacement of concrete replacement cap stones and damaged existing granite cap stones through the procurement, setting, and installation of new granite cap stones along the parapet in accordance with the details shown on the Contract Drawings, as specified herein and as required by the Engineer.

This work will be in conjunction of Item 127.5 Granite Cap Stone Removal and Reset.

The Work included under this Item shall conform to the applicable Items including, but not limited to the following:

Item 100.7 Granite Cap Stone Flashing, Copper Flashing
Item 127.5 Granite Cap Stone Remove and Reset
Item 960.2 Granite Cap Stone Dowels, SS
Item 998. Study and Analysis of Masonry Materials and Procedures

MATERIALS

Granite shall conform to the requirements of ASTM C615 for Granite Dimension stone and the following: Granite shall be sound and uniform in quality, texture, and strength, and shall be free of flaws, reeds, rifts, laminations, cracks, seams, starts, or other defects that may impair its strength, durability, function, or appearance. Exposed surfaces shall be free from spots, spalls, chips, stains, discoloration, or other defects that would affect its appearance. Dimension and color to match existing granite cap stone. Submit samples for approval.

SUBMITTALS

The Submit granite samples for this Item in accordance with Item 998. Study and Analysis of Masonry Materials and Procedures.

CONSTRUCTION METHODS

Granite cap stones shall be carefully packed and banded by the supplier for shipment. Following shipping, cap stones shall be stored on wood skids or pallets, covered with non–staining, waterproof membrane and protected from the weather. Skids shall be placed and stacked in such a manner as to evenly distribute the weight of the stone materials and to prevent breakage, cracking, and damage to granite pieces. Granite materials shall be stored in such a manner as to allow air to circulate around the stones. Cap stones shall not be permitted to be in direct contact with the ground during storage.

Stones shall be carefully handled to prevent chipping, breakage, soiling, or other damage. Cap stone damaged in any manner will be rejected and shall be replaced with new materials.

Installation

Installation of procured granite cap stones shall be completed during Item 127.5. The Contractor shall follow all installation procedures listed within Item 127.5.

ITEM 685.11 (Continued)

METHOD OF MEASUREMENT

Item 685.11 will be measured for payment by the Each granite cap stone replacement delivered.

BASIS OF PAYMENT

Item 685.11 will be paid for at the Contract unit price per Each, which price shall include all labor, materials, equipment, storing, and all incidental costs required to complete the work.

ITEM 701.3 CAST-IN-PLACE SIDEWALK – REPAIR AND WIDEN SQUARE FOOT

The work under this Item shall conform to the relevant provisions of Subsections 120, 701, 901 of the Standard Specifications and the following:

The work under this Item shall include the partial depth repair and widening of the cast-in-place concrete sidewalks along the Eliot Bridge in accordance with the details shown on the Contract Drawings, as specified herein and as requied by the Engineer.

MATERIALS

Epoxy reinforcement
Epoxy reinforcement shall meet the relevant provisions of Subsection 901 of the Standard Specifications.

Dowels
Epoxy reinforcement shall meet the relevant provisions of Subsection 901 of the Standard Specifications.

SUBMITTALS

Contractor shall submit a demolition plan highlighting the equipment to be used for concrete removal at the existing sidewalks and the sequence of concrete and reinforcement placement of the widened sidewalks.

Design Mixtures

For each concrete mixture, submit proposed mix proportions and test results confirming mix meets requirements stated below. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments. Indicate amounts of mixing water to be withheld for later addition at Project site. Indicate amount of fly ash in the mix.

METHOD OF MEASUREMENT

Item 701.3 will be measured for payment by the Square Foot of cast-in-place sidewalk – repaired and widened, complete in place.

BASIS OF PAYMENT

Item 701.3 will be paid for at the Contract unit price per Square Foot, which price shall include all labor, materials, equipment, and all incidental costs required to complete the work.

All reinforced concrete excavation for this item shall be paid for under Item 127.41 Reinforced Concrete Excavation.

All epoxy rebar for this Item shall be paid for under Item 910.1 Steel Reinforcement for Structures – Epoxy Coated.

ITEM 706.41 BRICK VENEER NEW, INTERIOR OF PARAPETS SQUARE FOOT
ITEM 706.42 BRICK VENEER REPAIR, EXTERIOR FACADES SQUARE FOOT

The work under this Item shall include the repair of brick veneer on the exterior facade of the masonry parapet in accordance with the details shown on the Contract Drawings, as specified herein and as directed by the Engineer after Item 127.62 has been completed.

The Work included under this Item shall conform to the applicable special provisons including, but not limited to the following:

Item 127.61 Brick Veneer Removal, Interior of Parapets
Item 127.62 Brick Veneer Removal, Exterior Facades
Item 127.63 Brick Veneer Removal, Exterior Facades, Toothing
Item 998. Study and Analysis of Masonry Materials and Procedures

MATERIALS

Brick

Replacement brick shall be salvaged brick from the interior face of the parapet in accordance with Item 127.61 Brick Veneer Removal, Interior of Parapets. If new brick shall be used due to a lack of salvaged brick the new brick shall be approved by the Engineer in accordance with Item 998. Study and Analysis of Masonry Materials and Procedures and shall meet ASTM C62-17 specifications. Any new brick procured shall be paid for under Item 706.41.

Mortar Joint Filler

Joint Filler: Joint Mortar to be determined in accordance with Item 998. Mortar shall consist of Type II Portland Cement and shall conform to ASTM C270 and M4.02.15 of the standard specifications.

Brick Veneer Anchorage

New brick veneer shall be anchored to the existing concrete parapets using hot-dip galvanized anchors “dovetail” style anchors. Anchor shall be 3/16” diameter.

Cleaning Exposed Surfaces

After removals and edge conditioning are complete, remove bond inhibiting materials (dirt, grease, loosely bonded aggregate). Micro-abrasive blasting, including sand-blasting, or harsh chemical cleaners shall at no time be used on the bridge’s masonry, brick facades, or mortar. Detergents and paint strippers formulated for use on granite and brick masonry shall be used, in conjunction with stiff natural-bristle or nylon-bristle brushing and/or hose stream of water under normal pressure (100 psi or less).

ITEMS 706.41 and 706.42 (Continued)

The cleaning material shall consist of potable, clean water free of contaminants. Where water has high iron or other metal content, pre-treat with complexing agents before use to reduce risk of staining. Stone masonry cleaner shall be one of the following products recommended for use on historic stone masonry:

- Restoration Cleaner Detergent, ProSoCo, Inc., South Plainfield, NJ.
- Hydro-Clean HT-626 Brick, Granite, Sandstone & Terra Cotta Cleaner, Hydrochemical Techniques Inc., Hartford, CT.
- Florok HD 900 Restoration Cleaner Chargar Corporation, Hamden, CT.
- Approved equal.

Abrasion blasting or high-pressure water blasting with water that does not contain detergents or any bond inhibiting chemicals is permitted for existing concrete surfaces only. Check the concrete surfaces after cleaning to ensure that the surface is free from additional loose aggregate and that additional delaminations are not present.

SUBMITTALS

Should "new" brick be necessary for this Work, the Contractor shall submit brick samples in accordance with Item 998.

Manufacturer's Product Data

Manufacturer's product data shall be submitted for the following items:

1. Brick
2. Mortar Joint Filler
3. Brick Veneer Anchorage
4. Masonry cleaner

Warranty

Furnish joint sealant manufacturer's written single–source performance warranty that joint sealant work will be free of defects related to workmanship or material deficiency for five (5) years from date of Substantial Completion of the Project.

CONSTRUCTION METHODS

Setting

No brick shall be laid in inclement weather or when the temperature is 36 degrees Fahrenheit, and dropping, nor shall any work be done on rising temperatures until the temperature reaches 32 degrees Fahrenheit. Frozen mortar materials shall not be used.

All setting shall be done by competent masons under adequate supervision. Do any cleaning necessary to the exterior face of the masonry parapet to provide a clean base surface, free from dust, oil, grease, other impurities, or loose/friable particles in accordance with Item 127.62.

ITEMS 706.41 and 706.42 (Continued)

Brick with chips, cracks, stains, or other defects that might be visible in the finished work shall not be used.

Before setting, the back of each piece of brick shall be dampened. Each piece shall be carefully bedded into a wet, sticky bond coat mixture and tapped home to a full and solid bearing. Care shall be exercised to equalize bed and joint openings and eliminate the need for redressing of exposed surfaces.

Bricks shall be set to match the existing surrounding pattern.

Joints

Unless otherwise indicated, expansion joints shall be 1/2 inch thick.

1. Initial dry sand–cement joint fill placement shall occur after bond coat has substantially set, typically no sooner than 24 hours after placement of brick on bond coat. Joints shall be dry and free of standing water. Joints shall be free of dust and debris. If joints have collected dust or debris between placement of bricks and installation of joint fill material, blow joints free with compressed air system approved by the Engineer.
2. Dry sweep joints fill with dry sand cement joint fill and follow by spraying with water to compact in joints. Final filling of joints as specified shall be done in accordance with the following paragraph.
3. Rake mortar joints flat with a 1/8" recess at the top of all horizontal joints.
4. Expansion joints shall be cleaned of all mortar and left ready for sealing of joints.
5. Upon completion of brick work, surfaces shall be left in a clean, unsoiled condition, acceptable to the Engineer.
6. Cure joints for at least 7 days after installing by covering with curing paper or other non–staining material approved by the Engineer.

Layout

The brick layout indicated on the Contract Drawings is approximate. The final configuration of the brickwork will be determined in the field by the Engineer. Do not set brick until determination is made.

Delivery, Handling, and Storage

Brick shall be carefully packed and banded. Brick shall be stored on wood skids or pallets, covered with non–staining, waterproof membrane and protected from the weather. Skids shall be placed and stacked in such a manner as to evenly distribute the weight of the brick materials and to prevent breakage, cracking, and damage to brick pieces. Brick materials shall be stored in such a manner as to allow air to circulate around the bricks. Brick shall not be permitted to be in direct contact with the ground any time during storage.

Brick shall be carefully handled to prevent chipping, breakage, soiling, or other damage. Brick damaged in any manner will be rejected and shall be replaced with new materials.

ITEMS 706.41 and 706.42 (Continued)

Protection of Finished Surfaces

Finished surfaces adjacent to the paving work shall be adequately protected from soiling, staining, and other damage.

Adjust and Clean

1. Remove and replace bricks that have been broken, chipped, stained, or otherwise damaged. Remove and replace units which are misaligned or not to grade or do not match adjoining brick work. Provide new matching units, install as specified and fill joints to eliminate evidence of replacement. Repair defective and unsatisfactory joints as required to provide a neat, uniform appearance.
2. After completion of bricklaying, surfaces shall be carefully cleaned, removing all dirt, excess mortar, filler, and stains using the approved cleaning method. High pressure abrasion blasting methods shall not be used to clean the masonry.
3. Protect all adjacent architecture, pavement, lawns, and planting from damage by masonry cleaner. Employ waterproof tarps and other appropriate barriers to prevent damage to adjacent materials.
4. After cleaning, rinse thoroughly with clean water.

INSTALLER QUALIFICATIONS

All bricklayers shall have successfully completed at least 10 project involving brick or masonry work in the last 10 years. The Contractor shall submit the qualifications of the selected applicator to the Engineer for approval.

METHOD OF MEASUREMENT

Item 706.41 and Item 706.42 will be measured for payment by the Square Foot of brick veneer installed, complete in place.

BASIS OF PAYMENT

Item 706.41 and Item 706.42 will be paid for at the respective Contract unit prices per Square Foot, which price shall include all labor, materials, equipment, mockup, and all incidental costs required to complete the work.

ITEM 706.43 BRICK MASONRY/GRANITE END POST RECONSTRUCTION LUMP SUM

The work under this Item shall include the installation of brick masonry and granite at the end posts of the Eliot Bridge in accordance with the details shown on the Contract Drawings, as specified herein and as requried by the Engineer.

MATERIALS

Brick

Replacement brick shall be salvaged brick from the face end pier in accordance with Item 127.61. If new brick shall be used due to a lack of salvaged brick the new brick shall be approved by the Engineer in accordance with Item 706.41 and shall meet ASTM C 62-17 standards. Any new brick procured for this Item shall be paid for under Item 706.41.

Mortar Joint Filler

Joint Filler: Joint Mortar to be determined in accordance with Item 998. Mortar shall consist of Type II Portland Cement and shall conform to ASTM C270 and M4.02.15 of the standard specifications.

Brick Veneer Anchorage

New brick veneer shall be anchored to the existing concrete parapets using hot-dip galvanized anchors “dovetail” style anchors. Anchor shall be 3/16” diameter.

Masonry Cleaner

Masonry cleaner shall be a product specifically designed to remove excess mortar and grout, rust, job dirt, and all construction stains during a final clean down of new surfaces and leave the brick veneer surfaces uniformly clean. Masonry cleaner shall be formulated to avoid damaging or staining of brick surfaces, damage to mortar joints, and alteration of the color of the mortar joints. Masonry cleaner shall be an environmentally safe product that can be flushed into a storm sewer system without damage to that system. High pressure abrasion blasting methods shall not be used to clean the masonry.

Granite

Granite shall conform to the requirements of ASTM C615 for Granite Dimension stone and the following: Granite shall be sound and uniform in quality, texture, and strength, and shall be free of flaws, reeds, rifts, laminations, cracks, seams, starts, or other defects that may impair its strength, durability, function, or appearance. Exposed surfaces shall be free from spots, spalls, chips, stains, discoloration, or other defects that would affect its appearance. Dimension and color to match existing granite cap stone. Submit samples for approval by Engineer in accordance with Item 998.

ITEM 706.43 (Continued)

SUBMITTALS

Manufacturer's Product Data

Manufacturer's product data shall be submitted for the following items:

1. Sand–cement mix color grout materials, bond coats including additives
2. Brick (if needed)
3. Shop Drawings showing dimensions and size of granite stone replacement for reconstruction of the end posts.

Warranty

Furnish joint sealant manufacturer's written single–source performance warranty that joint sealant work will be free of defects related to workmanship or material deficiency for five (5) years from date of Substantial Completion of the Project.

CONSTRUCTION METHODS

Construction methods for this Item shall conform to the specifications set forth in Item 706.42 Brick Veneer Repair, Exterior Facades and Item 685.11 Granite Cap Stone Replacement.

INSTALLER QUALIFICATIONS

All bricklayers shall have successfully completed at least 10 project involving brick or masonry work in the last 10 years. The Contractor shall submit the qualifications of the selected applicator to the Engineer for approval.

BASIS OF PAYMENT

Item 706.43 will be paid for at the Contract unit price Lump Sum, which price shall include all labor, materials, equipment, and all incidental costs required to complete the work.

Payment of 20% of the Lump Sum price of this item will be made upon the Engineer's acceptance of the Contractor's submittals and shop drawings for the granite stone replacement.

The remaining 80% of the Lump Sum price of this Item will be paid following completion of the work.

ITEM 706.44 BRICK VENEER, MASONRY REPOINTING SQUARE FOOT

The work under this Item shall include the repointing of brick veneer on the exterior facade of the masonry parapet in accordance with the details shown on the Contract Drawings, as specified herein and as directed by the Engineer after Item 127.62 has been completed.

REFERENCE STANDARDS

The publications listed below form a part of these Specifications to the extent referenced. The publications are referred to in the text by basic designation only. In case of conflict between provisions of codes, laws, ordinances, and these Specifications, including the Contract Drawings, the more stringent requirements will apply.

American Society for Testing Materials (ASTM)

C144 Standard Specification for Aggregate for Masonry Mortar

C150 Standard Specification for Portland Cement

C207 Standard Specification for Hydrated Lime for Masonry Purposes

C270 Standard Specification for Mortar for Unit Masonry

C780 Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry

The Masonry Society (TMS)

TMS 402/602 Building Code Requirements and Specification for Masonry Structures

MATERIALS

Mortar Joint Filler

Joint Filler: Joint Mortar to be determined in accordance with Item 998. Mortar shall consist of Type II Portland Cement and shall conform to ASTM C270 and M4.02.15 of the standard specifications.

Shims

Plastic shims of various thicknesses, at least 2 in. long and 2 in. wide, for support of granite blocks during removal of existing mortar and repointing work.

ITEM 706.44 (Continued)

SUBMITTALS

Provide the following Submittals prior to commencement of work:

1. Manufacturer's technical literature describing all materials to be used for the Work including instructions for storage, handling, use, and Material Safety Data Sheets. Prior to delivery, submit to MassDOT certificates attesting to compliance with the applicable Special Provisions' reference standards.
2. For Contractor, mechanics, and manufacturers, provide a list of similar projects completed in the last (5) years.
3. Sequence of work.
4. Submit three (3) cured samples of pointing mortar for color and texture to match mortar and three (3) cured samples of pointing mortar for compressive strength testing in accordance with Item 998. Continue to submit samples until approved by MassDOT. Do not proceed with mockup or work until mortar is approved (Samples utilized for Item 706.41 Brick Veneer New, Interior Parapets will be acceptable if approved in accordance with Item 998.).

CONSTRUCTION METHODS

The contractor shall be responsible for developing his own safe and stable work platform/staging system which shall be designed by a Professional Engineer Licensed in Massachusetts and submitted to MassDOT for approval.

Sample Mockup Panel Procedure

Sample mockup developed for Item 706.41 shall be acceptable for use to demonstrate repointing.

Mortar Removal

The procedure for removing existing mortar shall be decided upon successful completion of mockups and is subject to approval by the Historic Review Team in accordance with Item 998. When cutting mortar with a rotary saw or hand tools, remove only mortar. Do not chip or cut into bricks with saw or hand tools. Replace damaged bricks in accordance with Item 127.62. Remove all mortar from joints to 1 ½ in minimum depth, or to a depth to remove all deteriorated mortar, whichever is greater. Remove mortar at T-joints with a hammer and chisel, as observed during the mockup. As mortar is removed, install shims at areas where the stability of the masonry depends on the continuous bearing of the brick on the mortar. After removing existing mortar, blow out dust and mortar particles using compressed air. Ensure that surfaces to be repointed are not contaminated with oil from the air blower.

Mortar Mixing

Control the batching procedure to provide proper proportions by measuring materials by volume. Mix all cementitious materials, sand, and water thoroughly in a mechanical batch mixer using the minimum amount of water to produce a workable consistency.

ITEM 706.44 (Continued)

All mortar for repointing shall be prehydrated. Mix only enough water with premixed dry ingredients to produce a damp workable consistency that retains its shape when formed into a ball. Let mortar stand in damped condition for 1/2 to 1 hour. Retemper only as necessary for the required consistency. Add water to replace that which has evaporated. Do not retemper more than once for color consistency. All mortar must be placed within 2 hours of initial mixing.

Pointing

Dampen the joint to be pointed prior to pointing with a fine mist sprayer. Do not introduce large amounts of water into the wall cavity. The masonry must absorb all surface water. Pack the mortar tightly into the joint in areas between shims in 3/4 in. maximum lifts. Allow each lift to become thumbprint dry before applying next lift. Tool joint to a flat profile to match existing mortar. When final lift is thumbprint hard, remove excess mortar from adjacent bricks by brushing. Keep the pointing mortar damp for 2 to 3 days using burlap placed over the mortar and kept moist using a fine mist hand sprayer. Allow mortar to set a minimum of seven days prior to removal of shims. Remove shims and repeat pointing procedure at gaps left at shim locations. Wipe off all excessive mortar as the work progresses. Dry brush at the end of the day.

Cleaning of Excess Mortar

Clean exposed surfaces of excess mortar and foreign matter using stiff nylon or bristle brushes and clean water, spray-applied at very low pressure (<100 psi), as the work progresses. High pressure abrasion blasting methods shall not be used to clean the masonry.

INSTALLER QUALIFICATIONS

All bricklayers shall have successfully completed at least 10 project involving brick or masonry work in the last 10 years. The Contractor shall submit the qualifications of the selected applicator to the Engineer for approval.

METHOD OF MEASUREMENT

Item 706.44 will be measured for payment by the Square Foot of brick veneer masonry repointed, complete in place.

BASIS OF PAYMENT

Item 706.44 will be paid for at the Contract unit price per Square Foot, which price shall include all labor, materials, equipment, and all incidental costs required to complete the work.

ITEM 706.45 BRICK VENEER – ARCH REPAIR EACH

The work under this Item shall include the installation of brick veneer on the exterior arches, the adjacent brick along the entrances of the pedestrian underpasses and the furnishing and installation of the steel lintel beam of the Eliot Bridge at the Pedestrian Underpass Tunnels in accordance with the details shown on the Contract Drawings, as specified herein and as requried by the Engineer.

MATERIALS

Brick

Replacement brick shall be salvaged brick from the interior face of the parapet in accordance with Item 127.61. If new brick shall be used due to a lack of salvaged brick the new brick shall be approved by the Engineer and match the brick selected as part of Items 998. and 706.41. Any new brick procured for this Item shall be paid for under Item 706.41.

Steel

Structural steel for lintel beam shall be AAHSTO M270 Grade 50 and shall be galvanized per ASTM A123.

Mortar Joint Filler

Mortar for brick work shall be approved by the Engineer and match the mortar type selected as part of Items 998. and 706.41.

Masonry Cleaner

Masonry cleaner shall be a product specifically designed to remove excess mortar and grout, rust, job dirt, and all construction stains during a final clean down of new surfaces and leave the brick veneer surfaces uniformly clean. Masonry cleaner shall be formulated to avoid damaging or staining of brick surfaces, damage to mortar joints, and alteration of the color of the mortar joints. Masonry cleaner shall be an environmentally safe product that can be flushed into a storm sewer system without damage to that system. High pressure abrasion blasting methods shall not be used to clean the masonry.

SUBMITTALS

Manufacturer's Product Data

Manufacturer's product data shall be submitted for the following items:

1. Brick
2. Mortar Joint Filler
3. Brick Veneer Anchorage
4. Masonry cleaner

ITEM 706.45 (Continued)

Warranty

Furnish joint sealant manufacturer's written single–source performance warranty that joint sealant work will be free of defects related to workmanship or material deficiency for five (5) years from date of Substantial Completion of the Project.

CONSTRUCTION METHODS

Construction methods for this Item shall conform to the specifications set forth in Item 706.42 Brick Veneer Repair, Exterior Facades.

INSTALLER QUALIFICATIONS

All bricklayers shall have successfully completed at least 10 project involving brick or masonry work in the last 10 years. The Contractor shall submit the qualifications of the selected applicator to the Engineer for approval.

METHOD OF MEASUREMENT

Item 706.45 will be measured for payment by the Each brick veneer – arch repaired, complete in place.

BASIS OF PAYMENT

Item **706.45** will be paid for at the Contract unit price per Each, which price shall include all labor, materials, equipment, furnishing and installation of the steel lintel beam, and all incidental costs required to complete the work.

New brick procured for this Item will be paid for under Item 706.41.

ITEM 740. ENGINEERS FIELD OFFICE AND EQUIPMENT (TYPE A) MONTH

The work under this Item shall conform to the relevant provisions of Subsection 740 of the Standard Specifications and the following:

Two computer systems and printer system meeting minimum requirements set forth below including installation, maintenance, power, paper, disks, and other supplies shall be provided at the Resident Engineer's Office:

All equipment shall be UL approved and Energy Star compliant.

The Computer System shall meet the following minimum criteria or better:

Processor:	Intel, 3.5 GHz
System Memory (RAM):	12 GB
Hard Drive:	500 GB
Optical Drive:	DVD-RW/DVD+RW/CD-RW/CD+RW
Graphics Card:	8 GB
Network Adapter:	10/100 Mbit/s
USB Ports:	6 USB 3.0 ports
Keyboard:	Generic
Mouse:	Optical mouse with scroll, MS-Mouse compliant
Video/Audio	the computer system shall be capable of allow video calling and recording:
Video camera	shall be High Definition 1080p widescreen capable video calling and recording with built in microphone. The microphone system shall capture natural audio while filtering out background noise.
Audio	shall be stereo multimedia speaker system delivering premium sound.
OS:	Latest Windows Professional with all security updates
Web Browser:	Latest Internet Explorer with all security updates
Applications:	Latest MS Office Professional with all security updates Latest Adobe Acrobat Professional with all security updates Latest Autodesk AutoCAD LT Antivirus software with all current security updates maintained through the life of the contract.
Monitors:	Two 27" LED with Full HD resolution. Max. resolution 1920 x 1080
Flash drives:	2 (two) - 128GB USB 3.0
Internet access:	High Speed (min. 24 mbps) internet access with wireless router.

ITEM 740. (Continued)

The Multifunction Printer System shall meet the following minimum criteria or better:

Color laser printer, fax, scanner, email and copier all in one with the following minimum capabilities:

- Estimated volume 8,000 pages per month
- LCD touch panel display
- 50 page reversing automatic document feeder (RADF) (not including the bypass tray)
- Reduction/enlargement capability
- Ability to copy and print 11" x 17" paper size
- email and network pc connectivity
- Microsoft and Apple compatibility
- ability to overwrite latent images on hard drive
- 600 x 600 dpi capability
- 30 pages per minute print speed (color),
- 4 Paper Trays Standard
- Automatic duplexing
- Finisher with staple functions
- Standard Ethernet. Print Controller
- Scan documents to PDF, PC and USB
- ability to print with authenticated access protection

The Contractor shall supply a maintenance contract for next day service, and all supplies (toner, staples, paper) necessary to meet estimated monthly usage.

The Engineer's Field Office and the equipment included herein including the computer system, and printer shall remain the property of the Contractor at the completion of the project. Disks, flash drives, and card readers with cards shall become the property of the Department.

Compensation for this work will be made at the contract unit price per month which price includes full compensation for all services and equipment, and incidentals necessary to provide equipment, maintenance, insurance as specified and as directed by the Engineer.

ITEM 758. CONSTRUCTION NOISE CONTROL LUMP SUM

Work under this item shall conform to the relevant provisions of Subsection 850 of the Standard Specifications, and the following:

This intent of this Item is to minimize construction noise within construction areas, lay down/staging areas, and communities adjacent to the construction site.

Compliance with this Item may require the use of equipment with efficient noise reduction devices or enclosures, construction of temporary noise barriers, and scheduling of activities to avoid noise-sensitive time periods.

DEFINITIONS

Noise is any sound which has the potential to annoy or disturb humans, or to cause an adverse psychological or physiological effect on humans.

Daytime refers to the period from 7:00 AM to 6:00 PM local time daily, except Sundays and Federal holidays.

Evening refers to the period from 6:00 PM to 10:00 PM local time daily, except Sundays and Federal holidays.

Nighttime refers to the period from 10:00 PM to 7:00 AM local time daily, as well as all day Sunday and Federal holidays.

Noise-Sensitive Locations shall mean locations where particular sensitivities to noise exist, such as residential areas, institutions, hospitals, and parks.

Nuisance Noise refers to sound levels that annoy or disturb a reasonable person of normal sensitivities, but do not exceed the noise limits specified herein.

Lot-line refers to the line separating a parcel of land from another parcel or from the street.

Background Noise shall be defined as the noise level prior to any construction activity.

dBA shall be defined as the sound level (in decibels referenced to 20 micro-pascals) as measured using the A-weighting network on a sound level meter.

dBC shall be defined as the sound level (in decibels referenced to 20 micro-pascals) as measured using the C-weighting network on a sound level meter.
Lmax shall be defined as the maximum measured sound level.

Leq shall be defined as the equivalent sound level, or the continuous sound level that represents the same sound energy as the varying sound levels over a specified monitoring period.

L10 shall be defined as the sound level exceeded 10 percent of the time for a specified monitoring period.

ITEM 758. (Continued)

SUBMITTALS

Develop and submit for approval a noise control plan that outlines in detail the measures to be implemented by the Contractor to comply with this Item. The plan should include background noise measurements at selected noise-sensitive locations to establish baseline daytime, evening, and nighttime noise levels. For work activities to be performed, the plan should also include details as to how noise emissions will be controlled and/or minimized during all work activities.

CONSTRUCTION LIMITATIONS

Noise levels

Daytime, evening, and nighttime construction noise emission limits at the noise monitoring locations shall not exceed the levels specified in Table 1.

Work shall be performed in a manner to limit nuisance conditions such as noise which exhibits a specific readily audible frequency or tone (i.e., backup alarms) or impact noise (i.e., jackhammers).

Equipment Operations

The use of impact pile-drivers if used shall be restricted to daytime hours only.

MATERIALS

General

All equipment and materials specified in this part will remain the property of the Contractor or Contractor's Subcontractor and suppliers, as applicable.

Noise Monitoring Equipment

Noise measurements, if directed by the Engineer, shall be performed with an instrument that is in compliance with the criteria for a Type 1 (precision) or Type 2 (General Purpose) sound Level meter as defined in the current revision of ANSI Standard S1.4.

The sound level meter shall be capable of measuring dBA and dBC noise levels and operating on the SLOW and FAST response settings.

Sound level meters shall be capable of measuring the Lmax, Leq, and L10 criteria.

All sound level meters, microphones, and calibrators shall undergo certified laboratory calibration conformance testing at least once a year. Calibration certificates shall be provided to the Engineer if requested.

ITEM 758. (Continued)

Noise Reduction Materials And Equipment

Noise reduction materials may be new or used. Used materials shall be of a quality and condition to perform their designated function.

Noise reduction equipment and materials may include, but not limited to:

Shields, shrouds, or intake and exhaust mufflers.

Noise-deadening material to line hoppers, conveyor transfer points, storage bins, or chutes.

Noise barrier using material consistent with Temporary Noise Barrier materials specified herein.

Back-up alarms used on the construction site shall be back-up alarms with a minimum increment above the background noise level to satisfy the performance requirements of the current revisions of Standard Automotive Engineering (SAE) J994 and OSHA requirements.

Temporary Noise Barriers

Temporary barriers shall be constructed of 3/4-inch Medium Density Overlay (MDO) plywood sheeting, or other acceptable material with a STC-25 rating or greater, calculated in accordance with American Society of Testing materials (ASTM) Classification E413, using values of sound transmission loss.

The temporary barriers shall be lined on one side with glass fiber or mineral wool type noise-absorbing material at least 2-inches thick. This material shall be protected by wire mesh or perforated sheets that are corrosion resistant and that have at least 30 percent open area, with provision for water damage.

The materials used for temporary barriers shall be sufficient to last through the duration of construction for this Contract.

Construction Details

Barrier panels shall be attached to support frames constructed in sections to provide a movable barrier utilizing a standard “Temporary Precast Concrete Median Barrier” or other supports designed to withstand 80 mph wind loads plus a 30 percent gust factor.

When barrier units are joined together, the mating surfaces of the barrier sides shall be flush with each other. Gaps between barrier units, and between the bottom edge of the barrier panels and the ground, shall be closed with material that will completely close the gaps, and be dense enough to attenuate noise.

The height of the barriers shall not be less than 8 feet of more than 15 feet.

ITEM 758. (Continued)

CONSTRUCTION METHODS

Noise Monitoring Methods

General

The sound level meter shall be field-calibrated using an acoustic calibrator, according to the manufacturer's Specifications, prior to and after each measurement.

Except otherwise indicated, all measurements shall be performed using the A-weighting network and the SLOW response of the sound meter.

Impulsive or impact noise shall be measured using the C-weighting network and the FAST response of the sound level meter.

The measurement microphone shall be fitted with an appropriate windscreen, shall be located 5 feet above the ground, and shall be at least 5 feet away from the nearest reflective surface.

Noise monitoring shall not be performed during precipitation or when wind speeds are greater than 15 mph.

Preconstruction Noise Monitoring

Prior to the commencement of construction activities, preconstruction noise measurements to establish baseline (i.e., background) daytime, evening, and nighttime noise levels shall be taken for 24 hours during two non-consecutive weekdays and one two-day weekend periods at selected noise-sensitive locations.

Background noise levels shall be recorded for each one-hour period and include Lmax, Leq, and L10 values.

Background noise levels shall be included as part of the noise control plan to be submitted as directed herein.

Construction Noise Monitoring

If directed by the Engineer, noise level measurements during construction activities shall be taken at noise-sensitive locations at least once each week during the applicable daytime, evening, and nighttime period.

The period for each noise measurement shall be 20 minutes.

Construction noise measurements shall coincide with daytime, evening, and nighttime periods of maximum noise-generating construction activity and shall be performed during the construction phase or activity that has the greatest potential to exceed noise level limitations as specified in Table 1.

ITEM 758. (Continued)

TABLE 1. CONSTRUCTION NOISE EMISSION LIMITS

Noise Monitoring Equipment Location Land Use	Non-Impact Equipment L10 Level (dBA) (whichever is greater)	Non-Impact Equipment Lmax Level (dBA)	Impact Equipment L10 Level (dBA)	Impact Equipment Lmax Level (dBA)
DAYTIME				
Noise-Sensitive Locations	75 or Background +5[(a)]	85[(a)]; 90[(b)]	---	90[(b)]
Commercial Areas	80 or Background +5[(a)]	---	---	---
Industrial Areas	85 or Background +5[(a)]	---	---	---
EVENING				
Noise-Sensitive Locations	Background +5[(b)]	80[(b)]	Background +5[(b)]	80[(b)]
NIGHTTIME				
Noise-Sensitive Locations				
BL < 70 dBA	Background +5[(b5)]	80[(b)]	Background +5[(b)]	80[(b)]
BL ≥ 70 dBA	Background +3[(b)]	80[(b)]	Background +3[(b)]	80[(b)]

Note:

(a) Measured at any point along the lot line, but not closer than 50 feet from any construction equipment.
(b) Measured at any point along the lot line.

ITEM 758. (Continued)

If, in the estimation of the person performing the measurements, outside sources contributes significantly to the measured noise level, the measurements shall be repeated with the same outside source contributions when construction is inactive to determine the background noise level.

Reporting

All construction noise monitoring measurements taken shall be reported to Engineer.

Noise Reduction Methods

The Contactor shall use all reasonable efforts to include noise reduction methods listed below to minimize construction noise emission levels. Noise reduction methods may include, but not limited to:

Use of: 1) concrete crushers or pavement saws for concrete removal, demolitions, or similar construction activity; 2) pre-auguring equipment to reduce the duration of impact or vibratory pile driving; 3) local power grid to reduce the use of generators.

Attaching: 1) intake and exhaust mufflers, shields, or shrouds; 2) noise-deadening material to inside of hoppers, conveyor transfer points, or chutes.

Maintaining: 1) equipment; 2) precast decking or plates; 3) surface irregularities on construction sites to prevent unnecessary noise.

Limiting: 1) the number and duration of equipment idling on the site; 2) the use of annunciators or public address systems; 3) the use of air or gasoline-driven hand tools.

Configuring, to the extent feasible, the construction in a manner that keeps loud equipment and activities as far as possible from noise-sensitive locations.

Scheduling truck loading, unloading, hauling operations to minimize noise.
Constructing noise barriers.

Temporary Noise Barriers

General

As outlined in the noise monitoring plan and if directed by the Engineer, the Contractor shall install temporary noise barrier(s) at specified locations.

The temporary noise barrier(s) shall be readily movable so that it may be repositioned, as necessary, to provide noise abatement for non-stationary, as well as stationary, processes.

ITEM 758. (Continued)

Installation, Maintenance, and Removal

The barriers shall be installed such that the noise-absorptive surfaces face the construction noise source.

The Contractor shall maintain the temporary noise barriers and repair all damage that occurs, including, but not limited to, keeping barriers clean from graffiti and maintaining structural integrity. Gaps, holes, and weaknesses in the barriers, and openings between or under the units, shall be repaired promptly or replaced by the Contractor with new material.

The Contractors shall remove and dispose of the temporary noise barriers at the end of Contract or sooner at the direction of the Engineer.

BASIS OF PAYMENT

Item 758. will be paid for at the Contract unit price Lump Sum, which price shall include all labor, materials, equipment, lighting, and all incidental costs required to complete the work.

Payment of 25% of the Lump Sum price of this item will be made upon Acceptance of Construction Noise Control Plan.

The remaining 75% of the Lump Sum price of this Item will be paid following Completion of Contract.

ITEM 767.121 SEDIMENT CONTROL BARRIER FOOT

The work under this item shall conform to the relevant provisions of Subsections 670, 751 and 767 of the Standard Specifications and shall include the furnishing and placement of a sediment control barrier. Sediment control barrier shall be installed prior to disturbing upslope soil.

The purpose of the sediment control barrier is to slow runoff velocity and filter suspended sediments from storm water flow. Sediment barrier may be used to contain stockpile sediments, to break slope length, and to slow or prevent upgradient water or water off road surfaces from flowing into a work zone. Contractor shall be responsible for ensuring that barriers fulfill the intent of adequately controlling siltation and runoff.

Twelve-inch diameter (after installation) compost filter tubes with biodegradable natural fabric (i.e., cotton, jute, burlap) are intended to be the primary sedimentation control barrier. Photo-biodegradable fabric shall not be used.

For small areas of disturbance with minimal slope and slope length, the Engineer may approve the following sediment control methods:

- 9-inch compost filter tubes
- Straw bales which shall be trenched

No straw wattles may be used. Additional compost filter tubes (adding depth or height) shall be used at specific locations of concentrated flow such as at gully points, steep slopes, or identified failure points in the sediment capture line.

When required by permits, additional sediment barrier shall be stored on-site for emergency use and replacement for the duration of the contract.

Where shown on the plans or when required by permits, sedimentation fence shall be used in addition to compost filter tubes and straw bales and shall be compensated under that item.

Sediment control barriers shall be installed in the approximate location as shown on the plans and as required so that no excavated or disturbed soil can enter mitigation areas or adjacent wetlands or waterways. If necessary to accommodate field conditions and to maximize effectiveness, barrier locations may be shifted with approval from the Engineer. Barriers shall be in place prior to excavation work. No work shall take place outside the barriers.

MATERIALS AND CONSTRUCTION

Prior to initial placement of barriers, the Contractor and the Engineer shall review locations specified on the plans and adjust placement to ensure that the placement will provide maximum effectiveness.

Barriers shall be staked, trenched, and/or wedged as specified herein and according to the Manufacturer's instructions. Barriers shall be securely in contact with existing soil such that there is no flow beneath the barrier.

ITEM 767.121 (Continued)

COMPOST FILTER TUBE

Compost material inside the filter tube shall meet M1.06.0, except for the following: no peat, manure or bio-solids shall be used; no kiln-dried wood or construction debris shall be allowed; material shall pass through a 2-inch sieve; and the C:N ratio shall be disregarded.

Outer tube fabric shall be made of 100% biodegradable materials (i.e., cotton, hemp or jute) and shall have a knitted mesh with openings that allow for sufficient water flow and effective sediment capture.

Tubes shall be tamped, but not trenched, to ensure good contact with soil. When reinforcement is necessary, tubes shall be stacked as shown on the detail plans.

STRAW BALES

Straw bales shall be used if shown on the plans or when specified by Orders of Condition or other permit requirements.

Bales should be placed in a single row, lengthwise on the contour, with ends of adjacent bales tightly abutting one another. All bales should be either wire-bound or string-tied. Straw bales should be installed so that bindings are oriented around the sides (rather than along the tops and bottoms) of the bales in order to prevent deterioration of the bindings.

The barrier should be entrenched and backfilled. A trench should be excavated the width of a bale and the length of the proposed barrier to a minimum depth of 4 inches. The trench must be deep enough to remove all grass and other material which might allow underflow. After the bales are staked and chinked (filled by wedging), the excavated soil should be backfilled against the barrier. Backfill soil should conform to the ground level on the downhill side and should be built up to 4 inches against the uphill side of the barrier.

Each bale should be securely anchored by at least 2 stakes or re-bars driven through the bale. The first stake in each bale should be driven toward the previously laid bale to force the bales together. Stakes or re-bars should be driven deep enough into the ground to securely anchor the bales. For safety reasons, stakes should not extend above the bales but should be driven in flush with the top of the bale.

The gaps between the bales should be chinked (filled by wedging) with straw to prevent water from escaping between the bales. Loose straw scattered over the area immediately uphill from a straw bale barrier tends to increase barrier efficiency. Wedging must be done carefully in order not to separate the bales.

When used in a swale, the barrier should be extended to such a length that the bottoms of the end bales are higher in elevation than the top of the lowest middle bale to assure that sediment-laden runoff will flow either through or over the barrier but not around it.

ITEM 767.121 (Continued)

Sedimentation Fence

Materials and Installation shall be per Section 670.40 and 670.60 of the Standard Specifications and the following:

Sedimentation fence shall only be used if shown on the plans or when specified by Orders of Condition or other permit requirements.

When used with compost filter tubes, the tube shall be placed on a minimum of 8 inches of folded fabric on the upslope side of the fence. Fabric does not need to be trenched.

When used with straw bales, an 8-inch deep and 4-inch wide trench or V-trench shall be dug on the upslope side of the fence line. One foot of fabric shall be placed in the bottom of the trench followed by backfilling with compacted earth or gravel. Stakes shall be on the down slope side of the trench and shall be spaced such that the fence remains vertical and effective.

Width of fabric shall be sufficient to provide a 36-inch high barrier after fabric is folded or trenched. Sagging fabric will require additional staking or other anchoring.

MAINTENANCE

Maintenance of the sediment control barrier shall be per Section 670.60 of the Standard Specifications or per the Stormwater Pollution Prevention Plan (SWPPP), whichever is more restrictive.

The contractor shall inspect the sediment barrier in accordance with relevant permits. At a minimum, barriers shall be inspected at least once every 7 calendar days and after a rain event resulting in 0.25 inches or more of rainfall. Contractor shall be responsible for ensuring that an effective barrier is in place and working effectively for all phases of the Contract.

Barriers that decompose such that they no longer provide the function required shall be repaired or replaced as directed. If the resulting berm of compost within the fabric tube is sufficiently intact (despite fabric decay) and continues to provide effective water and sediment control, barrier does not necessarily require replacement.

DISMANTLING & REMOVING

Barriers shall be dismantled and/or removed, as required, when construction work is complete and upslope areas have been permanently stabilized and after receiving permission to do so from the Engineer.

Regardless of site context, nonbiodegradable material and components of the sediment barriers, including photo-biodegradable fabric, plastic netting, nylon twine, and sedimentation fence, shall be removed and disposed off-site by the Contractor.

ITEM 767.121 (Continued)

For naturalized areas, biodegradable, natural fabric and material may be left in place to decompose on-site. In urban, residential, or other locations where aesthetics is a concern, the following shall apply:

- Compost filter tube fabric shall be cut and removed, and compost shall be raked to blend evenly (as would be done with a soil amendment or mulch). No more than a 2-inch depth shall be left on soil substrate.
- Straw bales shall be removed and disposed off-site by the Contractor. Areas of trenching shall be raked smooth and disturbed soils stabilized with a seed mix matching adjacent seeding or existing grasses (i.e., lawn or native grass mix).
- Sedimentation fence, stakes, and other debris shall be removed and disposed off-site. Site shall be restored to a neat and clean condition.

METHOD OF MEASUREMENT

Item 767.121 will be measured for payment by the Foot of sediment control barrier.

BASIS OF PAYMENT

Item 767.121 will be paid for at the contract unit price per Foot, which price shall include all labor, equipment, materials, maintenance, dismantling, removal, restoration of soil, and all incidental costs required to complete the work.

Additional barrier, such as double or triple stacking of compost filter tubes, will be paid for per foot of tube installed.

Barriers that have been driven over or otherwise damage by construction activities shall be repaired or replaced as directed by the Engineer at the Contractors expense.

ITEM 806.111 1 INCH RTRC CONDUIT FOOT
ITEM 806.211 2 INCH RTRC CONDUIT FOOT

The work under these Items shall conform to the relevant provisions of Subsection 801 of the Standard Specifications and the following:

This work covers the use, installation, and construction specification for reinforced thermosetting resin conduit (RTRC) and associated fittings.

MATERIALS

Provide new materials that conform to the details shown on the plans, the requirements of this Item, and to the pertinent requirements of the following:

- UL-listed Type RTRC identified for Above Ground use (AG) meeting UL 1684
- NEMA requirements
- NEC Article 355 requirements

Provide all required sweeps, bends, repair couplings, ground box/manhole termination kits, adapters, conduit hangers (bridge), brackets, mounting strut, expansion joints, and accessories to complete the fiberglass conduit installation as shown on the plans and as required for a complete installation. Provide all materials for installation and testing. Ensure components of the fiberglass conduit system are suitable for the intended application, that provide the strength requirements of the intended application, and that are provided by the same manufacturer. Provide a single protective end cap for each end of all conduit sections, factory bends and fittings, to minimize the risk of damage to the conduit system during shipping and handling. Leave the end cap in place on the conduit until delivery to project site.

- Provide fiberglass conduit that conforms to the following requirements:
- A percent ovality of less than 5%
- An underground system that performs in an ambient temperature range of -30°F to 130°F without degradation of material properties
- An aerial system that performs in an ambient temperature range of -104°F to 200°F without degradation of material properties
- Resistant to most harsh chemicals
- Protected against degradation due to oxidation or general corrosion
- Capable of being direct buried by trenching or boring with no special consideration to using selective backfill
- Has a low coefficient of thermal expansion, such that expansion and contraction is minimal.
- Free of visible cracks, holes or other physical defects that would degrade its performance,
- Uniform as practical in respect to overall dimensions, color, density, thickness, etc., 1-3 8794 07-11
- Contains a UV light stabilizer which will protect it, for a minimum of 12 months, in direct sunlight.

ITEMS 806.111 and 806.211 (Continued)

Provide standard wall filament wound fiberglass reinforced epoxy conduit. Provide conduit, elbows and fittings that are manufactured from the same resin/hardener/glass systems manufactured by the same filament wound system.

Provide fiberglass conduit suitable for concrete encasement.

Provide 1.625 x 1.125 inch or 1.625 x 2.250 heavy duty channel. Meet the following design loads at 70 degrees F.

- Ultimate Design Flexural: 40,000 psi (longitudinal)
- Modulus of elasticity=E= 3,000,000 psi (longitudinal)
- Max. Design Deflection= L / 60
- Min. Design Deflection= L /180
- Minimum Safety Factor= 4:1
- Maximum deflection 1.6 inches over 60" support span with 8 lb./in load

Provide fiberglass or other non-metallic strut and hanger system components that meet the following requirements:

- Polyester (PF) or Vinylester (VF) containing continuous glass fibers
- Ultraviolet (UV) resistant surface veil over 100% of surface
- Class 1 Fire Rated per ASTM E-84.

Provide non-metallic polyurethane (PU) clamps suitable for the installation unless otherwise approved by the Engineer. All nuts, bolts, washers, and other metallic pieces of the conduit hanger system shall be #316 stainless steel unless otherwise approved by the Engineer.

CONSTRUCTION METHODS

Place conduit in accordance with the lines, grades, details, and dimensions shown on the plans or as directed. Install underground fiberglass conduit at a minimum depth of 18 in., unless otherwise shown on the plans. Install conduit in accordance with the requirements of the NEC.

Ream all field cut conduit ends to remove burrs and sharp edges. Fasten all conduit placed on structures with fiberglass conduit brackets or hangers as shown on the plans or as directed. Fit the conduit terminations with bushings or bell ends.

Do not install any metal parts in contact with the ASTM A-588 metal bridge beams.

Install PVC pipe sleeves around bolts through bridge beams as shown on the plans. Other non-metallic sleeve material may be approved by the Engineer.

ITEMS 806.111 and 806.211 (Continued)

Prior to installation of cables or final acceptance, draw a spherical template having a diameter of not less than 75% of the inside diameter of the conduit to ensure that the conduit is free from obstruction. Fit the ends of all empty conduit with caps.

For underground installation, trench, excavate and backfill as shown on the plans and in accordance with Item 400, "Excavation and Backfill for Structures", except for measurement and payment.

Backfill conduit trenches in six-inch lifts. Place a detectable underground metalized Mylar marking tape above the conduit or concrete encasement. Extend the tape continuously to the adjacent ground boxes on each conduit run. Legibly imprint the marking tape with “TxDOT CONDUIT SYSTEM” every 18 in. The supplying and installation of the marking tapes is not paid for directly but is considered incidental to the various bid items. Where existing surfacing is removed for placing conduit, repair by backfilling with material equal in composition and density to the surrounding areas and by replacing any removed surfacing, such as asphalt pavement or concrete riprap, with like material to equivalent condition. Provide a bare copper no. 6 AWG in all conduits runs, if no other cable is to be installed.

Examination Of Product

Examine each conduit system component carefully to verify that the materials, design, construction, markings, and workmanship comply with the requirements of this specification. The Engineer may test the products to meet NEMA conduit standards.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 806.111 and Item 806.211. will be measured and paid per Subsections 801.80 and 8701.81, respectively.

ITEM 812.09 LIGHT STANDARD FOUNDATION PRECAST EACH

Work under this Item shall conform to the applicable provisions of Subsection 801 of the Standard Specifications and the following:

Work shall consist of constructing new light standard foundations in place per the plans. All exposed corners shall have a one-inch chamfer. All exposed concrete surfaces shall have a hand-rubbed finish.

Any reinforced concrete demolition required in order to install the proposed light standard foundation shall be paid under Item 127.1 Reinforced Concrete Excavation.

MATERIALS

Refer to the plans for the details of the light standard foundations.

CONSTRUCTION METHODS

All light standard foundations shall be constructed per Section 801.62 of the Standard specifications, except deviations may be required based on field conditions. All deviations must be approved by the engineer prior to making any changes.

METHOD OF MEASUREMENT

Item 812.09 will be measured for payment by the Each light standard foundation precast installed, complete in place.

BASIS OF PAYMENT

Item 812.09 will be paid for at the Contract unit price per Each, which price shall include all labor, materials, equipment, excavation, backfilling, compaction and leveling, galvanized anchor bolts, galvanized nuts and washers, conduit, elbows, sweeps, and all incidental costs required to complete the work.

ITEM 820.2 NAVIGATION LIGHTS LUMP SUM

The work under this Item shall conform to the relevant provisions of Subsection 824 of the Standard Specifications and the following:

Solar Enclosure/Controller

The contractor shall furnish all supervision, materials, equipment, accessories, handling, shipping and delivery to provide the specified Navigation Systems Assemblies as detailed herein, complete with all appurtenances, including cabinet, cabinet foundations, controller, batteries and solar PV module. All transportation, handling, shipping cost, manufacturer's storage and other necessary costs shall be included. Cabinet housing shall be stainless steel (#316) NEMA 4X with gasketed door. Minimum size 20"x 20", enclosure shall be capable of housing two batteries and solar controller. Cabinet shall be pole mounted as detailed on the Contract Drawings. Controller shall be based on Morningstar Corporation, SunLight. Controller shall be rated 12V, 20-amp rating. Controller shall be fully automatic operation. Controller detects day and night using PV array, suitable for all 12/24V dc lamps, rotary digital switch to select among 10 lighting options. Regulated voltage of sealed and flooded batteries are 14.1 Volt at 12V and 28.8V at 24V. Load disconnect 11.7V at 12V and 23.4 at 24V. LVD reconnect 12.8V at 12V and 25.6V at 24V. System batteries based on 12V (108Ah), Plate Alloy (Lead Calcium), Container/Cover (Polypropylene). Operating Temperature Range -79ºF-140ºF, self-sealing vent, electrolyte-sulfuric acid thixotropic gel. 12.93" long, 6.74" width, 7,75 height". PV module based on Solarland USA, Model SLP140-12. Maximum power 140W (26.57W x 59.06H), voltage at Pmax (17.2V), current at Pmax (8.14A), open-current voltage (21.6V), short circuit current (9.05A), maximum system voltage 1000V DC, operating temperature (-40ºC-85ºC). Power Tolerance ± 5%. PV module shall include Bird Spike Deterrent.

Construction Requirements

Installation shall be performed in accordance with pay item 824.78, Solar Enclosure/Controller of the MassDOT Massachusetts Highway Department Standard Specifications for Highway and Bridges.

Nautical Lamps

This work shall be done in accordance with the MassDOT Massachusetts Highway Department Standard Specifications for Highways and Bridges Section 824-Flashing Beacons, Illuminated Warning Signs, and Illuminated Barrier Arrows and this Special Provisions Technical Specification, as detailed on the Drawings and as follows:

The contractor shall furnish all supervision, materials, equipment, accessories, handling, shipping and delivery to provide the specified Lighting Assemblies as detailed herein, complete with all appurtenances. All transportation, handling, shipping cost, manufacturer's storage and other necessary costs shall be included.

Lighting assemblies shall be Type L1 and L2 as follows:

ITEM 820.2 (Continued)

Type L1: Navigational Light, Marine signal for marking stationary piers (Channel Margin Marker), LED (2.8W), 12V, 180º Fresnel glass lens red.

Type L2: Navigational Light, Marine signal for marking the center of the navigational channel, stationary piers (Center Channel Marker), LED (2.0W), 12V, 180º Fresnel glass lens green.

Navigation Lights – L1 Channel Margin Marker

The luminaires shall match the style and appearance of the equipment indicated on the Drawings.

The housing shall be cast silicon bronze, suitable for salt water/marine environment. Construction to be rain-tight and fully gasketed, easy access for lamp replacement. Lens shall be heat-resistant Fresnel glass, 180º horizontal arc exposure. Outside diameter 8" nominal, color Red. Lamp source shall be LED, 2.8W, 12V DC, 100,000 hours minimum.

Luminaire to be mounted on a 2" schedule 40 (#316) stainless steel with bronze castings pipe. Pipe to be mounted on swivel and shall provide for all wiring to be completely contained inside the fixture assemble. Gaskets and O-rings shall be used to provide weather-tight assemble. Swivel assembly shall be heavy-duty construction, cast with the same material as the fixture head. A stainless steel, service chain shall be provided to facilitate raising and lowering the fixture for service.

Furnish and install a cast junction box with gasketed access cover for mounting. Junction box shall be of the same material as the fixture assembly and shall match the navigation light base footprint. Orientation of the junction box shall be capable of rotation in 90-degree increments.

Navigation Lights – L2 Center Channel Marker

The luminaires shall match the style and appearance of the equipment indicated on the Drawings.

The housing shall be cast silicon bronze, suitable for salt water/marine environment. Construction to be rain-tight and fully gasketed, easy access for lamp replacement. Lens shall be heat-resistant Fresnel glass, 180º horizontal arc exposure. Outside diameter 8" nominal, color Green. Lamp source shall be LED, 2.0W, 12V DC, 100,000 hours minimum.

Luminaire to be mounted on a 2" schedule 40 (#316) stainless steel with bronze castings pipe. Pipe to be mounted on swivel and shall provide for all wiring to be completely contained inside the fixture assemble. Gaskets and O-rings shall be used to provide weather-tight assemble. Swivel assembly shall be heavy-duty construction, cast with the same material as the fixture head. A stainless-steel service chain shall be provided to facilitate raising and lowering the fixture for service.

Furnish and install a cast junction box with gasketed access cover for mounting. Junction box shall be of the same material as the fixture assembly and shall match the navigation light base footprint. Orientation of the junction box shall be capable of rotation in 90-degree increments.

ITEM 820.2 (Continued)

Construction Requirements

Installation shall be performed in accordance with pay item 874.79 Nautical Lamps, of the MassDOT Massachusetts Highway Department Standard Specifications for Highways and Bridges.

BASIS OF PAYMENT

Item 820.2 will be paid for at the Contract unit price Lump Sum, which price shall include all labor, materials, equipment, and all incidental costs required to complete the work.

ITEM 821.111 DCR LIGHT EACH

The work under this Item consists of procuring and installing "DCR Light Pole".

DCR Light Pole and luminary shall be furnished and installed as shown on the plans or approved by the Engineer.

Light pole manufacturers:

- P+K Tubular Products
- HAPCO Pole Products
- King Luminaire by StressCrete Group
- Or approved equal

METHOD OF MEASUREMENT

Item 821.111 will be measured for payment by the each DCR light installed, complete in place.

BASIS OF PAYMENT

Item 821.111 will be paid for at the Contract unit price per Each, which price shall include all labor, materials, equipment, and all incidental costs required to complete the work.

ITEM 822.211 HIGHWAY LIGHTING POLE – TWIN 5 FOOT BRACKET ON DCR STYLE POLE EACH

The work under these items shall conform to the relevant provisions of Subsection 820 of the Standard Specifications and the following:

This Item of work shall consist of furnishing and installing poles, davit bracket arms for luminaires to be mounted at 26 feet high as located and detailed on the Contract Plans.

This Item includes poles to be used with the roadway luminaires specified herein. All poles shall be of the same design shape; dimensionally, aesthetically, and supplied by the same manufacturer.

All poles shall be in accordance with MassDOT manufacturing and submittal standards and include the following:

The pole shall consist of a single piece, round tapered steel shaft with a galvanized finish, which is applied after all fabrication has been completed. The length of each pole assembly shall position the proposed luminaires at the mounting height above the finished roadway as shown on the drawings.

Each pole shall include base plate, handhole, anchor bolts as required, and base plate covers.

All materials required to mount the poles regardless of the mounting shall be replaced and provided by the Contractor.

1. Breakaway couplings will be provided and shall conform to all MassDOT standards and be supplied by the pole Manufacturer. When a breakaway base is used as shown on the drawings, a customized full-length galvanized base plate cover shall be provided. Breakaway couplings shall be cast iron (Triplex) not aluminum.
2. A 4-inch X 6-inch reinforced galvanized handhole shall be included and oriented 90 degrees from the luminaire. The handhole and reinforcements shall be welded to the pole shaft at 1 foot 6 inches above the top of the base plate. Internally positioned and welded securely on the opposite pole wall from the handhole, a grounding lug, complete with grounding screw shall be provided. A galvanized cover shall be provided by the Manufacturer.
3. For base mounted poles, the anchor bolts, if required, shall be manufactured using a carbon steel bar and have a 90-degree bend on one end and shall be galvanized over the entire length of the bolt. Four (4) anchor bolts with galvanized nuts and washers shall be provided for each new pole foundation required for this project (see detail drawing for pole foundation requirements.). The length of the anchor bolt shall be in accordance with the recommendation of the pole Manufacturer.
4. All materials are to be galvanized after fabrication (no exceptions will be taken). Any modifications made to the pole in the field shall be approved by the engineer.
5. All poles shall be provided with an internal vibration-dampening device secured by means of stainless-steel hardware. Actual mounting height of device shall be per the recommendations of the pole manufacturer.

The Contractor is required to provide all miscellaneous hardware required to install the above items, which are not noted on drawings or specification. All hardware, unless noted above, shall be stainless steel grade 316 or better.

ITEM 822.211 (Continued)

The Contractor shall provide the following information complete in form, prior to acceptance and manufacture of any products for this project. Any exclusion of the following items will invalidate the submittal (no partial submittals):

A. Contractor shall supply a certification of compliance with the specifications, warranty, design calculations, and weld details.
B. Submit shop drawings, exploded view assembly drawings, catalog cuts, descriptive information for poles, arms, and mounting hardware for each product type specified in accordance with Subsection 5.02 of the Specifications. (Note: seven (7) copies of each shall be supplied.) A Professional Engineer (Structural) registered in the Commonwealth of Massachusetts (Structural) shall stamp all drawings.
C. Submit structural design calculations, stamped by a Professional Engineer (Structural) registered in the Commonwealth of Massachusetts for all components of pole and anchor base. Design shall be in accordance MassDOT standard and supplemental specification Section 820.41.
D. Submit installation instructions provided by the Manufacturers detailing the installation procedures and recommended maintenance procedures for all poles.

The Manufacturer shall comply with the following warranty:

A. The Manufacturer warrants that the design, material, and workmanship incorporated in each pole shall be of the highest grade and consistent with established, and generally accepted, standards for lighting applications.
B. The Manufacturer agrees that this warranty (non-prorated warranty) shall commence with the acceptance of the poles, whether a defect is patent or latent, and shall continue for a period of five (5) years (non-prorated warranty) after acceptance by the MassDOT.
C. This warranty by the Manufacturer shall be valid for all installations of procured products, regardless of the Installing Contractor. The Manufacturer will be allowed to inspect, at no cost to the Department with the Engineer present, the installation of the product in order for the final issuance of the warranty specified above. Should any modifications be required regarding the installation of the product(s), it will be at the expense of the Contractor. Once the Manufacturer accepts all modifications, the product warranty will become effective and supported by the Manufacturer.

Any claims against the warranty will be valid regardless of who performs the installation. The Manufacturer will be allowed to inspect after the time the repair has been made, at no cost to the Department with the Engineer present, the installation of the product in order for the final issuance of the warranty specified.

METHOD OF MEASUREMENT

Item 822.211 will be measured for payment by the Each.

BASIS OF PAYMENT

Item 822.211 will be paid for at the Contract unit price per Each, which price shall include all labor, materials, equipment, break-away couplings, dampeners, hardware, brackets, fasteners, pull box covers with straps, and all incidental costs required to complete the work.

ITEM 823.811 LUMINAIRE EACH

The work under this Item shall conform to the relevant provisions of Subsection 820 of the Standard Specifications and the following:

The work under this item shall consist of furnishing, installing, connecting, and testing Bridge Lighting systems complete with luminaires, lighting standards, bracket arms, poles, lighting panelboards & contactors and all other equipment and material required to make the Bridge Lighting system complete and workable as specified herein, and as shown in the Contract Drawings. The Bridge Lighting System consists of exterior roadway lighting.

REFERENCE STANDARDS

The publications listed below form a part of these Specifications to the extent referenced. The publications are referred to in the text by basic designation only. In case of conflict between provisions of codes, laws, ordinances, and these Specifications, including the Contract Drawings, the more stringent requirements will apply.

American Association of State Highway and Transportation Officials (AASHTO)

BR-LTS-4-12 Signals	Structural Supports for Highway Signs, Luminaires, and Traffic Signals

American National Standards Institute (ANSI)

C2	National Electric Code
C136.3	American National Standard for Roadway Lighting Equipment Luminaire Attachments

American Society for Testing and Materials (ASTM)

A123	Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products
A153	Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware
B108	Specification for Aluminum Alloy Permanent Mold Castings
B597	Practice for Heat Treatment of Aluminum Alloys
D1435	Practice for Outdoor Weather of Plastics

Board of Fire Prevention Regulations

527 CMR 1.00	Massachusetts Electrical Code
527 CMR 12.00	Massachusetts Electrical Code (Amendments)

Illuminating Engineering Society of North America (IESNA)

ANSI/IES RP-8-18	Recommended Practice for Design and Maintenance of Roadway and Parking Facility Lighting
ANSI/IES LM-10-20	Approved Method: Photometric Testing of Roadway and Area Lighting Fluorescent Luminaires
ANSI/IES LM-31-20	Approved Method: Photometric Testing for Roadway Luminaires – Incandescent & HID

ITEM 823.811 (Continued)

National Electrical Manufacturers Association (NEMA)

AB1	Molded Case Circuit Breakers
ICS2	Controllers, Contactors and Overload Relays, Rated Not More than 2,000 Volts AC or 750 Volts DC
ICS6	Industrial Control Systems Enclosures
PB1	Panelboards
250	Enclosures for Electrical Equipment (1000V Max)

National Fire Protection Association (NFPA)

70	National Electrical Code (NEC)

Underwriter's Laboratories, Inc. (UL)

50	Enclosures for Electrical Equipment, Non-Environmental Considerations
67	Standard for Panelboards
467	Grounding and Bonding Equipment
489	Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures (Ed. 13)
508	Standard for Industrial Control Equipment (Ed. 18)
773	Standard for Plug-In Locking Type Photocontrols for Use with Area Lighting (Ed. 5)
773A	Standard for Nonindustrial Photoelectric Switches for Lighting Control (Ed. 6)
1012	Standard for Power Units Other Than Class 2 (Ed. 8)

MATERIALS

All materials shall be new and meet the requirements of Division III Materials where applicable and the requirements as specified herein.

All materials, equipment, and devices shall, as a minimum, meet the requirements of UL where UL standards are established for those items, and the requirements of NFPA 70. All equipment and materials provided shall be new.

Lighting assemblies consisting of, lighting standards, and luminaires shall be furnished and installed and be the type shown on the contract drawings. Bolt circle dimensions shall be verified at those locations where lighting standard foundations are existing.

All assembled luminaires shall bear the Underwriters' "UL 1598 Listed for Wet Locations" Label.

Locations of lighting standards and luminaires are shown diagrammatically. Verify exact locations in the field. Notify the Engineer about field conditions at variance with plans before commencing installation.

ITEM 823.811 (Continued)

Blemished, damaged, or unsatisfactory poles, brackets and luminaires shall be replaced in a manner satisfactory to the project engineer, at sole cost to the Contractor.

Luminaires will be as depicted on the Contract drawings and as described herein.

Luminaire

Accepted manufacturers of highway lighting fixtures

1. Leotek
2. King Luminaire
3. GE Lighting Solutions
4. Approved Equal

The complete luminaire shall be designed to operate one LED source from a nominal 120 Volt, power source. LED to be 4,000 K (neutral white) in color. Luminaire shall be capable of starting and operating the specified lamp within the limits specified by the lamp manufacturer.

The luminaire shall be provided with a high-power factor constant wattage electronic LED driver featuring a 740F lamp starting capacity and a power factor exceeding 90%. Rated UL class 2 operation (24 Volts DC) for maintenance. Line voltage available shall be 120 volts to 277 volts. LED driver shall comply with UL standard UL1012 and have a Class A sound rating. The LED driver shall tolerate sustained open circuit and short circuit output conditions without damage.

The luminaire shall be an ANSI/IESNA distribution type as indicated on the drawings. Reflector to be ventilated and shall have an integral heat sink.

The luminaire shall consist of a tenon mounting, a cast aluminum housing, and a drop lens as detailed on the drawings. Access to the lamp module shall be tool-less.

The luminaire shall be IP66 certified, and UL listed as suitable for wet location.

The luminaire is finished with polyester powder paint to ensure maximum durability. The finish is to be black, textured and of 100 microns minimal thickness

Lighting standard shall consist of steel pole, mounting bracket, pole cap, finial, base cover, anchor plate and mounting bolts. Pole is to be round in cross section with a minimum wall thickness of 7 GA, have decorative elements as depicted on the Contract Drawings, and a 2-1/4”x 6-1/2” access door.

Lighting standard is finished with polyester powder paint to ensure maximum durability. The finish is to be black, textured and of 100 microns minimal thickness

Lighting Contactors

Lighting contactors shall be open type, number of poles as shown, magnetically latched, with 30 amp contacts fully rated at 208 volts line to line and 120 volts line to neutral.

ITEM 823.811 (Continued)

Lighting contactors shall be suitable for operation with 120 volt 2 or 3wire control circuits and include 2 N.O and 2 N.C. auxiliary contacts. Auxiliary contacts shall be rated at 30 amps continuous.

Lighting contactors and associated accessories shall be enclosed in a NEMA-4X Type 316 stainless steel surface mounted lighting control cabinet, size as shown, with the following features:

1. Seams continuously welded and ground smooth
2. Brush finish
3. Seamless foam-in place gasket
4. Internal mounting panel
5. Continuous hinge door with stainless steel screws and clamps

Accessories

The lighting control cabinets shall be equipped with front cover mounted NEMA-4X On-Off-Auto selector switch, and pilot lights. Devices shall be heavy duty type, NEMA A600/P600 rated. Provide nameplates for all cover mounted devices.

Provide all wiring, control relays, lighting contactor and accessories as required for the operation, control and monitoring of the lighting system.

Panel Boards

Furnish factory assembled dead front type panelboards complete with branch circuit breakers and a main circuit breaker or main lugs only as shown on the Contract Drawings.

Furnish all 3-phase, 3-wire panelboards with full capacity separate ground bus. Provide separate insulated neutral bus and a separate ground bus for panelboards connected to a 3-phase, 4-wire service, or single phase, 3-wire service as shown on the Contract Drawings.

Furnish panelboards with the voltage, frequency and current ratings conforming to NEMA Standard PB1, Federal Specification W-P-115B, UL 67, NEC, and as shown on the Contract Drawings.

Furnish the panelboard main, neutral, and ground busses with minimum 98% conductivity rectangular copper bars provided with bolted type lugs.

Provide drilled busses to fit either ‘A’, ‘B’, or ‘C’ Phase connectors so that connectors are interchangeable and installed in a distributed phase sequence.

Provide tin plated busses, connectors, and terminals, to a minimum plated thickness of 0.0057in. Provide terminal lugs which are prevented from turning per NEMA standard PB1. Lugs are to be compatible with the conductor material and size.

ITEM 823.811 (Continued)

Provide main bus-bracing for each panelboard adequate for interrupt ratings of 10 kA symmetrical short circuit minimum at 208Y/120 Volts or 250 Volts.

Provide typed panelboard directory cards with the following information:

1. Panelboard name designation
2. Panelboard voltage rating
3. Panelboard ampere rating
4. Panelboard short circuit rating
5. Panelboard pole/circuit numbers and branch circuit description as wired in the field
6. Indicate 2 pole and 3 pole branch circuit breakers where applicable
7. Label spare circuit breakers “spare”

Panelboard Cabinets

Provide NEMA-4X stainless steel surface mounted cabinets without knockouts, unless otherwise indicated.

Unless otherwise specified, provide panelboard cabinets of code-gauge stainless, sheet steel and equip with gutters of ample size for the risers and outgoing circuits. Cabinets are not to exceed 78 inches in height.

Provide hinged door option for all panelboards. Each door of the cabinet shall be hung on semi or fully concealed hinges with a combination catch and lock.

On cabinets 48 in. high and over, provide a 3-point catch assembly latching at the top, bottom and middle.

Provide all panelboard locks keyed alike.

Provide cabinets drilled only for the exact conduit entrances and mounting bolts.

Circuit Breakers

Furnish bolt on type fully rated branch and main circuit breakers. Furnish frame sizes, trip settings and number of poles as indicated. Breakers with a short circuit requirement higher than 10 kA symmetrical shall be current limiting. Provide circuit breakers marked with ampere trip rating that can be read at a distance of 2 feet from the panel. Provide breakers meeting the requirements of Federal Spec. W-C-375B and NEMA AB1.

Furnish all breakers with quick make, quick break, toggle mechanisms; thermal magnetic, inverse time limit overload; and instantaneous short circuit protection on all poles, unless otherwise indicate. Provide indication of automatic tripping by the breaker handle assuming a distinctive position from the manual ON and OFF position. Furnish breaker handles that are trip free on overloads.

ITEM 823.811 (Continued)

Single pole breakers with handle ties or nails in lieu of multi-pole breakers are not acceptable. Handle ties may be utilized between single pole breakers for use with multi-wire branch circuits only.

Furnish handle lock device on breakers as indicated to prevent the manual opening of the selected breakers.

Furnish padlocking device on breakers as indicated to prevent the opening of indicated breakers. Voltage and interrupting rating of the main breaker in a panelboard is to be greater than voltage and short circuit rating of the panelboard main buses, as indicated. Furnish breakers to operate at the frequency indicated.

Furnish ground fault interrupter circuit breakers for circuits as indicated.

Furnish single pole breakers with full module size. Two pole breakers in a single pole's module are not acceptable.

Enclosed circuit breakers shall be bolt on type or cable-in and cable out type.

SUBMITTALS

Submit the following to the Engineer for approval:

1. Luminaires, including lamps, ballasts, etc.
2. Lighting poles and mounting brackets
3. Lamp holders
4. Independent testing laboratory photometric data
5. Terminal blocks
6. Fuses and fuse holders
7. Pin and socket (quick-disconnect) connectors, weather reliability
8. Experience record certification
9. Certified illumination calculations
10. Vibration test results
11. Paint adhesion tests
12. Panelboards
13. Circuit breakers
14. Lighting contactors and lighting control accessories
15. Lighting control cabinets
16. Operation and maintenance information (per component)

Shop Drawings

Each luminaire (including manufacturer's data), including fabrication and assembly drawings, bill of material.

ITEM 823.811 (Continued)

Lighting standards, including base plate, shaft and bracket details, dimensions, wind loading calculations, pole deflection and other applicable information shall be professionally certified by a Professional Engineer, Registered in the Commonwealth of Massachusetts that the materials meet all guidelines from Article 1.02.

Lighting design light level calculations, stamped by a licensed professional engineer, shall be submitted for review.

Luminaire photometric data, including Iso-illuminance lines of horizontal illuminance based on required mounting height, average and minimum ratio, computerized candela distribution data

graphically representing in polar coordinates, the average vertical transverse through 75 degree lateral, coefficients of utilization curves (street and house side). Photometric data shall also be submitted on disk in IESNA format. All photometric tests must have been completed by an independent testing laboratory with in the past five years.

For each item submitted, an Operations and Maintenance Manual shall be provided for review.

Samples

Submit sample fixture and reports indicating that all required tests specified have been successfully completed. The sample, if acceptable, will be retained until completion of the work to confirm quality conformance to the prescribed requirements herein. Provide the sample with lamp capable of operation at 120 volts with six-foot cord and plug.

Pole(s) and Luminaire(s) Finish: Provide samples of the pole finish and the luminaire finish

Certified Illumination Calculations

Computerized horizontal illuminance levels in lumens/ft^2 at ground level, taken every six feet. Include average maintained illuminance level and average/minimum ratio.

Also, include computerized horizontal luminance levels in candela/m^2, per ANSI/IESNA-RP-8-18, at ground level for a typical layout of each spacing/roadway width. Include average maintained, maximum, and minimum luminance levels. Also include average/minimum and maximum/minimum uniformity ratios.

Distribution data according to ANSI/IESNA distribution type (as defined in IESNA Lighting Handbook HB-93).

Independent Testing

The Engineer reserves the right to order such tests as it deems necessary to ensure compliance with these Special Provisions and to reject those luminaires failing such tests, or those luminaires with improper or inadequate light distribution. The Engineer shall be the sole judge as to acceptability.

ITEM 823.811 (Continued)

The Engineer shall randomly select one luminaire of each light distribution from the Project's production lot at either the manufacturer's plant or job site; this choice shall be of sole discretion of the Engineer. The Contractor shall then deliver the luminaire(s) to a recognized independent testing laboratory that is acceptable to the Engineer. The luminaires shall be tested at an independent testing laboratory for compliance with illumination, efficiency, uniformity ratios of illumination depicted on the design documents. The results of these tests shall be forwarded directly to the Engineer. All testing shall be at the sole expense of the Contractor.

Paint Adhesion Test

Paint tests shall be conducted by an independent laboratory and submitted to the Engineer for review. The Manufacturer shall submit a single 12 inch by 24 inch by 0.032-inch-thick panel of 5050 aluminum to the independent testing laboratory for the tests. The Vendor shall use the same preparation treatment, the same polyester powder paint, and the same method of application as the housing shall receive. Testing shall be as follows:

A. A 2.0 mil thick coating of polyester powder paint shall withstand a 160 inch-pound impact measured with a standard Gardner Impact Tester.
B. The flexibility of polyester powder paint shall withstand a 180-degree bend over a 1/4 inch mandrel diameter without loss of adhesion or cracking.
C. Polyester powder paint shall not exhibit any blistering or loss of adhesion when exposed for 500 hours of 100 percent humidity at 100 degrees F or after a 24-hour period of immersion in 100 degree F tap water.

Delivery, Storage, and Handling

Provide in accordance with manufacturer’s instructions. One copy of these instructions shall be included with the equipment at the time of shipment. Contractor is responsible for maintaining the lighting equipment in new and working condition until it has been installed and accepted by the Engineer.

Project As-Built Drawings

Maintain a set of drawings at the project site on which shall be accurately shown the actual installation of all work indicating thereon any variations from the contract drawings, including size changes, locations, or dimensions.

As-Built drawings shall be kept current as the work progresses and shall be available to the Engineer for periodic review.

At the conclusion of the work, the contractor shall deliver to the Engineer a complete set of reproducible drawings showing the entire work as actually installed. Furthermore, one copy of the As-Built drawings shall be included with each of the O&M manuals.

Submission of accurate As-Built drawings and their review for completeness shall be a condition precedent to receipt of final payment for the work.

ITEM 823.811 (Continued)

Warranty

The Contractor shall warrant the equipment and performance of the installation and equipment for a period of 1 year beyond the date of acceptance. Any defect shall be repaired or replace by the Contractor without any additional expense to the Owner.

CONSTRUCTION METHODS

Provide all equipment, materials, and labor to install lighting, electric controls, switches, panelboards, and miscellaneous electrical equipment as indicated and as specified. Make electrical connections required for recording and indicating instruments and miscellaneous devices. Install conduit and wiring and make electrical connections between all control panels, consoles, luminaires, cabinets and external equipment and devices. All conduit connections to NEMA 4X enclosures shall be by Myer's type conduit hubs.

Highway Lighting Pole & Luminaire Removal
Contactor to coordinate with NSTAR for removal of existing lighting service connection and existing street light connections where required.

Remove and dispose of all existing Bridge and Passageway luminaires, poles, brackets, etc. to include all conduit, wiring, and associated hardware. Abide by all applicable laws and regulations regarding disposal.

Remove and dispose of existing roadway lighting to include all conduit, wiring, foundation, and associated hardware as indicated on Contract Drawings.

Channel
Install Type 316 stainless steel for mounting of electrical equipment in outdoor areas, pump rooms, electric rooms and on structure walls.

Physical Checkout and Testing
Provide field and functional testing in accordance with Section 813-Wiring, Grounding and Service Connections. In addition, provide a functional test of the completed installation to show conformance of all equipment and systems with the Contract Documents. A detailed functional test plan shall be submitted to the Engineer for approval. At least 3 days' notice shall be provided prior to any test activity to the Department and Engineer, who shall have the option of witnessing all tests. Upon completion of testing, the test results shall be submitted for approval.

METHOD OF MEASUREMENT

Item 823.811 will be measured for payment by the Each luminaire installed, complete in place.

BASIS OF PAYMENT

Item 823.811 will be paid for at the Contract unit price per Each, which price shall include all labor, materials, equipment, and all incidental costs required to complete the work.

ITEM 851.3 **MAINTENANCE OF WATERWAY/ CONSTRUCTION BARGE RENTAL** **LUMP SUM**

The work under this Item shall include the coordination and preparation of a plan to maintain water traffic on the Charles River during construction operations in coordination with District 6 personnel and the US Coast Guard.

Work under this Item shall also include the rental of a construction barge, size and type to be determined by the Contractor, and any work boats required to access the work zone and/or barge to be utilized throughout the contract. The Contractor shall allow the Engineer access to the barge and work boats as required throughout the length of the Contract.

RESTRICTIONS

1. Only one span of the navigable waterway below the bridge may be occupied at any time by the Contractor. The navigable Spans are Spans 3-5 below the bridge. Additional requirements may be made by the US Coast Guard.

2. No equipment may be stored outside the working limits at any time.

3. No work may occur directly before, during, or directly after any major DCR events, such as the Head of the Charles Regatta. Full restrictions can be found in the Schedule of Operations section in these special provisions.

SUBMITTALS

1. Contractor shall submit a Waterway Traffic Maintenance Plan showing maintenance of waterway traffic during construction. Plan shall include dates of proposed work and include any major events scheduled through DCR or other entities. Any required signage or other devices to allow proper waterway traffic shall be shown in the plan.

2. The plan shall include all necessary signage and permitting required for access to the waterway through the Coast Guard and other entities.

3. The Contractor will be required to submit a USCG Notice prior to construction. The notice must be sent approximately 90 days prior to construction. A sample is included as an appendix to these special provisions.

BASIS OF PAYMENT

Item **851.3** will be paid for at the Contract unit price Lump Sum, which price shall include all labor, materials, equipment, and all incidental costs required to complete the work.

Payment of 75% of the Lump Sum price of this item will be made upon Acceptance of Waterway Traffic Maintenance Plan.
The remaining 25% of the Lump Sum price of this Item will be paid following Completion of Contract.

ITEM 852.11 TEMPORARY PEDESTRIAN BARRICADE FOOT
ITEM 852.12 TEMPORARY PEDESTRIAN CURB RAMP EACH

Work under these items consist of furnishing, deploying, maintaining in proper operating conditions, and removing temporary pedestrian barricades and temporary pedestrian ramps as part of a Temporary Pedestrian Access Route (TPAR) in order to guide pedestrians around a fully- or partially-closed sidewalk. These devices are intended to prevent pedestrians from entering the work area and to prevent pedestrians from inadvertently entering the vehicle travel lane by providing visual and physical separation between each space.

Materials

The Temporary Pedestrian Barricade shall have a continuous bottom rail or edge no more than two (2) inches above the ground and eight (8) inches in height (minimum) to accommodate cane users, have a smooth and continuous hand railing along the top edge no less than 32 inches above the ground and not obstruct or project into the pedestrian path of travel. Barricade walls shall be nearly vertical and generally within the same plane.

If exposed to traffic, Temporary Pedestrian Barricades shall be crashworthy.

The Temporary Pedestrian Curb Ramp shall provide a 48 inch minimum width, with a firm, stable, and non-slip surface. Protective edging with a two (2) inch minimum height shall be installed when the curb ramp or landing platform has a vertical drop of six (6) inches or greater.

The Temporary Pedestrian Curb Ramp walkway and landing area surface shall be of a solid, continuous, contrasting color abutting up to the existing sidewalk.

If a Temporary Pedestrian Curb Ramp leads to a crosswalk, a detectable warning pad must be used at the base of the ramp; if it leads to a protected path that does not conflict with vehicular traffic then a detectable pad shall not be used.

CONSTRUCTION METHODS

The Temporary Pedestrian Barricade shall be placed in an area that will provide pedestrians with a TPAR on a smooth, continuous hard surface for its entirety. The geometry and alignment of the facility shall meet the applicable requirements of the "Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities" and the Massachusetts Architectural Access Board.

The recommended width of the TPAR is 60 inches, but if constraints exist a minimum clear width of 48 inches shall be provided along its entirety. If a 60 inch width cannot be accommodated in full, a 60 inch by 60 inch passing space shall be provided every 200 feet or less along the TPAR.

Turning areas shall be 60 inches by 60 inches minimum.

ITEMS 852.11 and 852.12 (Continued)

Lateral joints between any surfaces shall not exceed 0.5 inches. Lateral edges may be vertical up to 0.25 inches high and shall be beveled at 1V:2H between 0.25 inches and 0.5 inches.

The TPAR shall be kept clear of debris, snow, and ice and the Temporary Pedestrian Barricades and Temporary Pedestrian Curb Ramps shall not obstruct drainage.

Removal and/or resetting of Temporary Pedestrian Barricades and Temporary Pedestrian Curb Ramps shall be considered incidental.

COMPENSATION

Payment for Temporary Pedestrian Barricades will be made at the contract price per foot installed in place, including all incidental items. This price shall include the cost of furnishing, installing, resetting, removal, and maintaining in good working condition.

Payment for Temporary Pedestrian Curb Ramps will be made at the contract price per each unit installed in place, including all incidental items. This price shall include the cost of furnishing, installing, resetting, removal, and maintaining in good working condition.

ITEM 859.1 REFLECTORIZED DRUMS WITH SEQUENTIAL FLASHING WARNING LIGHTS DAY

The work under this Item shall conform the relevant provisions of Subsection 850 of the Standard Specifications and the following:

Work under this item consists of furnishing, installing, maintaining in proper operating conditions, and removing reflectorized drums, and any necessary ballast, equipped with sequential flashing warning lights.

MATERIALS

Reflectorized drums shall be listed on the MassDOT Qualified Traffic Control Equipment List. Reflective sheeting on drums shall meet or exceed ASTM D4956 Type VIII. All drums shall be maintained in a satisfactory manner including the removal of oils, dirt, and debris that may cause reduced retroreflectivity.

The Contractor shall use one of the following sequential flashing warning light systems unless otherwise approved by the Engineer:

1. Empco-Lite LWCSD.
2. pi-Lit® Sequential Barricade-Style Lamp; or
3. Unipart Dorman SynchroGUIDE.

Sequential flashing warning lights shall be secured to reflectorized drums per the light manufacturer's specifications.

CONSTRUCTION METHODS

The first ten (10) drums in any merging or shifting taper as designated in the Temporary Traffic Control Plan shall be equipped with sequential flashing warning lights. These lights shall be operating, at a minimum, between dusk and dawn when the taper is deployed.

The successive flashing of the sequential warning lights shall occur from the upstream end of the merging or shifting taper to the downstream end of the taper in order to identify the desired vehicle path. Each warning light in the sequence shall be flashed at a rate of not less than 55, nor more than 75 times per minute.

Warning lights shall be powered off when drums are not deployed in a taper.

METHOD OF MEASUREMENT

A group of ten (10) reflectorized drums with sequential flashing warning lights is considered one (1) unit and will be measured by the day. Each period of up to 24 hours during which this unit is in use will be measured as one day regardless of the number of times that the drums are positioned, repositioned, removed, or returned to service.

BASIS OF PAYMENT

Reflectorized Drums with Sequential Flashing Warning Lights will be paid for at the contract unit price per day, which shall include full compensation for furnishing, positioning, repositioning, and removing the group of ten (10) drums as directed by the Engineer.

ITEM 874.41 TRAFFIC SIGN REMOVED AND DISCARDED EACH

The work to be done under this Item shall consist of the dismantling, removing, and discarding of all existing regulatory and warning signs and their supports as shown on the plans and/or as required by the Engineer.

Also included is the excavation of the existing foundations. If, in the opinion of the Engineer, the existing foundation will not interfere with new construction, it may be removed to a depth of 6 inches below the existing ground, the whole backfilled with gravel and compacted, and the existing surfaces restored or replaced in kind. The existing sign panels and supports, under this Item, not needed on the project, shall be legally discarded by the Contractor.

The existing signs shall not be removed until the new signs and structures replacing them are ready for traffic unless otherwise directed by the Engineer.

If signs are attached to existing light poles, utility poles or traffic poles, only the sign and attached hardware shall be removed and discarded.

METHOD OF MEASUREMENT

Item 874.41 will be measured for payment by the Each traffic sign removed and discarded.

BASIS OF PAYMENT

Item 874.41 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, supplying and placing of gravel backfill, compaction, the restoration or replacement in kind of disturbed surfaces, and all incidental costs required to complete the work.

ITEM 900.411	**TRUSS ENCASEMENT REPAIRS - DEEP**	**CUBIC YARD**
ITEM 900.412	**TRUSS ENCASEMENT REPAIRS - SHALLOW**	**SQUARE YARD**
ITEM 900.413	**CONCRETE BEAM REPAIRS**	**CUBIC YARD**
ITEM 900.414	**CONCRETE DIAPHRAGM REPAIRS**	**CUBIC YARD**

The work under these Items shall conform to the relevant provisions of Subsection 901 of the Standard Specifications and the following:

The Contractor shall establish limits of various repairs through visual inspection and sounding. The location and extent of all concrete repairs are to be verified and approved by the engineer after the contractor has sounded and marked out the proposed locations. The proposed repair areas should reasonably follow the outlines of the deterioration and square corners are preferred.

The work shall consist of forming and placing single component shrinkage compensated mortar repair material that is pre-extended, polymer modified, and contains an integral corrosion inhibiting admixture. It shall be used for overhead and vertical surface repairs as directed by the Engineer.

The work under Items 900.411, 900.412, 900.413 and 900.414 shall include the concrete repairs to the concrete encased trusses, beams and diaphragms of the Eliot Bridge in accordance with the details shown on the Contract Drawings, as specified herein and as directed by the Engineer.

All reinforced concrete excavation for this item shall be paid for under Item 127.1 Reinforced Concrete Excavation.

Items 900.411 and 900.412 apply only to repairs to the concrete encased trusses in Spans 3 through 5.

Item 900.413 applies only to the concrete beams in Spans 1, 2, 6 and 7.

Item 900.414 applies only to the concrete diaphragms located between the concrete trusses and beams.

The Contractor shall be experienced in this type of work and present proof of such experience by providing written documentation listing several projects on which single component shrinkage compensated micro concrete was satisfactorily placed under his supervision..

The mortar shall be applied by workmen who, in the judgment of the Engineer, are sufficiently experienced and skilled in this class of work.

MATERIALS

Repair Material

Repair mortar shall be rapid set and chosen from MassDOT's Qualified Construction Materials List and shall be suitable for vertical and overhead installation. The QCML can be found at the following link: https://www.mass.gov/info-details/rapid-set-concrete-patch-materials-horizontal-verticaloverhead.

ITEMS 900.411 through 900.414 (Continued)

Epoxy Reinforcement

Epoxy reinforcement shall meet the requirements of Standard Specification Item 910.1 and all relevant sections of Section 901 of the Standard Specifications. Epoxy coated rebar shall meet the requirements of ASTM A775.

All epoxy rebar for this Item shall be paid for under Item 910.1 Steel Reinforcement for Structures – Epoxy Coated.

Welded Wire Mesh

Epoxy-Coated Welded Wire Reinforcement: ASTM A 884, Class A coated, Type 1, plain steel.

Epoxy Bonding Compound

Epoxy bonding compound shall be compatible with the repair material chosen from the MassDOT QCML.

SUBMITTALS

Contractor shall submit a demolition plan highlighting the equipment to be used for concrete removal at the existing concrete encased trusses, beams and diaphragms and the sequence of concrete and reinforcement placement of the repairs.

Manufacturer's Product Data

For each type of product indicated.

Material Test Reports

For the following, from a qualified testing agency, indicating compliance with requirements for aggregates.

Formwork/Staging

The contractor shall be responsible for developing their own safe and stable work platform/staging system which shall be designed by a Professional Engineer Licensed in Massachusetts and submitted to MassDOT for approval.

Material Certificates

For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Form materials and form-release agents.
4. Steel reinforcement and accessories.

ITEMS 900.411 through 900.414 (Continued)

5. Fiber reinforcement.
6. Waterstops.
7. Curing compounds.
8. Bonding agents.
9. Adhesives.
10. Semirigid joint filler.
11. Joint-filler strips.
12. Repair materials.

CONSTRUCTION METHODS

Placing Repair Material

1. Chip back to sound concrete, 1" minimum beyond existing reinforcing.
2. Clean existing reinforcement to remove corrosion. Where bar section loss is > 20%, replace bar as indicated on plans.
3. Apply epoxy bonding compound to concrete surface (if required).
4. Place repair material and finish to match adjacent surface.

Handling, Storage, and Protection of Materials

Handle and store materials separately in such manner as to prevent intrusion of foreign matter, segregation, or deterioration. Do not use foreign materials or those containing ice. Remove improper and rejected materials immediately from point of use. Cover materials, including steel reinforcement and accessories, during construction period. Stockpile concrete constituents properly to assure uniformity throughout project.

Mixing

Thorough mixing of the repair mortar is required. A forced-action mixer is essential. Mixing in a suitably sized container using an appropriate paddle with a slow speed (400-500 rpm) heavy-duty drill is acceptable. Free-fall mixers must not be used. Only full bags shall be mixed and used. It is essential that machine mixing capacity and the crew size is adequate to enable the placing operation to be carried out continuously. Mechanically mix in appropriate sized mortar mixer or with electric drill and paddle.

Temperature Restrictions

The mixing shall be carried out in accordance with the manufacturer's specifications. The repair mortar shall not be mixed and placed when air or substrate temperatures are below 45°F. Cold weather protection shall be provided in accordance with Subsection 901.64 C of the Standards. Hot weather protection shall be provided in accordance with Subsection 901.64 A of the Standards.

ITEMS 900.411 through 900.414 (Continued)

Preparation of Substrate Surfaces

The edges of the areas to be repaired shall be saw cut to a minimum depth of 3/4" to avoid featheredging and to provide a squared edge. All deteriorated, scaling, loose or unsound concrete shall be removed by mechanical or hand chipping. The remaining surface shall be free of oil, grease, paint, corrosion deposits, dust, laitance or other surface contamination. The effectiveness of the cleaning shall be verified with a pull off test. No method of surface preparation shall be used that could damage sound concrete.

All reinforcing steel shall be abrasively blast cleaned in accordance with the ICRI Technical Guideline No. 03730 "Guide for Surface Preparation for the Repair of Deteriorated Concrete Resulting from Reinforcing Steel Corrosion"

The Contractor shall have the approval of the Engineer certifying that all spalled and deteriorated concrete has been removed prior to repairing the deteriorated areas; all reinforcing steel is satisfactorily cleaned.

Manufacturer's Field Representative

The Contractor shall arrange with the mortar manufacturer to have the services of a competent field representative at the work site prior to any mixing of components to instruct the work crews in the proper mixing and application procedures. The field representative shall remain at the job site after work commences to instruct until she/he and the Engineer are satisfied that the crew has mastered the technique of installing the system successfully. The representative shall make periodic visits to the project as the work progresses and shall confer on each visit with the Engineer.

Formwork and Placing of Repair Mortar

1. All formwork shall be rigid and tight to prevent loss of material. All forming shall be designed by a Professional Engineer that is registered in Massachusetts. All elements of the formwork and anchorages shall be designed for a pressure of 12 PSI. All submittals shall be reviewed and approved by the District Bridge Engineer.
2. The forms shall be watertight with perimeters lined with foam gasket material.
3. Form ports for pumping the mortar shall be placed no greater than 4 feet on center. Venting ports shall be placed no more than 2 feet on center.
4. The formwork shall include drainage outlets for presoaking of the substrate.
5. Form detailing shall allow for a minimum of 1-1/2" cover over all steel.
6. A suitable form release agent shall be used to facilitate the removal of forms from the cast material.
7. The forms shall be filled with clean water 24 hours prior to the mortar placement.
8. Immediately before placing, the water shall be drained and the drainage outlets sealed, leaving the substrate saturated surface dry (SSD) with no ponded water remaining.
9. In jobsite circumstances where the formwork cannot be filled with water, spray the substrate with clean water to achieve a saturated surface dry (SSD) condition immediately before placing the mortar.

ITEMS 900.411 through 900.414 (Continued)

10. The pump shall be capable of continuous even flow of mortar into the repair cavity without having any line surge. Line surge will result in possible air voids and segregation.
11. Prior to pumping mortar, all hoses must be pre-wetted with clean water to ensure that initial flow properties are maintained.
12. The pumping distance must be kept to a minimum. The pumping hoses shall be a minimum diameter of 3 times to size of the largest aggregate and the minimum size permitted shall be 1" diameter.
13. The pump pressure shall be limited to the minimum necessary to completely fill the cavity with repair mortar.
14. Immediately after mixing, pump the repair mortar into the formed area.
15. District personnel shall cast (6) 2-inch by 2-inch cubes to determine that 1 and 7 day compressive strength results meet the requirements of the performance criteria.

Curing

1. Formwork shall remain in place until a minimum compressive strength of 2500 psi is reached, or 5 days, whichever is greater.
2. If the repair area is not to receive a protective coating, an approved curing compound shall be applied to the repair area upon form removal.
3. If the repair area is to receive a protective coating, polyethylene sheeting shall be applied to the repair area and the sheeting perimeter shall be taped down until the completion of a 7 day curing period.

METHOD OF MEASUREMENT

Items 900.411, 900.413, and 900414 will be measured for payment by the Cubic Yard.

Item 900.412 will be measured for payment by the Square Yard.

BASIS OF PAYMENT

Items 900.411, 900.413, and 900414 will be paid for at the respective Contract unit prices per Cubic Yard, which price shall include all labor, materials, equipment, and all incidental costs required to complete the work.

Item 900.412 will be paid for at the Contract unit price per Square Yard, which price shall include all labor, materials, equipment, and all incidental costs required to complete the work.

Demolition related to these items shall be paid under Item 127.1 Reinforced Concrete Excavation.

Epoxy rebar installed as part of this item shall be paid under Item 910.1 - Steel Reinforcement for Structures – Epoxy Coated.

ITEM 912.5	**DRILLED AND GROUTED #5 DOWELS**	**EACH**
ITEM 912.6	**DRILLED AND GROUTED #6 DOWELS**	**EACH**
ITEM 912.7	**DRILLED AND GROUTED #7 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 shall consist of drilling holes, furnishing, installing, and grouting of steel dowel reinforcement at the locations shown on the drawings or as required by the Engineer.

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 core the holes, and the diameter of the core hole shall at a minimum conform to the recommendations of the manufacturer and be submitted to the Engineer for approval.

MATERIALS

Grouting material which has been tested, approved and is on the Approved Products List is acceptable for use on MassDOT - Highway Division bridge projects. The Engineer shall confer with the Research & Materials Division regarding which products are approved for use on MassDOT – Highway Division bridge projects.

Reinforcing steel dowels shall meet the requirements of AASHTO M31 Grade 60. All reinforcing steel dowels shall be epoxy coated in accordance with ASTM A755 or shall be galvanized in accordance with ASTM A767M. Reinforcing steel dowels shall be incidental to the work under these Items.

CONSTRUCTION METHODS

All dowel holes shall be diamond core drilled. No impact or percussion type drills will be allowed without prior approval of the Engineer. The inner surfaces of diamond core drilled dowel holes shall be scored to develop sufficient keying action. The method of scoring of the dowel hole's inner surfaces shall be subject to the approval of the Engineer. The holes shall be blown clear of any debris with oil-free compressed air 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 portion of the existing structure that is to remain in place. Any damage to any portion of the existing structure 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 Contractor's 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, at a minimum, 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.

ITEMS 912.5 through 912.7 (Continued)

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 coring of the proposed dowel 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, the Contractor and the 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 Contract Unit Price shall be considered as full compensation for all costs in connections therewith.

The Contractor shall have no claim for any variation in the diameter of the hole, the method of coring the hole, or the type of grout used in anchoring the proposed dowels.

METHOD OF MEASUREMENT

Item 912.5, Item 912.6, and Item 912.7 will be measured for payment by the Each dowel installed, complete in place.

BASIS OF PAYMENT

Item 912.5, Item 912.6, and Item 912.7 will be paid for at the respective Contract unit prices per Each dowel installed in place, which price shall include all labor, materials, equipment, furnishing dowels, drilling holes, grouting the dowels regardless of the diameter or depth of the hole, and all incidental costs required to complete the work.

ITEM 960.2 GRANITE CAP STONE DOWELS, SS EACH

The work under this Item shall include the furnishing and installation of stainless-steel dowels in accordance with the details shown on the Contract Drawings, as specified herein and as required by the Engineer.

MATERIALS

Stainless Steel Dowels

Stainless steel dowels shall be plain, round, smooth, coated bars, free from burrs or other deformations. Provide dowel of the size and length in accordance with the details shown on the Contract Drawings and conform to ASTM A453.

Non-Shrink Grout

Non-shrink grout must be chosen from the MassDOT Qualified Construction Materials List (QCML).

SUBMITTALS

Manufacturer's Product Data

Manufacturer's product data shall be submitted for the following items:

1. Stainless steel dowels
2. Non-shrink grout

CONSTRUCTION METHODS

Setting

1. Existing dowels shall be removed and discarded based on condition. Existing dowels should be re-used when possible.
2. Provide a new 1-1/2” diameter core hole for installation of dowels. Core hole should be drilled 2-1/2” into existing concrete parapet per the Construction Plans. Remove all debris from core hole.
3. Fill core hole with non-shrink grout per manufacturer’s instructions.

Install dowel per the Construction Plans.

METHOD OF MEASUREMENT

Item 960.2 will be measured for payment by the Each granite cap stone dowel SS installed, complete in place.

BASIS OF PAYMENT

Item 960.2 will be paid for at the Contract unit price per Each, which price shall include all labor, materials, equipment, and all incidental costs required to complete the work.

ITEM 968.4 SCUPPER - REMOVED EACH

The work under this Item shall include the removal and disposal of the existing bridge scuppers that have been paved over in accordance with the details shown on the Contract Drawings, as specified herein and as directed by the Engineer.

METHOD OF MEASUREMENT

Item 968.4 will be measured for payment by the Each scupper removed.

BASIS OF PAYMENT

Item 968.4 will be paid for at the Contract unit price per Each, which price shall include all labor, materials, equipment, removal from site and proper disposal, cleaning, lighting, temporary shielding, and all incidental costs required to complete the work.

After removal of the scuppers, the deck shall be patched under Items 905 and 910.1.

ITEM 973. BRIDGE EXPANSION JOINT REPLACEMENT FOOT

The work under this Item shall conform to the relevant provisions of Subsection 971 of the Standard Specifications and the following:

The work under this Item shall include the replacement of the expansion joint of the Eliot Bridge in accordance with the details shown on the Contract Drawings, as specified herein and as directed by the Engineer.

MATERIALS

Expansion joint shall be an Asphaltic Plug joint system. Contractor to submit Asphaltic plug joint system that meet requirements of ASTM Standard D6297-20.

SUBMITTALS

Work this section with the specifications for Item 998.

Manufacturer's Product Data

Manufacturer's product data shall be submitted for the following items:

1. Asphaltic plug joint system.

CONSTRUCTION METHODS

1. Transversely sawcut the surfacing layer full depth to the deck surfacing on each side of the joint per Contract Plans.
2. Break out and remove all material between the sawcuts, including any waterproofing if present, down to the concrete deck surface. Ensure surface is level across gap.
3. Clean the blockout area and thoroughly dry.
4. Fill the expansion gap with the heated asphaltic plug joint material per manufacturer installation guide, ensuring no voids and that the surface is level.
5. Allow joint to cool. Site should be cleaned thoroughly after asphaltic plug joint is poured.

METHOD OF MEASUREMENT

Item 973 will be measured for payment by the Foot of bridge expansion joint replaced.

BASIS OF PAYMENT

Item 973 will be paid for at the Contract unit price per Foot, which price shall include all labor, materials, equipment, and all incidental costs required to complete the work.

ITEM 998. STUDY AND ANALYSIS OF MASONRY MATERIALS AND PROCEDURES LUMP SUM

The work under this item shall consist of sampling and testing existing granite cap stones, brick, and mortar and any new masonry materials procured to complete the work in accordance with the details shown on the Contract Drawings, as specified herein and as directed by the Engineer This project qualifies as Charles River Basin a National Register-listed Historic District. The Eliot Bridge is a contributing property in the historic district and will require proper coordination with Historic Preservation Officers.

The Work included under this Item shall conform to the applicable special provisions including, but not limited to the following:

Item 127.5 Granite Cap Stone Remove and Reset
Item 127.61 Brick Veneer Removal, Interior of Parapets
Item 127.62 Brick Veneer Removal, Exterior Facades
Item 127.63 Brick Veneer Removal, Exterior Facades, Toothing
Item 685.11 Granite Cap Stone Replacement
Item 706.41 Brick Veneer New, Interior Parapets
Item 706.42 Brick Veneer Repair, Exterior Facades
Item 706.43 Brick Masonry/Granite End Pier Reconstruction
Item 706.44 Brick Veneer Masonry Repointing
Item 706.45 Brick Veneer – Arch Repair

SUBMITTALS

The Contractor shall submit a plan for undertaking the Study and Analysis of Masonry Materials and Procedures; methods for analyzing mortar, brick, and granite components; and methodology for determining mortar and brick proportions and procedures used as well as the method for approval by the Engineer, Historic Preservation Officers and MassDOT Cultural Resource Unit.

Prior to the initiation of work, the Contractor shall submit the following items included as part of the Study and Analysis of Masonry Materials and Procedures:

A. Salvage Report in accordance with Item 127.5 and Item 127.61.
B. Analysis of material samples obtained from salvaged granite, brick and mortar components.
C. Mock-up for new interior brick façade in accordance with Item 706.41.
D. Written report of findings, recommendations, and procedures of the study for review and approval by the Engineer, Historic Preservation Officers, and MassDOT Cultural Resource Unit. Report shall include recommended grout color, type, and aggregate size (based on analysis of existing grout), recommendations for replacement granite stones, identify the color, size and shape of existing brick and recommendations for color and type of replacement brick.
E. Meeting minutes as a result of any historical bridge coordination with the Contractor, the Engineer, Historic Preservation Officers and MassDOT Cultural Resource Unit.
F. Mortar design mixes required for but not limited to Item 127.5, Item 706.41, Item 706.42, Item 706.43, Item 706.44, and Item 706.45.

ITEM 998. (Continued)

MATERIALS

Material Analysis

The study and analysis of masonry materials and procedures and subsequent mortar, brick and granite work shall be performed in compliance with the Secretary of the Interior's Standards for the Treatment of Historic Properties.

The Contractor shall perform all mortar and granite materials analysis utilizing the services of a testing laboratory that is ISO 9001 certified. The analyses shall use a combination of petrography in conjunction with chemical methods. The laboratory shall have proven experience in mortar, cast stone, stucco and granite analysis for historic restoration work. Petrography shall be performed in accordance with ASTM C856. The laboratory shall have a proven broad knowledge of materials used in the past. The analysis shall isolate and identify all types of materials, determine their proportions, and investigate the various textures and surface finishes.

Existing grout shall be analyzed for strength and other properties, including aggregate size.

Design Mixes

Separate design mixes shall be prepared for existing granite and brick and related masonry connections. The design mixes shall utilize findings from the analysis to match the color, texture, and appearance of the existing architectural granite and brick components. The design mixes shall also be able to meet the durability requirements of the proposed work and meet any structural requirements listed on the contract drawings and relevant Item Specifications.

Approvals

The study and analysis shall require approvals by the Engineer, Historic Preservation Officers and MassDOT Cultural Resource Unit. Historic Preservation Officers shall include representatives of the Boston Landmarks Commission, Cambridge Historical Commission and Department of Conservation and Recreation (DCR). The Contractor must submit the plan for approval prior to initiation of the study work. The Contractor shall coordinate on-site review meetings of mock-up and material samples with the Engineer, Historic Preservation Officers and MassDOT Cultural Resource Unit. The Contractor shall obtain written approval of the written report with design mixes of the study and analysis from the Engineer, Historic Preservation Officers and MassDOT Cultural Resource Unit.

ITEM 998. (Continued)

Contact Details

Boston Landmarks Commission – Contact: Rosanne Foley, 617-635-1935, or Rosanne.Foley@Boston.gov.

Cambridge Historical Commission – Contact: Charles Sullivan, 617-349-4684 or csullivan@cambridgema.gov.

Department of Conservation and Recreation – Contact: Jeffrey Harris, 617-851-2241 or Jeffrey.Harris@mass.gov.

MassDOT Cultural Resource Unit– Contact: Jeffrey Shrimpton, 978-325-2094 or jeffrey.shrimpton@dot.state.ma.us, or Jameson Harwood, jameson.harwood@dot.state.ma.us

BASIS OF PAYMENT

Item 998. will be paid for at the Contract unit price Lump Sum, which price shall include all labor, materials, equipment, developing plans, performing tests and analyses, coordinating with the Engineer, Historic Preservation Officers and MassDOT Cultural Resource Unit, preparing a written report with design mixes, obtaining written approvals, and all incidental costs required to complete the work.

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Temporary Traffic Control

Typical Details and
Massachusetts Guidelines
for MassDOT, Municipalities,
Utilities, and Contractors

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INTRODUCTION

This guide has been prepared to assist in the planning and installing of temporary traffic controls in maintenance, utility, or short-term construction work areas (work lasting 10 hours or less). This guide serves to assist with the many decisions that must be made for each work site. Special planning for traffic control is necessary on a case by case basis because conditions can vary widely among work locations. **Since this guide cannot cover every situation, representative illustrations covering typical short-term construction, maintenance, and utility operations are presented**.

All typical traffic control device setups illustrated should be considered as guides. The traffic control devices that are shown, the arrangement or position of the devices, and the distances prescribed in the tables are based on the Federal Highway Administration's (FHWA) Manual on Uniform Traffic Control Devices (MUTCD) and the Massachusetts Amendments to the MUTCD (MA Amendments), but these illustrations only present minimum standards. The provision of safe work zones for all roadway users and roadway workers affected by these activities is paramount. Traffic controls may be expanded or improved upon whenever deemed necessary. Traffic movement through the work site all traffic control devices shall be periodically observed and inspected at all locations.

If necessary, Part 6 of the MUTCD and the MA Amendments, Chapter 17 (Work Zone Management) of MassDOT's Project Development & Design Guide, and the “Traffic Engineering and Safety Section” of the MassDOT web site: (https://www.massdot.state.ma.us/highway/Departments/TrafficandSafetyEngineering.aspx), as well as MassDOT District offices can provide additional guidance, information, and suggestions for work zone setups.

RESPONSIBILITIES FOR TRAFFIC CONTROL

Short-term construction, maintenance, and utility work on or near the roadway creates a potentially hazardous situation, typically requiring the use of temporary traffic controls. These controls are important to protect both work crews and the road users. It is the responsibility of each maintenance foreman to establish and maintain safe and effective controls.

Usually the supervisor, working with the crew, plans the traffic control procedures for proposed work sites. The foreman is responsible for re-questing, storing, and maintaining all traffic control devices necessary for their crews.

The foreman is responsible for placing the devices according to these guidelines. They must inspect each installation and observe traffic flow through the area. The foreman is generally authorized to make adjustments to the original installations that, in their judgment, are necessary to improve the control of traffic and establish greater safety.

All necessary traffic control devices must be installed before work begins and properly maintained during the work period. They must also be removed as soon as they are no longer relevant to the roadway conditions.

In situations such as night time road or lane closures, detours, or other unusual conditions on state highways, the District Traffic Maintenance Engineer (DTME) should be advised. If the DTME is absent, the section foreman shall follow the instructions of the District Maintenance Engineer.

TRAFFIC CONTROL DEVICES

Traffic control devices regulate the movement of road users, warn of unexpected or unusual roadway conditions, and inform them how to maneuver safely through or around the work area. All signs, channelizing devices, barricades, and other miscellaneous traffic control devices should work together to guide traffic safely and efficiently. Common temporary traffic control devices are outlined and described below.

Signs

Temporary traffic control zone (TTCZ) signs are the primary means of providing information and directions to roadway users. All signs must be retroreflective per MassDOT's latest standard.

Warning signs call attention to unexpected conditions and to situations that might not be readily apparent to road users on or adjacent to a roadway. Warning signs alert road users to conditions that might call for a reduction of speed or an action in the interest of safety and efficient traffic operations. Nearly all warning signs for construction and work areas have black legends and borders on a fluorescent orange background.

Regulatory signs shall be used to inform road users of selected traffic laws or regulations and indicate the applicability of the legal requirements. Regulatory signs typically have black legends and borders on a white background.

Channelizing Devices

When used properly, traffic cones, reflectorized plastic drums, and barricades guide traffic through the work area along an appropriate travel path. It takes roadway users a certain distance along the roadway to safely move away from the upcoming active work site. These transition distances are based on the following taper length (L) formulas:

L = $WS^2/60$ for speeds of 40 mph or less; or

L = WS for speeds of 45 mph or more; where

- L = minimum length of taper in feet,
- S = posted speed limit or typical travel speed in miles per hour prior to the work, and
- W = width of lane closure in feet.

The spacing of channelizing devices (in feet) is approximately equal to the existing speed of traffic (in mph).

Warning Lights

Rotating beacons and other flashing lights mounted on work vehicles, signs, or channelizing devices help alert roadway users to the work area. They may also be used to warn roadway users of hazards within the work area. The first 10 drums in any taper shall be equipped with sequential flashing lights.

Arrow Boards

Arrow boards are a special type of sign that are highly visible work zone warning devices. They are particularly effective on highways, where both speed and volume are high. Arrow boards in the non-directional, CAUTION, mode (four corner flashing) may be used to indicate that a shoulder is closed. Arrow boards in the arrow mode shall only be used when a travel lane is dropped on a multi-lane road and one lane of traffic must merge with another. All arrow boards should be located at the beginning of each lane or shoulder closure taper without extending outside of it. Arrow boards shall flash at a rate of 25 to 40 flashes per minute. Arrow boards shall not be used to indicate a lane shift.

BASIC REQUIREMENTS

In every work situation, the temporary traffic control setup must: Give roadway users sufficient advance warning of the work area; advise roadway users of the proper actions to take and travel paths to follow; and provide protection to roadway users, workers, and the work area. These three general requirements can be met as outlined below.

Provide Advance Warning

Warning devices along the approaches to a work area alert roadway Users to changes to road and operating conditions. Roadway users are usually alerted to these dangers via a sign or series of signs installed in the same order as the roadway user generally would expect to see them on long-term construction projects.

The initial project limit sign is usually a general warning such as “ROAD WORK 1500 FT”. Other operational warning signs then provide the roadway user with more specific information about the situation. A minimum of three advance warning signs (the initial project limit sign and two operational warning signs) is recommended when work is located on the traveled way. Warning lights and flags can be used to attract attention to the signs. A highly visible work area helps reinforce the advance warnings.

Advise and Direct Travelers

Operational warning signs provide information to the road-way user such as the type of work being performed, special conditions to watch for, or actions to take. These include signs such as, SHOULDER WORK, RIGHT LANE CLOSED, DETOUR 500 FT, ROAD CLOSED to THRU TRAFFIC, POLICE OFFICER AHEAD, etc. All of these signs must be located far enough in advance of the work area that the roadway user has sufficient time to react to them appropriately. For projects in Urban Areas, see detail: Typical Device Spacing for minimum sign spacing.

Protect Travelers, Workers, and the Work Area

The primary protection of any work area is its own visibility. Traffic cones, reflectorized plastic drums, portable breakaway barricades, etc. are used to make the work area visible and separate workers from traffic.

Other devices, such as flashing lights, flags, delineators, temporary lighting, and portable changeable message signs (PCMS) can be used to provide additional emphasis and visibility.

Workers must protect themselves by being alert to their work situation, wearing safety vests and hard hats, and by facing traffic whenever possible.

Work vehicles can also add protection when they are equipped with truck mounted attenuators, rotating beacons, flashing lights, flashing arrow boards, etc. and are parked between workers and oncoming traffic. However, workers should not position themselves between two closely parked vehicles. No private personal vehicles are allowed within the work site.

PLANNING GUIDELINES

Decisions regarding selection of work area traffic control devices require a knowledge and understanding of the specifics of each work zone. As there may be vast differences between situations, three main variables need to be considered prior to determining the need for, or the selection of, traffic control devices: 1) location of work, 2) type of roadway, and 3) speed of traffic.

Compiling information about these variables will help with planning a safe work area control. Each of these variables is explained below.

Location of Work

The choice of traffic controls needed for a short-term construction, maintenance, or utility operation depends upon the work zone's location. As a general rule, the closer the active work site is to the roadway, the more control devices are needed. Work can take place:

- Away from the shoulder or edge of pavement. No special devices are needed if work is confined to an area 15 or more feet from the edge of the shoulder. A general warning sign, such as ROAD WORK AHEAD, should be used if workers and equipment must occasionally move closer to the roadway.
- On or near the shoulder/ edge of pavement. This area should be signed as if work were on the road itself, since it is part of the roadway users' recovery area. Advance warning and operational signs are needed, as well as channelization devices to direct traffic and keep the work area visible to roadway users.
- On the median of a divided highway. Work in this location may require traffic control in both directions of traffic. Advance warning and channelization devices should be used if the median is narrow.
- On the roadway. This condition requires detailed protection for workers and sufficient warning to roadway users. Advance warning must provide a general message that work is taking place as well as information about specific hazards and specific actions the roadway user must take.

TYPE OF ROADWAY

The characteristics of the roadway also have an important influence on the selection of work area traffic control. The roadway, itself, may present special hazards. You should plan for maximum protection, using the worst hazard present as your guide to signing the work area. Some general considerations are described below for road conditions.

One-way roads: A one-way road requires signage on both sides of the road if it carries two or more lanes in one direction, ensuring roadway users in all lanes are alerted and informed.

Two-way roads:

- **Undivided:** Two-way, undivided roads will usually require controls for both directions of traffic. When the active work site is well off the roadway, controls for the opposite lane may be eliminated.
- **Divided:** Work on divided multi-lane roadways can often be handled as work along a one-way road (i.e. signs are provided along both sides of the roadway along the direction affected). If the work is in the median, both directions of traffic must be controlled, and both approaches should be double signed (i.e. have all 3 advance warning signs on both sides of each direction).

EFFECTS OF SPEED ON WORK ZONES

Speed is an important consideration in the use of work area traffic control devices. As a general rule, the greater the speed of traffic approaching a work area, the greater the size, number, and spacing of control devices.

Size. The standard size for most warning signs is 36 x 36 inches on conventional roadways and 48 x 48 inches on freeways and expressways. Signs larger than the standard 36 x 36 inches may be desirable on high-speed conventional roads.

Position. Install signs far enough in advance of the work area so the roadway users have time to react to them (see charts associated with diagrams for spacing).

OTHER FACTORS

Sight Obstructions. To ensure safety, work areas must be visible. Assess the placement of the temporary traffic control devices by driving through the area, and determine if the devices can be easily seen and provide sufficient time for roadway users to react in a safe manner. Extra precaution should be enacted in areas where horizontal or vertical curves may obstruct a roadway user's clear view of road activities ahead.

Police/Flaggers. It should be noted that the MUTCD does not require police/flaggers for stationary setups. If police/flaggers are used, a police/flagger ahead sign should be used in advance of any point where the police/flagger is stationed to control road users.

PROCEDURES FOR WORK AREA TRAFFIC CONTROL

1. PLAN YOUR WORK

Inspect location of work area and its surroundings.

Analyze:

- Location of work in relation to the traveled way, intersecting road-ways, driveways, and sight distances;
- Type of roadway and traffic involved; and
- Volume and speed of traffic.

Meet and discuss the work and necessary traffic control with the crew.

Study representative illustrations in this guide to develop a temporary traffic control plan (TTCP).

Other Considerations:

- Base your traffic control plan on the premise that all roadway users are unfamiliar with the area.
- The closer the work area location is to traffic, the more controls are needed.
- Plan for maximum protection.
- Select and inspect the temporary control devices needed (including all warning signs), if they are not in good condition, REPLACE THEM!
- Then collect and transport them to the work site.
- Determine their proper placement.
- Install signs and other traffic control devices prior to allowing personnel or equipment onto the roadway.
- Make sure signs are reflective, accurate, clean, and meet specifications. Completely cover any existing permanent signs that will conflict with the messages of the new work area control signs.

2. INSTALLING/REMOVING TEMP. TRAFFIC CONTROL DEVICES

Care must be exercised when installing and removing temporary traffic control (TTC) devices. The traffic control needed to perform the operation safely is dictated by the location on the roadway the operation will occur: in a shoulder or a lane, in the left lane or right, etc. In all cases, installing TTC begins and ends as a mobile operation.

A shadow vehicle with a truck mounted attenuator (TMA) shall be used to protect workers installing and removing TTC devices on all roadways with a posted speed limit of 45 MPH or greater as directed by the engineer. TTC devices shall not be installed or removed from a shadow vehicle with a TMA. TTC devices shall be installed or removed from a work operation vehicle only and a shadow vehicle with a TMA shall be used to protect the workers installing or removing the devices.

PROCEDURES FOR WORK AREA TRAFFIC CONTROL (CONT.)

3. INSTALL TRAFFIC CONTROL DEVICES AT WORK SITE

FOR LOWER SPEED (≤ 40 MPH) ROADWAYS:

1) All devices shall be installed in order with the flow of traffic.

2) Where one direction of traffic is being affected, the first sign installed should be the sign farthest from the work site, and on the same side as the work.

3) Where two directions of traffic are affected, install signs for opposing traffic first, starting with the sign farthest from the work area. When signs for opposing traffic have been installed, install signs on the same side as the work area, again beginning with the sign farthest from the active work site.

4) Once signs are in place, other traffic control devices shall be installed in the same manner as the signs.

FOR HIGHER SPEED (≥ 45 MPH) ROADWAYS:

1) All devices shall be installed in order with the flow of traffic.

2) Install all advance warning signs, beginning with the ROAD WORK XXX (W20-1) sign and ending with the END ROAD WORK/DOUBLE FINES END (MA-R2-10E) sign.

3) Install all signs beginning with the opposite side which will be closed (for a right lane closure; first, install all signs on the left side (shoulder) and then install all signs on the right side (shoulder). No signs shall be erected on the roadway unless delineated by traffic control devices.

4) If required, install shoulder taper as the mobile operation advances.

5) Install arrow board on the shoulder prior to the merging taper or as close to the beginning of the merging taper as possible.

6) Install channelizing devices to form a merging taper. Use of a shadow vehicle with a TMA during installation is required on roads with speed limits of 45 MPH or greater or as directed by the Engineer.

7) Install traffic control devices along the buffer space at the appropriate spacing.

8) Continue placing devices along the work space at the appropriate spacing.

9) Install devices for the termination area as necessary.

10) Place the shadow vehicle with a TMA in advance of the first work crew or hazard approached by motorists. Multiple shadow vehicles may be required based on the number of lane and shoulder closures implemented.

4. INSPECT WORK AREA SIGNING AND CONTROL DEVICES

1) Assess the placement of the temporary traffic control devices by driving through the work area. All approaches to the work zone should be checked.

2) Ensure roadway users will have sufficient time to read signs and react in a safe manner.

PROCEDURES FOR WORK AREA TRAFFIC CONTROL (CONT.)

3) Check visibility of entire work area. If approaching roadway users can't see the work area well, or if they can't see ahead to traffic that may already be queued on the approach because of the work, additional traffic control devices should be deployed.

4) Check to ensure the proper temporary traffic control devices are positioned to protect workers from traffic (where possible).

5) Ensure all workers wear safety vests, hard hats, and all other necessary safety equipment. All worker safety gear should be in good condition. All reflective gear should be clean and highly visible in the dark.

6) Record in the log book the number and location of all signs and devices.

Considerations:

- Work area signs should never be blocked from view or obscured by vegetation, existing signs, or other obstructions.
- Flags, flashing lights, and edge line traffic cones can be used to improve visibility.

5. REMOVE TRAFFIC CONTROL DEVICES AT WORK SITE

All workers and equipment should be clear from work site BEFORE removing signs and other devices.

FOR LOWER SPEED (≤ 40 MPH) ROADWAYS:

1) Remove signs and other devices within the delineated area when work is complete.

2) Remove other traffic control devices in the reverse order in which they were installed

3) Remove signs in the reverse order in which they were installed (i.e. sign closest to the work area to be removed first).

4) When the operation is complete, uncover any existing permanent signs covered in Step 2.

5) Record in the log book the time at which the signs were removed.

FOR HIGHER SPEED (≥ 45 MPH) ROADWAYS:

All TTC devices for a stationary lane closure on a multi-lane roadway, except advance warning signs, should be removed against the flow of traffic in the following sequence:

1) Remove the channelizing devices starting from the end of the activity area working back to the widest part of the merging taper.

2) A shadow vehicle with TMA shall be positioned to protect workers removing devices and work backwards as the setup is removed from the roadway.

PROCEDURES FOR WORK AREA TRAFFIC CONTROL (CONT.)

3) Place the removal vehicle on the shoulder, and remove the channelizing devices from the merging taper by hand onto the work vehicle.

4) Remove the arrow board once traffic is clear and it is safe to do so.

5) Circle back and moving with the flow of traffic, remove the advance warning signs starting with the opposite side from previous lane closure first.

6) At no time shall workers run across the multilane roadway to remove signs on both sides of the road simultaneously.

7) Record in the log book the time at which the signs were removed

RAMP FACILITIES

At all times it is necessary to control the on and off-ramp traffic during the installation and breakdown of traffic control devices. Use of temporary traffic slow-downs or rolling roadblocks is recommended to allow for the safety of workers handing temporary traffic control devices on ramp facilities. A shadow vehicle with a TMA shall be used to protect the workers installing or removing the devices. At no time shall the work operation vehicle be used as the shadow vehicle with the TMA.

USE OF THIS GUIDE

Illustrations showing minimum standards for short-term construction, maintenance, and utility operations are arranged in this guide by type of operation. The users of this guide should compare all illustrated examples and examine their differences. After gathering information about the work zones using the general guidelines as outlined, proceed as follows:

1) Turn to the Index. Consider the type of operations and the type of roadway upon which work will occur.

2) Select the figure that most closely matches the conditions where you plan to work. Remember that all diagrams represent minimum standards.

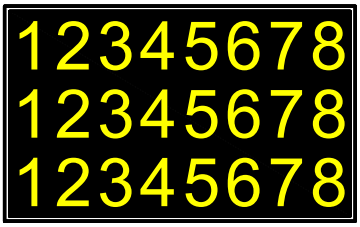
3) Read the title of the illustration to ensure that it is appropriate to your location. Study the layout of traffic control devices and read all notes.

4) Consult the appropriate tables, as directed on each illustration to determine taper length and proper spacing of signs. Notice that distances change when speeds change. Also note that these are guidelines, only, and they must be adapted to your specific work area.

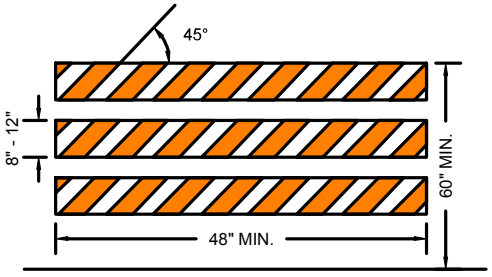
5) Use the **"PROCEDURES FOR WORK AREA TRAFFIC CONTROL"** for assistance in completing all necessary steps to provide effective and safe work area traffic control.

massDOT Massachusetts Department of Transportation Highway Division PAGE 10	Work Zone Safety Standard Details and Drawings	FIGURE 1 TYPICAL TRAFFIC CONTROL DEVICES NOT TO SCALE

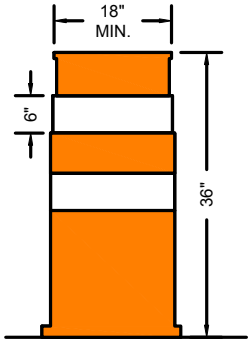
SIGN



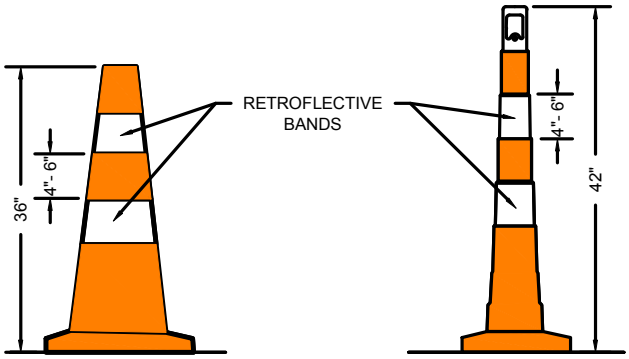
PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)



TYPE III BARRICADE

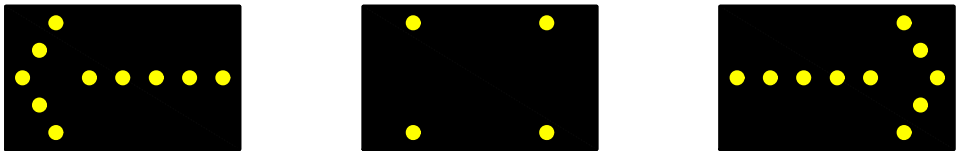


DRUM



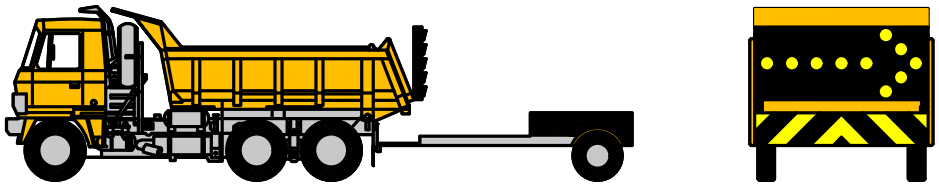
CONES

Cones may be used for all daytime operations. For night work, drums should be used to form the taper(s) and cones can be used along the tangent section of the work setup.



LEFT CAUTION RIGHT

ARROW BOARD (WITH MODE)



TRUCK MOUNTED ATTENUATORS

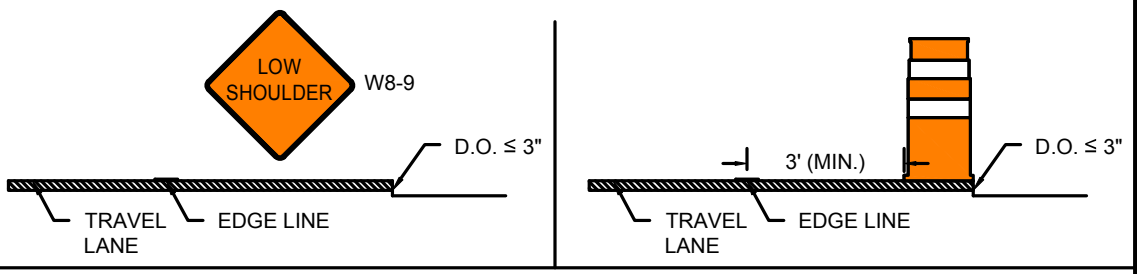
Truck Mounted Attenuators (TMA) shall be positioned between the start of the work area and the end of the designated buffer zone. The TMAs are to be positioned in each temporarily closed lane. This includes shoulders (≥8 feet) whether combined with a travel lane closure or being closed alone. These TMA conditions are required on roadways with speeds of 45 MPH or greater. TMAs can be used on other roadways at the discretion of the engineer. TMAs shall be used for the deployment and removal of all traffic control devices, including all advance warning signs.

SHORT-TERM PAVEMENT EDGE DROP-OFFS

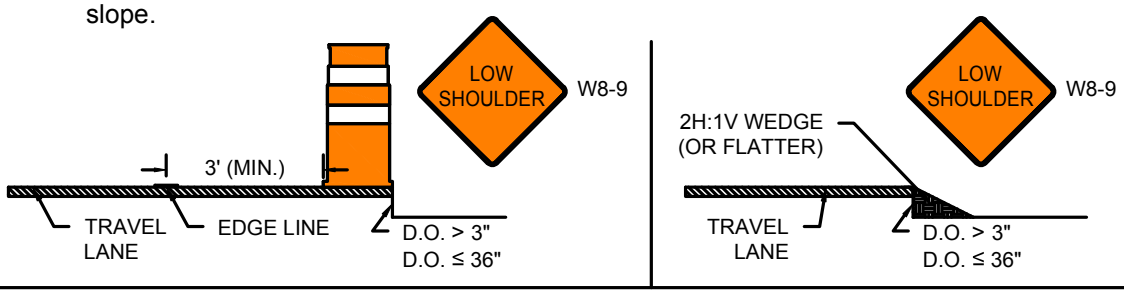
Note that this guidance is adopted from the Roadside Design Guide*, 4th Edition.*

Pavement drop-offs may occur during paving, excavation, and other construction activities. Drop-offs create hazards for vehicles if not properly mitigated. The following applies for all roads with speed limits greater than 30 mph; for roads with speed limits of 30 mph or less, treatments for pavement edge drop-offs are at the discretion of the Engineer. Drop-offs between adjacent, open travel lanes should not exceed 2", and any drop-off in excess of 3" should not be left unattended without one of these mitigation measures applied.

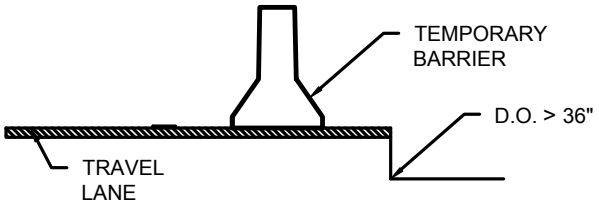
- Shoulder drop-offs 3" or less adjacent to a shoulder or active travel lane should be mitigated by:
  - ✓ A W8-9 (LOW SHOULDER) sign in advance of and at regular intervals throughout the treatment; or
  - ✓ The placement of drums on the traffic side of the drop-off.



- Shoulder drop-offs greater than 3" but less than or equal to 36" should be mitigated by:
  - ✓ A W8-9 (LOW SHOULDER) sign in advance of and at regular intervals throughout the treatment and the placement of drums on the traffic side off the drop-off, offset at least 3' from the travel lane; or
  - ✓ A W8-9 (LOW SHOULDER) sign in advance of and at regular intervals throughout the treatment and the placement of a temporary wedge of material along the face of the drop-off. The wedge should consist of stable material placed on a 2H:1V or flatter slope.



- Shoulder drop-offs greater than 36" must be protected by temporary barrier.



massDOT Massachusetts Department of Transportation Highway Division PAGE 12	Work Zone Safety Standard Details and Drawings	TYPICAL DEVICE SPACING

POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)	CHANNELIZATION DEVICES (DRUMS OR CONES)			
		TRAVEL LANE CLOSURE LENGTH (L) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	500 / 500 / 500	320	305	20	55
45-55	500 / 1000 / 1000	660	495	40	40
60-65	1000 / 1600 / 2600	780	645	40	50

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

MINIMUM SPACING OF ADVANCE WARNING SIGNS FOR URBAN ROADWAYS	
ROAD TYPE	DISTANCE BETWEEN SIGNS
URBAN (LOW SPEED)	100 FT
URBAN (HIGH SPEED)	350 FT

NOTES

1. 40 FT = 10 FT PAVEMENT MARKING + 30 FT SKIP

LEGEND


WORK ZONE


CHANNELIZATION DEVICE

FLASHING ARROW BOARD


PORTABLE CHANGEABLE MESSAGE SIGN


TRUCK MOUNTED ATTENUATOR

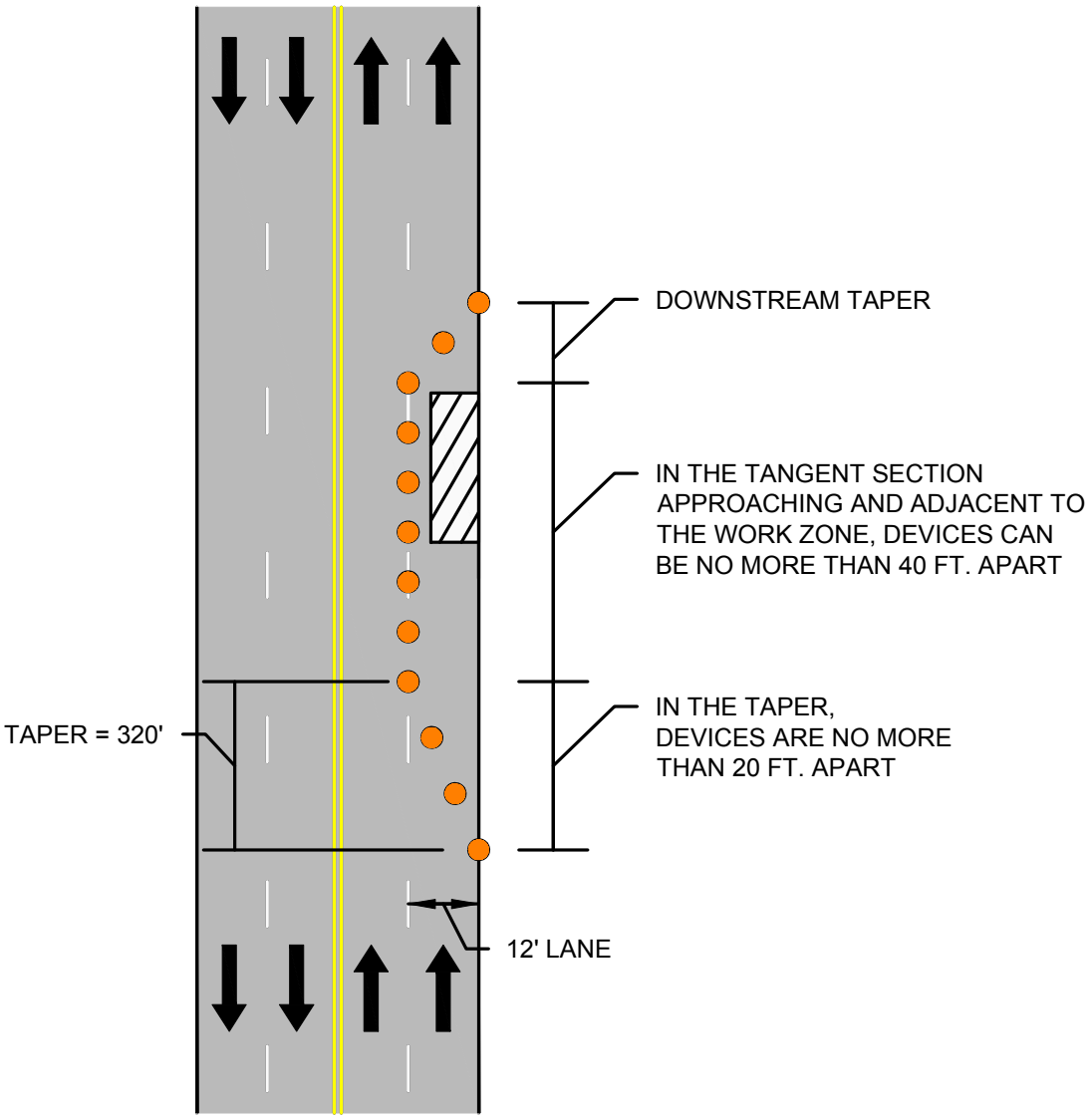
RADAR SPEED FEEDBACK BOARD

POLICE DETAIL OR UNIFORMED FLAGGER

TEMPORARY PORTABLE RUMBLE STRIP

TYPE III BARRICADE

NOT TO SCALE



massDOT Massachusetts Department of Transportation Highway Division PAGE 13	Work Zone Safety Standard Details and Drawings	FIGURE 3 TYPICAL DEVICE SPACING (AT 30 MPH)

Guidance for Flagging Operations

NOTE:
A flagger shall always be aware of their surroundings and have a good escape route. A flagger shall never be positioned directly beside or against construction equipment. When a flagger is required to direct traffic in an area where the escape route is partially blocked by a traversable obstruction such as a guardrail, the flagger shall be physically capable of traversing that obstruction. Prior to commencing a project, the supervisor in charge shall review the project, including guardrail areas, for safe flagging stations. The supervisor in charge shall clearly communicate with the flagger(s), indicating any locations where they cannot safely perform their duties.

Each flagger shall be equipped with the following high visibility clothing, signaling, and safety devices:

1) A white protective hard hat with a minimum level of reflectivity per the requirements of ANSI, Type I, Class E&G;
2) A clean, unfaded, untorn lime/yellow reflective safety vest and pants meeting the requirements of ANSI 107 Class 3 with the words "Traffic Control" on the front and rear panels in minimum two (2) inch (50 millimeter) high letters;
3) A 24 inch "STOP/SLOW" traffic paddle conforming to the requirements of Part 6E.03 of the Manual on Uniform Traffic Control Devices (MUTCD), a weighted, reflectorized red flag, flagger station advance warning signage, and two-way radios capable of providing clear communication within the work zone between flaggers, the Contractor, and the Engineer. The traffic paddle shall be mounted on a pole of sufficient length to be seven feet above the ground as measured from the bottom of the paddle;
4) A working flashlight with a minimum of 15,000 candlepower and a six inch red attachable wand, a whistle with a working lanyard, and a First Aid kit that complies with the requirements of ANSI Z308.1; and
5) An industrial/safety type portable air horn that complies with the requirements of the U.S. Coast Guard.

A "STOP/SLOW" paddle should be the primary hand-signaling device. It shall have an octagonal shape on a rigid handle. Flag use should be limited to emergency situations.

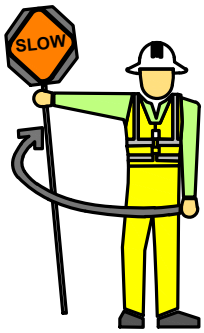
TO STOP TRAFFIC

Properly Trained Flaggers

- Give clear messages to drivers.
- Allow distance for drivers to react.
- Coordinate with other flaggers.
- Use standard signaling methods.

Properly Equipped Flaggers

- Use approved stop/slow paddles.
- Use approved safety apparel.
- Use retroreflective equipment.
- Use hand held radios, as needed.
- All flaggers shall wear safety apparel that meets ANSI Class 3 requirements. The combination of vest and pants is required.



TO LET TRAFFIC PROCEED

Proper Flagging Stations

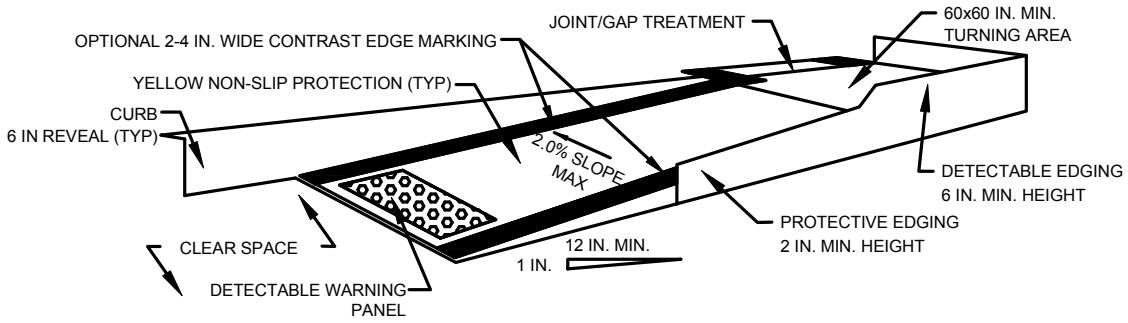
- Good approach sight distance.
- Highly visible to traffic.
- Stand alone away from other machinery and people.
- Stand on right edge of pavement or shoulder- proceed to centerline only when first vehicle has come to stop.
- Have a good escape route.

TO ALERT AND SLOW TRAFFIC

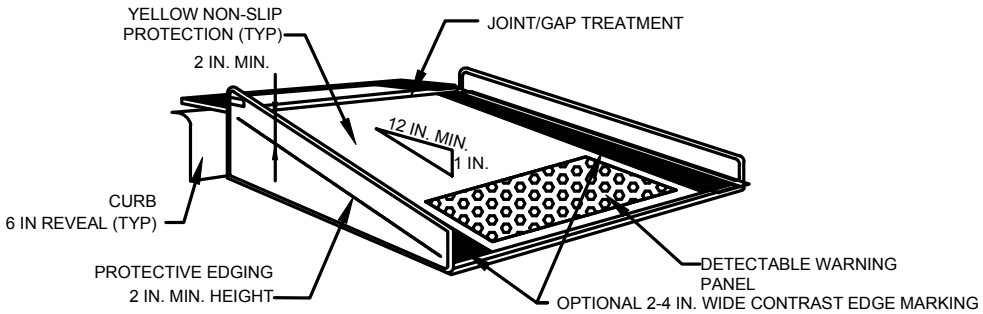
Proper Advance Warning Signs

- Always use warning signs.
- Allow for reaction distance from signs.
- Remove signs if no longer necessary or not flagging.
- Use free hand in up-and-down motion to help slow traffic.

massDOT Massachusetts Department of Transportation Highway Division PAGE 16	Work Zone Safety Standard Details and Drawings	FIGURE 4 TYPICAL PEDESTRIAN DEVICES (1 OF 2) NOT TO SCALE



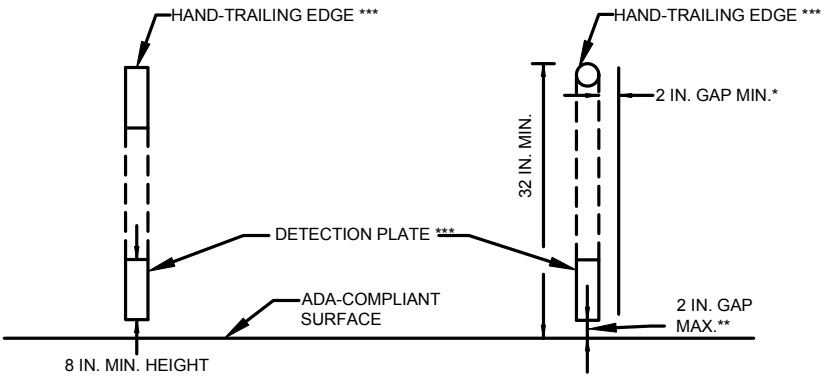
TEMPORARY CURB RAMP-PARALLEL TO CURB



TEMPORARY CURB RAMP-PERPENDICULAR TO CURB

NOTES:

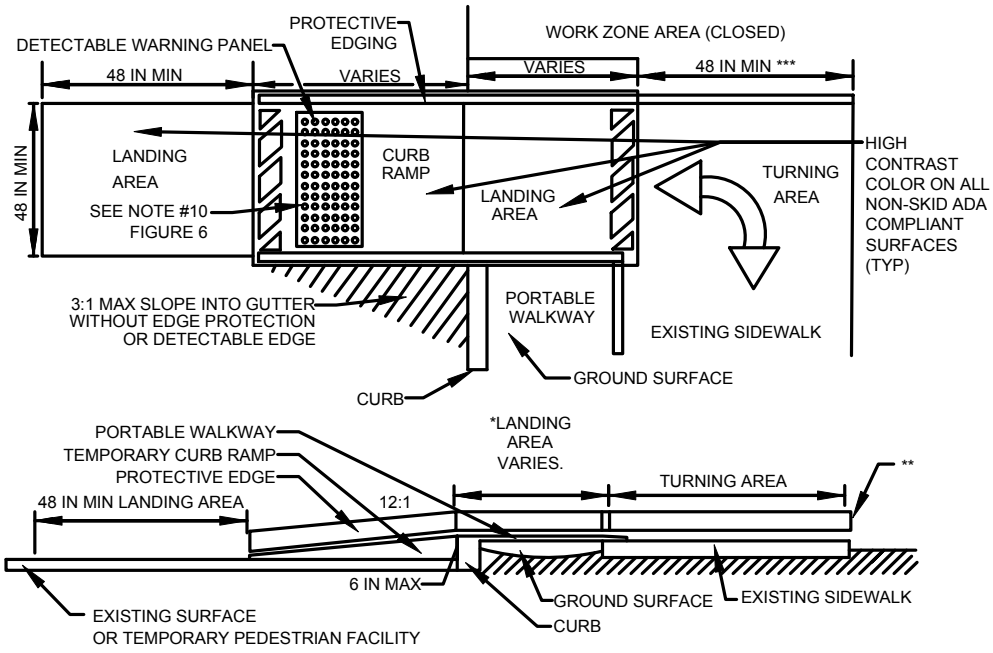
1. CURB RAMPS SHALL BE 60 IN. MINIMUM WIDTH WITH A FIRM, STABLE, AND NON-SLIP SURFACE.
2. PROTECTIVE EDGING WITH A 2 IN. MINIMUM HEIGHT SHALL BE INSTALLED WHEN THE CURB RAMP OR LANDING PLATFORM HAS A VERTICAL DROP OF 6 IN. OR GREATER OR HAS A SIDE APRON SLOP STEEPER THAN 1:3 (33%). PROTECTIVE EDGING SHOULD BE CONSIDERED WHEN THE CURB RAMPS OR LANDING PLATFORMS HAVE A VERTICAL DROP OF 3 IN. OR MORE.
3. PROTECTABLE EDGING WITH 6 IN. MINIMUM HEIGHT AND CONTRASTING COLOR SHALL BE INSTALLED ON ALL CURB RAMP LANDINGS WHERE THE WALKWAY CHANGES DIRECTION (TURNS).
4. THE CURB RAMP WALKWAY AND LANDING AREA SURFACE SHALL BE OF A SOLID CONTINUOUS CONTRASTING COLOR ABUTTING UP TO THE EXISTING SIDEWALK.
5. CURB RAMPS AND LANDINGS SHOULD HAVE A 1:50 (2%) MAX CROSS-SLOPE.
6. CLEAR SPACE OF 48x48 IN. MINIMUM SHALL BE PROVIDED ABOVE AND BELOW THE CURB RAMP.
7. WATER FLOW IN THE GUTTER SYSTEM SHALL HAVE MINIMAL RESTRICTION.
8. LATERAL JOINTS OR GAPS BETWEEN SURFACES SHALL BE LESS THAN 0.5 IN. WIDTH.
9. CHANGES BETWEEN SURFACE HEIGHTS SHOULD NOT EXCEED 0.5 IN. LATERAL EDGES SHOULD BE VERTICAL UP TO 0.25 IN. HIGH, AND BEVELED AT 1:2 BETWEEN 0.25 IN. AND 0.5 IN. HEIGHT.
10. IF A TEMPORARY PEDESTRIAN RAMP LEADS TO A CROSSWALK, THEN A DETECTABLE WARNING PAD MUST BE ADHERED TO THE BASE OF THE RAMP. IF IT LEADS TO A PROTECTED PEDESTRIAN BYPASS THAT DOES NOT CONFLICT WITH VEHICULAR TRAFFIC, THEN A PAD SHALL NOT BE INSTALLED ON THE RAMP.



CROSS SECTION VIEW

PEDESTRIAN CHANNELIZING DEVICE

* THERE SHALL BE A 2 INCH GAP BETWEEN THE HAND-TRAILING EDGE AND ITS SUPPORT.
** A MAXIMUM 2 INCH GAP BETWEEN THE BOTTOM OF THE BOTTOM RAIL AND THE SURFACE MAY BE USED TO PROVIDE DRAINAGE.
*** THE HAND-TRAILING EDGE AND DETECTION PLATE SHALL BE CONTINUOUS THROUGHOUT THE LENGTH OF THE PATH SUCH THAT A PEDESTRIAN USER WITH A LONG CANE CAN FOLLOW IT.



TEMPORARY CURB RAMP

* LANDING AREA USED TO OVERLAP NON-ADA COMPLIANT SURFACES.
** DETECTABLE EDGE REMOVED IF A CONTINUOUS SIDEWALK.
*** 60 IN. IF AN OBSTRUCTION IS AT BACK OF SIDEWALK.

massDOT Massachusetts Department of Transportation Highway Division

PAGE 17

Work Zone Safety Standard Details and Drawings

FIGURE 5
TYPICAL PEDESTRIAN DEVICES
(2 OF 2)
NOT TO SCALE

massDOT Massachusetts Department of Transportation Highway Division PAGE 18	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS TWO LANE UNDIVIDED ROADWAY HALF OF ROADWAY CLOSED WORK NEAR CURVE

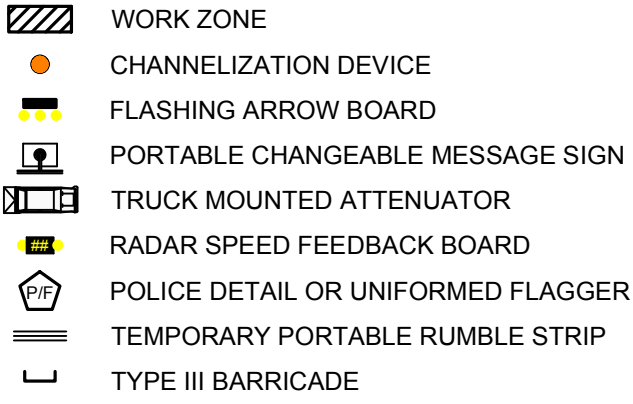
POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)	CHANNELIZATION DEVICES (DRUMS OR CONES)			
		TRAVEL LANE CLOSURE LENGTH (L) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	500 / 500 / 500	50	100	20	30
45-55	500 / 1000 / 1000	100	150	40	20

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

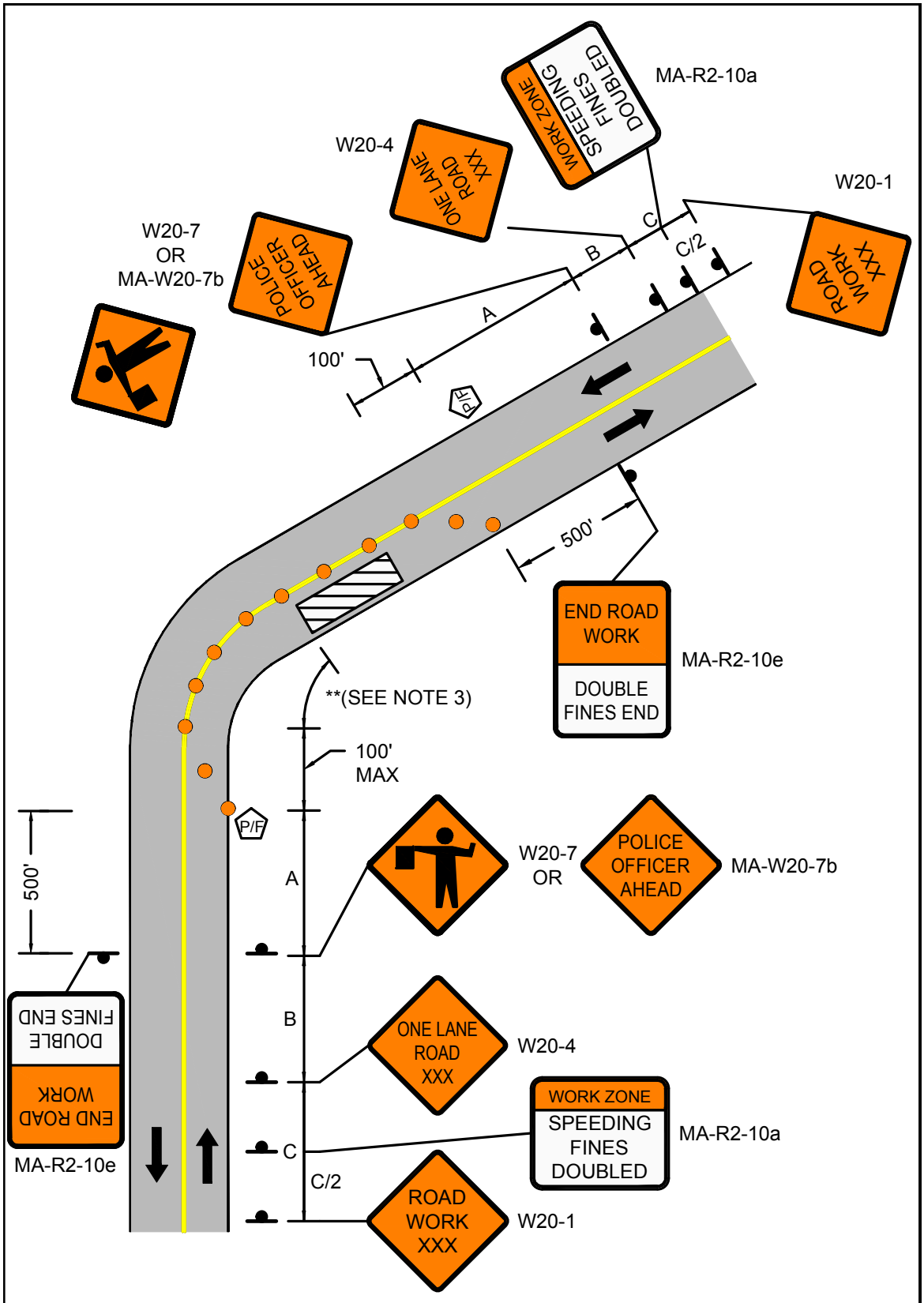
NOTES

1. IF POLICE DETAIL/UNIFORMED FLAGGER SUPPORT IS REQUIRED, PROVIDE TWO UNITS.
2. MA-R2-10a LOCATED AT C/2.
3. ** = EXTEND ENOUGH SO TAPER IS BEFORE CURVE

LEGEND



NOT TO SCALE



massDOT Massachusetts Department of Transportation Highway Division PAGE 19	Work Zone Safety Standard Details and Drawings	FIGURE 6 STATIONARY OPERATIONS TWO LANE UNDIVIDED ROADWAY HALF OF ROADWAY CLOSED WORK NEAR CURVE

massDOT Massachusetts Department of Transportation Highway Division PAGE 20	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS TWO LANE UNDIVIDED ROADWAY HALF OF ROADWAY CLOSED

POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)	CHANNELIZATION DEVICES (DRUMS OR CONES)			
		TRAVEL LANE CLOSURE LENGTH (L) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	500 / 500 / 500	50	100	20	30
45-55	500 / 1000 / 1000	100	150	40	20

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

POSTED REGULATORY OR WORK ZONE SPEED	SEPARATION BETWEEN RUMBLE STRIPS
36-mph to 55-mph	15-feet
35-mph and under	10-feet

NOTES

1. IF POLICE DETAIL/UNIFORMED FLAGGER SUPPORT IS REQUIRED, PROVIDE TWO UNITS.
2. MA-R2-10a LOCATED AT C/2.
3. ** OPTIONAL AT THE ENGINEER'S DISCRETION.
4. *** SHALL BE DEPLOYED IF RUMBLE STRIPS ARE PRESENT.

LEGEND


WORK ZONE


CHANNELIZATION DEVICE

FLASHING ARROW BOARD


PORTABLE CHANGEABLE MESSAGE SIGN


TRUCK MOUNTED ATTENUATOR

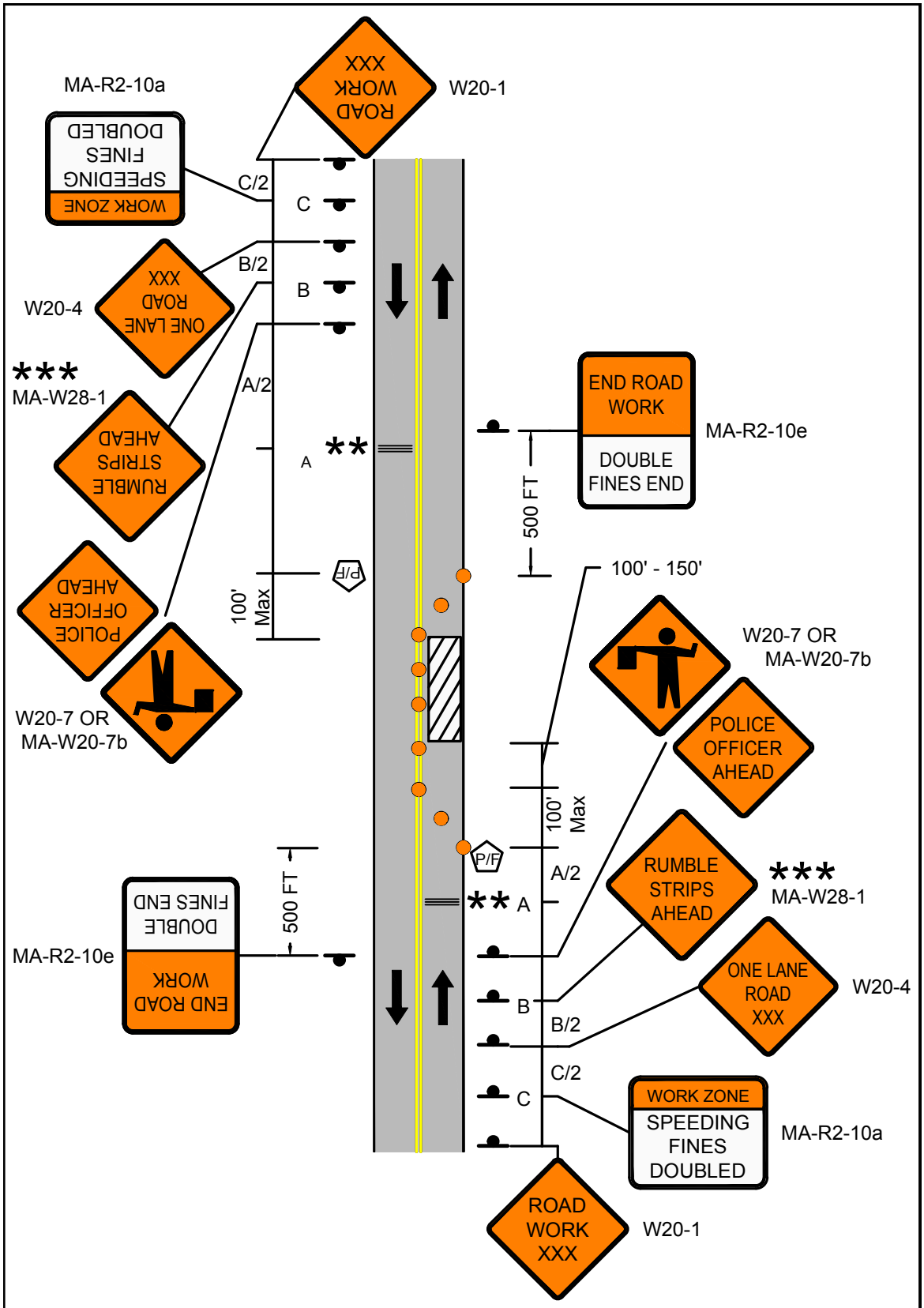
RADAR SPEED FEEDBACK BOARD

POLICE DETAIL OR UNIFORMED FLAGGER

TEMPORARY PORTABLE RUMBLE STRIP

TYPE III BARRICADE

NOT TO SCALE



massDOT Massachusetts Department of Transportation Highway Division PAGE 21	Work Zone Safety Standard Details and Drawings	FIGURE 7 STATIONARY OPERATIONS TWO LANE UNDIVIDED ROADWAY HALF OF ROADWAY CLOSED

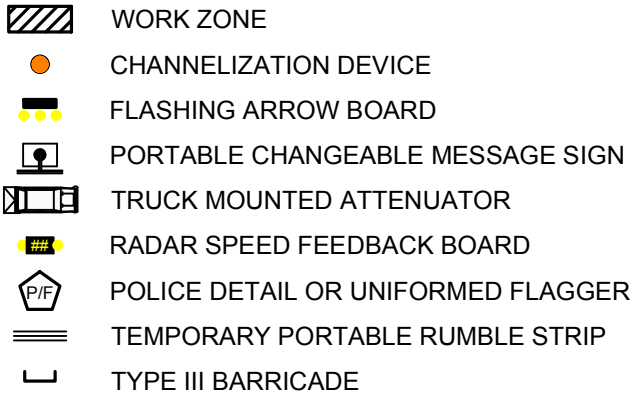
massDOT Massachusetts Department of Transportation Highway Division PAGE 22	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS TWO LANE UNDIVIDED ROADWAY SHOULDER CLOSED

POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)	CHANNELIZATION DEVICES (DRUMS OR CONES)			
		SHOULDER TAPER LENGTH (L/3) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	500 / 500 / 500	110	305	20	45
45-55	500 / 1000 / 1000	220	495	40	30
60-65	1000 / 1600 / 2600	260	645	40	35

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

NOTES
1. MA-R2-10a at C/2 and A/2.

LEGEND



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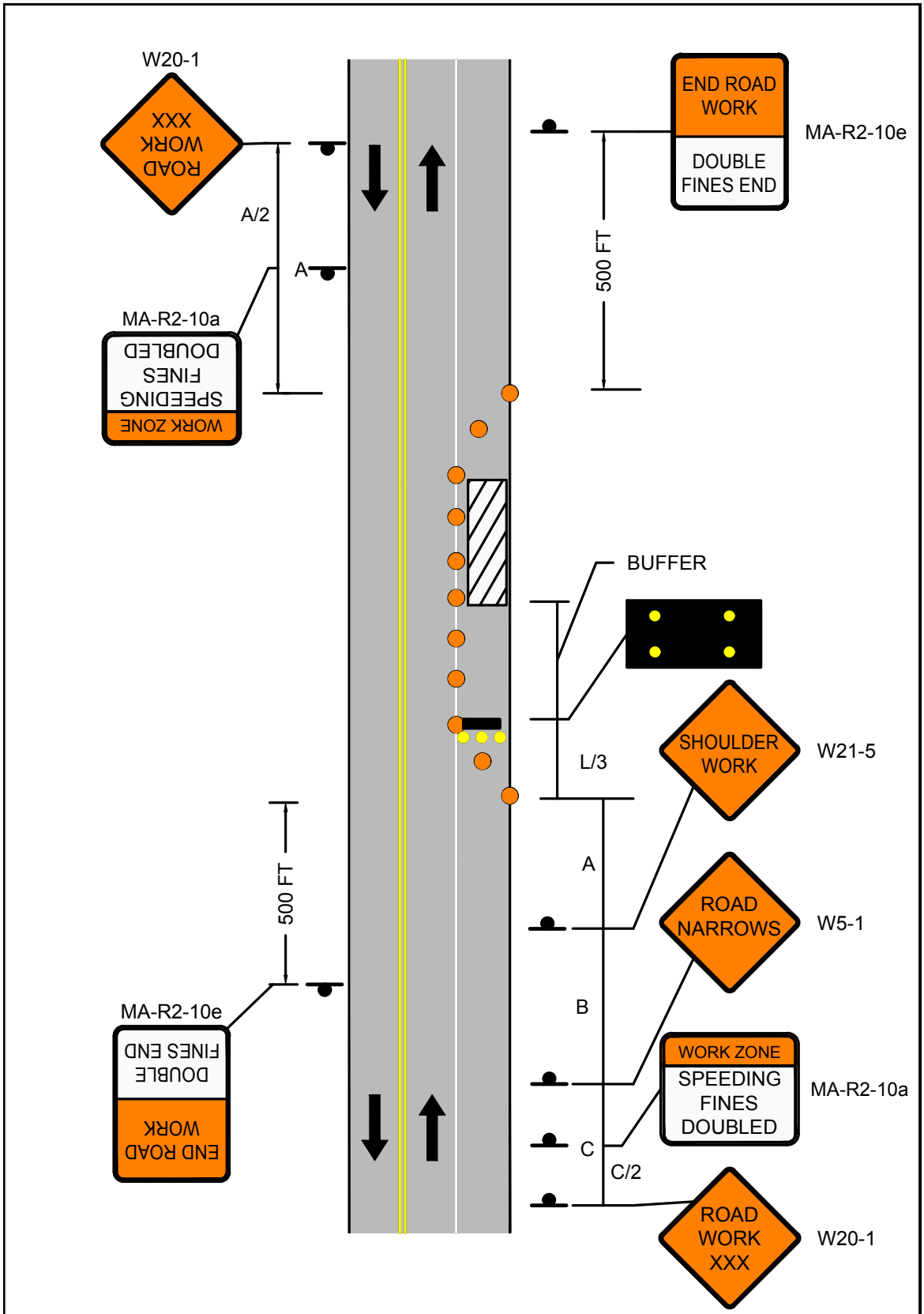


massDOT Massachusetts Department of Transportation Highway Division PAGE 23	Work Zone Safety Standard Details and Drawings	FIGURE 8 STATIONARY OPERATIONS TWO LANE UNDIVIDED ROADWAY SHOULDER CLOSED

massDOT Massachusetts Department of Transportation Highway Division PAGE 24	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS TWO LANE UNDIVIDED ROADWAY WITH TRAVERSABLE SHOULDER HALF OF ROADWAY CLOSED MAINTAIN TWO-WAY TRAFFIC

POSTED SPEED LIMIT (MPH)	CHANNELIZATION DEVICES (DRUMS OR CONES)				
	SHOULDER TAPER LENGTH (L/3) (FT)	TRAVEL LANE SHIFT LENGTH (L/2) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	110	160	305	20	125
45-55	220	330	495	40	100
60-65	260	390	645	40	115

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)
25-40	500 / 500 / 500
45-55	500 / 1000 / 1000
60-65	1000 / 1600 / 2600

NOTES

1. MA-R2-10a LOCATED AT C/2.

LEGEND


WORK ZONE


CHANNELIZATION DEVICE

FLASHING ARROW BOARD


PORTABLE CHANGEABLE MESSAGE SIGN


TRUCK MOUNTED ATTENUATOR

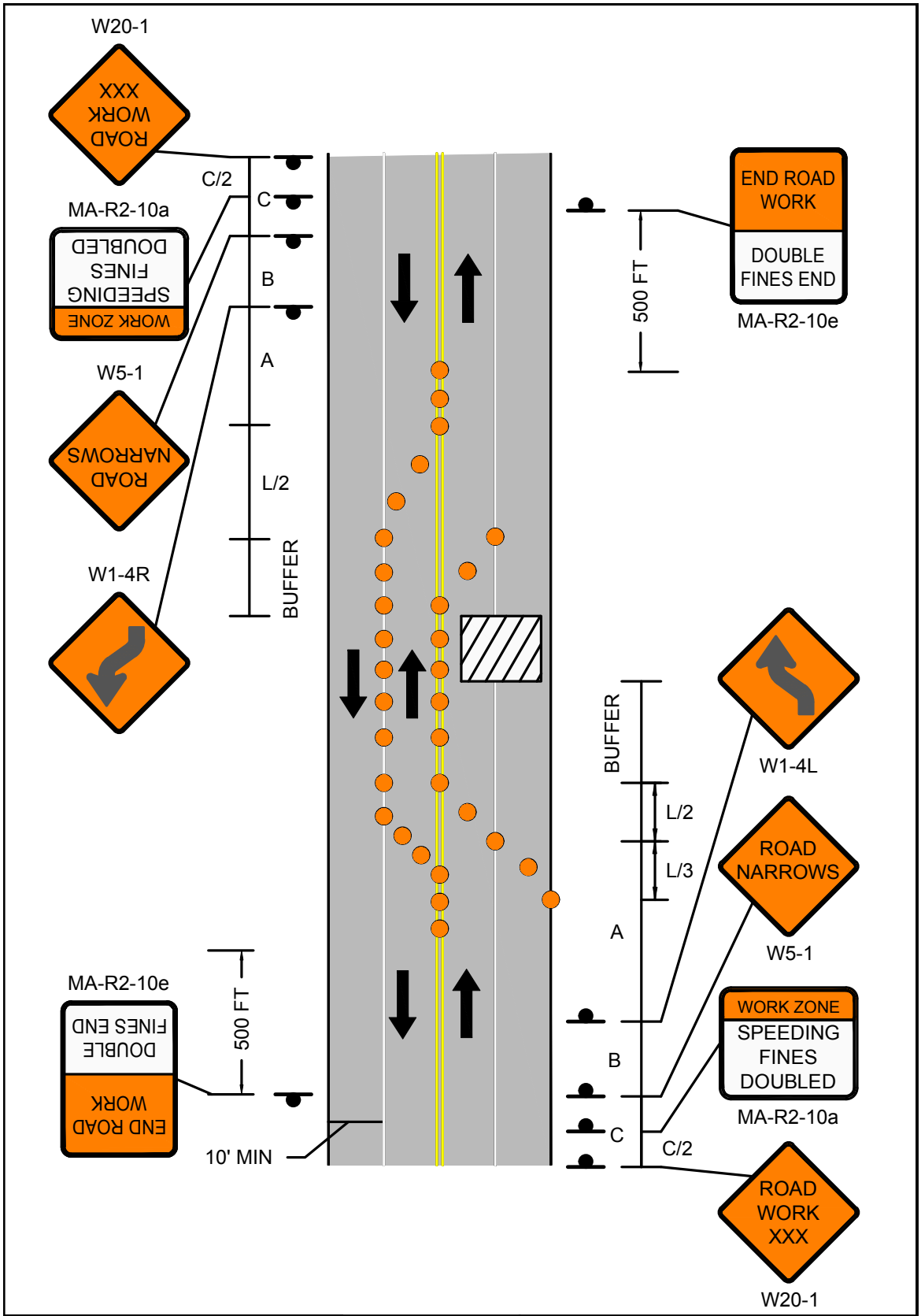
RADAR SPEED FEEDBACK BOARD

POLICE DETAIL OR UNIFORMED FLAGGER

TEMPORARY PORTABLE RUMBLE STRIP

TYPE III BARRICADE

NOT TO SCALE



massDOT Massachusetts Department of Transportation Highway Division

PAGE 25

Work Zone Safety Standard Details and Drawings

FIGURE 9
STATIONARY OPERATIONS
TWO LANE UNDIVIDED ROADWAY
WITH TRAVERSABLE SHOULDER
HALF OF ROADWAY CLOSED
MAINTAIN TWO-WAY TRAFFIC

massDOT Massachusetts Department of Transportation Highway Division PAGE 26	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS FOUR LANE UNDIVIDED ROADWAY RIGHT LANE CLOSED

POSTED SPEED LIMIT (MPH)	CHANNELATION DEVICES (DRUMS OR CONES)				
	SHOULDER TAPER LENGTH (L/3) (FT)	TRAVEL LANE CLOSURE LENGTH (L) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	110	320	305	20	60
45-55	220	660	495	40	50
60-65	260	780	645	40	55

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)
25-40	500 / 500 / 500
45-55	500 / 1000 / 1000
60-65	1000 / 1600 / 2600

NOTES

1. MA-R2-10a LOCATED AT A/2 AND C/2.
2. ** OPTIONAL AT THE ENGINEER'S DISCRETION.

LEGEND


WORK ZONE


CHANNELIZATION DEVICE

FLASHING ARROW BOARD


PORTABLE CHANGEABLE MESSAGE SIGN


TRUCK MOUNTED ATTENUATOR

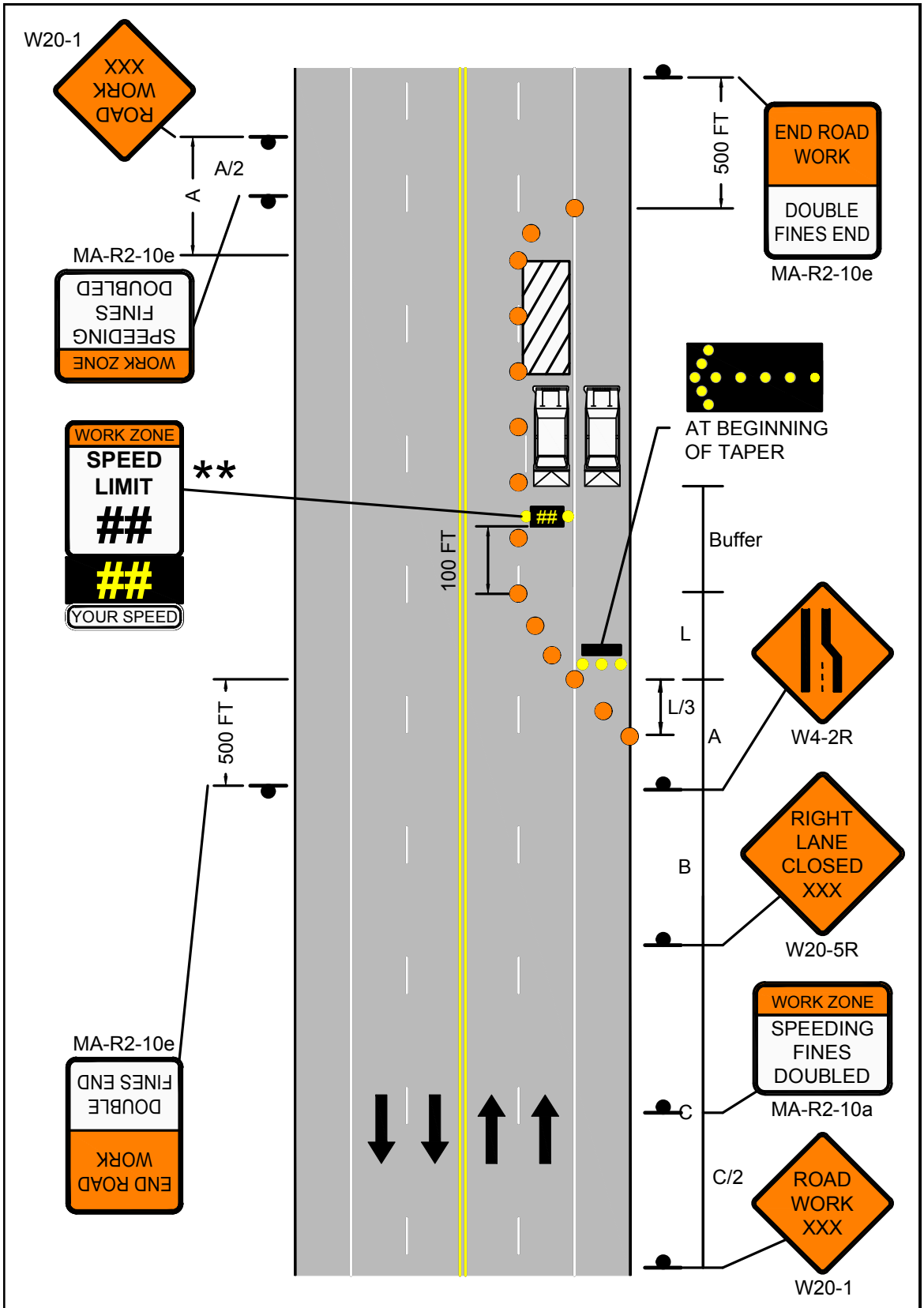
RADAR SPEED FEEDBACK BOARD

POLICE DETAIL OR UNIFORMED FLAGGER

TEMPORARY PORTABLE RUMBLE STRIP

TYPE III BARRICADE

NOT TO SCALE



massDOT Massachusetts Department of Transportation Highway Division PAGE 27	Work Zone Safety Standard Details and Drawings	FIGURE 10 STATIONARY OPERATIONS FOUR LANE UNDIVIDED ROADWAY RIGHT LANE CLOSED

massDOT Massachusetts Department of Transportation Highway Division PAGE 28	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS FOUR LANE UNDIVIDED ROADWAY LEFT LANE CLOSED

POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)	CHANNELIZATION DEVICES (DRUMS OR CONES)			
		TRAVEL LANE CLOSURE LENGTH (L) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	500 / 500 / 500	320	305	20	105
45-55	500 / 1000 / 1000	660	495	40	80
60-65	1000 / 1600 / 2600	780	645	40	100

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

NOTES

1. MA-R2-10a LOCATED AT A/2 AND C/2.
2. ** OPTIONAL AT THE ENGINEER'S DISCRETION. 2' OFFSET FROM EDGE OF TRAVEL LANE TO RADAR SPEED FEEDBACK BOARD IS REQUIRED. BOARD MAY BE MOVED FULLY OR PARTIALLY OFF PAVED SHOULDER, IF REQUIRED.

LEGEND


WORK ZONE


CHANNELIZATION DEVICE

FLASHING ARROW BOARD


PORTABLE CHANGEABLE MESSAGE SIGN


TRUCK MOUNTED ATTENUATOR

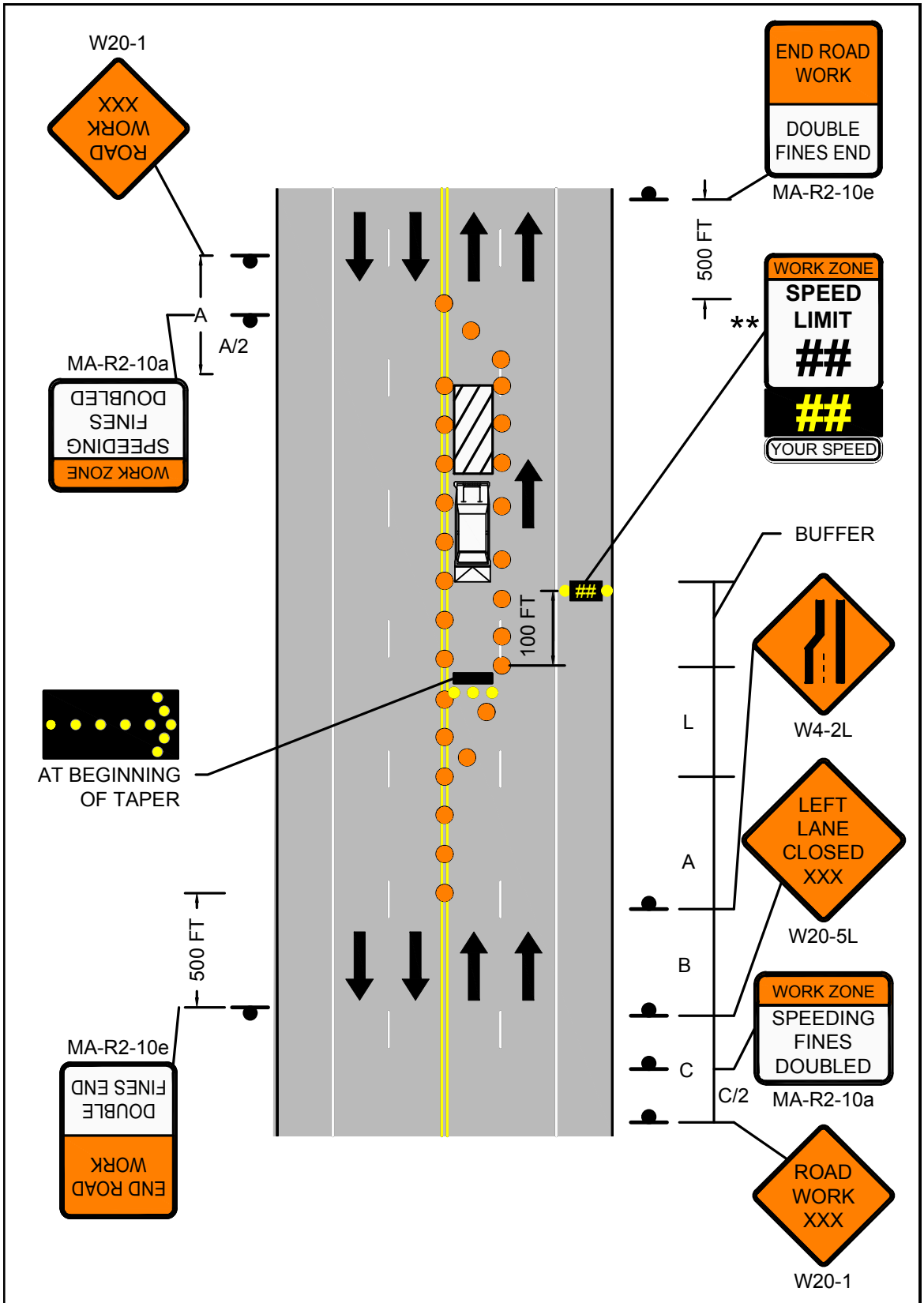
RADAR SPEED FEEDBACK BOARD

POLICE DETAIL OR UNIFORMED FLAGGER

TEMPORARY PORTABLE RUMBLE STRIP

TYPE III BARRICADE

NOT TO SCALE



massDOT Massachusetts Department of Transportation Highway Division PAGE 29	Work Zone Safety Standard Details and Drawings	FIGURE 11 STATIONARY OPERATIONS FOUR LANE UNDIVIDED ROADWAY LEFT LANE CLOSED

massDOT Massachusetts Department of Transportation Highway Division PAGE 30	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS FOUR LANE UNDIVIDED ROADWAY HALF OF ROADWAY CLOSED

POSTED SPEED LIMIT (MPH)	CHANNELIZATION DEVICES (DRUMS OR CONES)					
	SHOULDER TAPER LENGTH (L/3) (FT)	TRAVEL LANE CLOSURE LENGTH (L) (FT)	TRAVEL LANE SHIFT LENGTH (L/2) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	110	320	160	305	20	140
45-55	220	660	330	495	40	120
60-65	260	780	390	645	40	140

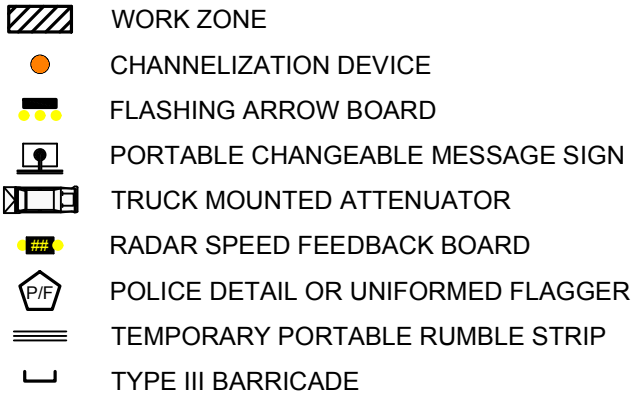
* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)
25-40	500 / 500 / 500
45-55	500 / 1000 / 1000
60-65	1000 / 1600 / 2600

NOTES

1. MA-R2-10a LOCATED AT C/2.
2. ** OPTIONAL AT THE ENGINEER'S DISCRETION.
3. W1-4L SHALL BE PLACED AT THE MIDDLE OF THE TANGENT.

LEGEND



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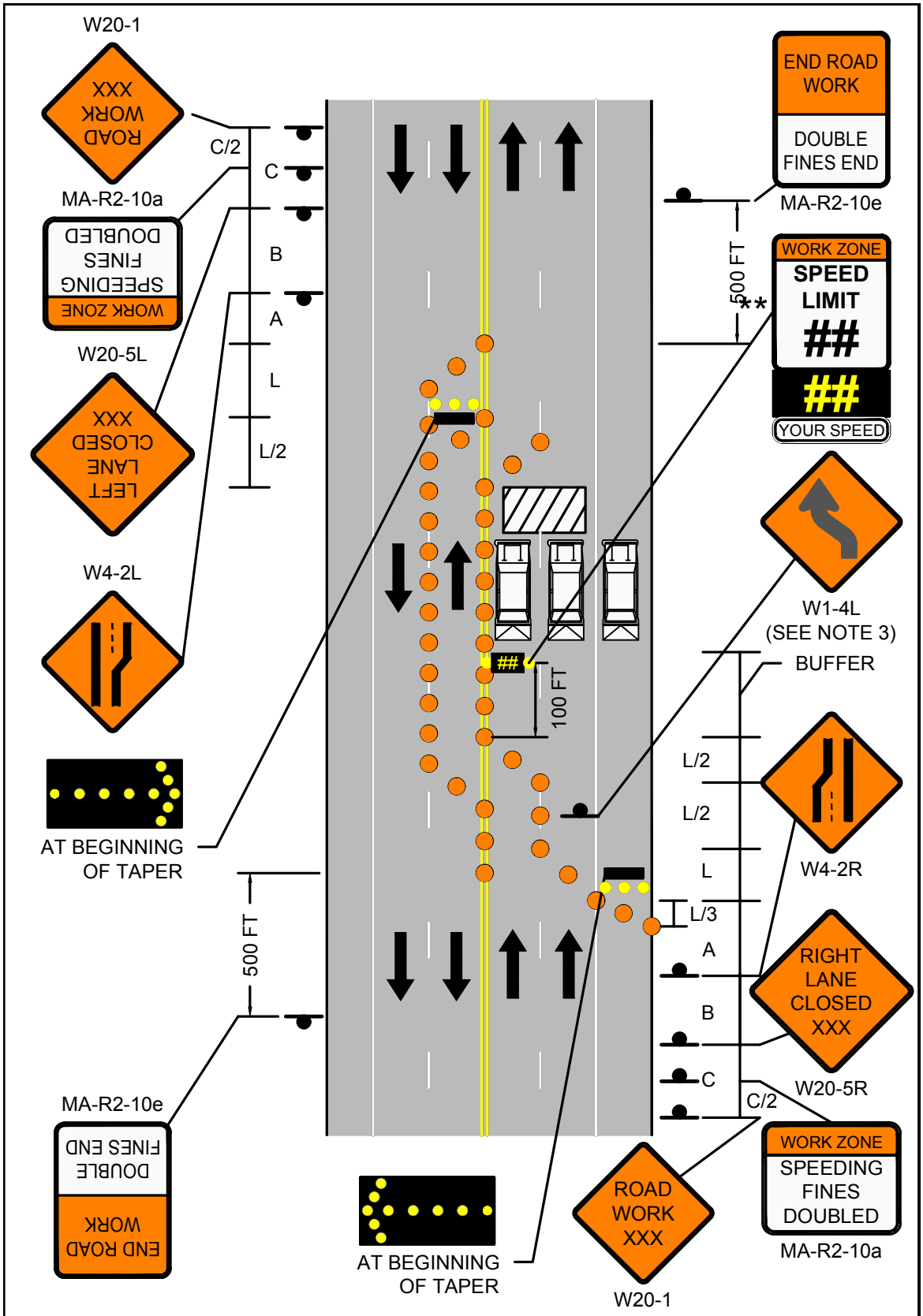


massDOT Massachusetts Department of Transportation Highway Division PAGE 31	Work Zone Safety Standard Details and Drawings	FIGURE 12 STATIONARY OPERATIONS FOUR LANE UNDIVIDED ROADWAY HALF OF ROADWAY CLOSED

massDOT Massachusetts Department of Transportation Highway Division PAGE 32	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY RIGHT LANE CLOSED

POSTED SPEED LIMIT (MPH)	CHANNELIZATION DEVICES (DRUMS OR CONES)				
	SHOULDER TAPER LENGTH (L/3) (FT)	TRAVEL LANE CLOSURE LENGTH (L) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	110	320	305	20	60
45-55	220	660	495	40	50
60-65	260	780	645	40	55

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)
25-40	500 / 500 / 500
45-55	500 / 1000 / 1000
60-65	1000 / 1600 / 2600

NOTES

1. MA-R2-10a LOCATED AT C/2.
2. ** OPTIONAL AT THE ENGINEER'S DISCRETION.

LEGEND


WORK ZONE


CHANNELIZATION DEVICE

FLASHING ARROW BOARD


PORTABLE CHANGEABLE MESSAGE SIGN


TRUCK MOUNTED ATTENUATOR

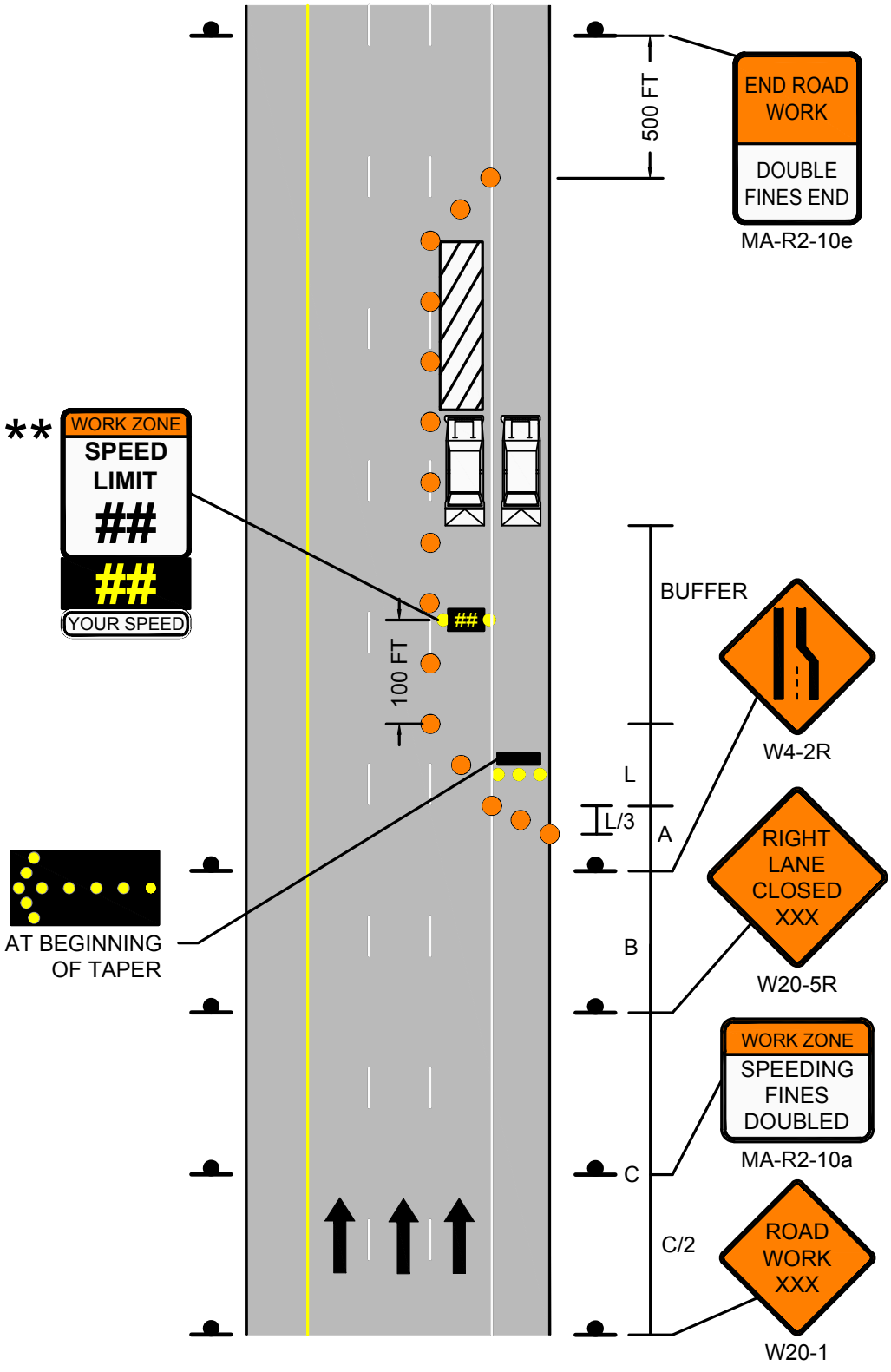
RADAR SPEED FEEDBACK BOARD

POLICE DETAIL OR UNIFORMED FLAGGER

TEMPORARY PORTABLE RUMBLE STRIP

TYPE III BARRICADE

NOT TO SCALE



massDOT Massachusetts Department of Transportation Highway Division PAGE 33	Work Zone Safety Standard Details and Drawings	FIGURE 13 STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY RIGHT LANE CLOSED

massDOT Massachusetts Department of Transportation Highway Division PAGE 34	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY LEFT LANE CLOSED

POSTED SPEED LIMIT (MPH)	CHANNELIZATION DEVICES (DRUMS OR CONES)				
	SHOULDER TAPER LENGTH (L/3) (FT)	TRAVEL LANE CLOSURE LENGTH (L) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	110	320	305	20	60
45-55	220	660	495	40	50
60-65	260	780	645	40	55

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)
25-40	500 / 500 / 500
45-55	500 / 1000 / 1000
60-65	1000 / 1600 / 2600

NOTES

1. MA-R2-10a LOCATED AT C/2.
2. ** OPTIONAL AT THE ENGINEER'S DISCRETION.

LEGEND


WORK ZONE


CHANNELIZATION DEVICE

FLASHING ARROW BOARD


PORTABLE CHANGEABLE MESSAGE SIGN


TRUCK MOUNTED ATTENUATOR

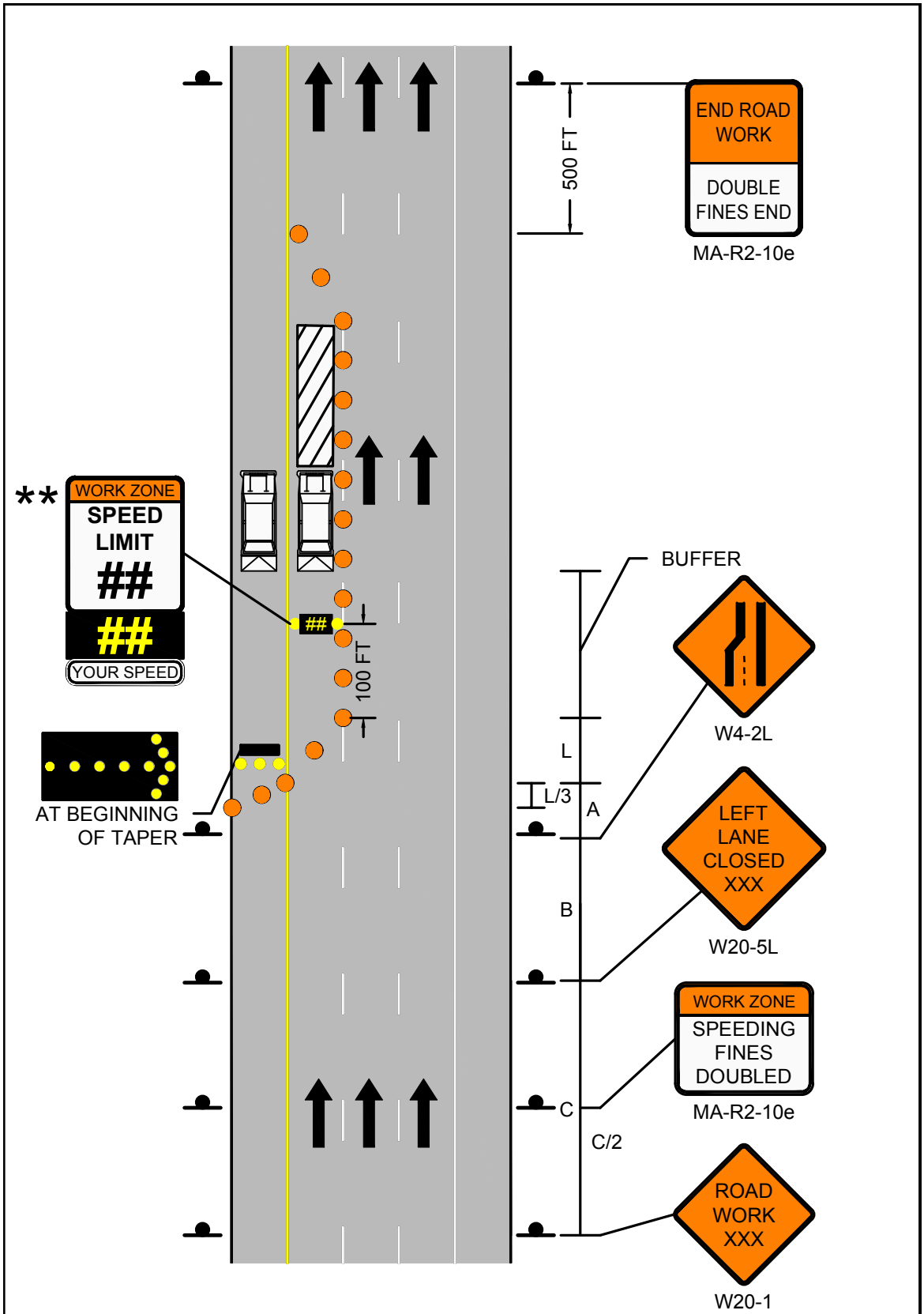
RADAR SPEED FEEDBACK BOARD

POLICE DETAIL OR UNIFORMED FLAGGER

TEMPORARY PORTABLE RUMBLE STRIP

TYPE III BARRICADE

NOT TO SCALE



massDOT Massachusetts Department of Transportation Highway Division PAGE 35	Work Zone Safety Standard Details and Drawings	FIGURE 14 STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY LEFT LANE CLOSED

massDOT Massachusetts Department of Transportation Highway Division PAGE 36	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY CENTER LANE OR RIGHT/CENTER LANES CLOSED

POSTED SPEED LIMIT (MPH)	CHANNELIZATION DEVICES (DRUMS OR CONES)					
	SHOULDER TAPER LENGTH (L/3) (FT)	TRAVEL LANE CLOSURE LENGTH (L) (FT)	TANGENT LENGTH BETWEEN TAPERS T (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	110	320	640	305	20	110
45-55	220	660	1320	495	40	100
60-65	260	780	1560	645	40	115

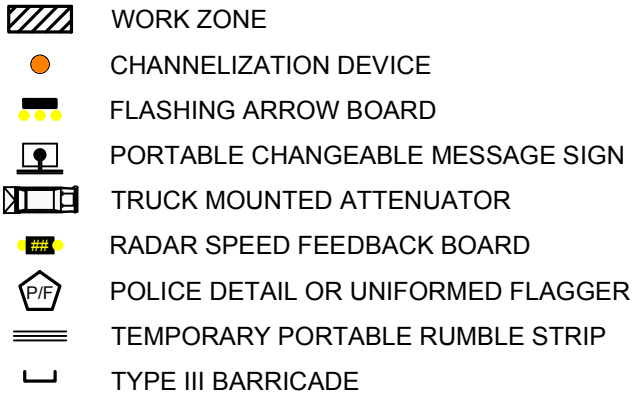
* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)
25-40	500 / 500 / 500
45-55	500 / 1000 / 1000
60-65	1000 / 1600 / 2600

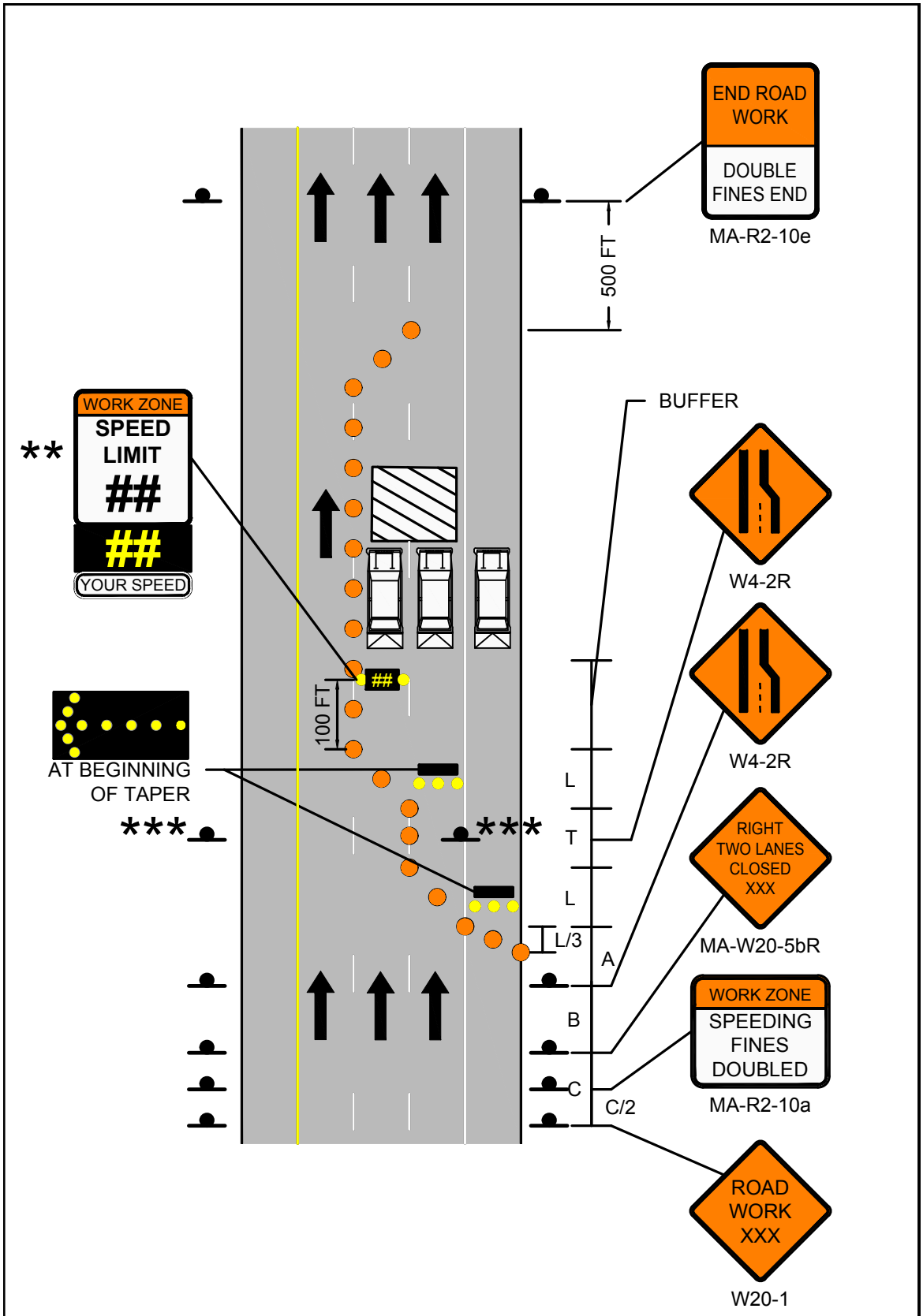
NOTES

1. MA-R2-10a LOCATED AT C/2.
2. ** OPTIONAL AT THE ENGINEER'S DISCRETION.
3. *** THIS SET OF SIGNS SHALL BE LOCATED AT T/2.

LEGEND



NOT TO SCALE



massDOT Massachusetts Department of Transportation Highway Division PAGE 37	Work Zone Safety Standard Details and Drawings	FIGURE 15 STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY CENTER LANE OR RIGHT/CENTER LANES CLOSED

massDOT Massachusetts Department of Transportation Highway Division PAGE 38	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY CENTER LANE OR LEFT/CENTER LANES CLOSED

POSTED SPEED LIMIT (MPH)	CHANNELIZATION DEVICES (DRUMS OR CONES)					
	SHOULDER TAPER LENGTH (L/3) (FT)	TRAVEL LANE CLOSURE LENGTH (L) (FT)	TANGENT LENGTH BETWEEN TAPERS T (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	110	320	640	305	20	110
45-55	220	660	1320	495	40	100
60-65	260	780	1560	645	40	115

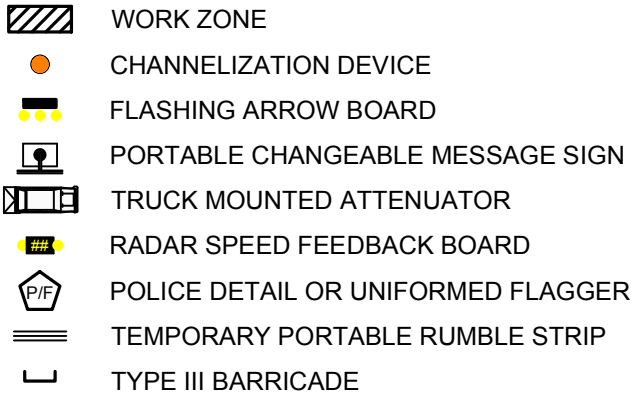
* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)
25-40	500 / 500 / 500
45-55	500 / 1000 / 1000
60-65	1000 / 1600 / 2600

NOTES

1. MA-R2-10a LOCATED AT C/2.
2. ** OPTIONAL AT THE ENGINEER'S DISCRETION.
3. *** THIS SET OF SIGNS SHALL BE LOCATED AT T/2.

LEGEND



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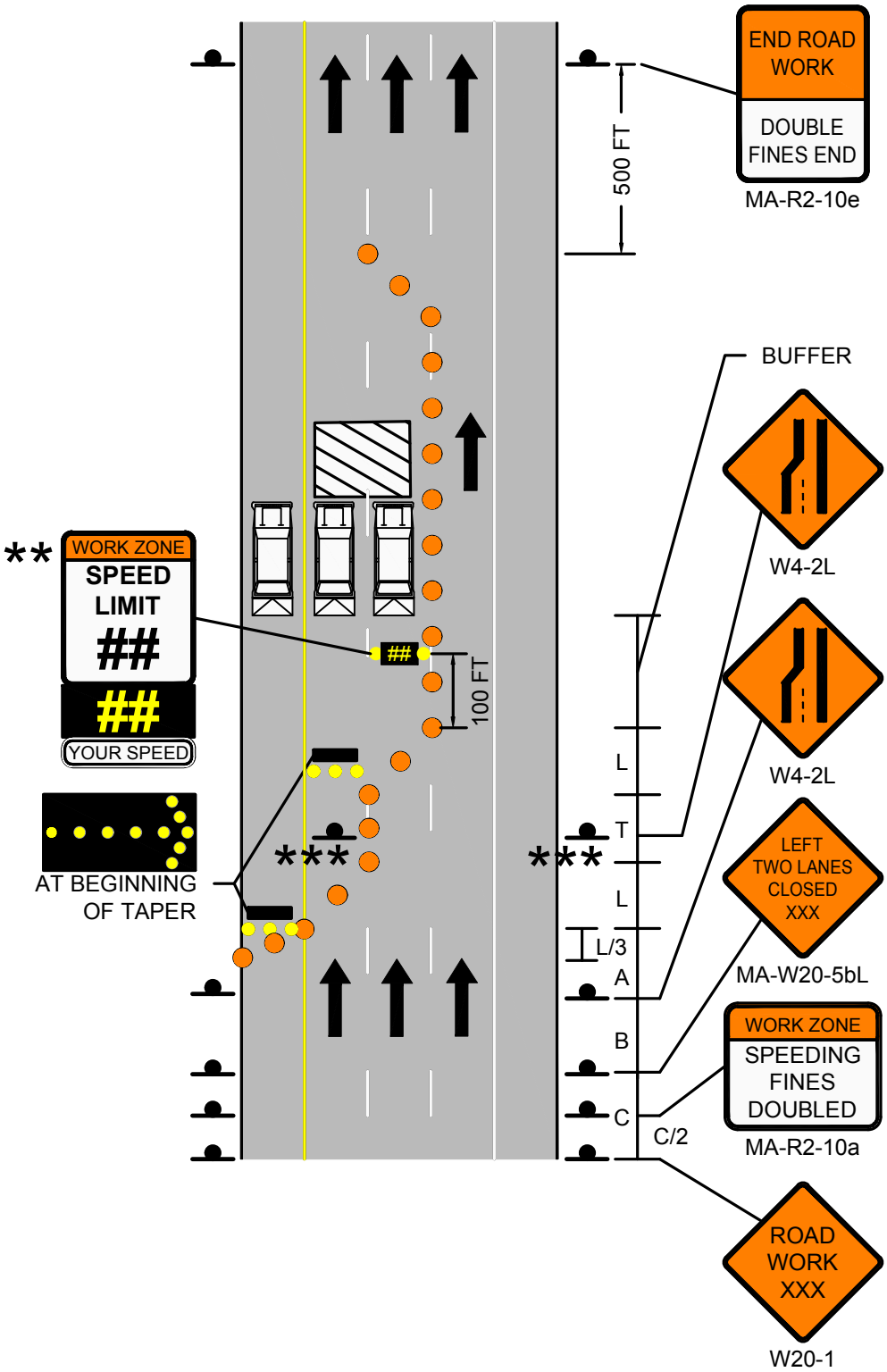


massDOT Massachusetts Department of Transportation Highway Division PAGE 39	Work Zone Safety Standard Details and Drawings	FIGURE 16 STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY CENTER LANE OR LEFT/CENTER LANES CLOSED

massDOT Massachusetts Department of Transportation Highway Division PAGE 40	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY RIGHT SIDE OF OFF RAMP CLOSED

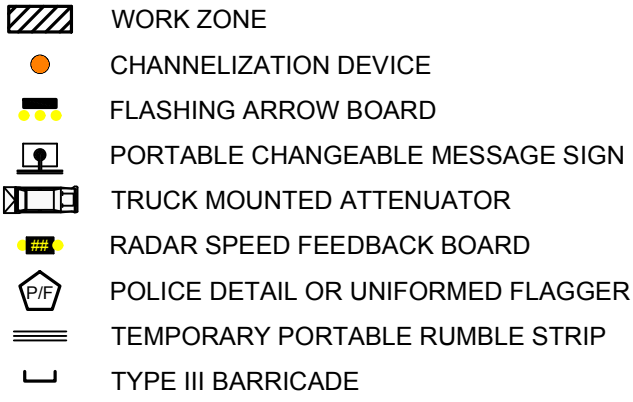
POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)	CHANNELIZATION DEVICES (DRUMS OR CONES)			
		TRAVEL LANE SHIFT LENGTH (L/2) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	500 / 500 / 500	160	305	20	45
45-55	500 / 1000 / 1000	330	495	40	35

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

NOTES

1. MA-R2-10a LOCATED AT C/2.

LEGEND



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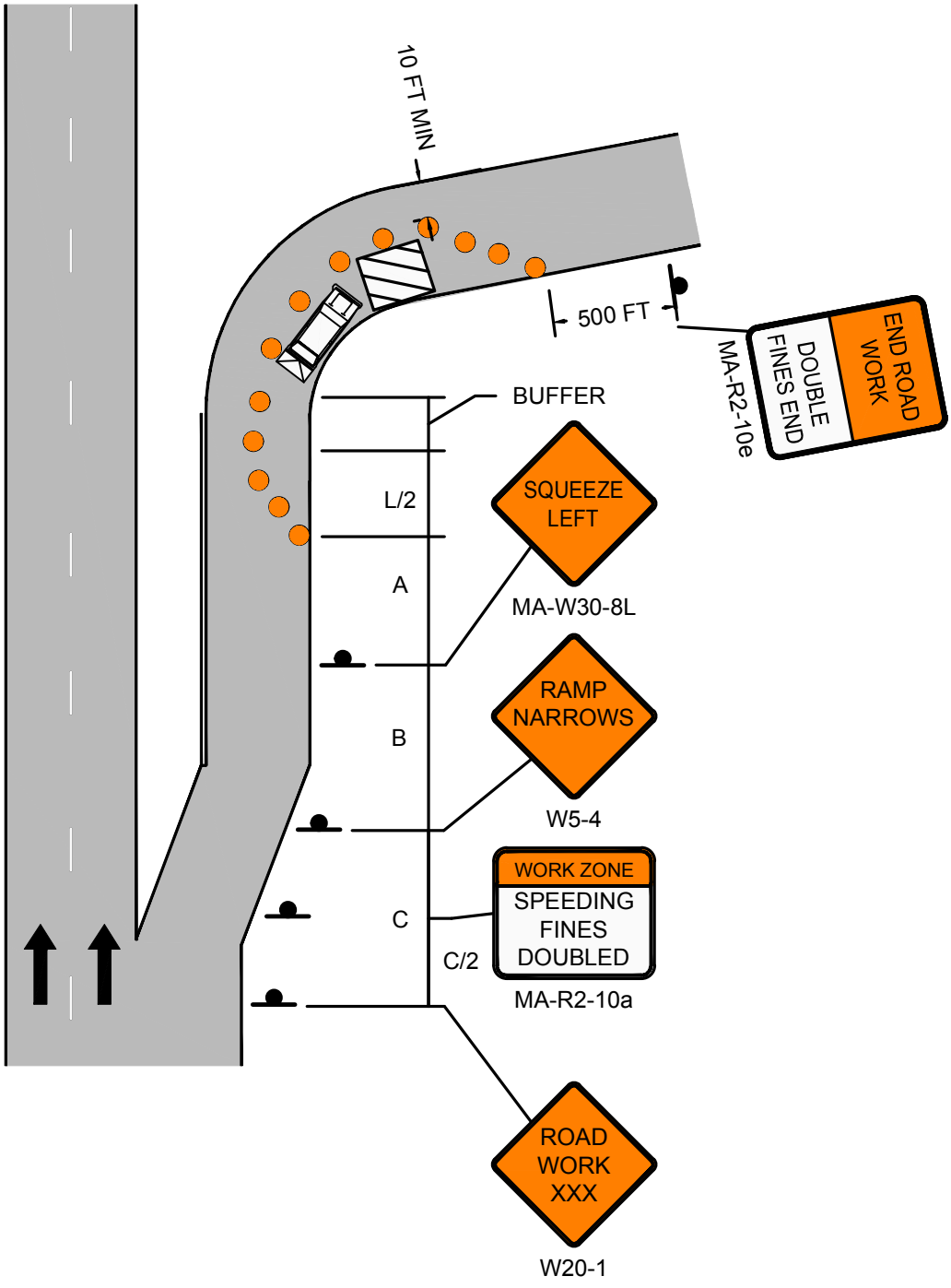


massDOT Massachusetts Department of Transportation Highway Division PAGE 41	Work Zone Safety Standard Details and Drawings	FIGURE 17 STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY RIGHT SIDE OF OFF RAMP CLOSED

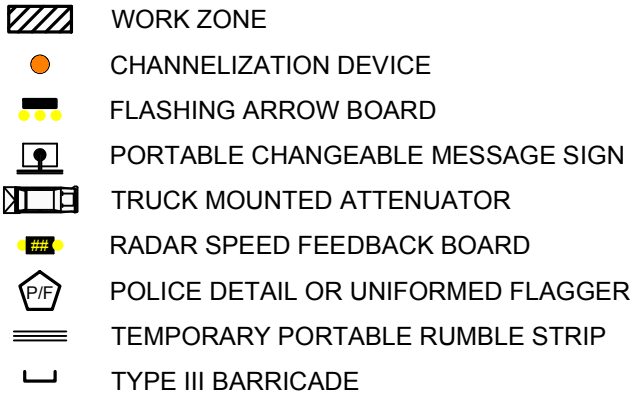
massDOT Massachusetts Department of Transportation Highway Division PAGE 42	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY LEFT SIDE OF OFF RAMP CLOSED

POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)	CHANNELIZATION DEVICES (DRUMS OR CONES)			
		TRAVEL LANE SHIFT LENGTH (L/2) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	500 / 500 / 500	160	305	20	45
45-55	500 / 1000 / 1000	330	495	40	35

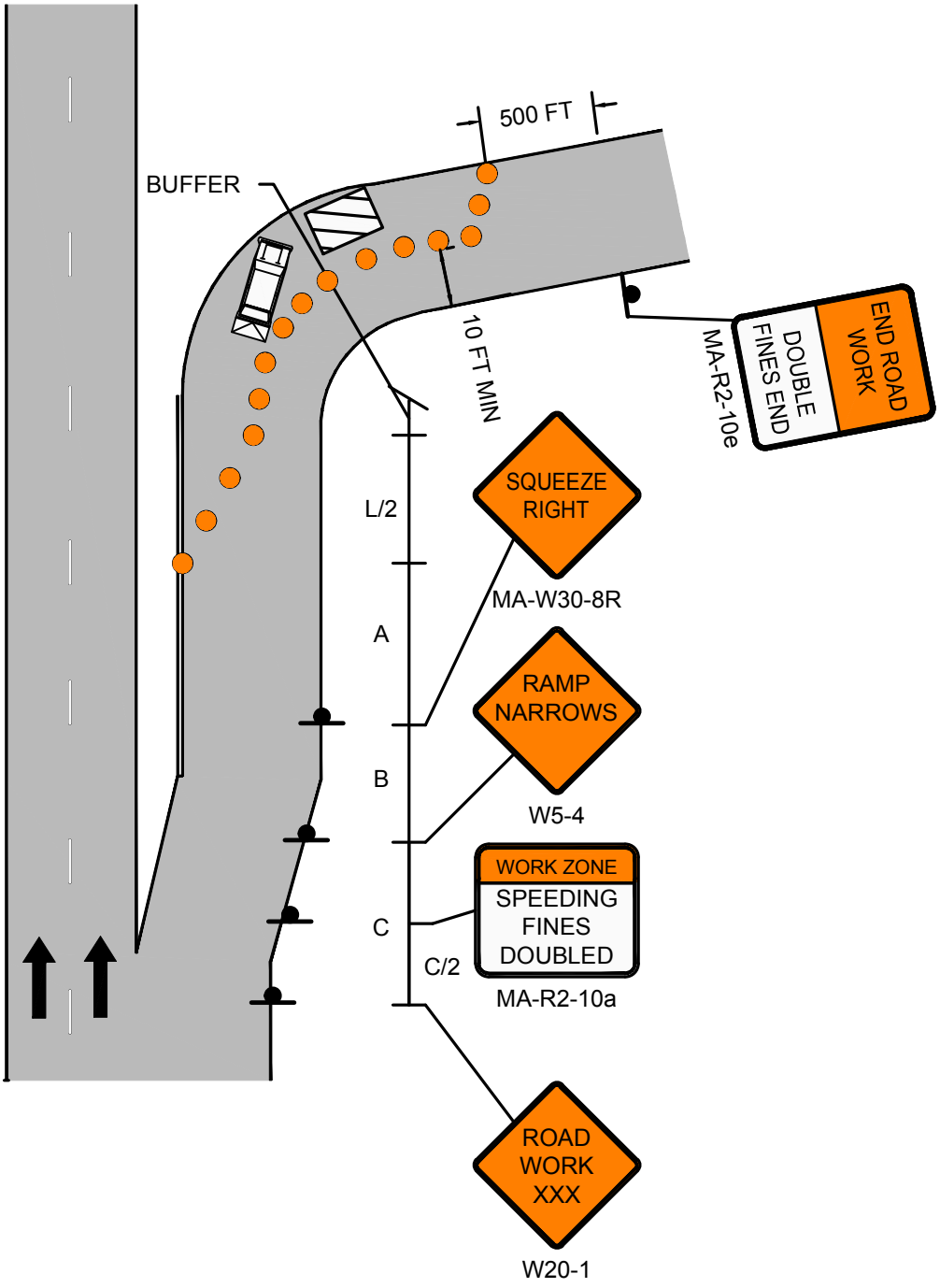
* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

NOTES
1. MA-R2-10a LOCATED AT C/2.

LEGEND



NOT TO SCALE



massDOT Massachusetts Department of Transportation Highway Division	Work Zone Safety Standard Details and Drawings	FIGURE 18 STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY LEFT SIDE OF OFF RAMP CLOSED PAGE 43

massDOT Massachusetts Department of Transportation Highway Division PAGE 44	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY ROADWORK BEYOND ON RAMP

POSTED SPEED LIMIT (MPH)	CHANNELIZATION DEVICES (DRUMS OR CONES)				
	SHOULDER TAPER LENGTH (L/3) (FT)	TRAVEL LANE CLOSURE LENGTH (L) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	110	320	305	20	175
45-55	220	660	495	40	135
60-65	260	780	645	40	155

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)
25-40	500 / 500 / 500
45-55	500 / 1000 / 1000
60-65	1000 / 1600 / 2600

NOTES

1. MA-R2-10a LOCATED AT C/2.

LEGEND


WORK ZONE


CHANNELIZATION DEVICE

FLASHING ARROW BOARD


PORTABLE CHANGEABLE MESSAGE SIGN


TRUCK MOUNTED ATTENUATOR

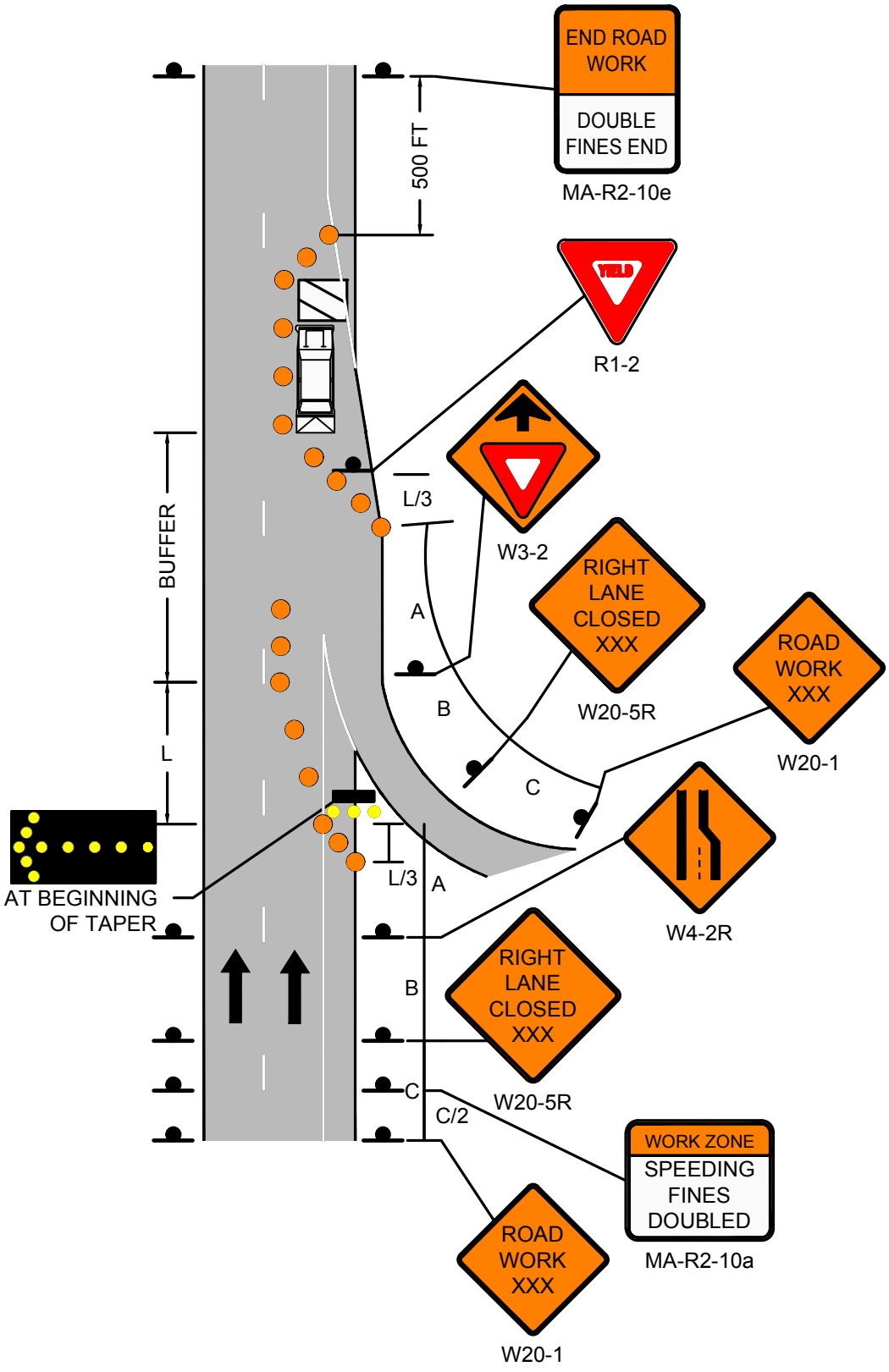
RADAR SPEED FEEDBACK BOARD

POLICE DETAIL OR UNIFORMED FLAGGER

TEMPORARY PORTABLE RUMBLE STRIP

TYPE III BARRICADE

NOT TO SCALE



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PAGE 45

Work Zone Safety Standard Details and Drawings

FIGURE 19
STATIONARY OPERATIONS
MULTILANE DIVIDED ROADWAY
ROADWORK BEYOND ON RAMP

massDOT Massachusetts Department of Transportation Highway Division PAGE 46	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY ROADWORK BEYOND OFF RAMP

POSTED SPEED LIMIT (MPH)	CHANNELIZATION DEVICES (DRUMS OR CONES)					
	SHOULDER TAPER LENGTH (L/3) (FT)	TRAVEL LANE CLOSURE LENGTH (L) (FT)	TRAVEL LANE SHIFT LENGTH (L/2) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	110	320	160	305	20	70
45-55	220	660	330	495	40	55
60-65	260	780	390	645	40	65

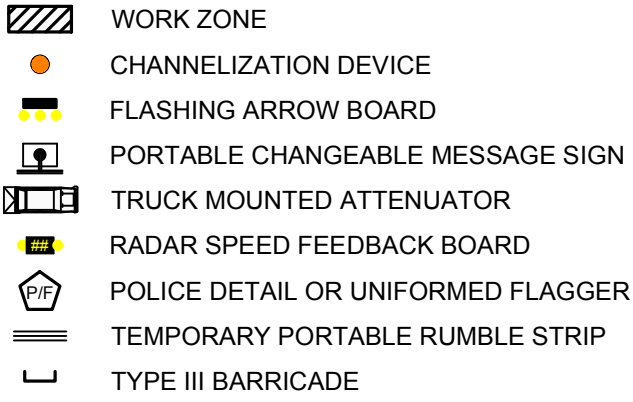
* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)
25-40	500 / 500 / 500
45-55	500 / 1000 / 1000
60-65	1000 / 1600 / 2600

NOTES

1. MA-R2-10a LOCATED AT C/2.

LEGEND



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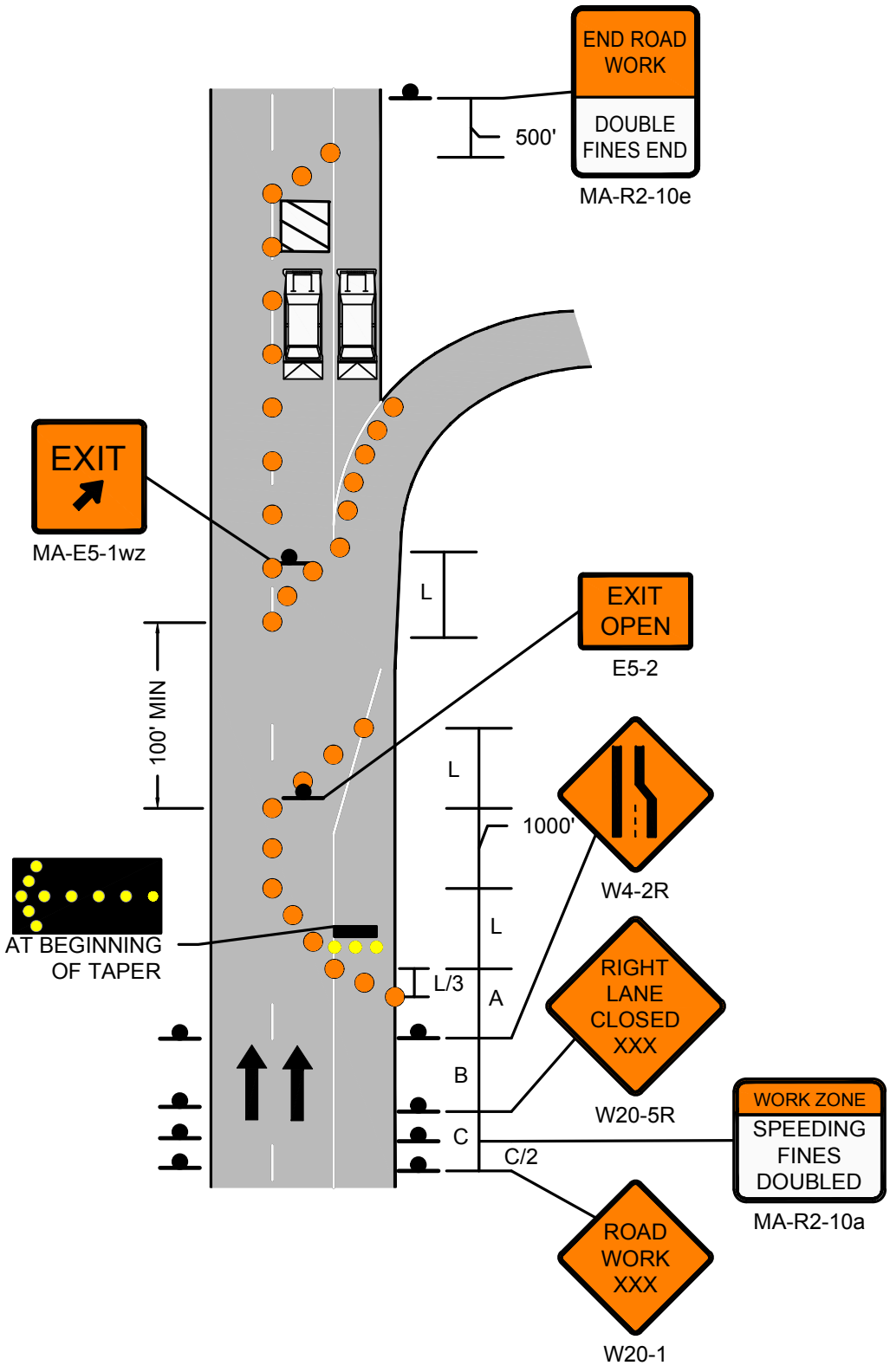


massDOT Massachusetts Department of Transportation Highway Division PAGE 47	Work Zone Safety Standard Details and Drawings	FIGURE 20 STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY ROADWORK BEYOND OFF RAMP

massDOT Massachusetts Department of Transportation Highway Division PAGE 48	Work Zone Safety Standard Details and Drawings	MULTILANE DIVIDED ROADWAY TYPICAL RAMP CLOSURE

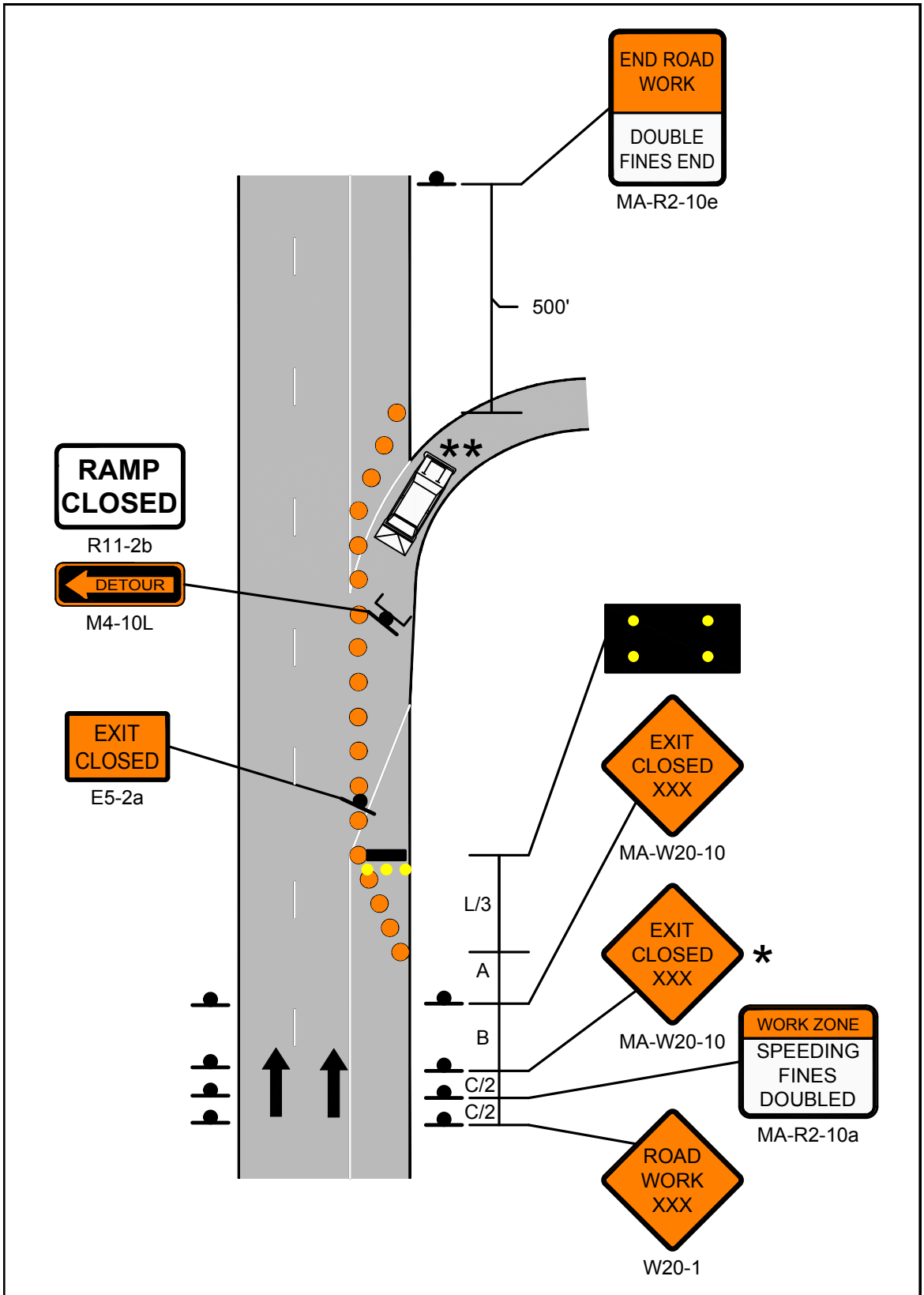
POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)	CHANNELIZATION DEVICES (DRUMS OR CONES)			
		SHOULDER TAPER LENGTH (L/3) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES
25-40	500 / 500 / 500	110	305	20	45
45-55	500 / 1000 / 1000	220	495	40	30
60-65	1000 / 1600 / 2600	260	645	40	35

NOTES
1. MA-R2-10a LOCATED AT C/2.
2. * NOT REQUIRED IF RIGHT LANE IS CLOSED IN ADVANCE OF EXIT.
3. ** OPTIONAL AT ENGINEER'S DISCRETION.

LEGEND

- WORK ZONE
- CHANNELIZATION DEVICE
- FLASHING ARROW BOARD
- PORTABLE CHANGEABLE MESSAGE SIGN
- TRUCK MOUNTED ATTENUATOR
- RADAR SPEED FEEDBACK BOARD
- POLICE DETAIL OR UNIFORMED FLAGGER
- TEMPORARY PORTABLE RUMBLE STRIP
- TYPE III BARRICADE

NOT TO SCALE



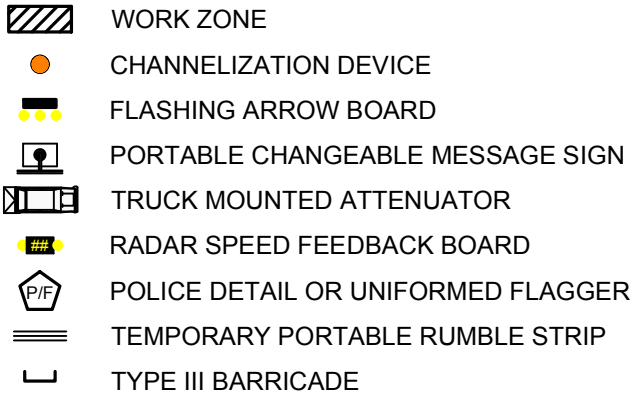
massDOT Massachusetts Department of Transportation Highway Division PAGE 49	Work Zone Safety Standard Details and Drawings	FIGURE 21 MULTILANE DIVIDED ROADWAY TYPICAL RAMP CLOSURE

massDOT Massachusetts Department of Transportation Highway Division PAGE 50	Work Zone Safety Standard Details and Drawings	MULTILANE DIVIDED ROADWAY TYPICAL CLOVERLEAF RAMP CLOSURE

POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)	CHANNELIZATION DEVICES (DRUMS OR CONES)			
		SHOULDER TAPER LENGTH (L/3) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES
25-40	500 / 500 / 500	110	305	20	45
45-55	500 / 1000 / 1000	220	495	40	30
60-65	1000 / 1600 / 2600	260	645	40	35

NOTES
1. MA-R2-10a LOCATED AT C/2.
2. * NOT REQUIRED IF RIGHT LANE IS CLOSED IN ADVANCE OF EXIT.
3. ** OPTIONAL AT ENGINEER'S DISCRETION.

LEGEND



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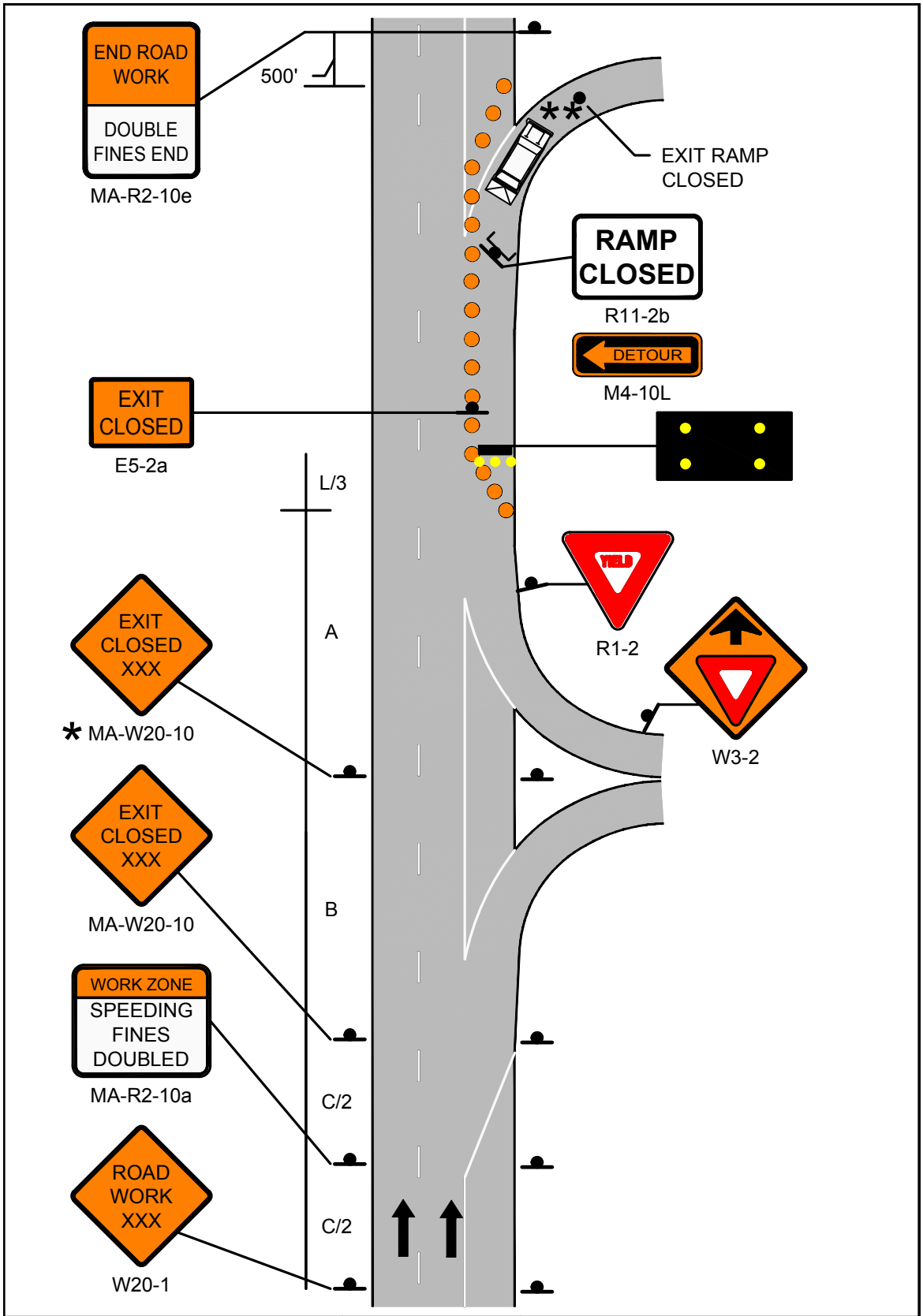

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Work Zone Safety Standard Details and Drawings

FIGURE 22
MULTILANE DIVIDED ROADWAY
TYPICAL CLOVERLEAF RAMP CLOSURE

massDOT Massachusetts Department of Transportation Highway Division PAGE 52	Work Zone Safety Standard Details and Drawings	MULTILANE DIVIDED ROADWAY TYPICAL RAMP CLOSURE ADVANCE SIGNING

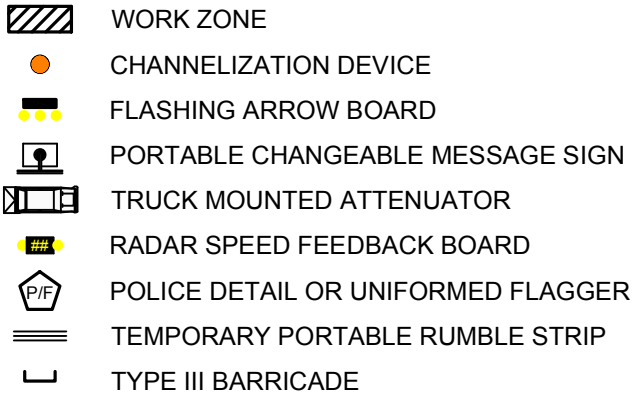
NOTES

1. IF THE CLOSED RAMP IS LOCATED DOWNSTREAM FROM THE PROPOSED DETOUR ROUTE/RAMP, A PCMS SHALL BE POSITIONED AT A SUFFICIENT DISTANCE IN ADVANCE OF THE DETOUR ROUTE/RAMP AND SHOULD STATE WHICH RAMP IS CLOSED AND WHICH SHALL BE USED FOR THE DETOUR.

2. IF THE CLOSED RAMP IS LOCATED UPSTREAM FROM THE PROPOSED DETOUR ROUTE/RAMP, A PCMS SHALL BE POSITIONED PRIOR TO THE CLOSED RAMP AND SHOULD STATE WHICH RAMP IS CLOSED AND WHICH SHALL BE USED FOR THE DETOUR.

3. A SUFFICIENT NUMBER OF DETOUR SIGNS (M4-9 SERIES) SHOULD BE DEPLOYED TO PROPERLY DIRECT DETOURED TRAFFIC. SIGN SPACING SHALL BE AT THE DIRECTION OF THE ENGINEER.

LEGEND



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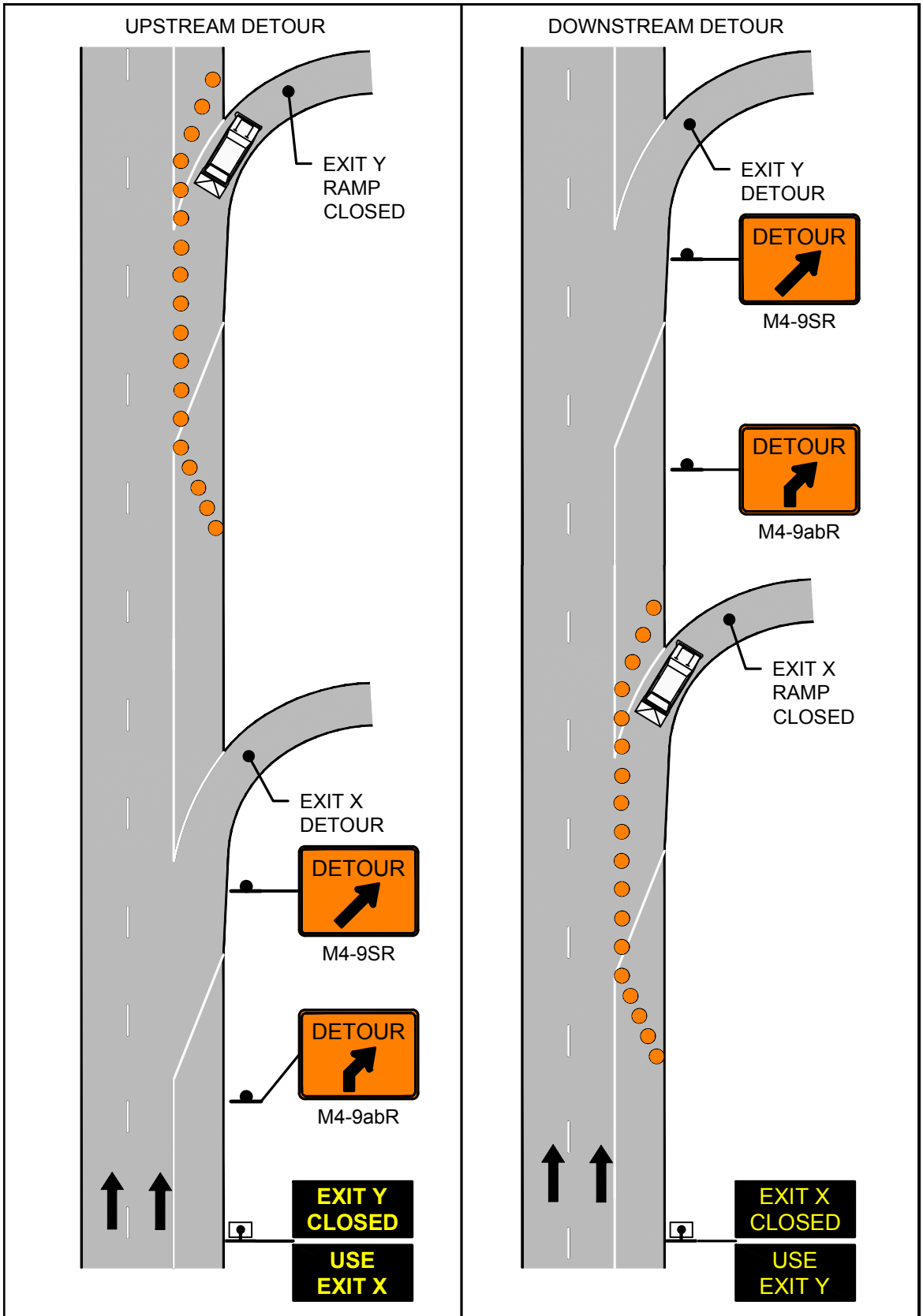


massDOT Massachusetts Department of Transportation Highway Division

PAGE 53

Work Zone Safety
Standard Details
and Drawings

FIGURE 23
MULTILANE DIVIDED ROADWAY
TYPICAL RAMP CLOSURE
ADVANCE SIGNING

massDOT Massachusetts Department of Transportation Highway Division PAGE 54	Work Zone Safety Standard Details and Drawings	FIGURE 24-1 MULTILANE DIVIDED ROADWAY PLACEMENT OF TEMPORARY PORTABLE RUMBLE STRIPS SHEET 1 OF 2

POSTED REGULATORY OR WORK ZONE SPEED	SEPARATION BETWEEN RUMBLE STRIPS
Above 55-mph	20-feet
36-mph to 55-mph	15-feet
35-mph and under	10-feet

POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)	TANGENT LENGTH BETWEEN TAPERS (T) (FT)
25-40	500 / 500 / 500	640
45-55	500 / 1000 / 1000	1320
60-65	1000 / 1600 / 2600	1560

NOTES

1. THE INTENTION OF THESE DETAILS IS ONLY TO DEPICT THE PLACEMENT OF TEMPORARY PORTABLE RUMBLE STRIPS (TPRS) IN RELATIONSHIP TO THE TAPER AND THE BUFFER OF A SINGLE- OR MULTI-LANE CLOSURE. THE DEPICTION OF THE NUMBER AND SPACING OF ALL OTHER TRAFFIC CONTROL DEVICES IS NOT TO SCALE. REFER TO OTHER DETAILS FOR LANE CLOSURES FOR THE PLACEMENT AND NUMBER OF ALL OTHER TRAFFIC CONTROL DEVICES.
2. THESE DETAILS ONLY DEPICT RIGHT LANE CLOSURES. LEFT LANE CLOSURES SHOULD UTILIZE A MIRROR IMAGE OF THESE SETUPS, STARTING WITH CLOSURE OF THE LEFTMOST LANE.
3. * THIS TPRS ARRAY IS OPTIONAL AT THE ENGINEER'S DISCRETION. IF USED, IT SHOULD BE PLACED ADJACENT TO THE BUFFER.
4. DETAILS SHOW THE MINIMUM NUMBER OF TPRS REQUIRED. ADDITIONAL MAY BE USED IF CONDITIONS WARRANT.

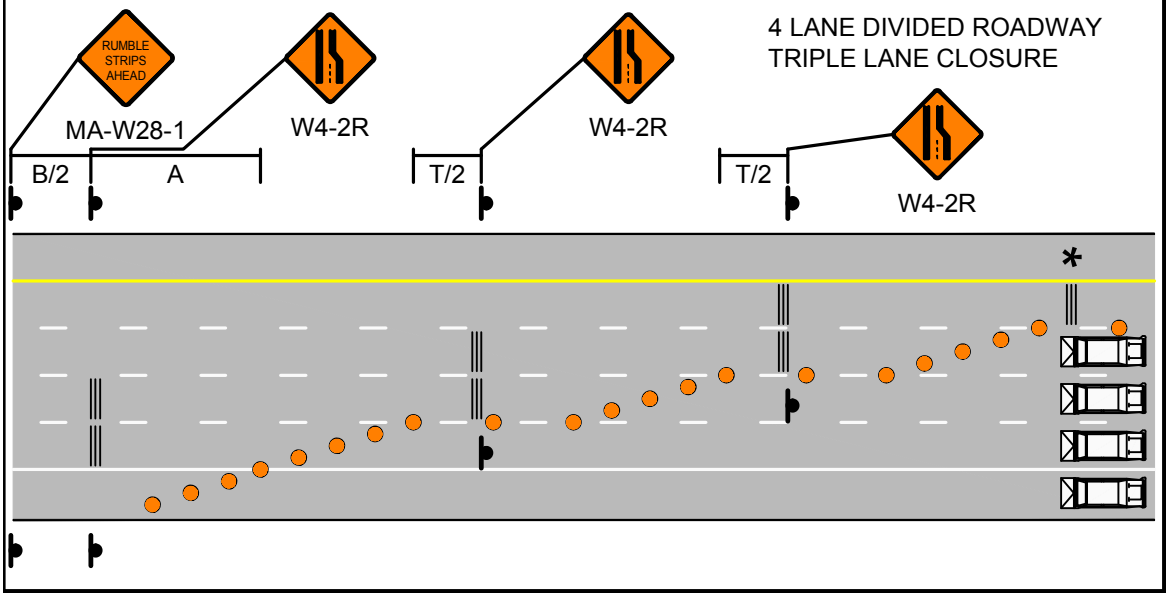
LEGEND

CHANNELIZATION DEVICE

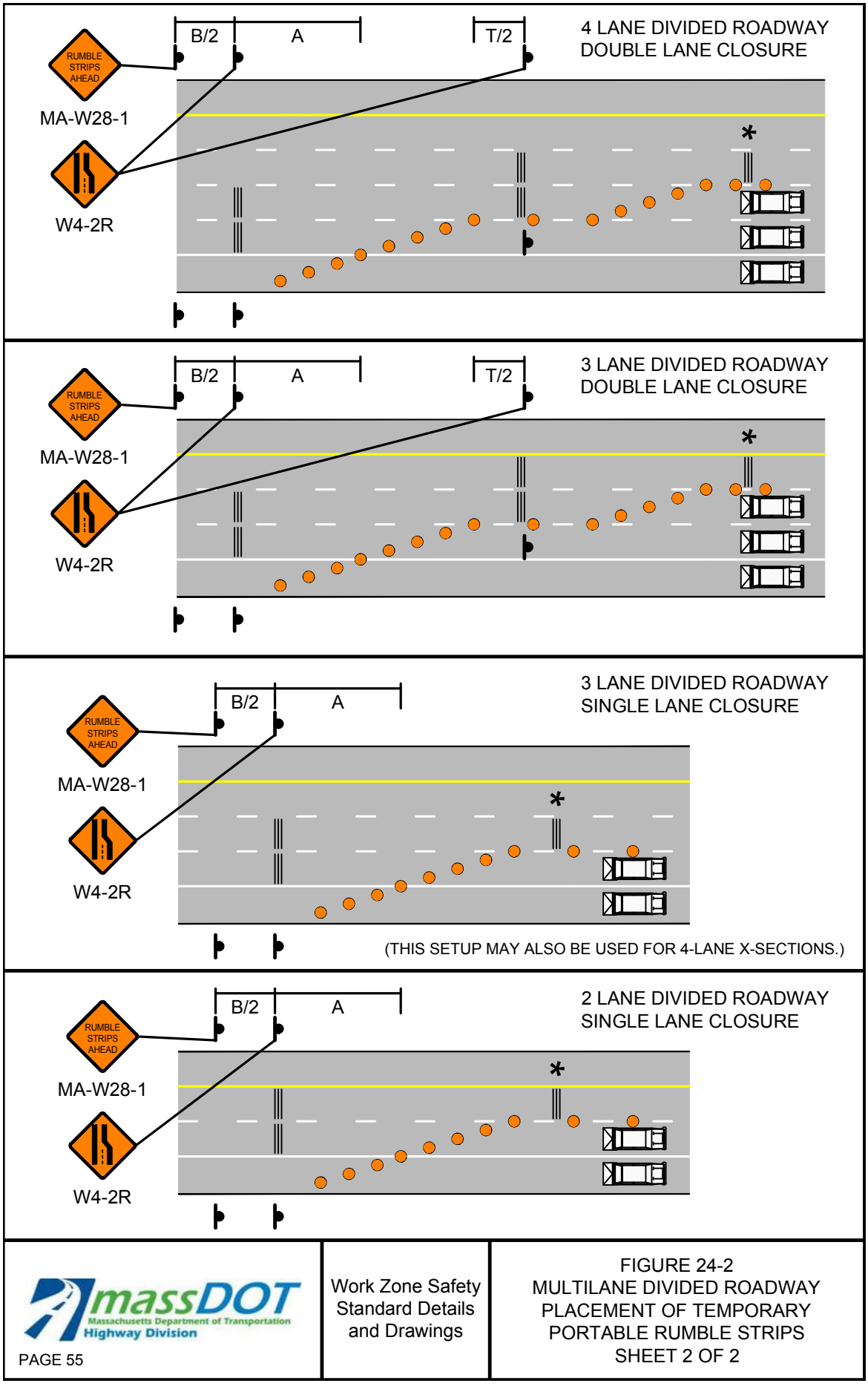
TRUCK MOUNTED ATTENUATOR

TEMPORARY PORTABLE RUMBLE STRIP

NOT TO SCALE



4 LANE DIVIDED ROADWAY
TRIPLE LANE CLOSURE



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PAGE 55

Work Zone Safety Standard Details and Drawings

FIGURE 24-2
MULTILANE DIVIDED ROADWAY
PLACEMENT OF TEMPORARY
PORTABLE RUMBLE STRIPS
SHEET 2 OF 2

Notes for Mobile Operations

- Unless otherwise stated, these notes shall apply to all Mobile Operation setups.
- Additional, setup-specific notes may be found on individual sheets.

1. The Supervisor shall travel the designated roadway prior to scheduling the work to ensure that sufficient and appropriate traffic control devices will be available. Special consideration shall be exercised to ensure that appropriate traffic controls be placed in areas that will have limited visibility of the work areas or any associated traffic queues.

2. Vehicles used for these operations shall be made highly visible with appropriate equipment such as flashing lights, rotating beacons, flags, signs, flashing arrow boards, and/or portable changeable message signs. Any signs mounted to these vehicles shall not obscure the visibility of other devices.

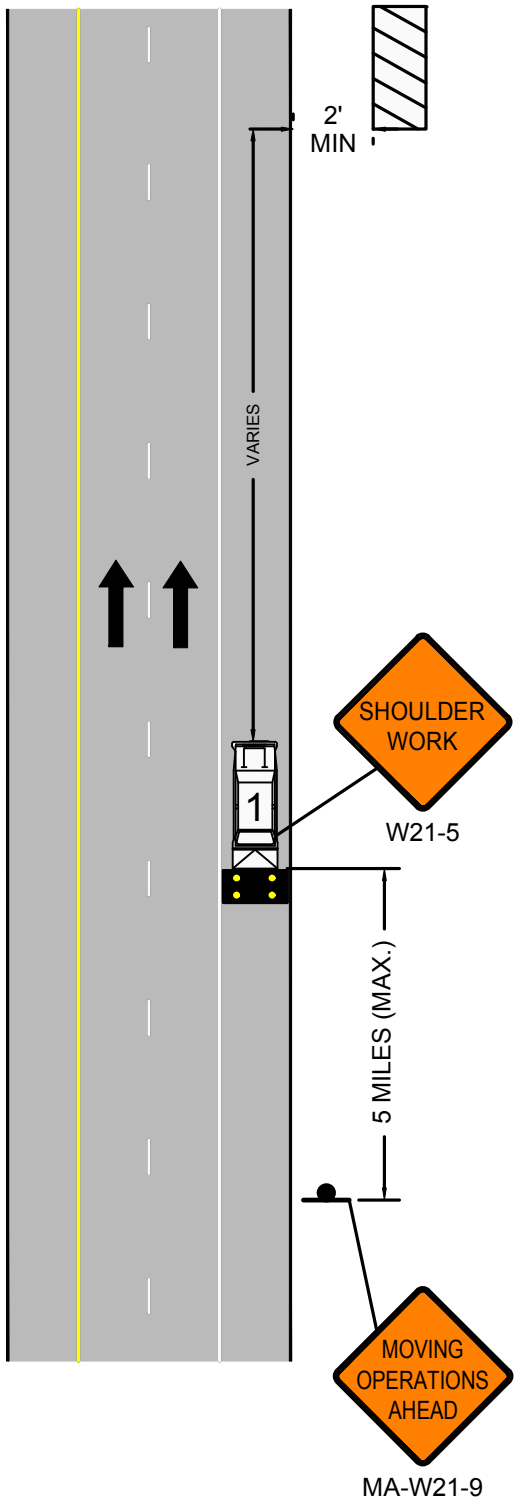
3. All vehicles shown may not be required based upon roadway conditions. However, when needed and practical, additional shadow vehicles and equipment to warn and protect motorists and workers should be used. Based upon roadway conditions, the addition of a police detail with cruiser may be used for additional protection or warning for the traveling public.

4. The distance between the work and shadow vehicle(s) may vary according to the terrain and other factors. Shadow vehicles are used to warn traffic of the operations ahead. Whenever adequate sight distance exists, the shadow vehicle(s) should maintain the minimum appropriate distance and maintain the same speed to prevent non-work related vehicles from entering the work convoy. If this formation cannot be maintained then additional traffic control devices should be deployed in advance of any vertical or horizontal curves that may restrict the sight distance of an oncoming vehicle to either the work vehicle or associated traffic queue.

5. All shadow vehicles shall be equipped with a truck or trailer mounted attenuator (TMA) and a flashing arrow board.

6. Signs should be covered or turned from view when work is not in progress.

7. Portable changeable message signs may be used in lieu of MA-W21-9 signs and any signs mounted directly to a shadow vehicle.



LEGEND

WORK ZONE

SHADOW VEHICLE

FLASHING ARROW BOARD
(WITH STATUS)

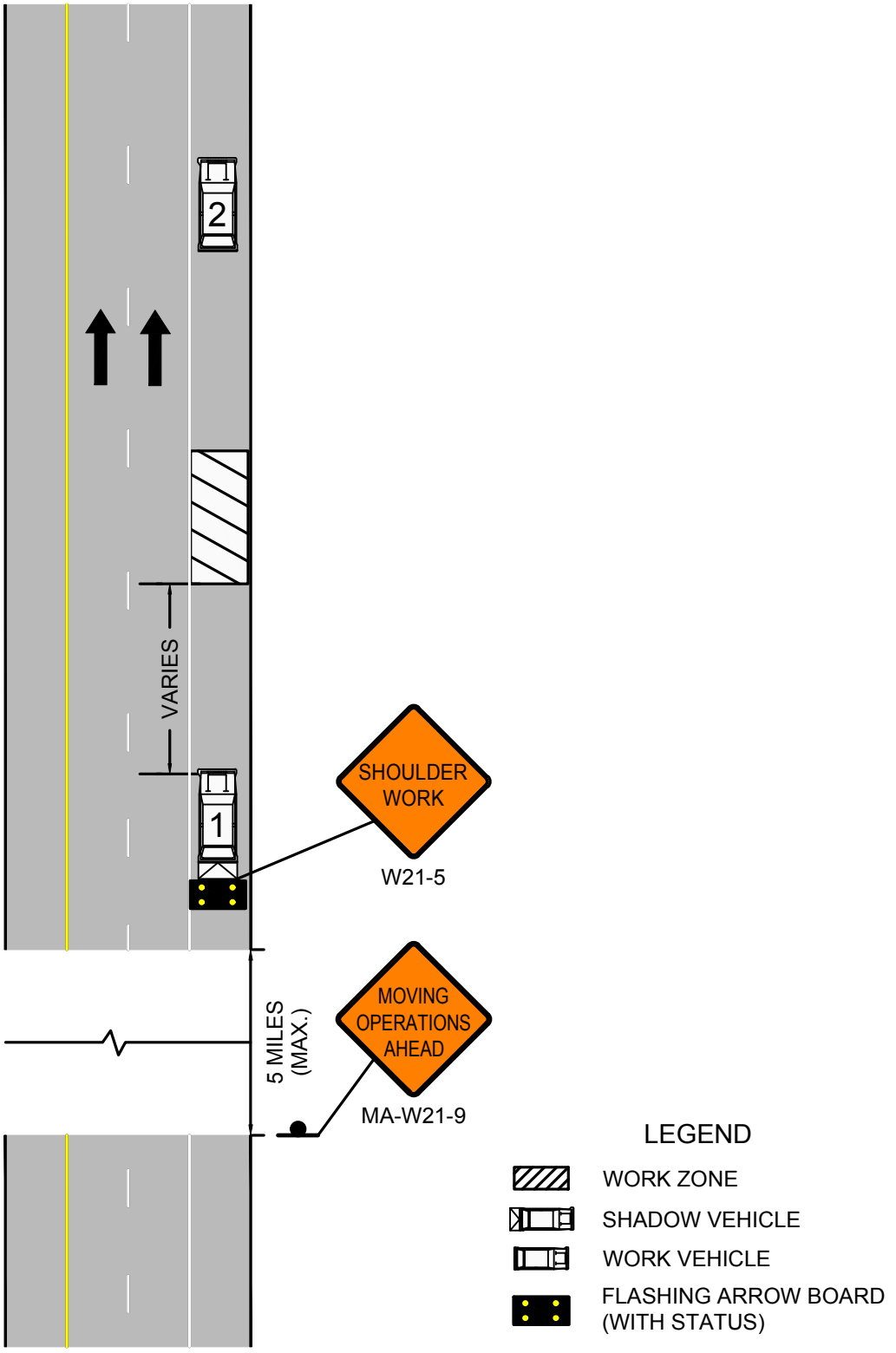
NOT TO SCALE

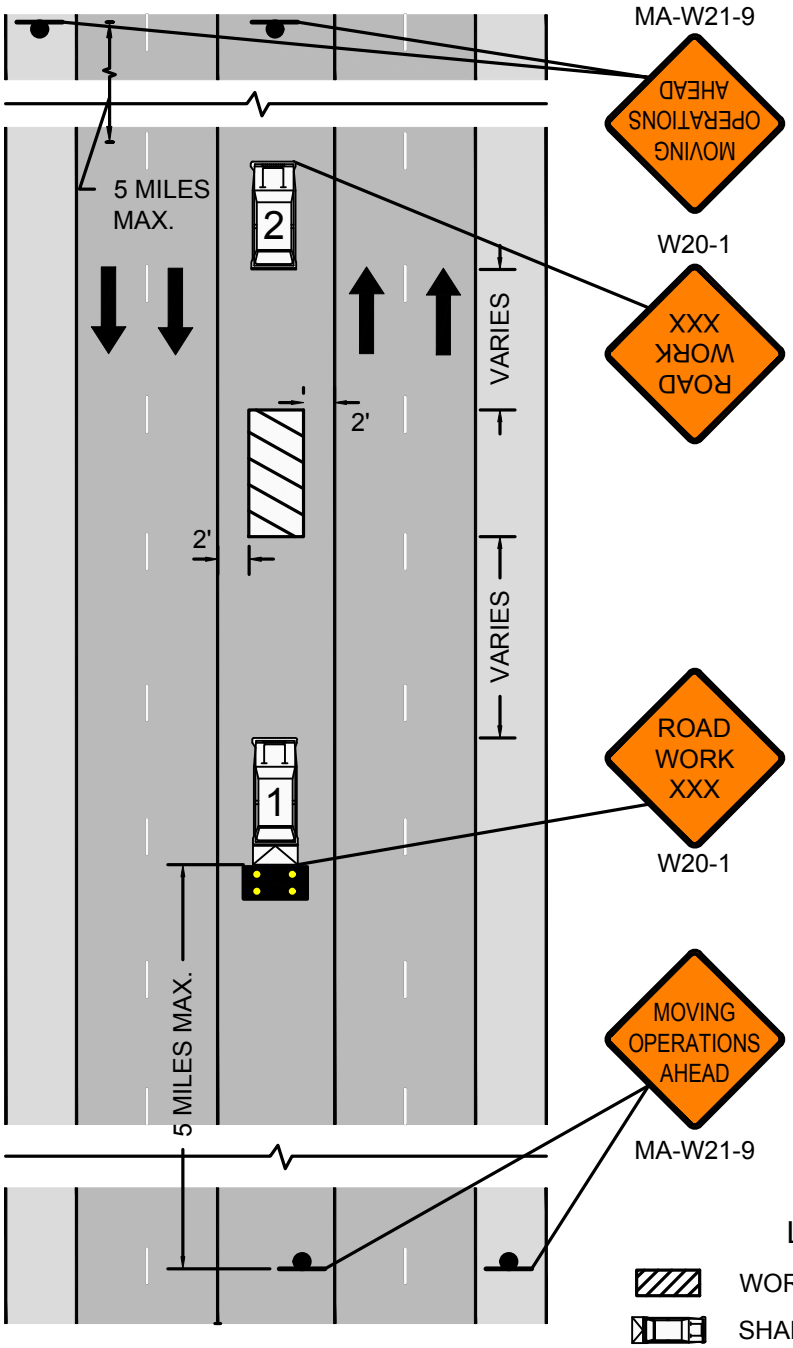
NOTES

1. IF THE WORK AREA IS SUFFICIENTLY AWAY FROM THE EDGE OF ROADWAY (20' MINIMUM) THEN SIGNS AND VEHICLES MAY NOT BE REQUIRED.

massDOT Massachusetts Department of Transportation Highway Division PAGE 57	Work Zone Safety Standard Details and Drawings	FIGURE 25 MOBILE OPERATIONS ANY ROADWAY BEYOND RIGHT SHOULDER

massDOT Massachusetts Department of Transportation Highway Division PAGE 58	Work Zone Safety Standard Details and Drawings	FIGURE 26 MOBILE OPERATIONS ANY ROADWAY SHOULDER





LEGEND

- WORK ZONE
- SHADOW VEHICLE
- WORK VEHICLE
- FLASHING ARROW BOARD (WITH STATUS)

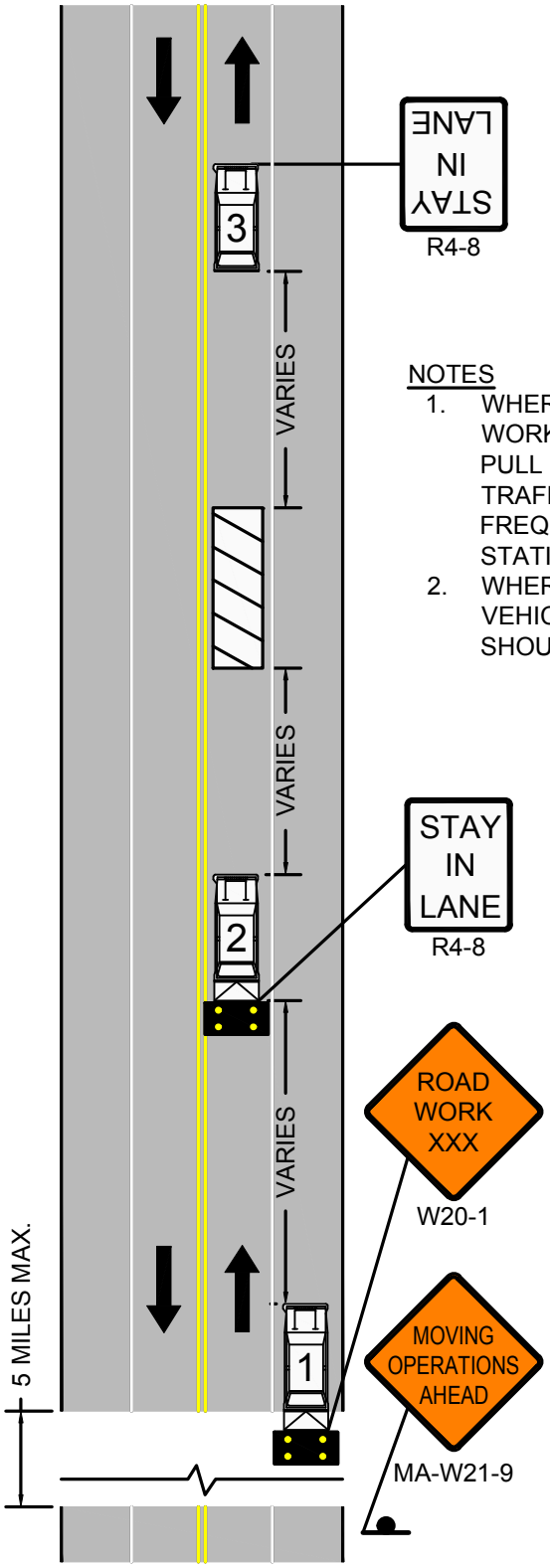
NOT TO SCALE

NOTES

1. IF THE 2' OFFSET CANNOT BE MAINTAINED, A SHORT-TERM STATIONARY SETUP SHOULD BE USED.

massDOT Massachusetts Department of Transportation Highway Division PAGE 59	Work Zone Safety Standard Details and Drawings	FIGURE 27 MOBILE OPERATIONS DIVIDED ROADWAY MEDIAN WORK

massDOT Massachusetts Department of Transportation Highway Division PAGE 60	Work Zone Safety Standard Details and Drawings	FIGURE 28 MOBILE OPERATIONS UNDIVIDED TWO LANE ROADWAY HALF OF ROADWAY CLOSED



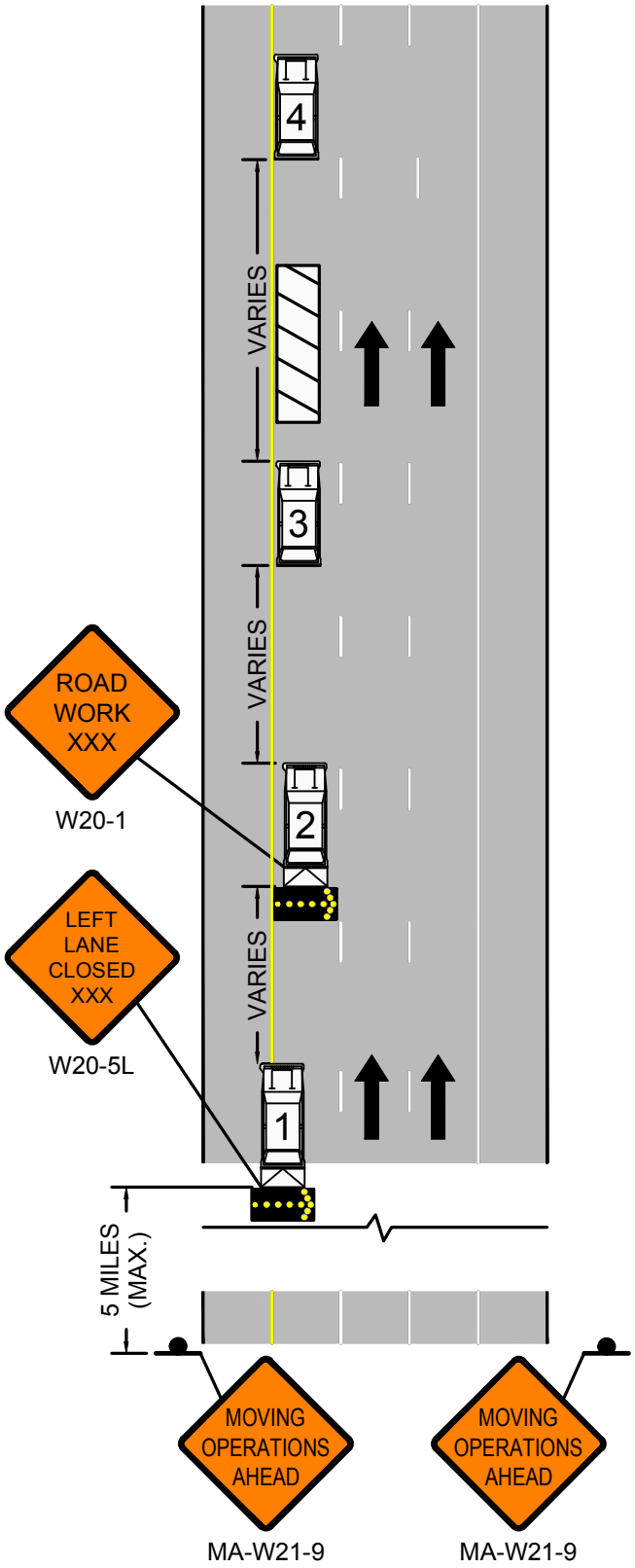
NOTES

1. WHERE PRACTICAL AND WHEN NEEDED, THE WORK AND SHADOW VEHICLE(S) SHOULD PULL OVER PERIODICALLY TO ALLOW TRAFFIC TO PASS. IF THIS CANNOT BE DONE FREQUENTLY, THEN AN ALTERNATE STATIONARY SETUP SHALL BE DEPLOYED.
2. WHERE A WIDE SHOULDER EXISTS, SHADOW VEHICLE #1 SHOULD DRIVE ON THE SHOULDER.

LEGEND

- WORK ZONE
- SHADOW VEHICLE
- WORK VEHICLE
- FLASHING ARROW BOARD (WITH STATUS)

NOT TO SCALE



LEGEND

WORK ZONE

SHADOW VEHICLE

WORK VEHICLE

FLASHING ARROW BOARD (WITH STATUS)

NOT TO SCALE

massDOT Massachusetts Department of Transportation Highway Division

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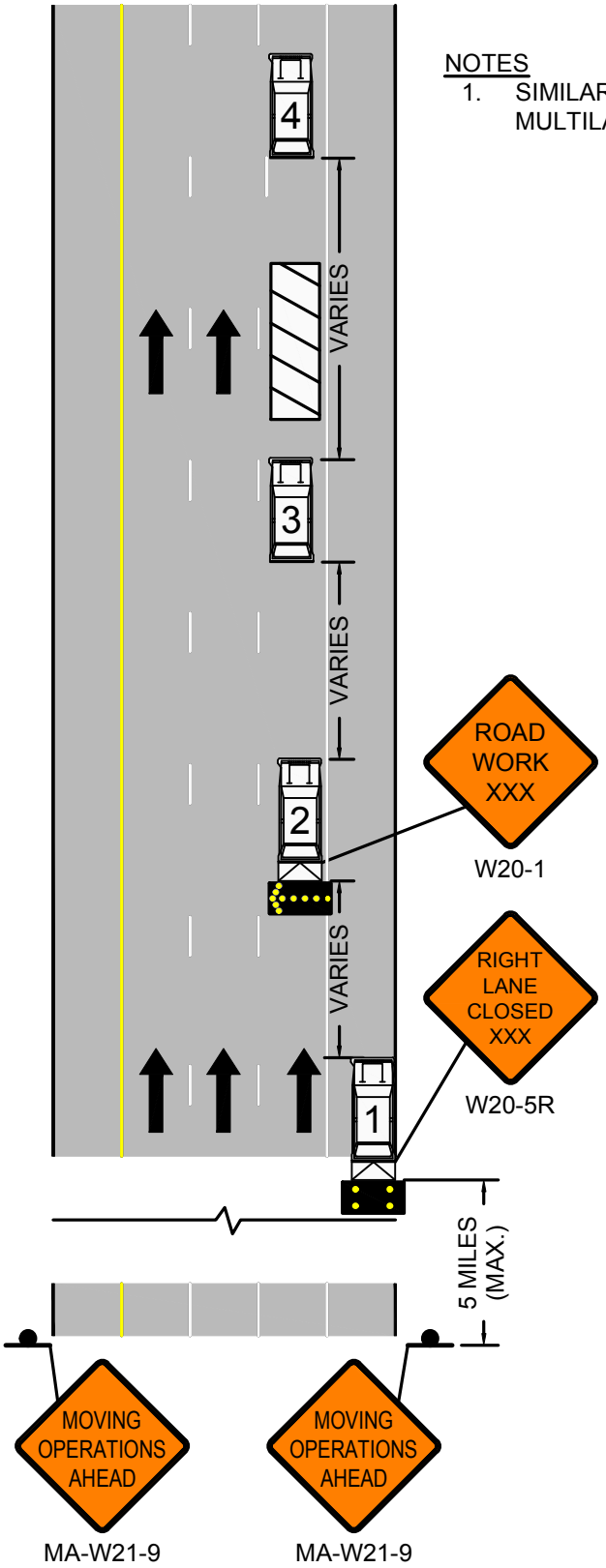
Work Zone Safety Standard Details and Drawings

FIGURE 29
MOBILE OPERATIONS
MULTILANE DIVIDED ROADWAY
LEFT LANE

massDOT Massachusetts Department of Transportation Highway Division PAGE 62	Work Zone Safety Standard Details and Drawings	FIGURE 30 MOBILE OPERATIONS MULTILANE DIVIDED ROADWAY RIGHT LANE



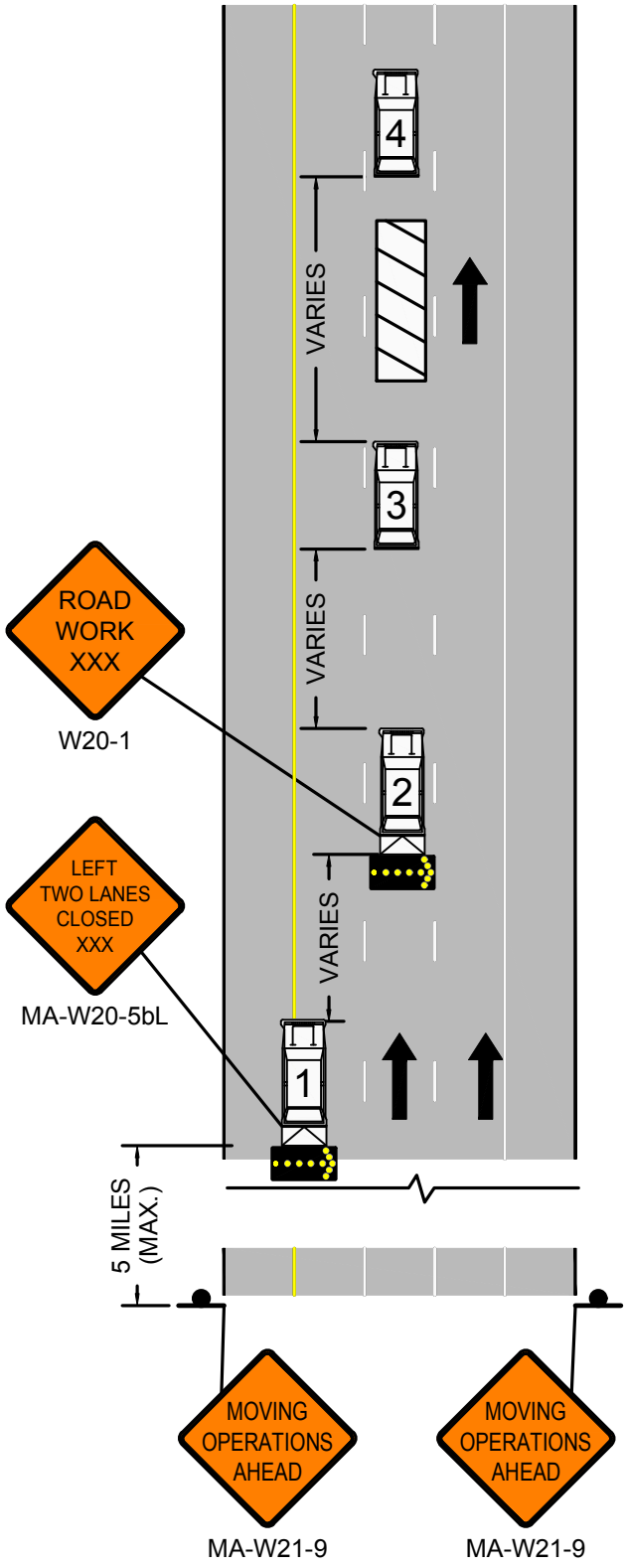
NOTES

1. SIMILAR SETUP MAY BE USED FOR A MULTILANE UNDIVIDED HIGHWAY.

LEGEND

- WORK ZONE
- SHADOW VEHICLE
- WORK VEHICLE
- FLASHING ARROW BOARD (WITH STATUS)

NOT TO SCALE



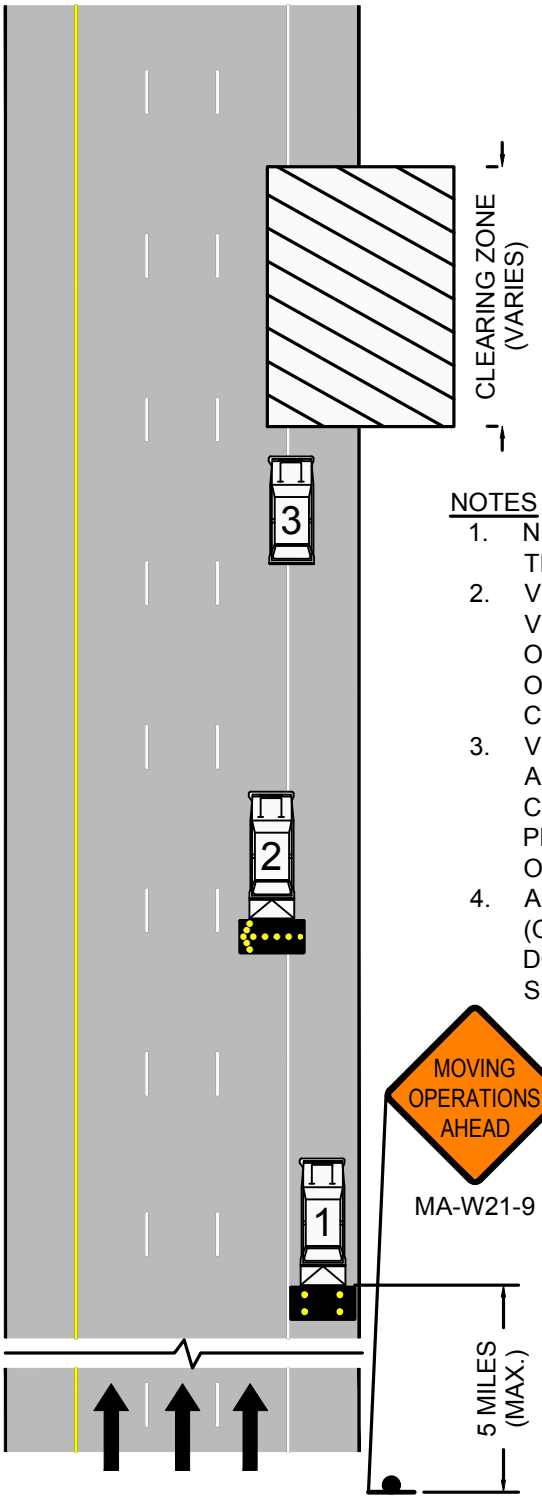
LEGEND

- WORK ZONE
- SHADOW VEHICLE
- WORK VEHICLE
- FLASHING ARROW BOARD (WITH STATUS)

NOT TO SCALE

massDOT Massachusetts Department of Transportation Highway Division PAGE 63	Work Zone Safety Standard Details and Drawings	FIGURE 31 MOBILE OPERATIONS MULTILANE DIVIDED ROADWAY CENTER LANE

massDOT Massachusetts Department of Transportation Highway Division 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)

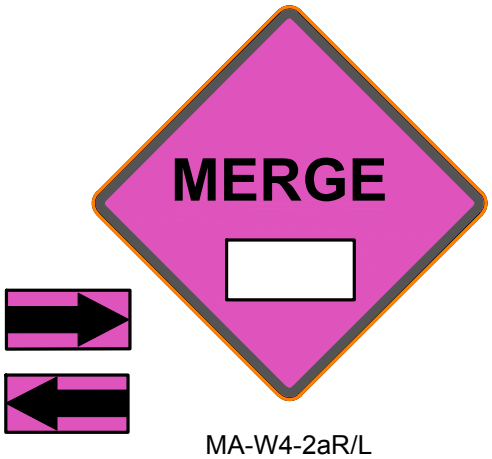
NOT TO SCALE

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).

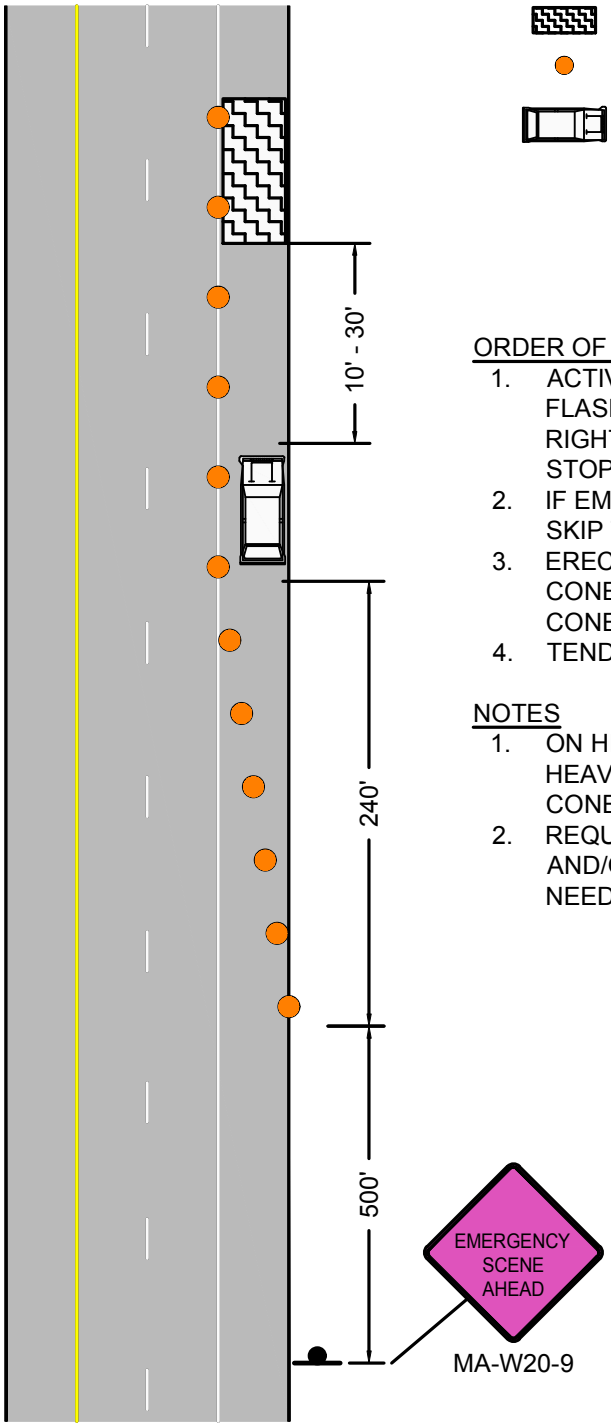
Standard Emergency Signs (36"x36" or 48"x48")

MA-W20-9



MA-W4-2aR/L

massDOT Massachusetts Department of Transportation Highway Division PAGE 66	Work Zone Safety Standard Details and Drawings	FIGURE 33 EMERGENCY RESPONSE ANY ROADWAY SHOULDER ENCROACHMENT



LEGEND

EMERGENCY AREA

CHANNELIZATION DEVICE

EMERGENCY RESPONSE VEHICLE

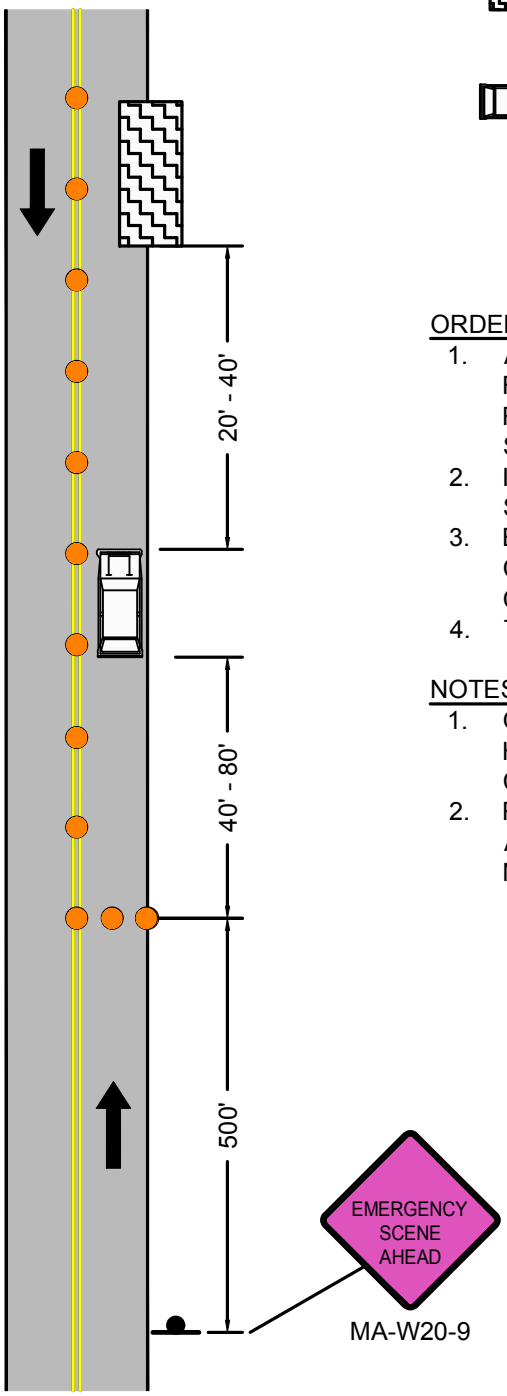
NOT TO SCALE

ORDER OF RESPONSE ACTIVITIES

1. ACTIVATE HAZARD WARNING LIGHTS AND FLASHERS. PULL VEHICLE OVER TO THE RIGHT EDGE OF TRAVEL LANE BEFORE STOPPING.
2. IF EMERGENCY INVOLVES AN INJURY, SKIP TO STEP 4 THEN RETURN TO STEP 3.
3. ERECT SIGNS AND PLACE TRAFFIC CONES. USE 40' SPACING BETWEEN CONES.
4. TEND TO EMERGENCY/INCIDENT.

NOTES

1. ON HILLY TERRAIN, SHARP CURVES, IN HEAVY TRAFFIC, OR WITH HIGH SPEEDS, CONE SPACING MAY BE DOUBLED TO 80'.
2. REQUEST ADDITIONAL ASSISTANCE AND/OR TRAFFIC CONTROL DEVICES, IF NEEDED.



LEGEND

EMERGENCY AREA

CHANNELIZATION DEVICE

EMERGENCY RESPONSE VEHICLE

NOT TO SCALE

ORDER OF RESPONSE ACTIVITIES

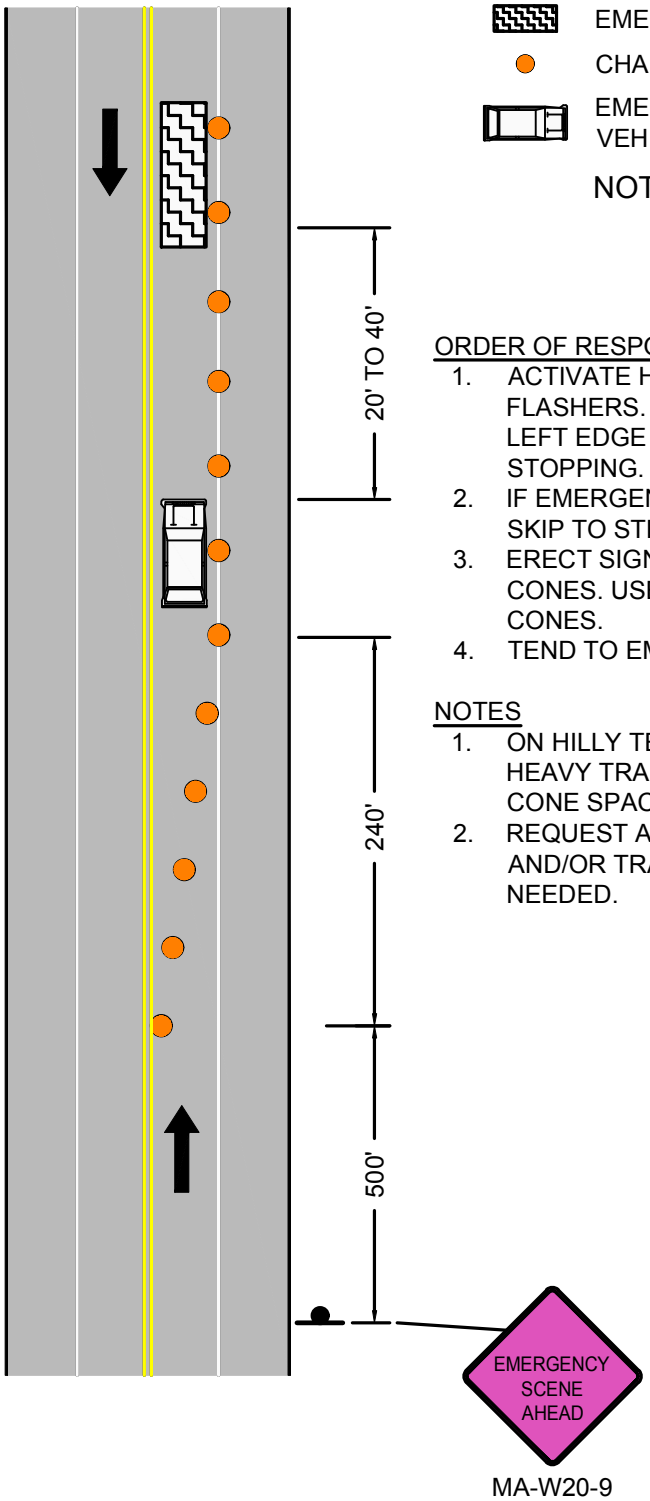
1. ACTIVATE HAZARD WARNING LIGHTS AND FLASHERS. PULL VEHICLE OVER TO THE RIGHT EDGE OF TRAVEL LANE BEFORE STOPPING.
2. IF EMERGENCY INVOLVES AN INJURY, SKIP TO STEP 4 THEN RETURN TO STEP 3.
3. ERECT SIGNS AND PLACE TRAFFIC CONES. USE 40' SPACING BETWEEN CONES.
4. TEND TO EMERGENCY/INCIDENT.

NOTES

1. ON HILLY TERRAIN, SHARP CURVES, IN HEAVY TRAFFIC, OR WITH HIGH SPEEDS, CONE SPACING MAY BE DOUBLED TO 80'.
2. REQUEST ADDITIONAL ASSISTANCE AND/OR TRAFFIC CONTROL DEVICES, IF NEEDED.

massDOT Massachusetts Department of Transportation Highway Division PAGE 67	Work Zone Safety Standard Details and Drawings	FIGURE 34 EMERGENCY RESPONSE TWO LANE ROADWAY NO SHOULDER TRAVEL LANE ENCROACHMENT

massDOT Massachusetts Department of Transportation Highway Division PAGE 68	Work Zone Safety Standard Details and Drawings	FIGURE 35 EMERGENCY RESPONSE TWO LANE ROADWAY TRAVERSABLE SHOULDER SINGLE LANE ENCROACHMENT



LEGEND

- EMERGENCY AREA
- CHANNELIZATION DEVICE
- EMERGENCY RESPONSE VEHICLE

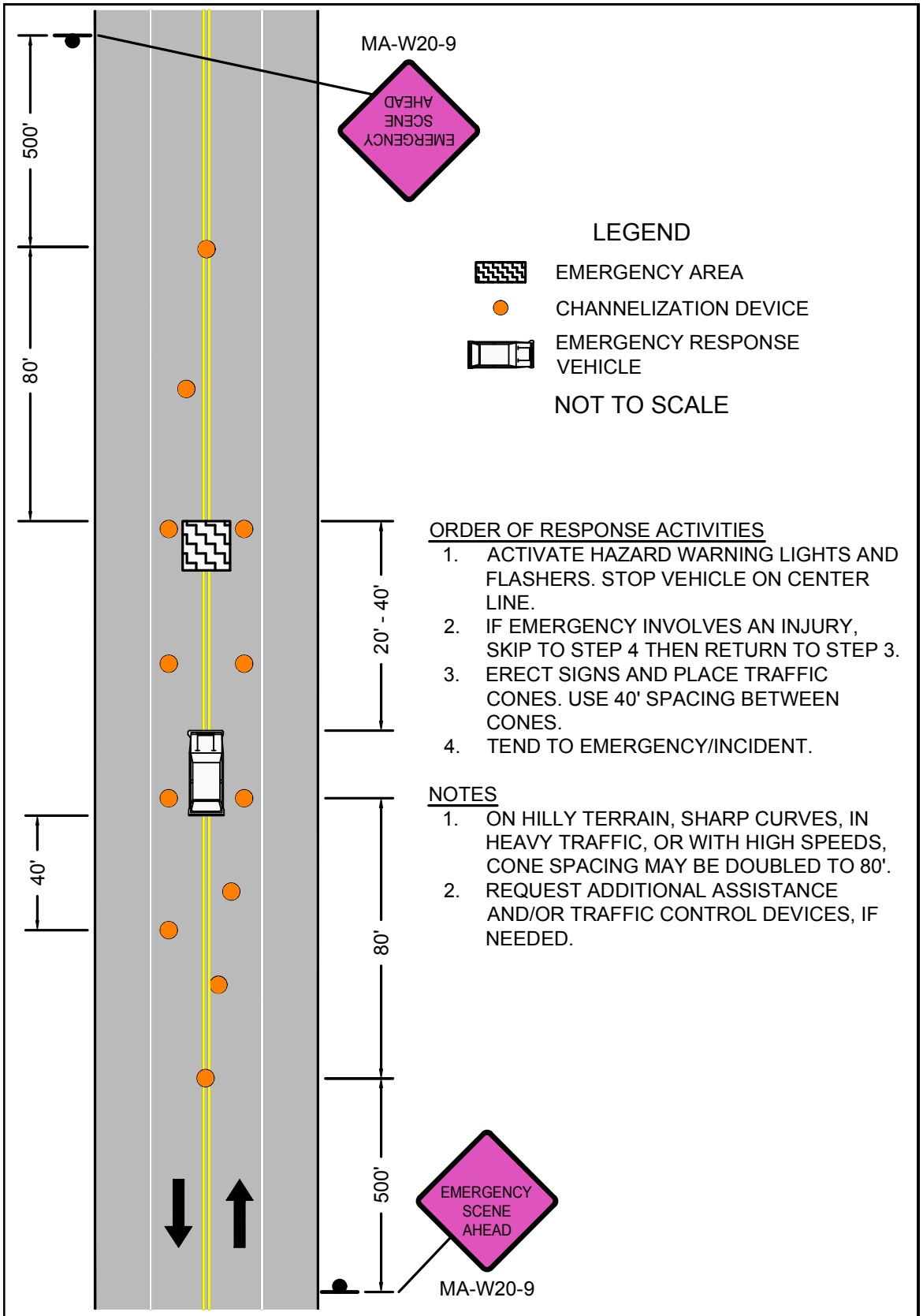
NOT TO SCALE

ORDER OF RESPONSE ACTIVITIES

1. ACTIVATE HAZARD WARNING LIGHTS AND FLASHERS. PULL VEHICLE OVER TO THE LEFT EDGE OF TRAVEL LANE BEFORE STOPPING.
2. IF EMERGENCY INVOLVES AN INJURY, SKIP TO STEP 4 THEN RETURN TO STEP 3.
3. ERECT SIGNS AND PLACE TRAFFIC CONES. USE 40' SPACING BETWEEN CONES.
4. TEND TO EMERGENCY/INCIDENT.

NOTES

1. ON HILLY TERRAIN, SHARP CURVES, IN HEAVY TRAFFIC, OR WITH HIGH SPEEDS, CONE SPACING MAY BE DOUBLED TO 80'.
2. REQUEST ADDITIONAL ASSISTANCE AND/OR TRAFFIC CONTROL DEVICES, IF NEEDED.



ORDER OF RESPONSE ACTIVITIES

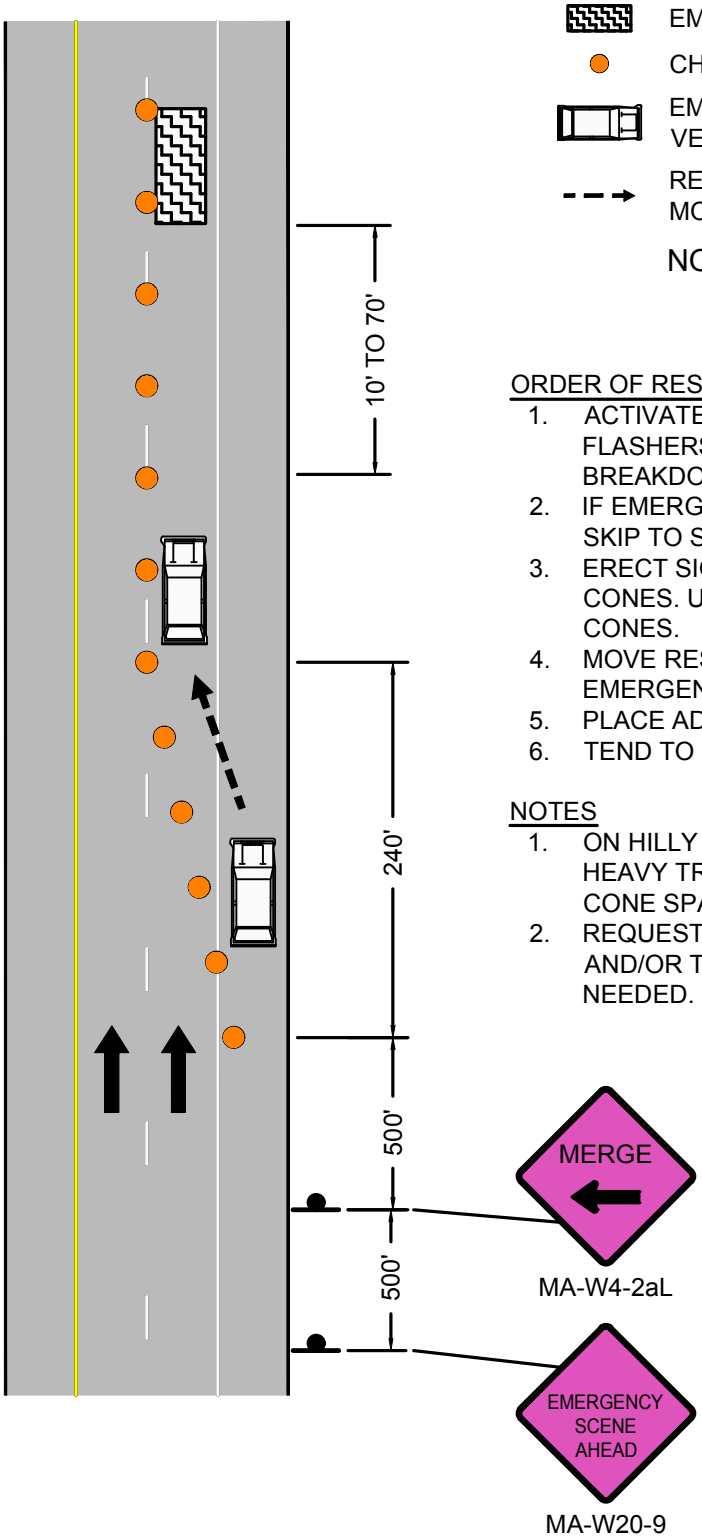
1. ACTIVATE HAZARD WARNING LIGHTS AND FLASHERS. STOP VEHICLE ON CENTER LINE.
2. IF EMERGENCY INVOLVES AN INJURY, SKIP TO STEP 4 THEN RETURN TO STEP 3.
3. ERECT SIGNS AND PLACE TRAFFIC CONES. USE 40' SPACING BETWEEN CONES.
4. TEND TO EMERGENCY/INCIDENT.

NOTES

1. ON HILLY TERRAIN, SHARP CURVES, IN HEAVY TRAFFIC, OR WITH HIGH SPEEDS, CONE SPACING MAY BE DOUBLED TO 80'.
2. REQUEST ADDITIONAL ASSISTANCE AND/OR TRAFFIC CONTROL DEVICES, IF NEEDED.

massDOT Massachusetts Department of Transportation Highway Division PAGE 69	Work Zone Safety Standard Details and Drawings	FIGURE 36 EMERGENCY RESPONSE TWO LANE ROADWAY TRAVERSABLE SHOULDER CENTER OF ROADWAY

massDOT Massachusetts Department of Transportation Highway Division PAGE 70	Work Zone Safety Standard Details and Drawings	FIGURE 37 EMERGENCY RESPONSE MULTILANE DIVIDED ROADWAY RIGHT LANE



LEGEND

- EMERGENCY AREA
- CHANNELIZATION DEVICE
- EMERGENCY RESPONSE VEHICLE
- RESPONSE VEHICLE MOVEMENT

NOT TO SCALE

ORDER OF RESPONSE ACTIVITIES

1. ACTIVATE HAZARD WARNING LIGHTS AND FLASHERS. STOP VEHICLE IN BREAKDOWN LANE.
2. IF EMERGENCY INVOLVES AN INJURY, SKIP TO STEP 6 THEN RETURN TO STEP 3.
3. ERECT SIGNS AND PLACE TRAFFIC CONES. USE 40' SPACING BETWEEN CONES.
4. MOVE RESPONSE VEHICLE BEHIND EMERGENCY.
5. PLACE ADDITIONAL CONES.
6. TEND TO EMERGENCY.

NOTES

1. ON HILLY TERRAIN, SHARP CURVES, IN HEAVY TRAFFIC, OR WITH HIGH SPEEDS, CONE SPACING MAY BE DOUBLED TO 80'.
2. REQUEST ADDITIONAL ASSISTANCE AND/OR TRAFFIC CONTROL DEVICES, IF NEEDED.

LEGEND

- EMERGENCY AREA
- CHANNELIZATION DEVICE
- EMERGENCY RESPONSE VEHICLE
- RESPONSE VEHICLE MOVEMENT

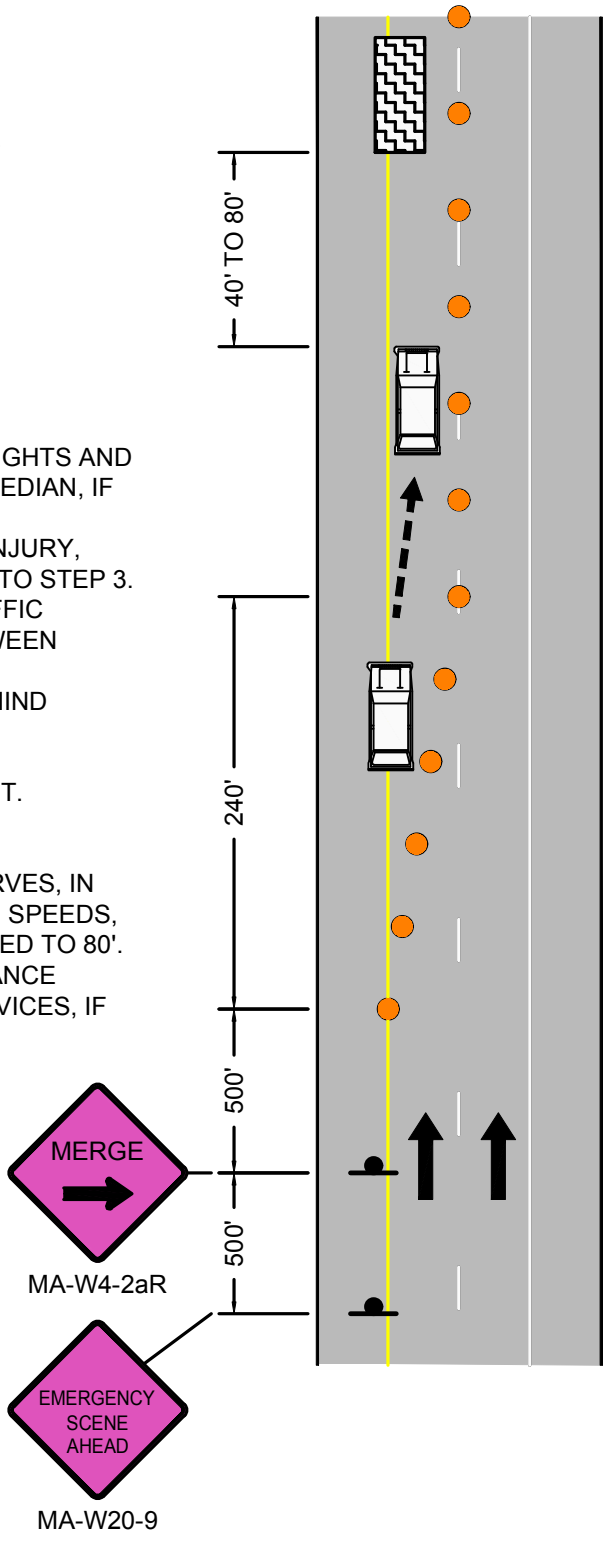
NOT TO SCALE

ORDER OF RESPONSE ACTIVITIES

1. ACTIVATE HAZARD WARNING LIGHTS AND FLASHERS. STOP VEHICLE IN MEDIAN, IF PRESENT.
2. IF EMERGENCY INVOLVES AN INJURY, SKIP TO STEP 6 THEN RETURN TO STEP 3.
3. ERECT SIGNS AND PLACE TRAFFIC CONES. USE 40' SPACING BETWEEN CONES.
4. MOVE RESPONSE VEHICLE BEHIND EMERGENCY.
5. PLACE ADDITIONAL CONES.
6. TEND TO EMERGENCY/INCIDENT.

NOTES

1. ON HILLY TERRAIN, SHARP CURVES, IN HEAVY TRAFFIC, OR WITH HIGH SPEEDS, CONE SPACING MAY BE DOUBLED TO 80'.
2. REQUEST ADDITIONAL ASSISTANCE AND/OR TRAFFIC CONTROL DEVICES, IF NEEDED.



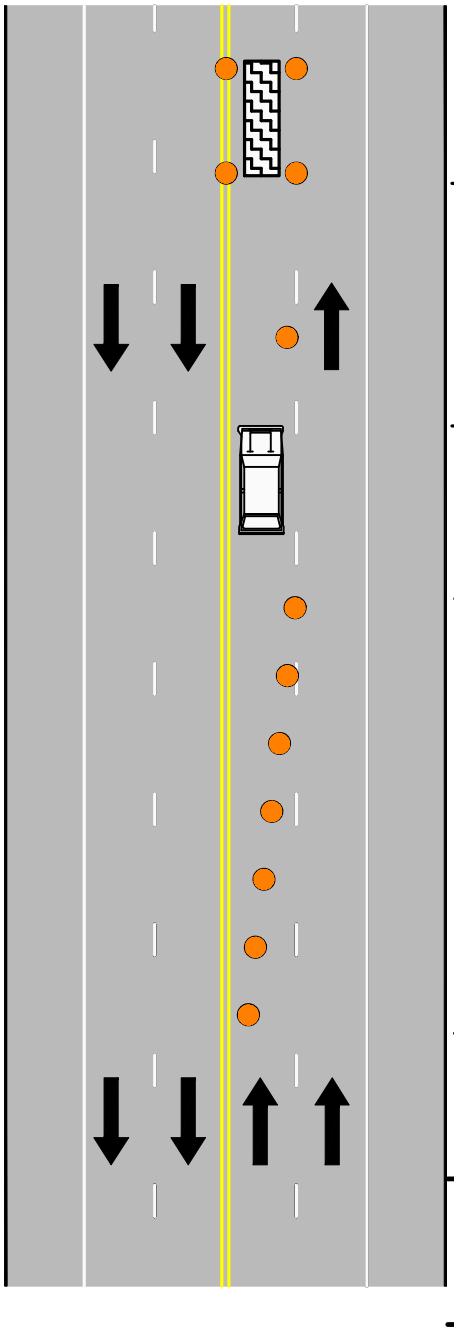
massDOT Massachusetts Department of Transportation Highway Division

PAGE 71

Work Zone Safety Standard Details and Drawings

FIGURE 38
EMERGENCY RESPONSE
MULTILANE DIVIDED ROADWAY
LEFT LANE

massDOT Massachusetts Department of Transportation Highway Division PAGE 72	Work Zone Safety Standard Details and Drawings	FIGURE 39 EMERGENCY RESPONSE MULTILANE UNDIVIDED ROADWAY LEFT LANE



LEGEND

- EMERGENCY AREA
- CHANNELIZATION DEVICE
- EMERGENCY RESPONSE VEHICLE

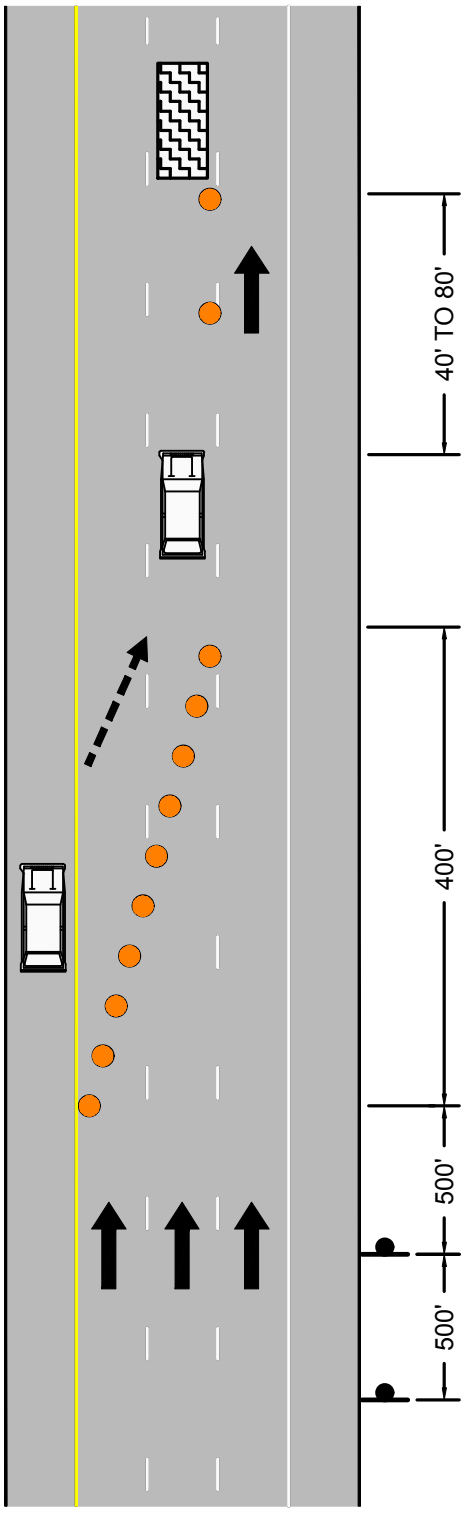
NOT TO SCALE

NOTES

1. ON HILLY TERRAIN, SHARP CURVES, IN HEAVY TRAFFIC, OR WITH HIGH SPEEDS, CONE SPACING MAY BE DOUBLED TO 80'.
2. REQUEST ADDITIONAL ASSISTANCE AND/OR TRAFFIC CONTROL DEVICES, IF NEEDED.

ORDER OF RESPONSE ACTIVITIES

1. ACTIVATE HAZARD WARNING LIGHTS AND FLASHERS. PULL VEHICLE OVER TO THE RIGHT EDGE OF BREAKDOWN LANE OR SHOULDER OR, IF NOT PRESENT, RIGHT EDGE OF TRAVEL LANE BEFORE STOPPING.
2. IF EMERGENCY INVOLVES AN INJURY, SKIP TO STEP 4 THEN RETURN TO STEP 3.
3. ERECT SIGNS AND PLACE TRAFFIC CONES. USE 40' SPACING BETWEEN CONES.
4. TEND TO EMERGENCY/INCIDENT.



LEGEND

- EMERGENCY AREA
- CHANNELIZATION DEVICE
- EMERGENCY RESPONSE VEHICLE
- RESPONSE VEHICLE MOVEMENT

NOT TO SCALE

ORDER OF RESPONSE ACTIVITIES

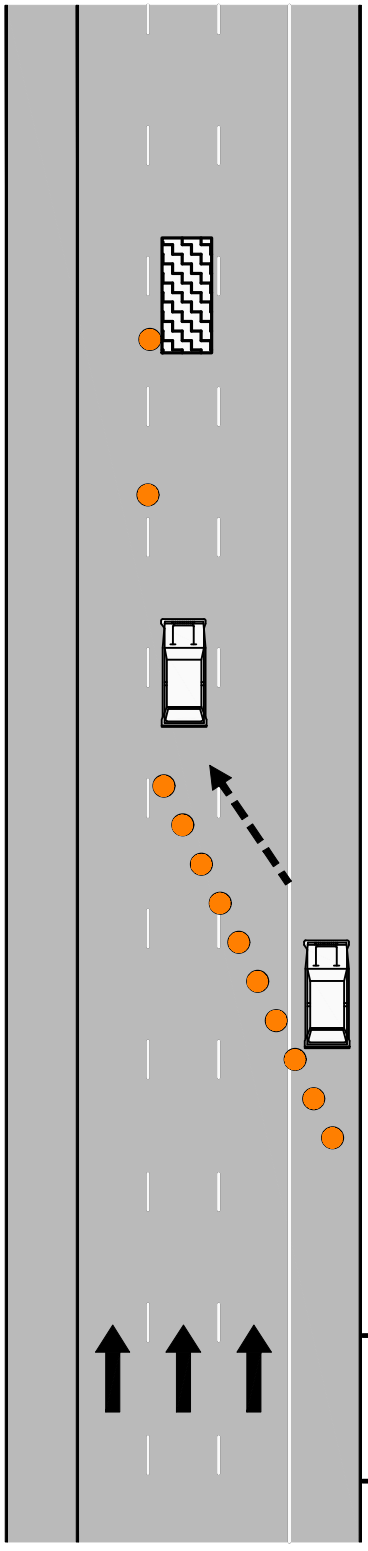
1. ACTIVATE HAZARD WARNING LIGHTS AND FLASHERS. STOP VEHICLE IN MEDIAN, IF PRESENT.
2. IF EMERGENCY INVOLVES AN INJURY, SKIP TO STEP 6 THEN RETURN TO STEP 3.
3. ERECT SIGNS AND PLACE TRAFFIC CONES. USE 40' SPACING BETWEEN CONES.
4. MOVE RESPONSE VEHICLE BEHIND EMERGENCY.
5. PLACE ADDITIONAL CONES.
6. TEND TO EMERGENCY/INCIDENT.

NOTES

1. ON HILLY TERRAIN, SHARP CURVES, IN HEAVY TRAFFIC, OR WITH HIGH SPEEDS, CONE SPACING MAY BE DOUBLED TO 80'.
2. REQUEST ADDITIONAL ASSISTANCE AND/OR TRAFFIC CONTROL DEVICES, IF NEEDED.

massDOT Massachusetts Department of Transportation Highway Division PAGE 73	Work Zone Safety Standard Details and Drawings	FIGURE 40 EMERGENCY RESPONSE MULTILANE DIVIDED ROADWAY MIDDLE LANE APPROACH FROM LEFT

massDOT Massachusetts Department of Transportation Highway Division 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

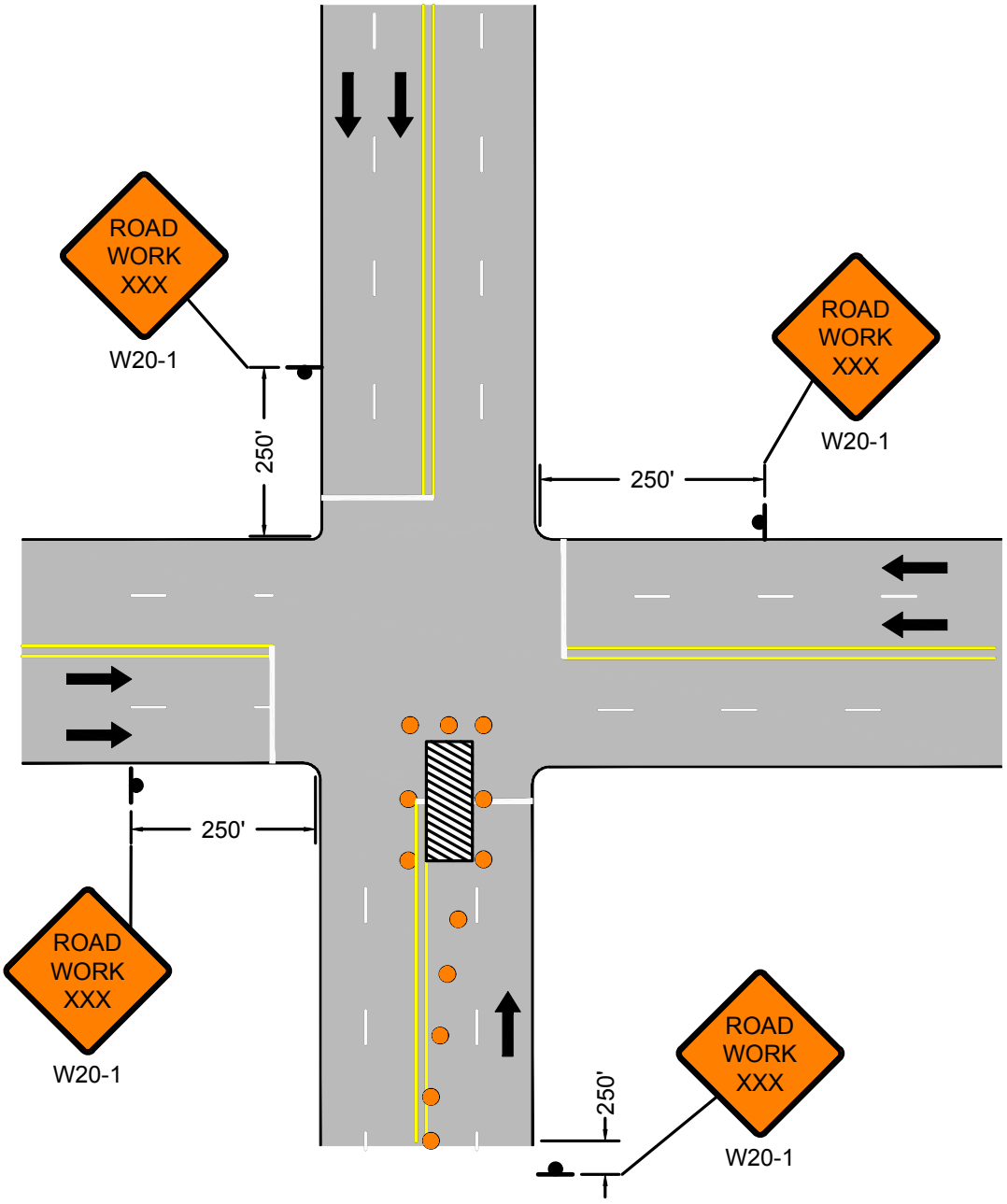
NOT TO SCALE

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.



LEGEND

WORK ZONE

CHANNELIZATION DEVICE

NOT TO SCALE

NOTES

1. DURATION OF WORK = 20 MINUTES OR LESS.
2. EQUIPMENT: 12 CONES + 4 PORTABLE SIGNS.
3. CONE SPACING IS 20 FEET.
4. SINGLE WORK VEHICLE PARKED/STOPPED.
5. POLICE DETAIL REQUIRED.

massDOT Massachusetts Department of Transportation Highway Division

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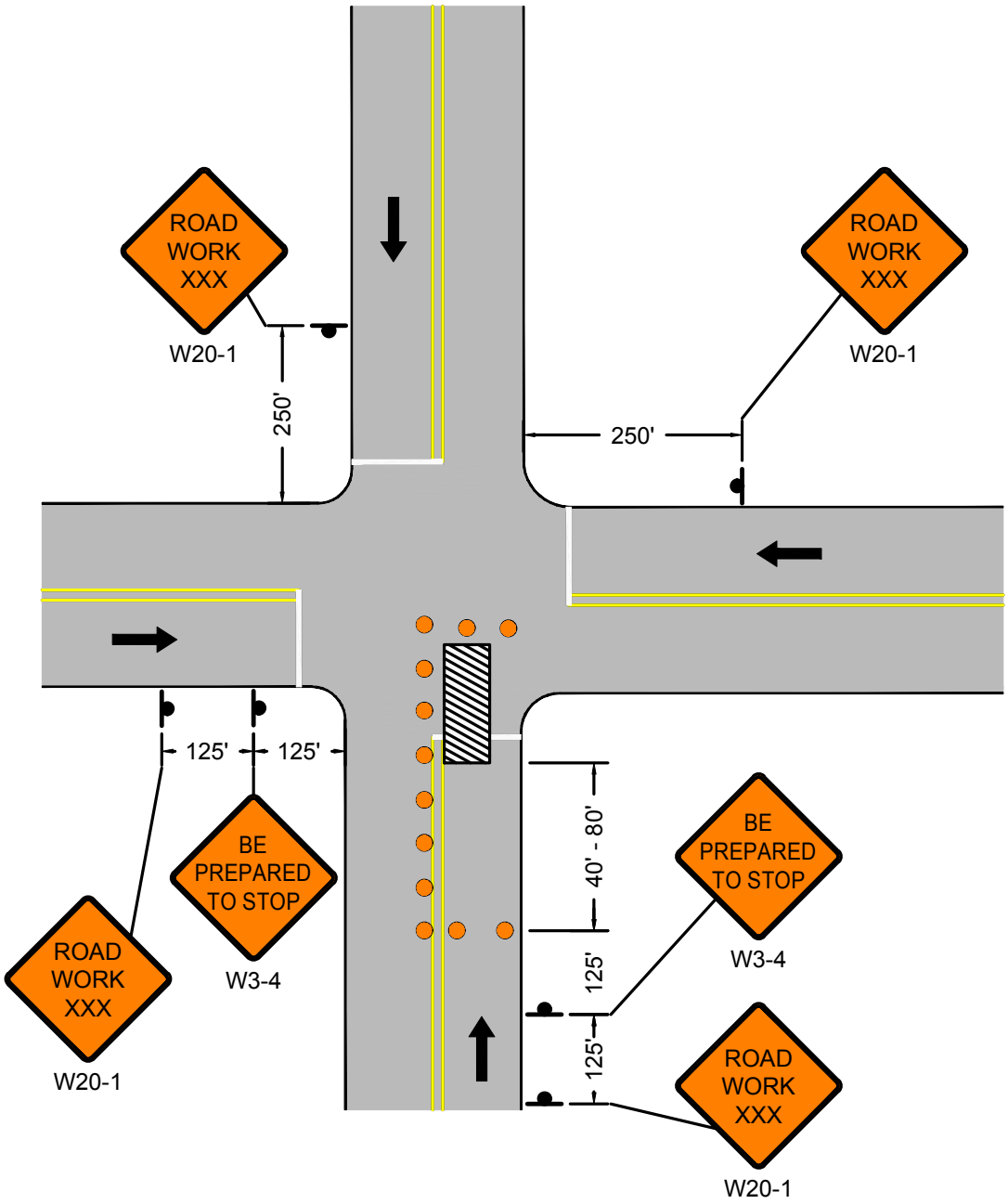
Work Zone Safety Standard Details and Drawings

FIGURE 42
TRAFFIC SIGNAL REPAIR WORK
MULTILANE UNDIVIDED ROADWAY
LEFTMOST OR LEFT TURNING LANE

massDOT Massachusetts Department of Transportation Highway Division PAGE 76	Work Zone Safety Standard Details and Drawings	FIGURE 43 TRAFFIC SIGNAL REPAIR WORK TWO LANE UNDIVIDED ROADWAY ONE LEG OF INTERSECTION



LEGEND

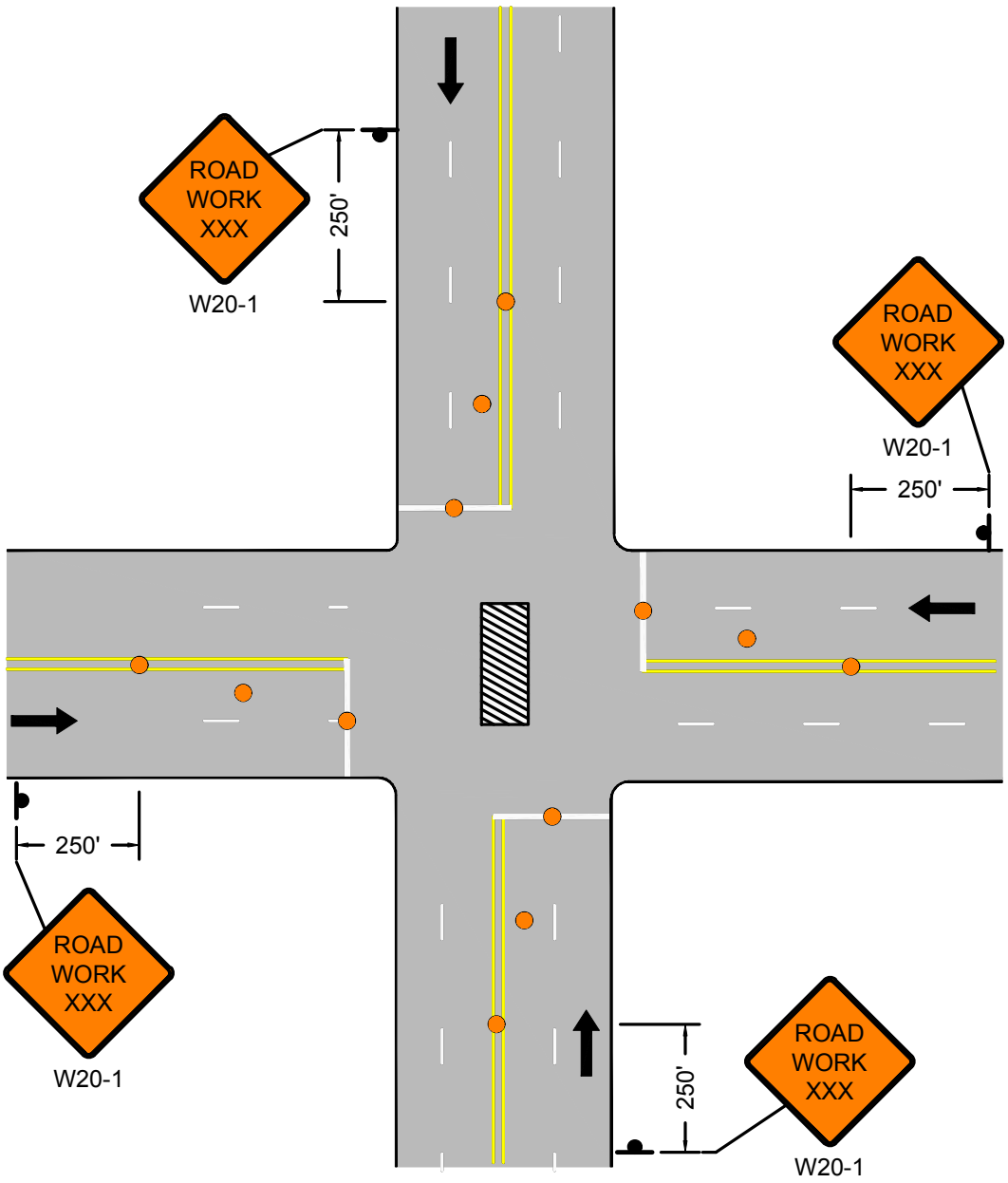
WORK ZONE

CHANNELIZATION DEVICE

NOT TO SCALE

NOTES

1. DURATION OF WORK = 20 MINUTES OR LESS.
2. EQUIPMENT: 12 CONES + 6 PORTABLE SIGNS.
3. CONE SPACING IS 20 FEET.
4. SINGLE WORK VEHICLE PARKED/STOPPED.
5. POLICE DETAIL REQUIRED.



LEGEND

WORK ZONE

CHANNELIZATION DEVICE

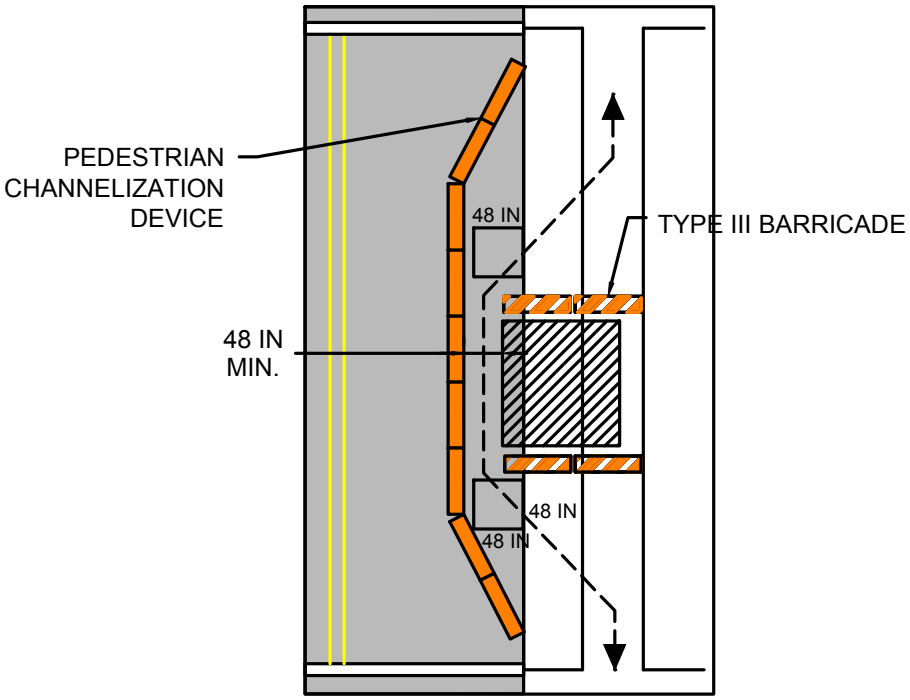
NOT TO SCALE

NOTES

1. DURATION OF WORK = 20 MINUTES OR LESS.
2. EQUIPMENT: 12 CONES + 4 PORTABLE SIGNS.
3. CONE SPACING IS 20 FEET.
4. SINGLE WORK VEHICLE PARKED/STOPPED.
5. POLICE DETAIL REQUIRED.

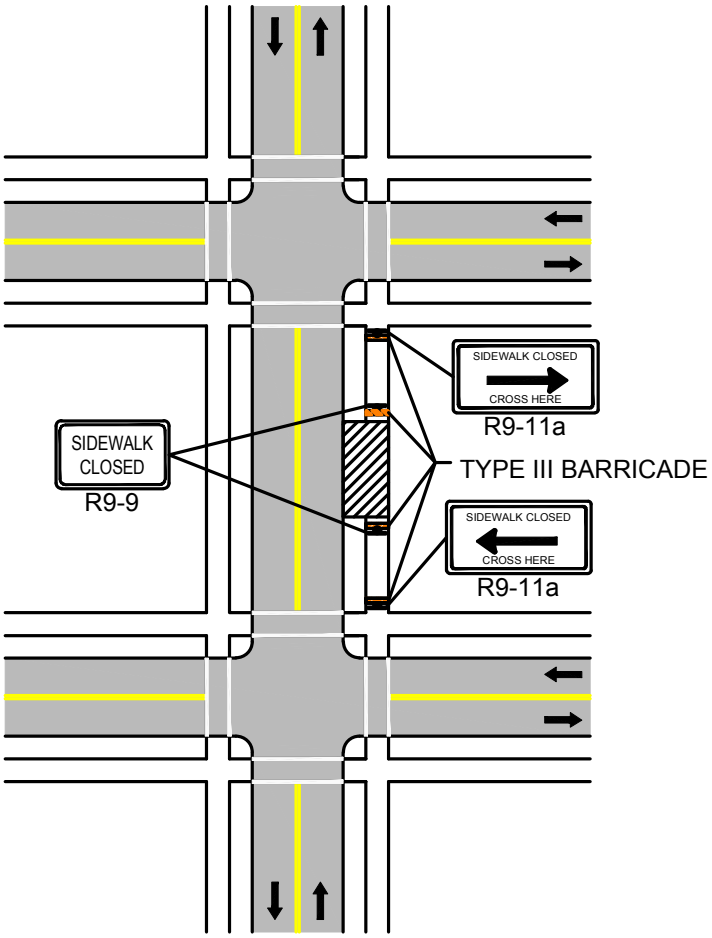
massDOT Massachusetts Department of Transportation Highway Division PAGE 77	Work Zone Safety Standard Details and Drawings	FIGURE 44 TRAFFIC SIGNAL REPAIR WORK MULTILANE UNDIVIDED ROADWAY CENTER OF INTERSECTION

massDOT Massachusetts Department of Transportation Highway Division PAGE 78	Work Zone Safety Standard Details and Drawings	FIGURE 45 PEDESTRIAN BYPASS



NOTES:

1. WHEN EXISTING PEDESTRIAN FACILITIES ARE DISRUPTED, CLOSED, OR RELOCATED IN A TTC ZONE, TEMPORARY FACILITIES SHALL BE PROVIDED AND THEY SHALL BE DETECTABLE AND INCLUDE ACCESSIBILITY FEATURES CONSISTENT WITH THE FEATURES PRESENT IN THE EXISTING PEDESTRIAN FACILITY.
2. A PEDESTRIAN CHANNELIZATION DEVICE THAT IS DETECTABLE BY A PERSON WITH A VISUAL DISABILITY TRAVELING WITH THE AID OF A LONG CANE SHALL BE PLACED ALONG THE FULL LENGTH OF THE TEMPORARY PEDESTRIAN ROUTE.
3. WHEN USED, TEMPORARY RAMPS SHALL COMPLY WITH AMERICANS WITH DISABILITIES ACT.
4. THE ALTERNATE PATHWAY SHOULD HAVE A SMOOTH CONTINUOUS HARD SURFACE FOR THE ENTIRE LENGTH OF THE TEMPORARY PEDESTRIAN FACILITY.
5. THE TEMPORARY SIDEWALK SHOULD BE A MINIMUM OF 4 FEET WIDE. IF THE SIDEWALK EXCEEDS 200 FEET THEN A 5 FOOT BY 5 FOOT PASSING ZONE SHALL BE PROVIDED NEAR THE MID-POINT OF THE CLOSURE.
6. THE PROTECTIVE REQUIREMENTS OF A TTC WORK ZONE MAY HAVE AN IMPACT IN DETERMINING THE NEED FOR TEMPORARY TRAFFIC BARRIERS AND THEIR USE IN PROVIDING PEDESTRIAN DELINEATION SHOULD BE BASED ON ENGINEERING JUDGMENT.
7. ON-DEMAND PEDESTRIAN ASSISTANCE PERSONNEL TO ASSIST WITH NAVIGATION AROUND THE CLOSURE/WORK AREA MAY BE CONSIDERED AS AN OPTION IN PLACE OF PROVIDING ADA/AAB DEVICES FOR WORK FOR CLOSURES LASTING 4 HOURS OR LESS.
8. CONTROLS ONLY FOR PEDESTRIAN TRAFFIC ARE SHOWN; VEHICULAR TRAFFIC SHOULD BE HANDLED AS SHOWN ELSEWHERE. THESE DETAILS ARE USED IN CONJUNCTION WITH THE PROPOSED LANE CLOSURE DETAILS AND DURING CONSTRUCTION STAGING, AS DETERMINED BY THE ENGINEER.



NOTES:

1. CLOSURE OF A SIDEWALK FACILITY SHALL CONSTITUTE THE PROVISION FOR MANAGING PEDESTRIAN TRAFFIC AND ACCOMMODATING ALL USERS. IF THE EXISTING PEDESTRIAN ACCESS ROUTE(S) CAN BE TEMPORARILY RELOCATED ALONG THE EXISTING SIDEWALK , AND SAID FACILITY PROVIDES A MINIMUM WIDTH OF 48-INCHES OF SOLID, SMOOTH UNOBSTRUCTED SURFACE, THEN NO DETOURING OF THE ROUTE SHALL BE REQUIRED. DELINEATION OF THE WORK AREA IS STILL REQUIRED.

2. IF IT IS NECESSARY TO DIVERT PEDESTRIAN TRAFFIC TO AN ALTERNATE ROUTE ACROSS THE ROADWAY FROM THE EXISTING FACILITY, THE FIGURE ABOVE SHALL BE FOLLOWED TO PROVIDE ADEQUATE DIRECTION TO PEDESTRIANS. ALTERNATE ROUTE SHALL PROVIDE THE SAME LEVEL OF ACCOMMODATION AS THE FACILITY THAT IS BEING DETOURED AND RETAIN ADA COMPLIANCE IN ITS ENTIRETY.

3. FOR EMERGENCY OR SHORT-DURATION SIDEWALK CLOSURES OF 4-HOURS OR LESS, IT IS OPTIONAL TO HAVE ON-DEMAND PEDESTRIAN ASSISTANCE PERSONNEL AVAILABLE AT ALL TIMES DURING THE CLOSURE TO ASSIST THOSE MOBILITY CHALLENGED PERSONS WHO REQUIRE ADDITIONAL ASSISTANCE TO SAFELY NAVIGATE AROUND THE WORK AREA IN LIEU OF A FULL DETOUR.

massDOT Massachusetts Department of Transportation Highway Division PAGE 80	Work Zone Safety Standard Details and Drawings	STATIONARY OPERATIONS BIKE LANE CLOSURE

POSTED SPEED LIMIT (MPH)	SPACING FOR BIKE ADVANCE WARNING SIGNS (FT) (A,B))	CHANNELIZATION DEVICES (DRUMS OR CONES)			
		TRANSITION LENGTH (L/3)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	150 / 150	100	305	20	45
45-55	150 / 150	220	495	40	35
60-65	150 / 150	260	645	40	40

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

NOTES

1. DETAIL SHALL BE USED IN CONJUNCTION WITH THE PROPOSED LANE CLOSURE DETAILS. SIGNING SHOWN ONLY FOR BIKE TRAFFIC. FOLLOW ALL OTHER RELEVANT DETAILS FOR TTC DEVICES FOR VEHICULAR TRAFFIC.
2. ** SIGN SHALL BE USED ONLY IF THERE IS A MARKED BIKE LANE.
3. *** SIGN SHALL BE USED ONLY IF THERE IS NO MARKED BIKE LANE.

LEGEND


WORK ZONE


CHANNELIZATION DEVICE

FLASHING ARROW BOARD


PORTABLE CHANGEABLE MESSAGE SIGN


TRUCK MOUNTED ATTENUATOR

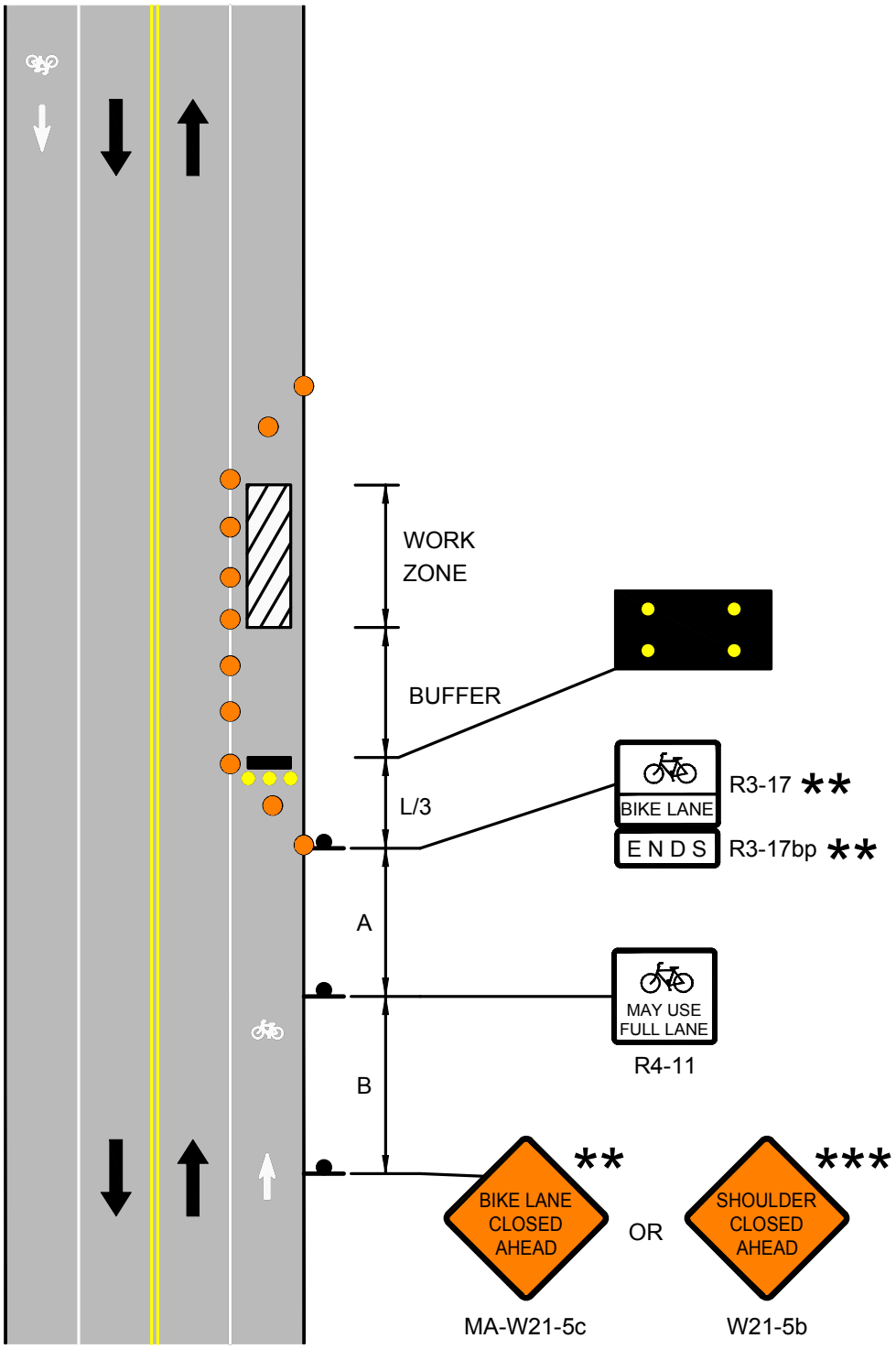
RADAR SPEED FEEDBACK BOARD

POLICE DETAIL OR UNIFORMED FLAGGER

TEMPORARY PORTABLE RUMBLE STRIP

TYPE III BARRICADE

NOT TO SCALE



massDOT Massachusetts Department of Transportation Highway Division PAGE 81	Work Zone Safety Standard Details and Drawings	FIGURE 48 STATIONARY OPERATIONS BIKE LANE CLOSURE

Rev. June, 2017

DOCUMENT A00820

Massachusetts Department of Transportation
Conditions of Custody

REQUEST FOR RELEASE OF MASSDOT AUTOCAD FILES FORM
(Only to be used following award of contract)

City/Town: BOSTON-CAMBRIDGE Project File Number: 608762

Contract Number: 124916

Project Description: Bridge Preservation of B-16-246=C-01-029, Eliot Street over the Charles River

All AutoCAD files are provided solely as a courtesy to facilitate public access to information. MassDOT attempts to provide current and accurate information but cannot guarantee so. MassDOT provides such documents, files or other data "as is" without any warranty of any kind, either expressed or implied, including but not limited to, accuracy, reliability, omissions, completeness and currentness. The Commonwealth of Massachusetts and its Consultants shall not be liable for any claim for damages, including lost profits or other consequential, exemplary, incidental, indirect or special damages, relating in any way to the documents, files or other data accessible from this file, including, but not limited to, claims arising out of or related to electronic access or transmission of data or viruses. Because data stored on electronic media can deteriorate undetected or be modified without our knowledge, MassDOT cannot be held liable for its completeness or correctness. MassDOT makes no representation as to the compatibility of these files beyond the version of the stated CAD software.

By signing this form, I agree that it shall be my responsibility to reconcile this electronic data with the conformed contract documents, and that only the conformed contract documents shall be regarded as legal documents for this Project. I understand that this authorization does not give me the right to distribute the files. I agree to the terms above and wish to receive the AutoCAD files.

This signed form shall be emailed to the Highway Design Engineer at the MassDOT -Highway Division at the following email address:

DOTHighwayDesign@dot.state.ma.us
Attn: AutoCAD Files

Name of person requesting AutoCAD files: _____

Affiliation/Company: _____

Address: _____

_____

Telephone number: _____

Email address: _____

Signature/Date: _____

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DOCUMENT A00847

U.S. Department of Homeland Security

United States Coast Guard

Bridge Work Notification – Inspections and Repairs

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U.S. Department of Homeland Security
United States Coast Guard

Commander
First Coast Guard District

408 Atlantic Av.
Boston, MA 02110
Staff Symbol: (dpb)
Phone: (781) 901-0348
Jeffrey.D.Stieb@uscg.mil

Bridge Work Notification – Inspections and Repairs

The timely notification of bridge inspections and repairs allows the Coast Guard to notify vessels transiting the waterway. Type or print clearly and e-mail to the Bridge Management Specialist listed above at least fifteen (15) days prior to commencing work. Please note that the Coast Guard needs 90 days notice of projects which require waterway closures.

Bridge Owner and Point of Contact: Melissa Lenker, MassDOT - Highway Division	
Address: 10 Park Plaza, Room 4260, Boston, MA 02116 Room 7360	
Office Phone:	**Cell:** 978-429-1772

Project Description, Bridge Name, Waterway:
Bridge #B-16-246 is located over the Charles River between the City of Cambridge and Boston. Massachusetts Department of Transportation (MassDOT) is proposing to perform "repair-in-kind" rehabilitation of several bridge elements. The rehabilitation tasks include:

- Partial depth concrete repair to the entire sidewalk to repair existing deterioration and produce a uniform walking surface.
- Bridge joint replacement at the east and west abutments.
- Reconstruction of the median (concrete railing)
- Replacement of the median lighting.
- Installation of end treatment for the proposed median reconstruction.
- Complete reconstruction of the brick arch opening at each abutment portal.
- Bridge drainage cleaning and restoration at scupper locations.
- Milling and paving of the bridge deck.
- Spot deck concrete repair.
- Spot truss concrete encasement repair.
- Development of traffic management plans.
- Revised pavement marking plans.

Start Date:	**Finish Date:**	**Work Hours: 8**

Work Methods, Reduction of Vertical and Horizontal Clearance, and Impact on Navigation:
A barge will be used to assist with the repair and rehabilitation activities. The use of movable spud barges will be temporarily placed along the bottom of the Charles River to provide stability. The spud on the barge is 18' aluminum tubes which are raised and lifted from vertical by an electric cable winch system.

The repairs to the underside of the bridge will occur from the barge and will be limited to one "arch" span at a time. The Contractor will be required to provide adequate warning on the waterway for vessels to avoid the work area. At no time will two of the three navigable spans be accessed by the Contractor to perform work. The proposed temporary impacts to navigation have been minimized to the extent practicable.

A chart or map of the bridge location, photographs, and/or an elevation view of work locations and the effect of the work on clearances will allow the Coast Guard to provide a faster response.

Attachments:

- Figures
- Attachment A – Site Plans
- Attachment B – Photographic Log

Contractor Name and Contact Information: To be determined after project is placed to public bid. Contractor contact information will be provided as soon as the Contractor is selected.

Vessels on Scene, Location of Vessels, and Radio Frequency Monitored:
One movable spud barge will be utilized to conduct repairs on the underside of the bridge. As mentioned above, the barge will be placed under one "arch" span at a time, to avoid impacting navigation.

24 Hour On-Scene Point of Contact and Cell Number: To be provided once Contractor is selected for the work.

12/9/19

Location: \\BOSFIL11\Data2\NAI_proj\MASSDOT\2018\E2X69149 - Eliot bridge\600 Discipline Resource Files\620 Environmental\GIS\Figure 1 - USGS Map.mxd

Prepared for: massDOT Highway Division

Prepared by: Jacobs

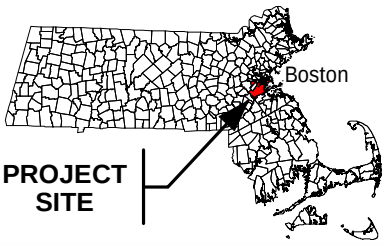
FIGURE 1 - USGS MAP

BRICK AND GRANITE CAP REPAIR AND REPLACEMENT
ELIOT STREET OVER THE CHARLES RIVER
BOSTON, SUFFOLK COUNTY, MASSACHUSETTS

MAY 2022

608762

Location: \\BOSFIL11\Data2\NAI_proj\MASSDOT\2018\E2X69149 - Eliot bridge\600 Discipline Resource Files\620 Environmental\GIS\Figure 2 - Aerial Map.mxd



0 175 350 Feet

1 inch = 204 feet

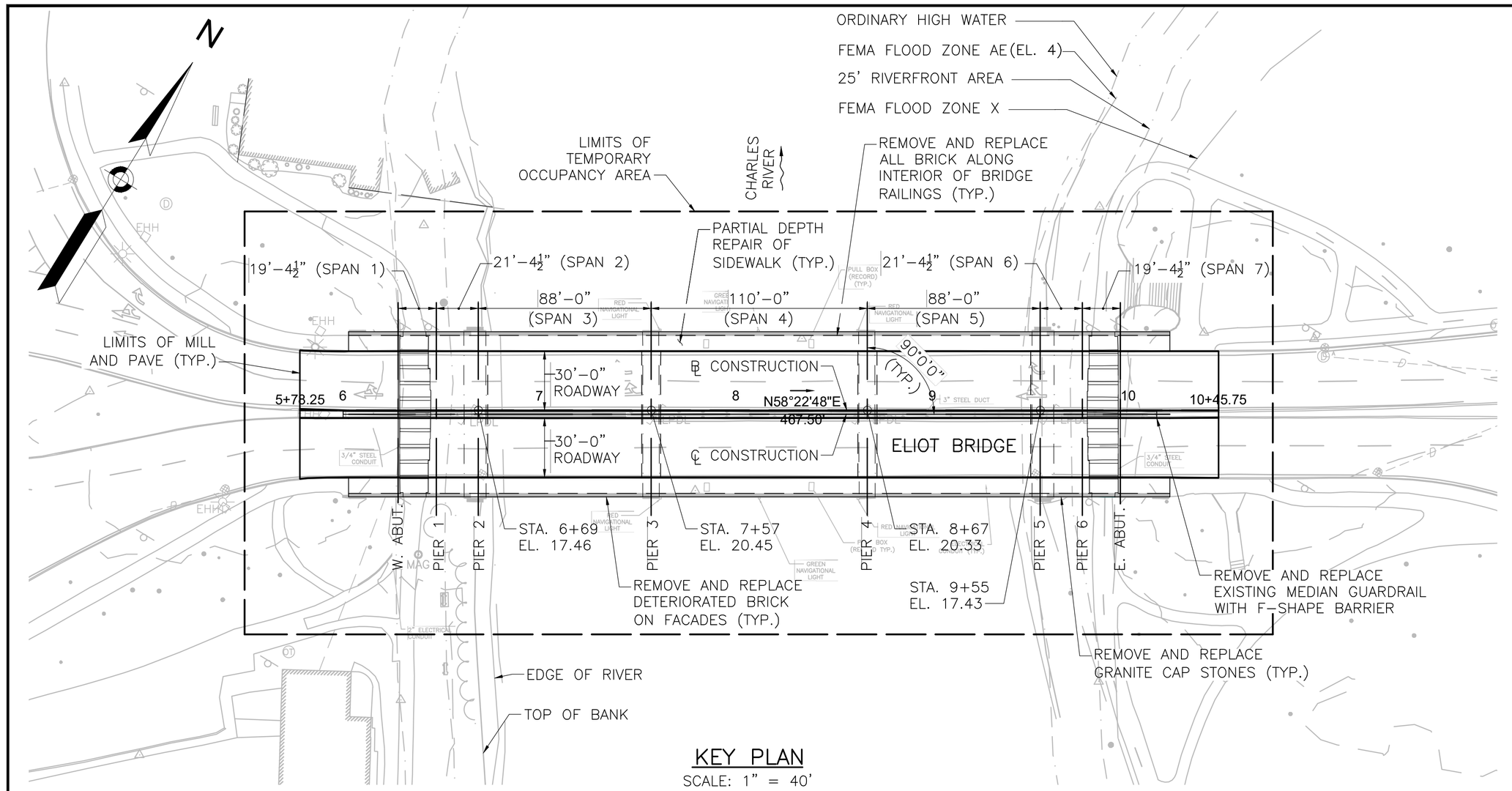
Prepared for: massDOT Highway Division

Prepared by: Jacobs

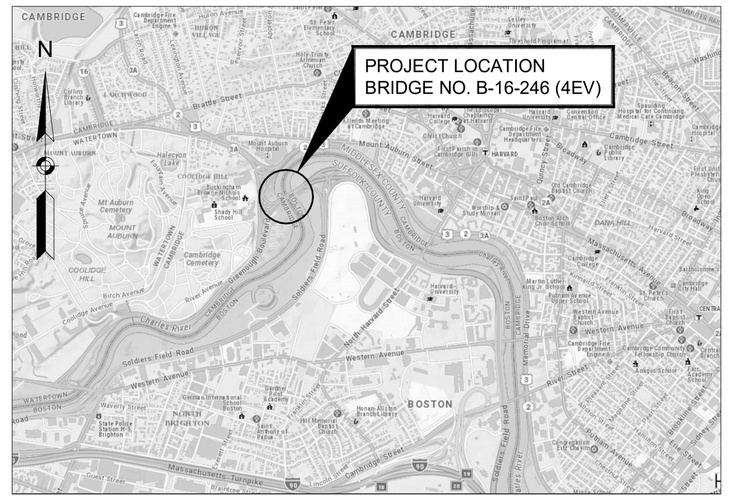
FIGURE 2 - AERIAL MAP

BRICK AND GRANITE CAP REPAIR AND REPLACEMENT
ELIOT STREET OVER THE CHARLES RIVER
BOSTON, SUFFOLK COUNTY, MASSACHUSETTS

MAY 2022
608762



KEY PLAN
SCALE: 1" = 40'



LOCUS
SCALE: 1" = 2000'

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	–	7	19
PROJECT FILE NO. 608762			

FIRST SHEET

PROJECT INFORMATION	
PROJECT FILE NO.: 608762	
PROJECT DESCRIPTION: PROPOSED BRIDGE REPAIRS	
BRIDGE DESIGN LOADING: HL-15	
SURVEY: FIELD BOOK NO. 41472	
ELEVATION REFERENCE: NAVD OF 1988	
BENCH MARK:	#A-12 (BENCH MARK DISK), 42°21'41.8" (N) 071°05'50.9 (W), EL.=7.91'

TRAFFIC DATA	ROADWAY OVER	ROADWAY UNDER
DESIGN YEAR	2020	
AVERAGE DAILY TRAFFIC – PRESENT	49286	
AVERAGE DAILY TRAFFIC – DESIGN YEAR	49286	
DESIGN HOURLY VOLUME	4394	
DIRECTIONAL DISTRIBUTION	53%	
TRUCK PERCENTAGE – AVERAGE DAY	9%	
TRUCK PERCENTAGE – PEAK HOUR	9%	
DESIGN SPEED	35	
DIRECTIONAL DESIGN HOURLY VOLUME	2582	

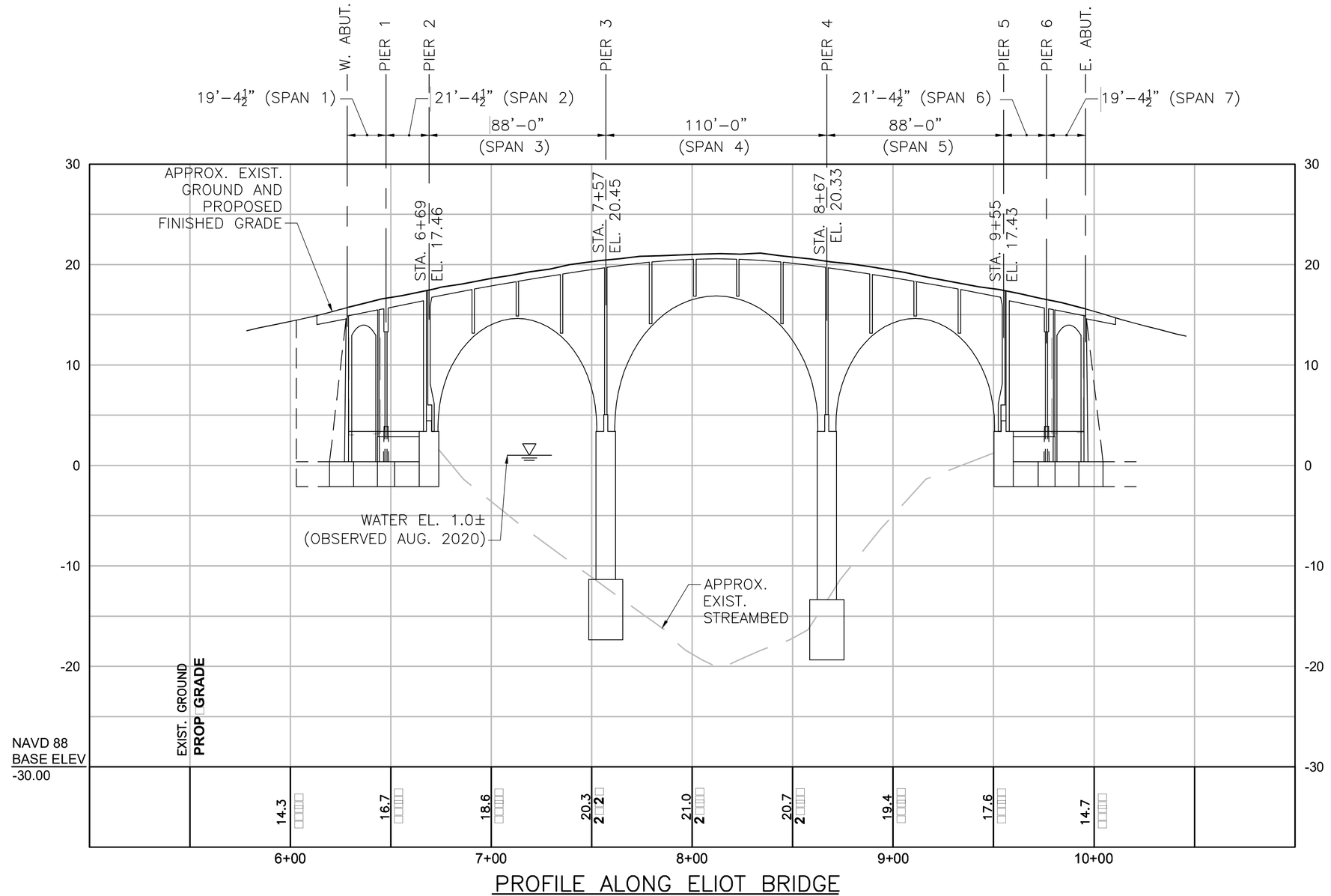
SEISMIC DESIGN CRITERIA	
DESIGN RETURN PERIOD:	1000 YEARS
DESIGN SPECTRA	
As	0.096
SDs	0.217
SD1	0.069
SITE CLASS	D
SEISMIC DESIGN CATEGORY (SDC)	A

DESIGN:

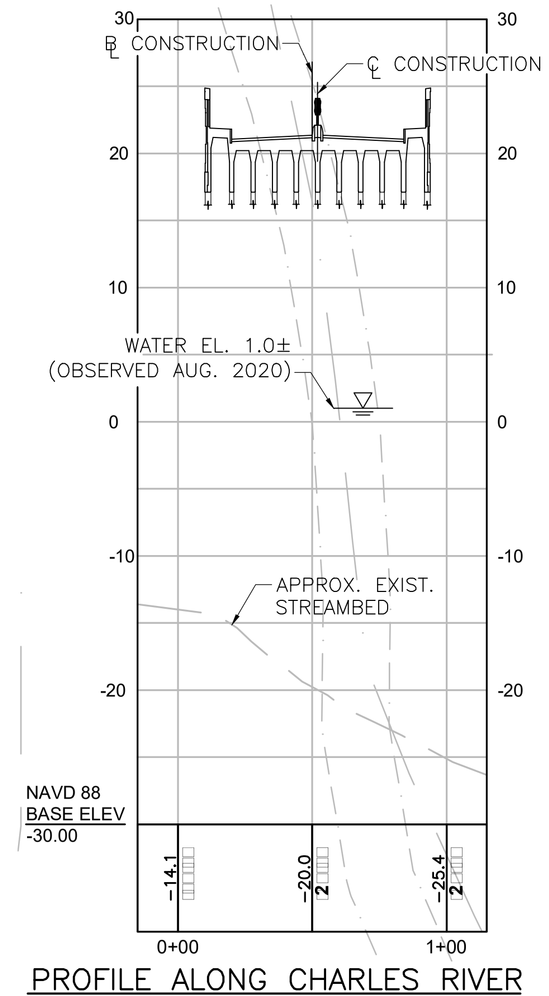
ALL REPAIRS INTENDED TO RESTORE FUNCTION AND CAPACITY OF ORIGINAL CONSTRUCTION. BRIDGE WAS DESIGNED TO AASHTO H-15 LOADING.

NOTES:

1. APPROVAL DOES NOT INCLUDE STRUCTURAL ANALYSIS.
2. DUE TO THE LIMITED NATURE OF THE PROPOSED WORK, NO GEOTECH OR HYDRAULIC REPORTS HAVE BEEN PREPARED FOR THIS PROJECT.
3. NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988 IS USED THROUGHOUT.
4. PLAN AND PROFILE ARE BASED ON SURVEY DATED AUGUST 2020 AND SUPPLEMENTED WITH PROFILE INFORMATION FROM EXISTING DESIGN DRAWINGS.



PROFILE ALONG ELIOT BRIDGE
HORIZ. SCALE: 1" = 40'
VERT. SCALE: 1" = 8'



PROFILE ALONG CHARLES RIVER
HORIZ. SCALE: 1" = 40'
VERT. SCALE: 1" = 8'

Jacobs
120 ST. JAMES AVENUE, 5TH FLOOR
BOSTON, MA 02116

massDOT
Massachusetts Department of Transportation
Highway Division

SKETCH PLANS OF PROPOSED BRIDGE REHABILITATION

ELIOT BRIDGE
OVER CHARLES RIVER

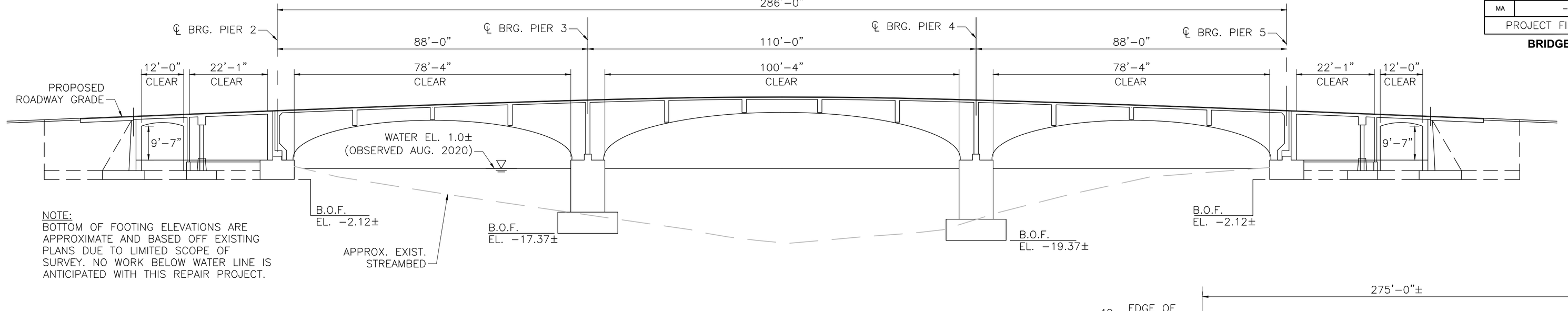
MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION

APPROVED BY	DATE
STRUCTURAL ELEMENTS:	
TITLE:	
HIGHWAY ELEMENTS:	
TITLE:	

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

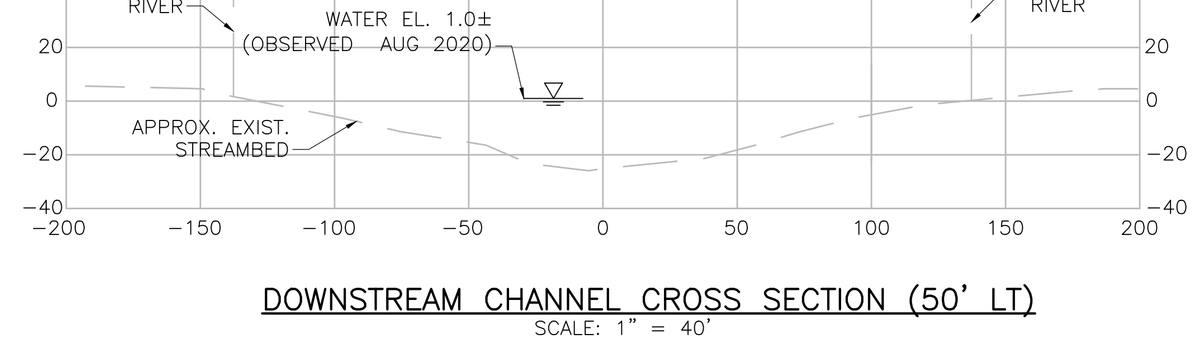
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	–	8	19
PROJECT FILE NO. 608762			

BRIDGE SECTIONS

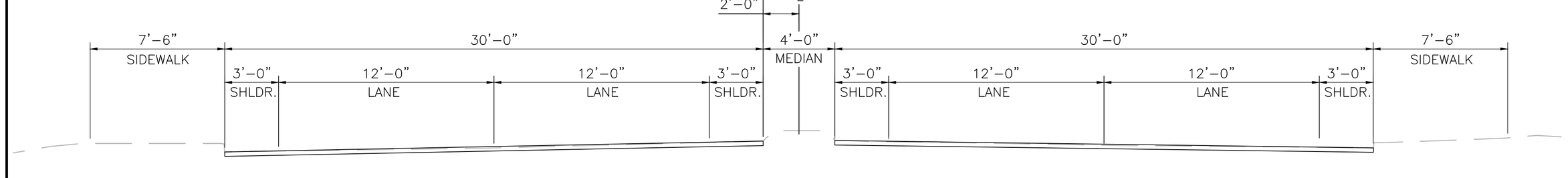


NOTE:
BOTTOM OF FOOTING ELEVATIONS ARE APPROXIMATE AND BASED OFF EXISTING PLANS DUE TO LIMITED SCOPE OF SURVEY. NO WORK BELOW WATER LINE IS ANTICIPATED WITH THIS REPAIR PROJECT.

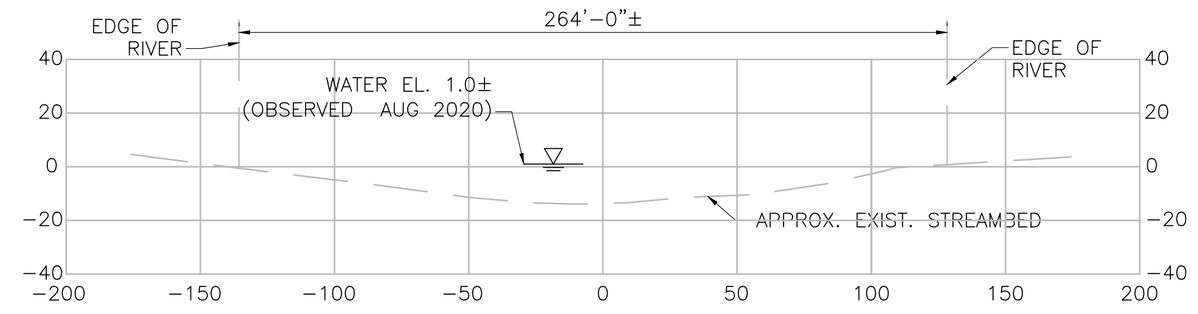
LONGITUDINAL SECTION
SCALE: $\frac{1}{16}$" = 1'–0"



DOWNSTREAM CHANNEL CROSS SECTION (50' LT)
SCALE: 1" = 40'

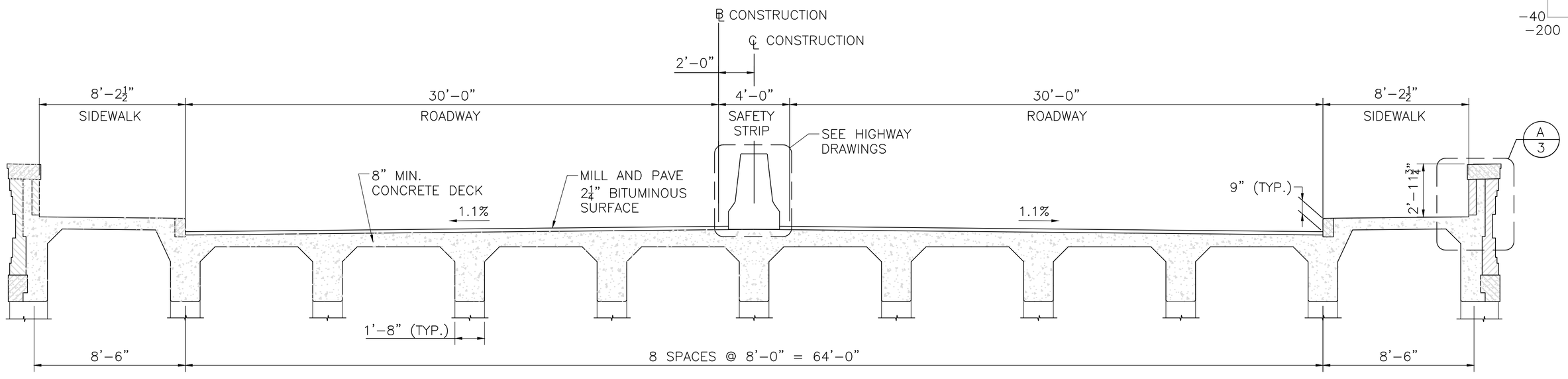


APPROACH SECTION
SCALE: $\frac{1}{4}$" = 1'–0"



UPSTREAM CHANNEL CROSS SECTION (50' RT)
SCALE: 1" = 40'

NOTE:
HYDRAULIC INFORMATION LIMITED. THERE IS NO WORK PROPOSED BELOW THE WATER LINE. ALL INFORMATION SHOWN IS TAKEN FROM EXISTING DRAWINGS OR OBSERVED WATER DURING SURVEY.

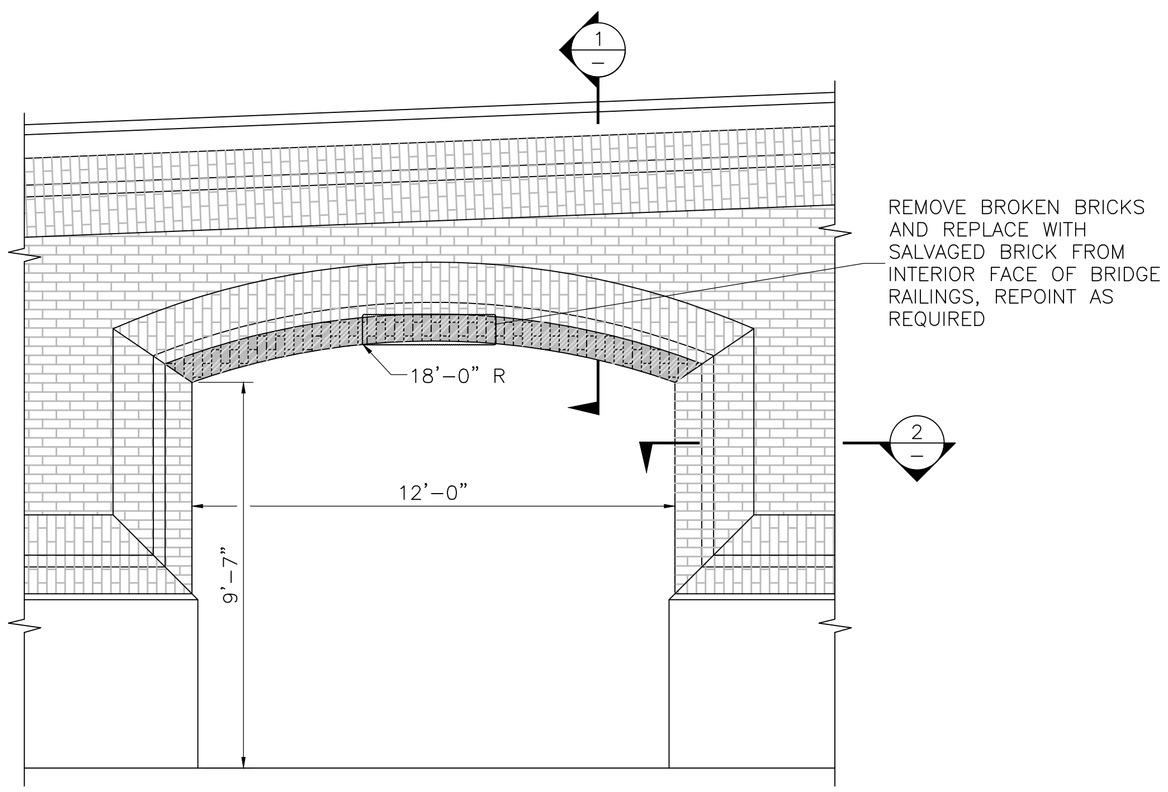


TRANSVERSE SECTION
SCALE: $\frac{1}{4}$" = 1'–0"

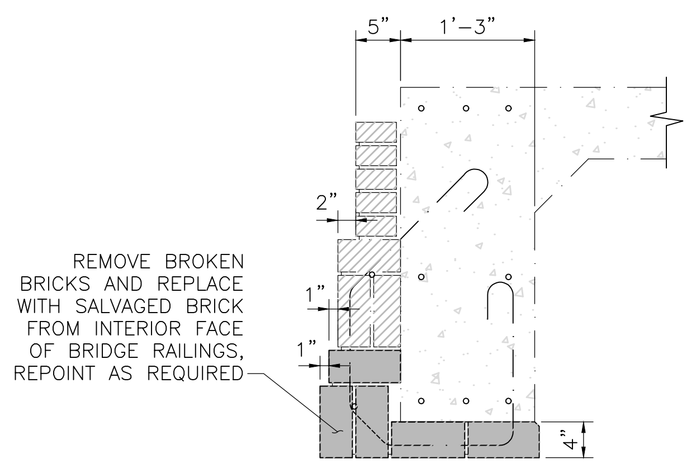
BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	–	9	12
PROJECT FILE NO. 608762			

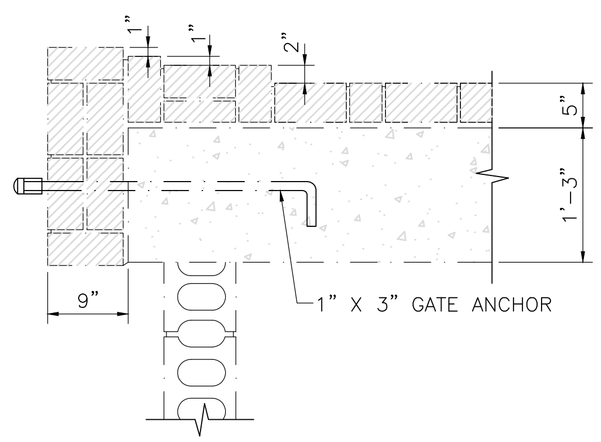
REPAIR DETAILS



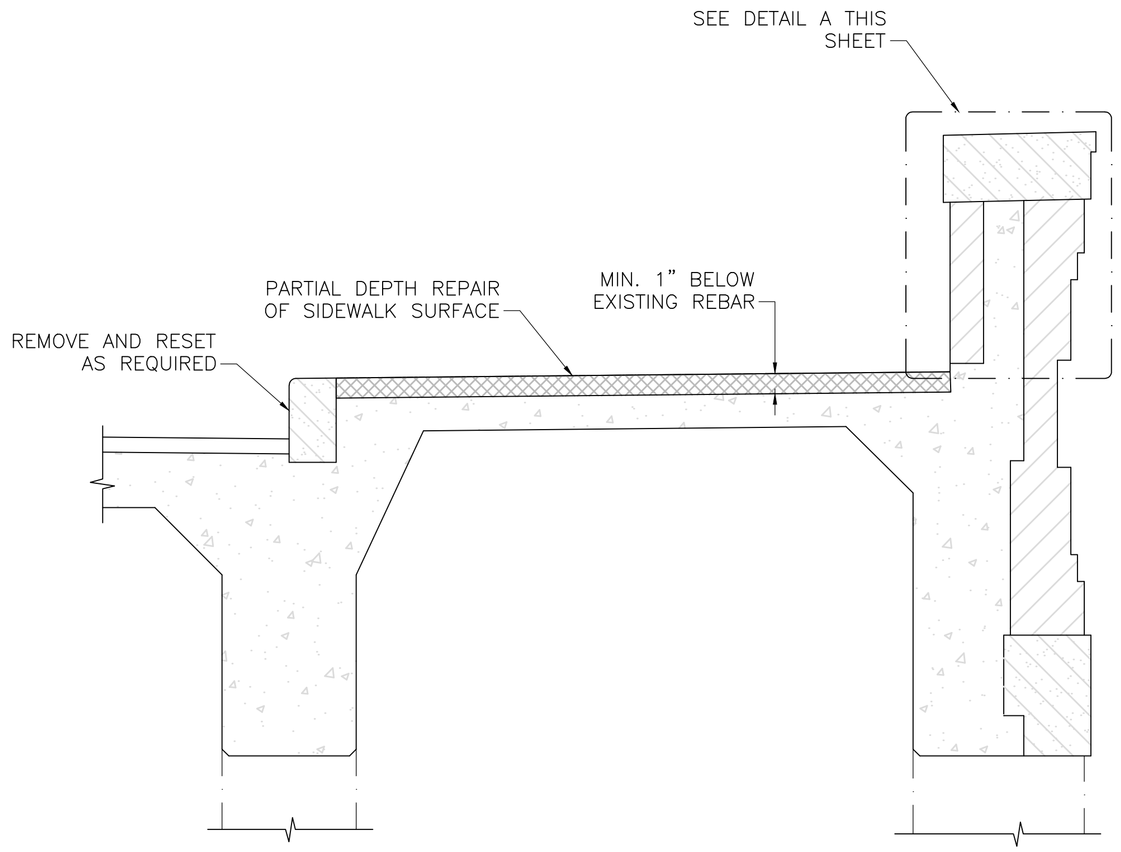
TYPICAL PEDESTIAN UNDERPASS ARCH ELEVATION
SCALE: $\frac{3}{8}$" = 1'–0"



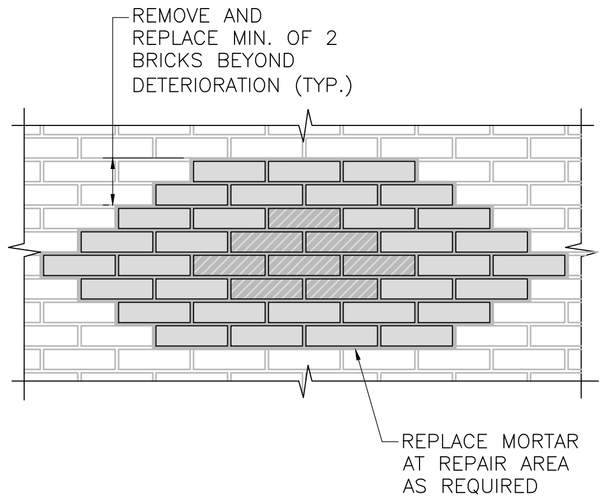
SECTION 1
SCALE: 1" = 1'–0"



SECTION 2
SCALE: 1" = 1'–0"



SIDEWALK REPAIR DETAIL
SCALE: $\frac{3}{4}$" = 1'–0"



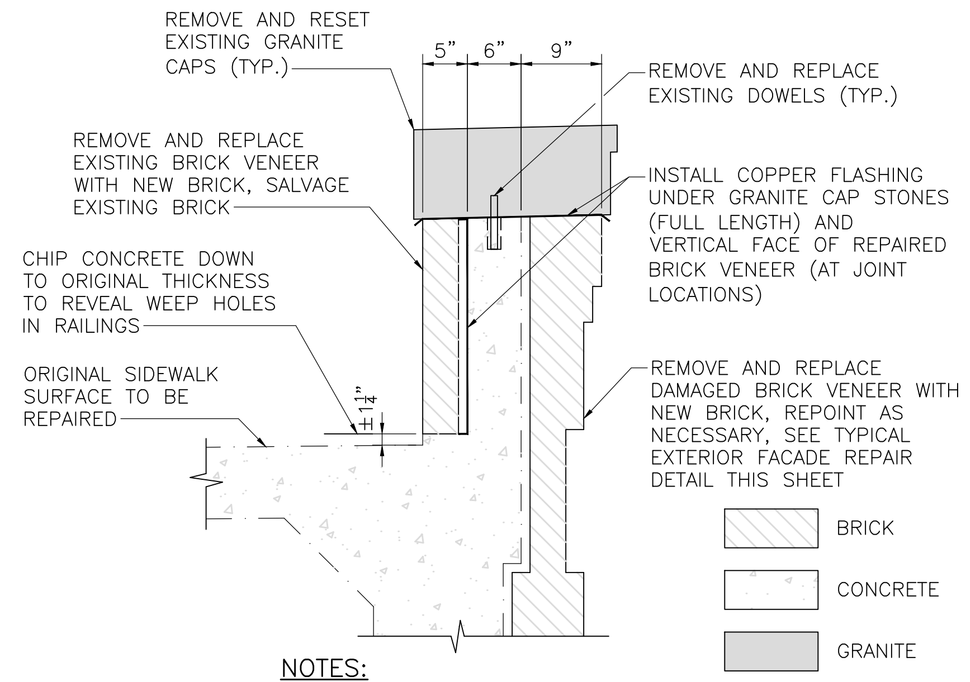
DAMAGED BRICK VENEER TO BE REMOVED AND REPACED

ADDITIONAL BRICK VENEER TO BE REMOVED AND REPLACED AS REQUIRED TO REPAIR AREA

NOTES:

REPLACEMENT BRICK SHALL BE SALVAGED BRICK FROM INTERIOR RAILING DEMOLITION, SEE REPAIR DETAIL 'A'.

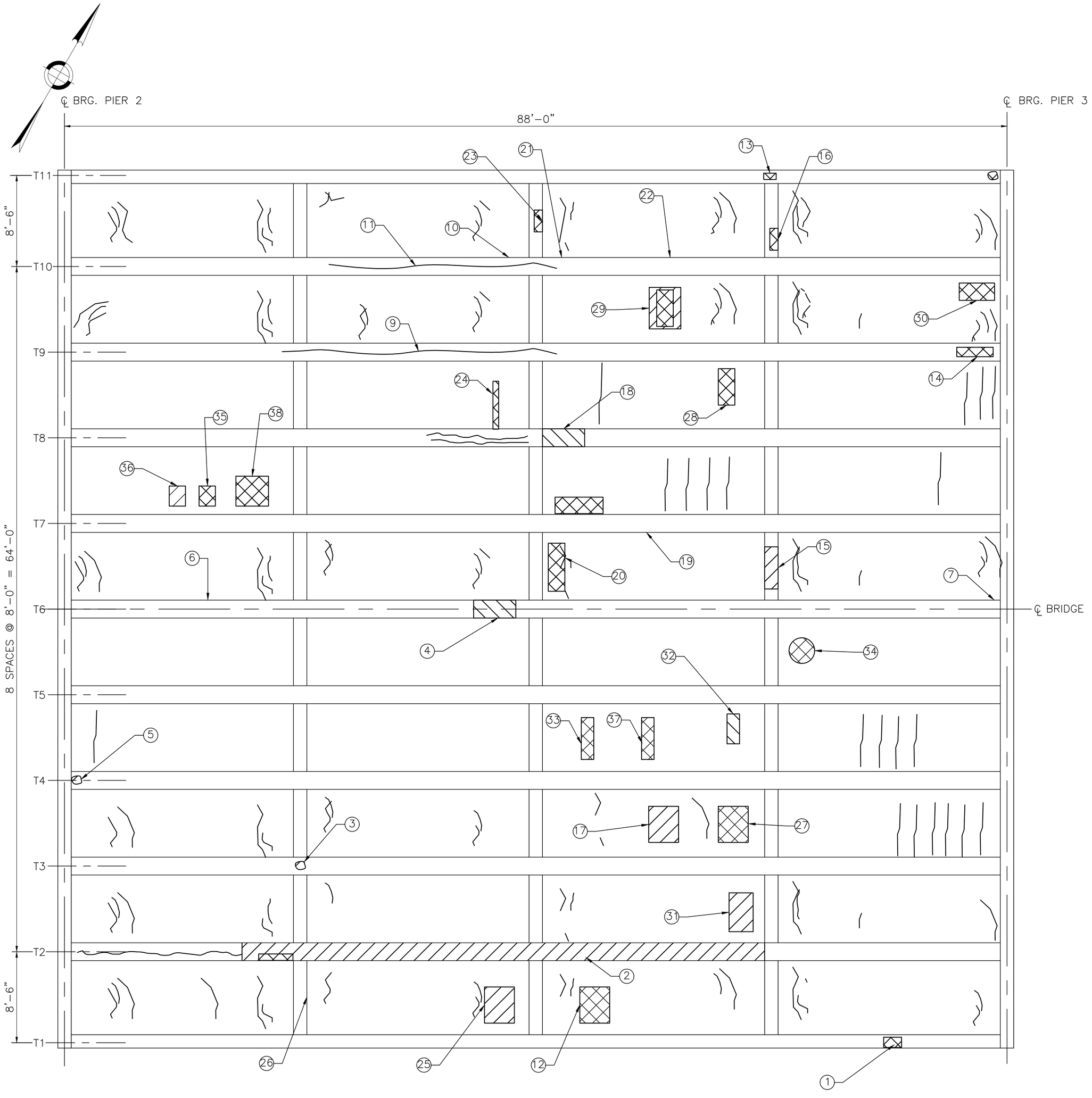
TYPICAL EXTERIOR FACADE REPAIR DETAIL
NOT TO SCALE



NOTES:

SEE SHEETS 7 THROUGH 12 FOR SPECIFIC LOCATIONS OF BRICK DETERIORATION.

DETAIL A
SCALE: 1" = 1'–0"



SPAN 3

SCALE: 3/16" = 1'–0"

REPAIR AREA #	LENGTH	WIDTH	DEPTH	DEFICIENCY
1	1'-6"	0'-1 1/2"	0'-2 1/2"	HOLLOW AREA/SPALL
2	30'-0"	FULL WIDTH	N/A	HOLLOW AREA
2	6'-3"	1'-6"	0'-8"	SPALL
3	1'-4"	9"	0'-1 1/2"	SPALL
4	6'-0"	1'-6"	0'-3 1/2"	SPALL
5	0'-8"	N/A	N/A	POPOUT
6	0'-8"	0'-3"	0'-4"	SPALL
7	0'-8"	0'-8"	N/A	HOLLOW AREA
8	8'-6"	FULL WIDTH	0'-3"	SPALL
9	13'-0"	0'-1"	N/A	SPALL
10	1'-0"	N/A	N/A	POPOUT
11	2'-8"	0'-2"	0'-4 1/2"	SPALL
12	1'-5"	0'-10"	0'-0 1/2"	SPALL
13	1'-5"	0'-8"	0'-1 1/2"	SPALL
14	2'-0"	0'-10"	0'-0 1/2"	SPALL
15	3'-0"	0'-8"	N/A	HOLLOW AREA
16	0'-10"	0'-6"	0'-1"	SPALL
17	3'-0"	1'-2"	N/A	HOLLOW AREA
18	4'-0"	0'-4"	N/A	DELAMINATION
19	0'-5"	0'-3"	0'-0 1/2"	POPOUT
20	0'-7"	0'-7"	0'-2"	3 SPALLS
21	0'-6 1/2"	0'-1 1/2"	N/A	POPOUT
22	1'-8"	0'-2 1/2"	N/A	POPOUT
23	0'-6"	0'-4"	0'-0 1/2"	SPALL
24	0'-6"	1'-6"	0'-1"	SPALL
25	2'-8"	0'-5"	0'-0 1/2"	POPOUT
26	0'-7"	1'-5"	0'-0 1/2"	SPALL
27	3'-6"	1'-1"	0'-1"	SPALL/ HOLLOW AREA
28	1'-5"	0'-4"	0'-1"	SPALL
29	2'-10"	3'-4"	0'-2"	SPALL
30	1'-4"	2'-6"	0'-2"	SPALL
31	0'-6"	1'-8"	N/A	HOLLOW AREA
32	1'-6"	1'-0"	N/A	HOLLOW AREA
33	3'-11"	1'-6"	0'-1 1/2"	SPALL
34	0'-6"	0'-6"	0'-2"	SPALL
35	2'-4"	0'-6"	0'-1"	SPALL
36	1'-0"	0'-3"	N/A	HOLLOW AREA
37	1'-5"	0'-7"	0'-1"	SPALL
38	3'-4"	0'-8"	0'-1"	SPALL

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	–	10	19
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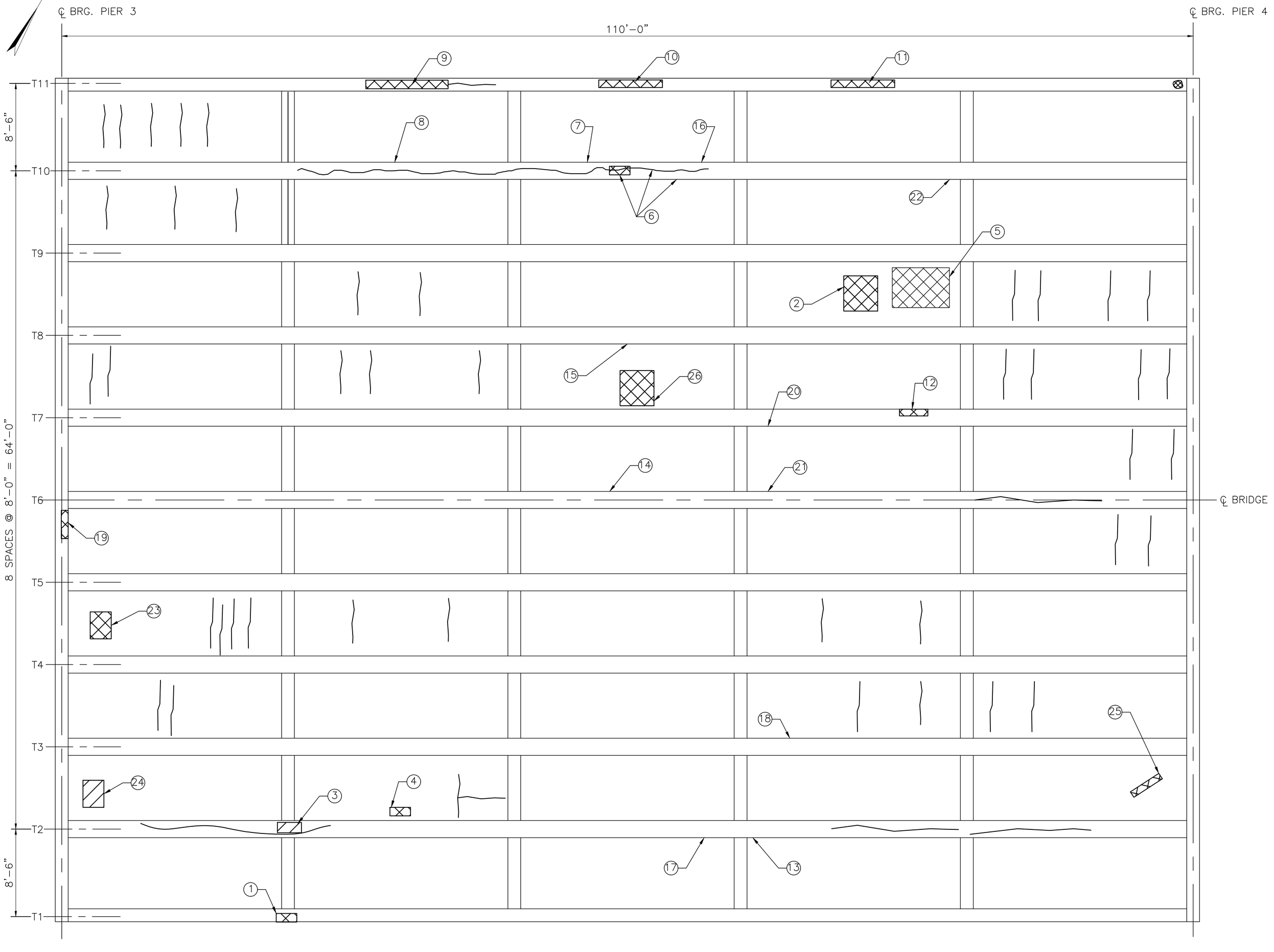
UNDERSIDE REPAIR AREAS (□ OF □)

UNDERSIDE REPAIR NOTES:

1. REPAIR AREAS ARE APPROXIMATE AND BASED ON ROUTINE BRIDGE INSPECTION CONDUCTED IN AUGUST 2019.
2. ALL REPAIR AREAS SHALL BE CONFIRMED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
3. ALL AREAS SHALL BE SOUNDED FOR LOOSE CONCRETE AND MARKED PRIOR TO REPAIR.
4. REPAIR DETAILS TO BE INCLUDED IN FUTURE SUBMISSION.

LEGEND:

~~~ – HAIRLINE CRACK WITH EFFLORESCENCE

XXX – SPALL

/// – HOLLOW SOUNDING AREA

T = TRUSS

HA = HOLLOW AREA
~~~



SPAN 4
SCALE: 3/16" = 1'–0"

UNDERSIDE REPAIR NOTES:

1. FOR UNDERSIDE REPAIR NOTES SEE SHEET 4.

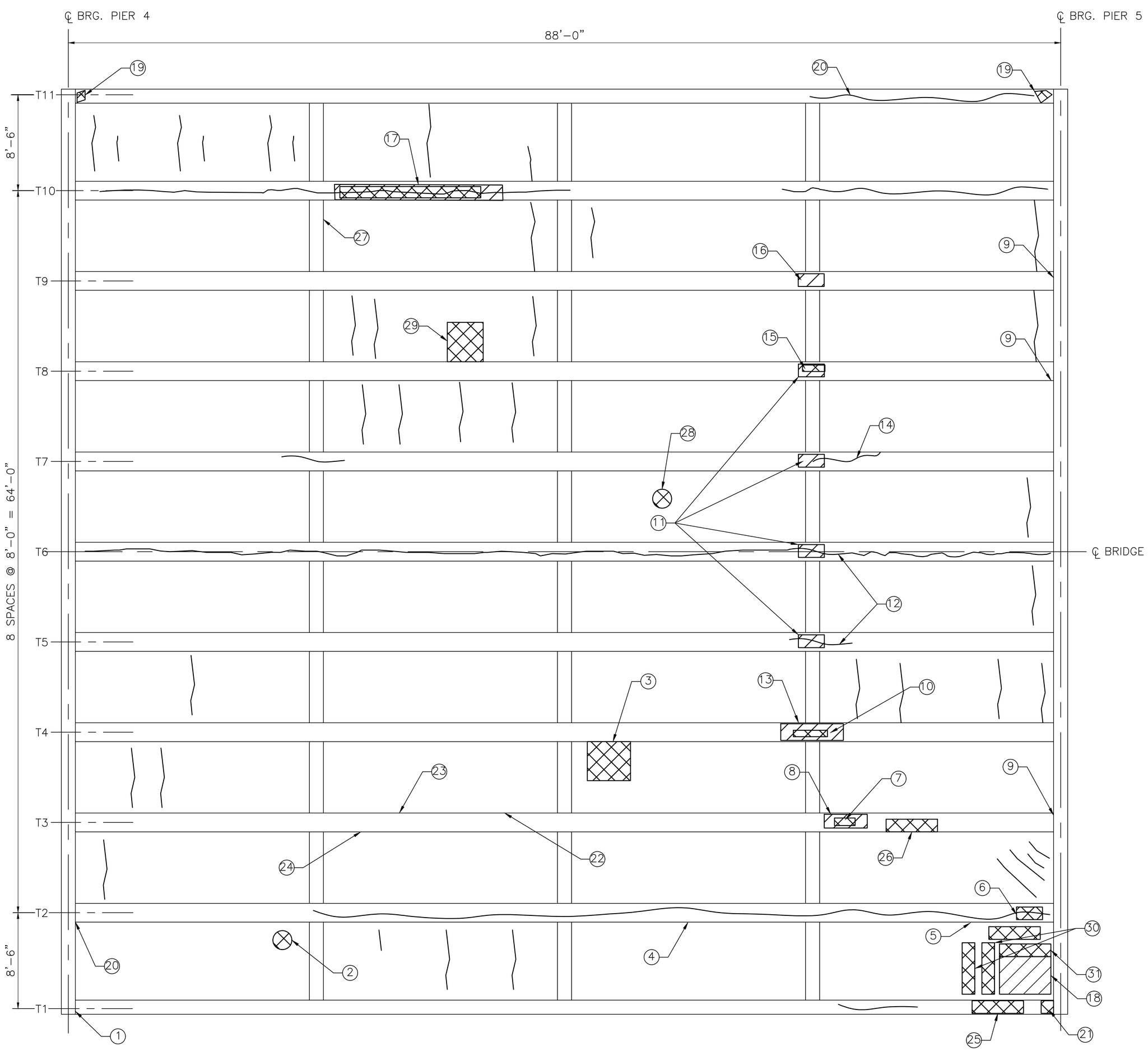
LEGEND:

~~~ – HAIRLINE CRACK WITH EFFLORESCENCE
▩ – SPALL
▨ – HOLLOW SOUNDING AREA
T = TRUSS
HA = HOLLOW AREA

REPAIR AREA #	LENGTH	WIDTH	DEPTH	DEFICIENCY
1	2'-6"	0'-10"	1-1/2"	SPALL
2	2'-6"	1'-9"	0'-1 1/2"	SPALL
3	2'-4"	1'-0"	N/A	HOLLOW AREA
4	0'-9"	0'-9"	0'-0 1/2"	SPALL
5	3'-6"	2'-0"	0'-1"	SPALL
6	7'-0"	FULL WIDTH	0'-3"	SPALL
7	0'-7"	N/A	N/A	HOLLOW AREA
8	8'-0"	2'-6"	0'-6"	SPALL/HOLLOW AREA
9	10'-0"	0'-11"	0'-3"	SPALL
10	6'-0"	0'-8"	0'-1 1/2"	SPALL
11	7'-0"	1'-0"	0'-1 1/2"	SPALL
12	3'-0"	0'-7"	0'-1"	SPALL
13	1'-3"	0'-4"	0'-3"	SPALL
14	6'-0"	FULL WIDTH	0'-4"	HOLLOW AREA
15	1'-6"	0'-6"	0'-1"	6 SPALLS/ POPOUTS
16	1'-6"	0'-8"	0'-0 1/2"	SPALL
17	1'-3"	0'-2"	0'-2"	SPALL
18	0'-4"	0'-2"	0'-0 1/2"	POPOUT
19	1'-8"	1'-0"	0'-1"	2 SPALLS
20	0'-6"	0'-6"	0'-0 1/2"	SPALL
21	1'-9"	0'-3"	0'-0 1/2"	SPALL
22	0'-9"	0'-9"	0'-1 1/2"	SPALL
23	0'-8"	1'-0"	0'-1"	SPALL
24	1'-0"	2'-0"	N/A	HOLLOW AREA
25	1'-0"	N/A	N/A	POPOUT
26	2'-0"	1'-4"	0'-1 1/2"	SPALL
~~~

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	–	12	19
PROJECT FILE NO. 608762			

UNDERSIDE REPAIR AREAS (□ OF □)



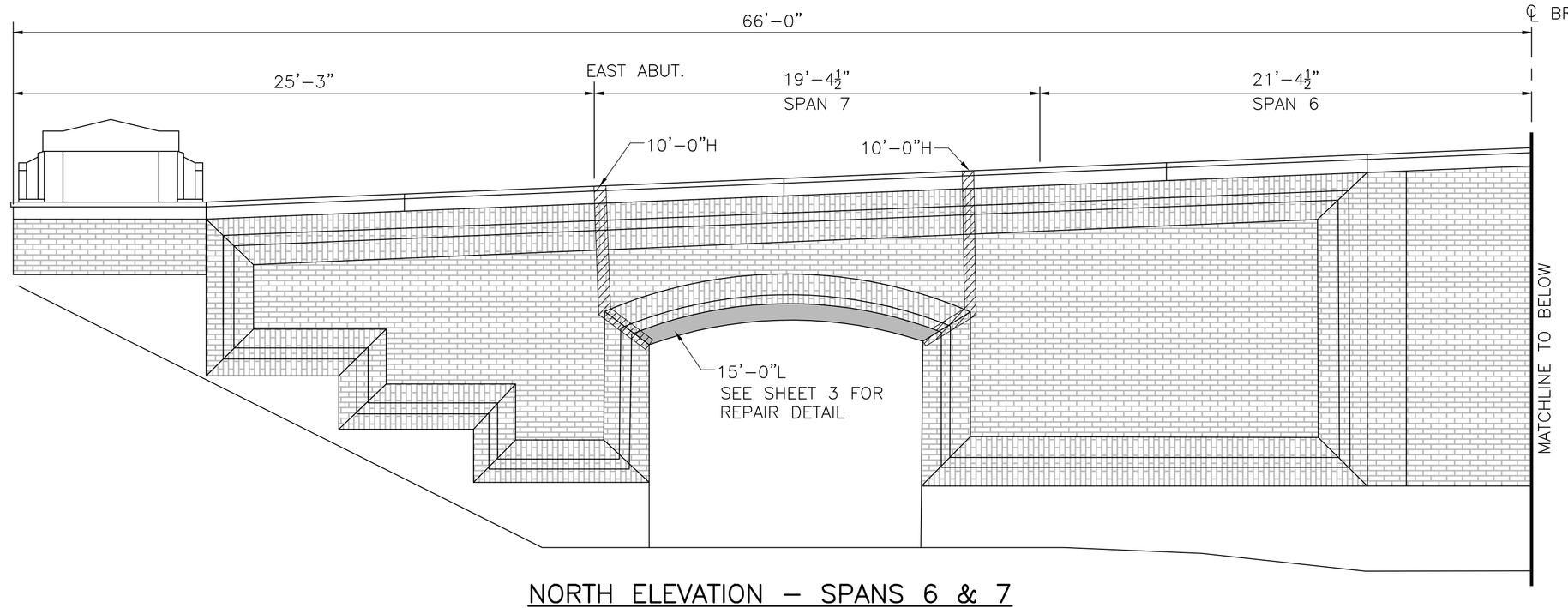
SPAN 5
SCALE: 3/16" = 1'–0"

UNDERSIDE REPAIR NOTES:

1. FOR UNDERSIDE REPAIR NOTES SEE SHEET 4.

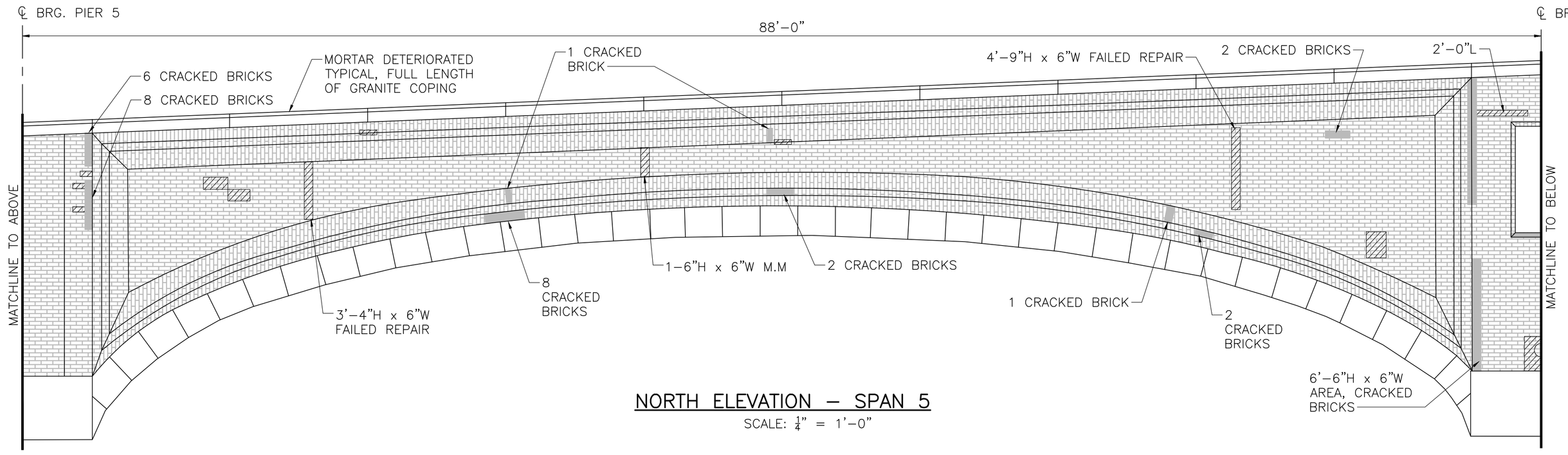
LEGEND:

~~~ – HAIRLINE CRACK WITH EFFLORESCENCE

XXXX – SPALL

//// – HOLLOW SOUNDING AREA

T = TRUSS

HA = HOLLOW AREA

REPAIR AREA #	LENGTH	WIDTH	DEPTH	DEFICIENCY
1	0'-8"	N/A	N/A	SPALL
2	1'-0"	0'-4"	0'-0 1/2"	SPALL
3	2'-10"	2'-0"	0'-1 1/2"	SPALL
4	2'-6"	0'-4"	0'-2"	SPALL
5	12'-0"	1'-2"	0'-4"	SPALL
6	2'-8"	1'-0"	0'-1"	SPALL
7	4'-4"	1'-1"	N/A	SPALL
8	5'-0"	N/A	N/A	DELAMINATION
9	2'-0"	N/A	N/A	SPALL
10	2'-0"	0'-11"	0'-4"	SPALL
11	N/A	N/A	0'-4"	SPALL
12	1'-6"	1'-0"	0'-4"	SPALL
13	6'-0"	FULL WIDTH	N/A	DELAMINATON
14	5'-0"	FULL WIDTH	0'-4"	SPALL
15	6'-0"	1'-8"	0'-4"	SPALL
16	N/A	FULL WIDTH	N/A	HOLLLOW AREA
17	17'-0"	FULL WIDTH	0'-4"	SPALL
18	3'-0"	2'-0"	N/A	HOLLOW AREA
19	1'-4"	0'-8"	0'-1"	SPALL
20	0'-5"	1'-0"	0'-1"	SPALL
21	0'-10"	1'-4 1/2"	0'-6"	SPALL
22	1'-6"	0'-4"	0'-1"	SPALL
23	1'-1"	1'-1"	0'-1"	SPALL
24	1'-11"	0'-7"	0'-1"	9 POPUTS
25	3'-0"	0'-5"	0'-1"	SPALL
26	2'-8"	0'-6"	0'-3"	SPALL
27	1'-10"	0'-4"	0'-0 1/2"	POPOUTS
28	1'-3"	1'-3"	0'-3"	SPALL
29	2'-0"	1'-0"	0'-1 1/2"	SPALL
30	2'-8"	0'-5"	0'-1"	2 SPALLS/ DELAMINATION
31	0'-6"	1'-0"	0'-1"	SPALL
~~~



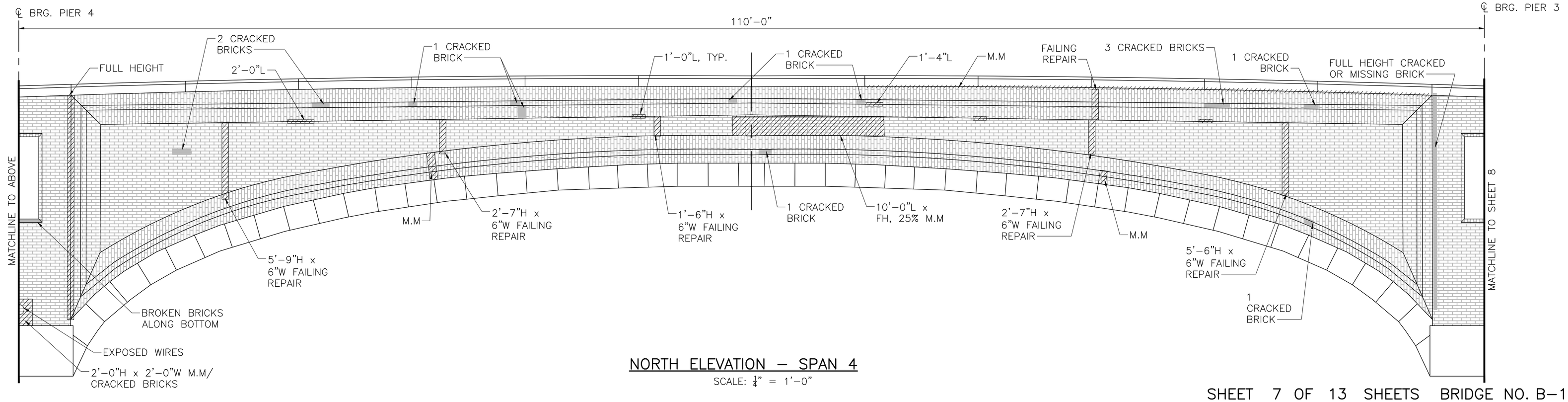
NORTH ELEVATION – SPANS 6 & 7

SCALE: ¼" = 1'-0"



NORTH ELEVATION – SPAN 5

SCALE: ¼" = 1'-0"



NORTH ELEVATION – SPAN 4

SCALE: ¼" = 1'-0"

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
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BRIDGE ELEVATIONS (□ OF □)

BRICK REPAIR NOTES:

1. CONTRACTOR SHALL LOCATE ALL AREAS OF DETERIORATION PRIOR TO START OF WORK.
2. AREAS OF REPAIR ON FACADES SHALL USE SALVAGED BRICK FROM INTERIOR OF BRIDGE RAILING.
3. SEE SHEET 3 FOR REPAIR DETAILS.

LEGEND:

- MISSING/DAMAGED BRICK
- MISSING MORTAR (M.M.)
- L – LONG
- H – HIGH
- W – WIDE

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	–	14	19
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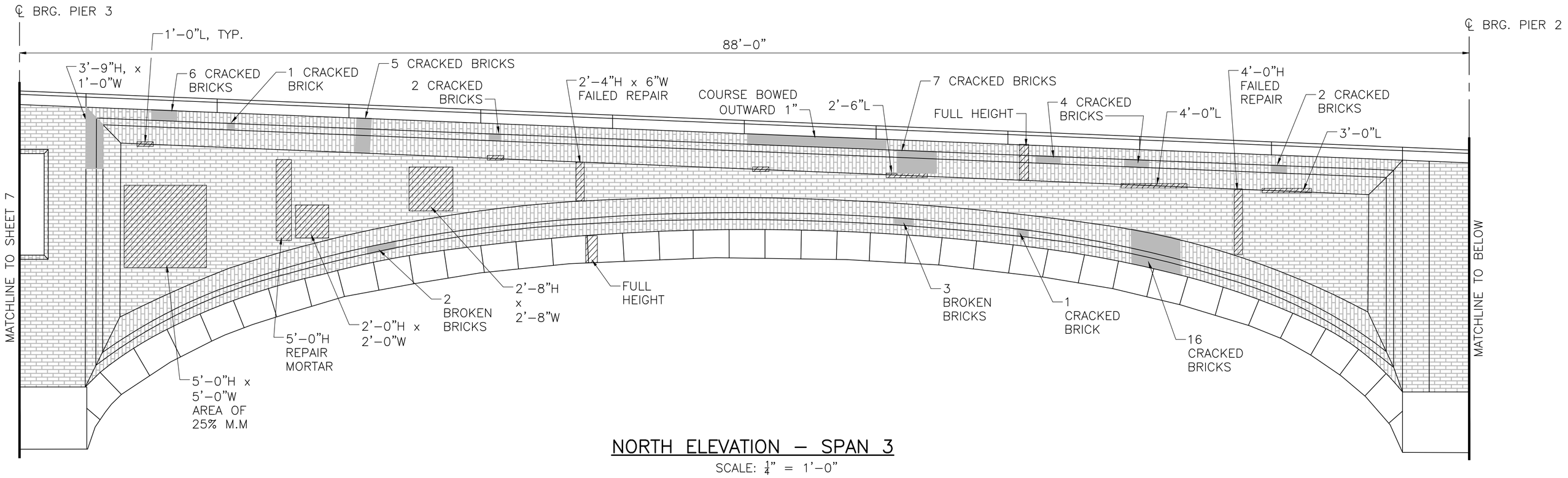
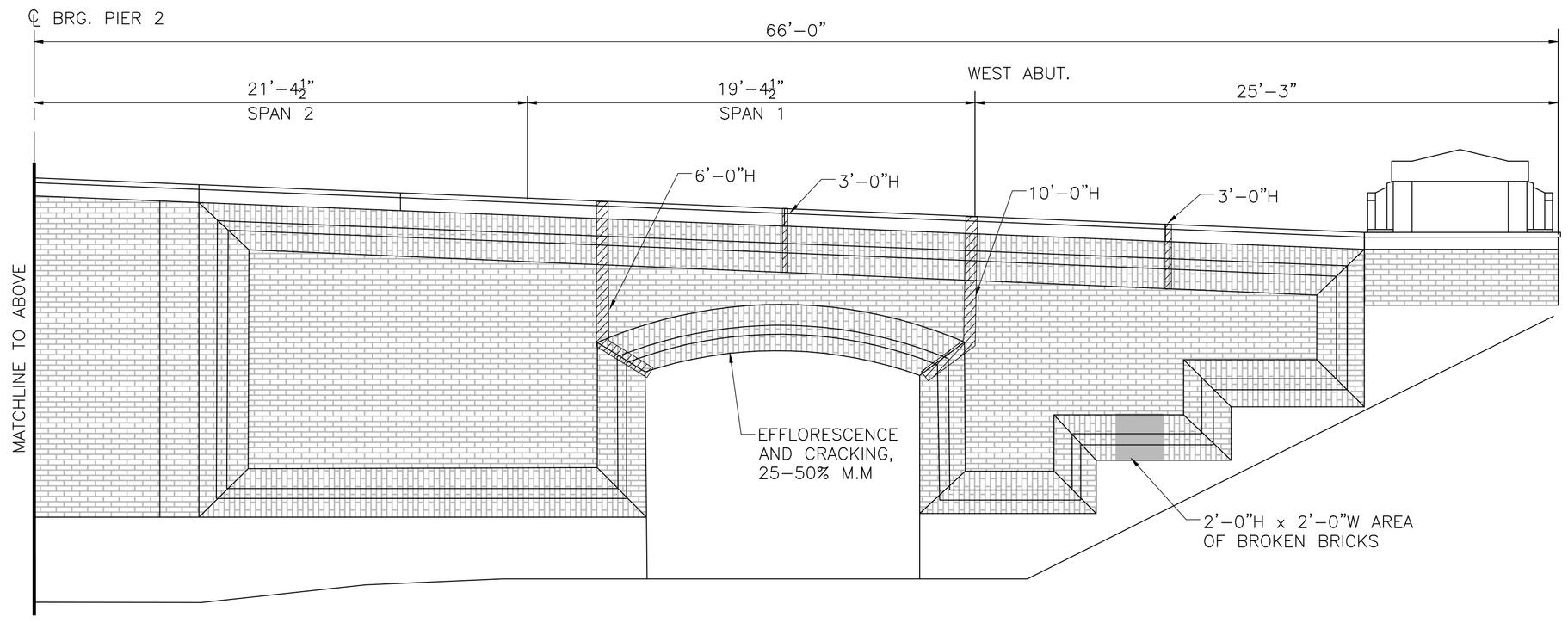
BRIDGE ELEVATIONS (2 OF 2)



NORTH ELEVATION – SPAN 3

SCALE: $\frac{1}{4}$" = 1'–0"



NORTH ELEVATION – SPANS 1 & 2

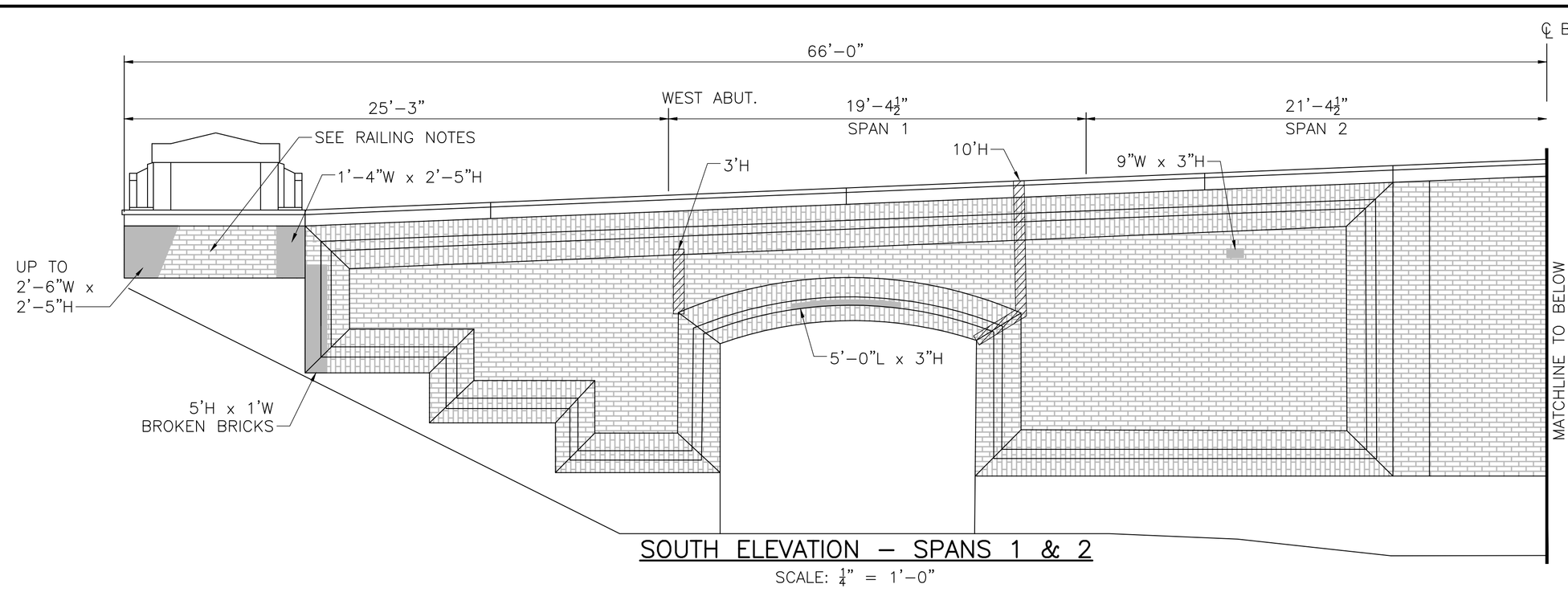
SCALE: $\frac{1}{4}$" = 1'–0"

REPAIR NOTES:

1. SEE SHEET 7 FOR NOTES.

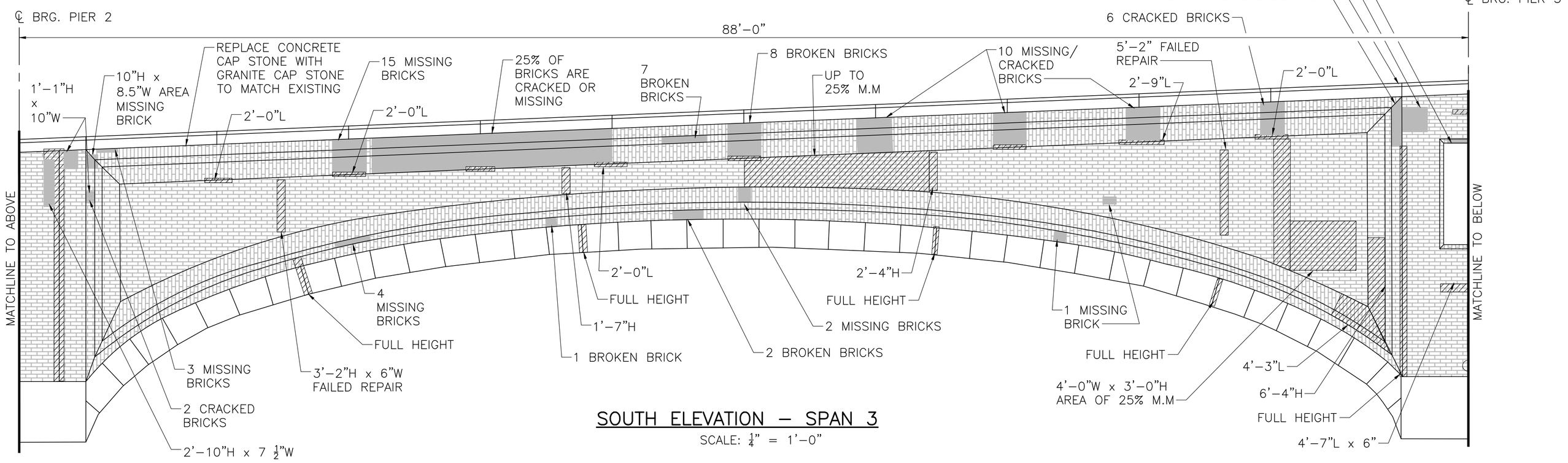
LEGEND:

- MISSING/DAMAGED BRICK
- MISSING MORTAR (M.M.)
- L – LONG
- H – HIGH
- W – WIDE



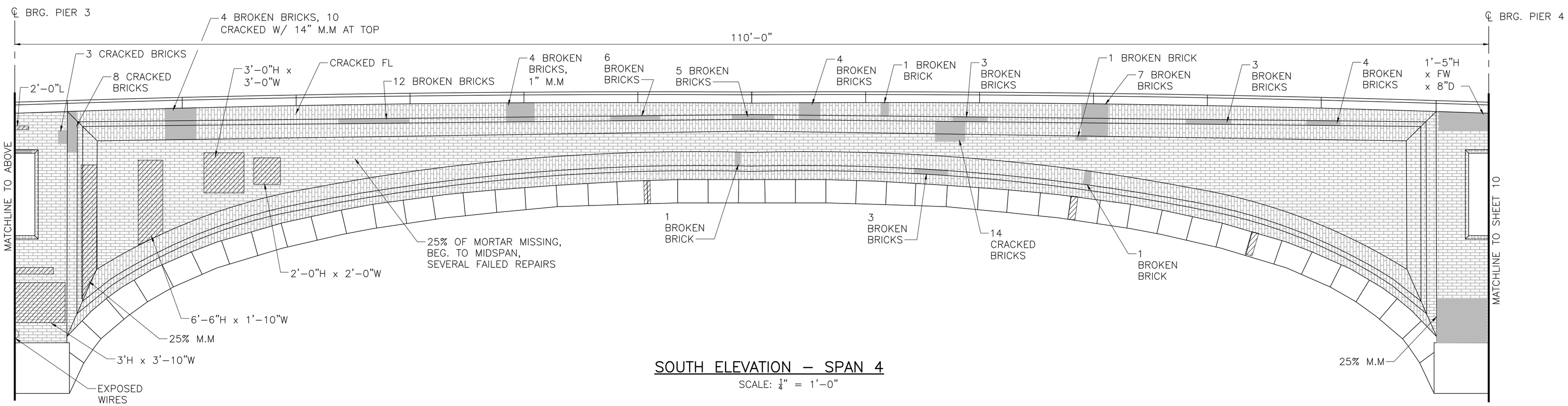
SOUTH ELEVATION – SPANS 1 & 2

SCALE: ¼" = 1'–0"



SOUTH ELEVATION – SPAN 3

SCALE: ¼" = 1'–0"



SOUTH ELEVATION – SPAN 4

SCALE: ¼" = 1'–0"

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	–	15	19
PROJECT FILE NO. 608762			

BRIDGE ELEVATIONS (□ OF □)

REPAIR NOTES:

1. SEE SHEET 7 FOR NOTES.

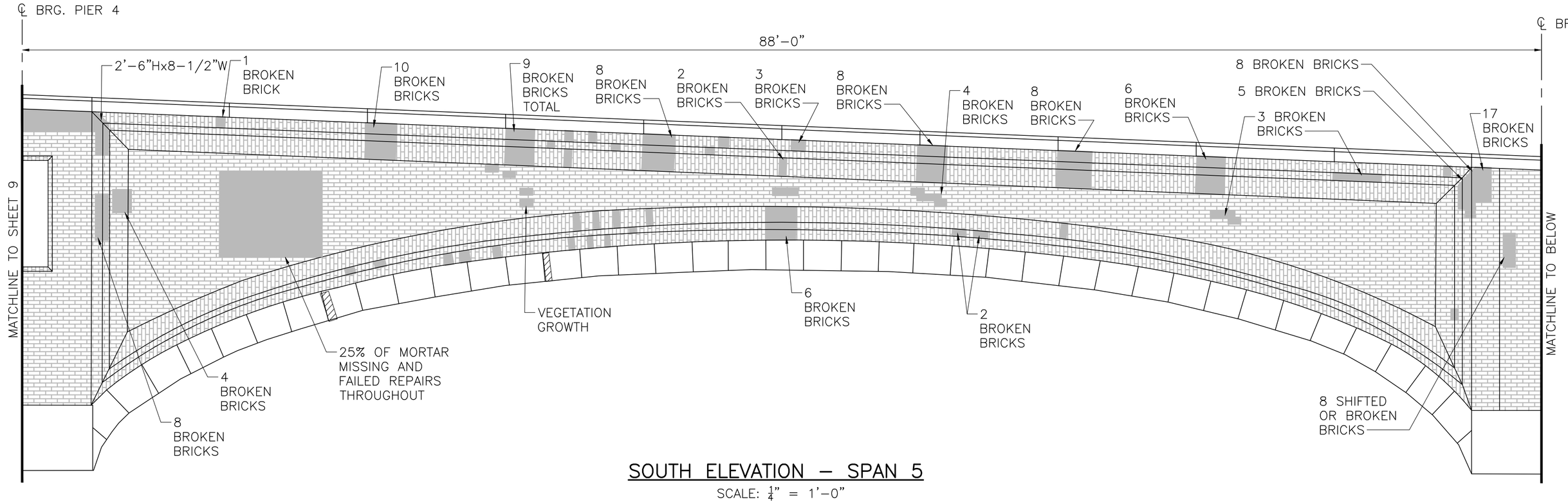
LEGEND:

- MISSING/DAMAGED BRICK
- MISSING MORTAR (M.M.)
- L – LONG
- H – HIGH
- W – WIDE

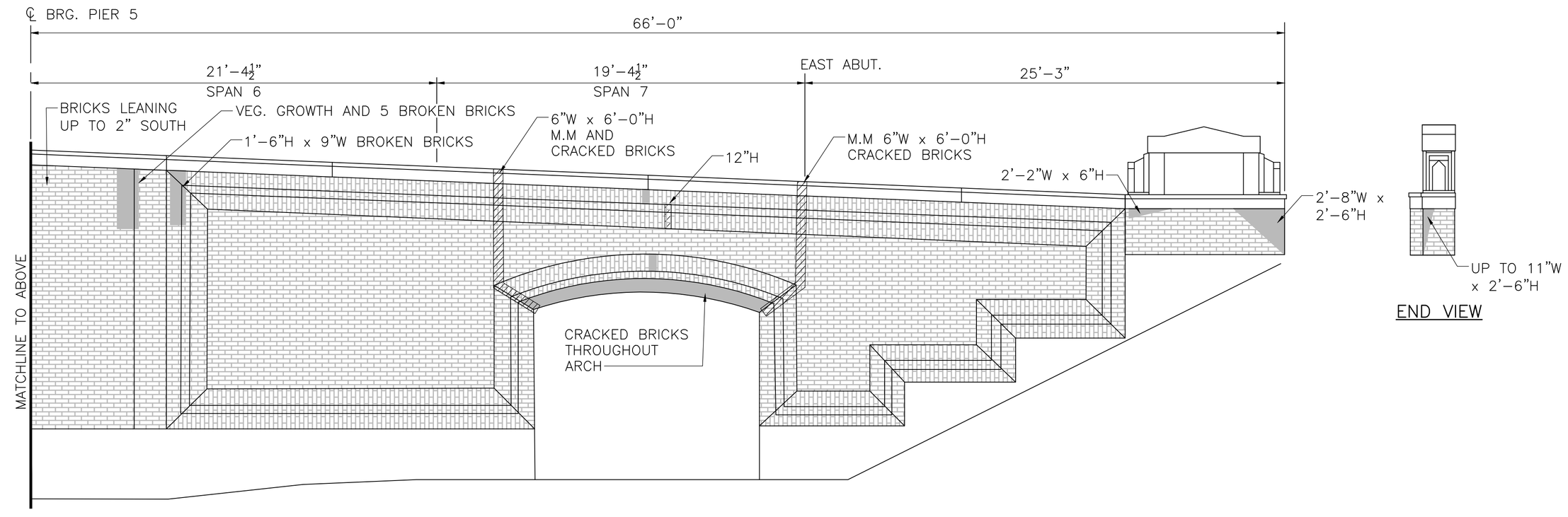
BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	–	16	19
PROJECT FILE NO. 608762			

BRIDGE ELEVATIONS (□ OF □)



SOUTH ELEVATION – SPAN 5
SCALE: $\frac{1}{4}$" = 1'–0"



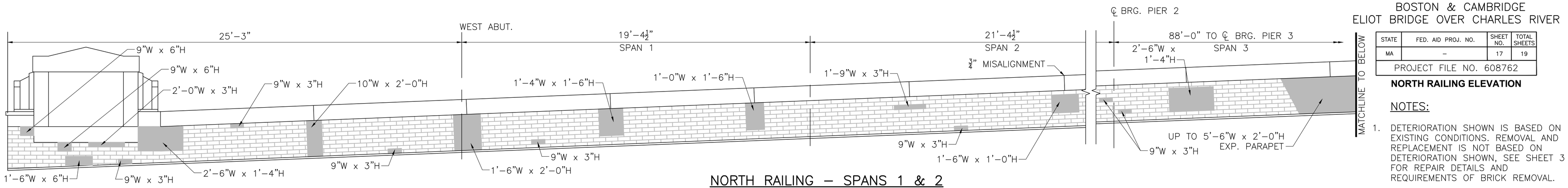
SOUTH ELEVATION – SPANS 6 & 7
SCALE: $\frac{1}{4}$" = 1'–0"

REPAIR NOTES:

1. SEE SHEET 7 FOR NOTES.

LEGEND:

- MISSING/DAMAGED BRICK
- MISSING MORTAR (M.M.)
- L – LONG
- H – HIGH
- W – WIDE



NORTH RAILING – SPANS 1 & 2

SCALE: ⅜" = 1'-0"

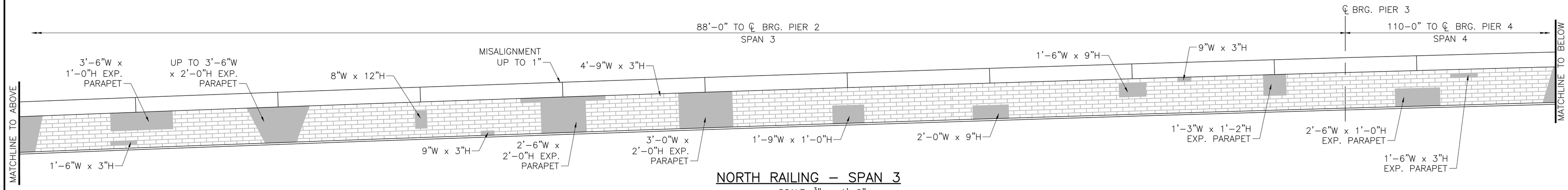
BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	–	17	19
PROJECT FILE NO. 608762			

NORTH RAILING ELEVATION

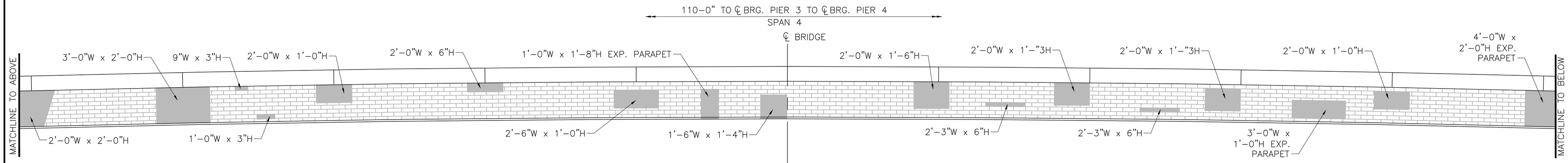
NOTES:

1. DETERIORATION SHOWN IS BASED ON EXISTING CONDITIONS. REMOVAL AND REPLACEMENT IS NOT BASED ON DETERIORATION SHOWN, SEE SHEET 3 FOR REPAIR DETAILS AND REQUIREMENTS OF BRICK REMOVAL.



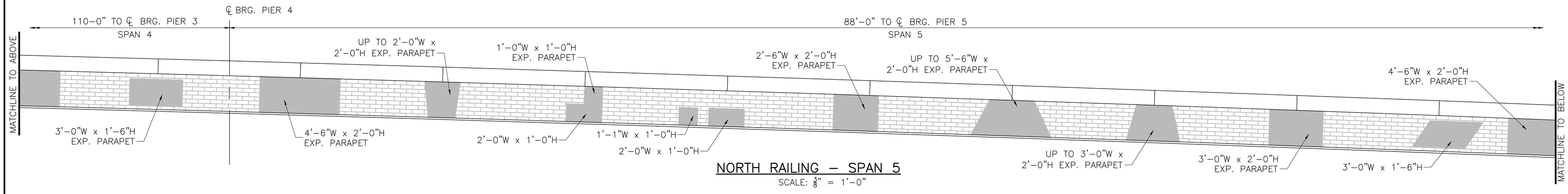
NORTH RAILING – SPAN 3

SCALE: ⅜" = 1'-0"



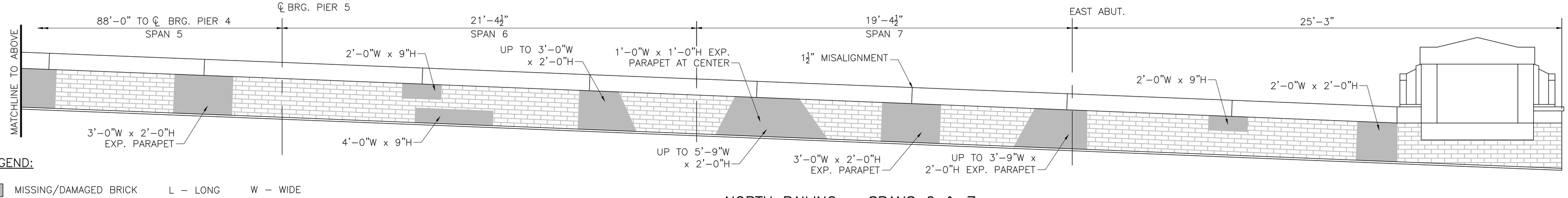
NORTH RAILING – SPAN 4

SCALE: ⅜" = 1'-0"



NORTH RAILING – SPAN 5

SCALE: ⅜" = 1'-0"



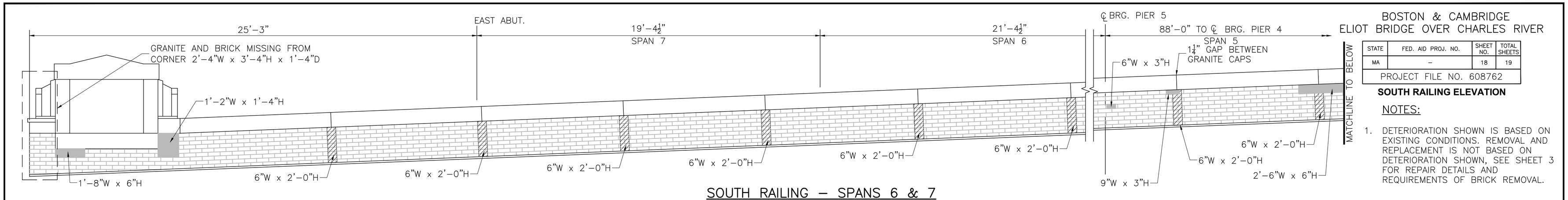
NORTH RAILING – SPANS 6 & 7

SCALE: ⅜" = 1'-0"

LEGEND:

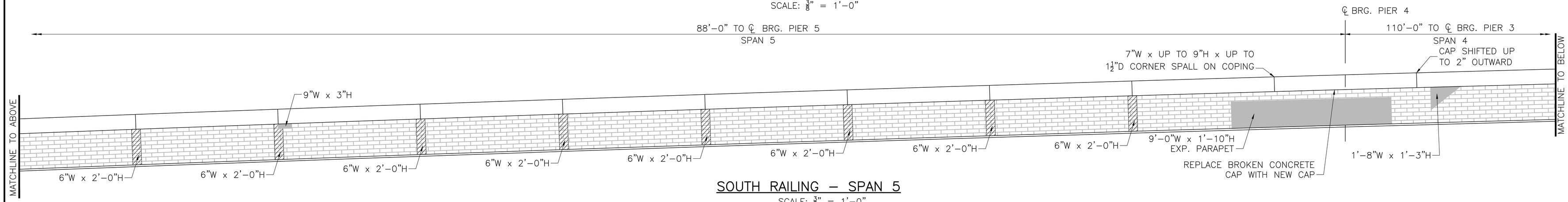
MISSING/DAMAGED BRICK — L – LONG — W – WIDE

MISSING MORTAR (M.M.) — H – HIGH — EXP. – EXPOSED



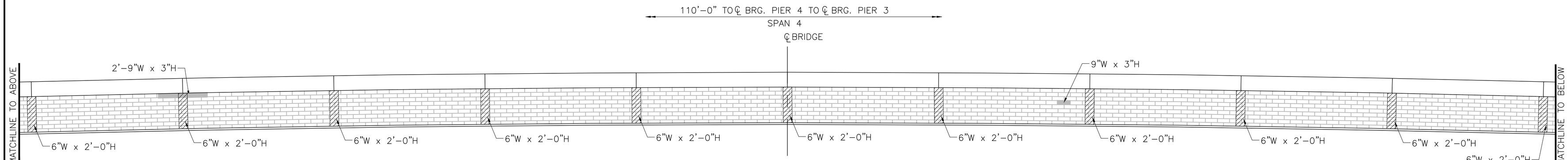
SOUTH RAILING – SPANS 6 & 7

SCALE: ⅜" = 1'–0"



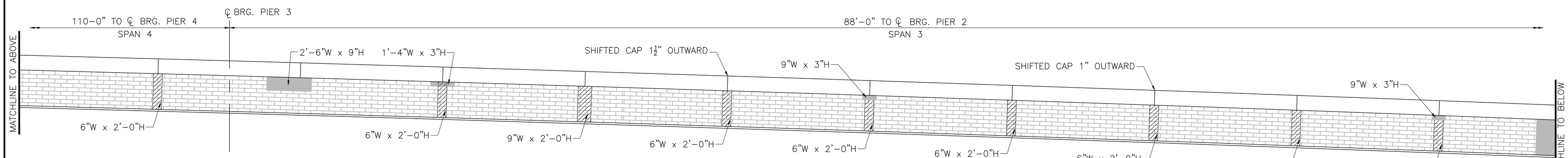
SOUTH RAILING – SPAN 5

SCALE: ⅜" = 1'–0"



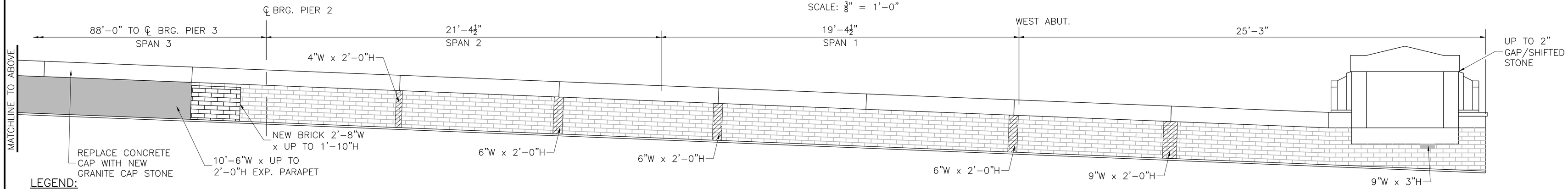
SOUTH RAILING – SPAN 4

SCALE: ⅜" = 1'–0"



SOUTH RAILING – SPAN 3

SCALE: ⅜" = 1'–0"



SOUTH RAILING – SPANS 1 & 2

SCALE: ⅜" = 1'–0"

LEGEND:

- MISSING/DAMAGED BRICK — L – LONG — W – WIDE
- MISSING MORTAR (M.M.) — H – HIGH

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	–	18	19
PROJECT FILE NO. 608762			

SOUTH RAILING ELEVATION

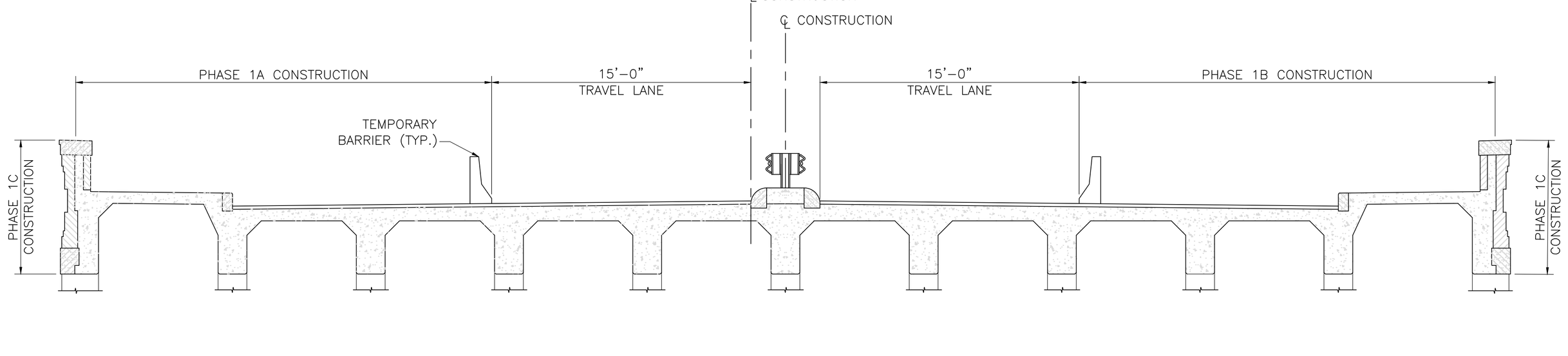
NOTES:

1. DETERIORATION SHOWN IS BASED ON EXISTING CONDITIONS. REMOVAL AND REPLACEMENT IS NOT BASED ON DETERIORATION SHOWN, SEE SHEET 3 FOR REPAIR DETAILS AND REQUIREMENTS OF BRICK REMOVAL.

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	–	19	19
PROJECT FILE NO. 608762			

TRAFFIC PHASING



PHASE 1 CONSTRUCTION

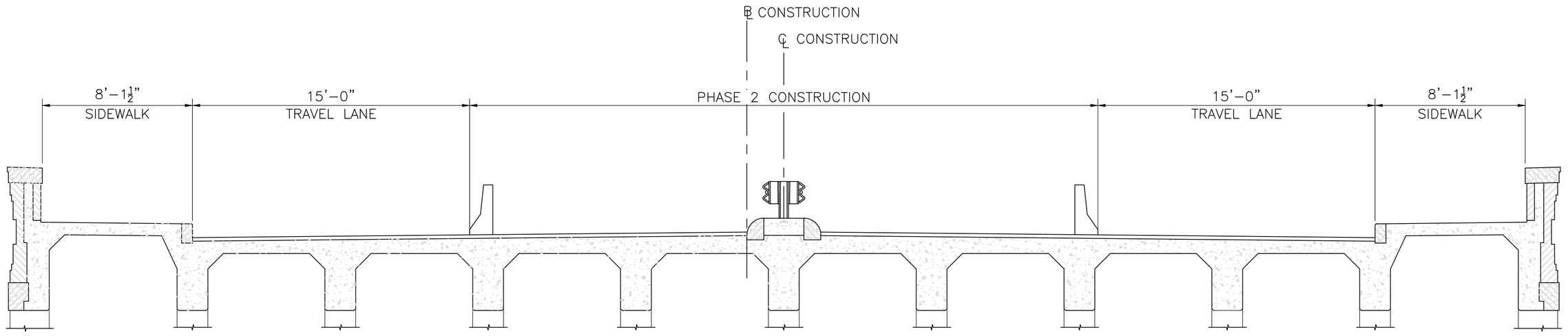
SCALE: $\frac{1}{4}$" = 1'–0"

PHASE 1A AND 1B NOTES:

1. REMOVE AND REPLACE INTERIOR BRICK VENEER ON BRIDGE RAILING.
2. REPAIR CONCRETE SIDEWALK.
3. REMOVE AND RESET GRANITE CAP STONES.
4. MILL AND PAVE THE DECK.

PHASE 1C NOTES:

1. REMOVE AND REPLACE DETERIORATED BRICK ALONG EXTERIOR.
2. REMOVE AND RESET GRANITE CAP STONES AS REQUIRED.



PHASE 2 CONSTRUCTION

SCALE: $\frac{1}{4}$" = 1'–0"

1. REMOVE EXISTING MEDIAN GUARDRAIL, LIGHTING, AND MEDIAN.
2. RECONSTRUCT MEDIAN AND PROPOSED MEDIAN BARRIER.
3. INSTALL MEDIAN LIGHTING.
4. INSTALL END TREATMENTS TO MEDIAN.

TRAFFIC NOTES:

1. TRAFFIC PHASING MAY BE IMPLEMENTED AT NIGHT OR DURING WEEKEND SHUTDOWNS. WEEKDAY WORK TO BE COORDINATED WITH DISTRICT 6.
2. PHASES 1A AND 1B MAY OCCUR SIMULTANEOUSLY WITH APPROVAL FROM DISTRICT 6.
3. PHASES 1A AND 1B MUST BE COMPLETED PRIOR TO WORK ON BRIDGE FACADES (PHASE 1C) AS INTERIOR BRICK MUST BE SALVAGED TO REPAIR EXTERIOR FACADES, SEE SHEET 3 FOR REPAIR DETAILS.
4. PHASE 2 MAY OCCUR PRIOR TO PHASE I.

Jacobs

PHOTOGRAPHIC LOG

Site Location: Eliot Bridge, Boston & Cambridge, MA | Project No. 608762

Photo No.	Date:
1	09/19/20

Direction Photo Taken:
Southwest

Description:
View of Eliot Bridge and Charles River.

Photo No.	Date:
2	09/19/20

Direction Photo Taken:
Southeast

Description:
View northside of Eliot Bridge from the western bank of the Charles River.

Jacobs

PHOTOGRAPHIC LOG

Site Location: Eliot Bridge, Boston & Cambridge, MA | Project No. 608762

Photo No.	Date:
3	09/19/20

Direction Photo Taken:
Southeast

Description:
View of the underside of Eliot Bridge.

Photo No.	Date:
4	09/19/20

Direction Photo Taken:
Southwest

Description:
Underside of the Eliot Bridge.

Jacobs

PHOTOGRAPHIC LOG

Site Location: Eliot Bridge, Boston & Cambridge, MA | Project No. 608762

Photo No.	Date:
5	09/19/20

Direction Photo Taken:
Northeast

Description:
View of the southern side of Eliot bridge from the western bank of the Charles River.

Photo No.	Date:
6	09/19/20

Direction Photo Taken:
Northeast

Description:
View of the traveling lanes over the Eliot Bridge.

DOCUMENT A00848

DEPARTMENT OF CONSERVATION AND RECREATION

DCR CONSTRUCTION/ACCESS PERMIT

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DEPARTMENT OF CONSERVATION AND RECREATION
SPECIAL USE PERMIT
251 CAUSEWAY STREET, 9TH FLOOR, BOSTON MA 02114

Governor	Lieutenant Governor	EOEEA Secretary	Commissioner
Maura T. Healey	Kimberley Driscoll	Rebecca L. Tepper	Douglas J. Rice

DCR CONSTRUCTION/ACCESS PERMIT

Issued Date April 13, 2023

Permit Number **CP-01156**

ISSUED IN ACCORDANCE WITH M.G.L. C.132A§7 AND C.92§33 & ALL OTHER POWERS ENABLING

Permit Issued To

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
10 PARK PLAZA
BOSTON, MA 02116
LAUREN A FOTOS
5087351357
lauren.fotos@dot.state.ma.us

Contractor Information

Permit Purpose:

As requested by MASSACHUSETTS DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION, the purpose of the permit is to enter upon DCR property on Book 33333, Page 333 in Allston for the following purpose: On behalf of the Massachusetts Department of Transportation (MassDOT), Jacobs Engineering Group (Jacobs) is submitting this DCR Construction Access Permit Application for the proposed rehabilitation of the Eliot Bridge # B-16-246 (Eliot Street over the Charles River) located in the Cities of Boston and Cambridge. The MassDOT Project, Number 608762, as designed, requires a DCR Construction Access Permit, totaling approximately 3,700 square feet on the DCR parcel (parking lot) in Boston (Book 33333, Page 333). The DCR parking lot is located southeast of Eliot Bridge, along the easterly side of the Charles River. The proposed improvements are located within right-of-way owned by the Commonwealth of Massachusetts. The DCR Construction Access Permit will be required by MassDOT to stage equipment for the repair of Eliot Bridge. The proposed tasks will include partial depth concrete repair to the entire sidewalk to repair existing deterioration and produce a uniform appearance, bridge joint replacement at the east and west abutments, reconstruction of the median barrier with a concrete barrier, replacement of the median lighting, installation of end treatment for the proposed median reconstruction, complete reconstruction of the brick arch opening at each abutment portal, bridge drainage repairs including full depth patching of previous scupper locations, milling and paving of the bridge deck, spot deck concrete repair, spot truss concrete encasement repair, development of traffic management plans, and revised pavement marking plans.

Note - The Permit Details are as described in the Special Conditions.

WHEREAS: the Commonwealth of Massachusetts is the owner and/or has control of the premises subject to this permit as described in the Special Conditions (hereinafter collectively known as the Premises); in Allston,MA 02134;

WHEREAS: the Permittee requests temporary access to the Premises in order to perform construction work as described in the Special Conditions (hereinafter the Project);

WHEREAS: the Permittee's activities will include approved activities, as described in the Special Conditions, that work will occur during approved hours only; and

WHEREAS: The granting of this Permit shall in no way interfere with the rights of the DCR to exercise its rights in or over the Premises.

NOW, THEREFORE, WITNESSETH, in accordance with Massachusetts General Laws chapter 92, §§33, 37, and chapter 132A §7; and rules and regulations promulgated there under (including Code of Massachusetts Regulations titles 304 and 350), DCR Standard Construction Specifications and Engineering Policy Memorandums and all other powers enabling, the DCR hereby grants to the Permittee and/or its contractors, agents, representatives, or employees the right to perform work on the Premises as

DCR CONSTRUCTION/ACCESS PERMIT

Issued Date April 13, 2023 **Permit Number** **CP-01156**

described in the Special Conditions subject to the following terms and conditions.

IMPORTANT: SUBSEQUENT TO FULL EXECUTION OF THIS CONSTRUCTION / ACCESS PERMIT BY BOTH PARTIES, THE PERMITTEE MAY ONLY COMMENCE WORK WITH 72 HOURS VERBAL NOTICE TO DCR (617) 626-1444

This permit is issued and accepted upon by the Permittee subject to the terms and conditions herein and defined supra: conducting work under this permit shall constitute acceptance of all terms and conditions herein; shall conform to all provisions of law applicable to the exercise of the rights, the performance of work under the permit and the rules and regulations of the Department of Conservation and Recreation; shall do the work subject to the approval of the **PERMIT SECTION** of the Department of Conservation and Recreation as to the time, manner, location and all other conditions; that the permit may be revoked at any time by the said **PERMIT SECTION**; that the violation of any specification or requirement in this permit shall cause or constitute an immediate revocation thereof; shall protect and maintain all trees, drainage and other structures; shall restore the surface of the ground to a condition satisfactory to the **PERMIT SECTION** and maintain it in such condition against damage caused by the abovementioned work. The Permittee and its successors and assigns, to the extent allowed by law, **SHALL INDEMNIFY AND HOLD HARMLESS** the DCR and its successors and assigns from all damages and/or claims arising from acts or omissions of the Permittee on the premises or of anyone acting by or through the Permittee. The Permittee's obligation under this paragraph shall include reimbursement for or restoration of all damages to the DCR's property. During the process of the work the Permittee shall place and maintain proper barriers at all times, and from the beginning of twilight through the whole of every night sufficient lights to protect the public from injury or damage.

PERMIT DETAILS

Location Details

Book 33333, Page 333
Parking lot located along the western shoulder of Soldiers Field Road, directly across from (west of) the Harvard Cumnock Synthetic Fields 1 & 2.

Description of Work

On behalf of the Massachusetts Department of Transportation (MassDOT), Jacobs Engineering Group (Jacobs) is submitting this DCR Construction Access Permit Application for the proposed rehabilitation of the Eliot Bridge # B-16-246 (Eliot Street over the Charles River) located in the Cities of Boston and Cambridge. The MassDOT Project, Number 608762, as designed, requires a DCR Construction Access Permit, totaling approximately 3,700 square feet on the DCR parcel (parking lot) in Boston (Book 33333, Page 333). The DCR parking lot is located southeast of Eliot Bridge, along the easterly side of the Charles River. The proposed improvements are located within right-of-way owned by the Commonwealth of Massachusetts. The DCR Construction Access Permit will be required by MassDOT to stage equipment for the repair of Eliot Bridge. The proposed tasks will include partial depth concrete repair to the entire sidewalk to repair existing deterioration and produce a uniform appearance, bridge joint replacement at the east and west abutments, reconstruction of the median barrier with a concrete barrier, replacement of the median lighting, installation of end treatment for the proposed median reconstruction, complete reconstruction of the brick arch opening at each abutment portal, bridge drainage repairs including full depth patching of previous scupper locations, milling and paving of the bridge deck, spot deck concrete repair, spot truss concrete encasement repair, development of traffic management plans, and revised pavement marking plans.

DCR Roadway/Sidewalk Impact Summary

SPECIAL CONDITIONS / REQUIREMENTS:

(Modifications to sections of the General Conditions are listed below)

A. CONDITION OF PREMISES
All damaged/disturbed DCR property shall be repaired/restored to its previous or better condition.

B. PERMIT TERM

Effective Dates: **Starts**: 10/02/2023 **Expires**: 10/01/2025

C. ADMINISTRATION FEE, RESTORATION, CONSIDERATION and MITIGATION

DCR CONSTRUCTION/ACCESS PERMIT

Issued Date April 13, 2023 **Permit Number** CP-01156

D. REQUIREMENTS

Upon selection of a contractor, the contractor shall submit a separate DCR Construction Access Application: https://www.mass.gov/how-to/applying-for-an-on-line-construction-access-permit-and-notifying-for-a-construction-emergency.

·ways and means for the project
·laydown area

The laydown area shall be applied for by the contractor:
·DCR has selected the lot abutting BB&N as the appropriate location for staging. The lot depicted in the application is too active and cannot accommodate construction usage.

The plans for the new lights shall be updated to identify the Load Center.

The contractor, NOT DCR Ops, shall be responsible for all sidewalk/pedestrian route snow removal throughout the work zone on the bridge up to, and including the next closest crosswalk on the Cambridge side; and up to the next closest split on the Boston side. If the pedestrian underpasses will be obstructed in any way, a more detailed snow removal plan and pedestrian detour must be discussed.
·See MassDOT for snow removal expectations on the roadway.

Work shall be coordinated with DCR Special Events:
·Event schedule to be provided prior to start date.

E. INSPECTIONS, ACCESS, AND PERMITS

All necessary State and Local permits shall be secured prior to this permit being active.

F. PUBLIC SAFETY

Pedestrian and bicycle traffic shall remain flowing.

Pedestrians shall be provided 48" of passage.

Pedestrian detours shall be ADA and MUTCD compliant. All pedestrian detours shall use ADA/AAB approved temporary ramps for all transitions.

G. RESTORATION OF PREMISES

See attached DCR specs for roadway and sidewalk reconstruction.

H. TRAFFIC MANAGEMENT

Any detours onto Memorial Drive shall be coordinated with the Riverbend Park seasonal setup.

Mass State Police details shall be used at all times.

Selected contractor shall submit a site specific Traffic Management Plan.

All temporary traffic control devices shall be setup according to the most recent MUTCD:
·sign selection
·sign/barrel/cone spacing
·taper lengths based upon posted speed limits

I. ENVIRONMENTAL IMPACTS AND REPORTING

See attached DCR Tree Specs

J. OPERATING SCHEDULE

Work impacting Traffic: 9:00am to 3:30pm

Work outside the roadway: 7:00am to 5:00pm

Z. NOTICE

DCR CONSTRUCTION/ACCESS PERMIT

Issued Date April 13, 2023 **Permit Number** **CP-01156**

See attached DCR Traffic Notification form. This shall be submitted a minimum of 72 hours prior to occupying a lane on a DCR parkway. If mobilizing on a Monday, this shall be submitted by noon on the Wednesday prior.

DCR CONSTRUCTION/ACCESS PERMIT

Issued Date April 13, 2023 **Permit Number** **CP-01156**

Notices and Contacts

1. DCR Construction Access Permits, Sean Casey (617) 626-1444

2. DCR Deputy Chief Engineer, Jeff Parenti
251 Causeway Street, Suite 700
Boston, Massachusetts 02114

3. DCR Boston Region Manager, Kevin Thibeault, (617) 727-5290

4. DCR Forest Health East Region Arborist, Jeffrey Enochs, (508) 942-3872

5. DCR Environmental Section Head, Tom Valton, (339) 368-2930

6. Notifications to:

Sgt. Gerald T. Shea 617-740-7575 (Main)

DCR CONSTRUCTION/ACCESS PERMIT

Issued Date April 13, 2023 **Permit Number** **CP-01156**

GENERAL CONDITIONS

A. CONDITION OF PREMISES

1. The Permittee acknowledges that it has made an inspection of the Premises and that the Premises are in a satisfactory condition, suitable for the purposes of this Permit in the Premises' existing condition and that it has not relied upon representations or statements of the DCR, its officers, employees or agents with respect to these conditions. The Permittee expressly agrees that the DCR has no obligation to make any alterations, repairs, additions, or improvements to the Premises. The Permittee acknowledges and agrees for itself and its contractors, subcontractors, officers, servants, agents, employees, representatives and invitees that it accepts the Permitted Area in 'as is', 'where is' and 'with all defects' condition; that DCR is under no obligation to make any repairs, renovations or alterations to the Permitted Area; that DCR has made no representations or warranties regarding the adequacy, operability, safety or fitness of the Permitted Area for any particular purpose or use; and that DCR has made no representations that the Permitted Area complies with applicable laws, ordinances, rules and regulations of government authorities. The Permittee further acknowledges and agrees that entry and activities upon the Permitted Area by the Permittee and its contractors, subcontractors, officers, servants, agents, employees, representatives and invitees shall be at the sole risk and sole expense of the Permittee.

2. At the Permittee's expense DCR property shall be restored/ returned to its original or better condition, in accordance with standards and specifications of the DCR and this permit.

3. Upon the expiration, termination, or revocation of this Permit, the Permittee shall promptly vacate and surrender the Permitted Area and remove all of its personal property from the Permitted Area. Any property not so removed shall, at the option of DCR and at the sole expense of the Permittee, either become the property of DCR or be removed by DCR and disposed of without any liability in DCR for such removal and disposition.

B. PERMIT TERM

1. The term for the use authorized herein is specified in the Special Conditions, subject to review of the Permittee's performance and compliance with all terms and conditions of this Permit.

2. All obligations required of the Permittee under the terms of this Permit shall expressly survive the given termination/ expiration date until such obligations are completed to the satisfaction of the DCR, unless the DCR has exercised its option to terminate the agreement.

3. If the Permittee is found to be noncompliant with any term and or requirement of this Permit, and does not remedy or cure the noncompliance matter promptly or within a time frame set by DCR, the DCR may immediately revoke this Permit.

C. ADMINISTRATION FEE; RESTORATION, CONSIDERATION; & MITIGATION; **[in accordance with 801 CMR 4.02]**

1. The Permittee shall pay the Commonwealth a fifty dollar administration/application fee.

2. In addition to the administration fee (C.1. above), and required work. The permittee will compensate DCR for the disruption to the DCR properties including parkway, boulevard, road and/or recreational facilities by doing mitigation and or the payment of Parkway/Roadway Excavation Fee, Sidewalk and Parkland modification fees.

3. See the Special Conditions of this permit~~tee~~ for the details of the compensation to DCR for the disruption to the DCR parkway and/or recreational facilities which may include fees or mitigation or a combination of both.

4. If mitigation is allowed as an alternate for the fees, the cost of the mitigation must equal or exceed the Parkway Excavation Fee, Sidewalk and Parkland modification fees: should the mitigation work not exceed the fee amount the difference shall be paid to DCR.

SEE THE SPECIAL CONDITIONS AND THE PAYMENT TRANSMITTAL INVOICE FOR DETAILS ON FEES,

PAYMENT SCHEDULE AND MITIGATION APPROVED FOR THIS PERMIT.

5. Payments, shall be made online or in the form of a money order, cashier's check or certified bank check payable to the Department of Conservation and Recreation (exclusively), accompanied by a DCR "Payment Transmittal Form," Exhibit 1 attached to this permit. Indicate your Permit Number on your check, all correspondence and on the mailing envelope; mail to the following address:

Department of Conservation and Recreation
Construction Access Permit
Application or Permit No: _____

251 Causeway Street, Suite 700
Boston, Massachusetts 02114

D. REQUIREMENTS

1. The Permittee shall keep a copy of this Permit at the Premises (on site and visible) and shall be solely responsible for maintenance, care, repair or replacement of all work, improvements or installations related to the permitted work placed or situated on the Premises at all times.

2. The Permittee shall be solely responsible for all expenses arising under this Permit.

3. The Permittee will not use any DCR utilities or resources without express permission from DCR. If the Permittee and or its representative or contractor uses any DCR utilities any expenses associated with that use is the responsibility of the Permittee.

4. The Permittee shall conform to all provisions of state, federal and local laws, rules and regulations applicable to the exercise of the rights and the performance of work under the Permit. Such provisions include, but are not limited to, all health, environmental, noise and sanitary standards and conditions required by Commonwealth of Massachusetts statutes; rules and regulations, including DCR regulations, local bylaws, engineering standards and administrative and executive orders.

   a. Prior to the commencement of any work involving excavation or disturbance of any soils and or vegetation under this Construction / Access Permit:

      i. Dig Safe must be notified for field mark-out of utilities (1-888-DIG-SAFE).

      ii. The Permittee will comply with M.G.L. Chapter 254 requiring approval by the Massachusetts Historical Commission

   b. The Permittee shall adhere to all OSHA Standards for Safety during the construction period.

   c. The Permittee will comply with local noise regulations, exercising care to subject neighborhood abutters to the least amount of noise and vibration pollution during working and non-work hours.

5. All correspondence with the DCR regarding permitted activities should indicate the DCR Construction Permit Number associated with this permit.

6. If the work herein authorized is for a driveway entrance, this Permit is granted and accepted on the condition that if the ownership of the land to which the driveway is appurtenant shall at any time become united with that of any adjoining lot fronting on the roadway and also having an entrance on said roadway, then the DCR may revoke the right to maintain any or all of such entrances and grant a single entrance in place thereof. The entrance hereby granted shall be used only for the Premises shown on the Plan.

7. Within thirty (30) days, after completion of the project or a date specified herein, by the DCR in the Special Conditions, the Permittee shall submit a Mylar copy and PDF of as-built plan(s) for the Project as it relates to DCR property. This information shall be sent to Construction Access Permits, Department of Conservation & Recreation, 251 Causeway Street, Suite 700, Boston, Massachusetts 02114. In addition to the standard title box the permittee will list/add the DCR Construction Permit Number associated with this permit.

8. Within thirty (30) days, after completion of the project or a date specified by DCR in the Special Conditions, the Permittee shall submit two (2) copies of all final environmental reports generated for the Permittee's Project related to DCR property if applicable.

One (1) copy each of the information will be sent (see Notices and Contacts) to the attention of the Environmental Section Head and the Regional Director.

9. The Permittee shall keep the Premises in a clean and orderly manner at all times.

10. The Permittee shall be solely responsible for ice and snow removal during the winter months and street sweepings during the spring, summer and fall on all DCR property associated with this permit and/or impacted by the permit, per DCR protocol (inclusive of all area where public access is possible, as well as but not limited to all roadways, sidewalks and walking paths), inclusive of any and all associated costs and labor. This responsibility will remain in place until the work area(s) are closed and all obstacles that would interfere with DCR's regular maintenance are removed, leaving the area unencumbered.

E. INSPECTIONS, ACCESS, AND PERMITS

1. The Permittee shall arrange for inspections by local health officials, utilities engineers, building inspectors and others as may be required.

2. The Permittee shall take prompt action to correct any condition that is found not compliant with any federal, state, or local regulation, code or statute.

3. The Permittee agrees at its own expense, to file for; obtain and comply with all applicable federal, state and local permits, licenses and approvals necessary for the work to be performed which is the subject of this Permit. Failure to obtain any required permits, licenses and or approvals, prior to the commencement of work, or failure to maintain such legal obligations in full effect throughout the term of this Permit shall be cause for revocation of this Permit by the DCR.

4. The DCR shall be provided full and unrestricted access to and upon the Premises at all times during the Term of this Permit to inspect the Premises and to review the operations and inspect the Permittee's equipment.

5. The permittee shall maintain adequate abutter access at all times.

F. PUBLIC SAFETY

1. The Permittee will hire as many safety and/or law enforcement details, as needed to ensure the general public (including but not exclusive of pedestrian, cyclists, and vehicular traffic) safety at all times during all permitted activities on and near the Premises. Advanced notice of starting work shall be provided to the appropriate authority.

   a. For vehicle traffic management and public safety, in and/or on DCR property **excluding** parkways, boulevards, skating rinks, and or water sheds, the Permittee shall contact and hire as many Environmental Police Officers, as needed to ensure the safety of park users at all times.

   b. For vehicle traffic management and public safety, in and/or on DCR Parkways, Boulevards, skating rinks, and or state water sheds the Permittee shall hire as many Massachusetts State Trooper details as necessary to ensure the public safety at all times during all activities on and/or near the Premises.

   c. For work inside DCR Parks **excluding** motor vehicle traffic management on Chapter 90 Roadways (parkways and public ways), the Permittee may hire Park Rangers, to ensure the wellbeing of the public in low use situations, within the confines of the park (i.e. playing fields, bike-paths, parking lots, gardens etc. ...).

   d. For projects impacting both DCR property and municipal roadways, for safety and/or traffic management on the municipal roadways the Permittee may hire as many local safety and/or law enforcement details, or certified flagmen as needed to ensure public safety.

2. The Permittee shall barricade excavations with safety fencing and reflectorized drums with "Type A" flashers to guide personnel and eliminate free access to the work area on, in, or near the Premises. All flashers and "steady-burn" lights on drums must be in good working order. From dusk through dawn, the

   Permittee shall place sufficient working lights to protect the public from injury or damage.

3. Signage indicating the name of the Permittee, and including contact names and telephone numbers shall be on the premises (permitted work site) in plain view or erected during the duration of the Project.

    a. Additional signage may be required by DCR; See Notice paragraph 2 and the Special Conditions.

G. RESTORATION OF PREMISES

1. See SPECIAL CONDITIONS for additional information specific to this permit.

2. At the Permittee's sole expense, DCR property shall be restored/returned to its original or better condition, or otherwise improved in accordance with this permit, and in accordance with standards and specifications of the DCR. The Permittee is responsible for repairing, replacing and restoring any and all damage to the DCR real or personal property, its infrastructure improvements and appurtenances, or any other property of third-parties, caused or necessitated by the Permittee by operation of this Permit, regardless of whether such damage occurs within or without the layout of the Premises itself.

    a. Any/all DCR utilities (storm drainage, electrical services, plumbing, sprinklers, sanitary services, dam and flood control structures, traffic signals and/or street lighting) worked on, damaged or altered (installation, change, relocation, modification, or adjustment) shall be replaced by the Permittee at their expense, unless specifically addressed in this permit.

    b. Temporary service for the impacted utility shall be provided by the Permittee. The Permittee must provide adequate and safe services.

    c. Temporary operating expenses for the impacted utility starting at the time of the disruption and/or installation, through DCR acceptance shall be the responsibility of the Permittee.

    d. All utilities/equipment shall be replaced or reinstalled to working order by the Permittee at their expense unless specifically addressed in this permit or its attachments.

    e. The appropriate DCR section chief, engineer and/or designee shall with assessment review and consultation, determine if the part(s)/fixture(s) may be reused and/or replaced. If the part(s)/fixture(s) need to be replaced, DCR shall supply the specifications.

    f. All DCR utilities worked on by the Permittee shall be reviewed and/or inspected by DCR prior to acceptance.

3. Abandonment of existing underground utilities, pipes, chambers, etc.; The Permittee, its agents, contractor or representative shall take all appropriate measures to properly close, fill and cap all underground structure(s) to guard against future sinkholes and eliminate the possibility of future collapse of these abandoned structures. Pipe abandonment under DCR owned or controlled property shall be managed as follows:

    a. Located under DCR roadways: All pipes, underground utilities, chambers etc. that are under the roadway must be completely filled with grout or high slump500 psi concrete and abandoned in place.

    b. Not located under DCR roadways: All pipes, underground utilities, chambers etc. that are 18-in. in diameter or greater must be completely filled with grout or high slump 500 psi concrete and abandoned in place. (Specification §.02650, ¶ 3.01 D.3).

    c. All pipes that are less than 18-in. in diameter shall be securely plugged with brick, mortar, concrete and/or masonry plugs in both ends at least 12-in. thick and abandoned in place.

4. Any and all parkways, boulevards, roadways, parking areas and/or driveways repairs including trench patches that remain in place for one year or longer will be reviewed by the Permittee and the DCR annually, until such time as the road is permanently repaved from curb to curb. Should the patch fail or prove to be inadequate, the Permittee will be responsible for removal and restoration of the failing area.

5. All opening(s) shall be covered by steel plates when not in use. The Permittee shall not use steel plates that are vulnerable to flexing, or lateral movement due to vehicular traffic. Where any gaps exist between the plate and the roadway surface, "cold-patch" asphalt mix shall be used to fill those voids.

6. In non-trench areas of roadways or sidewalks requiring repairs, the subgrade material shall be Massachusetts Department of

Transportation - Highway Division (hereinafter MassDOT -HD) "Type C" Gravel (2" maximum aggregate size) and it shall be mechanically compacted in six-inch (6") lifts.

7. Pavement trimming: Only saw cutting (without overcuts) shall be allowed as a means of creating the final, permanent edge between existing and new hot-mix asphalt or cement concrete on any roadway or sidewalk. All accidental overcuts shall be filled with bituminous joint sealer. The standard "cutback" for all permanent pavement patches shall be twenty-four inches (24") beyond the original pavement cuts made to perform the work allowed by this permit. If curbing does not allow for twenty-four inches (24"), then the face of the curbing will serve as the edge of the permanent pavement patch.

8. Controlled-density fill (hereinafter the CDF) shall be used for backfilling trenches made in roadway or sidewalk pavement. The CDF shall conform to MASSDOT -"Type 2E," "Flowable and Excavatable." (If the Permittee needs to use backfill materials with higher strength characteristics than MassDOT -"Type 2E" CDF, then the Permittee can request a waiver from the DCR to substitute that higher strength backfill.)

    a. The Permittee shall place the CDF so as to allow enough room for a depth of pavement replacement that matches existing pavement thickness

    b. The Permittee is responsible for allowing sufficient curing time for the CDF prior to installing pavement material. The Permittee shall exercise extra caution in areas of high water table.

9. If the Permittee cannot use MassDOT -"Type 2E" CDF, trenches and other excavations shall be back-filled with DCR-approved gravel. The use of previously excavated material as backfill is acceptable, providing that the previously excavated material is suitable for sub-base with no stones larger than 3" in diameter, and is free of all clays and organic matter. However, immediately below any sidewalk or roadway surface, there must be a minimum of twelve inches (12") of clean gravel borrow (MassDOT #M1.03.0 - Type "C" two-inch [2"] maximum stone size) for the sub-base.

10. All sub-base shall be mechanically compacted in six-inch (6") lifts to ninety-five percent (95%) compaction, as tested by nuclear compaction equipment, and verified by the DCR on site.

11. The permanent pavement patch of bituminous concrete for roadway sections shall consist of the following minimum measurements: four inch (4") base, two inch (2") binder, one and three-quarter inch (1-3/4") of "State Top" (one-half-inch (1/2") stone size) top course. Pavement replacement thickness must match the existing pavement thickness, or conform to Figure # 1 "TYPICAL ROADWAY TRENCH REPAIR" whichever pavement depth is deeper.

12. All mixes shall conform to MassDOT "Type I" mixes: Base, Binder, "State Top" [with one-half inch (1/2") stone size] for roadway use & "Dense Top" [with three-eighths inch (3/8") stone size] for sidewalk use. The permanent hot-mix asphalt patch shall extend over the original trench cut, and act as a "bridge" twenty-four inches (24"). All hot-mix asphalt surfaces (vertical and horizontal) shall be coated with emulsion tack coat immediately prior to placing any new hot-mix asphalt layer.

13. The Permittee shall be responsible for the adequacy and performance of the trench pavement patch (roadway and/or sidewalk) and restoration of all affected curbing in the work zone. DCR reserves the right to have the trench patches repaired or replaced completely and curbing reset at the expense of the applicant as a result of incomplete or inadequate work by the Permittee.

14. All pavement markings removed and/or damaged during the course of construction must be replaced with markings matching the configuration, color, width and type (thermoplastic, paint, etc.) of the markings removed.

15. Any sidewalk replacement shall conform to the most recent Americans with Disabilities Act (hereinafter the ADA) or Architectural Access Board (hereinafter the AAB) handicapped accessibility standards, whichever is more stringent.

16. Any fine-grading of subgrade soils required before sidewalk installation shall be accomplished with MassDOT -M1.03.0 "Type C" Gravel Borrow (two-inch (2") maximum stone size).

17. Any sidewalk damaged must be replaced with a material matching the existing sidewalk surface (hot-mix asphalt or cement concrete), and the replacement shall conform with the following;

    a. The limits of the sidewalk repair shall include the entire work area and extend to the nearest sidewalk control joint. Sawcuts shall be made along those joints and only full, complete concrete sidewalk panels shall be removed. All demolished concrete walkways shall be removed from the DCR property and legally disposed of off-site.

b. All cement concrete sidewalk shall contain welded wire mesh. Welded wire mesh for cement concrete walks must meet ASTM Specification A185 and be 6 gauge wire with six-inch by six-inch (6" x 6") squares. Only sheet mesh shall be permitted (no rolls). The mesh must be installed at mid-depth in the slab and rest on reinforcement "chairs" or cement concrete bricks spaced at 36" maximum in every direction to keep the mesh from deforming during cement concrete placement.

18. For all edgestone/curbing being reset or replaced, on both the front and back of the curbing/edgestone, 2,000 p.s.i. cement concrete (with a six-inch by six-inch (6" x 6") profile) shall be installed for the entire length of the curbing/edgestone being reset or replaced, and the top surface of both the front and back sections of this cement concrete shall be one and three-quarter inches (1 ¾") lower than the finished roadway elevation.

19. Detectable warning panels are required for any pedestrian ramp. The detectable warning panels for cement concrete pedestrian ramps shall be "brick-colored" and "safety yellow" for hot-mix asphalt pedestrian ramps. Exceptions to this are possible with the prior approval of DCR's Chief Engineer, if, for example, the Permittee is trying to match the color of existing nearby pedestrian ramp warning panels. This work must be MUTCD, ADA and AAB compliant.

a. Detectable warning panels can be precast concrete, cast-in-place concrete or other suitable material permanently applied to the ramp.

H. TRAFFIC MANAGEMENT

1. Traffic Management, including both Vehicle and Pedestrian management; the Permittee must provide safe passage to the public including but not limited to motorists, cyclists, pedestrians, workers, and others affected by the Permittee activities and are the sole responsibility of the Permittee.

2. The Permittee assumes full liability and responsibility for Traffic Management, and shall plan for traffic control on a case by case basis to adjust for the varying conditions among work locations in cooperation with the detail officer.

3. All work done on DCR roadways must conform to the **2009** U.S. Department of Transportation, Federal Highway Administration's Manual on Uniform Travel Control Devices Guidelines ("MUTCD") and the **April 28th 2009 Governors Executive Order 511**. Including recently updated Federal Regulations (the FHWA's **Rule on Work Zone Safety and Mobility**) emphasize the importance of providing safe work areas for motorists, workers, and others affected by the maintenance/ utility/ construction activities; whenever the need is indicated the permittee should expand or improve traffic controls.

4. For additional and permit specific Traffic Management requirements see the Special Conditions.

5. Without limiting any of Permittee's obligations under this or any other Section of this Permit, the Permittee is responsible for proper Traffic Management, including the planning and installation of temporary traffic controls in maintenance, utility, or construction work areas, including, but not limited to, responsibility for ensuring that the pedestrian and vehicular safety is properly and safely performed according to all applicable federal, state, and local laws, regulations and governmental requirements.

6. The Permittee shall submit a site specific Traffic and Pedestrian Management Plan stamped by P.E. (hereinafter the TMP) for DCR's review, comment, and subsequent approval.

7. The site specific **TRAFFIC MANAGEMENT PLANS** DCR approved will be strictly adhered to during field operations.

(see the Special Conditions, Item H for Approved Plan)

a. At the discretion of the DCR Chief Engineer or his designee, all TMPs must be prepared and stamped by a Massachusetts Licensed Engineer, specializing in traffic management.

b. The Permittee will notify and coordinate with the District Manager, the facility supervisor and / or the Regional Engineer regarding the TMP, as listed in the Special Conditions and/or Notices and Contacts Section of this Permit.

c. Any subsequent changes to the approved plan **(See the Special Conditions, item H)** by any party other than DCR must be resubmitted to DCR and are subject to DCR's review and subsequent approval before any construction

activities may commence.

d. The TMP will be followed and precautions will be taken to protect the public, the environment and any cultural resource in the area.

8. If the work associated with this Permit potentially impacts other parties, the contractor/ permittee is responsible for notification, and cooperative coordination with all parties, (including but not exclusive of DCR, contractors and representatives, Federal, State and local entities; police fire and ambulance, public transportation and utilities) working in the permitted locations. The coordination is to assure such that all disruptions of vehicular and/or pedestrian traffic is minimized.

   a. If this is not done to the satisfaction of DCR this permit will be revoked by a DCR representative during field operations and all associated work will stop until the deficiencies are resolved to the satisfaction of DCR traffic and or permit engineers.

9. In order to reduce the effects on the public who use the DCR's recreational areas, parks, campgrounds, parkways, boulevards and/or roadways, the Permittee will minimize construction work during peak use periods.

10. Pedestrian and vehicular traffic flow and safety shall be maintained at all times. Detours shall conform to the 2009 U.S. Department of Transportation, Federal Highway Administration's Manual on Uniform Travel Control Devices Guidelines ("MUTCD").

11. The Permittee will leave sidewalk areas clear and open to permit unimpeded pedestrian traffic passage at all times during construction. A minimum of three feet (3') clearance will be maintained to permit public access to alternate passage by the affected portion of the Premises.

12. All deliveries shall be made in such a manner as to have the least negative impact on the visiting public, the Premises and the environment.

I. ENVIRONMENTAL IMPACTS AND REPORTING

1. Prior to any construction work for a project in or adjacent to an environmentally sensitive resource area(s), the Permittee will contact appropriate Federal, State, and local agencies and or authorities, obtain any licenses, permits and or Certificates necessary and will comply with all applicable laws, rules and regulations. The Permittee will supply copies of all applicable documentation to DCR when applying for this permit, and or as they are granted, including but not limited to:

   a. Executive Office of Energy and Environmental Affairs, Offices of Massachusetts Environmental Policy Act and Coastal Zone Management

   b. The Massachusetts Department of Fish and Game regarding wildlife and/or plant impacts.

   c. MassGIS data on any Priority Habitat of Rare Species.

   d. The Massachusetts Department of Environmental Protection's Wetland, Waterways, and Water Management Sections

      i. During all construction phases the Permittee will minimize any potential impacts to flora, fauna and natural resources and habitats on, in, or near the Premises; including the preparation and execution of a management plan for resource protection, erosion and sedimentation control, to minimize the potential impacts to environmentally sensitive resources.

      ii. Special care will be used when permitted work area borders wetlands or waterways resource area(s), including but not limited to installation and maintenance of staked "salt hay" straw bales and silt fences to prevent sediment erosion and siltation from entering resource areas, and protect adjacent resources in accordance with the management plan. Erosion control measures will be in place prior to the start of any earthwork. The Permittee is responsible for inspecting all control measures twice weekly and after every rainfall event, and will maintain the erosion controls such that they operate properly. All erosion control measures will be maintained throughout the construction season until slopes have been stabilized and will be removed upon completion of

2. This permit in **NO** way should be construed as approval of any other applicable permits, notices or findings issued by Federal, State, and local agencies and/or authorities including but not limited to the Massachusetts Department of Fish and Game, and the Department of Environmental Protection.

3. The Permittee shall protect and maintain drainage and other structures against damage.

    a. Any drainage structures damaged or altered will be replaced by the Permittee at their expense. All catch basins should be deep-sump unless utilities or site conditions interfere with the installation, as determined by DCR storm water engineer(s).

    b. Absolutely no bitumen, asphalt, concrete or brick debris shall be dumped into drainage structures during the construction period. All storm water structures within the limits of work shall be

    cleaned prior to the conclusion of the project. This work shall include removing any accumulated dirt, refuse and other debris from each structure, including the gutter mouth of curb inlets. All removed materials shall be properly handled and transported to an approved disposal facility. The Permittee shall incur all cleanup costs.

    c. For NPDES MS4 requirements, the following activities shall continue throughout the construction period:

        i. Street Sweeping

        ii. Catch Basin Cleaning

    d. If applicable, construction projects shall provide the DCR Storm Water Manager, Robert Lowell with a copy of the Storm Water Pollution Prevention Plan for the site.

    e. If applicable, construction projects shall provide the DCR Storm Water Manager, Robert Lowell with a copy of site dewatering permits.

4. The Permittee shall protect and maintain all existing trees against damage.

    a. If applicable, air excavation tools shall be used on DCR property to ensure tree root protection within the drip line. (ref: Special Conditions)

    b. If applicable, a Certified Arborist shall be required on-site during excavations that are located within the drip line. (ref: Special Conditions)

5. Should the permitted work area be located adjacent to an environmentally sensitive area (i.e. wetlands, protected habitat, waterway, and/or coastal shoreline), the Permittee shall notify the DCR Landscape Architect and/or DCR Ecologist, (see Notices and Contacts) a minimum of seventy-two (72) hours prior to any tree or shrub removal (see Notices and Contacts).

    a. Should the Permittee disturb any vegetation, the disturbed areas will, upon DCR's approval, be filled, groomed, and planted with native vegetation to blend in with the natural landscape at or before 95% project completion.

    b. The Permittee will monitor the areas of replaced vegetation to make sure that they are established. If the vegetation dies, the Permittee will consult with DCR Landscape Architect (see Notices and Contacts) to work out replacement details.

6. The Permittee will minimize the impact on trees and shrubs on, in and near the Premises.

    a. The Permittee will remove and replace trees and shrubs only if absolutely necessary to the integrity of the construction and only if such removal is approved by DCR Landscape Architect prior to start of construction.

    b. Any tree removed, damaged and or distressed by the proximity of the construction allowed by this permit will be replaced and warranted for two (2) years at the permittee's cost.

    c. A second notice will be made to the DCR Landscape Architect (see Notices and Contacts) a minimum of 72 hours

before any tree is removed.

i. If the removal of a tree is approved, the Permittee is responsible for disposal/elimination of all associated vegetation materials, above and below ground including but not exclusive of leaves, branches, trunk, and the stump, and restoration of the area.

d. In locations where tree removal/loss are unavoidable, the specific field placement of replacement vegetation will be at a location(s) as directed by DCR; planting locations may include areas outside the permit premises.

e. The Permittee will replace all trees removed for construction, the replacement will be based on caliper inch removed and/or cash equivalent. DCR's Landscape Architect and or designee will have the choice of species, size and location;

i. One caliper inch (1") for every caliper inch of lost/removed trees in **suburban areas,** as deemed practical by DCR.

ii. Two caliper inches (2") for every caliper inch of lost/removed trees in **urban areas,** as deemed practical by DCR.

iii. Any deficiency to the total required replacement caliper inch(es) shall be paid as restitution to the Conservation Trust and Urban Parks Trust Fund. (See the Special Conditions for details).

f. All replacement trees shall be tagged at the approved nursery by the DCR Landscape Architect, before being shipped to the work site.

All replacement trees shall be planted by an approved Landscape Contractor, supervised by a Massachusetts Certified Arborist and by standard arboricultural practices. They will be planted within the planting season during which the work is completed. If this cannot be done, planting shall be done in the next planting season. Planting seasons are April 1 through June 15 and September 15 through October 31.

J. OPERATING SCHEDULE

1. DCR roadways shall not be occupied between the hours of 6:30 a.m. and 9:30 a.m. and the hours of 3:30 p.m. and 6:30 p.m. Monday through Friday, or as otherwise described **in the Special Conditions**. This provision includes time for the placements of traffic equipment to set up the Traffic Management Plan.

2. The Permittee shall shut down all work at 12:00 p.m. (noon) on the eve of major holidays, which include Memorial Day, Independence Day, Labor Day, Thanksgiving, Christmas and New Year's Day or as otherwise described in the Special Conditions.

3. During periods of closing due to inclement weather or any other cause not within the control of the DCR, all other obligations of the Permittee shall not be waived. The DCR shall not be responsible for any costs incurred or revenue lost due to closing or re-opening of facilities or roadways under the provisions of this section.

4. Should a Special Event occur on the premises during the active duration of this permit, the Permittee will minimize any impacts on the park patrons. Any permitted work on DCR properties associated with the special event location, will cease and or shutdown at 10:00 p.m. prior to the start of the special event permit, and shall only resume after the area impacted by the special event has been cleared, cleaned and maintained.

K. TAXPAYER IDENTIFICATION NUMBER

1. Upon request by DCR, the Permittee shall remit to the DCR a Department of Revenue Certification of Good Standing; complete and remit a Taxpayer Identification Number and/or a Certification (Massachusetts Substitute W-9 Form) prior to the execution of this Permit. (as noted in the Special Conditions)

L. RISK OF OPERATION AND INDEMNIFICATION

1. The Permittee shall assume all risk in connection with any and all activities engaged in on the Premises, and shall be solely responsible and answerable in damages and any other remedies for all accidents or injuries to all persons or property caused by the

Permittee and/or its contractors, agents, representatives, employees, licensees, guests and invitees.

2. The Permittee shall be responsible for the security of the Premises and the protection of the assets and property of the DCR. The Commonwealth shall not be responsible for property of the Permittee, its contractors, agents, representatives, employees, licensees, guests and invitees.

3. The Permittee shall agree to defend, hold harmless, and indemnify the Commonwealth of Massachusetts, the DCR, and its agents, officers and employees from any claims regardless of fault, arising out of any violation of any law, ordinance or regulation affecting the activities authorized herein by this Permit, from any claims for personal injury or death or damage to personal property, of whatever kind or nature, arising from the Permittee's activities on the Premises, including claims arising from the intentional, reckless or negligent acts or omissions of the Permittee, its contractors, agents, representatives, employees, Permittee's, licensees, guests and invitees,

   as authorized under this Permit and claims arising from the Permittee's failure to provide adequate security on the Premises.

4. The Permittee shall not make any claims against the Commonwealth or the DCR for any injury, loss, or damage to persons, including bodily injury or death, or damage to property or costs or liabilities arising out of or in connection with this Permit, the obligations thereunder and the Permitted Uses, such as without limitation response actions engaged in or required under law or this Permit, including any acts or omissions of the Permittee, its contractors, agents, representatives, employees, licensees, guests and invitees, except for claims arising solely from the reckless conduct of the DCR.

5. The Permittee shall waive any and all claims for compensation for any and all loss or damage sustained by reason of any interference by any public agency or official in the operation of this Permit.

6. The risk of loss resulting from any natural weather phenomena or occurrences remains with the Permittee.

   a. Compensation due to the DCR shall not be reduced or abated in any manner due to natural weather phenomena or other occurrences.

M. INSURANCE

1. The Permittee, its employees, contractors or agents shall hold the appropriate valid license(s) as required by law to perform the construction work associated with this Permit for the duration of the Permit.

2. The Permittee and or their contractor shall carry insurance in the types and amounts as described in this section of the Permit at its own expense.

3. The Permittee shall maintain said policies for the full Term of this Construction permit. Failure to maintain insurance coverage shall be deemed a material breach of the Permittee's duties under this

   Construction permit.

4. If the Permittee's insurance provisions, terms, and coverage, are amended, changed, suspended, expired or cancelled in any fashion, the Permittee shall, to the extent practicable, provide DCR with at least 30 days advance notice thereof.

5. The Permittee shall furnish Certificates of Insurance issued by an insurer or insurers qualified to do business in the Commonwealth. Said Certificates of Insurance upon request must be provided for review and approval to the address listed below anytime up to the expiration of the Permit.

Department of Conservation and Recreation
Construction Access Permits
Permit No: _____
251 Causeway Street, Suite 700
Boston, Massachusetts 02114

6. Failure to furnish said Certificates of Insurance and/or policies shall be deemed a material breach of the Permittee's duties under this Permit but in no way shall release Permittee of its obligations herein.

7. The Commonwealth of Massachusetts, including its DCR, shall be named as an additional insured on all policies specified herein, except that in regard to section M.12 the Commonwealth shall be named as an additional insured only on the contractors pollution liability portion of the professional/contractors pollution liability policies per policy endorsements.

8. **General Liability:** The Permittee shall carry General Liability Insurance in the minimum amount of $1,000,000 per occurrence, $2,000,000 in the aggregate.

9. **Public/Products Liability Insurance**. The Permittee shall carry public liability insurance as to third persons, and products liability insurance against claims based upon the services provided, in the minimum amount of One Million Dollars ($1,000,000) in the event of death or injury to one individual, and a minimum of Two Million Dollars ($2,000,000) in the event of death or injury to more than one individual, or such other amounts of liability insurance coverage the DCR shall reasonably require from time to time.

10. **Fire and Casualty Insurance**. The Permittee and or their contractor shall carry fire and casualty liability insurance in a minimum amount equal to the fair market value of the structure(s) located upon the Premises, if required by DCR.

11. **Professional/Environmental Impairment Liability Insurance**: Unless specifically excluded in writing in the Special Conditions of this Permit, the Permittee shall carry, or shall cause its contractor to carry, Environmental Impairment Liability Insurance, and shall cause its consultants to carry Professional Liability Insurance, that includes coverage for environmental contamination, bodily injury and/or property damage arising out of acts, errors and omissions of Permittee or its contractors, employees or agents in the performance of the Permitted Uses or any other activities or failures to act at or with respect to the Premises in the amount of one million dollars ($1,000,000) for each claim and three million dollars ($3,000,000) in the aggregate. Coverage includes claims based upon or arising out of underground storage tanks. Notwithstanding any contrary provisions section, said Professional Liability and Environmental Impairment Liability Insurance may be written on a "claims made" basis provided that the insurance coverage is maintained during the full term of this Permit and for at least three (3) years after the expiration of the Term.

12. **Automobile Bodily Injury and Property Damage Liability Insurance** in an amount not less than the compulsory coverage required in Massachusetts. Such insurance shall extend to owned, non-owned and hired automobiles used in the performance of the activities under this License. The limits of liability of such insurance shall be not less than one million dollars ($1,000,000) combined single limit.

13. If the Permittee's and/or their contractor's insurance provisions, terms, coverage, etc. are amended, changed, suspended, expired or cancelled in any fashion, the Permittee must notify the DCR verbally immediately and shall notify the DCR in writing within five (5) business days.

N. HAZARDS ~ PHYSICAL, ENVIRONMENTAL AND CHEMICAL

1. The Permittee shall periodically inspect all areas used by the public in and around the Premises for the presence of unsafe or hazardous conditions and shall promptly remedy such conditions when found and shall promptly report the conditions to the DCR. The Permittee shall develop an accident reporting system and shall ensure that all employees understand and comply with said system. The Permittee shall make and preserve records of all accidents, emergencies and administration of medical aid on the Premises.

2. The Permittee shall immediately verbally notify DCR of any injuries, property damage or related incidents that occur on the Premises and shall provide written notice to the DCR Regional Engineer within five (5) calendar days of said incident. The written notice shall provide a detailed account of the incident, including, but not limited to, the nature of the incident, the names of any individuals involved and the names of any and all witnesses, all phone numbers, addresses, and contact information of affected individuals and witnesses, and the names of any agencies (federal, state, and/or local) that responded to the incident.

3. If the Permittee is notified by any regulatory agency having authority over the Premises that the Premises operations are in violation of an applicable rule, regulation or statute, the Permittee shall take immediate action to cure said violation. If the Permittee fails to take prompt remedial measures, the DCR may suspend the operations on any part or all of the Premises.

4. The Permittee shall not release, discharge or similarly dispose of hazardous substances, chemicals or materials.

5. Without limiting any of Permittee's obligations under this or any other Section of this Permit, Permittee agrees that it shall not cause any hazardous materials to be used, (with the exception of oil and other petroleum products contained within and necessary for the equipment utilized during the Permitted Uses), generated, stored or disposed of on, under or about, or transported to, from or through the Premises, except for soil, groundwater or any other material originating on the Premises and removed from the Premises by Permittee as required for the Permitted Uses (e.g., drill cuttings and soil samples, and excavated soil). Permittee assumes full liability and responsibility for such soil, groundwater or other material removed from and not replaced on the Premises including, but not limited to, responsibility for ensuring that the handling, treatment, transport, storage and/or disposal of these materials is properly and safely performed according to all applicable federal, state, and local laws, regulations and governmental requirements.

6. If Permittee's use of the Premises results in the need for a further response action under applicable environmental laws (other than the c. 21E response actions being undertaken as described in the Scope of Work), the Permittee shall give immediate telephone notice to DCR by calling the Environmental Section Head, Robert Lowell at (617) 626-1340. Without limiting any other provision of this Permit, completion of any such response action shall be the sole responsibility of the Permittee, shall be performed in accordance with applicable environmental laws at Permittee's sole expense, and shall not be performed without the prior approval of DCR unless an emergency situation exists and approval cannot be obtained. DCR reserves the right to supervise Permittee's contractor(s) implementing any such response action, and all submittals required to be made to any regulatory agency must be reviewed and approved by DCR.

7. For the purposes of this Permit, "hazardous materials" shall include, but not be limited to, substances defined as "hazardous substances", "toxic substances", "hazardous wastes", "hazardous materials", "oil" or "asbestos" in any federal or state statute concerning hazardous substances, wastes or materials now or hereafter enacted, including all regulations adopted or publications promulgated hereunder.

8. Pesticide applications may be allowed with written permission by DCR. If allowed, only those materials approved and registered by the U.S. Environmental Protection Agency for the specific purpose planned shall be considered for use on the Premises. Label instructions shall be strictly followed in the preparation and application of pesticides and other hazardous substances and disposal of excess materials and containers. Any and all applicators shall be duly licensed by the Commonwealth and the U.S. Environmental Protection Agency. Use of said materials must have prior authorization from DCR.

9. The Permittee assumes all risk associated with any environmental condition within the subject property and shall be solely responsible for all costs associated with evaluating, assessing and remediating, in accordance with all applicable laws, any environmental contamination (1) discovered during the

   Permittee's work or activities under this permit to the extent such evaluation, assessment or remediation is required for Permittee's work, or (2) resulting from Permittee's work or activities under this permit.

   Permittee shall notify DCR of any such assessment and remediation activities for review and approval of proposed activities; except for emergency containment. The Permittee is hereby held solely responsible for obtaining and maintaining any and all environmental compliance permits required by local, state and federal laws and regulations when regular or emergency work is proposed within, or in close proximity to, any wetland area.

10. In the event the Permittee learns of any release of oil or hazardous material or any other emergency within or from the Permitted Area, in addition to providing any regulatory notice required by any local, state or federal law or regulation, the Permittee shall provide notice of any such release or other emergency to DCR as soon as practicable thereafter, but not more than three (3) hours following any such release or emergency. Notice shall be given orally by telephone to the DCR Operations Control Center at (617) 946-3150. In the case of a release or other environmental emergency, notice must also be given in writing within twelve (12) hours, please indicate your Permit Number on all correspondence and on the mailing envelope and deposit in the United States mail, certified, return receipt requested, postage prepaid to:

    Department of Conservation and Recreation
    21 Causeway St., Suite 700
    Boston, MA 02114
    ATTN: Robert Lowell

11. In the event that the Permittee may impact contaminated soil and/or groundwater through permitted activities, the result may require site characterization under the supervision of a Licensed Site Professional (LSP). In this instance, the Permittee shall

cease work and obtain from the Massachusetts Department of Environmental Protection (MassDEP) a written approval of a Response Abatement Measure (RAM) Plan (per 310 CMR 40) for the Permitted Uses to continue. The Permittee and its LSP shall oversee work in the Permitted Area to ensure that:

a. Worker health and safety is protected.

b. Soil generated and to be removed, if any, is properly disposed of in accordance with M.G.L. c. 21E / Massachusetts Contingency Plan and other applicable state and federal law.

c. The RAM is properly implemented and completed. Disposal, if any, of such soil shall be done under the supervision of an LSP and certified by the LSP to MassDEP.

O. LAND MARKERS AND MONUMENTS

1. The Permittee shall take reasonable precautions to protect all public land survey monuments, public land boundary markers and private property corners.

2. In the event that any such markers or monuments are disturbed or destroyed, the Permittee shall take appropriate action to reestablish them in accordance with specifications of the town or county surveyor, or the DCR.

P. TERMINATION

1. The nature of this Permit is a revocable license. As such, the DCR may terminate, with or without cause, upon written or oral notice to the Permittee, at which time all work associated with the permit will immediately end. If applicable, thereafter, the Permittee may cure or remedy such matter within no more than twenty four (24) hours. If the Permittee does not satisfactorily remedy or cure said matter, this Permit will be deemed terminated. If this Permit is revoked or terminated, Permittee shall not be relieved of liability to DCR or the Commonwealth for arrears in any fees or for any other injury, cost, liability or damage sustained or for any response action required or identified as needed as result of a Permittee's entry and/or use of the Premises, whether occurring before or after such termination.

2. All obligations required of the Permittee under the terms of this Permit shall expressively survive the given termination/expiration date until such obligations are completed to the satisfaction of the DCR.

Q. NON-DISCRIMINATION

1. The Permittee acknowledges that there shall be no discrimination against any employee who is employed in the work covered by this Permit, or against any applicant for such employment, based on race, color, religion, sex, sexual orientation, age, national origin, veterans' status, or physical or mental handicap.

2. The Permittee shall comply with all applicable federal and state statutes, and rules and regulations promulgated there-under prohibiting discrimination in employment.

R. STATUS OF PERMITTEE

1. The relationship of the Permittee to the Commonwealth of Massachusetts and the DCR is that of a Licensee. The Permittee covenants and agrees that it will conduct itself consistent with such status, that it will neither hold itself out as, nor claim to be, an officer or employee of the Commonwealth by reason hereof, and that it will not, by reason hereof, make any claim, demand or application to, or for any right or privilege applicable to an officer or employee of the Commonwealth of Massachusetts, including, but not limited to, Worker's
Compensation Coverage, unemployment insurance benefits, Social Security coverage or retirement membership or credit.

2. Nothing herein contained shall create or be construed as creating a co-partnership between the DCR and the Permittee or to constitute the Permittee as an agent of the DCR.

3. The Permittee acknowledges that this Permit does not confer any rights in real property to the Permittee. As a licensee, the Permittee may enter and use the Premises solely for those purposes contained in this Permit. Any use of the Premises by the Permittee that is inconsistent with the terms of this Permit shall be deemed a material breach of the Permittee's rights and

obligations under this Permit.

S. MERGER

1. All Attachments or Exhibits to this Permit are hereby incorporated by reference and become part of this Permit. Any failure to comply with the terms and conditions contained in any Attachment or Exhibit by either party constitutes a breach of this Permit. The Attachments and Exhibits are intended to be used to clarify the terms of this Permit. In the event there is an irreconcilable conflict between the terms of this Permit and those contained in an Attachment or Exhibit, the term contained in this Permit shall supersede.

2. Plans and documents, including, but not limited to, TMP, pedestrian and vehicle plans, and MUTCD specifications, which are submitted to and approved by the DCR, are hereby incorporated by reference and become part of this Permit.

T. WAIVER

1. No waiver during the term of this Permit, by either party, of any term, condition or covenant of this Permit shall be deemed a waiver at any time thereafter of the same provision or of any other provision contained herein, or of the strict and prompt performance thereof.

U. FORCE MAJEURE

1. Neither party shall be liable to perform its part of this Permit when such failure is due to fire, flood, war, riot, insurrection and/or other catastrophe beyond the control of the parties.

V. SEVERABILITY

1. If any provision of this Permit, or portion of such provision, is held invalid, the remainder of this Permit shall continue in full effect.

W. MODIFICATIONS OR AMENDMENTS

1. Modifications or amendments to this Permit shall be in writing and duly executed by both parties hereto to be effective.

X. ASSIGNMENT AND SUBLETTING

1. Except with the consent of the DCR, this Permit is not transferable.

2. The Permittee shall not assign, sublease, transfer or otherwise dispose of its management responsibilities or of any right, interest or use of the Premises covered by this Permit to anyone other than its contractor or parties specifically named in this permit, without the prior written consent of the DCR.

3. Any such disposition without the written consent of the DCR shall constitute a material breach of this Permit, which shall be cause for immediate termination of the Permit by the DCR.

4. The DCR shall not be obligated to recognize any right of any person or entity to any interest in this Permit or to any rights, equipment, structures, or property of the Permittee at the Premises. Any assignments of rights under this Permit are void.

5. The Permittee may not enter into any agreement with any entity or person, except employees of the Permittee, and/or its contractor or parties specifically named in this permit and/or their contractors, to exercise substantial management responsibilities for operation of the Premises without the prior non-electronic written consent of the DCR Commissioner or designee.

Y. ATTACHMENT

1. The Permittee is not authorized to permit and shall not permit any liens, mortgages or other security interests for any purpose to be attached to the Permitted Area in connection with the Permittee's use of, occupancy of, and/or activities in, around or

DCR CONSTRUCTION/ACCESS PERMIT

Issued Date April 13, 2023 **Permit Number** **CP-01156**

DCR. The Permittee shall, upon the request of DCR, furnish such surety bonds as DCR may request and require, as it relates to said waivers. In the event that any liens, mortgages, or other security interests are attached to the Permitted Area or any part thereof or improvement thereto, the Permittee shall forthwith cause such liens, mortgages, and/or security interests to be released of record without cost to DCR.

Z. NOTICE

1. For purposes of this Permit, the parties hereto shall, unless otherwise indicated below, be deemed duly notified of any information or issues arising from the operation of this Permit in accordance with the terms and provisions hereof only if written notices are provided by first class mail, overnight mail or hand delivered or fax delivery with confirmation to the parties noted in the Notices and Contacts section, (DCR Construction Permits Director; DCR Region Manager, and (DCR Chief Engineer) subject to change upon notice in writing to that effect;

2. If the permitted work site encompasses and or encroaches upon designated parking spaces and or parking areas, the permittee will install additional **signage** indicating the parking restriction.

    1. The "TEMPORARY PARKING RESTRICTIONS" signage must be installed at least 48 hours prior to the start of each portion of the permitted work. A copy of the parking restriction along with the date and time it was posted must be emailed to the DCR Parking Clerk for contact information (see Notices and Contacts). Should the permittee not post within the specified time, they will be responsible for any towing reimbursement that may occur.

    2. Should the parking spaces and/or parking areas be located in a residential neighborhood the permittee will provide written notice (mailed or posted) to area residents who may be impacted, at least 72 hours prior to use of the parking space. This notice may include leafleting all cars and mailboxes within 150 feet of the restricted parking area. A description of how you notified the neighbors plus a copy of the parking restriction including the date and time it was posted must be emailed to the parking clerk for contact information (see Notices and Contacts)..

3. Before any work is started, the Permittee will provide notice to parties indicated in the Special Conditions and the Notices and Contacts section.

4. The Permittee will supply a written work schedule prior to the commencement of work, and will update the schedule at the time of 50% and 80% completion to parties indicated in the Special Conditions and Notices and Contact section.

Sean Casey, Construction Access Permits

DOCUMENT A00849

National Oceanic and Atmospheric Administration

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June 13, 2023

Kaitlyn Shaw
Environmental Reviewer-North of Cohasset
Massachusetts Division of Marine Fisheries, Habitat Program
251 Causeway Street, Suite 400
Boston, MA 02114-2152
mike.r.johnson@noaa.gov

RE: Eliot Bridge Brick and Granite Cap Repair (Bridge #B-16-246)
MassDOT Highway Division Project Number 608762
Eliot Street over the Charles River, Boston and Cambridge, MA
Consultation Letter Regarding Essential Fish Habitat Review

Dear Ms. Shaw:

On behalf of the Massachusetts Department of Transportation (MassDOT), Jacobs Engineering Group (Jacobs) is submitting this consultation letter for the proposed brick and granite cap rehabilitation of Bridge # B-16-246 (Eliot Street over the Charles River) located in the Cities of Boston and Cambridge, Massachusetts. The proposed improvements are located within the right-of-way owned by the Commonwealth of Massachusetts. The existing conditions and extent of the work required are described in the following narrative and attachments.

A barge will be used to assist with the repair and rehabilitation activities. The use of movable spud barge will be temporarily placed along the bottom of the Charles River to provide stability. The spud on the barge is 18 foot aluminum tubes which are raised and lifted from vertical by an electric cable winch system. The outrigger system employs two, 25 foot long, 3 feet in diameter spud feet. Although the spuds will only occupy the small substrate area, however, the barge will move along an area under and immediately adjacent to each overpass, so therefore the total estimated temporary impact can occur within a conservative area of 0.35 acres.

The repairs to the underside of the bridge will occur from the barge and will be limited to one “arch” span at a time. To perform the “repair-in-kind” rehabilitation of several bridge elements, the rehabilitation tasks include:

- Partial depth concrete repair to the entire sidewalk to repair existing deterioration and produce a uniform appearance.
- Removal and replacement of deteriorated brick along the bridge parapets.
- Removal and resetting of the granite cap stones with spot repairs and replacements of select stones.
- Sidewalk widening with “shaped curb detail” incorporated.
- Bridge joint replacement at the expansion joints of the piers.
- Reconstruction of the median with concrete barrier.
- Replacement of the median lighting.
- Installation of end treatment for the proposed median railing.
- Complete reconstruction of the brick arch opening at each abutment portal.
- Removal of the existing bridge scuppers and patching of the area with concrete.
- Milling and paving of the bridge deck.
- Replacement of the bridge deck waterproofing membrane.
- Spot deck concrete repair.

- Spot truss concrete encasement repair.
- Traffic management plans.
- Revised pavement marking plans.
- Replace navigation lighting along both bridge elevations.

The Charles River will not be permanently impacted by the proposed construction activities. There will be no fill associated with the rehabilitation of the bridge. The sole impact to the Charles River will be the temporary placement of the movable spuds to stabilize the barge. This activity is not anticipated to adversely affect EFH or HAPC.

The Programmatic **Appendix B Verification Form** has been attached for your review and approval.

Figure 1 depicts the proposed work area. **Figure 2** depicts how the project area will not take place with Essential Fish Habitat (EFH) area protected from fishing, EFH of Atlantic salmon or highly migratory species, or Habitat Areas of Particular Concern (HAPC). Please note how the mapped EFH does not extend further westward from around the North Station/Museum of Science area of the Charles River.

Figures 3 and 4 depict the project area with ALL conservative mapping turned on. Specifically, in turning on the New England/Mid-Atlantic EFH Species layer, a large buffer is drawn extending further west from the Massachusetts coastline. The species that are listed under these layers are adult and juvenile summer flounder, scup, black sea bass, surfclam and ocean quahog. This buffer for both HAPC and EFH extends into upland, developed areas extending from Woburn south to Norwood.

The entirety of the Charles River until Needham is listed as a diadromous fish river herring spawning and nursery habitat. However, we feel as though the project falls under the Programmatic Agreement of 50 CFR 600.920(j)(1) and that the proposed design has addressed all reasonable foreseeable adverse impacts on EFH. Therefore, we request that NOAA NMFS review the enclosed materials and concur with our determination that the project will not adversely affect EFH or HAPC.

If you have any questions concerning the enclosed project information, please feel free to contact David Paulson at david.j.paulson@state.ma.us of MassDOT Highway Division's Wildlife Unit.

Sincerely,

Kyle Purdy, CPESC
Jacobs

Attachments: Appendix B. Verification Form
Figures
Site Plans
Photographic Log

CC: Anthony Christakis, Melissa Lenker, David Paulson, Trevor Burns, MassDOT Highway Division
Anthony Richardson, Sue McArthur, Jacobs

Appendix B. Verification Form

Federal Highway Administration (FHWA) or the applicable state Department of Transportation (state DOT) will email a signed version of this completed form, together with any project plans, maps, supporting analyses, etc., to NOAA's National Marine Fisheries Service (NMFS), Greater Atlantic Regional Fisheries Office, Habitat Conservation Division (GARFO HCD) at NMFS.GAR.EFH.Consultation@noaa.gov, upon obtaining sufficient information. FHWA/state DOT must receive a response from GARFO HCD or wait at least 30 calendar days to proceed under the programmatic EFH consultation. FHWA will compile the information from the completed Verification Forms for the purposes of tracking and annual monitoring. FHWA/state DOT must include the completed Verification Form as part of a permit application with any other federal agency, such as U.S. Army Corps of Engineers or U.S. Coast Guard, to confirm that EFH consultation is complete.

Project Activity Type

1. ■ Bridge repair, demolition, and replacement
2. ☐ Culvert repair and replacement
3. ☐ Docks, piers, and waterway access projects
4. ☐ Slope stabilization

Transportation Project Information

Project Name:	Eliot Bridge Repair (B-16-246)	Project Number:	608762
Project Sponsor:	MassDOT Highway	Contact Person:	David Paulson
Email:	david.j.paulson@state.ma.us	Phone:	N/A
Latitude (e.g., 42.625884):		42.371587	
Longitude (e.g., -70.646114):		-71.132831	
City/Town, State:	Boston and Cambridge, MA	Waterway:	Charles River
Project Description and Purpose:	The brick and granite repair and rehabilitation of the bridge will be performed from the roadway, as well as from atop a barge within the Charles River. The use of movable spud barges will be temporarily placed along the bottom of the Charles River to provide stability. The spud on the barge is 18 foot aluminum tubes which are raised and lifted from vertical by an electric cable winch system. The repairs to the underside of the bridge		
Anticipated Project Start Date:	8/1/23	Anticipated Project End Date:	11/1/23
Total area of impact to EFH (in acres): Include locus map with area of impact.		0.35	
Area of impacts to sensitive habitats (in square feet):		No impacts to submerged aquatic vegetation (SAV) or oyster reefs allowed.	
Natural rocky habitat (e.g., bedrock, boulders, cobble, and/or gravel):		0	
Salt marsh:		0	
Areas containing shellfish (excluding oyster reefs):		0	
Intertidal mudflats:		0	
Area of impact to diadromous fish habitat:		0	

Potential Stressors Caused by the Activity (Check all that apply based on activity type)

☐Underwater Noise
☐Impingement/Entrainment and Entanglement
☐Water Quality/Turbidity
☐Habitat Alteration
☒Vessel Traffic

EFH Conservation Recommendation Checklist

FHWA/state DOT will indicate how the project addresses each of the programmatic EFH conservation recommendations, by selecting the appropriate check box and providing a brief explanation where necessary. If the project is not in compliance with a particular programmatic EFH conservation recommendation and FHWA/state DOT has still determined that the effects of a project on EFH are not substantial and the project is otherwise consistent with the FHWA programmatic EFH consultation, provide justification below under the conservation recommendations that is not included.

Underwater Noise

☒Check here if the EFH conservation recommendations in this section are not applicable because the project will not create underwater noise as a stressor. Proceed to the next stressor.

1. Use a soft start each day of pile driving, after a break of 30 minutes or more, and if any increase in pile installation or removal intensity is required. Build up power slowly from a low energy start-up over a 20-minute period to warn fish to leave the vicinity. This buildup shall occur in uniform stages to provide a constant increase in output.

☐ Not met:
- ☐ Not applicable, provide reasoning:
- ☐ Project is unable to accommodate, provide justification:

☐ Met:
- ☐ Shown on project plans
- ☐ Included in description, other terms and conditions

2. Noise-generating work conducted in diadromous streams within the spring diadromous fish TOY restriction listed in Appendix D must be isolated behind sealed, dewatered cofferdams, to avoid impeding fish migration.

☐ Not met:
- ☐ Not applicable, provide reasoning:
- ☐ Project is unable to accommodate, provide justification:

☐ Met:
- ☐ Shown on project plans
- ☐ Included in description, other terms and conditions

Impingement/Entrainment and Entanglement

☒ Check here if the EFH conservation recommendations in this section are not applicable because the project will not lead to impingement/entrainment and entanglement as a stressor. Proceed to the next stressor.

3. Turbidity control measures must be properly secured and monitored to ensure aquatic species are not entangled or trapped in the project area.

☐ Not met:
- ☐ Not applicable, provide reasoning:
- ☐ Project is unable to accommodate, provide justification:

☐ Met:
- ☐ Shown on project plans
- ☐ Included in description, other terms and conditions

4. Temporary intakes related to construction must be equipped with mesh size screening and approach velocity appropriate for the species and life stage anticipated. Per the NMFS Anadromous Salmonid Passage Facility Design manual, screen openings must not exceed 3/32 inch and screen approach velocity must be less than .25 feet per second (ft/sec).
    - In New York, New Jersey, Delaware, Maryland, and Pennsylvania, 2 millimeter (mm) wedge wire screens must be used with a maximum intake velocity of 0.5 feet per second (ft/sec).
    - In Virginia, a 1 mm wedge wire with a maximum intake velocity of 0.25 ft/sec).

☐ Not met:
- ☐ Not applicable, provide reasoning:
- ☐ Project is unable to accommodate, provide justification:

☐ Met:
- ☐ Shown on project plans
- ☐ Included in description, other terms and conditions

5. No new permanent surface water withdrawal, water intakes, or water diversions.

☐ Not met:
- ☐ Not applicable, provide reasoning:
- ☐ Project is unable to accommodate, provide justification:

☐ Met:
- ☐ Shown on project plans
- ☐ Included in description, other terms and conditions

Water Quality/Turbidity

☒ Check here if the EFH conservation recommendations in this section are not applicable because the project will not negatively affect water quality or create turbidity. Proceed to the next stressor.

6. Install soil erosion, sediment, and turbidity controls and maintain them in effective operating condition during construction. Remove controls upon completion of work, after all exposed soil and other fills, as well as any work waterward of ordinary high water or the high tide line, are permanently stabilized.

☐ Not met:
- ☐ Not applicable, provide reasoning:
- ☐ Project is unable to accommodate, provide justification:

☐ Met:
- ☐ Shown on project plans
- ☐ Included in description, other terms and conditions

7. Install and remove any in-water soil erosion, sediment, and turbidity controls outside the TOY restrictions in Appendix D.

☐ Not met:
- ☐ Not applicable, provide reasoning:
- ☐ Project is unable to accommodate, provide justification:

☐ Met:
- ☐ Shown on project plans
- ☐ Included in description, other terms and conditions

8. Work that produces greater than minimal turbidity or sedimentation in diadromous streams or EFH must not be done during the TOY restriction(s) in Appendix D.

☐ Not met:
- ☐ Not applicable, provide reasoning:
- ☐ Project is unable to accommodate, provide justification:

☐ Met:
- ☐ Shown on project plans
- ☐ Included in description, other terms and conditions

9. Prevent construction debris and sediment from entering aquatic areas and remove all construction debris and excess/deteriorated materials and dispose of in an upland area.

☐ Not met:
- ☐ Not applicable, provide reasoning:
- ☐ Project is unable to accommodate, provide justification:

☐ Met:
- ☐ Shown on project plans
- ☐ Included in description, other terms and conditions

10. Dredged and/or excavated materials, including any fine-grained materials removed from inside culverts, shall either be moved to an upland location and stabilized to prevent reentry into the waterway or disposed of at a previously approved disposal site.

☐ Not met:
- ☐ Not applicable, provide reasoning:
- ☐ Project is unable to accommodate, provide justification:

☐ Met:
- ☐ Shown on project plans
- ☐ Included in description, other terms and conditions

11. Completely remove and do not reuse existing creosote piles that are affected by project activities and do not install new creosote piles.

☐ Not met:
- ☐ Not applicable, provide reasoning:
- ☐ Project is unable to accommodate, provide justification:

☐ Met:
- ☐ Shown on project plans
- ☐ Included in description, other terms and conditions

12. Coat any chemically or pressure treated piles (CCA, ACQ, etc.) with an impact-resistant, biologically inert substance. Coat the piles at the point of manufacture, not on site.

☐ Not met:
- ☐ Not applicable, provide reasoning:
- ☐ Project is unable to accommodate, provide justification:

☐ Met:
- ☐ Shown on project plans
- ☐ Included in description, other terms and conditions

13. Derelict, degraded, or abandoned piles, except for those inside of existing work footprints for piers, must be completely removed or cut and driven three feet below the surface.

☐ Not met:
- ☐ Not applicable, provide reasoning:
- ☐ Project is unable to accommodate, provide justification:

☐ Met:
- ☐ Shown on project plans
- ☐ Included in description, other terms and conditions

14. Ensure that raw concrete does not contact the water; wet pours of concrete must be confined within sealed forms until the concrete is set or pre-cast members installed.

☐ Not met:

☐ Not applicable, provide reasoning:
☐ Project is unable to accommodate, provide justification:

☐ Met:
☐ Shown on project plans
☐ Included in description, other terms and conditions

Habitat Alteration

☒ Check here if the EFH conservation recommendations in this section are not applicable because the project will not cause habitat alteration. Proceed to the next stressor.

15. Remove temporary and/or obsolete structures and fills in their entirety. Use geotextile barriers prior to placement of temporary fill material to ensure complete removal.

☐ Not met:
☐ Not applicable, provide reasoning:
☐ Project is unable to accommodate, provide justification:

☐ Met:
☐ Shown on project plans
☐ Included in description, other terms and conditions

16. Install a riprap bedding layer (such as a gravel filter blanket or geotextile) prior to riprap placement to prevent underlying soils from washing through the riprap during high water.

☐ Not met:
☐ Not applicable, provide reasoning:
☐ Project is unable to accommodate, provide justification:

☐ Met:
☐ Shown on project plans
☐ Included in description, other terms and conditions

17. Return areas impacted by temporary activities, fills, or structures to pre-construction or better condition, including elevations and substrate, and replant with native species.

☐ Not met:
☐ Not applicable, provide reasoning:
☐ Project is unable to accommodate, provide justification:

☐ Met:
☐ Shown on project plans
☐ Included in description, other terms and conditions

18. Temporary monitoring devices shall be removed and the substrate restored to preconstruction elevations no later than 24 months from initial installation, or upon completion of data acquisition.

☐ Not met:
- ☐ Not applicable, provide reasoning:
- ☐ Project is unable to accommodate, provide justification:

☐ Met:
- ☐ Shown on project plans
- ☐ Included in description, other terms and conditions

19. Pipelines and cables that cross a waterway must not rest on the substrate. They may be attached to an overwater structure or be buried to allow an area to return to preexisting conditions.

☐ Not met:
- ☐ Not applicable, provide reasoning:
- ☐ Project is unable to accommodate, provide justification:

☐ Met:
- ☐ Shown on project plans
- ☐ Included in description, other terms and conditions

20. Any fill, including planting media and placement of any seed shellfish, spatted-shell, or cultch must be free of all non-native or invasive species and/or contaminants. An invasive species control plan must be part of the project if the transportation agency cannot guarantee this.

☐ Not met:
- ☐ Not applicable, provide reasoning:
- ☐ Project is unable to accommodate, provide justification:

☐ Met:
- ☐ Shown on project plans
- ☐ Included in description, other terms and conditions

21. Prevent dislodging of coir logs, mats, or native oyster shell.

☐ Not met:
- ☐ Not applicable, provide reasoning:
- ☐ Project is unable to accommodate, provide justification:

☐ Met:
- ☐ Shown on project plans
- ☐ Included in description, other terms and conditions

22. Incorporate measures to increase the ambient light transmission under overwater structures.

☐ Not met:
- ☐ Not applicable, provide reasoning:

☐ Project is unable to accommodate, provide justification:

☐ Met:
- ☐ Shown on project plans
- ☐ Included in description, other terms and conditions

23. The lowermost part of floating docks must be ≥ 18 inches above the substrate at all times, to avoid grounding and propeller scour and to provide adequate circulation and flushing.

☐ Not met:
- ☐ Not applicable, provide reasoning:
- ☐ Project is unable to accommodate, provide justification:

☐ Met:
- ☐ Shown on project plans
- ☐ Included in description, other terms and conditions

24. Conduct and submit pre-dredge benthic biological surveys to determine benthic communities present and conduct post-dredge surveys to ensure targeted depths have been reached and to determine benthic recovery.

☐ Not met:
- ☐ Not applicable, provide reasoning:
- ☐ Project is unable to accommodate, provide justification:

☐ Met:
- ☐ Shown on project plans
- ☐ Included in description, other terms and conditions

25. Grain size of any sediment used as part of habitat restoration must be the same size or larger than the native material at the site.

☐ Not met:
- ☐ Not applicable, provide reasoning:
- ☐ Project is unable to accommodate, provide justification:

☐ Met:
- ☐ Shown on project plans
- ☐ Included in description, other terms and conditions

26. If rock relocation is necessary, move them to an area of equivalent depth and substrate.

☐ Not met:
- ☐ Not applicable, provide reasoning:
- ☐ Project is unable to accommodate, provide justification:

☐ Met:
- ☐ Shown on project plans

☐ Included in description, other terms and conditions

27. Incorporate natural habitats (e.g., living shorelines) and soft approaches (e.g., vegetative plantings and large woody debris) into the stabilization design in addition to or instead of hardened structures. See NOAA's Guidance for Considering the Use of Living Shorelines for more information.

☐ Not met:
☐ Not applicable, provide reasoning:
☐ Project is unable to accommodate, provide justification:

☐ Met:
☐ Shown on project plans
☐ Included in description, other terms and conditions

Sensitive Habitats (SAS, natural rocky habitats, intertidal areas, and areas containing shellfish)

28. Locate all temporary structures, construction, access, and dewatering actives outside of sensitive habitats.

☐ Not met:
☐ Not applicable, provide reasoning:
☐ Project is unable to accommodate, provide justification:

☐ Met:
☐ Shown on project plans
☐ Included in description, other terms and conditions

29. Prior to construction, identify and mark in the field any SAV at the project site. An SAV survey is required for activities adjacent to mapped or known SAV if a survey has not been conducted in three years.

☐ Not met:
☐ Not applicable, provide reasoning:
☐ Project is unable to accommodate, provide justification:

☐ Met:
☐ Shown on project plans
☐ Included in description, other terms and conditions

30. Provide compensatory mitigation for all permanent and temporary impacts to sensitive habitats. This could include a contribution to an existing in-lieu fee program. When impacts are unavoidable:
    - conduct a biological survey to map the coverage of the sensitive habitats;
    - develop a compensatory mitigation plan for biological resource losses, including success criteria, monitoring plan, and long-term maintenance plan;

- submit the results of the biological survey and the mitigation plan to GARFO HCD for review; and
- undertake compensatory mitigation prior to or concurrent with any impacts to sensitive habitat.

☐ Not met:
  ☐ Not applicable, provide reasoning:
  ☐ Project is unable to accommodate, provide justification:

☐ Met:
  ☐ Shown on project plans
  ☐ Included in description, other terms and conditions

31. Where construction requires heavy equipment operation in or across wetlands or mudflats, the equipment shall have low ground pressure (typically ≤ 3 pounds per square inch); be placed on construction timber mats that are adequate to support the equipment; or be operated on 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 must not be dragged into position.

☐ Not met:
  ☐ Not applicable, provide reasoning:
  ☐ Project is unable to accommodate, provide justification:

☐ Met:
  ☐ Shown on project plans
  ☐ Included in description, other terms and conditions

32. Habitat restoration or mitigation projects must not result in a permanent conversion or loss of sensitive habitats.

☐ Not met:
  ☐ Not applicable, provide reasoning:
  ☐ Project is unable to accommodate, provide justification:

☐ Met:
  ☐ Shown on project plans
  ☐ Included in description, other terms and conditions

33. No dredging shall occur within:
  - intertidal areas;
  - 100 feet of SAV; or
  - 25 feet of SAS, natural rocky habitats, or areas containing shellfish.

☐ Not met:
  ☐ Not applicable, provide reasoning:
  ☐ Project is unable to accommodate, provide justification:

☐ Met:
- ☐ Shown on project plans
- ☐ Included in description, other terms and conditions

34. The height of docks and piers must be at least four feet above salt marsh substrate and must be greater than or equal to the width of the deck, to minimize shading impacts. The height must be measured from the marsh substrate to the bottom of the longitudinal support beam.

☐ Not met:
- ☐ Not applicable, provide reasoning:
- ☐ Project is unable to accommodate, provide justification:

☐ Met:
- ☐ Shown on project plans
- ☐ Included in description, other terms and conditions

35. Outlets must not discharge directly into sensitive habitats.

☐ Not met:
- ☐ Not applicable, provide reasoning:
- ☐ Project is unable to accommodate, provide justification:

☐ Met:
- ☐ Shown on project plans
- ☐ Included in description, other terms and conditions

Fish Passage/Migration Habitat

36. Design replacement crossings to provide diadromous and resident fish and aquatic organism passage. Structures must:
    - provide sufficient water depth and maintain suitable water velocities during migration periods; and
    - maintain or replicate natural stream channel and flow conditions.

☐ Not met:
- ☐ Not applicable, provide reasoning:
- ☐ Project is unable to accommodate, provide justification:

☐ Met:
- ☐ Shown on project plans
- ☐ Included in description, other terms and conditions

37. Incorporate climate change projections into the project design. Use the Intergovernmental Panel on Climate Change (IPCC) Representative Concentration Pathways (RCP) 8.5/high greenhouse gas emission scenario and RCP 4.5/intermediate greenhouse gas emission scenario (IPCC 2014) and the global mean and regional sea level rise projections for

intermediate-high and extreme scenarios referenced in Sweet *et al*. (2017) in design calculations for replacement structures.

☐ Not met:
- ☐ Not applicable, provide reasoning:
- ☐ Project is unable to accommodate, provide justification:

☐ Met:
- ☐ Shown on project plans
- ☐ Included in description, other terms and conditions

38. Replaced or upgraded crossings must be "in kind" or go up in order of preference set out in NMFS' Anadromous Salmonid Passage Facility Design:
    - Road abandonment and reclamation or road realignment to avoid crossing the stream.
    - Bridge or stream simulation spanning the stream flood plain, providing long-term dynamic channel stability, retention of existing spawning areas, maintenance of benthic invertebrate production, and minimized risk of failure. If a stream crossing is proposed in a segment of stream channel that includes a salmonid spawning area, only full-span stream simulation designs are acceptable.
    - Embedded pipe culvert, bottomless arch designs or non-floodplain spanning stream simulation.
    - Hydraulic design method, associated with more traditional culvert design approaches- limited to low stream gradients (0 to 1%) or for retrofits.
    - Culvert designed with an external fishway (including roughened channels) for steeper slopes.
    - Baffled culvert or internal weirs- to be used only for when other alternatives are infeasible.

☐ Not met:
- ☐ Not applicable, provide reasoning:
- ☐ Project is unable to accommodate, provide justification:

☐ Met:
- ☐ Shown on project plans
- ☐ Included in description, other terms and conditions

39. For activities that require soil erosion, sediment, and turbidity controls
    - in non-tidal streams containing diadromous fish:
        i. They must not encroach >25% of the stream width measured from ordinary high water during the diadromous TOY restriction; and
        ii. They must maintain safe, timely, and effective downstream fish passage throughout the project.
    - in tidal waters:
        i. They must not encroach >50% of a tidal stream's width as measured from mean high water.

☐ Not met:
- ☐ Not applicable, provide reasoning:
- ☐ Project is unable to accommodate, provide justification:

☐ Met:
- ☐ Shown on project plans
- ☐ Included in description, other terms and conditions

Vessel Traffic

☐Check here if the EFH conservation recommendations in this section are not applicable because the project will not use vessels.

40. Project vessels shall be operated in adequate water depths to avoid propeller scour and grounding at all tides. Shallow draft vessels will be used in shallow areas to maximize the navigational clearance between the vessel and the bottom substrate. Spuds may be used to elevate the vessel.

☐ Not met:
- ☐ Not applicable, provide reasoning:
- ☐ Project is unable to accommodate, provide justification:

■ Met:
- ■ Shown on project plans
- ■ Included in description, other terms and conditions

41. Project vessels shall not be moored in or use spuds in SAV or be located in such a way that the vessel could shade SAV.

☐ Not met:
- ☐ Not applicable, provide reasoning:
- ☐ Project is unable to accommodate, provide justification:

■ Met:
- ■ Shown on project plans
- ■ Included in description, other terms and conditions

NEW CLAUSE

Other Justification for Use of the Programmatic EFH Consultation

If the project is outside of the covered activities in the programmatic EFH consultation (i.e., is one of the actions described in the Excluded Activities list noted below) and FHWA/state DOT believes the effects are not any more significant and that the project should be eligible for programmatic EFH consultation, provide additional justification in the space below. FHWA/state DOT must provide appropriate rationale and GARFO HCD must review and approve it. The automatic concurrence period does not apply for transportation activities in this section that fall outside of the programmatic EFH consultation as described.

◉ The project is not listed as an excluded activity.

◯ The project is listed as an excluded activity.

Indicate the activity number from the list below (1 through 21):

Provide additional justification on why the activity should be eligible:

Activities that Require Individual Consultation

1. Any work (including anchoring) that results in impacts to:
   - existing or historically mapped submerged aquatic vegetation (SAV) beds or areas within 100 feet of existing or historically mapped SAV beds;
   - ≥ 1,000 square feet of salt marsh, areas containing shellfish, and intertidal areas;
   - ≥ 100 square feet of natural rocky habitat (e.g., bedrock, boulders, cobble, and/or gravel);
2. Stream channelization.
3. Any temporary structures, construction access, and dewatering activities proposed to be in place for ≥ two years.
4. Slip-lining or invert lining existing culverts.
5. Any permanent structures longer than 150 linear feet over salt marsh.
6. Construction of new or expansion of existing boating facilities17 or ferry terminals.
7. Independent pedestrian trails or bridges located directly adjacent to an existing crossing.
8. New or improvement dredging.
9. Any nearshore disposal or beach nourishment activities.
10. New fill/stabilization placed below mean low water in excess of 200 linear feet (lf).
11. Replacement or maintenance of:
    - sloped stabilization structures > 200 lf and waterward of the existing toe, or
    - vertical structures > 18 inches waterward of the existing face and > 200 lf.
12. In-water utility lines ≥ 100 lf installed by trench excavation, or ≥ 200 lf installed by jetplow, fluidization or other direct burial methods.
13. Thin layer deposition as a part of wetland restoration.
14. Placement of any seed shellfish, spatted-shell, or cultch in SAS.
15. Any exploratory trenching or other similar survey activities.
16. Airgun seismic activities.
17. Any new permanent surface water withdrawal, water intakes, or water diversions.
18. Any blasting or use of explosives that affects EFH or diadromous species habitats.
19. Construction of new bridges or culverts, where no crossing existed previously.
20. Any new or replacement causeways (raised roadways across waters or wetlands).
21. Any in-water work on dams, tide gates, or breakwaters.

FHWA's Determination of Effects to Essential Fish Habitat and Signature
After reviewing the programmatic EFH conservation recommendations in Appendix A, FHWA/state DOT will select the appropriate determination:

- (●) The activity is in compliance with all programmatic EFH conservation recommendations in the FHWA programmatic EFH consultation and adverse effects to EFH will not be substantial.
- ( ) The activity is not in compliance with all of the programmatic EFH conservation recommendations in the FHWA programmatic EFH consultation, however, the justification below demonstrates that the adverse effects to EFH are not substantial. This does not apply to EFH conservation recommendations that are not applicable to the project.

Use the electronic fillable fields to include the name and signature of the FHWA/state DOT preparing this Verification Form, along with the date.

MassDOT	*David Paulson*
FHWA/state DOT Name	Signature

6/21/23
Date

By providing your determination and signature, you are certifying that to the best of your knowledge the information provided in this form is accurate and based upon the best available scientific information. This form must be filled out and signed by FHWA or state DOT staff, as an officially designated non-federal representative. Do not lock the form when saving, as HCD will be unable to sign and finalize. Email this Verification Form as a fillable PDF to NMFS.GAR.EFH.Consultation@noaa.gov.

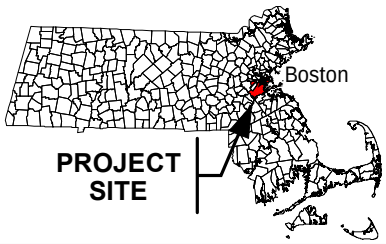
GARFO HCD Determination and Signature (To be filled out by NMFS)
After receiving the Verification Form, GARFO HCD will contact FHWA/state DOT with any concerns. HCD will email the completed form back to the FHWA/state DOT for record keeping.

- (●) GARFO HCD concurs with FHWA's determination that the proposed project is consistent with the programmatic EFH consultation (without the need for justification).
- ( ) GARFO HCD concurs with FHWA's determination that the proposed project is consistent with the programmatic EFH consultation, with justification described above.
- ( ) GARFO HCD does not concur with FHWA's determination that the project is consistent with the programmatic EFH consultation. FHWA/state DOT must conduct additional coordination with GARFO HCD and a separate individual EFH consultation may be required.

Kaitlyn C. Shaw	Kaitlyn C. Shaw
GARFO HCD Name	Signature

6/23/23
Date

Location: \\BOSFIL11\Data2\NAI_proj\MASSDOT\2018\E2X69149 - Eliot bridge\600 Discipline Resource Files\620 Environmental\GIS\Figure 1 - USGS Map.mxd



Source: MassGIS, Commonwealth of Massachusetts, Information Technology Division: USGS Cambridge, MA 7.5 MinuteTopographic Quadrangles

N
W E
S

1 inch = 2,000 feet

2,000 0 2,000 Feet

Prepared for: massDOT Highway Division

Prepared by: Jacobs

FIGURE 1 - USGS MAP

BRICK AND GRANITE CAP REPAIR AND REPLACEMENT
ELIOT STREET OVER THE CHARLES RIVER
BOSTON, SUFFOLK COUNTY, MASSACHUSETTS

SEPT 2020

E2X69149

NOAA FISHERIES
National Oceanic and Atmospheric Administration

QR code Share link

☰ MENU

Essential Fish Habitat Mapper

New England / Mid-Atlantic

? View Legend

Contents

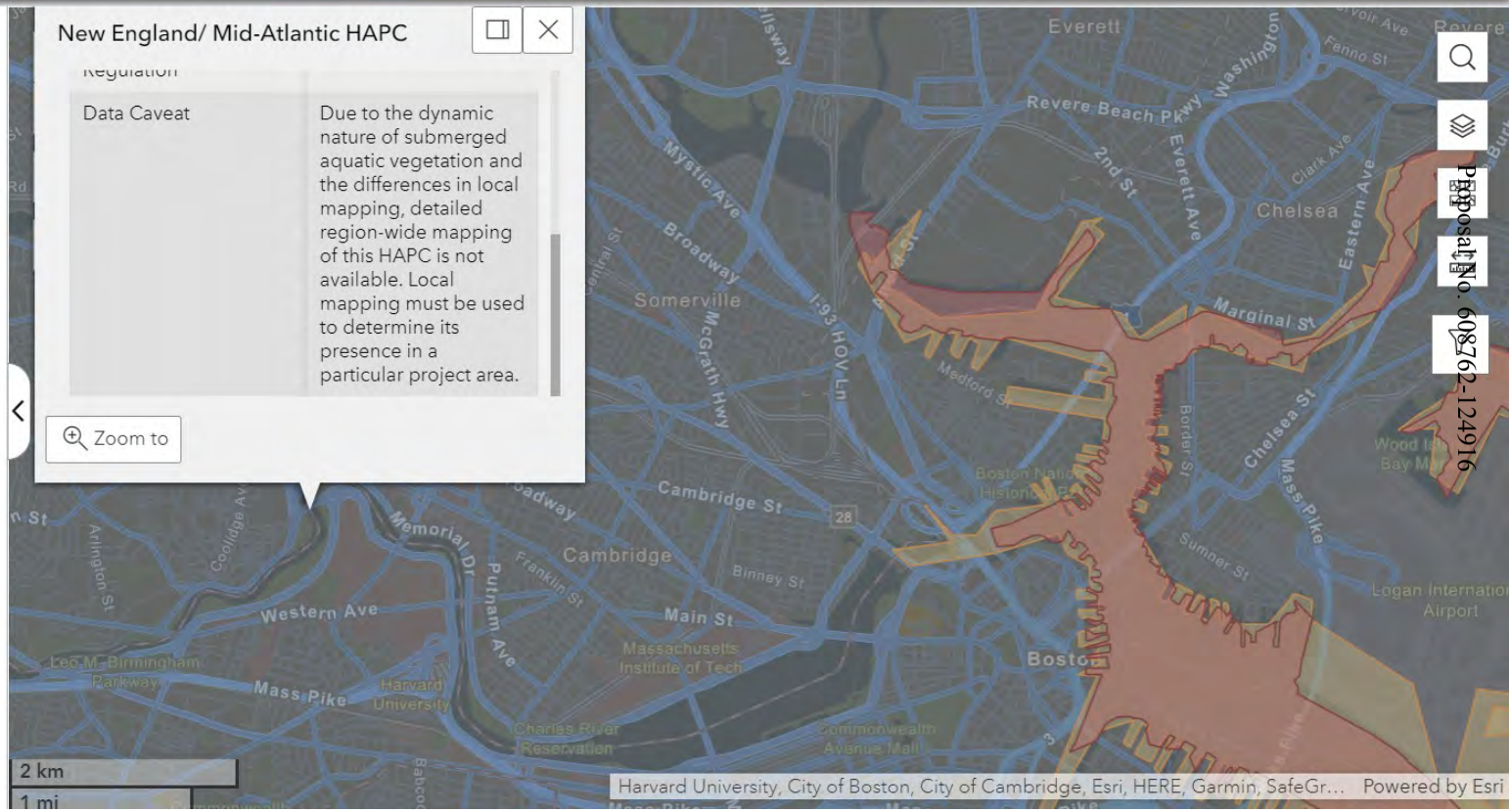
- EFH Areas Protected From Fishing
- Habitat Areas of Particular Concern
- Essential Fish Habitat
  - New England / Mid-Atlantic EFH Species
  - Atlantic salmon EFH
  - Highly Migratory Species EFH
- Reference Data

Choose Another Council Generate Report

New England/ Mid-Atlantic HAPC

Regulation	
Data Caveat	Due to the dynamic nature of submerged aquatic vegetation and the differences in local mapping, detailed region-wide mapping of this HAPC is not available. Local mapping must be used to determine its presence in a particular project area.

Zoom to



NOAA FISHERIES
National Oceanic and Atmospheric Administration

QR code Share link

☰ MENU

Essential Fish Habitat Mapper

New England / Mid-Atlantic

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  - New England / Mid-Atlantic EFH Species
  - Atlantic salmon EFH
  - Highly Migratory Species EFH
- Reference Data

Choose Another Council Generate Report

Mid-Atlantic & New England EFH Species

Life Stage	Adult
Fishery Management Plan	Summer Flounder, Scup, Black Sea Bass
Link to Text Description	View
Data Caveat	This GIS layer accurately portrays EFH as described in the FMP.

Zoom to 1 of 5

A00849-122

Proposal No. 608762-124916

NOAA FISHERIES
National Oceanic and Atmospheric Administration

QR code Share link

☰ MENU

Essential Fish Habitat Mapper

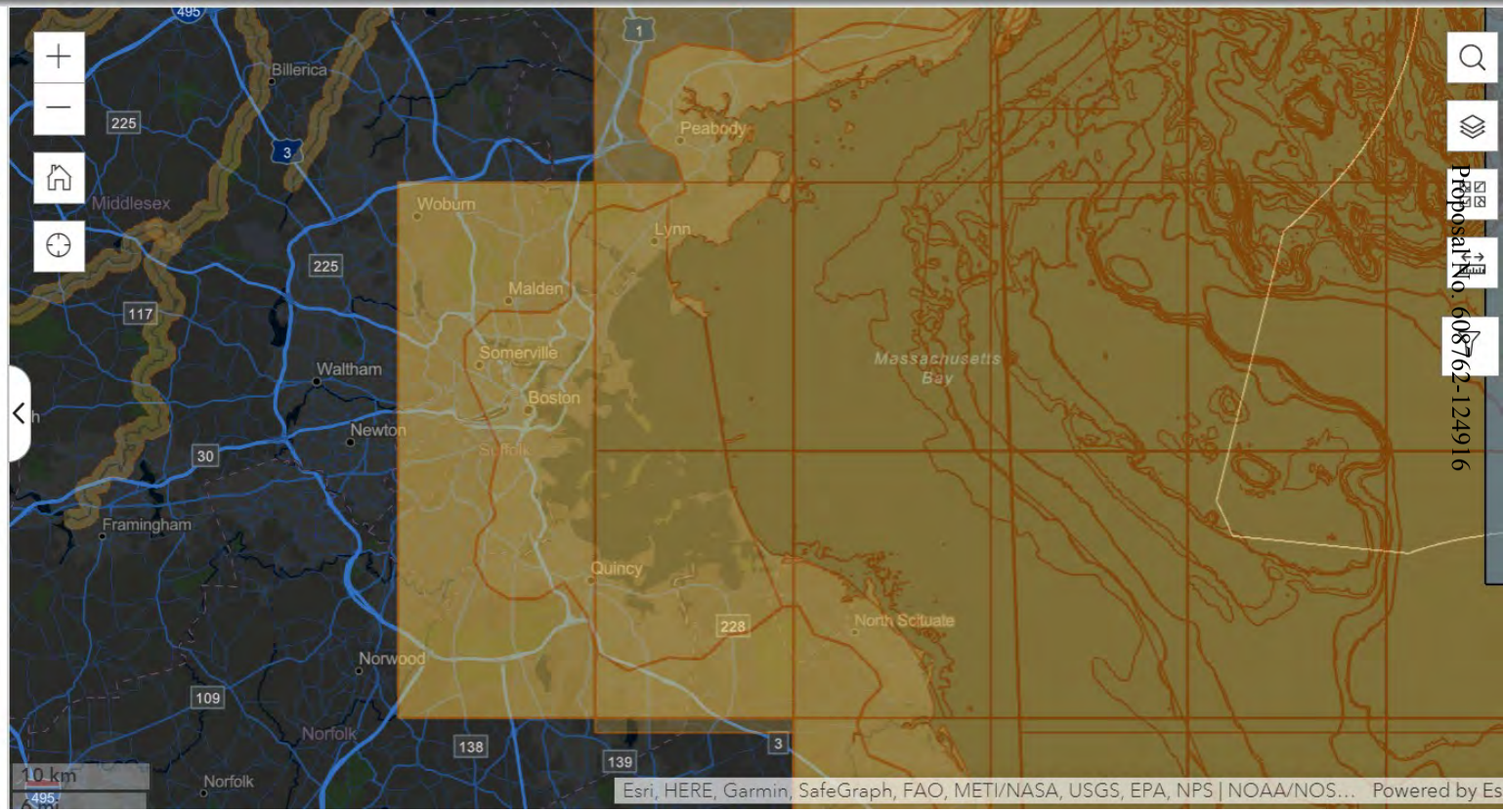
New England / Mid-Atlantic

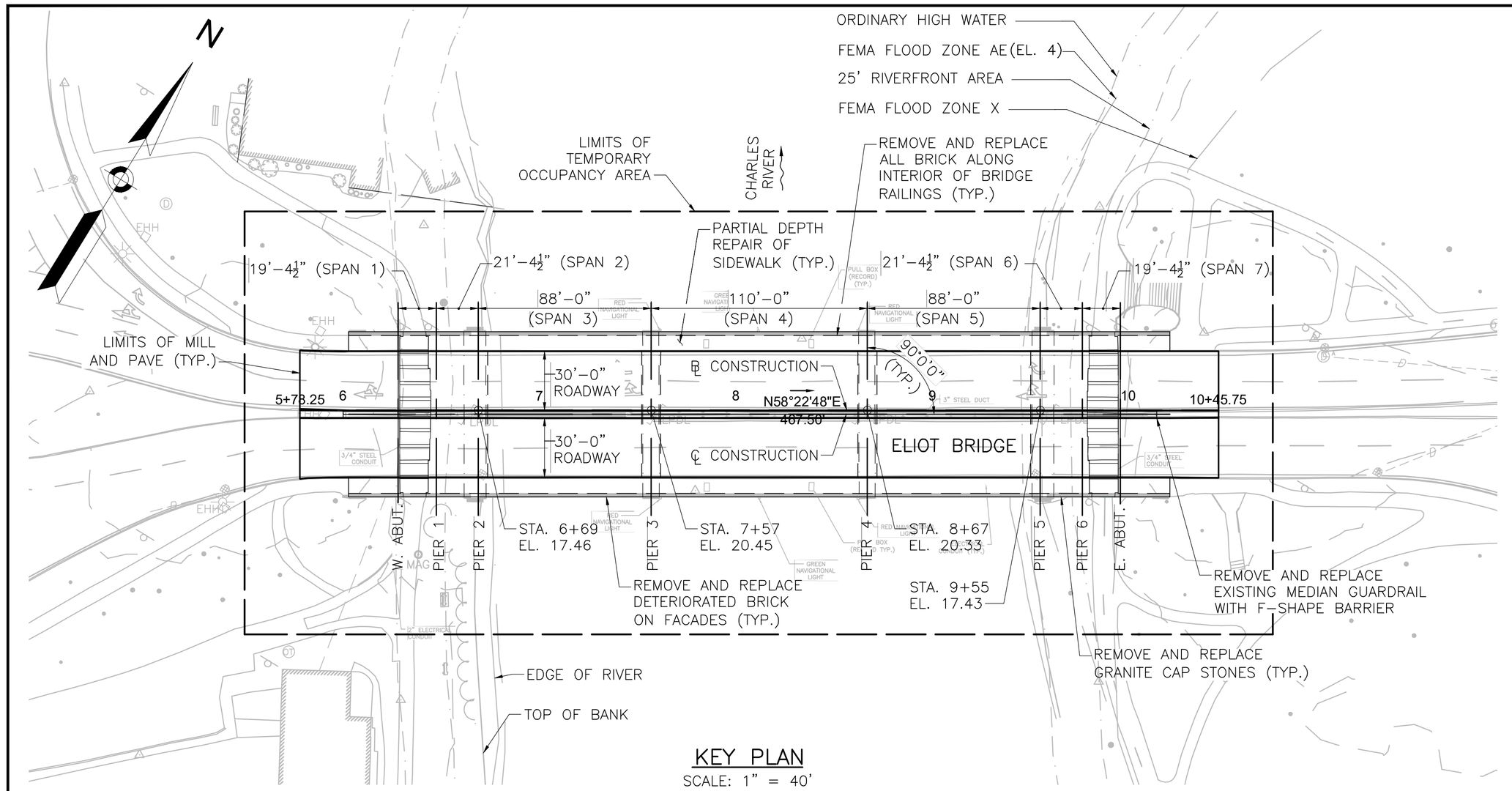
? View Legend

Contents

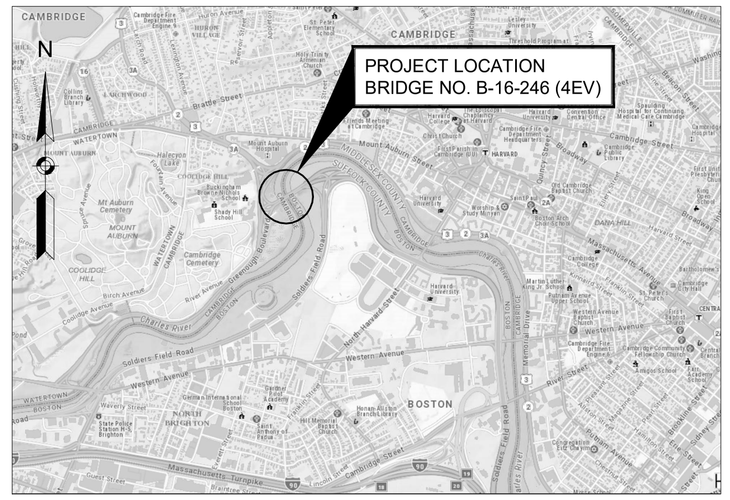
- EFH Areas Protected From Fishing
- Habitat Areas of Particular Concern
- Essential Fish Habitat
  - New England / Mid-Atlantic EFH Species
  - Atlantic salmon EFH
  - Highly Migratory Species EFH
- Reference Data

Choose Another Council Generate Report





KEY PLAN
SCALE: 1" = 40'



LOCUS
SCALE: 1" = 2000'

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	–	7	19
PROJECT FILE NO. 608762			

FIRST SHEET

PROJECT INFORMATION	
PROJECT FILE NO.: 608762	
PROJECT DESCRIPTION: PROPOSED BRIDGE REPAIRS	
BRIDGE DESIGN LOADING: HL-15	
SURVEY: FIELD BOOK NO. 41472	
ELEVATION REFERENCE: NAVD OF 1988	
BENCH MARK:	#A-12 (BENCH MARK DISK), 42°21'41.8" (N) 071°05'50.9 (W), EL.=7.91'

TRAFFIC DATA	ROADWAY OVER	ROADWAY UNDER
DESIGN YEAR	2020	
AVERAGE DAILY TRAFFIC – PRESENT	49286	
AVERAGE DAILY TRAFFIC – DESIGN YEAR	49286	
DESIGN HOURLY VOLUME	4394	
DIRECTIONAL DISTRIBUTION	53%	
TRUCK PERCENTAGE – AVERAGE DAY	9%	
TRUCK PERCENTAGE – PEAK HOUR	9%	
DESIGN SPEED	35	
DIRECTIONAL DESIGN HOURLY VOLUME	2582	

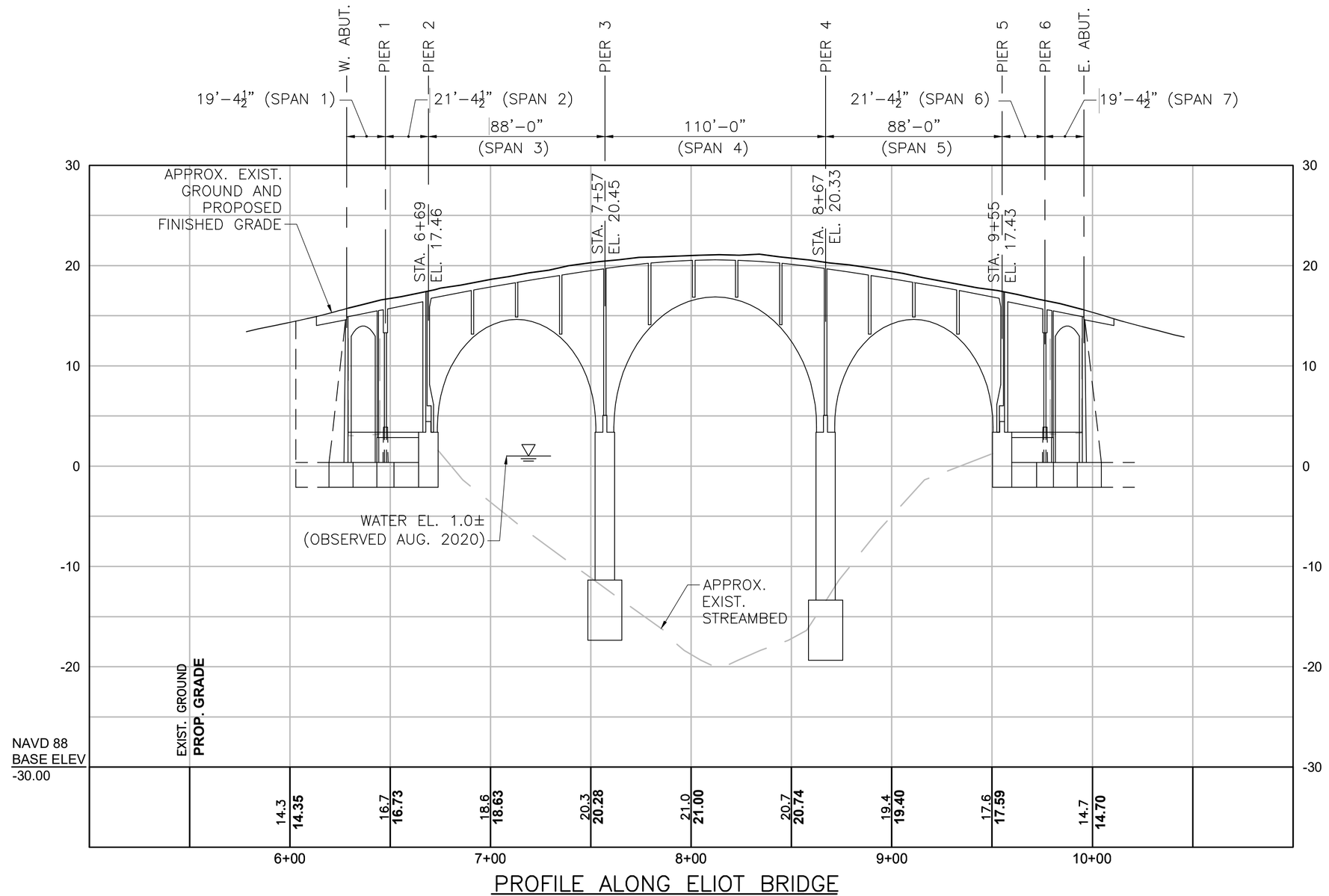
SEISMIC DESIGN CRITERIA	
DESIGN RETURN PERIOD:	1000 YEARS
DESIGN SPECTRA	
As	0.096
SDs	0.217
SD1	0.069
SITE CLASS	D
SEISMIC DESIGN CATEGORY (SDC)	A

DESIGN:

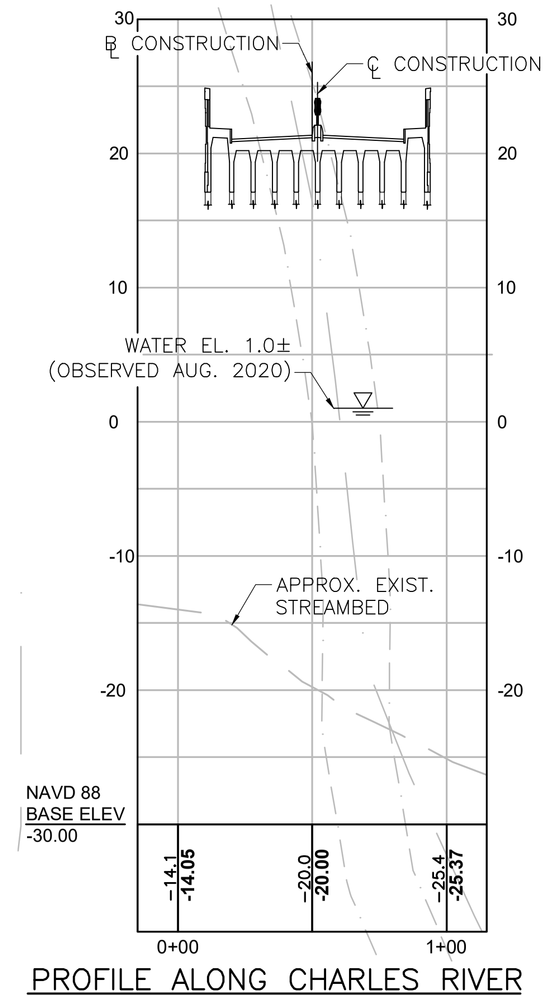
ALL REPAIRS INTENDED TO RESTORE FUNCTION AND CAPACITY OF ORIGINAL CONSTRUCTION. BRIDGE WAS DESIGNED TO AASHTO H-15 LOADING.

NOTES:

1. APPROVAL DOES NOT INCLUDE STRUCTURAL ANALYSIS.
2. DUE TO THE LIMITED NATURE OF THE PROPOSED WORK, NO GEOTECH OR HYDRAULIC REPORTS HAVE BEEN PREPARED FOR THIS PROJECT.
3. NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988 IS USED THROUGHOUT.
4. PLAN AND PROFILE ARE BASED ON SURVEY DATED AUGUST 2020 AND SUPPLEMENTED WITH PROFILE INFORMATION FROM EXISTING DESIGN DRAWINGS.



PROFILE ALONG ELIOT BRIDGE
HORIZ. SCALE: 1" = 40'
VERT. SCALE: 1" = 8'



PROFILE ALONG CHARLES RIVER
HORIZ. SCALE: 1" = 40'
VERT. SCALE: 1" = 8'

Jacobs
120 ST. JAMES AVENUE, 5TH FLOOR
BOSTON, MA 02116

MassDOT Massachusetts Department of Transportation Highway Division

SKETCH PLANS OF PROPOSED BRIDGE REHABILITATION

ELIOT BRIDGE
OVER CHARLES RIVER

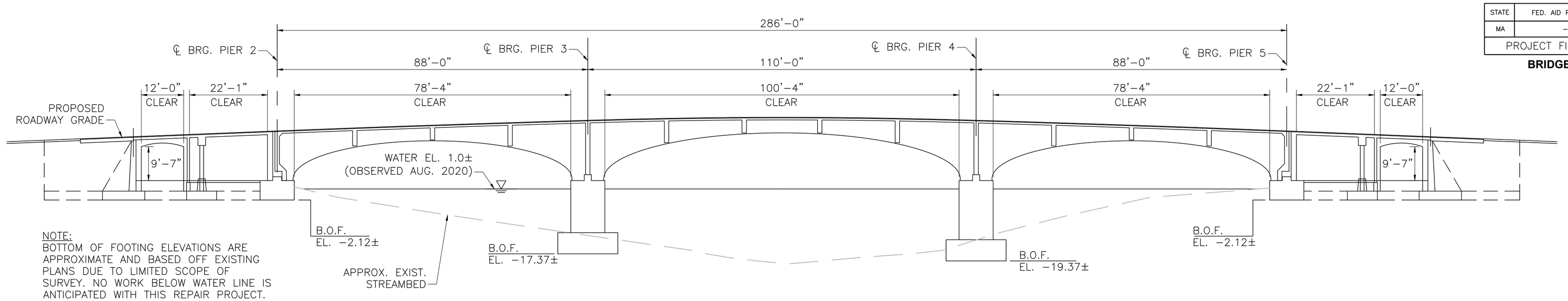
MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION

APPROVED BY	DATE
STRUCTURAL ELEMENTS:	
TITLE:	
HIGHWAY ELEMENTS:	
TITLE:	

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

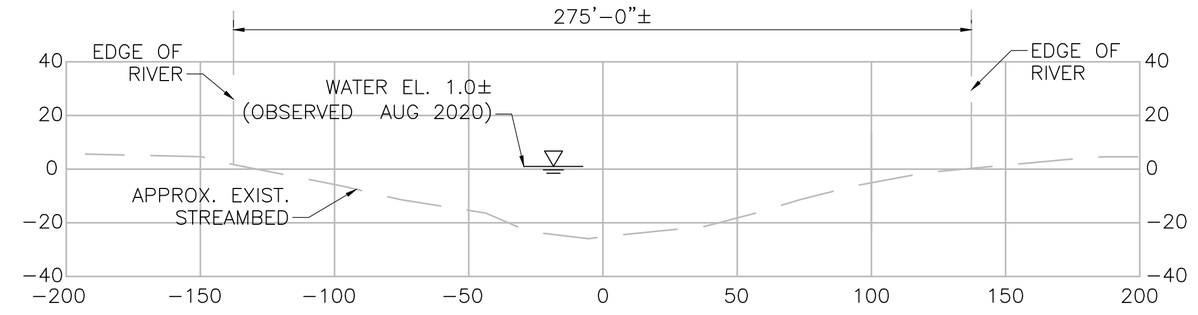
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	–	8	19
PROJECT FILE NO. 608762			

BRIDGE SECTIONS

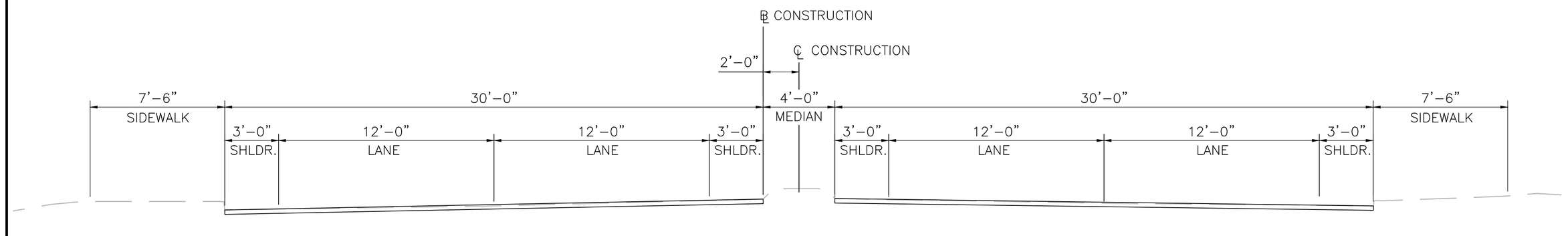


NOTE:
BOTTOM OF FOOTING ELEVATIONS ARE APPROXIMATE AND BASED OFF EXISTING PLANS DUE TO LIMITED SCOPE OF SURVEY. NO WORK BELOW WATER LINE IS ANTICIPATED WITH THIS REPAIR PROJECT.

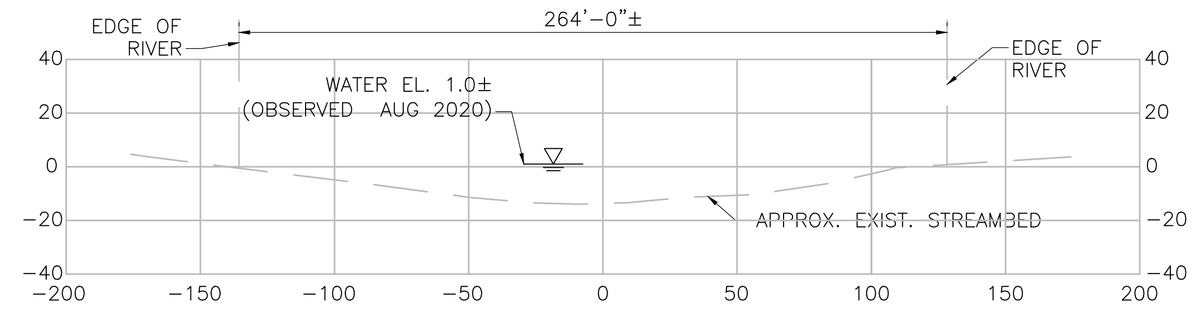
LONGITUDINAL SECTION
SCALE: $\frac{1}{16}$" = 1'–0"



DOWNSTREAM CHANNEL CROSS SECTION (50' LT)
SCALE: 1" = 40'

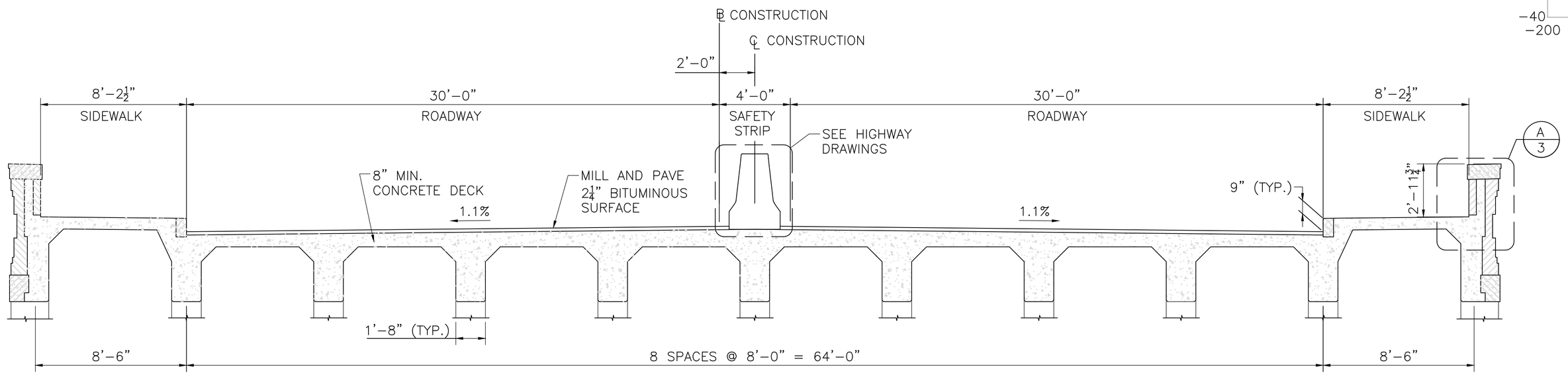


APPROACH SECTION
SCALE: $\frac{1}{4}$" = 1'–0"



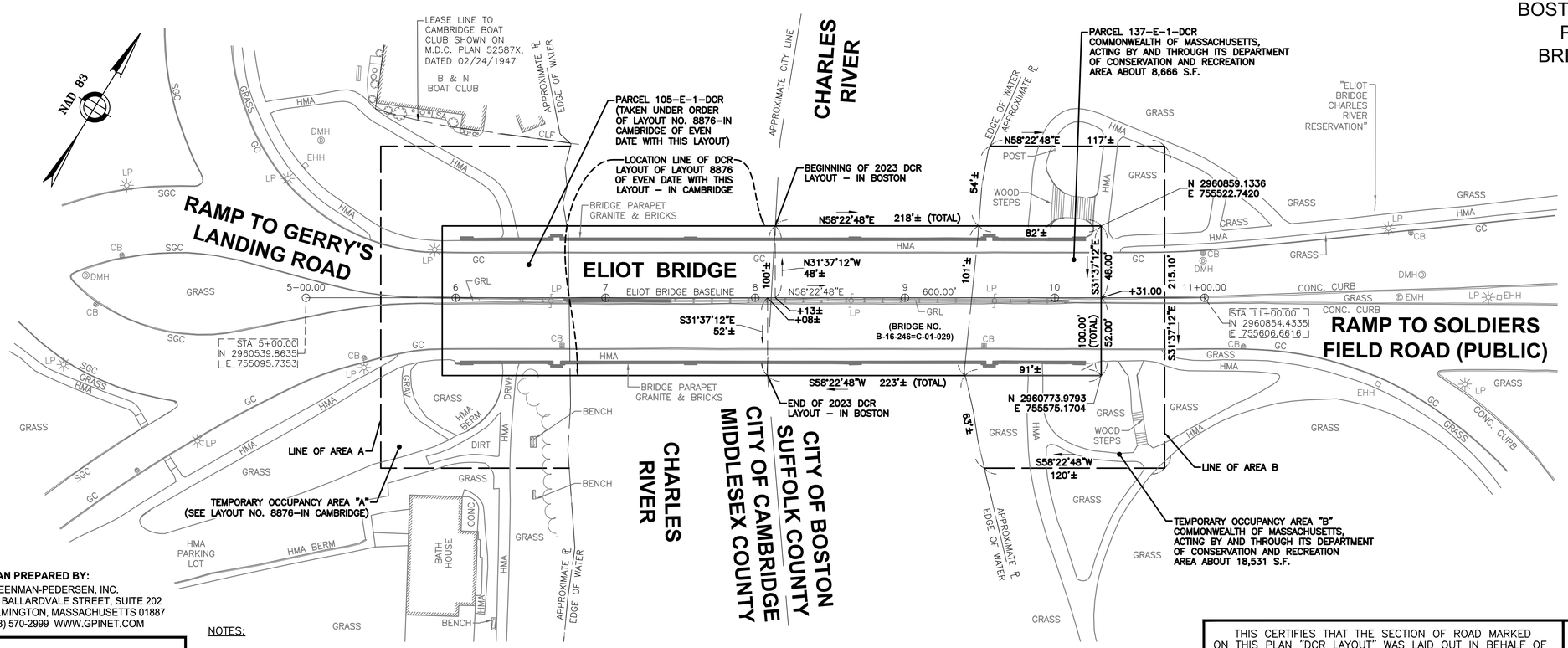
UPSTREAM CHANNEL CROSS SECTION (50' RT)
SCALE: 1" = 40'

NOTE:
HYDRAULIC INFORMATION LIMITED. THERE IS NO WORK PROPOSED BELOW THE WATER LINE. ALL INFORMATION SHOWN IS TAKEN FROM EXISTING DRAWINGS OR OBSERVED WATER DURING SURVEY.



TRANSVERSE SECTION
SCALE: $\frac{1}{4}$" = 1'–0"

BOSTON-2023 LAYOUT-ONE SHEET
PROJECT FILE NO. 608762
BRIDGE NO. B-16-246=C-01-029
LAYOUT NO. 8875



I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN CONFORMITY WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS.

PROGRESS PRINT 2023-02-14

DATE

JEFFREY P. BRADFORD, PLS #41862

massDOT

PLAN PREPARED BY:
GREENMAN-PEDERSEN, INC.
181 BALLARDVALE STREET, SUITE 202
WILMINGTON, MASSACHUSETTS 01887
(978) 570-2999 WWW.GPINET.COM

NOTES:

1. THE EXISTING DETAILS ARE FROM THE BASEPLAN PREPARED BY GREENMAN-PEDERSEN, INC. IN AUGUST AND SEPTEMBER 2020.
2. A PERMIT TO THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION FOR THE LAND OWNED BY THE COMMONWEALTH OF MASSACHUSETTS, ACTING BY AND THROUGH ITS DEPARTMENT OF CONSERVATION AND RECREATION (DCR) FOR TEMPORARY OCCUPANCY AREA "B", SHOWN ON THIS PLAN, WAS ISSUED UNDER A CONSTRUCTION ACCESS PERMIT.
3. THE DEPARTMENT OF CONSERVATION AND RECREATION (DCR) WAS FORMERLY KNOWN AS THE METROPOLITAN DISTRICT COMMISSION (MDC).

0 40 100 160
SCALE: 1" = 40'

THIS CERTIFIES THAT THE SECTION OF ROAD MARKED ON THIS PLAN "DCR LAYOUT" WAS LAID OUT IN BEHALF OF THE DEPARTMENT OF CONSERVATION AND RECREATION BY THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION, HIGHWAY DIVISION ON UNDER AUTHORITY OF CHAPTER 6C OF THE GENERAL LAWS.

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
DIRECTOR, RIGHT OF WAY BUREAU

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF ROAD IN THE CITY OF
BOSTON
SUFFOLK COUNTY
LAID OUT ON BEHALF OF THE
DEPARTMENT OF CONSERVATION AND RECREATION
BY THE MASSACHUSETTS DEPARTMENT
OF TRANSPORTATION, HIGHWAY DIVISION

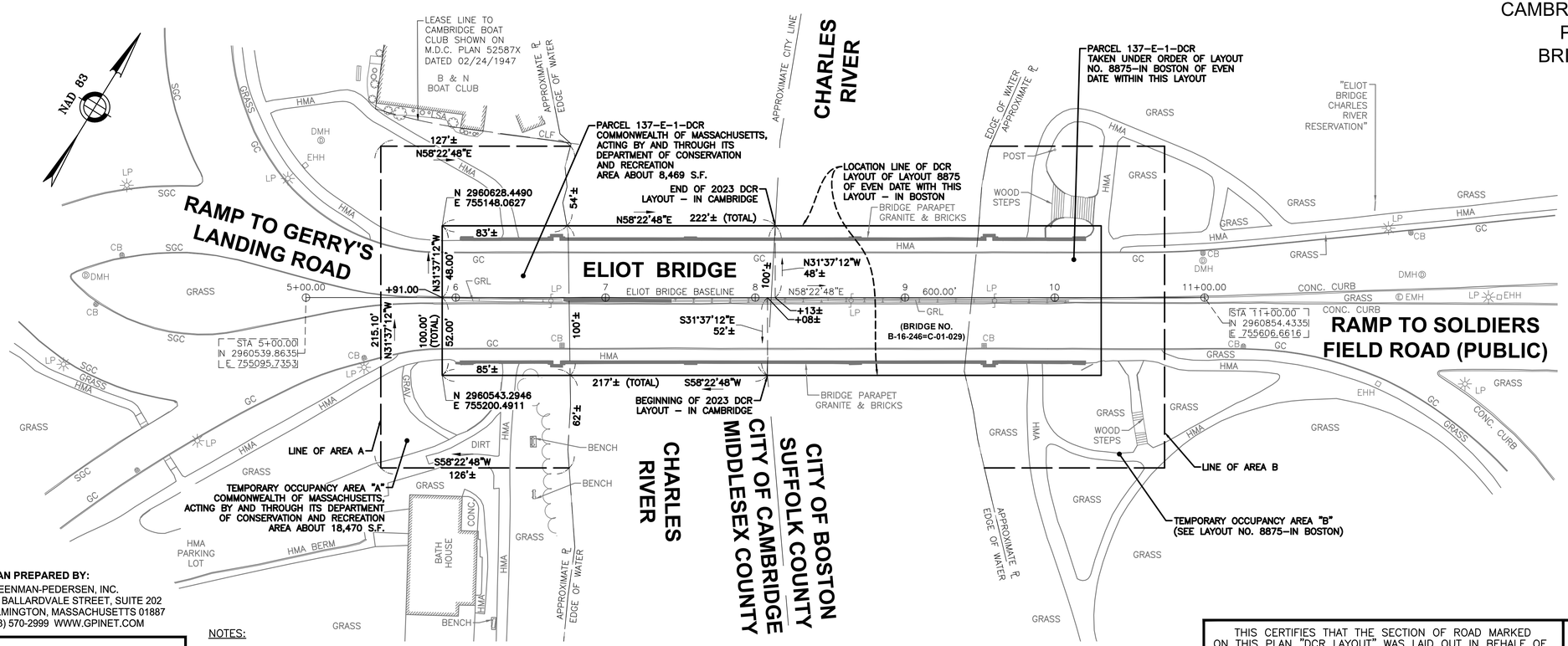
SCALE: 40 FEET TO THE INCH

CHIEF ENGINEER **LAYOUT NO. 8875**

AMR849 - 36

Proposal No. 608762-12916

CAMBRIDGE-2023 LAYOUT-ONE SHEET
PROJECT FILE NO. 608762
BRIDGE NO. B-16-246=C-01-029
LAYOUT NO. 8876



I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN CONFORMITY WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS.

PROGRESS PRINT 2023-02-14

DATE

JEFFREY P. BRADFORD, PLS #41862

PLAN PREPARED BY:
GREENMAN-PEDERSEN, INC.
181 BALLARDVALE STREET, SUITE 202
WILMINGTON, MASSACHUSETTS 01887
(978) 570-2999 WWW.GPINET.COM

NOTES:

1. THE EXISTING DETAILS ARE FROM THE BASEPLAN PREPARED BY GREENMAN–PEDERSEN INC. IN AUGUST AND SEPTEMBER 2020.
2. A PERMIT TO THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION FOR THE LAND OWNED BY THE COMMONWEALTH OF MASSACHUSETTS, ACTING BY AND THROUGH ITS DEPARTMENT OF CONSERVATION AND RECREATION (DCR) FOR TEMPORARY OCCUPANCY AREA "A", SHOWN ON THIS PLAN, WAS ISSUED UNDER A CONSTRUCTION ACCESS PERMIT.
3. THE DEPARTMENT OF CONSERVATION AND RECREATION (DCR) WAS FORMERLY KNOWN AS THE METROPOLITAN DISTRICT COMMISSION (MDC).

0 40 100 160
SCALE: 1" = 40'

THIS CERTIFIES THAT THE SECTION OF ROAD MARKED ON THIS PLAN "DCR LAYOUT" WAS LAID OUT IN BEHALF OF THE DEPARTMENT OF CONSERVATION AND RECREATION BY THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION, HIGHWAY DIVISION ON UNDER AUTHORITY OF CHAPTER 6C OF THE GENERAL LAWS.

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
DIRECTOR, RIGHT OF WAY BUREAU

massDOT

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF ROAD IN THE CITY OF
CAMBRIDGE
MIDDLESEX COUNTY
LAID OUT ON BEHALF OF THE
DEPARTMENT OF CONSERVATION AND RECREATION
BY THE MASSACHUSETTS DEPARTMENT
OF TRANSPORTATION, HIGHWAY DIVISION

SCALE: 40 FEET TO THE INCH

CHIEF ENGINEER

LAYOUT NO. 8876

AM849 - 27

Proposal No. 608762-12916

JMS-Designed Bridge Inspection Vessel

JMS Naval Architects designed a compact, self-propelled, bridge inspection vessel for a bridge inspection company in the northeast.

The new vessel is a 28' aluminum catamaran built by Aluma Marine & Fabrication in Harvey, LA and joins the owner's fleet of work and safety boats. The vessel was launched and tested this week with an in-water demonstration conducted at the train bridge in historic Mystic, CT.

JMS provided the concept, detail, and systems designs of the vessel, and provided technical support to the owner throughout the construction, outfitting, and testing of the vessel. The owner is in the process of patenting the design with intensions to produce more vessels for sale to other bridge inspectors and to expand their own fleet.

The vessel is outfitted with a Socage T360 aerial lift to provide workers with 60' of vertical reach above the water and allow for inspection and repair work of bridge structures. The vessel has an overall length of 28'-4", a beam of 7'-8" and a collapsed height of 11'-8" allowing it to be transported over the road between job sites. To increase stability of the vessel during man lift operations, the vessel is fitted with a unique outrigger system which employs two 25' long, 3' diameter inflatable sponsons which are hydraulically deployed and retracted. When deployed, the overall beam of the vessel increases to 22', providing a stable platform for aerial lift operations. The inflatable sponsons, built by CPI Marine in Kyle, TX, were fabricated from 40oz urethane and have 8" rub strakes to provide puncture and wear protection when operating in close proximity to structures and environmental obstacles. Each sponson has three removable air bladders for ease of maintenance and repair, as well as added protection against puncture. Each sponson can be deflated and packed into a 6' x 3' x 3' box for easy storage in a truck bed during road transport. The vessel is powered by twin Honda BF115 four stroke outboard engines with counter rotating propellers. The controls for the engines and hydraulic spuds are located inside an enclosed, heated wheelhouse, providing shelter for the operator.

The Socage T 360 aerial lift was procured and installed by Cues Equipment in North Franklin, CT. With a fully extended reach of 60' above the water, the aerial lift can be collapsed to a stowed height of only 7'-2" above the deck, permitting the vessel to have a low transport height for transit on public highways. The lightweight aluminum basket has a rated load capacity of 550lbs and can rotate up to 90 degrees in either direction. Both compressed air and AC power are available in the basket to support the use of inspection and repair tools on site. In addition to the aerial lift, Cues Equipment procured and installed a custom hydraulic power unit built by Foster Manufacturing Corp, and a Fabco Power 8kW hydraulic generator. The hydraulic power unit is fit with a Kubota diesel engine and supplies two independent hydraulic circuits which together power the aerial lift, hydraulic generator, outriggers, and hydraulic spuds.

Principal Characteristics:
Length: 28'-4"
Beam (sponsons stowed): 7'-7"
Beam (sponsons extended): 22"
Draft (sponsons stowed): 1'
Beam (sponsons extended): 2'
Height (stowed): 12'
Reach (aerial lift): 60' above water
Capacity (aerial lift): 550lbs
Hull: Aluminum
Propulsion: Twin Honda BF115 four stroke outboard engines with counter rotating propellers

5 October 2016

www.JMSnet.com

Jacobs

PHOTOGRAPHIC LOG

Site Location: Eliot Bridge, Boston & Cambridge, MA | Project No. 608762

Photo No.	Date:
1	09/19/20

Direction Photo Taken:
Southwest

Description:
View of Eliot Bridge and Charles River.

Photo No.	Date:
2	09/19/20

Direction Photo Taken:
Southeast

Description:
View northside of Eliot Bridge from the western bank of the Charles River.

Jacobs

PHOTOGRAPHIC LOG

Site Location: Eliot Bridge, Boston & Cambridge, MA | Project No. 608762

Photo No.	Date:
3	09/19/20

Direction Photo Taken:
Southeast

Description:
View of the underside of Eliot Bridge.

Photo No.	Date:
4	09/19/20

Direction Photo Taken:
Southwest

Description:
Underside of the Eliot Bridge.

Jacobs

PHOTOGRAPHIC LOG

Site Location: Eliot Bridge, Boston & Cambridge, MA | Project No. 608762

Photo No.	Date:
5	09/19/20

Direction Photo Taken:
Northeast

Description:
View of the southern side of Eliot bridge from the western bank of the Charles River.

Photo No.	Date:
6	09/19/20

Direction Photo Taken:
Northeast

Description:
View of the traveling lanes over the Eliot Bridge.

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DOCUMENT A00850

Massachusetts Department of Environmental Protection

Request for Determination of Applicability

Boston \ Cambridge

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Jacobs

August 23, 2023

Boston Conservation Commission
1 City Hall Square
Room 709
Boston, MA 02201

Subject: Request for Determination of Applicability
Brick and Granite Cap Repair on Bridge #B-16-246 = C-01-029
(Eliot Street over the Charles River)

Dear Boston Conservation Commission,

On behalf of the Massachusetts Department of Transportation (MassDOT), Jacobs Engineering Group (Jacobs) is submitting this Request for Determination of Applicability for the proposed rehabilitation of Bridge #B-16-246=C-01-029 (Eliot Street over the Charles River). Minor temporary impacts are proposed within the Charles River to perform this work, resulting in approximately 38,800 square feet of impacts to Land Under Waterbodies and Waterways.

Existing Conditions

Eliot Bridge is a seven span, concrete encased, steel truss bridge built in 1950. It spans the Charles River in both the cities of Cambridge and Boston (**Figures 1 & 2**). The land use immediately adjacent to the bridge includes developed open space, open water, deciduous forest, grassland, and unconsolidated shore. The bridge carries four lanes of traffic (two lanes in each direction, westbound and eastbound), with a sidewalk on each side. The main three spans, spans 3 through 5, consist of steel trusses. The trusses are encased with cast-in-place concrete with the truss members acting as steel reinforcement. The exterior of the bridge and the interior of the railings are covered by a brick veneer, capped with granite coping stones. Spans 1, 2, 6, and 7 consist of reinforced concrete T-beams. Navigational lights are located on the bridge.

Based on MassDEP wetland mapping, the Charles River is characterized as an open water (OW). No other MassDEP wetlands were identified within the Site. The Charles River includes the following WPA resources: Land Under Water Bodies and Waterways (LUWW) and Banks of the Charles River (and accompanying Riverfront Area).

According to National Wetlands Inventory (NWI) mapping provided by the USFWS, the Charles River is identified as a riverine, lower perennial, unconsolidated bottom (sand or mud), permanently flooded waterbody (R2UBH). No other NWI wetland features were identified within the Site.

The most recently issued Flood Insurance Rate Map[1], produced by the Federal Emergency Management Agency (FEMA), indicates that the Charles River and a portion of the adjacent Bank is classified as Zone AE (1% Annual Chance of Flooding), with a base flood elevation of 4 feet above mean sea level (**Figure 3**).

The Natural Resources Conservation Service[2] soil survey for Middlesex County and Suffolk County has mapped the Project area as Water (1). The Bank located on the west side of the bridge is mapped as

[1] Federal Emergency Management Agency, National Hazard Flood Layer, Digital Flood Insurance Rate Map. Map 25017C0557E, Effective 6/4/2010 and 25025C0057G, Effective 9/25/2009.

[2] Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey.

Jacobs

Urban Land (602). The Bank located on the east side of the bridge is mapped as Udorthents, wet substrate (655).

The Site is not located within an Area of Critical Environmental Concern or within an area designated as an Outstanding Resource Water[3] (ORW). The Site is not located within or adjacent to any Activity Use Limitation (AUL) Sites (**Figure 4**).

The project does not lie within the Massachusetts Coastal Zone. Therefore; coordination with Massachusetts Coastal Zone Management does not apply. However, because the project will be performed within a navigable waterway, an Inspection and Repair Notice will be filed with the U.S. Coast Guard so that they can notify mariners of the anticipated construction schedule.

Proposed Project

The main focus of the work will be the brick work that runs along the interior of the bridge railings as well as across the entire façade of the structure. The bricks are heavily deteriorated along the inside face of the railings and must be completely replaced with new bricks. Bricks that are salvaged from the interior faces of the bridge railings will be used to repair localized areas of deterioration and missing bricks along the exterior of the railings and the facades. A complete reconstruction of the brick arch opening at each abutment portal will also be implemented, with an improved detail to reduce the need for future maintenance. Additionally, the Project will not alter the sea level, increase the stormwater runoff, or the frequency at which flooding occurs. The Project is a routine stabilization of an existing structure to maintain resiliency to climate change.

Specifically, the proposed rehabilitation tasks will include:

- Partial depth concrete repair and widening of the entire sidewalk to repair existing deterioration and produce a uniform appearance
- Bridge joint replacement at the east and west abutments
- Reconstruction of the median with concrete barrier
- Replacement of the navigational lighting
- Installation of end treatment for the proposed median reconstruction
- Complete reconstruction of the brick arch opening at each abutment portal
- Bridge drainage cleaning and restoration. (Previous scupper locations have been paved over by maintenance crews. Jacobs will design a repair to remove the scuppers and patch with a deck repair)
- Milling and paving of the bridge deck
- Spot deck concrete repair
- Spot truss concrete encasement repair

A barge with spuds will be temporarily placed along the bottom of the Charles River to provide stability to perform the necessary improvements to the bridge. The spuds on the barge are 18' aluminum tubes which are raised and lifted from vertical by an electric cable winch system. The

[3] MassGIS, Dec. 2017. Designated Outstanding Resource Waters of Massachusetts.

Jacobs

August 23, 2023
(Eliot Street over the Charles River)

proposed improvements are located within the right-of-way owned by the Commonwealth of Massachusetts and do not involve permanent fill to existing wetlands or waterbodies.

As the Charles River is clearly depicted from aerial mapping and existing topography, field reconnaissance was deemed unnecessary as the Project would take place entirely within the Banks of the Charles River. Additionally, there are no existing bordering vegetated wetlands along the Bank within the vicinity of Eliot Bridge. For a depiction of existing conditions, please refer to the **Photographic Log**.

Wetland and Waterbody Impacts

Approximately 38,800 square feet of temporary impacts to Land Under Waterbodies and Waterways is anticipated by using a barge to perform the proposed work on the Eliot Bridge. This impact number may have been overestimated to accommodate the movement of the barge throughout the work zone. All work within the 25-foot Riverfront Area and the buffer zone to Bank will be within existing roadway and will therefore be exempt from regulation.

Regulatory Discussion

The project can be considered minor in nature as there are no anticipated permanent adverse impacts to any wetlands or waterbodies. The spud footings on the barge are used to stabilize the machine to create a safe work zone for the contractors. As a State Agency of the Commonwealth, MassDOT is exempt from the requirements of the City of Boston General Bylaws and local filing fees. Additionally, MassDOT is exempt from notifying abutters per regulation 310 CMR 10.05(4)(a).

Should you have any questions or comments regarding the proposed work, please feel free to contact me at susan.mcarthur@jacobs.com or (508) 904-6440.

Thank you,

Susan M. McArthur

Susan McArthur
Senior Environmental Scientist
508.904.6440
susan.mcarthur@jacobs.com

Copies to: Melissa Lenker, MassDOT
Anthony Richardson, Jacobs
MassDEP Northeast Regional Office

Massachusetts Department of Environmental Protection
Bureau of Water Resources - Wetlands

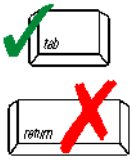
WPA Form 1- Request for Determination of Applicability

Boston
Municipality

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

A. General 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. Applicant:

Melissa — First Name
Lenker — Last Name
Massachusetts Department of Transportation - Highway Division , 10 Park Plaza, Room 7360 — Address
Boston — City/Town
MA — State
02116 — Zip Code
(978) 429-1772 — Phone Number
melissa.lenker@dot.state.ma.us — Email Address

2. Property Owner (if different from Applicant):

First Name
Last Name
Massachusetts Department of Transportation - Highway Division , 10 Park Plaza — Address
Boston — City/Town
MA — State
02116 — Zip Code
Phone Number
Email Address (if known)

3. Representative (if any)

Susan — First Name
McArthur — Last Name
Jacobs — Company Name
120 St. James Avenue, 5th Floor — Address
Boston — City/Town
MA — State
02116 — Zip Code
(508) 904-6440 — Phone Number
susan.mcarthur@jacobs.com — Email Address (if known)

B. Project Description

1. a. Project Location (use maps and plans to identify the location of the area subject to this request):

Eliot Bridge — Street Address
Cambridge & Boston, MA 02163 — City/Town
42.37168 — Latitude (Decimal Degrees Format with 5 digits after decimal e.g. XX.XXXXX)
-71.13547 — Longitude (Decimal Degrees Format with 5 digits after decimal e.g. -XX.XXXXX)

How to find Latitude and Longitude

and how to convert to decimal degrees

Assessors' Map Number
Assessors' Lot/Parcel Number

b. Area Description (use additional paper, if necessary):

Eliot Bridge over the Charles River in the Cities of Cambridge and Boston.

c. Plan and/or Map Reference(s): (use additional paper if necessary)

Bridge Preservation Plans — Title
8/23/23 — Date
Title
Date

Massachusetts Department of Environmental Protection
Bureau of Water Resources - Wetlands
WPA Form 1- Request for Determination of Applicability
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Boston
Municipality

B. Project Description (cont.)

2. a. Activity/Work Description (use additional paper and/or provide plan(s) of Activity, if necessary):

The proposed work will consist of masonry repairs to the Eliot Street Bridge and associated maintenance improvements. See attached narrative for additional details.

b. Identify provisions of the Wetlands Protection Act or regulations which may exempt the applicant from having to file a Notice of Intent for all or part of the described work (use additional paper, if necessary).

10.02 (2)(a.) 2. Minor maintenance to an existing and lawfully located structure.

3. a. If this application is a Request for Determination of Scope of Alternatives for work in the Riverfront Area, indicate the one classification below that best describes the project.

- ☐ Single family house on a lot recorded on or before 8/1/96
- ☐ Single family house on a lot recorded after 8/1/96
- ☐ Expansion of an existing structure on a lot recorded after 8/1/96
- ☐ Project, other than a single-family house or public project, where the applicant owned the lot before 8/7/96
- ☐ New agriculture or aquaculture project
- ☐ Public project where funds were appropriated prior to 8/7/96
- ☐ Project on a lot shown on an approved, definitive subdivision plan where there is a recorded deed restriction limiting total alteration of the Riverfront Area for the entire subdivision
- ☐ Residential subdivision; institutional, industrial, or commercial project
- ☐ Municipal project
- ☐ District, county, state, or federal government project
- ☐ Project required to evaluate off-site alternatives in more than one municipality in an Environmental Impact Report under MEPA or in an alternatives analysis pursuant to an application for a 404 permit from the U.S. Army Corps of Engineers or 401 Water Quality Certification from the Department of Environmental Protection.

b. Provide evidence (e.g., record of date subdivision lot was recorded) supporting the classification above (use additional paper and/or attach appropriate documents, if necessary.)

Massachusetts Department of Environmental Protection
Bureau of Water Resources - Wetlands
WPA Form 1- Request for Determination of Applicability
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Boston
Municipality

C. Determinations

1. I request the Boston make the following determination(s). Check any that apply:
Conservation Commission

☐ a. whether the **area** depicted on plan(s) and/or map(s) referenced above is an area subject to jurisdiction of the Wetlands Protection Act.

☐ b. whether the **boundaries** of resource area(s) depicted on plan(s) and/or map(s) referenced above are accurately delineated.

☒ c. whether the **Activities** depicted on plan(s) referenced above is subject to the Wetlands Protection Act and its regulations.

☐ d. whether the area and/or Activities depicted on plan(s) referenced above is subject to the jurisdiction of any **municipal wetlands' ordinance** or **bylaw** of:

Name of Municipality

☐ e. whether the following **scope of alternatives** is adequate for Activities in the Riverfront Area as depicted on referenced plan(s).

D. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Request for Determination of Applicability and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge.

I further certify that the property owner, if different from the applicant, and the appropriate DEP Regional Office were sent a complete copy of this Request (including all appropriate documentation) simultaneously with the submittal of this Request to the Conservation Commission.

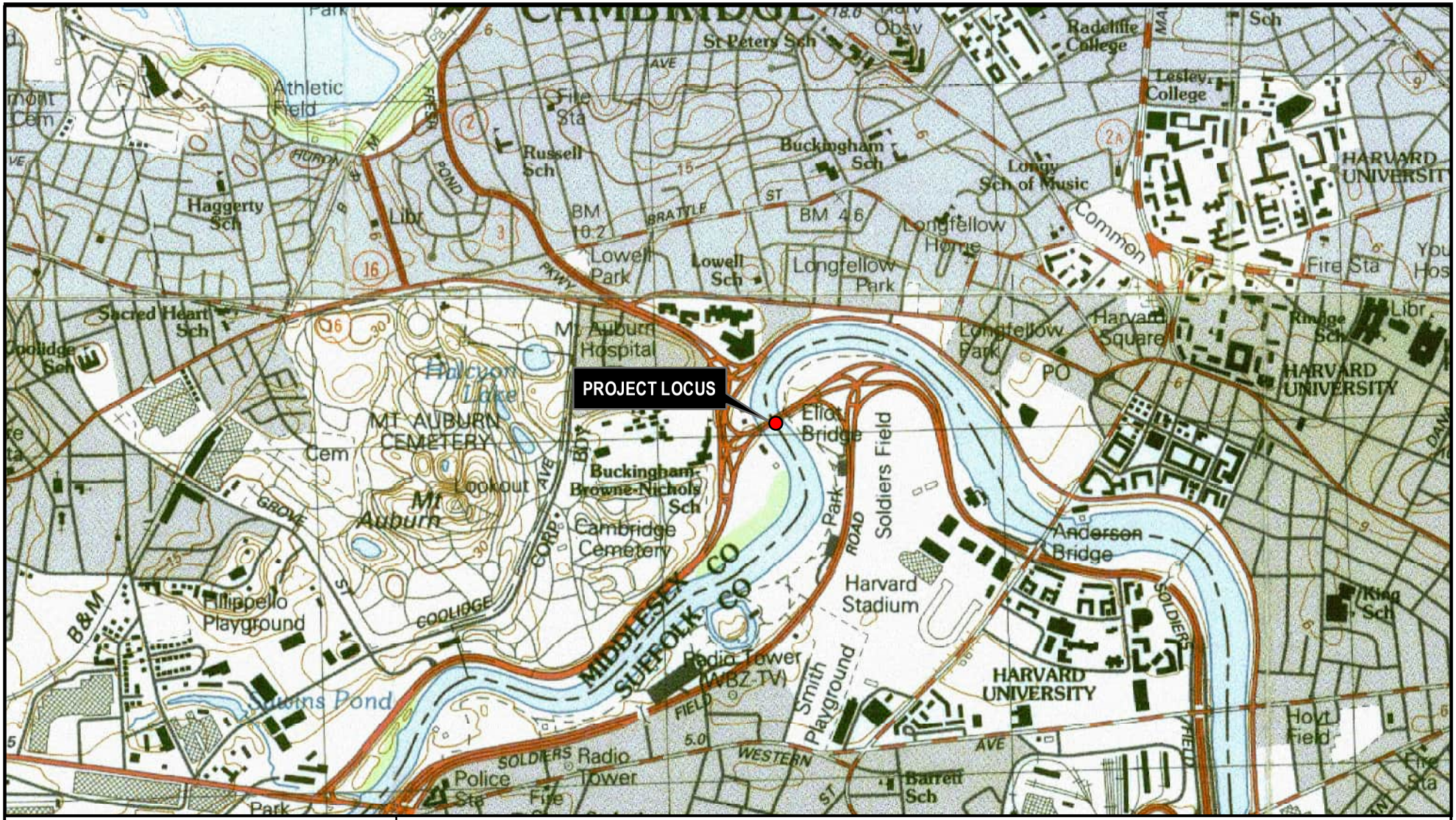
Failure by the applicant to send copies in a timely manner may result in dismissal of the Request for Determination of Applicability.

Signatures:

I also understand that notification of this Request will be placed in a local newspaper at my expense in accordance with Section 10.05(3)(b)(1) of the Wetlands Protection Act regulations.

Melissa Lenker — August 21, 2023
Signature of Applicant — Date

Susan M. McArthur — 8/23/2023
Signature of Representative (if any) — Date



Source: MassGIS, Commonwealth of Massachusetts, Information Technology Division: USGS Ware, MA 7.5 MinuteTopographic Quadrangle

Prepared for: massDOT Massachusetts Department of Transportation Highway Division

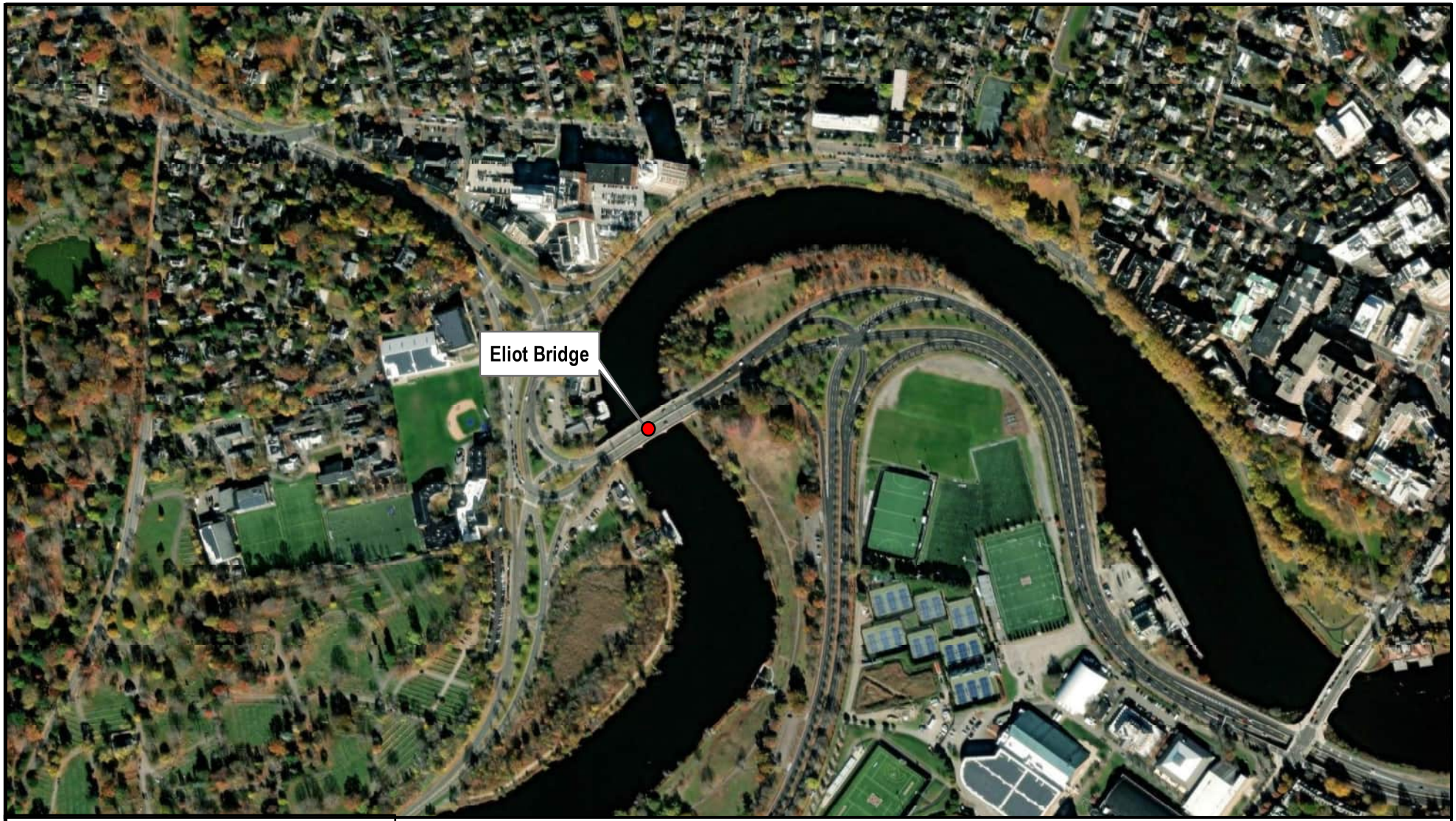
Prepared by: Jacobs

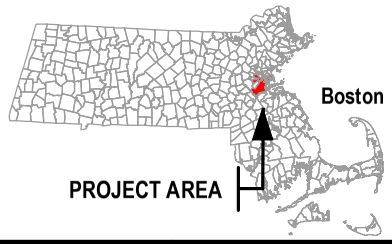
FIGURE 1 - USGS MAP

Boston – Cambridge – Brick and Granite Cap Repair and Replacement on B16-246
Eliot Street over The Charles River
Boston and Cambridge,Massachusetts

AUGUST 2023
E2X69149

FIGURE
1 OF 4





1 inch = 541.67 feet

0 325 650 1,300 Feet

NOT TO SCALE

Source: MassGIS, Commonwealth of Massachusetts, Information Technology Division: USGS Ware, MA 7.5 MinuteTopographic Quadrangle

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Prepared for: massDOT Highway Division

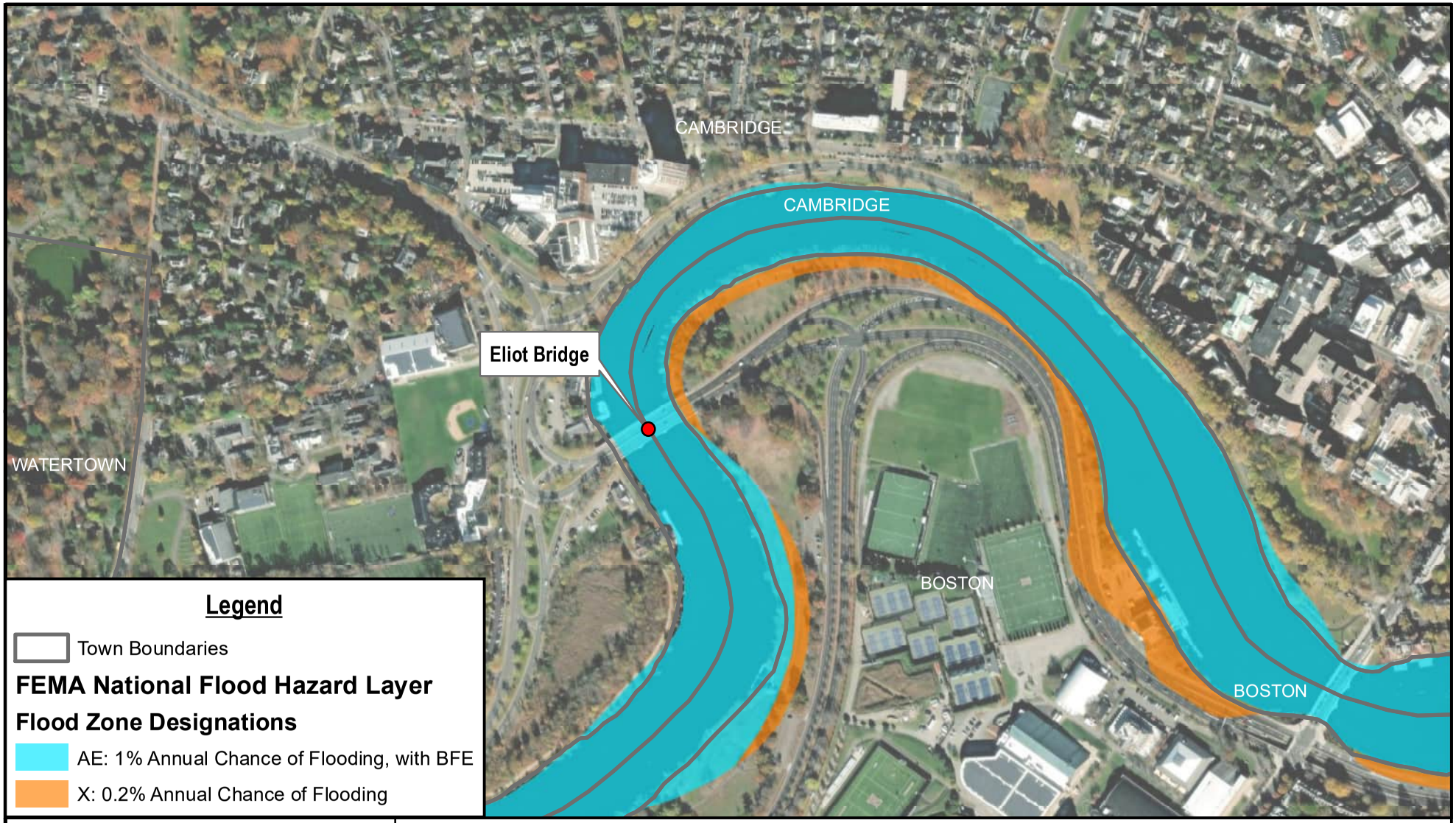
Prepared by: Jacobs

FIGURE 2 - AERIAL MAP

Boston – Cambridge – Brick and Granite Cap Repair and Replacement on B16-246
Eliot Street over The Charles River
Boston and Cambridge,Massachusetts

AUGUST 2023
E2X69149

FIGURE
2 OF 4



Legend

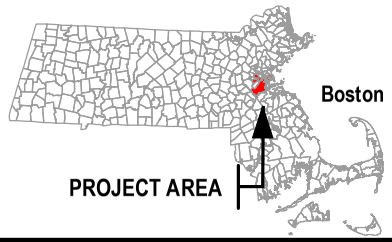
Town Boundaries

FEMA National Flood Hazard Layer

Flood Zone Designations

AE: 1% Annual Chance of Flooding, with BFE

X: 0.2% Annual Chance of Flooding



1 inch = 541.67 feet

0 325 650 1,300 Feet

NOT TO SCALE

Source: MassGIS, Commonwealth of Massachusetts, Information Technology Division: USGS Ware, MA 7.5 MinuteTopographic Quadrangle

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Prepared for: massDOT Highway Division

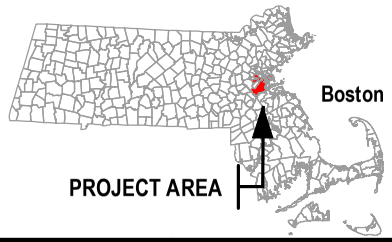
Prepared by: Jacobs

FIGURE 3 - FEMA MAP

Boston – Cambridge – Brick and Granite Cap Repair and Replacement on B16-246
Eliot Street over The Charles River
Boston and Cambridge,Massachusetts

AUGUST 2023
E2X69149

FIGURE
3 OF 4



1 inch = 541.67 feet

0 325 650 1,300 Feet

NOT TO SCALE

Source: MassGIS, Commonwealth of Massachusetts, Information Technology Division: USGS Ware, MA 7.5 MinuteTopographic Quadrangle

Resource Areas Reviewed:
AUL Points; Certified Vernal Pools; Potential Vernal Pools; NHESP Priority Habitats; NHESP Estimated Habitats; NHESP Natural Communities; Outstanding ResourceWaters; Areas of Critical Environmental Concern; DFW Coldwater Fisheries; Zone I, II, & IWPA Protection Areas

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Prepared for: massDOT Highway Division

Prepared by: Jacobs

FIGURE 4 - ENVIRONMENTAL FEATURES MAP

Boston – Cambridge – Brick and Granite Cap Repair and Replacement on B16-246
Eliot Street over The Charles River
Boston and Cambridge,Massachusetts

AUGUST 2023
E2X69149

FIGURE
4 OF 4

Jacobs

PHOTOGRAPHIC LOG

Site Location: Eliot Bridge, Boston & Cambridge, MA | **Project No.** 608762

Photo No.	**Date:**
1	09/19/20

Direction Photo Taken:
Southwest

Description:
View of Eliot Bridge and Charles River.

Photo No.	**Date:**
2	09/19/20

Direction Photo Taken:
Southeast

Description:
View northside of Eliot Bridge from the western bank of the Charles River.

Jacobs

PHOTOGRAPHIC LOG

Site Location: Eliot Bridge, Boston & Cambridge, MA | **Project No.** 608762

Photo No.	**Date:**
3	09/19/20

Direction Photo Taken:
Southeast

Description:
View of the underside of Eliot Bridge.

Photo No.	**Date:**
4	09/19/20

Direction Photo Taken:
Southwest

Description:
Underside of the Eliot Bridge.

Jacobs

PHOTOGRAPHIC LOG

Site Location: Eliot Bridge, Boston & Cambridge, MA | **Project No.** 608762

Photo No.	**Date:**
5	09/19/20

Direction Photo Taken:
Northeast

Description:
View of the southern side of Eliot bridge from the western bank of the Charles River.

Photo No.	**Date:**
6	09/19/20

Direction Photo Taken:
Northeast

Description:
View of the traveling lanes over the Eliot Bridge.

Jacobs

PHOTOGRAPHIC LOG

Site Location: Eliot Bridge, Boston & Cambridge, MA | **Project No.** 608762

Photo No.	**Date:**
7	05/05/16

Direction Photo Taken:
Northeast

Description:
Example of barge with staging tied off to the piers.

Photo No.	**Date:**
8	01/29/16

Direction Photo Taken:
Northeast

Description:
Example of barge being held in place by the two spuds.

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	1	37
PROJECT FILE NO.	608762		

TITLE SHEET & INDE

REPAIR PLANS AND DETAILS FOR

ELIOT BRIDGE

(BRIDGE NO. B-16-246 = BRIDGE NO. C-01-029)

IN THE CITY/TOWN OF

BOSTON & CAMBRIDGE

SUFFOLK & MIDDLESEX COUNTIES

FEDERAL AID PROJECT NO. -

PS&E SUBMITTAL

THE MASSACHUSETTS HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES DATED 2023, AS AMENDED, THE OCTOBER 2017 CONSTRUCTION STANDARD DETAILS, THE 2015 OVERHEAD SIGNAL STRUCTURE AND FOUNDATION STANDARD DRAWINGS, MASSDOT TRAFFIC MANAGEMENT PLANS AND DETAIL DRAWINGS, THE LATEST MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS WITH MASSACHUSETTS AMENDMENTS, THE 1990 STANDARD DRAWINGS FOR SIGNS AND SUPPORTS, THE 1968 STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING, AND THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK, WILL GOVERN.

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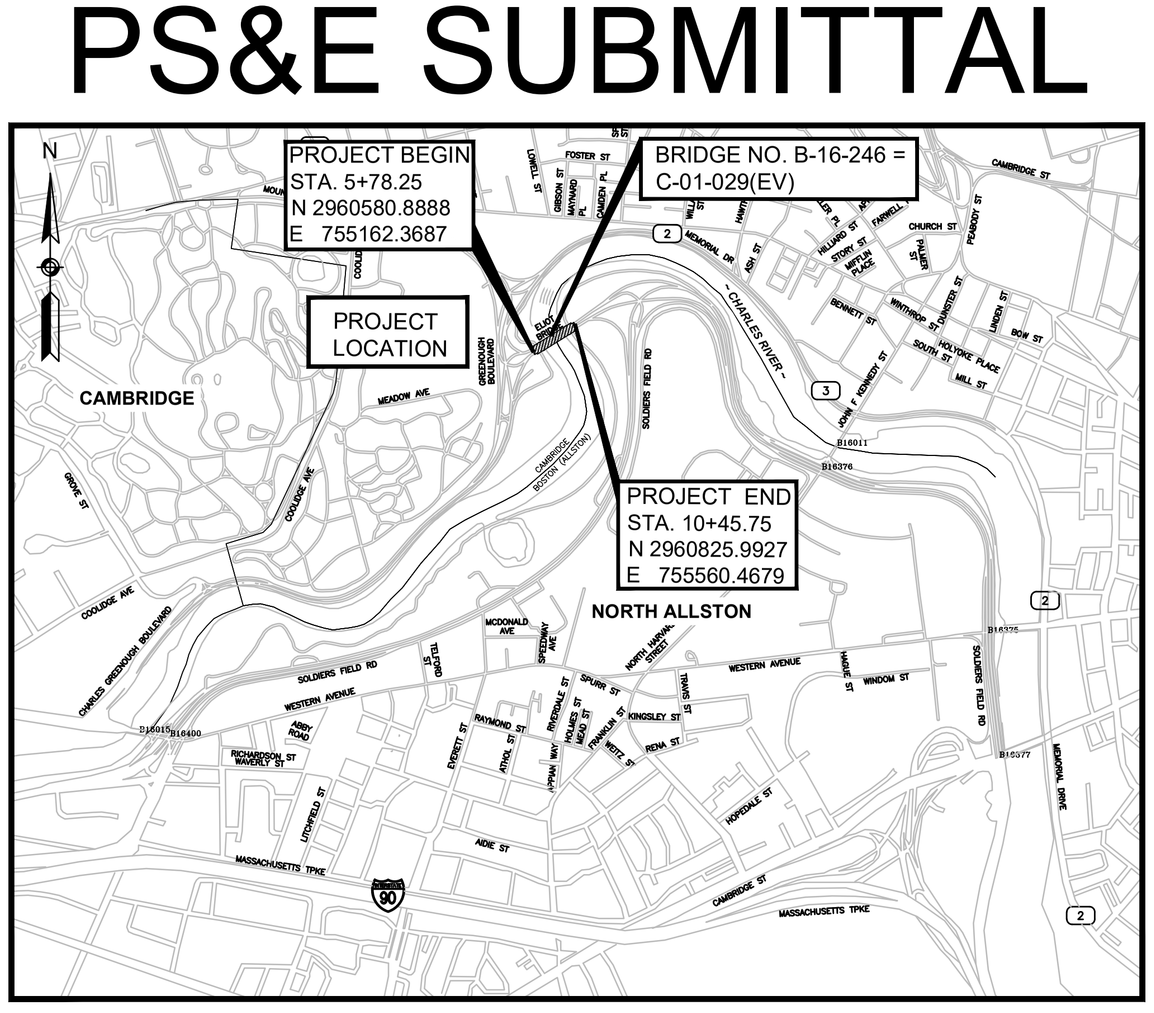


0 1000 2000 3000 4000

SCALE: 1" = 1000'

LENGTH OF PROJECT = 467.50 FEET = 0.089 MILES

DESIGN DESIGNATION (ELIOT BRIDGE)

DESIGN SPEED	25 MPH
ADT (2020)	48,286 VPD
ADT (2040)	60,138 VPD
K	9%
D	51% NB
T (PEAK HOUR)	N/A*
T (AVERAGE DAY)	N/A*
DHV	5412
DDHV	2760 NB
FUNCTIONAL CLASSIFICATION	URBAN PRINCIPAL ARTERIAL

*HEAVY TRAFFIC PROHIBITED

COMMONWEALTH OF MASSACHUSETTS
ANTHONY M RICHARDSON
CIVIL
No. 51810
REGISTERED PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION FOR REVIE ONL

5/18/2023	PS&E SUBMISSION	3
3/31/2023	100% RE-SUBMISSION	2
10/21/2022	100% SUBMISSION	1
12/21/2020	25% SUBMISSION	0
DATE	DESCRIPTION	REV #

massDOT
Massachusetts Department of Transportation
Highway Division

RECOMMENDED FOR APPROVAL

CHIEF ENGINEER _____ DATE _____

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGH A ADMINISTRATION

APPROVED

DIVISION ADMINISTRATOR _____ DATE _____

APPROVED

HIGH A ADMINISTRATOR _____ DATE _____

31-MAR-2023

100% RE-SUBMISSION

GENERAL SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
JB	JB	JERSEY BARRIER
CB	CB	CATCH BASIN
		CATCH BASIN CURB INLET
FP	FP	FLAG POLE
GP	GP	GAS PUMP
MB	MB	MAIL BOX
		POST SQUARE
		POST CIRCULAR
WELL	WELL	WELL
EHH	EHH	ELECTRIC HANDHOLE
		FENCE GATE POST
GG	GG	GAS GATE
BHL #	BHL #	BORING HOLE
MW #	MW #	MONITORING WELL
TP #	TP #	TEST PIT
		HYDRANT
		LIGHT POLE
CO.BD.		COUNTY BOUND
		GPS POINT
C	C	CABLE MANHOLE
D	D	DRAINAGE MANHOLE
E	E	ELECTRIC MANHOLE
G	G	GAS MANHOLE
M	M	MISC MANHOLE
S	S	SEWER MANHOLE
T	T	TELEPHONE MANHOLE
W	W	WATER MANHOLE
MHB	MHB	MASSACHUSETTS HIGHWAY BOUND
MON		MONUMENT
SB		STONE BOUND
TB		TOWN OR CITY BOUND
		TRAVERSE OR TRIANGULATION STATION
TPL or GUY	TPL or GUY	TROLLEY POLE OR GUY POLE
HTP		TRANSMISSION POLE
UFB	UFB	UTILITY POLE W/ FIREBOX
UPDL	UPDL	UTILITY POLE WITH DOUBLE LIGHT
ULT	ULT	UTILITY POLE W / 1 LIGHT
UPL	UPL	UTILITY POLE
		BUSH
SIZE & TYPE		TREE
		STUMP
		SWAMP / MARSH
WG	WG	WATER GATE
PM	PM	PARKING METER
		OVERHEAD CABLE/WIRE
		CURBING
100 99		CONTOURS (ON-THE-GROUND SURVEY DATA)
100 99		CONTOURS (PHOTOGRAMMETRIC DATA)
		UNDERGROUND DRAIN PIPE (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND ELECTRIC DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND GAS MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND SEWER MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND TELEPHONE DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND WATER MAIN (DOUBLE LINE 24 INCH AND OVER)
		BALANCED STONE WALL
		GUARD RAIL - STEEL POSTS
		GUARD RAIL - WOOD POSTS
		GUARD RAIL - DOUBLE FACE - STEEL POSTS
		GUARD RAIL - DOUBLE FACE - WOOD POSTS
x	x	CHAIN LINK OR METAL FENCE
		WOOD FENCE
		HAY BALES/SILT FENCE
		SEDIMENT CONTROL BARRIER
		TREE LINE
		SAWCUT LINE
		TOP OR BOTTOM OF SLOPE
		LIMIT OF EDGE OF PAVEMENT OR COLD PLANE AND OVERLAY
		BANK OF RIVER OR STREAM
		BORDER OF WETLAND
		100 FT WETLAND BUFFER
		200 FT RIVERFRONT BUFFER
		STATE HIGHWAY LAYOUT
		TOWN OR CITY LAYOUT
		COUNTY LAYOUT
		RAILROAD SIDELINE
		TOWN OR CITY BOUNDARY LINE
		PROPERTY LINE OR APPROXIMATE PROPERTY LINE
		EASEMENT

TRAFFIC SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
1	1	CONTROLLER PHASE ACTUATED
		TRAFFIC SIGNAL HEAD (SIZE AS NOTED)
		WIRE LOOP DETECTOR (6' x 6' TYP UNLESS OTHERWISE SPECIFIED)
		VIDEO DETECTION CAMERA
		MICROWAVE DETECTOR
		PEDESTRIAN PUSH BUTTON, SIGN (DIRECTIONAL ARROW AS SHOWN) AND SADDLE
	*	EMERGENCY PREEMPTION CONFIRMATION STROBE LIGHT
		VEHICULAR SIGNAL HEAD
		VEHICULAR SIGNAL HEAD, OPTICALLY PROGRAMMED
		FLASHING BEACON
		PEDESTRIAN SIGNAL HEAD, (TYPE AS NOTED OR AS SPECIFIED)
RRSG	RRSG	RAILROAD SIGNAL
OR		SIGNAL POST AND BASE (ALPHA-NUMERIC DESIGNATION NOTED)
	20'	MAST ARM, SHAFT AND BASE (ARM LENGTH AS NOTED)
		HIGH MAST POLE OR TOWER
		SIGN AND POST
		SIGN AND POST (2 POSTS)
	20'	MAST ARM WITH LUMINAIRE
		OPTICAL PRE-EMPTION DETECTOR
		CONTROL CABINET, GROUND MOUNTED
		CONTROL CABINET, POLE MOUNTED
		FLASHING BEACON CONTROL AND METER PEDESTAL
		LOAD CENTER ASSEMBLY
		PULL BOX 12"x12" (OR AS NOTED)
		ELECTRIC HANDHOLE 12"x24" (OR AS NOTED)
		TRAFFIC SIGNAL CONDUIT

PAVEMENT MARKINGS SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		PAVEMENT ARROW - WHITE
ONLY	ONLY	LEGEND "ONLY" - WHITE
	SL	STOP LINE
	CW	CROSSWALK
	SWL	SOLID WHITE LINE
	SYL	SOLID YELLOW LINE
	BWL	BROKEN WHITE LINE
	BYL	BROKEN YELLOW LINE
	DWL	DOTTED WHITE LINE
	DYL	DOTTED YELLOW LINE
	DWLEx	DOTTED WHITE LINE EXTENSION
	DYLEx	DOTTED YELLOW LINE EXTENSION
	DBWL	DOUBLE WHITE LINE
	DBYL	DOUBLE YELLOW LINE

LIGHTING SYMBOLS

PROP. LIGHT POLE

PROP. 12"X12" PULL BOX

PROP. 12"X24" HANDHOLE

PROP. 12"X12" BARRIER MOUNTED JUNCTION BOX

E — PROP. 3" PVC CONDUIT (1" PVC CONDUIT BETWEEN HH AND LIGHT POLE)

PROP. LOAD CENTER

+1.0 — RESULTANT LUMINAIRE (ALL LIGHT SOURCES)

1.0 / 0.50 — LUMINAIRE TEMPLATE - 0.5 FC & 1.0 FC (SINGLE LIGHT SOURCE)

FIXTURE #	1	* *EXISTING CIRCUIT
STATION	7+52	
OFFSET	24.0' RT	
ARM LENGTH	5'	III DISTRIBUTION TYPE
MOUNTING HEIGHT	27'	2X-60W NUMBER OF FIXTURES-WATTAGE

*REFER TO PLAN FOR ACTUAL LIGHTING INFORMATON

ABBREVIATIONS

GENERAL

AADT	ANNUAL AVERAGE DAILY TRAFFIC
ABAN	ABANDON
ADJ	ADJUST
APPROX.	APPROXIMATE
A.C.	ASPHALT CONCRETE
ACCM PIPE	ASPHALT COATED CORRUGATED METAL PIPE
BIT.	BITUMINOUS
BC	BOTTOM OF CURB
BD.	BOUND
BL	BASELINE
BLDG	BUILDING
BM	BENCHMARK
BO	BY OTHERS
BOS	BOTTOM OF SLOPE
BR.	BRIDGE
CB	CATCH BASIN
CBCI	CATCH BASIN WITH CURB INLET
CC	CEMENT CONCRETE
CCM	CEMENT CONCRETE MASONRY
CEM	CEMENT
CI	CURB INLET
CIP	CAST IRON PIPE
CLF	CHAIN LINK FENCE
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
CSP	CORRUGATED STEEL PIPE
CO.	COUNTY
CONC	CONCRETE
CONT	CONTINUOUS
CONST	CONSTRUCTION
CR GR	CROWN GRADE
DHV	DESIGN HOURLY VOLUME
DI	DROP INLET
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DW	STEADY DON'T WALK - PORTLAND ORANGE
DWY	DRIVEWAY
ELEV (or EL.)	ELEVATION
EMB	EMBANKMENT
EOP	EDGE OF PAVEMENT
EXIST (or EX)	EXISTING
EXC	EXCAVATION
F&C	FRAME AND COVER
F&G	FRAME AND GRATE
FDN.	FOUNDATION
FLDSTN	FIELDSTONE
GAR	GARAGE
GD	GROUND
GG	GAS GATE
GI	GUTTER INLET
GIP	GALVANIZED IRON PIPE
GRAN	GRANITE
GRAV	GRAVEL
GRD	GUARD
HDW	HEADWALL
HMA	HOT MIX ASPHALT
HOR	HORIZONTAL
HYD	HYDRANT
INV	INVERT
JCT	JUNCTION
L	LENGTH OF CURVE
LB	LEACH BASIN
LP	LIGHT POLE
LT	LEFT
MAX	MAXIMUM
MB	MAILBOX
MH	MANHOLE
MHB	MASSACHUSETTS HIGHWAY BOUND
MIN	MINIMUM
NIC	NOT IN CONTRACT
NO.	NUMBER
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PCR	PEDSTRIAN CURB RAMP
P.G.L.	PROFILE GRADE LINE
PI	POINT OF INTERSECTION
POC	POINT ON CURVE
POT	POINT ON TANGENT
PRC	POINT OF REVERSE CURVATURE
PROJ	PROJECT
PROP	PROPOSED
PSB	PLANTABLE SOIL BORROW
PT	POINT OF TANGENCY
PVC	POINT OF VERTICAL CURVATURE
PVI	POINT OF VERTICAL INTERSECTION
PVT	POINT OF VERTICAL TANGENCY
PVMT	PAVEMENT

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	2	37
PROJECT FILE NO.	608762		

LEGEND AND ABBREVIATIONS

ABBREVIATIONS (cont.)

GENERAL

PWW	PAVED WATER WAY
R	RADIUS OF CURVATURE
R&D	REMOVE AND DISPOSE
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
RDWY	ROADWAY
REM	REMOVE
RET	RETAIN
RET WALL	RETAINING WALL
ROW	RIGHT OF WAY
RR	RAILROAD
R&R	REMOVE AND RESET
R&S	REMOVE AND STACK
RT	RIGHT
SB	STONE BOUND
SHLD	SHOULDER
SMH	SEWER MANHOLE
ST	STREET
STA	STATION
SSD	STOPPING SIGHT DISTANCE
SHLO	STATE HIGHWAY LAYOUT LINE
SW	SIDEWALK
T	TANGENT DISTANCE OF CURVE/TRUCK %
TAN	TANGENT
TEMP	TEMPORARY
TC	TOP OF CURB
TOS	TOP OF SLOPE
TYP	TYPICAL
UP	UTILITY POLE
VAR	VARIES
VERT	VERTICAL
VC	VERTICAL CURVE
WG	WATER GATE
WIP	WROUGHT IRON PIPE
WM	WATER METER/WATER MAIN
X-SECT	CROSS SECTION

TRAFFIC SIGNAL ABBREVIATIONS

CAB	CABINET
CCVE	CLOSED CIRCUIT VIDEO EQUIPMENT
DW	STEADY UPRAISED HAND
FDW	FLASHING UPRAISED HAND
FR	FLASHING CIRCULAR RED
FRL	FLASHING RED LEFT ARROW
FRR	FLASHING RED RIGHT ARROW
FY	FLASHING CIRCULAR YELLOW
FYL	FLASHING YELLOW LEFT ARROW
FYR	FLASHING YELLOW RIGHT ARROW
G	STEADY CIRCULAR GREEN
GL	STEADY GREEN LEFT ARROW
GR	STEADY GREEN RIGHT ARROW
GSL	STEADY GREEN SLASH LEFT ARROW
GSR	STEADY GREEN SLASH RIGHT ARROW
GV	STEADY GREEN VERTICAL ARROW
OL	OVERLAP
PED	PEDESTRIAN
PTZ	PAN, TILT, ZOOM
R	STEADY CIRCULAR RED
RL	STEADY RED LEFT ARROW
RR	STEADY RED RIGHT ARROW
TR SIG	TRAFFIC SIGNAL
TSC	TRAFFIC SIGNAL CONDUIT
W	STEADY WALKING PERSON
Y	STEADY CIRCULAR YELLOW
YL	STEADY YELLOW LEFT ARROW

A00650 - 18
2-608762_LEGEND AND ABBREVIATIONS.DWG Plotted on 17-May-2023 10:06 AM
Proposal No. 608762-124916
31-MAR-2023
100% RE-SUBMISSION

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	3	37
PROJECT FILE NO.	608762		

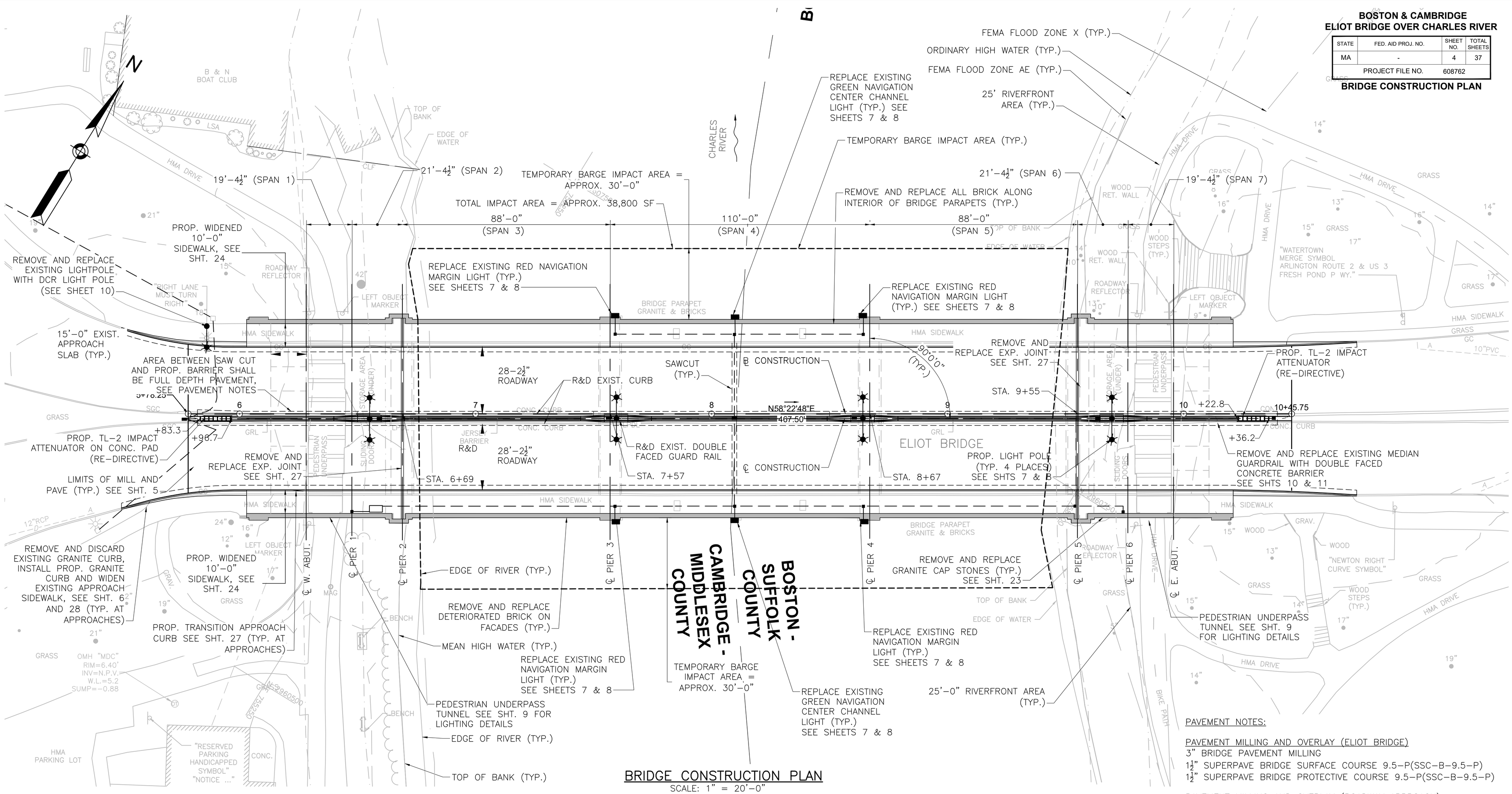
GENERAL NOTES:

1. THE EXISTING BASE MAPPING IS BASED ON FIELD SURVEY PERFORMED BY GPI IN JULY AND AUGUST 2020. TRANSVERSE TIE INFORMATION CAN BE FOUND IN FIELD BOOK 41472.
2. HORIZONTAL COORDINATES REFER TO THE MASSACHUSETTS STATE PLANE COORDINATE SYSTEM MAINLAND ZONE REFERENCED IN US FEET TO THE NORTH AMERICAN DATUM OF 1983 (NAD 83). ALL VERTICAL ELEVATIONS REFER TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
3. RIGHT OF WAYS AND PROPERTY LINES SHOWN HEREON WERE COMPILED FROM ASSESSORS MAPS, RECORDED DEEDS AND PLANS, AND FIELD EVIDENCE (PERFORMED BY GPI).
4. IT IS THE INTENT OF THE DESIGN TO PROVIDE A MINIMUM CONSTRUCTED SIDEWALK WIDTH FOR A PATH OF TRAVEL PAST ALL OBSTRUCTIONS OF 36". THE CONTRACTOR SHALL VERIFY THAT ALL POTENTIAL OBSTRUCTIONS, INCLUDING BUT NOT LIMITED TO SIGNS, MAILBOXES, UTILITY POLES, HYDRANTS, AND TRAFFIC SIGNAL EQUIPMENT ARE LOCATED AS TO PROVIDE THIS MINIMUM PATH OF TRAVEL CLEARANCE.
5. THE LOCATIONS OF THE EXISTING UTILITIES ARE SHOWN AS APPROXIMATE LOCATION ONLY. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT LOCATION OF ANY AND ALL EXISTING UTILITIES WITHIN THE PROJECT AREA PRIOR TO THE START OF CONSTRUCTION.
6. ALL EXISTING STATE HIGHWAY LAYOUT LINES, COUNTY, CITY AND TOWN LOCATION LINES, AND PROPERTY LINES HAVE BEEN ESTABLISHED FROM AVAILABLE INFORMATION AND THEIR EXACT LOCATIONS ARE NOT GUARANTEED.
7. PRIOR TO THE START OF WORK THE CONTRACTOR SHALL CONFORM TO ALL OF THE REQUIREMENTS SET FORTH IN THE SPECIFICATIONS WITH REGARD TO UTILITY NOTIFICATIONS AND TO SUBMITTALS REQUIRED BY THE CONTRACTOR REGARDING THE MAINTENANCE AND PROTECTION OF TRAFFIC.
8. THE CONTRACTOR IS HEREBY NOTIFIED THAT ADDITIONAL WORK WITHIN THE PROJECT LIMITS MAY BE PERFORMED BY OTHERS.
9. THE CONTRACTOR SHALL COORDINATE ALL ACTIVITIES WITH OTHER CONTRACTORS PERFORMING WORK WITHIN AND AT THE PROJECT LIMITS.
10. THE CONTRACTOR MAY BE REQUIRED TO PERFORM ITEMS OF WORK OUT OF NORMAL SEQUENCE AND SCHEDULE, AS DIRECTED BY THE ENGINEER, IN ORDER TO MEET THE OVERALL PROJECT SCHEDULE.
11. THE CONTRACTOR SHALL NOTIFY DIG-SAFE (1-888-344-7233), AT LEAST 72 BUSINESS HOURS BEFORE ANY CONSTRUCTION BEGINS.
12. THE CONTRACTOR SHALL BE REQUIRED TO PROCURE PROJECT RELATED ITEMS WITHOUT ADVERSELY IMPACTING THE PROJECT SCHEDULE; THEREFORE, IT IS THE CONTRACTOR'S RESPONSIBILITY TO SUBMIT THE APPROPRIATE SHOP DRAWINGS WITH SUFFICIENT LEAD TIME FOR PROCESSING IN ACCORDANCE WITH CONTRACT SPECIFICATIONS.
13. DAMAGE TO PRIVATE PROPERTIES BEYOND THE WORK LIMITS AS CAUSED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED "IN-KIND" BY THE CONTRACTOR AT THE CONTRACTOR'S SOLE EXPENSE.
14. AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED, BY THE CONTRACTOR, TO THEIR ORIGINAL CONDITION, AT THE CONTRACTOR'S SOLE EXPENSE.
15. LIMITS OF CLEARING AND GRUBBING ARE 1 FOOT BEYOND PROPOSED TOP OR TOE OF SLOPE UNLESS OTHERWISE INDICATED ON THE CONSTRUCTION PLANS.
16. GRANITE CURB: EXISTING CURB MARKED AS (R&R) SHALL BE RESET AS SHOWN IF, IN THE OPINION OF THE ENGINEER, IT IS IN GOOD CONDITION AND REUSABLE. OTHERWISE, IT SHALL BE DISCARDED BY THE CONTRACTOR AS PER DIRECTION OF THE ENGINEER.
17. ALL DISTURBED AREAS NOT DESIGNATED TO BE PAVED SHALL BE REPLANTED AS INDICATED ON THE CONSTRUCTION PLANS.
18. TREES AND SHRUBS WITHIN THE LIMITS OF WORK NOT SCHEDULED FOR REMOVAL AS INDICATED ON THE PLANS SHALL ONLY BE REMOVED UPON APPROVAL OF THE ENGINEER.
19. LIMITS OF BORDERING VEGETATED WETLANDS AND OTHER ENVIRONMENTAL RESOURCE AREAS WERE DELINEATED BY JACOBS IN SEPTEMBER 2020.
20. ALL EROSION CONTROLS MUST BE CHECKED/REPAIRED, AND ANY SILTATION REMOVED AFTER EACH RAIN EVENT.
21. THE CONTRACTOR SHALL COORDINATE ALL ARRANGEMENTS FOR THE ALTERATION AND/OR ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE AND ANY OTHER PRIVATE UTILITY THROUGH THE MASSDOT HIGHWAY DIVISION UTILITY SECTION.
22. UTILITIES: LOCATIONS OF M.H., G.G. W.G., ETC. ARE APPROXIMATE AND ARE SHOWN ONLY AS AN AID TO ASSIST BIDDERS IN DETERMINING LOCATIONS OR EXISTING UTILITIES AND SUBSURFACE STRUCTURES. THE CONTRACTOR IS FULLY RESPONSIBLE FOR MAKING REQUIRED FIELD INVESTIGATIONS AND OBTAINING INFORMATION FROM UTILITY COMPANIES AND INDIVIDUALS TO PINPOINT THE EXACT LOCATIONS AND ELEVATIONS OF ALL SUBSURFACE UTILITIES AND STRUCTURES.
23. SHOULD AN EXISTING UTILITY BE FOUND TO BE IN CONFLICT WITH THE PROPOSED WORK, THE LOCATION, SIZE AND TYPE SHALL BE ACCURATELY DETERMINED WITHOUT DELAY, BY THE CONTRACTOR, AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.
24. SHOP DRAWINGS OF ALL CASTINGS, PRECAST CONCRETE STRUCTURES, PIPE AND OTHER MANUFACTURED ITEMS SHALL BE SUBMITTED FOR APPROVAL BY THE ENGINEER, IN CONFORMANCE WITH CONTRACT SPECIFICATIONS, AND SAID APPROVAL SHALL BE REQUIRED PRIOR TO INITIATING PROCUREMENT OF MATERIALS.
25. FINAL LOCATION OF TRAFFIC SIGNS AND SUPPORTS AS SHOWN IN THE PLANS SHALL BE FIELD-CONFIRMED BY THE ENGINEER PRIOR TO INSTALLATION.
26. SAFETY CONTROLS FOR CONSTRUCTION OPERATIONS AND WORKZONE PROTECTION SHALL BE IN ACCORDANCE WITH CURRENT MASSDOT AND MUTCD REQUIREMENTS AND SPECIFICATIONS.
27. ALL CONSTRUCTION SIGNS IN PLACE BUT NOT PERTINENT TO THE ONGOING CONSTRUCTION PHASING SHALL BE "BAGGED".
28. THE CONTRACTOR SHALL PROVIDE FOR THE SAFE AND ORDERLY PASSAGE OF VEHICULAR AND PEDESTRIAN TRAFFIC IN AREAS UNDER CONSTRUCTION.
29. ANY AND ALL TRAFFIC RELATED ITEMS REQUIRED TO MAINTAIN TRAFFIC FLOW THROUGH OR AROUND THE PROJECT AREA SHALL BE MAINTAINED IN A CONDITION ACCEPTABLE TO THE ENGINEER. FURTHER, THE CONTRACTOR SHALL REPLACE THOSE ITEMS AS REQUIRED BY THE SPECIFICATIONS OR AS DEEMED NECESSARY BY THE ENGINEER.
30. ALL PROPOSED PAVEMENT MARKINGS SHALL MATCH EXISTING MARKINGS AT THE LIMITS OF WORK UNLESS DIRECTED BY THE ENGINEER.
31. ALL PROPOSED PAVEMENT MARKINGS SHALL BE WET REFLECTIVE THERMOPLASTIC.
32. ALL TRANSVERSE JOINTS, AND ALL LONGITUDINAL JOINTS BETWEEN NEW SURFACE PAVEMENT AND EXISTING SURFACE PAVEMENT TO REMAIN SHALL BE COATED WITH A HOT POURED RUBBERIZED ASPHALT SEALANT MEETING THE REQUIREMENTS OF FEDERAL SPECIFICATION NUMBER SS-S-1401.
33. ALL DISTURBED AREAS NOT DESIGNATED TO BE PAVED SHALL HAVE LOAM BORROW PLACED AND SEEDED. THE LOAM BORROW SHALL HAVE A MINIMUM DEPTH OF 4 INCHES AND SHALL BE PLACED FLUSH WITH THE TOP OF THE ADJACENT CURB, EDGING, BERM, OR PAVEMENT SURFACE.
34. CONTRACTOR SHALL SUBMIT ALL REQUIRED SHOP DRAWINGS FOR APPROVAL PRIOR TO FABRICATION OR DELIVERY OF MATERIAL TO THE SITE. THE CONTRACTOR SHALL TAKE FIELD MEASUREMENTS NECESSARY TO ENSURE PROPER FIT OF FINISHED WORK AND SHALL ASSUME FULL RESPONSIBILITY FOR THE ACCURACY WHEN SHOP DRAWINGS ARE BASED ON FIELD MEASUREMENTS ARE SUBMITTED FOR APPROVAL. THE FIELD MEASUREMENTS SHALL ALSO BE SUBMITTED FOR REFERENCE.
35. DUE TO THE NATURE OF REHABILITATION PROJECTS, THE EXACT EXTENT OF REHABILITATION WORK CANNOT ALWAYS BE ACCURATELY DETERMINED PRIOR TO THE COMMENCEMENT OF WORK. THESE CONTRACT DRAWINGS HAVE BEEN PREPARED BASE ON FIELD INSPECTIONS AND OTHER INFORMATION AVAILABLE AT THE TIME. ACTUAL FIELD CONDITIONS MAY REQUIRE MODIFICATION TO CONSTRUCTION DETAILS, DIMENSIONS AND WORK QUANTITIES. THE WORK SHALL BE PERFORMED IN ACCORDANCE WITH FIELD CONDITIONS AND AS REQUIRED BY THE ENGINEER.
36. PRIOR TO THE COMMENCEMENT OF WORK CONTRACTOR SHALL COORDINATE WITH DIG SAFE. COORDINATION WITH DIG SAFE AND SUBSEQUENT MARKING OF ROADWAY AND BRIDGE SHALL BE COMPLETED PRIOR TO ALL WORK AND ANY UTILITY DISCREPANCIES REPORTED TO THE ENGINEER IMMEDIATELY.
37. CONTRACTOR SHALL COORDINATE WITH THE COAST GUARD, DEPARTMENT OF CONSERVATION AND RECREATION (DCR) AND ANY OTHER APPLICABLE ENTITIES PRIOR TO WORK IN THE WATERWAY (ON BARGE OR OTHERWISE). AT NO TIME MAY THE CONTRACTOR WORK IN THE WATER WITHOUT COORDINATION WITH THE COAST GUARD. AT ALL TIMES WHEN WORK HAS COMMENCED, TWO OF THE THREE NAVIGABLE SPANS (SPANS 3 THROUGH 5) MUST BE MAINTAINED AS OPEN FOR NAUTICAL TRAFFIC.

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	4	37
PROJECT FILE NO.	608762		

BRIDGE CONSTRUCTION PLAN

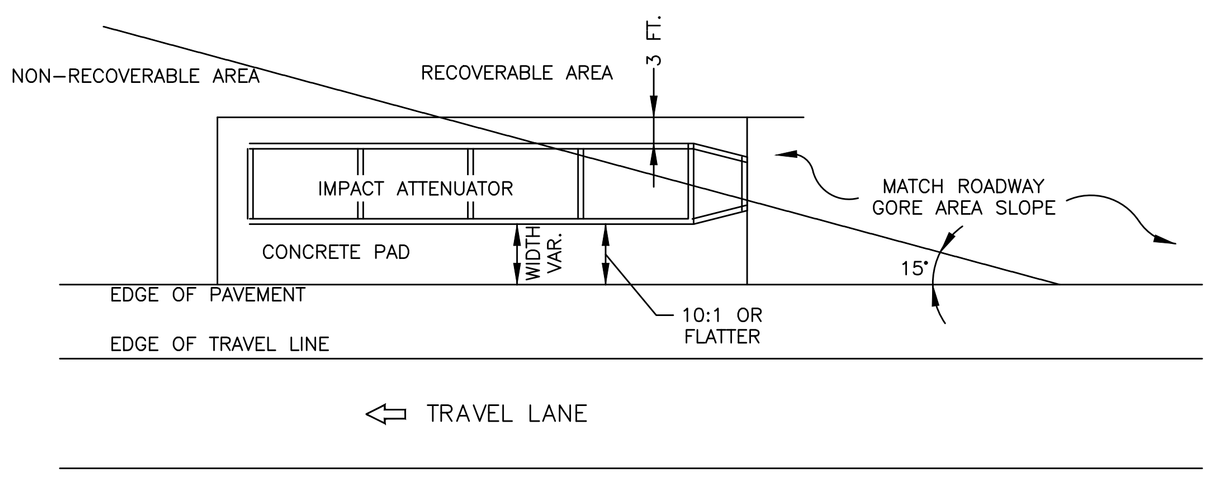


BRIDGE CONSTRUCTION PLAN

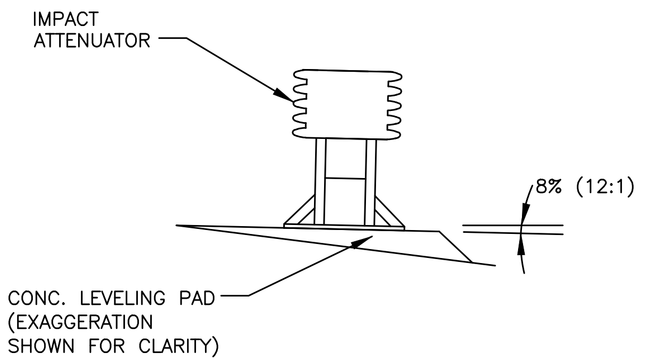
SCALE: 1" = 20'–0"

0 20 50 100

SCALE: 1" = 20'



IMPACT ATTENUATOR DETAIL
(NTS)



IMPACT ATTENUATOR LEVELING PAD DETAIL
(NTS)

PAVEMENT NOTES:

PAVEMENT MILLING AND OVERLAY (ELIOT BRIDGE)
3" BRIDGE PAVEMENT MILLING
1½" SUPERPAVE BRIDGE SURFACE COURSE 9.5–P(SSC–B–9.5–P)
1½" SUPERPAVE BRIDGE PROTECTIVE COURSE 9.5–P(SSC–B–9.5–P)

PAVEMENT MILLING AND OVERLAY (ROADWAY APPROACH)
1½" PAVEMENT MILLING
1½" SUPERPAVE SURFACE COURSE – 9.5 (SSC – 9.5)

FULL DEPTH CONSTRUCTION (ROADWAY APPROACH MEDIAN)
SURFACE COURSE: 1½" SUPERPAVE SURFACE U 12.5–P (SSC–12.5–P) OVER

INTERMEDIATE COURSE: 2" SUPERPAVE INTERMEDIATE COURSE 19.0 (SIC–19.0) OVER

BASE COURSE: 6" HIGH EARLY STRENGTH CEMENT CONCRETE BASE COURSE OVER

SUBBASE: EXISTING MATERIAL

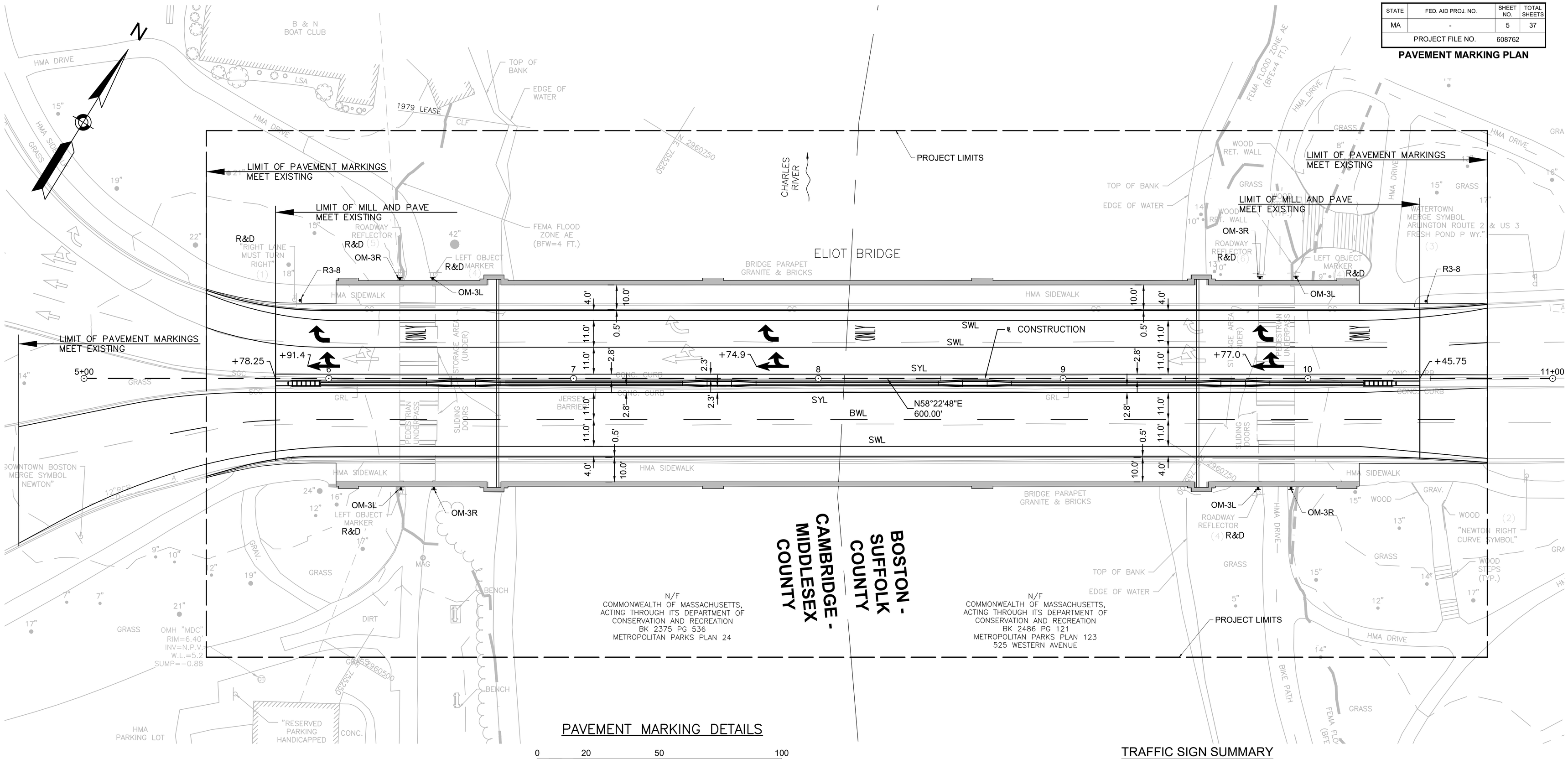
HOT MIX ASPHALT (APPROACH SIDEWALK)
2½" HMA IN TWO LAYERS 1¼" EACH OVER EXISTING BASE.

ALL SIDEWALK REPAIR SHALL INCLUDE THE FULL WIDTH OF THE SIDEWALK.

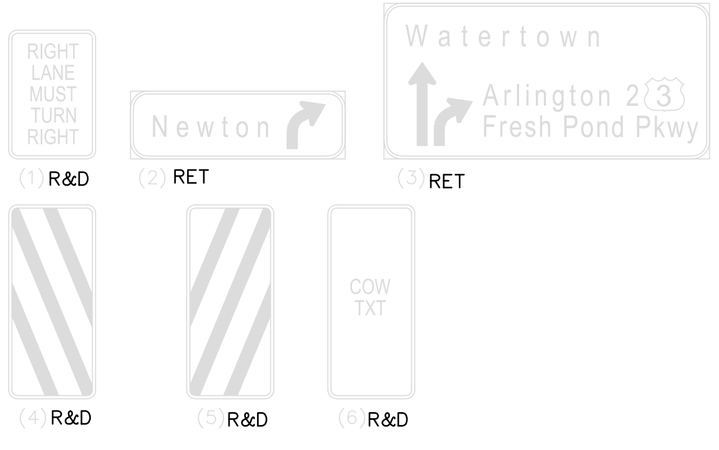
BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	5	37
PROJECT FILE NO.	608762		

PAVEMENT MARKING PLAN

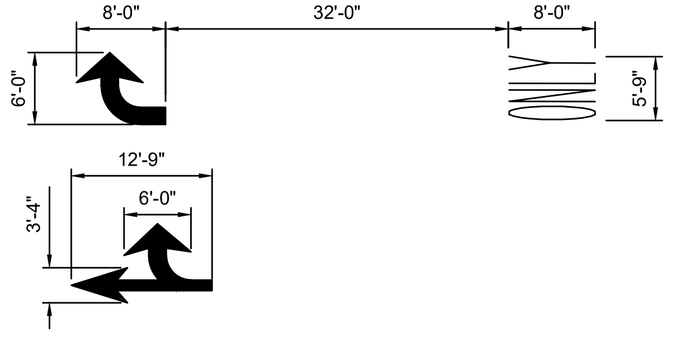


EXISTING SIGN LEGEND



PAVEMENT MARKING DETAILS

0 20 50 100
SCALE: 1" = 20'



TRAFFIC SIGN SUMMARY

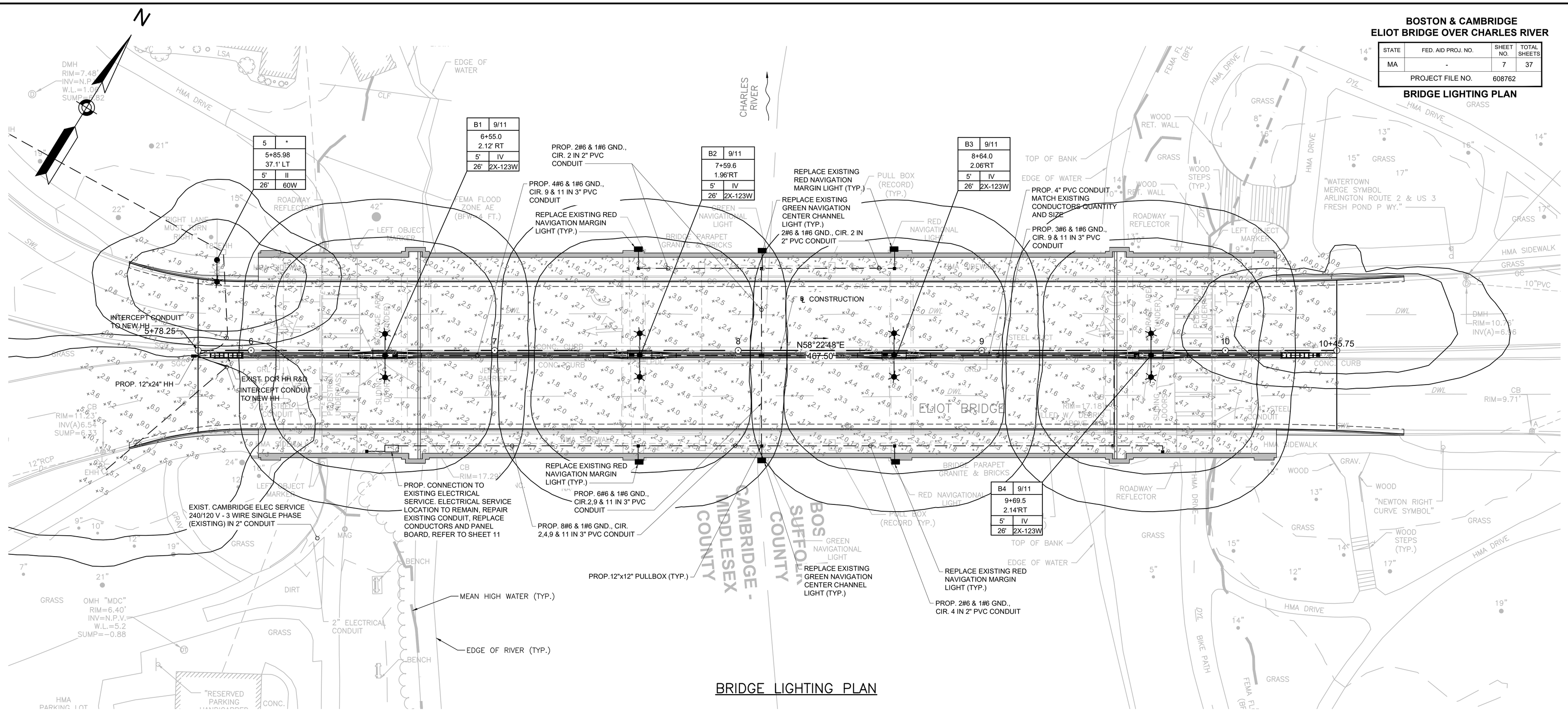
IDENTIFICATION NUMBER	SIZE WIDTH (IN)	SIZE HEIGHT (IN)	TEXT	DIMENSIONS (IN) LETTER HEIGHT	DIMENSIONS (IN) VERTICAL SPACING	DIMENSIONS (IN) ARROW RTE. MKR.	NUMBER OF SIGNS REQUIRED	POSTS	COLOR BACKGROUND	COLOR LEGEND	COLOR BORDER	UNIT AREA (S.F.)	TOTAL AREA (S.F.)
OM-3L	12"	36"		1	1	1	4	P-5	YELLOW	BLACK	BLACK	3.00	12.0
OM-3R	12"	36"					4	P-5	YELLOW	BLACK	BLACK	3.00	12.0
R3-8	30"	30"	ONLY				2	P-5	WHITE	BLACK	BLACK	6.25	12.5


100% RE-SUBMISSION
31-MAR-2023
6-608762_CURB AND BASELINE TIE PLAN.DWG
Plotted on 17-May-2023 12:24 PM
BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER
STATE
FED. AID PROJ. NO.
SHEET NO.
TOTAL SHEETS
MA
-
6
37
PROJECT FILE NO.
608762
CURB AND BASELINE TIE PLAN
ELIOT BRIDGE
CHARLES RIVER
BOSTON - SUFFOLK COUNTY
CAMBRIDGE - MIDDLESEX COUNTY
LIMIT OF WORK
STA. 10+73.33
N: 2960566.0581
E: 755138.3245
MATCH EXISTING
LIMIT OF WORK
STA 5+50.00
N: 2960566.0581
E: 755138.3245
MATCH EXISTING
CONSTRUCTION
N58°22'48"E
600.00'
COMMONWEALTH OF MASSACHUSETTS,
ACTING THROUGH ITS DEPARTMENT OF
CONSERVATION AND RECREATION
BK 2486 PG 121
METROPOLITAN PARKS PLAN 123
525 WESTERN AVENUE
COMMONWEALTH OF MASSACHUSETTS,
ACTING THROUGH ITS DEPARTMENT OF
CONSERVATION AND RECREATION
BK 2375 PG 536
METROPOLITAN PARKS PLAN 24
B & N
BOAT CLUB
BATH HOUSE
PEDESTRIAN UNDERPASS
STORAGE AREA (UNDER)
SLIDING DOORS
FEMA FLOOD ZONE AE
SCALE: 1" = 20'
0
20
50
100

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	7	37
PROJECT FILE NO.	608762		

BRIDGE LIGHTING PLAN



BRIDGE LIGHTING PLAN

0 20 50 100

SCALE: 1" = 20'

LEGEND

- PROP. LIGHT POLE
- PROP. DOUBLE LIGHT POLE
- PROP. 12"X12" PULL BOX
- PROP. 12"X24" HANDHOLE
- PROP. 12"X12" BARRIER MOUNTED JUNCTION BOX
- PROP. 3" PVC CONDUIT (1" PVC CONDUIT BETWEEN HH AND LIGHT POLE)
- PROP. LOAD CENTER

FIXTURE #	1	*	*USE EXISTING CIRCUIT
STATION OFFSET	7+52 24.0' RT		
ARM LENGTH	5'	III	DISTRIBUTION TYPE
MOUNTING HEIGHT	27'	2X-60W	NUMBER OF FIXTURES/WATTAGE

* REFER TO PLAN FOR ACTUAL LIGHT INFORMATION

Schedule

Symbol	Label	QTY	Manufacturer	Catalog Number	Description	Lamp	Number Lamps	Lumens per Lamp	Lumen Multiplier	LLF	Wattage	Efficiency	Distribution
	60WLEDT PROPOSED LUMINAIRE	4	Leotek Electronics USA LLC	GCM3-60J-MV-40K-4-XX-185	Gray cast aluminum housing, plastic access panel, LED board with optics installed.	123 White LEDs	1	18016	1	0.9	246	100%	IV
	60WLEDT PROPOSED LUMINAIRE	1	Leotek Electronics USA LLC		Gray cast aluminum housing, plastic access panel, LED board with optics installed.	60 White LEDs	1	9709	1	0.9	58.68	100%	IV
	150hps EXISTING COBRAHEAD	1	GE LIGHTING SOLUTIONS www.gelighting solutions.com	M2RC15S___GMC3	M-250R2 CUTOFF	1; 150W HPS, CLEAR ED23.5, HORZ	1	16000	1	0.65	183	70%	MC3
	400hps EXISTING COBRAHEAD	1	GE LIGHTING SOLUTIONS www.gelighting solutions.com	M_RL40S____RMS3_	M-400	1; 400W HPS, CLEAR ED18, HORZ	1	51000	1	1	468	73%	MS3
	EXISTING DCR PENDANT	1	King Luminaire	K800-P4SH-III-150(SSL)-8084		SWITCHBOX 222D1829, SETTING: POS 1 - 100K	1	14954	1	0.9	149	100%	

Statistics

Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min
Elliot Bridge Roadway	+	3.3 fc	8.0 fc	0.9 fc	8.9:1	3.7:1
North Sidewalk	+	1.7 fc	2.7 fc	0.6 fc	4.5:1	2.8:1
South Sidewalk	+	1.7 fc	2.6 fc	1.0 fc	2.6:1	1.7:1
Camb. Approach	+	3.1 fc	13.4 fc	0.7 fc	19.1:1	4.4:1

GENERAL NOTES:

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRIC CODE.
2. ALL CONDUIT UNDER GROUND SHALL BE 3" PVC UNLESS OTHERWISE NOTED. CONDUIT BETWEEN THE POLE AND THE ADJACENT HANDHOLE SHALL BE 1" PVC. ALL EXPOSED CONDUIT ON THE BRIDGE SHALL BE RTRC.
3. ALL WIRING SHALL BE WIRE TYPE 7 RHW.
4. ALL PROPOSED LIGHTING POLES SHALL HAVE MINIMUM 2 FEET CLEARANCE TO THE CURB FACE. UNLESS ON BARRIER.
5. CONDUIT SHOWN ON THESE PLANS IS DIAGRAMMATIC AND THE EXACT ROUTE AND MOUNTING SHALL BE DETERMINED BY THE CONTRACTOR.
6. POLE FOUNDATION SHALL BE PER MANUFACTURER'S REQUIREMENTS. MASSDOT STANDARD DRAWINGS AND/OR BARRIER DETAILS.
7. A GROUND ROD SHALL BE INSTALLED AT EACH POLE INSIDE THE ADJACENT HANDHOLE. EXCEPT LIGHT POLES ON THE BRIDGE WHICH SHALL BE BONDED.
8. THE LIGHT FIXTURES SHALL BE EQUIPPED WITH 7 PIN RECEPTACLES WITH SHORTING CAPS AND PHOTOCELLS.
9. SEE BRIDGE CONSTRUCTION PLAN FOR SIDEWALK AND TRENCH REPAIR AREAS.

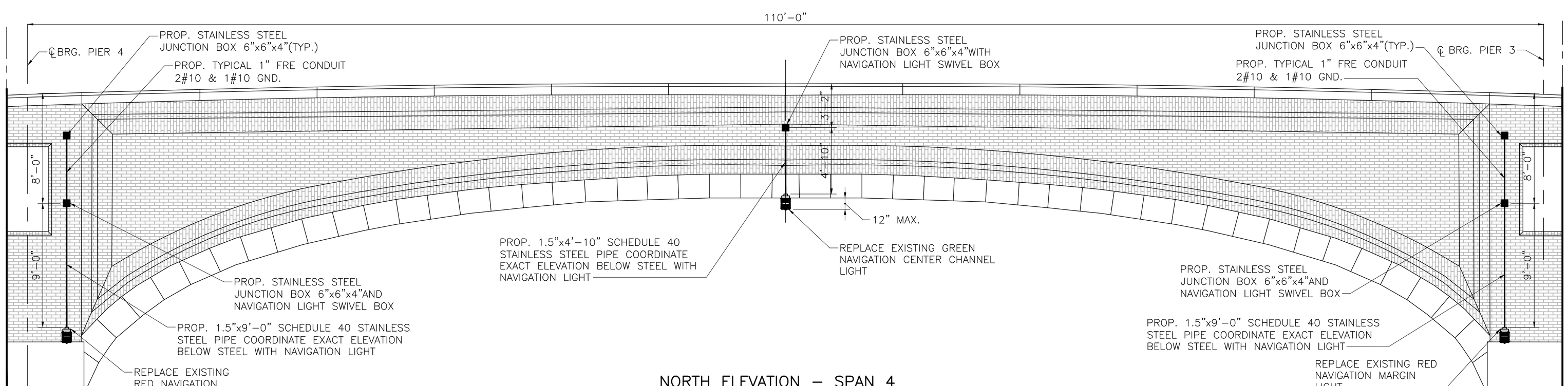
31-MAR-2023
100% RE-SUBMISSION

7-608762_BRIDGE LIGHTING PLAN.DWG Plotted on 22-Aug-2023 4:22 PM
Proposal No. 608762-124916
A00850 - 23

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

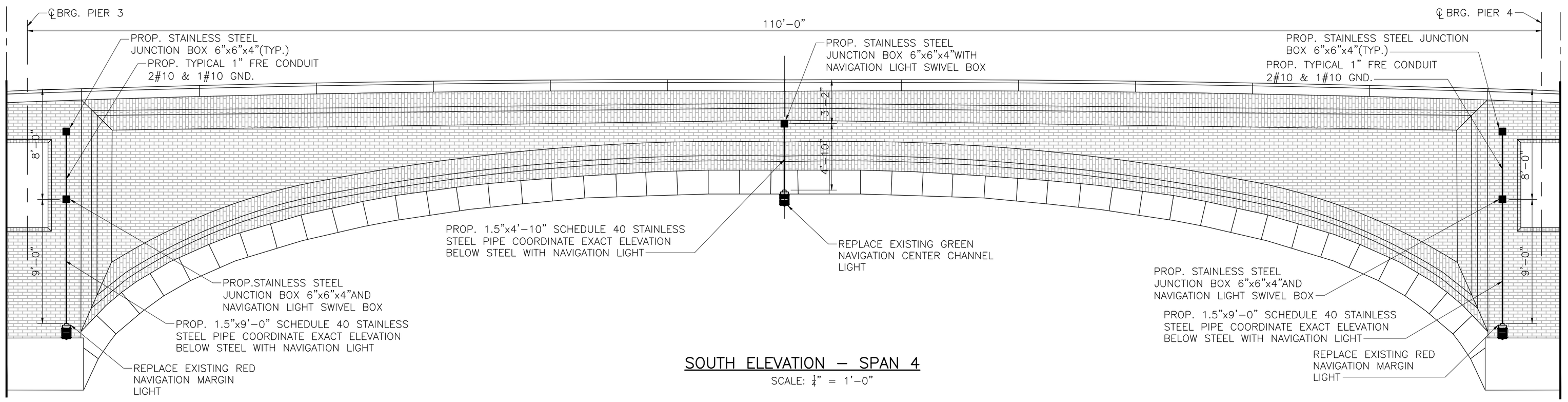
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	8	37
PROJECT FILE NO.	608762		

BRIDGE LIGHTING ELEVATION



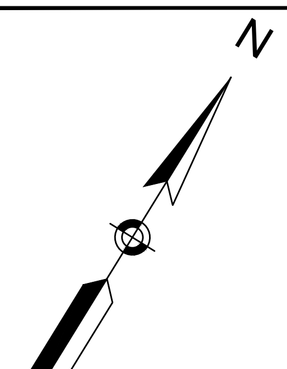
NORTH ELEVATION – SPAN 4

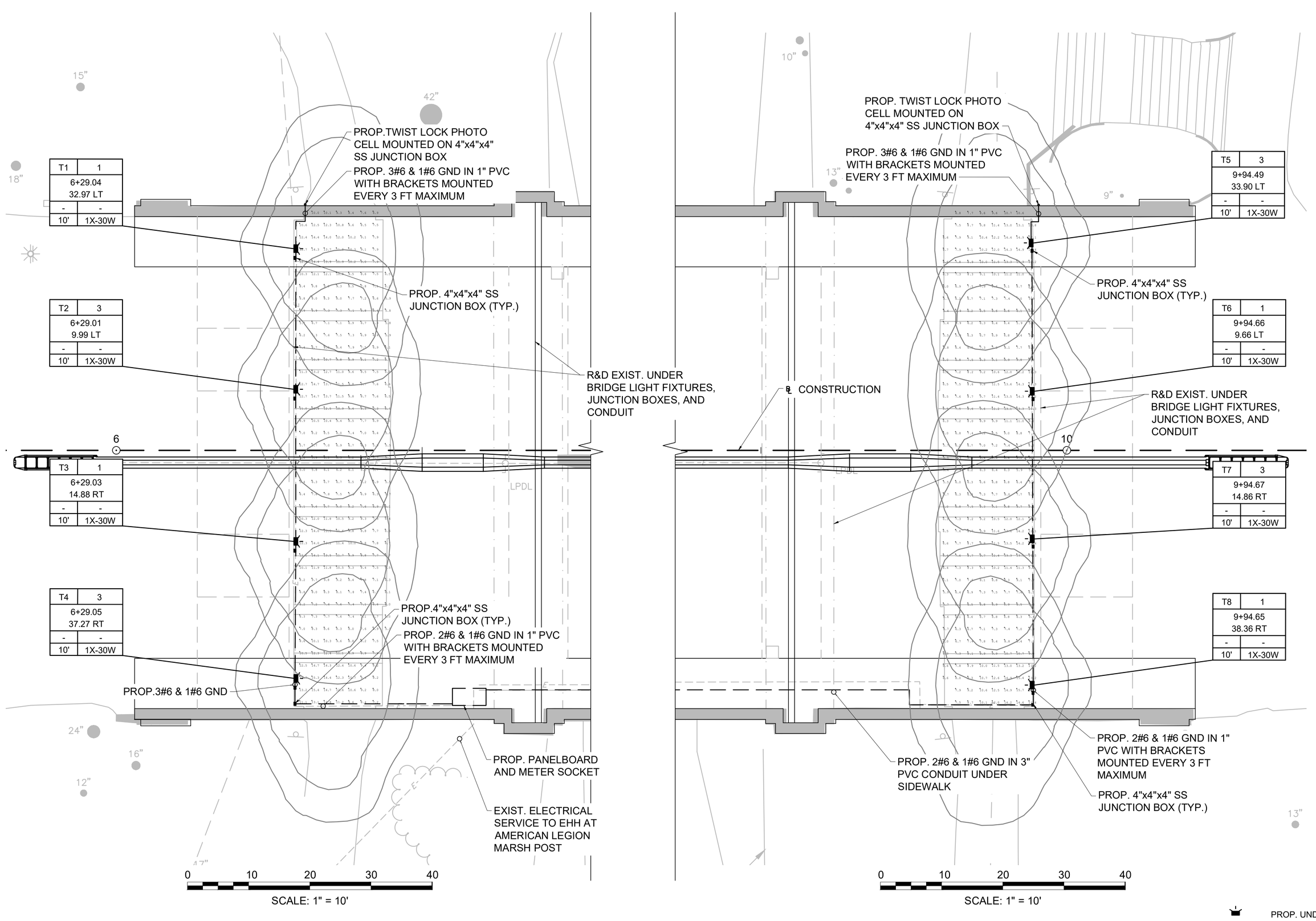
SCALE: ¼" = 1'-0"



SOUTH ELEVATION – SPAN 4

SCALE: ¼" = 1'-0"





Schedule

Symbol	Label	QTY	Manufacturer	Catalog Number	Description	Lamp	Number Lamps	Lumens per Lamp	Lumen Multiplier	LLF	Wattage	Efficiency	Distribution
	Wall	8	Lumecon	BLS-FTW-62-1-ADJ-D-G	FIXTURE PROVIDED WITH ADJUSTABLE SYSTEM WATTS AND COLOR TEMPERATURE. SETTINGS ARE FROM 40% TO 100%. CALCULATION BASED ON 60%, 37.17 WATTS/5187 LUMENS AT 5,000K WITH GLASS DIFFUSER.	LED	1	5186	1	0.99	39.17	100%	

Statistics

Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min
Bos Ped Tunnel 0 Ft	+	8.9 fc	15.5 fc	5.4 fc	2.87	1.65
Camb Ped Tunnel 0 FT	+	8.63 fc	14.9 fc	5.4 fc	2.76	1.60

LEGEND

- PROP. UNDERPASS FIXTURE
- PROP. 6"X6"X4" JUNCTION BOX
- PROP. 1" CONDUIT

FIXTURE #	T1	3	CIRCUIT NUMBER
STATION	7+52		
OFFSET	24.0' RT		
ARM LENGTH	-	-	DISTRIBUTION TYPE
MOUNTING HEIGHT	10'	1X-30W	NUMBER OF FIXTURES/WATTAGE

* REFER TO PLAN FOR ACTUAL LIGHT INFORMATION

GENERAL NOTES:

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRIC CODE.
2. ALL CONDUIT UNDER SIDEWALK SHALL BE 3" PVC UNLESS OTHERWISE NOTED. CONDUIT BETWEEN THE POLE AND THE ADJACENT HANDHOLE SHALL BE 1" PVC.
3. ALL WIRING SHALL BE WIRE TYPE 7 XHHW2 WITH XLP JACKET.
4. CONDUIT SHOWN ON THESE PLANS IS DIAGRAMMATIC AND THE EXACT ROUTE AND MOUNTING SHALL BE DETERMINED BY THE CONTRACTOR.
5. LIGHT POLE FIXTURES SHALL BE INSTALLED PER MANUFACTURER'S REQUIREMENTS. MASSDOT STANDARD DRAWINGS AND/OR BARRIER DETAILS.
6. SEE BRIDGE CONSTRUCTION PLAN FOR SIDEWALK AND TRENCH REPAIR AREAS.
7. PHOTOCELL SHALL BE POINTED TOWARD THE NORTHERN SKY.
8. R&D EXISTING UNDER BRIDGE LIGHTING IN THE PEDESTRIAN TUNNEL INCLUDING ALL CONDUIT AND JUNCTION BOXES.

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

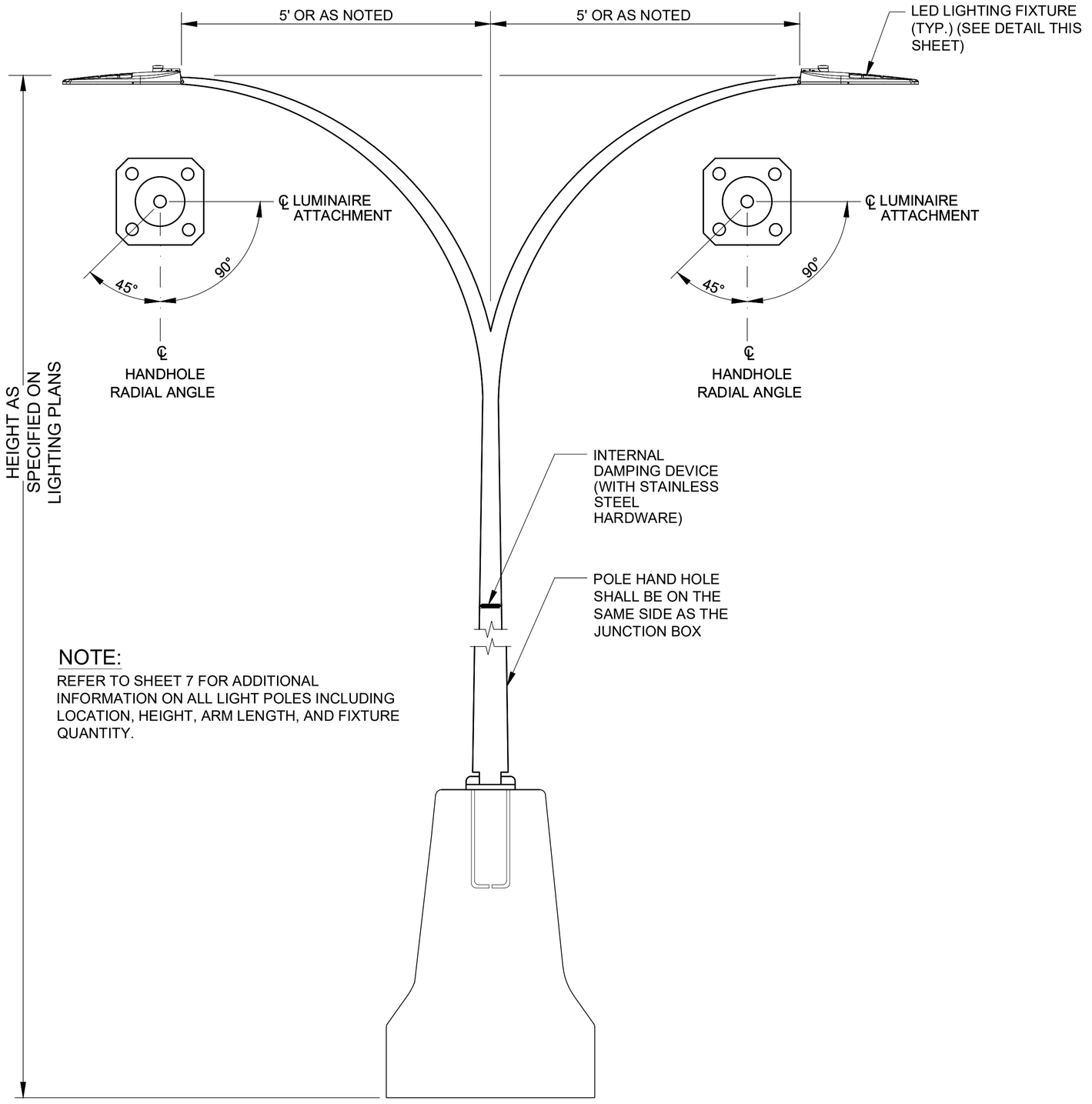
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	9	37
PROJECT FILE NO.	608762		

PEDESTRIAN TUNNEL LIGHTING PLAN

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	10	37
PROJECT FILE NO.	608762		

LIGHTING DETAILS
SHEET 1 OF 2

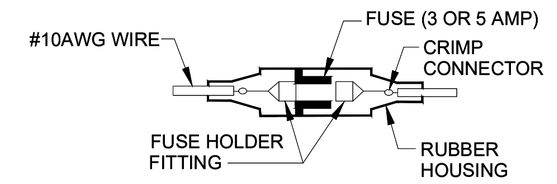
10-11-608762_LIGHTING DETAILS.DWG Plotted on 17-May-2023 12:44 PM



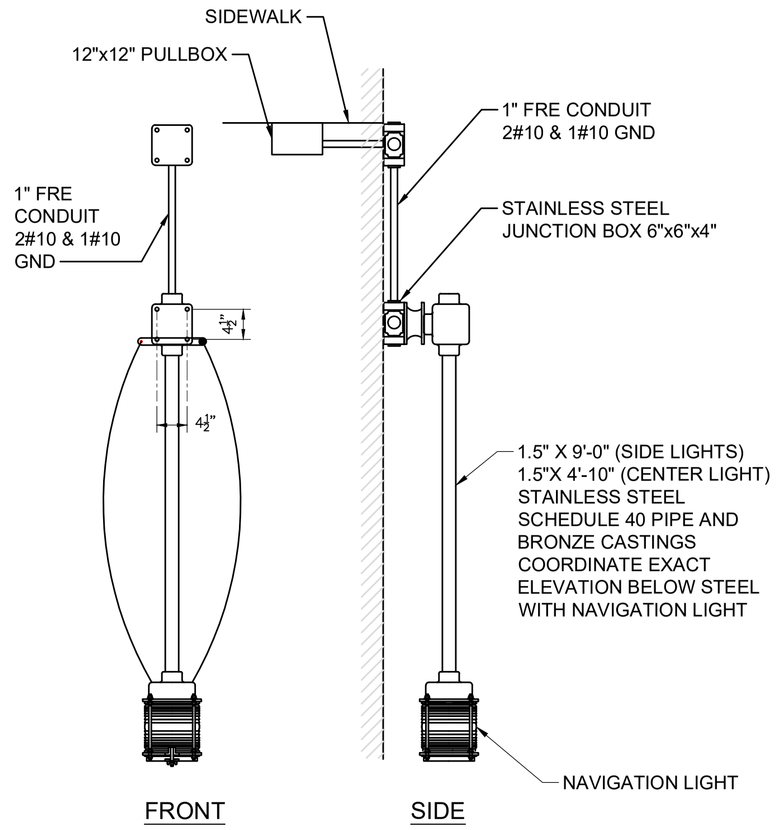
NOTE:
REFER TO SHEET 7 FOR ADDITIONAL INFORMATION ON ALL LIGHT POLES INCLUDING LOCATION, HEIGHT, ARM LENGTH, AND FIXTURE QUANTITY.

ROADWAY LIGHTING - DOUBLE ARM POLE ASSEMBLY (STEEL)
N.T.S.

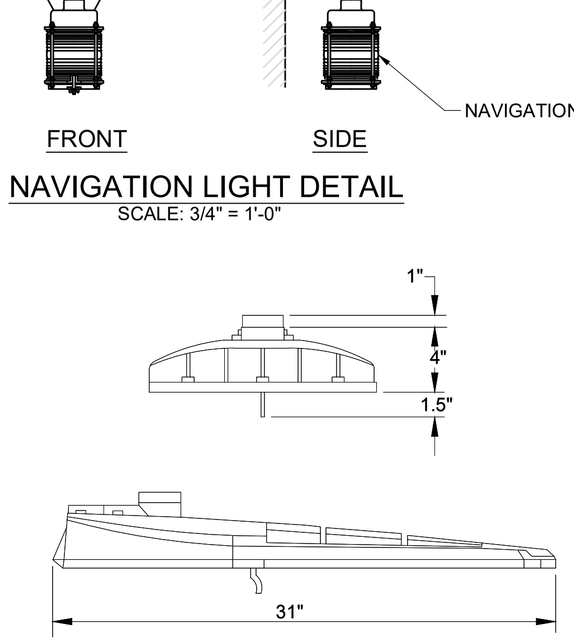
NOTES:
1. REFER TO SHEET 10 FOR MEDIAN BARRIER MOUNTED LIGHT POLE FOUNDATION DETAILS.



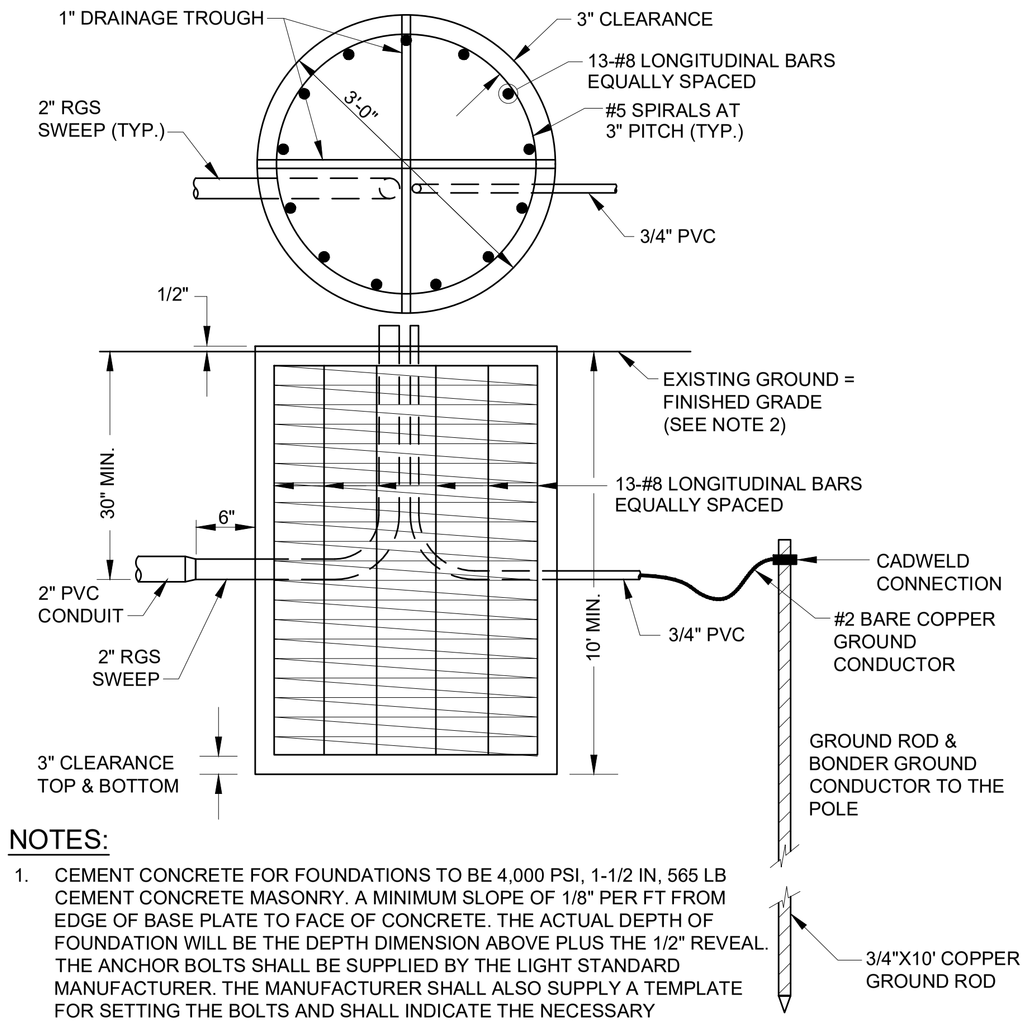
FUSE DETAIL FOR LUMINAIRE
N.T.S.



NAVIGATION LIGHT DETAIL
SCALE: 3/4" = 1'-0"

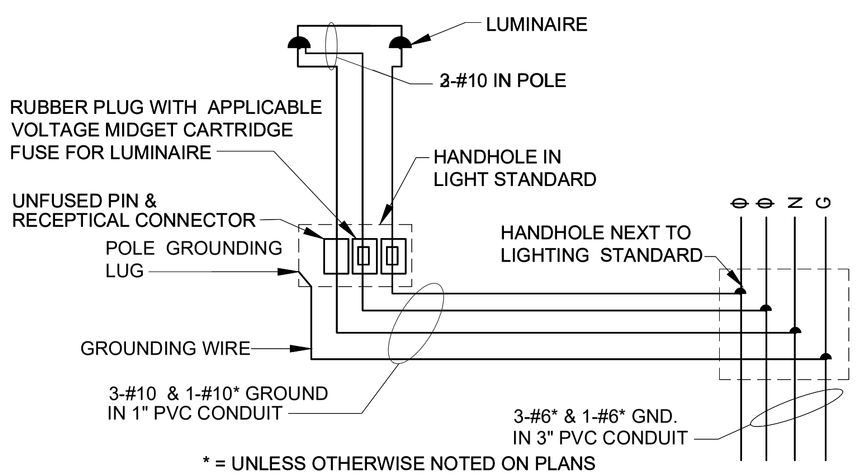


LED LIGHTING FIXTURE
N.T.S.

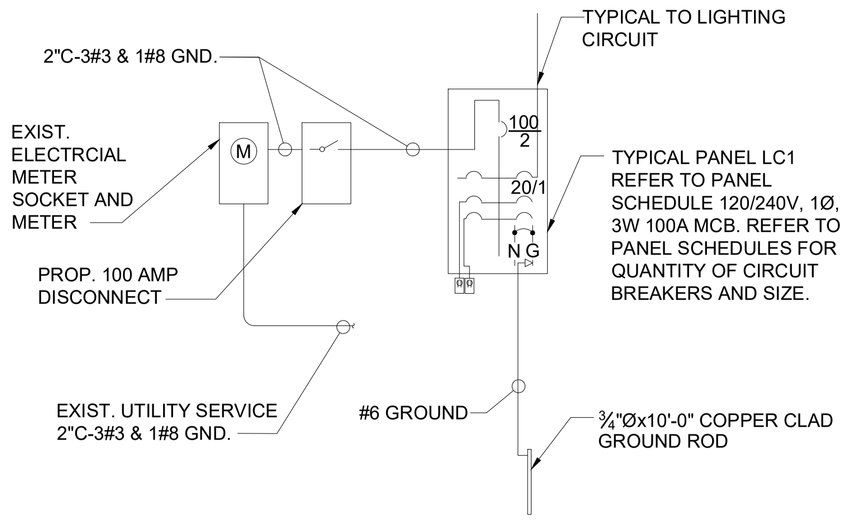


NOTES:
1. CEMENT CONCRETE FOR FOUNDATIONS TO BE 4,000 PSI, 1-1/2 IN, 565 LB CEMENT CONCRETE MASONRY. A MINIMUM SLOPE OF 1/8" PER FT FROM EDGE OF BASE PLATE TO FACE OF CONCRETE. THE ACTUAL DEPTH OF FOUNDATION WILL BE THE DEPTH DIMENSION ABOVE PLUS THE 1/2" REVEAL. THE ANCHOR BOLTS SHALL BE SUPPLIED BY THE LIGHT STANDARD MANUFACTURER. THE MANUFACTURER SHALL ALSO SUPPLY A TEMPLATE FOR SETTING THE BOLTS AND SHALL INDICATE THE NECESSARY PROJECTION.
2. LEVEL GRADES SHOWN. FOR AREAS WITH SLOPED EXISTING GRADE MAINTAIN A $\frac{1}{2}$ INCH REVEAL ON THE HIGH SIDE OF SLOPE AT FOUNDATION. MEASURE MINIMUM 10-FOOT EMBEDMENT FROM THE LOW SIDE OF SLOPE AT FOUNDATION AND INCREASE LENGTH ACCORDINGLY.
3. ALL REINFORCING STEEL SHALL BE ASTM A615 GRADE 60, EPOXY COATED.

LIGHT STANDARD FOUNDATION
N.T.S.



WIRING DIAGRAM FOR LUMINAIRE
N.T.S.



LOAD CENTER WIRING DETAIL
NOT TO SCALE

PANEL "LC1" (LIGHTING PANEL)

AIC 18,000 MIN.

SPACES	MOUNTING SURFACE	LOCATION LGT. CABINET	MAIN BREAKER 100A - 2P	VOLTAGE 120/240V.	MAIN BUS RAT. 225AMP	FEED BOTTOM
20						

CKT. NO.	DESCRIPTION	LOADS A Ø	LOADS B Ø	BKR SIZE	POLE	A B	BKR SIZE	POLE	LOADS A Ø	LOADS B Ø	DESCRIPTION	CKT. NO.
1	PED TUNNEL LIGHTS CAMB. SIDE	*254		20	1		20	1	10		NAVIGATION LIGHTS NORTH SIDE	2
3	PED TUNNEL LIGHTS BOSTON SIDE		*254	20	1		20	1		10	NAVIGATION LIGHTS SOUTH SIDE	4
5	PANEL GFCI 1	2000		20	1		20	1	1000		**INSIDE LIGHTS CAMBRIDGE SIDE	6
7	PANEL GFCI 2		2000	20	1		20	1		1000	**INSIDE LIGHTS BOSTON SIDE	8
9	MEDIAN LIGHTS	492		20	1		20	1	-		SPARE	10
11	MEDIAN LIGHTS		492	20	1		20	1		-	SPARE	12
13							20	1	-		SPARE	14
15							20	1		-	SPARE	16
17												18
19												20
	TOTAL	2612	2612				TOTAL		1010	1010		
									3622	3622		

(3622+3622=7244VA x 1.25 = 9055 VA)

** EXISTING LIGHT LOCATED WITH IN EXISTING STORAGE ROOM UNDER BRIDGE
* LOAD ARE BASED ON FIXTURE SETTING OF 100%

Proposal No. 608762-124916

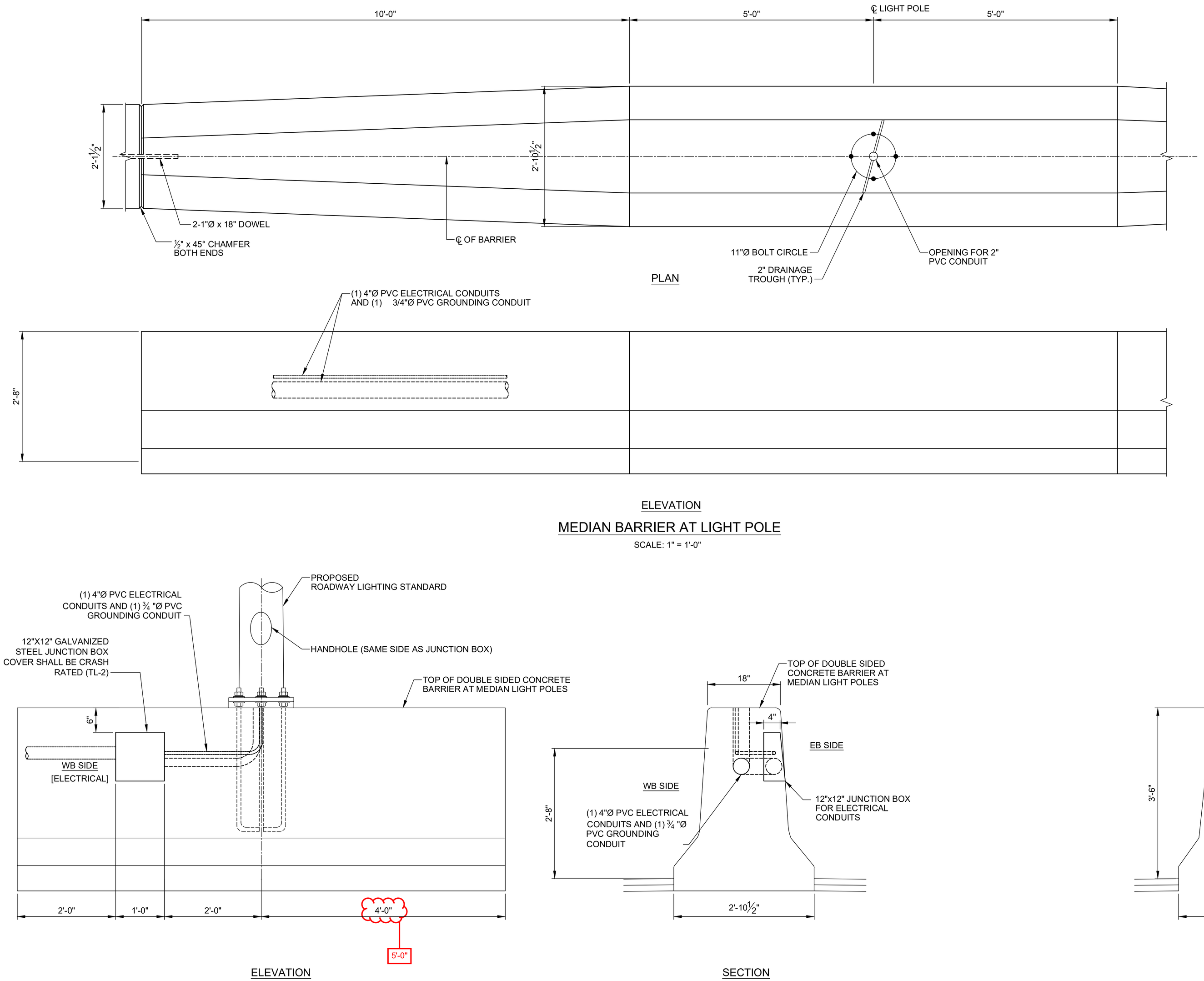
02-SEP-2022

100% SUBMISSION

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	11	37
PROJECT FILE NO.	608762		

LIGHTING DETAILS
SHEET 2 OF 2

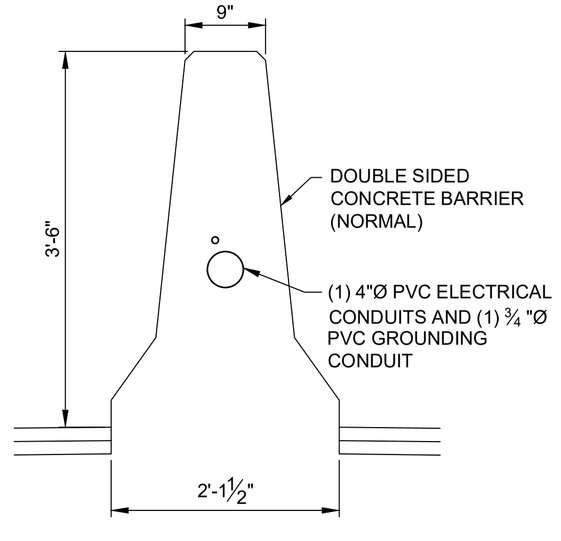


MEDIAN BARRIER AT LIGHT POLE

SCALE: 1" = 1'-0"

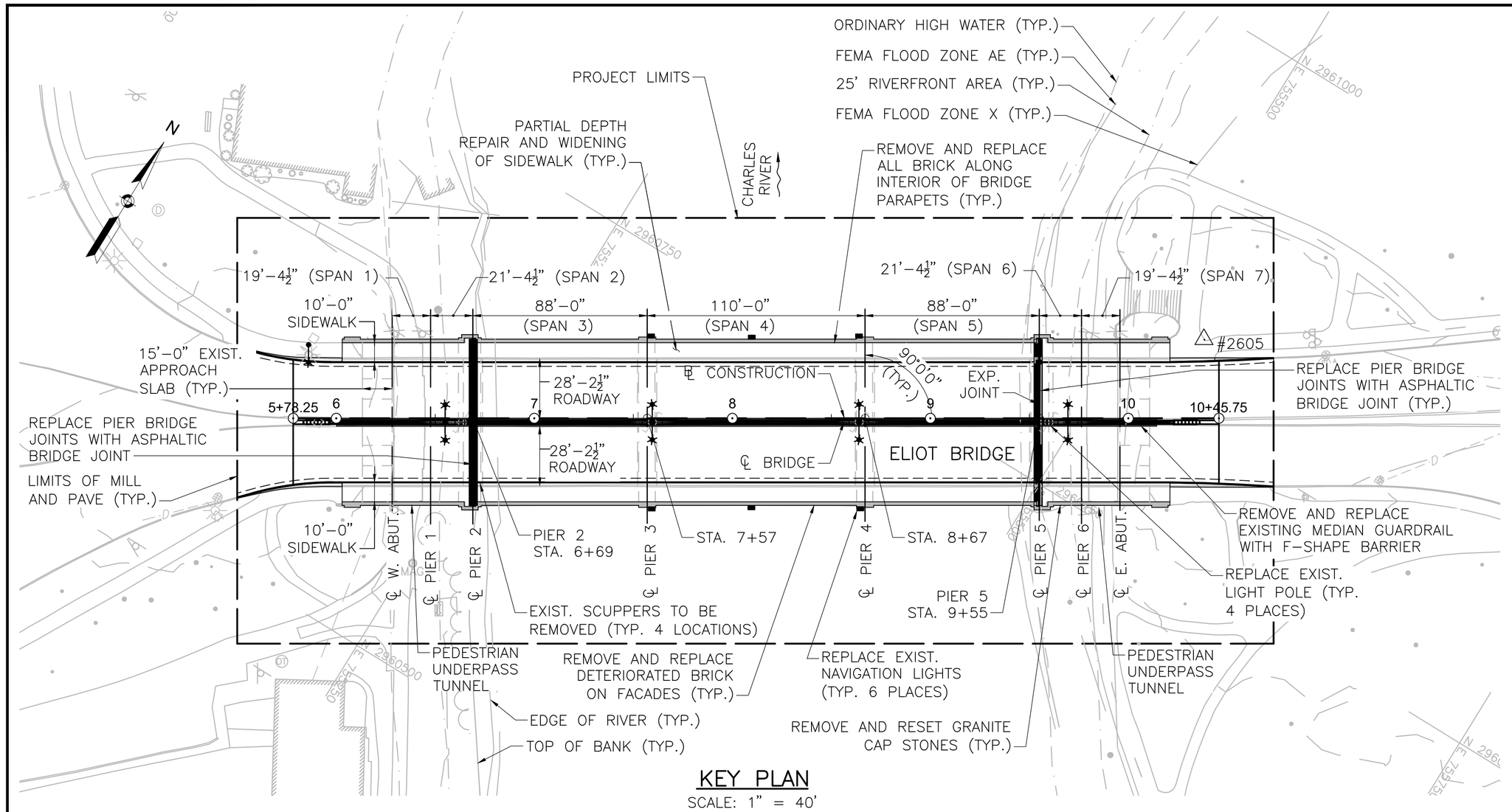
MEDIAN BARRIER JUNCTION BOX AND CONDUIT FEED DETAILS AT LIGHT POLE

SCALE: 1" = 1'-0"

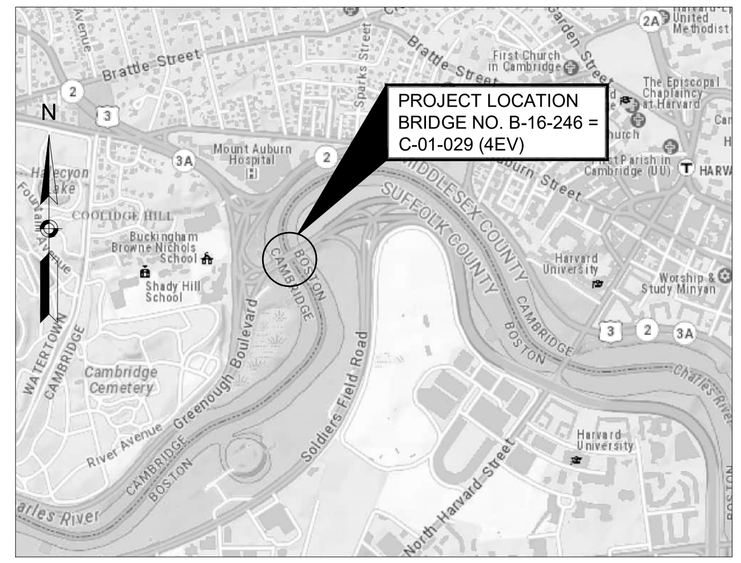


MEDIAN BARRIER DETAIL

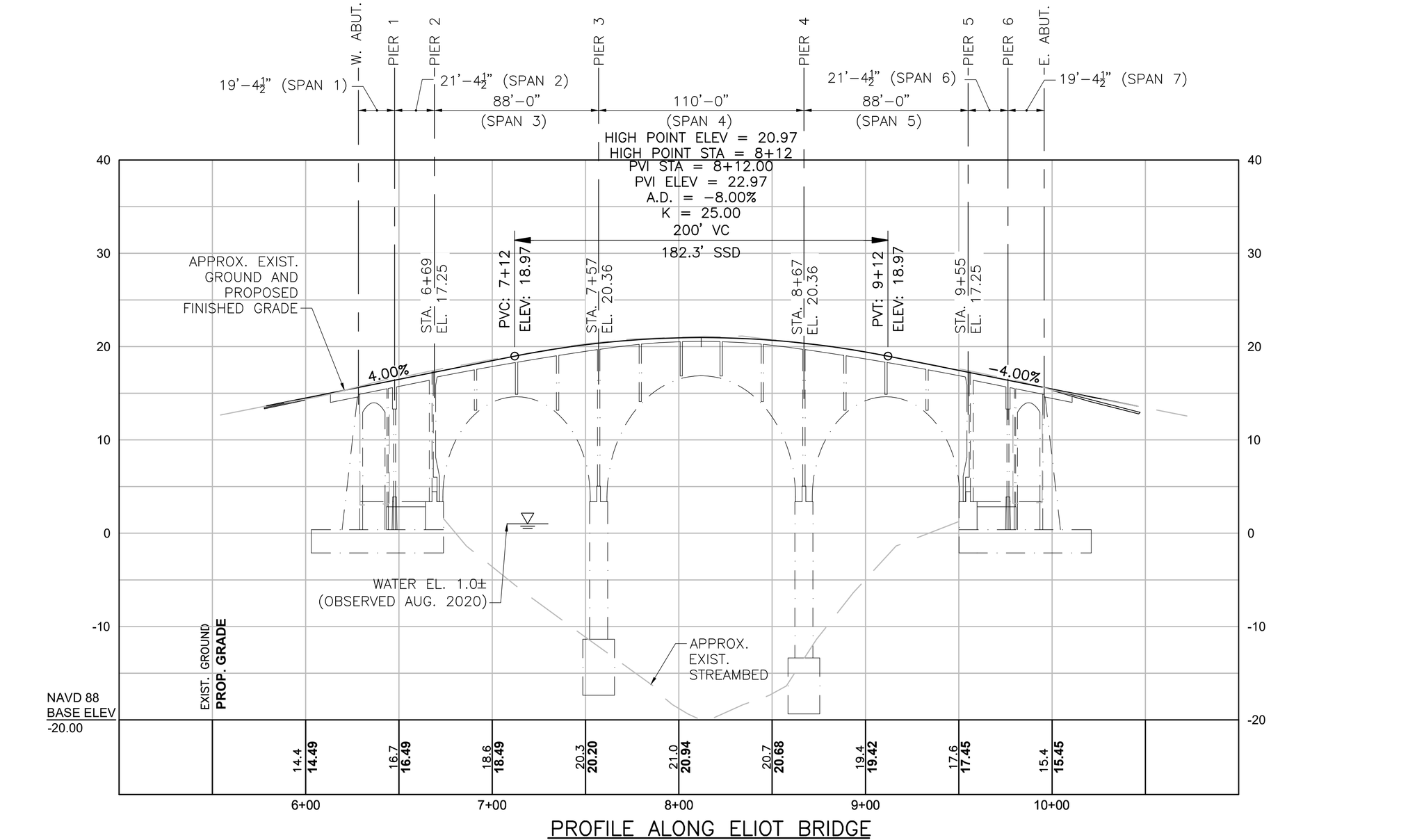
SCALE: 1" = 1'-0"



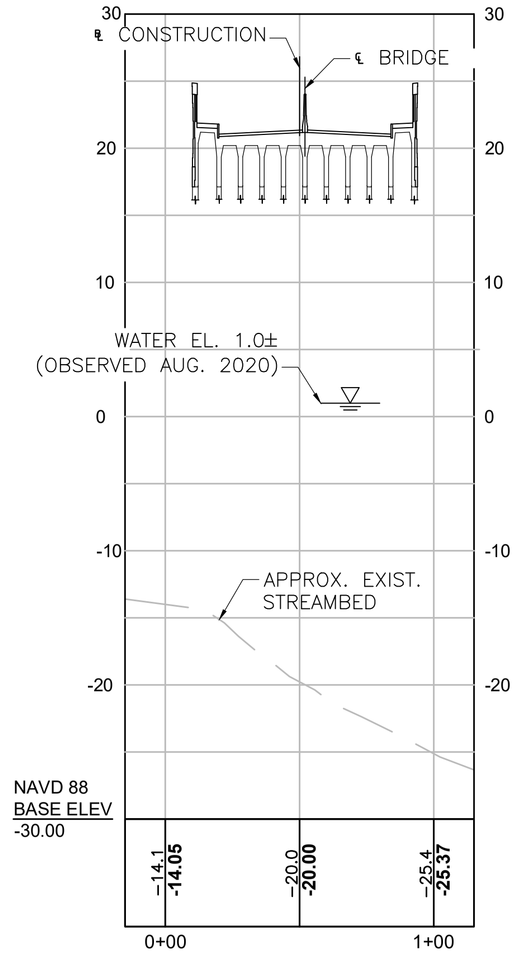
KEY PLAN
SCALE: 1" = 40'



LOCUS
SCALE: 1" = 1000'



PROFILE ALONG ELIOT BRIDGE
HORIZ. SCALE: 1" = 40'
VERT. SCALE: 1" = 8'



PROFILE ALONG CHARLES RIVER
HORIZ. SCALE: 1" = 40'
VERT. SCALE: 1" = 8'

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	12	37
PROJECT FILE NO.		608762	

PLAN AND PROFILE (BRIDGE)

PROJECT INFORMATION

PROJECT FILE NO.:	608762
PROJECT DESCRIPTION:	PROPOSED BRIDGE REPAIR
BRIDGE DESIGN LOADING:	H-15
SURVEY:	FIELD BOOK NO. 41472
ELEVATION REFERENCE:	NAVD OF 1988
BENCH MARK:	#2605 N: 2960855.885, E: 755533.380, EL.=13.405' (MASSDOT GPS MAG FND)

TRAFFIC DATA

	ROADWAY OVER	ROADWAY UNDER
DESIGN YEAR	2024	
AVERAGE DAILY TRAFFIC – PRESENT	45729	
AVERAGE DAILY TRAFFIC – DESIGN YEAR	45729	
DESIGN HOURLY VOLUME	4394	
DIRECTIONAL DISTRIBUTION	51%	
TRUCK PERCENTAGE – AVERAGE DAY	9%	
TRUCK PERCENTAGE – PEAK HOUR	9%	
DESIGN SPEED	35	
DIRECTIONAL DESIGN HOURLY VOLUME	2582	

SEISMIC DESIGN CRITERIA

DESIGN RETURN PERIOD:	1000 YEARS
DESIGN SPECTRA	
As	0.096
SDs	0.217
SD1	0.069
SITE CLASS	D
SEISMIC DESIGN CATEGORY (SDC)	A

DESIGN:

ALL REPAIRS INTENDED TO RESTORE FUNCTION AND CAPACITY OF ORIGINAL CONSTRUCTION. BRIDGE WAS DESIGNED TO AASHTO H-15 LOADING.

NOTES:

1. DUE TO THE LIMITED NATURE OF THE PROPOSED WORK, NO GEOTECHNICAL OR HYDRAULIC REPORTS HAVE BEEN PREPARED FOR THIS PROJECT.
2. NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988 IS USED THROUGHOUT.
3. PLAN AND PROFILE ARE BASED ON SURVEY DATED AUGUST 2020 AND SUPPLEMENTED WITH PROFILE INFORMATION FROM EXISTING DESIGN DRAWINGS.

Jacobs.
120 ST. JAMES AVENUE, 5TH FLOOR
BOSTON, MA 02116

massDOT Massachusetts Department of Transportation Highway Division

PROPOSED BRIDGE REPAIRS
BOSTON & CAMBRIDGE
ELIOT BRIDGE
OVER CHARLES RIVER

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION

APPROVED BY	DATE
STRUCTURAL ELEMENTS:	
TITLE:	
HIGHWAY ELEMENTS:	
TITLE:	

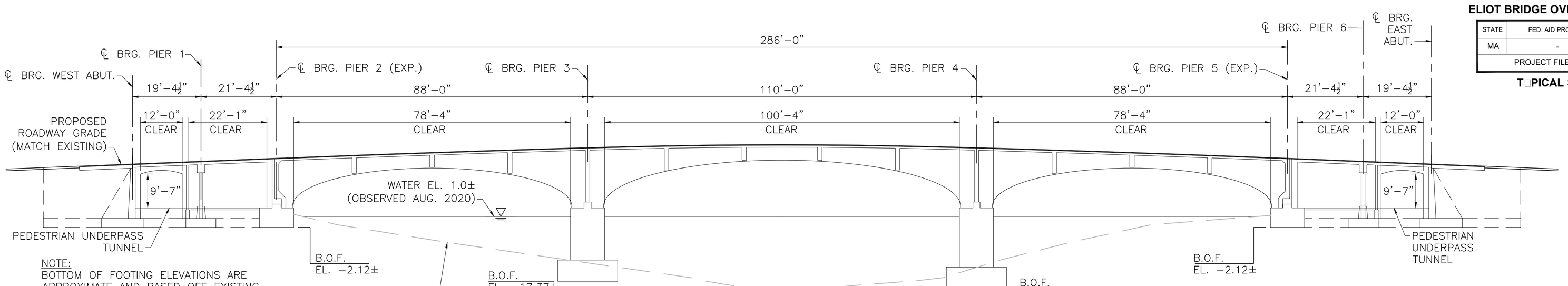
BRIDGE NO. B-16-246 = BRIDGE NO. C-01-029 (4EV)

100% RE-SUBMISSION 31-MAR-2023

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

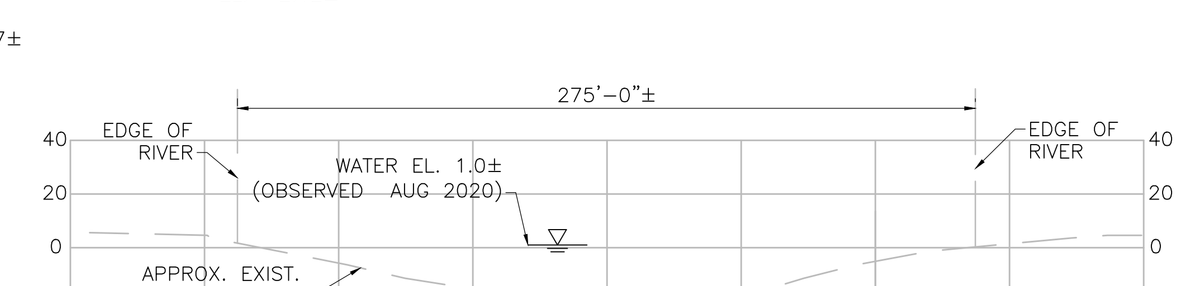
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	13	37
PROJECT FILE NO.	608762		

TYPICAL SECTIONS

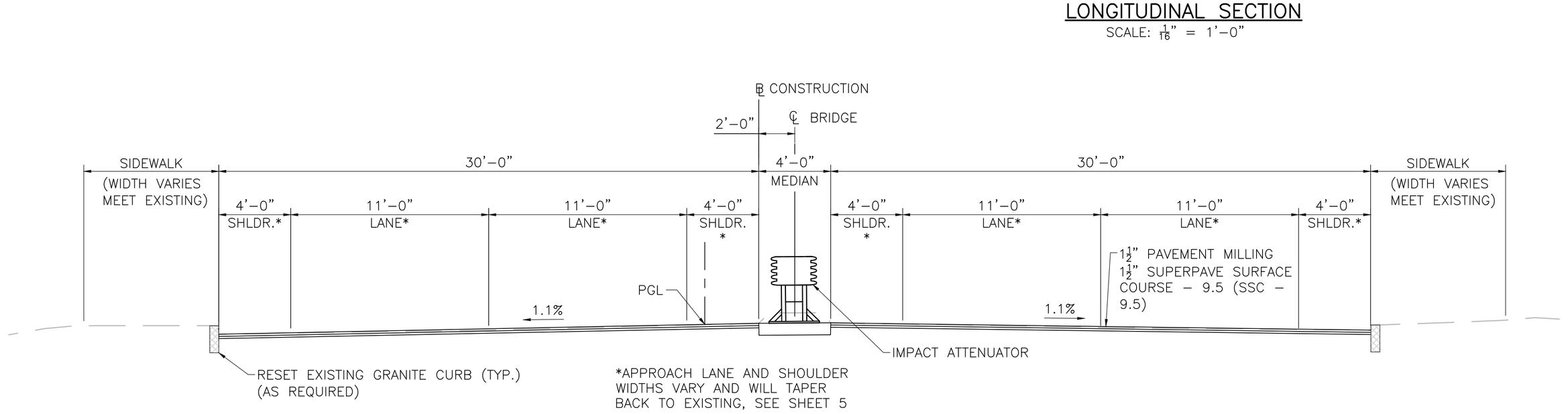


NOTE:
BOTTOM OF FOOTING ELEVATIONS ARE APPROXIMATE AND BASED OFF EXISTING PLANS DUE TO LIMITED SCOPE OF SURVEY. NO WORK BELOW WATER LINE IS ANTICIPATED WITH THIS REPAIR PROJECT.

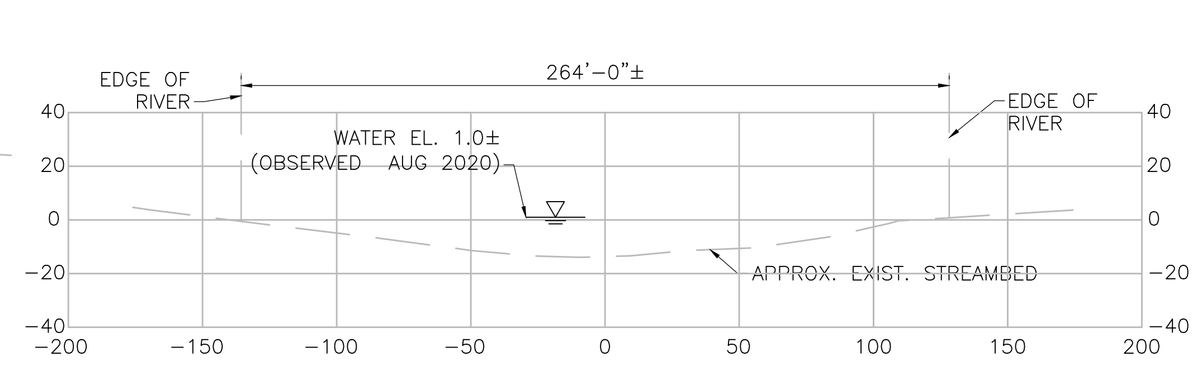
LONGITUDINAL SECTION
SCALE: $\frac{1}{16}$" = 1'–0"



DOWNSTREAM CHANNEL CROSS SECTION (50' LT)
SCALE: 1" = 40'

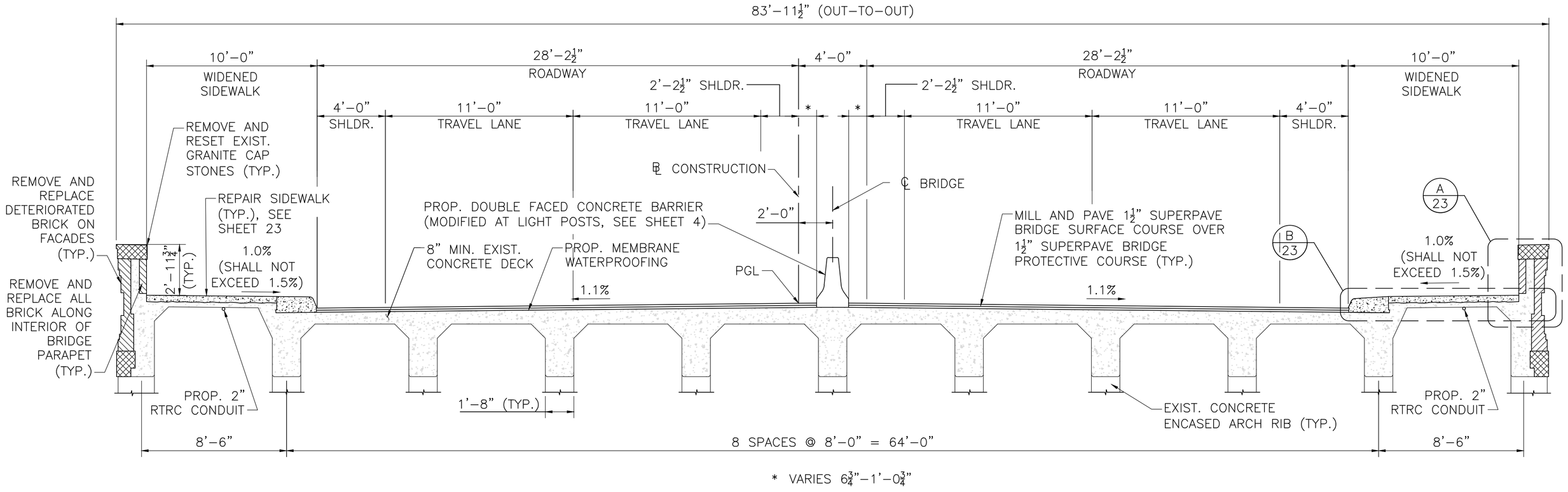


APPROACH SECTION
SCALE: $\frac{1}{4}$" = 1'–0"



UPSTREAM CHANNEL CROSS SECTION (50' RT)
SCALE: 1" = 40'

NOTE:
HYDRAULIC INFORMATION LIMITED. THERE IS NO WORK PROPOSED BELOW THE WATER LINE. ALL INFORMATION SHOWN IS TAKEN FROM EXISTING DRAWINGS OR OBSERVED WATER DURING SURVEY.



* VARIES 6¾"–1'–0¾"

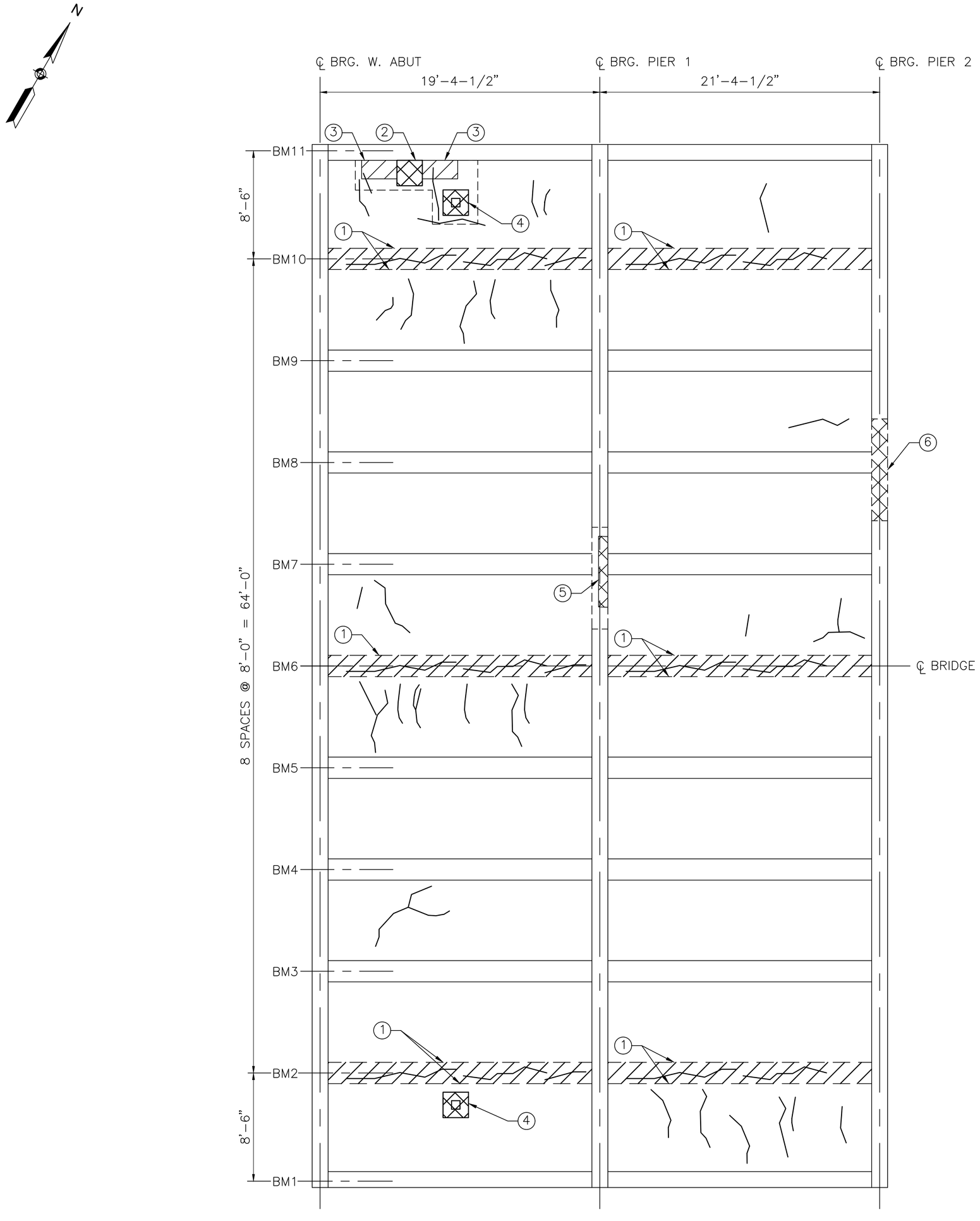
TRANSVERSE SECTION (BRIDGE SPANS 3, 4 AND 5)
SCALE: $\frac{1}{4}$" = 1'–0"

BRIDGE NO. B–16–246 = BRIDGE NO. C–01–029 (4EV)

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	14	37
PROJECT FILE NO.	608762		

UNDERSIDE REPAIR AREAS (SHEET 1 OF 5)



SPANS 1 AND 2
SCALE: 3/16" = 1'-0"

REPAIR AREA #	LOCATION	LENGTH	WIDTH	DEPTH	DEFICIENCY	REPAIR TYPE
1	BEAM	FULL LENGTH	FULL WIDTH	N/A	DELAMINATION	SHALLOW
2	DECK	1'-3"	0'-8"	0'-1"	SPALL WITH EXPOSED REBAR	FULL DEPTH
3	DECK	2'-0"	2'-0"	N/A	DELAMINATION	FULL DEPTH
4	DECK	1'-6"	0'-9"	0'-1 1/2"	SPALL WITH EXPOSED REBAR/DELAMINATION	FULL DEPTH
5	DIAPHRAGM	2'-6"	0'-2"	0'-2"	SPALL	DEEP
6	DIAPHRAGM	1'-6"	0'-6"	0'-3"	SPALL	DEEP

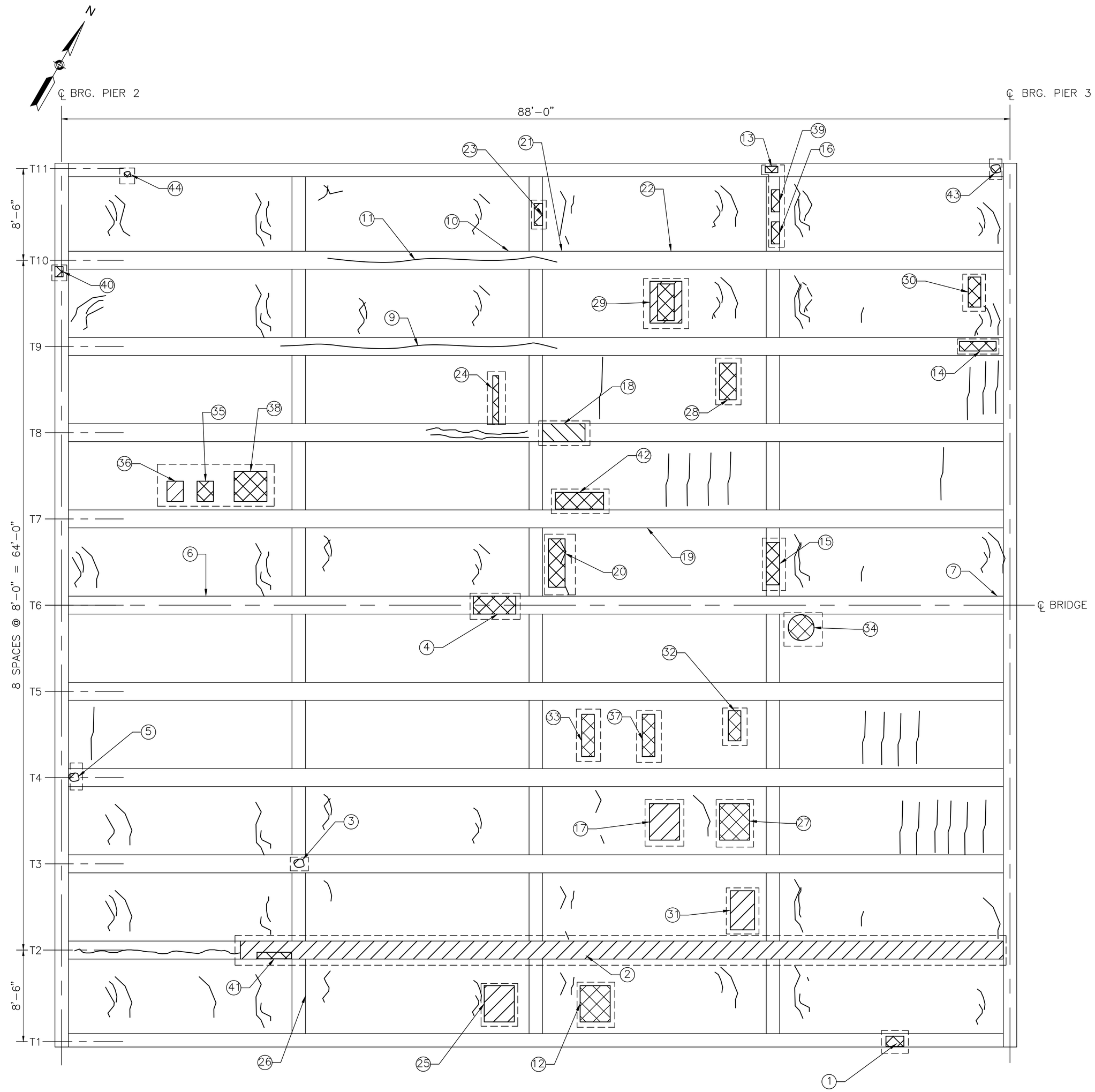
UNDERSIDE REPAIR NOTES:

1. REPAIR AREAS ARE APPROXIMATE AND BASED ON ROUTINE BRIDGE INSPECTION CONDUCTED IN AUGUST 2021.
2. ALL REPAIR AREAS SHALL BE CONFIRMED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
3. ALL AREAS SHALL BE SOUNDED FOR LOOSE CONCRETE AND MARKED PRIOR TO REPAIR.
4. SEE SHEETS 23 TO 26 FOR REPAIR DETAILS.

LEGEND:

~~~ = HAIRLINE CRACK WITH EFFLORESCENCE
XXX = SPALL
/// = HOLLOW SOUNDING AREA
BM = BEAM
[ ] = PROPOSED REPAIR AREA

BRIDGE NO. B-16-246 = BRIDGE NO. C-01-029 (4EV)
~~~



SPAN 3

SCALE: 3⁄16" = 1'–0"

REPAIR AREA #	LOCATION	LENGTH	WIDTH	DEPTH	DEFICIENCY	REPAIR TYPE
1	TRUSS	1'-6"	0'-1 1/2"	0'-2 1/2"	HOLLOW AREA/SPALL	FLANGE
2	TRUSS	45'-0"	FULL WIDTH	N/A	HOLLOW AREA	SHALLOW
3	TRUSS	1'-4"	0'-9"	0'-1 1/2"	SPALL W/EXPOSED REBAR	FLANGE
4	TRUSS	6'-0"	1'-6"	0'-3 1/2"	SPALL	FLANGE
5	TRUSS	0'-8"	N/A	N/A	POPOUT	DEEP
6	TRUSS	0'-8"	0'-3"	0'-4"	SPALL	DEEP
7	TRUSS	0'-8"	0'-8"	N/A	HOLLOW AREA	SHALLOW
8	TRUSS	8'-6"	FULL WIDTH	0'-3"	HOLLOW AREA	SHALLOW
9	TRUSS	13'-0"	0'-1"	N/A	SPALL	SHALLOW
10	TRUSS	1'-0"	N/A	N/A	POPOUT	DEEP
11	TRUSS	2'-8"	0'-2"	0'-4 1/2"	SPALL	DEEP
12	DECK	1'-5"	0'-10"	0'-0 1/2"	SPALL	FULL DEPTH
13	TRUSS	1'-5"	0'-8"	0'-1 1/2"	SPALL	FLANGE
14	TRUSS	2'-0"	0'-10"	0'-0 1/2"	SPALL	FLANGE
15	DIAPHR.	0'-9"	2'-6"	0'-2"	SPALL	FLANGE
16	DIAPHR.	0'-10"	0'-6"	0'-1"	SPALL	SHALLOW
17	DECK	3'-0"	1'-2"	N/A	HOLLOW AREA	SHALLOW
18	TRUSS	4'-0"	0'-4"	N/A	DELAMINATION	SHALLOW
19	TRUSS	0'-5"	0'-3"	0'-0 1/2"	POPOUT	DEEP
20	DECK	0'-7"	0'-7"	0'-2"	3 SPALLS	FULL DEPTH
21	TRUSS	0'-6 1/2"	0'-1 1/2"	N/A	POPOUT	DEEP
22	TRUSS	1'-8"	0'-2 1/2"	N/A	POPOUT	DEEP
23	DIAPHR.	0'-6"	0'-4"	0'-0 1/2"	SPALL	SHALLOW
24	DECK	0'-6"	1'-6"	0'-1"	SPALL	SHALLOW
25	DECK	2'-8"	0'-5"	0'-0 1/2"	POPOUT	FULL DEPTH
26	DIAPHR.	0'-7"	1'-5"	0'-0 1/2"	SPALL	SHALLOW
27	DECK	3'-6"	1'-1"	0'-1"	SPALL/HOLLOW AREA	SHALLOW
28	DECK	1'-5"	0'-4"	0'-1"	SPALL	SHALLOW
29	DECK	2'-10"	3'-4"	0'-2"	SPALL	FULL DEPTH
30	DECK	1'-4"	2'-6"	0'-2"	SPALL	FULL DEPTH
31	DECK	0'-6"	1'-8"	N/A	HOLLOW AREA	SHALLOW
32	DECK	1'-0"	2'-4"	0'-2"	SPALL	FULL DEPTH
33	DECK	3'-11"	1'-6"	0'-1 1/2"	SPALL	FULL DEPTH
34	DECK	0'-6"	0'-6"	0'-2"	SPALL	FULL DEPTH
35	DECK	2'-4"	0'-6"	0'-1"	SPALL	SHALLOW
36	DECK	1'-0"	0'-3"	N/A	HOLLOW AREA	SHALLOW
37	DECK	1'-5"	0'-7"	0'-1"	SPALL	SHALLOW
38	DECK	3'-4"	0'-8"	0'-1"	SPALL	SHALLOW
39	DECK	2'-0"	1'-6"	0'-1"	SPALL	SHALLOW
40	DIAPHR.	1'-0"	1'-6"	1'-2"	SPALL W/EXPOSED REBAR	DEEP
41	DIAPHR.	6'-3"	1'-6"	0'-8"	SPALL	DEEP
42	DECK	N/A	N/A	N/A	POPOUTS	DEEP
43	TRUSS	N/A	N/A	N/A	POPOUTS	DEEP
44	TRUSS	0'-4"	N/A	1'-2"	POPOUT	DEEP

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	15	37
PROJECT FILE NO.	608762		

UNDERSIDE REPAIR AREAS (SHEET 2 OF 5)

UNDERSIDE REPAIR NOTES:

1. FOR UNDERSIDE REPAIR NOTES SEE SHEET 14.

LEGEND:

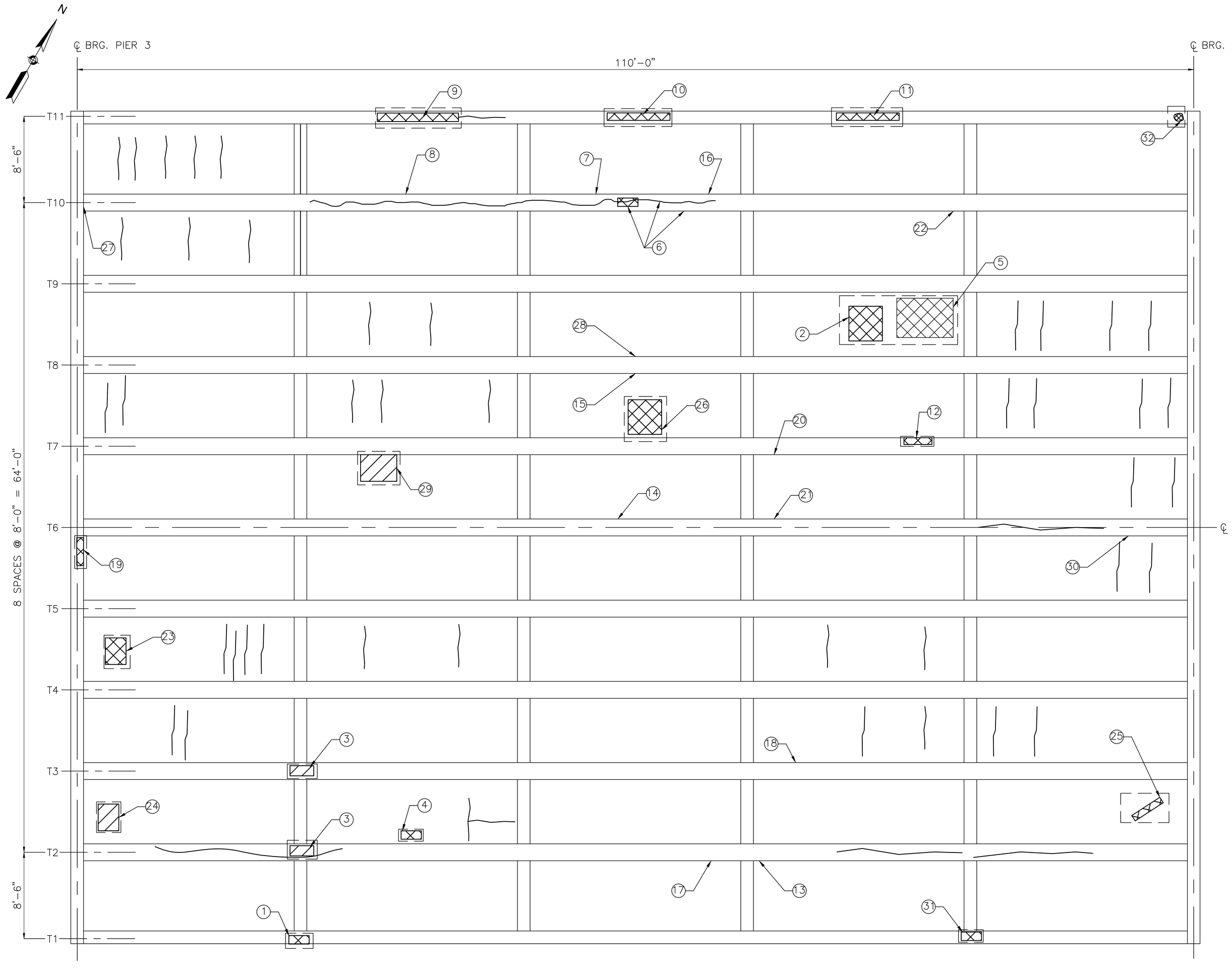
- ~~~ = HAIRLINE CRACK WITH EFFLORESCENCE
- XXXX = SPALL
- //// = HOLLOW SOUNDING AREA
- T = TRUSS
- [ ] = PROPOSED REPAIR AREA

BRIDGE NO. B-16-246 = BRIDGE NO. C-01-029 (4EV)

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	16	37
PROJECT FILE NO.	608762		

UNDERSIDE REPAIR AREAS (SHEET 3 OF 5)



SPAN 4

SCALE: 3/16" = 1'–0"

LEGEND:

- ~~~ = HAIRLINE CRACK WITH EFFLORESCENCE
- ▨ = SPALL
- ▨ = HOLLOW SOUNDING AREA
- T = TRUSS
- ⊏⊐ = PROPOSED REPAIR AREA

UNDERSIDE REPAIR NOTES:

1. FOR UNDERSIDE REPAIR NOTES SEE SHEET 14.

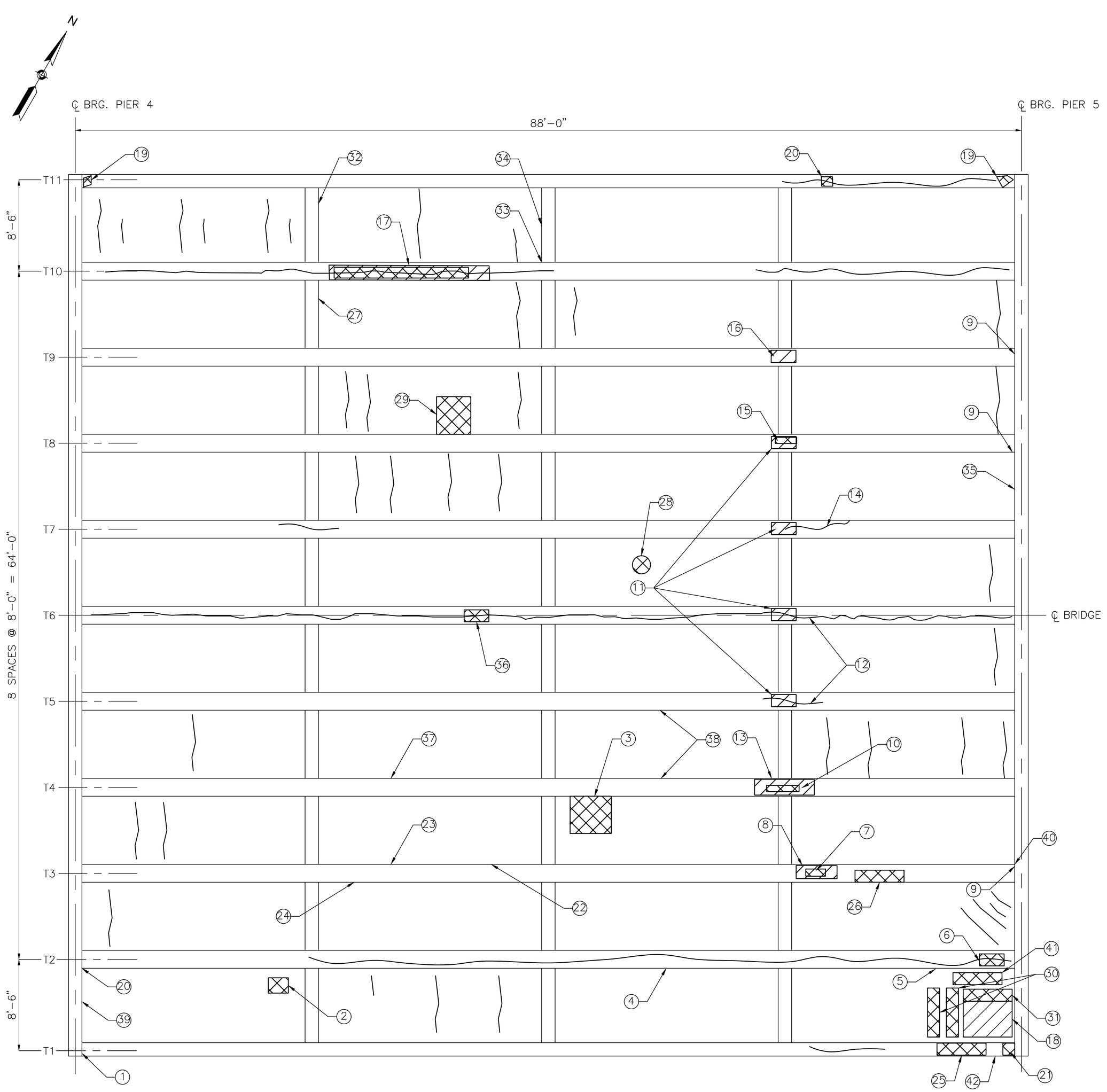
REPAIR AREA #	LOCATION	LENGTH	WIDTH	DEPTH	DEFICIENCY	REPAIR TYPE
1	TRUSS	2'-6"	0'-10"	1-1/2"	SPALL	FLANGE
2	DECK	2'-6"	1'-9"	0'-1 1/2"	SPALL	FULL DEPTH
3	TRUSS	2'-4"	1'-0"	N/A	HOLLOW AREA	SHALLOW
4	DECK	0'-9"	0'-9"	0'-0 1/2"	SPALL	SHALLOW
5	DECK	3'-6"	2'-0"	0'-1"	SPALL	FULL DEPTH
6	TRUSS	7'-0"	FULL WIDTH	0'-3"	SPALL	DEEP
7	TRUSS	0'-7"	N/A	N/A	HOLLOW AREA	SHALLOW
8	TRUSS	8'-0"	2'-6"	0'-6"	SPALL/HOLLOW AREA	DEEP
9	TRUSS	10'-0"	0'-11"	0'-3"	SPALL	FLANGE
10	TRUSS	6'-0"	0'-8"	0'-1 1/2"	SPALL	FLANGE
11	TRUSS	7'-0"	1'-0"	0'-1 1/2"	SPALL	FLANGE
12	TRUSS	3'-0"	0'-7"	0'-1"	SPALL	FLANGE
13	TRUSS	1'-3"	0'-4"	0'-3"	SPALL	DEEP
14	TRUSS	6'-0"	FULL WIDTH	0'-4"	SPALL/HOLLOW AREA	DEEP
15	TRUSS	1'-6"	0'-6"	0'-1"	6 SPALLS/ POPOUTS	DEEP
16	TRUSS	1'-6"	0'-8"	0'-0 1/2"	SPALL	SHALLOW
17	TRUSS	1'-3"	0'-2"	0'-2"	SPALL	DEEP
18	TRUSS	0'-4"	0'-2"	0'-0 1/2"	POPOUT	DEEP
19	DIAPHR.	1'-8"	1'-0"	0'-1"	2 SPALLS	SHALLOW
20	TRUSS	0'-6"	0'-6"	0'-0 1/2"	SPALL	SHALLOW
21	TRUSS	1'-9"	0'-3"	0'-0 1/2"	SPALL	SHALLOW
22	TRUSS	0'-9"	0'-9"	0'-1 1/2"	SPALL	SHALLOW
23	DECK	0'-8"	1'-0"	0'-1"	SPALL	SHALLOW
24	DECK	1'-0"	2'-0"	N/A	HOLLOW AREA	SHALLOW
25	DECK	1'-0"	N/A	N/A	POPOUT	SHALLOW
26	DECK	2'-0"	1'-4"	0'-1 1/2"	SPALL	FULL DEPTH
27	DIAPHR.	0'-9"	0'-9"	0'-1"	SPALL	SHALLOW
28	TRUSS	1'-4"	0'-6"	0'-2"	SPALL W/EXPOSED REBAR	DEEP
29	DECK	0'-9"	0'-9"	N/A	HOLLOW AREA	SHALLOW
30	TRUSS	0'-6"	0'-6"	0'-2"	SPALL	DEEP
31	TRUSS	0'-10"	0'-10"	0'-4"	SPALL	FLANGE
32	TRUSS	N/A	N/A	N/A	SPALL	FLANGE

BRIDGE NO. B–16–246 = BRIDGE NO. C–01–029 (4EV)

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	17	37
PROJECT FILE NO.	608762		

UNDERSIDE REPAIR AREAS (SHEET 4 OF 5)



SPAN 5
SCALE: 3⁄16" = 1'–0"

LEGEND:

- ~~~ = HAIRLINE CRACK WITH EFFLORESCENCE
- ▨ = SPALL
- ▨ = HOLLOW SOUNDING AREA
- T = TRUSS
- ⬚ = PROPOSED REPAIR AREA

UNDERSIDE REPAIR NOTES:

1. FOR UNDERSIDE REPAIR NOTES SEE SHEET 14.

REPAIR AREA #	LENGTH	WIDTH	DEPTH	DEFICIENCY	REPAIR TYPE
1	0'-8"	N/A	N/A	SPALL	SHALLOW
2	1'-0"	0'-4"	0'-0 1/2"	SPALL	SHALLOW
3	2'-10"	2'-0"	0'-1 1/2"	SPALL WITH EXPOSED REBAR	DEEP
4	2'-6"	0'-4"	0'-2"	SPALL	DEEP
5	12'-0"	1'-2"	0'-4"	SPALL	DEEP
6	2'-8"	1'-0"	0'-1"	SPALL	SHALLOW
7	4'-4"	1'-1"	0'-5"	SPALL	DEEP
8	5'-0"	N/A	N/A	DELAMINATION	SHALLOW
9	2'-0"	N/A	N/A	SPALL	SHALLOW
10	2'-0"	0'-11"	0'-4"	SPALL	DEEP
11	N/A	N/A	0'-4"	SPALL	DEEP
12	1'-6"	1'-0"	0'-4"	SPALL	DEEP
13	6'-0"	FULL WIDTH	N/A	DELAMINATON	SHALLOW
14	5'-0"	FULL WIDTH	0'-4"	SPALL	DEEP
15	6'-0"	1'-8"	0'-4"	SPALL	DEEP
16	N/A	FULL WIDTH	N/A	HOLLLOW AREA	SHALLOW
17	18'-0"	FULL WIDTH	0'-4"	SPALL	DEEP
18	3'-0"	2'-0"	N/A	HOLLOW AREA	SHALLOW
19	1'-4"	0'-8"	0'-1"	SPALL	SHALLOW
20	1'-6"	0'-6"	0'-5"	SPALL	DEEP
21	0'-10"	1'-4 1/2"	0'-6"	SPALL	DEEP
22	1'-6"	0'-4"	0'-1"	SPALL WITH EXPOSED REBAR	DEEP

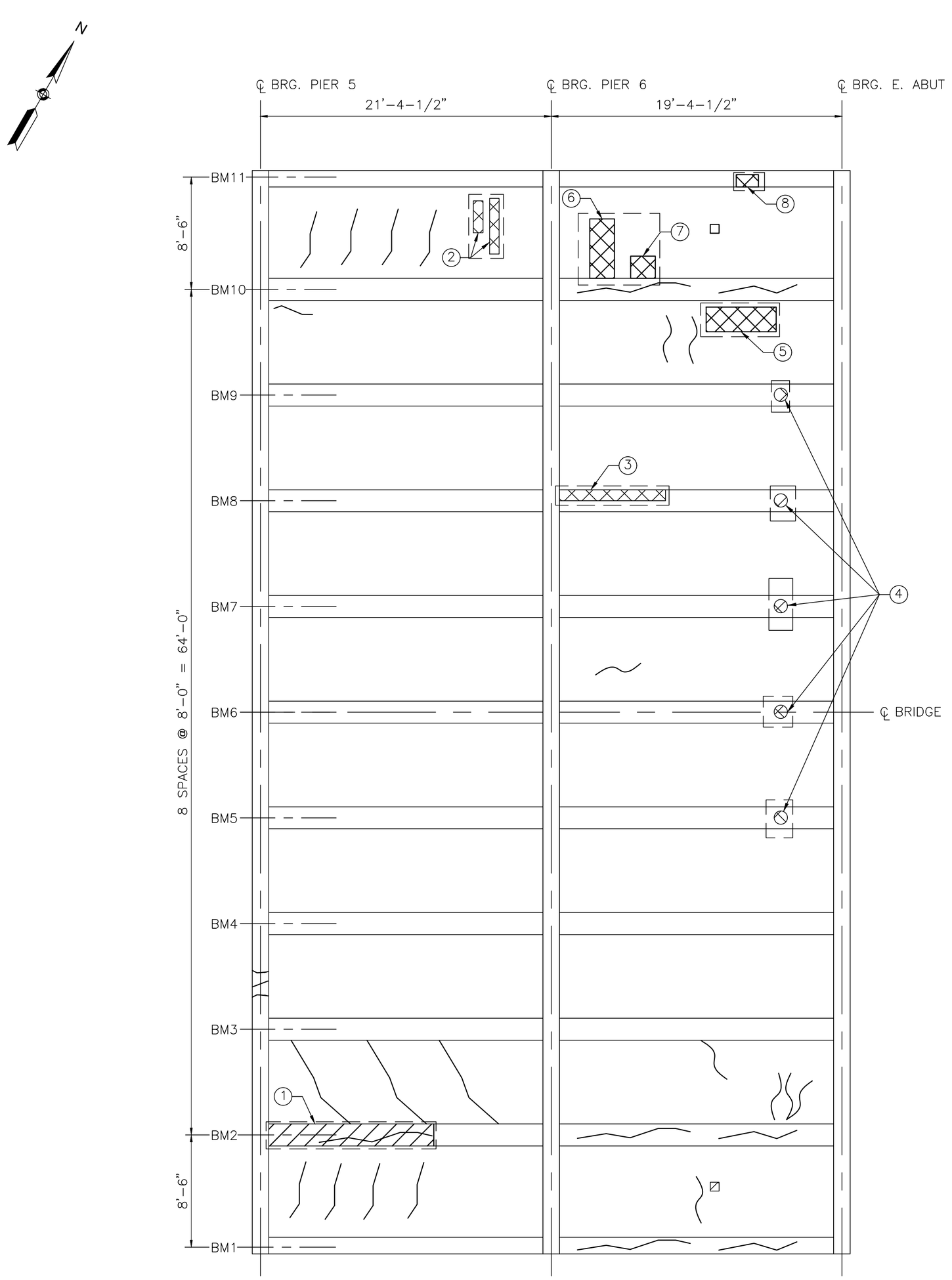
REPAIR AREA #	LENGTH	WIDTH	DEPTH	DEFICIENCY	REPAIR TYPE
23	1'-1"	1'-1"	0'-1"	SPALL	SHALLOW
24	1'-11"	0'-7"	0'-1"	9 POPUTS	DEEP
25	3'-0"	0'-5"	0'-1"	SPALL	SHALLOW
26	2'-8"	0'-6"	0'-3"	SPALL	DEEP
27	1'-10"	0'-4"	0'-0 1/2"	POPOUTS	DEEP
28	1'-3"	1'-3"	0'-3"	SPALL	SHALLOW
29	2'-0"	1'-0"	0'-1 1/2"	SPALL WITH EXPOSED REBAR	SHALLOW
30	2'-8"	0'-5"	0'-1"	2 SPALLS/ DELAMINATION	DEEP
31	0'-6"	1'-0"	0'-1"	SPALL	SHALLOW
32	2'-0"	0'-4"	0'-0 1/2"	POPOUT	DEEP
33	0'-9"	0'-6"	0'-0 1/2"	SPALL	SHALLOW
34	0'-6"	0'-3"	0'-0 1/2"	3 POPOUTS	DEEP
35	3'-0"	FULL WIDTH	0'-2"	SPALL WITH EXPOSED REBAR	DEEP
36	1'-3"	0'-6"	0'-1"	SPALL WITH EXPOSED REBAR	DEEP
37	0'-6"	0'-6"	0'-1"	6 POPOUTS	DEEP
38	1'-6"	0'-2"	0'-0 1/2"	6 POPOUTS	DEEP
39	0'-5"	1'-0"	0'-0 1/2"	2 SPALLS WITH EXPOSED REBAR	DEEP
40	3'-0"	2'-0"	0'-2"	SPALL WITH EXPOSED REBAR	DEEP
41	8'-0"	1'-6"	0'-5"	SPALL WITH EXPOSED REBAR	DEEP
42	1'-0"	0'-4"	0'-9"	SPALL	SHALLOW

BRIDGE NO. B–16–246 = BRIDGE NO. C–01–029 (4EV)

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	18	37
PROJECT FILE NO.	608762		

UNDERSIDE REPAIR AREAS (SHEET 5 OF 5)



SPANS 6 AND 7
SCALE: 3/16" = 1'-0"

REPAIR AREA #	LOCATION	LENGTH	WIDTH	DEPTH	DEFICIENCY	REPAIR TYPE
1	BEAM	8'-0"	FULL WIDTH	N/A	CRACK WITH DELAMINATION	SHALLOW
2	DECK	3'-0"	0'-4"	0'-1"	2 SPALLS WITH EXPOSED REBAR	FULL DEPTH
3	BEAM	0'-9"	0'-6"	0'-3/4"	5 SPALLS WITH EXPOSED REBAR	DEEP
4	BEAM	0'-6"	0'-6"	0"-1/2"	5 SPALLS	SHALLOW
5	DECK	2'-0"	2'-0"	0'-1 3/4"	SPALL WITH EXPOSED REBAR/DELAMINATION	FULL DEPTH
6	DECK	4'-6"	0'-8"	1'-0"	SPALL WITH EXPOSED REBAR	FULL DEPTH
7	DECK	1'-8"	0'-4"	0'-1"	SPALL WITH EXPOSED REBAR	FULL DEPTH
8	BEAM	0'-9"	0'-6"	0'-1"	SPALL WITH EXPOSED REBAR	DEEP

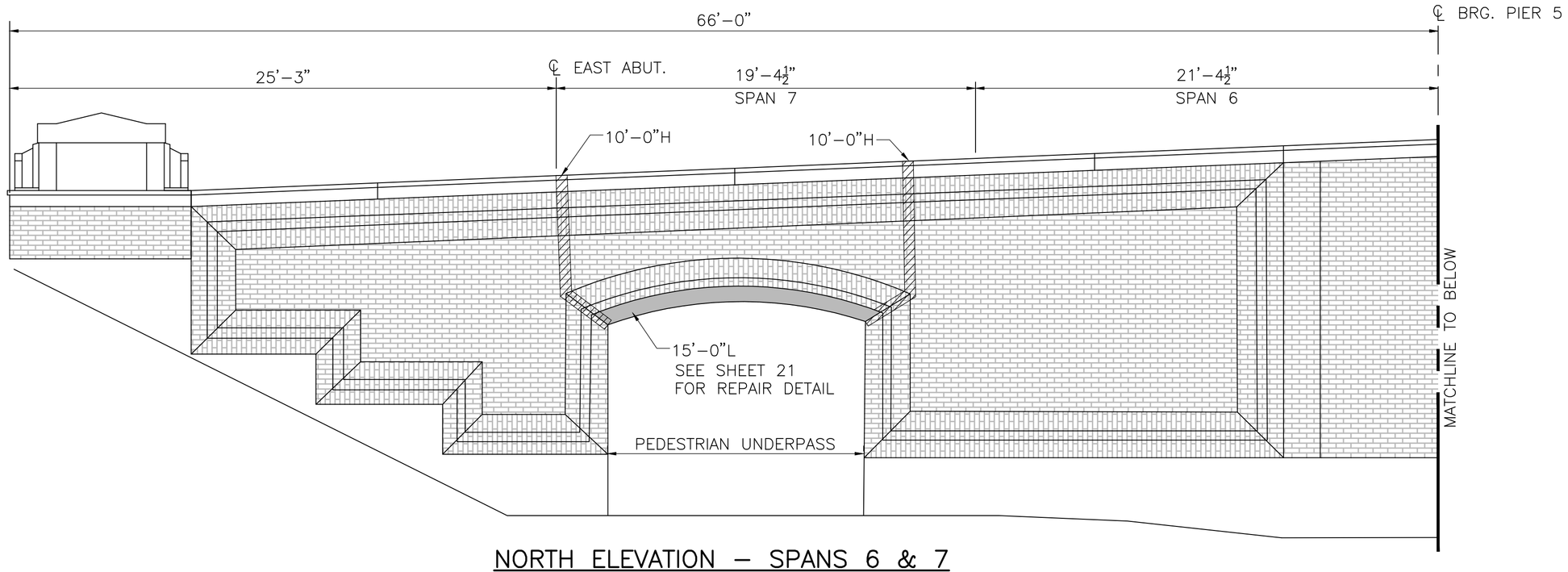
UNDERSIDE REPAIR NOTES:

1. FOR UNDERSIDE REPAIR NOTES SEE SHEET 14.

LEGEND:

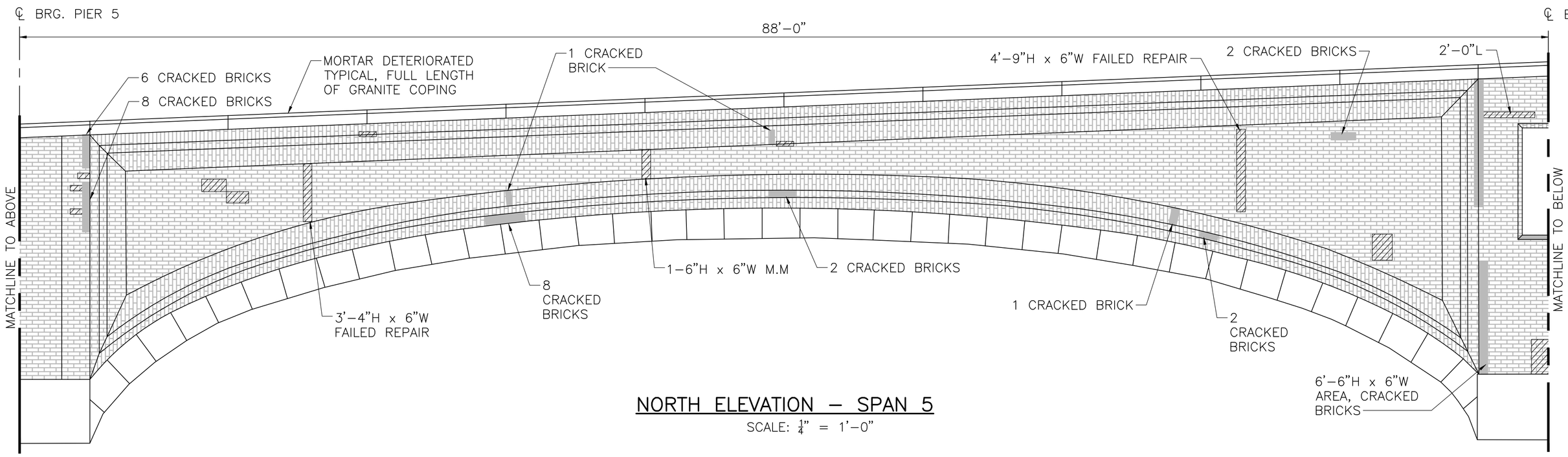
- ~~~ = HAIRLINE CRACK WITH EFFLORESCENCE
- ⊠ = SPALL
- ▨ = HOLLOW SOUNDING AREA
- BM = BEAM
- ⌈ - - ⌉ = PROPOSED REPAIR AREA

BRIDGE NO. B-16-246 = BRIDGE NO. C-01-029 (4EV)



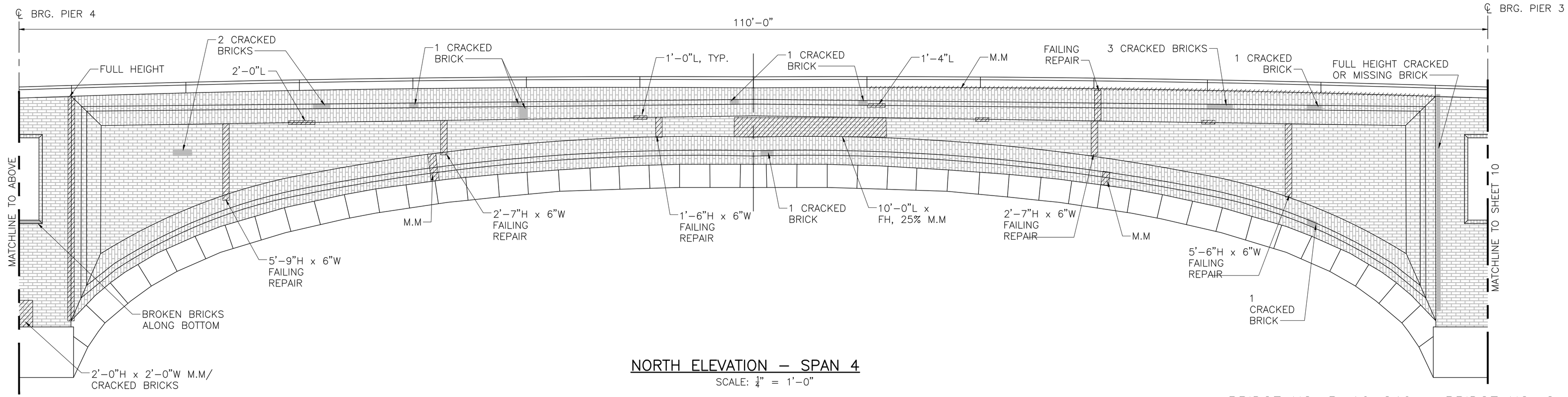
NORTH ELEVATION – SPANS 6 & 7

SCALE: ¼" = 1'-0"



NORTH ELEVATION – SPAN 5

SCALE: ¼" = 1'-0"



NORTH ELEVATION – SPAN 4

SCALE: ¼" = 1'-0"

BRIDGE NO. B-16-246 = BRIDGE NO. C-01-029 (4EV)

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	19	37
PROJECT FILE NO.	608762		

BRIDGE ELEVATIONS (SHEET 1 OF 4)

BRICK REPAIR NOTES:

1. REPAIR AREAS ARE APPROXIMATE AND BASED ON ROUTINE BRIDGE INSPECTION CONDUCTED IN AUGUST 2019.
2. CONTRACTOR SHALL LOCATE ALL AREAS OF DETERIORATION PRIOR TO START OF WORK.
3. AREAS OF REPAIR ON FACADES SHALL USE SALVAGED BRICK FROM INTERIOR OF BRIDGE PARAPET.
4. SEE SHEETS 23 TO 26 FOR REPAIR DETAILS.

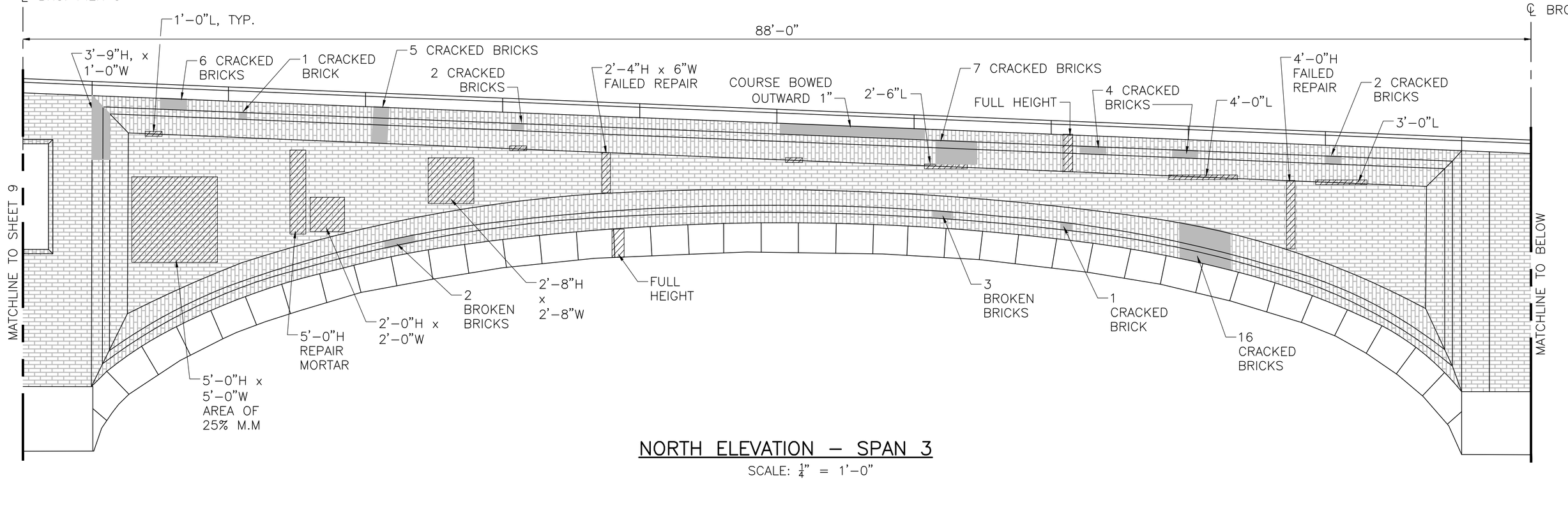
LEGEND:

- MISSING/DAMAGED BRICK
- MISSING MORTAR (M.M.)
- L – LONG
- H – HIGH
- W – WIDE

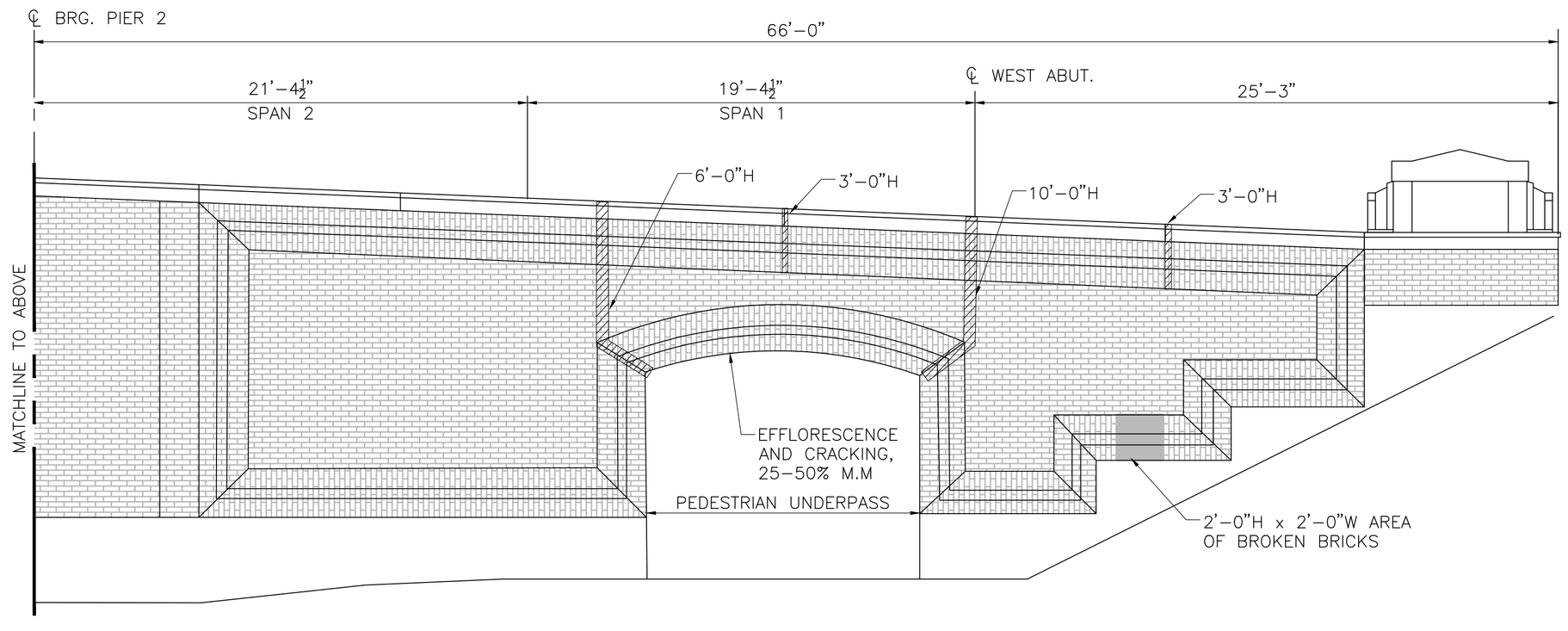
BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	20	37
PROJECT FILE NO.	608762		

BRIDGE ELEVATIONS (SHEET 2 OF 4)



NORTH ELEVATION – SPAN 3
SCALE: $\frac{1}{4}$" = 1'–0"



NORTH ELEVATION – SPANS 1 & 2
SCALE: $\frac{1}{4}$" = 1'–0"

REPAIR NOTES:

1. SEE SHEET 19 FOR NOTES.

LEGEND:

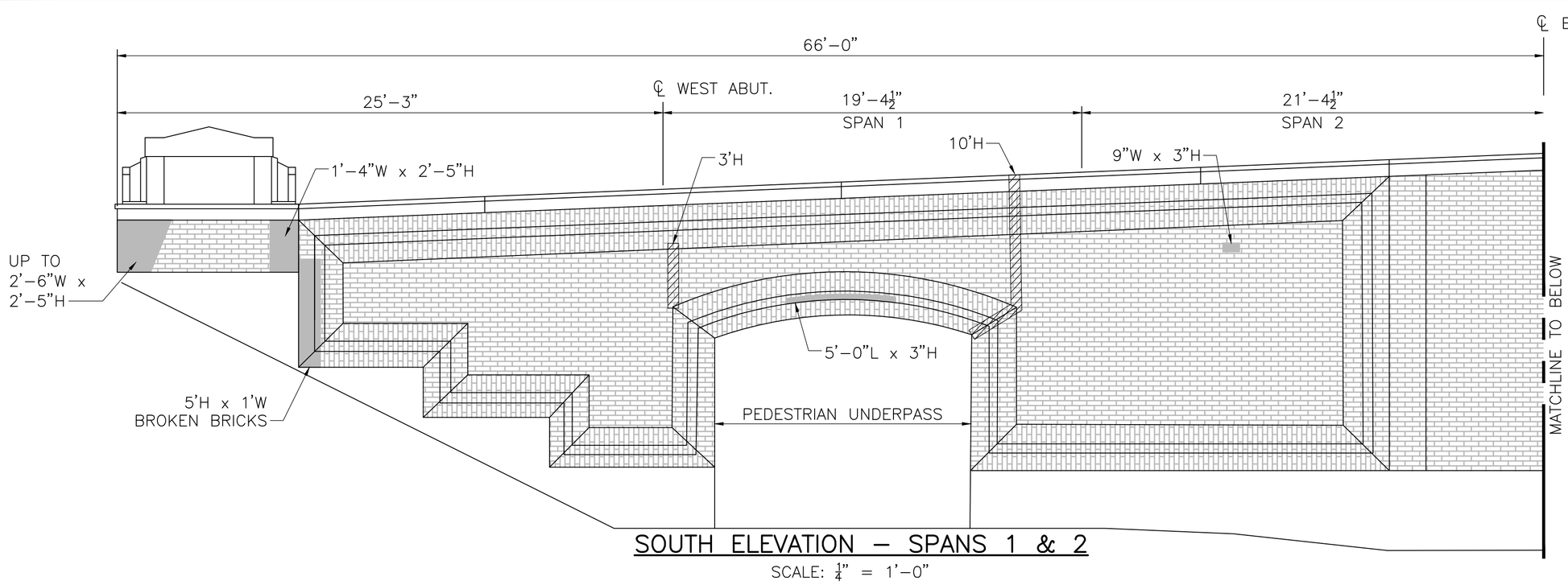
- MISSING/DAMAGED BRICK
- MISSING MORTAR (M.M.)
- L – LONG
- H – HIGH
- W – WIDE

BRIDGE NO. B–16–246 = BRIDGE NO. C–01–029 (4EV)

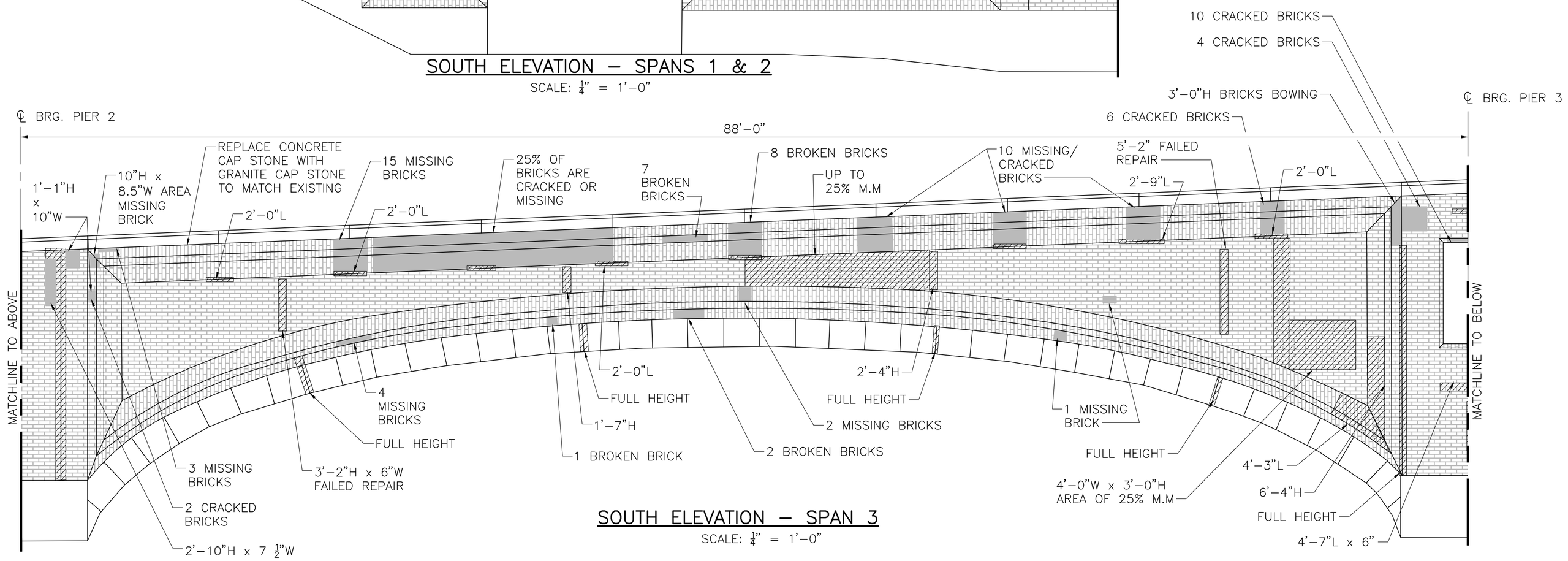
BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	21	37
PROJECT FILE NO.	608762		

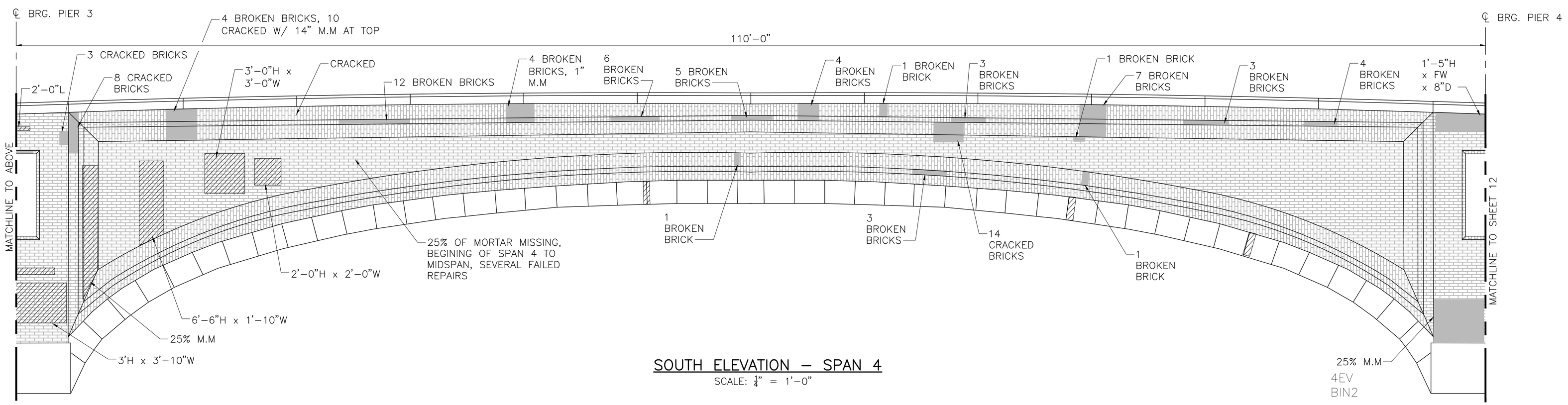
BRIDGE ELEVATIONS (SHEET 3 OF 4)



SOUTH ELEVATION – SPANS 1 & 2
SCALE: ¼" = 1'–0"



SOUTH ELEVATION – SPAN 3
SCALE: ¼" = 1'–0"



SOUTH ELEVATION – SPAN 4
SCALE: ¼" = 1'–0"

4EV
BIN2

BRIDGE NO. B–16–246 = BRIDGE NO. C–01–029 (4EV)

REPAIR NOTES:

1. SEE SHEET 19 FOR NOTES.

LEGEND:

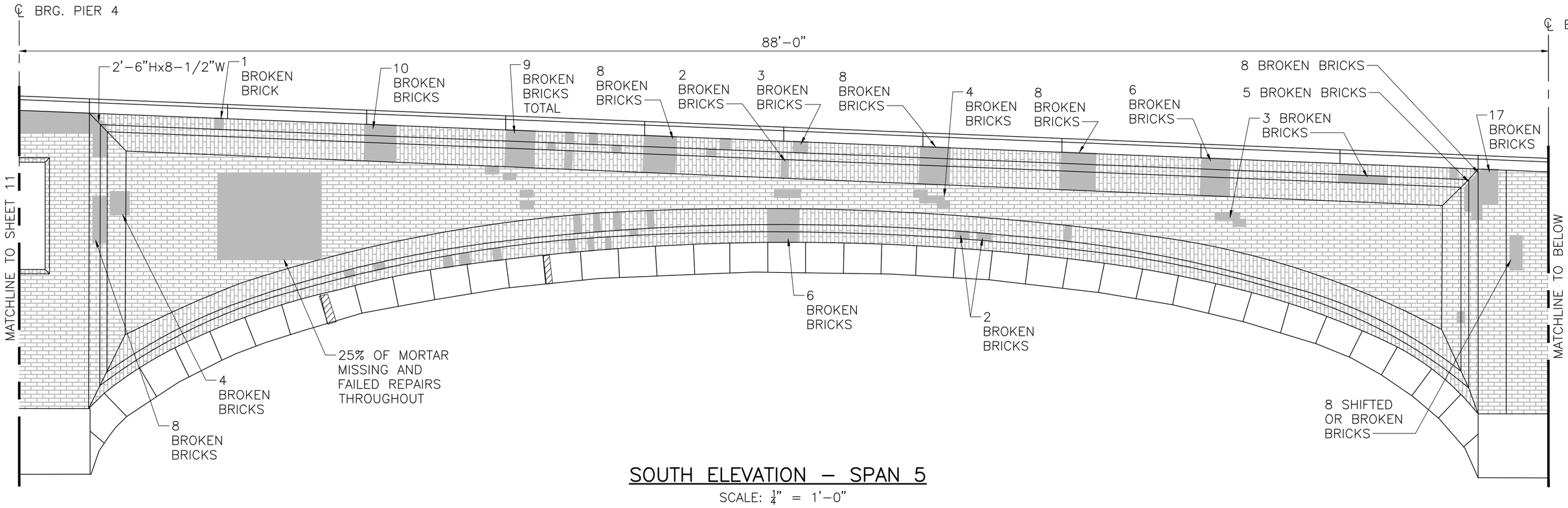
- MISSING/DAMAGED BRICK
- MISSING MORTAR (M.M.)
- L – LONG
- H – HIGH
- W – WIDE

Plotted on 17-May-2023 1:23 PM
19-22-608762_BRIDGE ELEVATIONS.DWG
Proposal No. 608762-124916
DD-Month-YYYY
Sketch Plans Submittal (SP2)
A00850 - 37

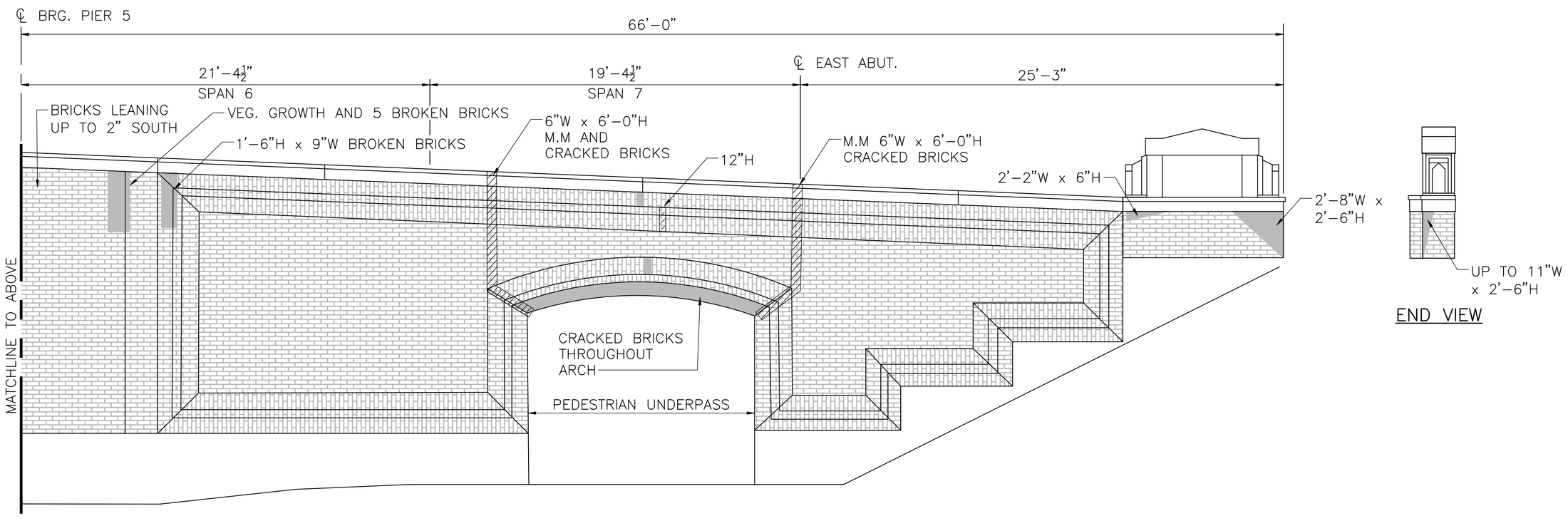
BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	22	37
PROJECT FILE NO.	608762		

BRIDGE ELEVATIONS (SHEET 4 OF 4)



SOUTH ELEVATION – SPAN 5
SCALE: ¼" = 1'–0"



SOUTH ELEVATION – SPANS 6 & 7
SCALE: ¼" = 1'–0"

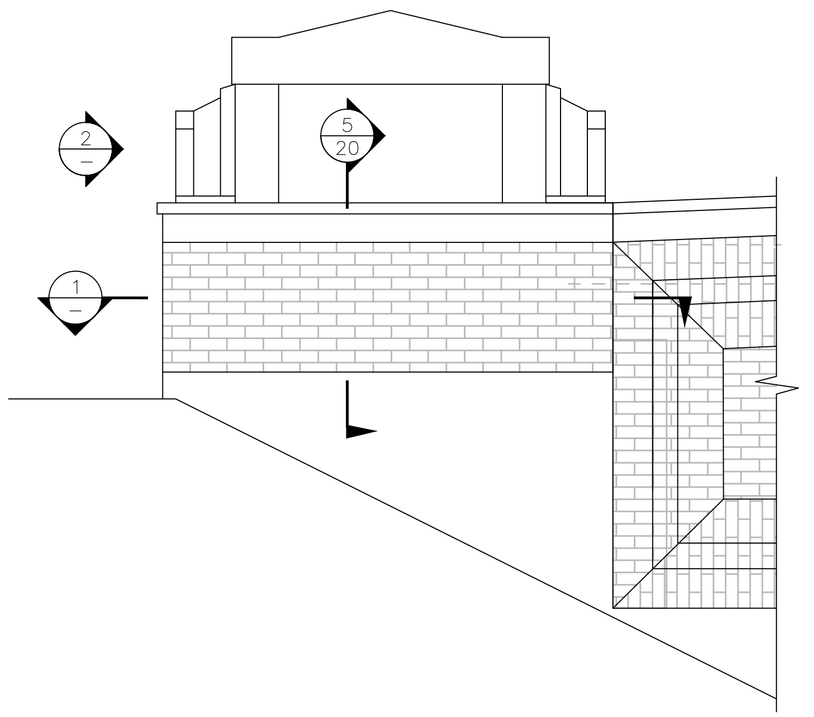
END VIEW

REPAIR NOTES:

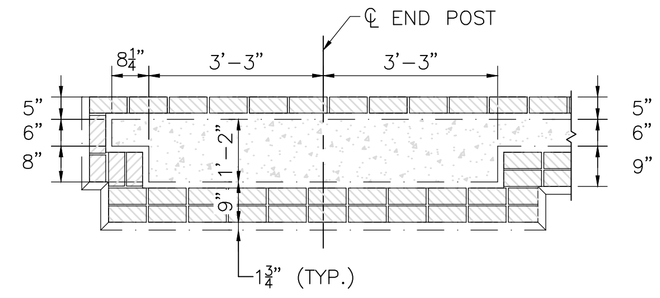
1. SEE SHEET 19 FOR NOTES.

LEGEND:

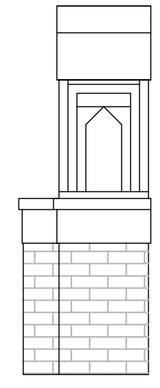
- MISSING/DAMAGED BRICK
- MISSING MORTAR (M.M.)
- L – LONG
- H – HIGH
- W – WIDE



TYPICAL END POST ELEVATION
SCALE: ½" = 1'–0"



SECTION 1 –
SCALE: ½" = 1'–0"



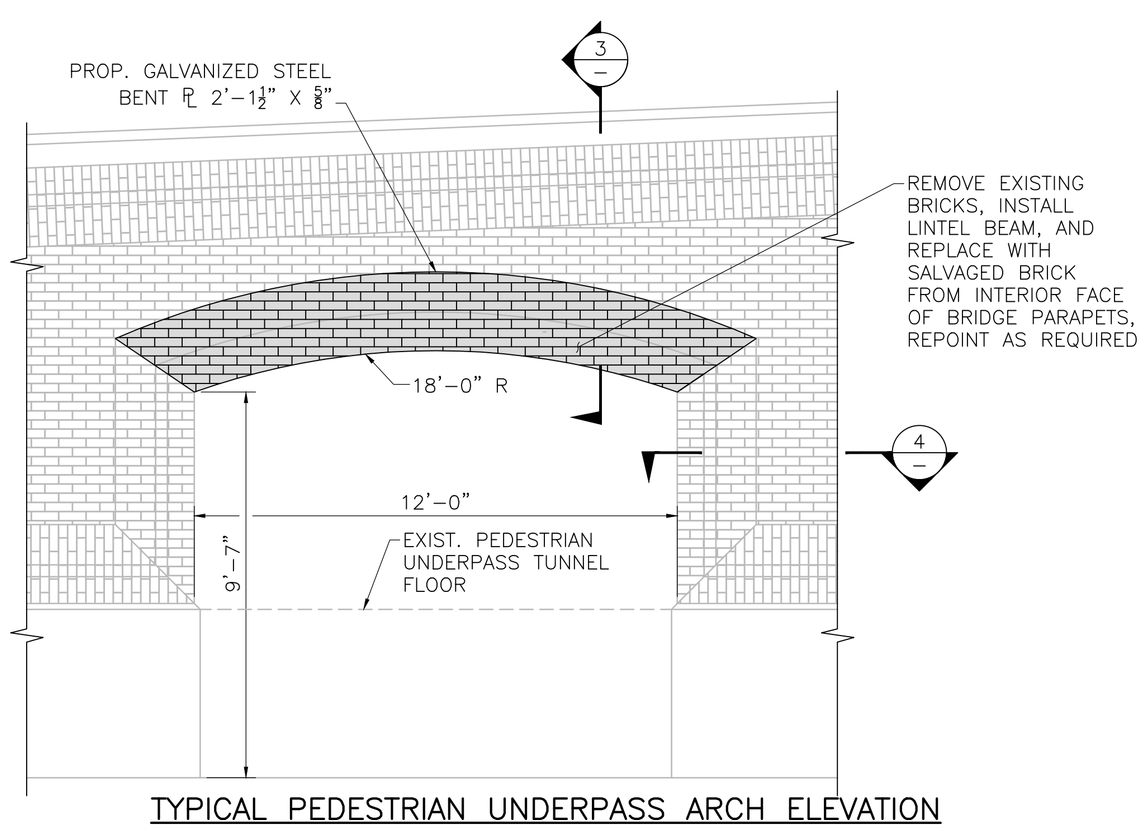
ELEVATION 2 –
SCALE: ½" = 1'–0"

BRIDGE NO. B–16–246 = BRIDGE NO. C–01–029 (4EV)

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

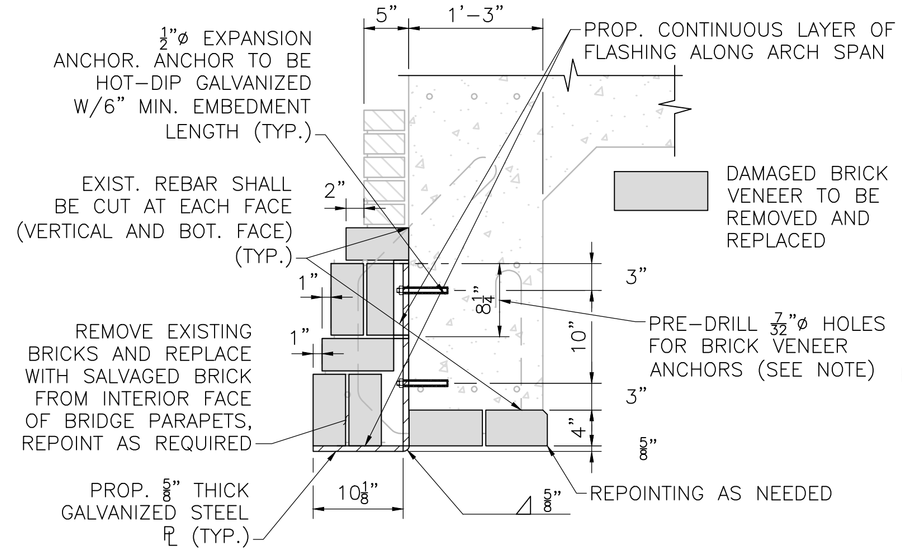
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	23	37
PROJECT FILE NO.	608762		

REPAIR DETAILS (SHEET □ OF □)

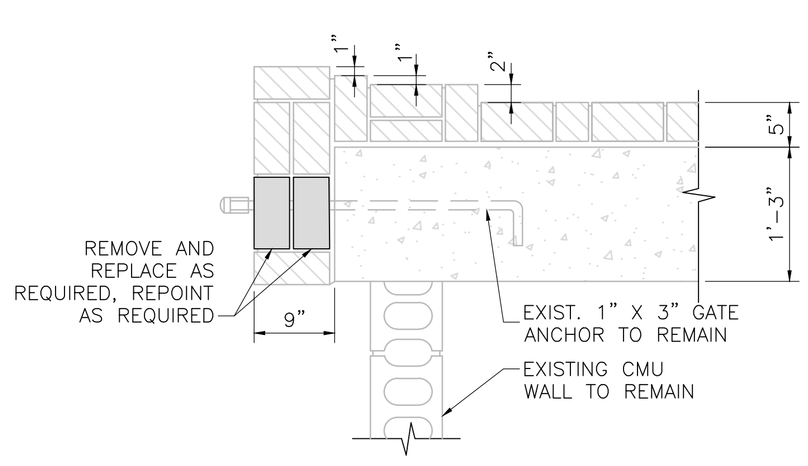


TYPICAL PEDESTRIAN UNDERPASS ARCH ELEVATION

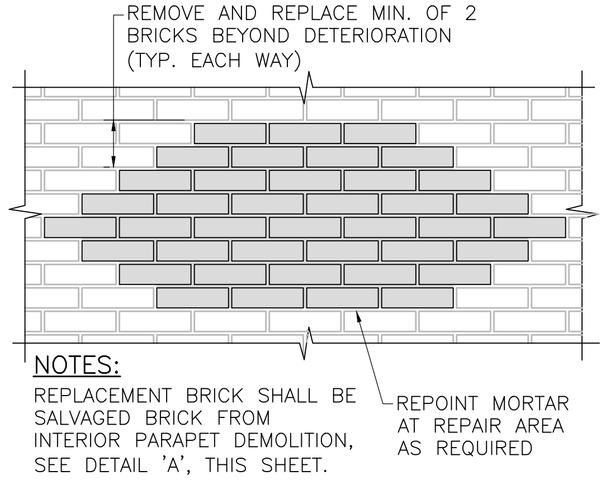
SCALE: ⅜" = 1'-0"



SECTION 3
SCALE: 1" = 1'-0"



SECTION 4
SCALE: 1" = 1'-0"

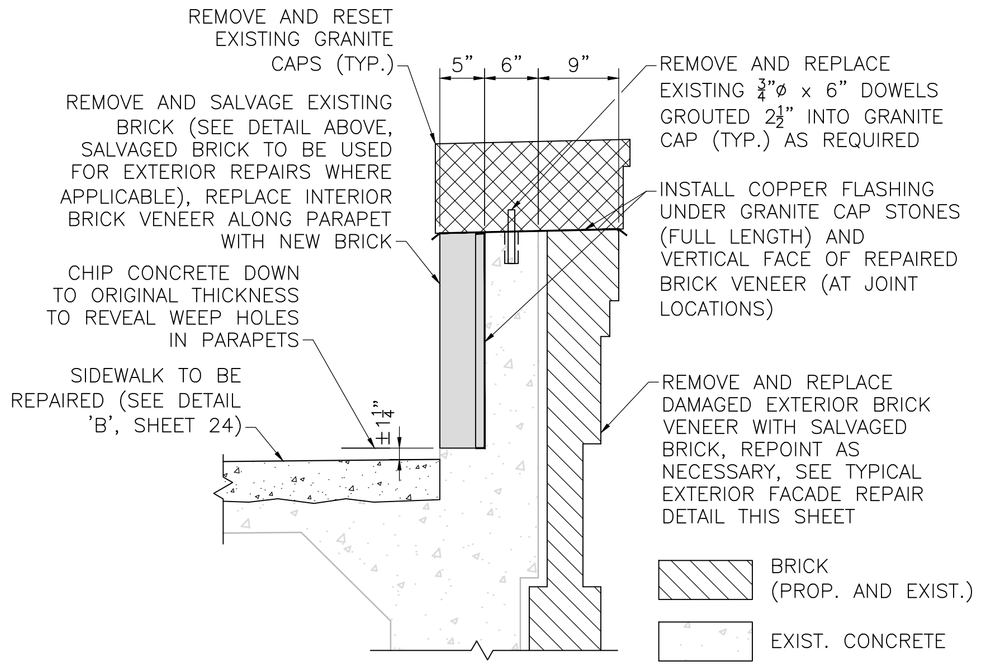


NOTES:

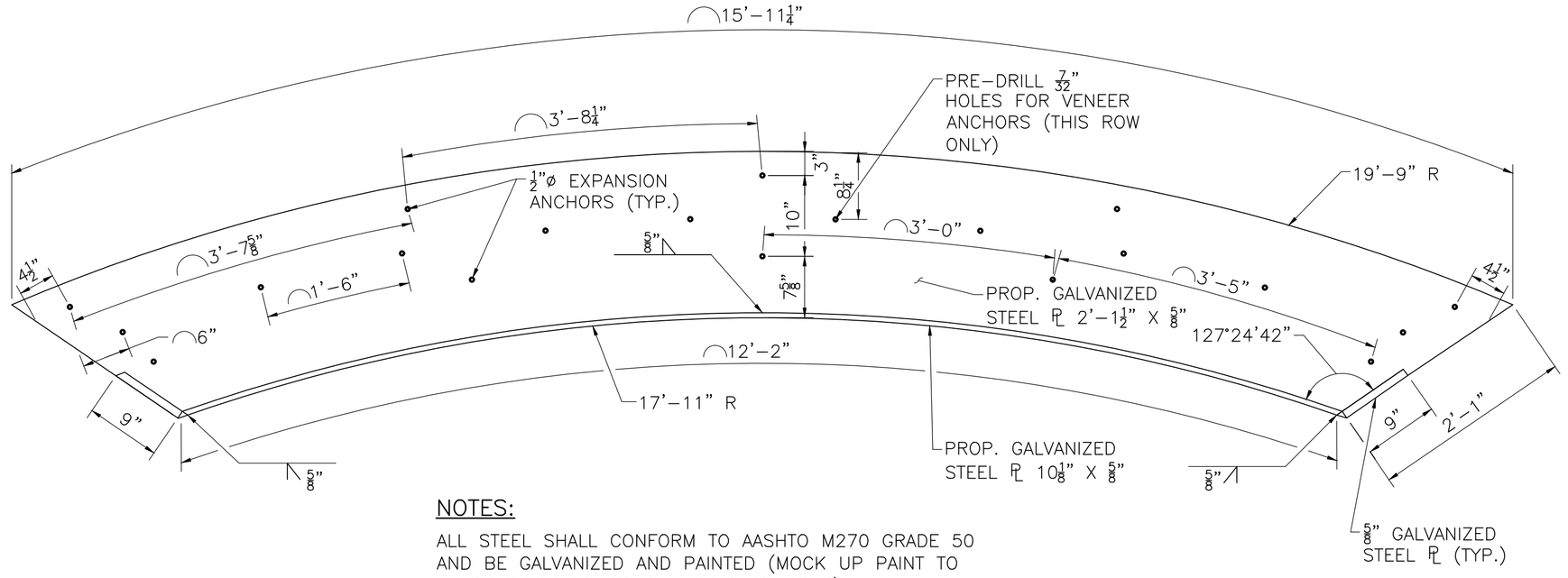
REPLACEMENT BRICK SHALL BE SALVAGED BRICK FROM INTERIOR PARAPET DEMOLITION, SEE DETAIL 'A', THIS SHEET.

TYPICAL EXTERIOR FACADE REPAIR DETAIL

SCALE: 1" = 1'-0"



DETAIL A
SCALE: 1" = 1'-0" 13



NOTES:

ALL STEEL SHALL CONFORM TO AASHTO M270 GRADE 50 AND BE GALVANIZED AND PAINTED (MOCK UP PAINT TO MATCH BRICK COLOR. SEE SPECIFICATIONS).

STEEL LINTEL DETAIL

SCALE: 1" = 1'-0"

BRICK REPAIR NOTES:

1. SEE SHEETS 19 THROUGH 22 FOR SPECIFIC LOCATIONS OF BRICK DETERIORATION.
2. BRICK USED FOR INTERIOR FACE OF RAILING SHALL BE NEW BRICK PER ITEM 706.41. NO SALVAGED BRICK SHALL BE USED FOR INTERIOR FACE OF PARAPET REPAIRS.
3. SALVAGED BRICK SHALL BE USED FOR ALL EXTERIOR FACADE REPAIRS. IF NO SALVAGED BRICK IS AVAILABLE, NEW BRICK MAY BE USED.

STEEL LINTEL INSTALLATION NOTES:

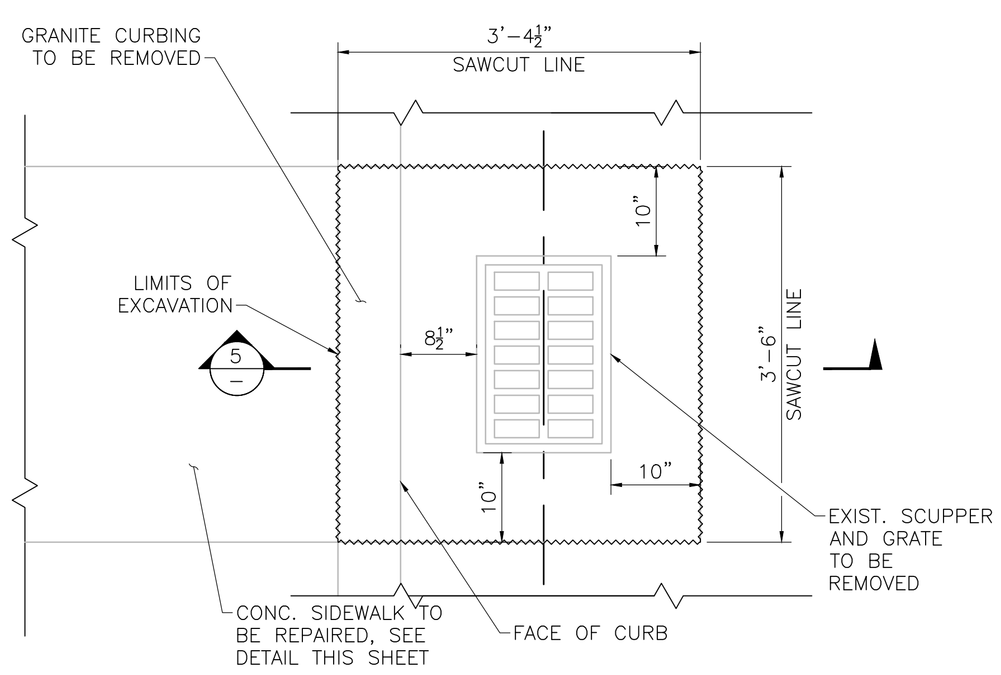
1. INSTALL TEMPORARY SHORING FOR THE BOTTOM LAYERS OF BRICK UNDER THE ARCH. TEMPORARY SHORING PLAN SHALL BE DESIGNED BY THE CONTRACTOR AND SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO INSTALLATION.
2. REMOVE AND DISCARD BROKEN BRICKS FROM THE ARCH RING AND REMOVE AND SALVAGE INTACT BRICKS FOR FUTURE USE.
3. INSTALL EXPANSION ANCHORS AS SHOWN ABOVE. CONTRACTOR SHALL AVOID EXISTING REBAR WHEN INSTALLING ANCHORS.
4. INSTALL 9" LONG STEEL PLATES FLUSH TO THE TOP OF THE LINTEL PLATE TO COVER THE REMAINDER OF THE CONCRETE SURFACE.
5. INSTALL FLASHING ONTO THE PLATES. OVERLAP THE FLASHING AND SEAL WITH MASTIC PAPER.
6. CONTRACTOR SHALL PRE-DRILL HOLES AS REQUIRED TO PLACE VENEER ANCHORS. VENEER ANCHORS SHALL BE HOT-DIP GALVANIZED STEEL AND SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO INSTALLATION.

23-26-608762_REPAIR DETAILS.DWG Plotted on 18-May-2023 6:17 PM
Proposal No. 608762-12916
02-SEP-2022
100% SUBMISSION
A90850 - 39

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

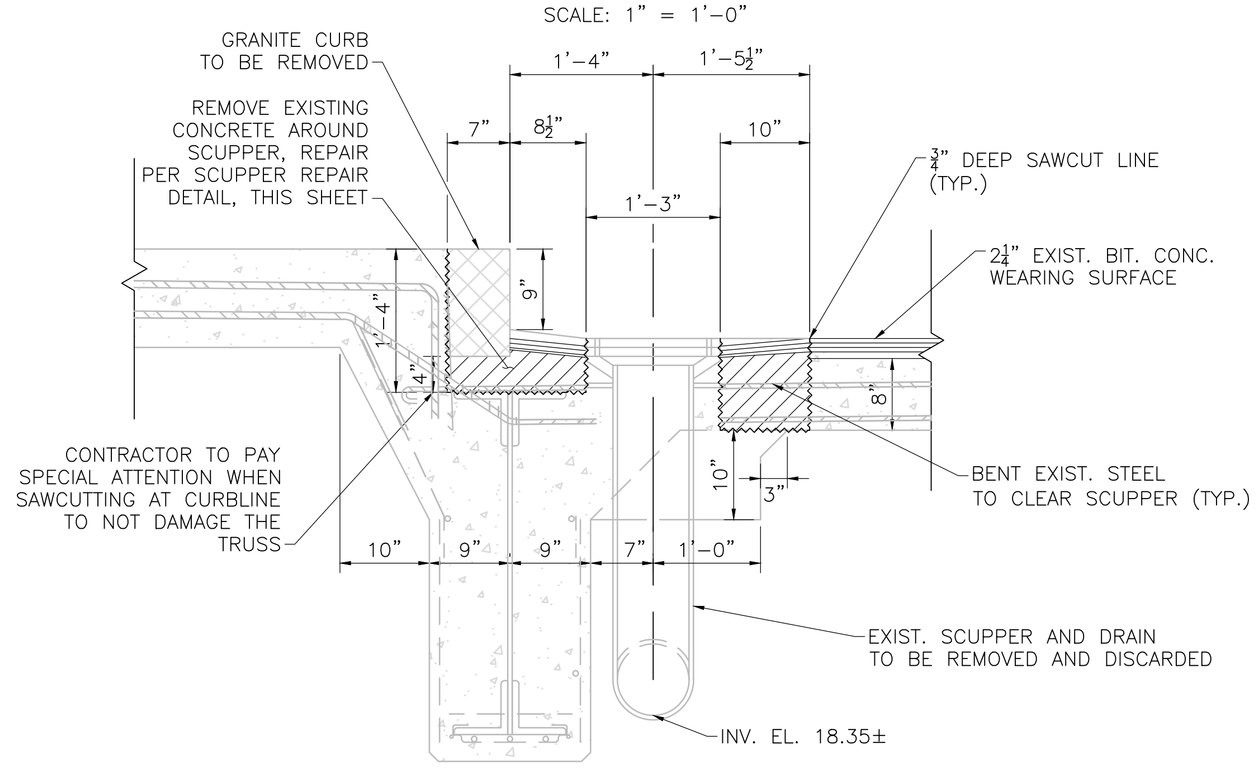
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	24	37
PROJECT FILE NO.	608762		

REPAIR DETAILS (SHEET 2 OF □)



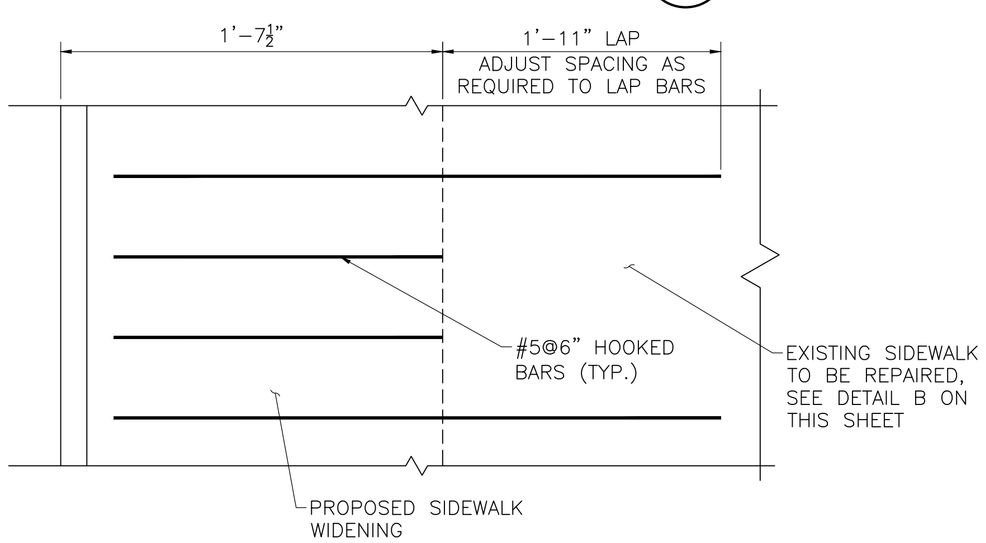
SCUPPER REMOVAL PLAN

SCALE: 1" = 1'-0"



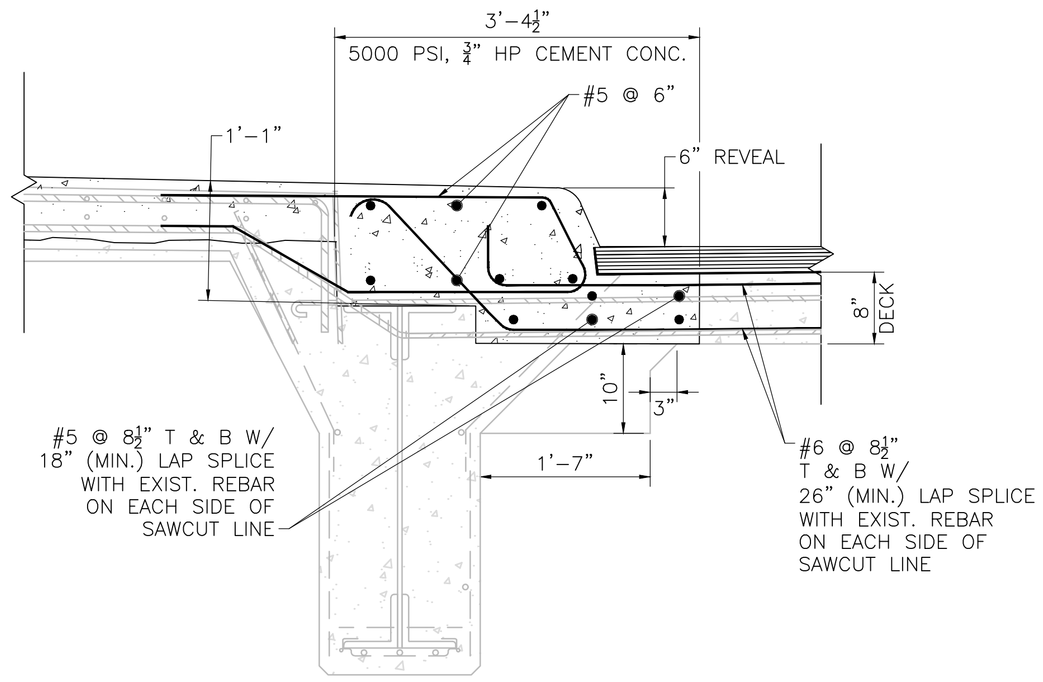
SECTION 5 / –

SCALE: 1" = 1'-0"



SIDEWALK WIDENING PLAN

SCALE: 1½" = 1'-0"

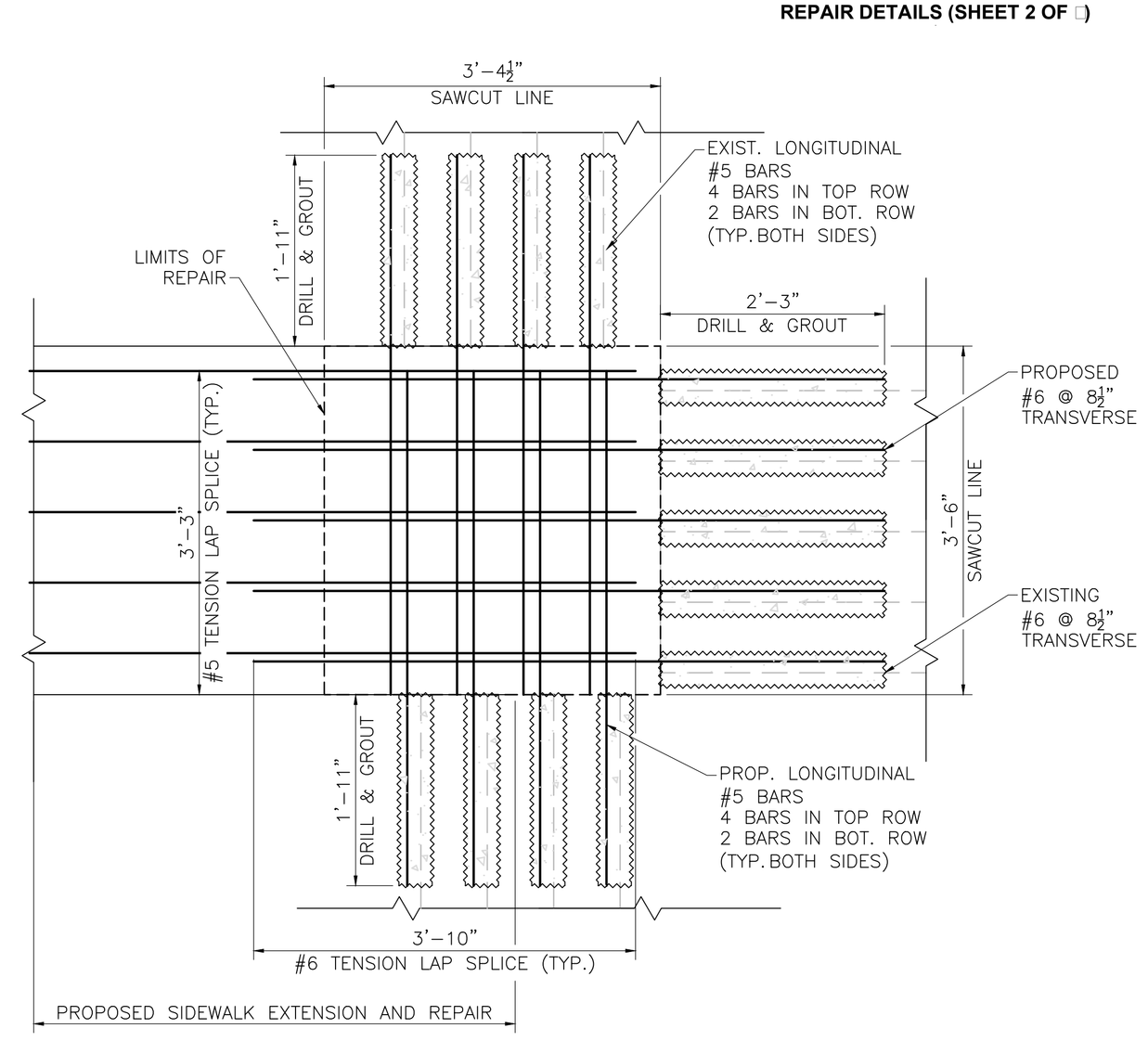


SCUPPER REPAIR DETAIL

SCALE: 1" = 1'-0"

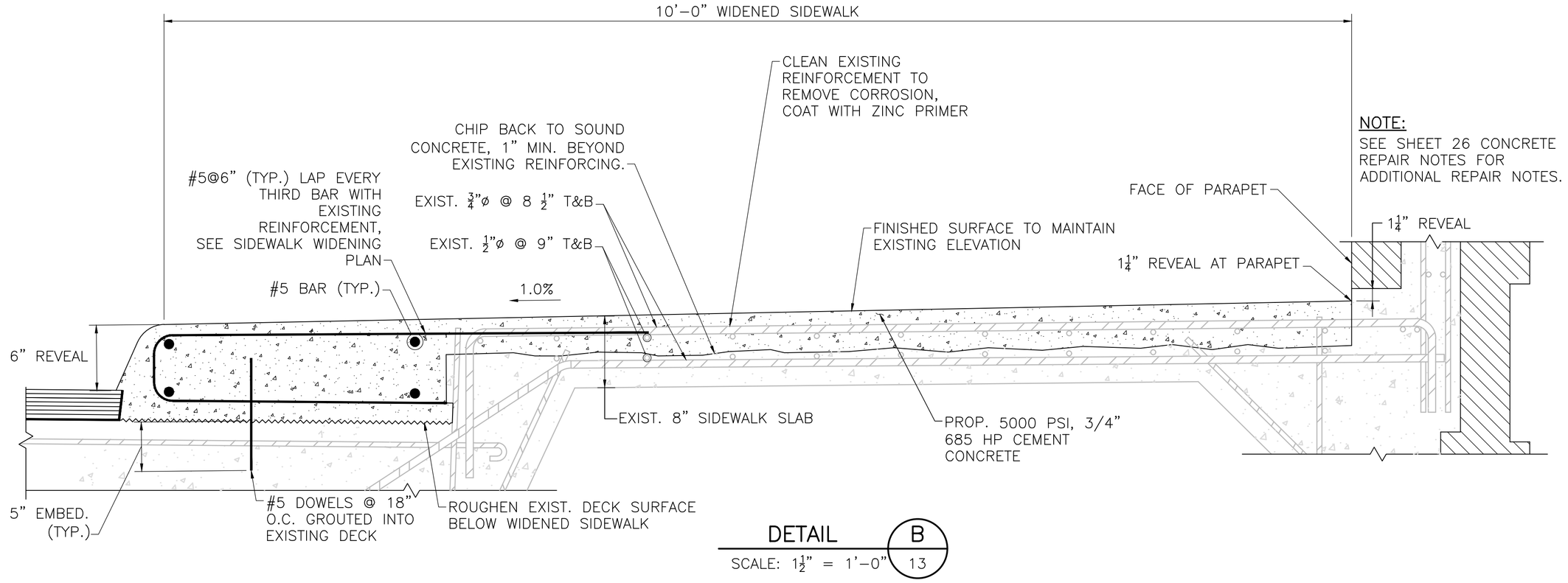
SCUPPER REPAIR SEQUENCE NOTES:

1. THERE ARE FOUR (4) SCUPPER LOCATIONS ON THE ELIOT BRIDGE.
2. REMOVE DETERIORATED EXISTING PAVEMENT, WATERPROOFING MEMBRANE FROM THE BRIDGE DECK AREAS TO THE LIMITS DIRECTED BY THE ENGINEER. THE PERIMETERS OF THE EXCAVATED AREAS SHALL BE SAWCUT PRIOR TO THE PAVEMENT REMOVAL. THE SHAPE OF THE EXCAVATED AREAS SHALL BE RECTANGULAR WITH SQUARE CORNERS. THE PAVEMENT AND MEMBRANE REMOVAL ABOVE THE CONCRETE EXCAVATION AREAS SHALL BE CONSIDERED INCIDENTAL TO THE CONCRETE EXCAVATION.
3. EXCAVATE CONCRETE (FULL OR PARTIAL DEPTH) TO THE LIMITS DIRECTED ON THE REMOVAL DETAIL OR UNTIL SOUND CONCRETE. LIMITS SHALL BE APPROVED BY THE ENGINEER. CLEAN AND RE-TIE THE EXPOSED STEEL REINFORCEMENT IF NECESSARY.
4. REMOVE AND DISPOSE OF THE EXISTING SCUPPER, RELATED STEEL SUPPORT MATERIALS, AND DRAINAGE MATERIALS FROM THE DECK.
5. FORM THE REPAIR AREA AND INSTALL NEW STEEL REINFORCEMENT AS DIRECTED BY THE ENGINEER.
6. MIX AND PLACE CONCRETE IN THE EXCAVATED AREAS ASSOCIATED WITH FULL OR PARTIAL DEPTH REPAIR NOTES ON THE FOLLOWING SHEETS. THE TOP SURFACE OF THE CONCRETE SHALL BE FLUSH WITH THE SURROUNDING EXISTING DECK SURFACE.



SCUPPER REPAIR PLAN

SCALE: 1" = 1'-0"



NOTE:
SEE SHEET 26 CONCRETE REPAIR NOTES FOR ADDITIONAL REPAIR NOTES.

DETAIL B / 13

SCALE: 1½" = 1'-0"

BRIDGE NO. B-16-246 = BRIDGE NO. C-01-029 (4EV)

23-26-608762_REPAIR DETAILS.DWG Plotted on 18-May-2023 2:33 PM

Proposal No. 608762-124916

02-SEP-2022

100% SUBMISSION

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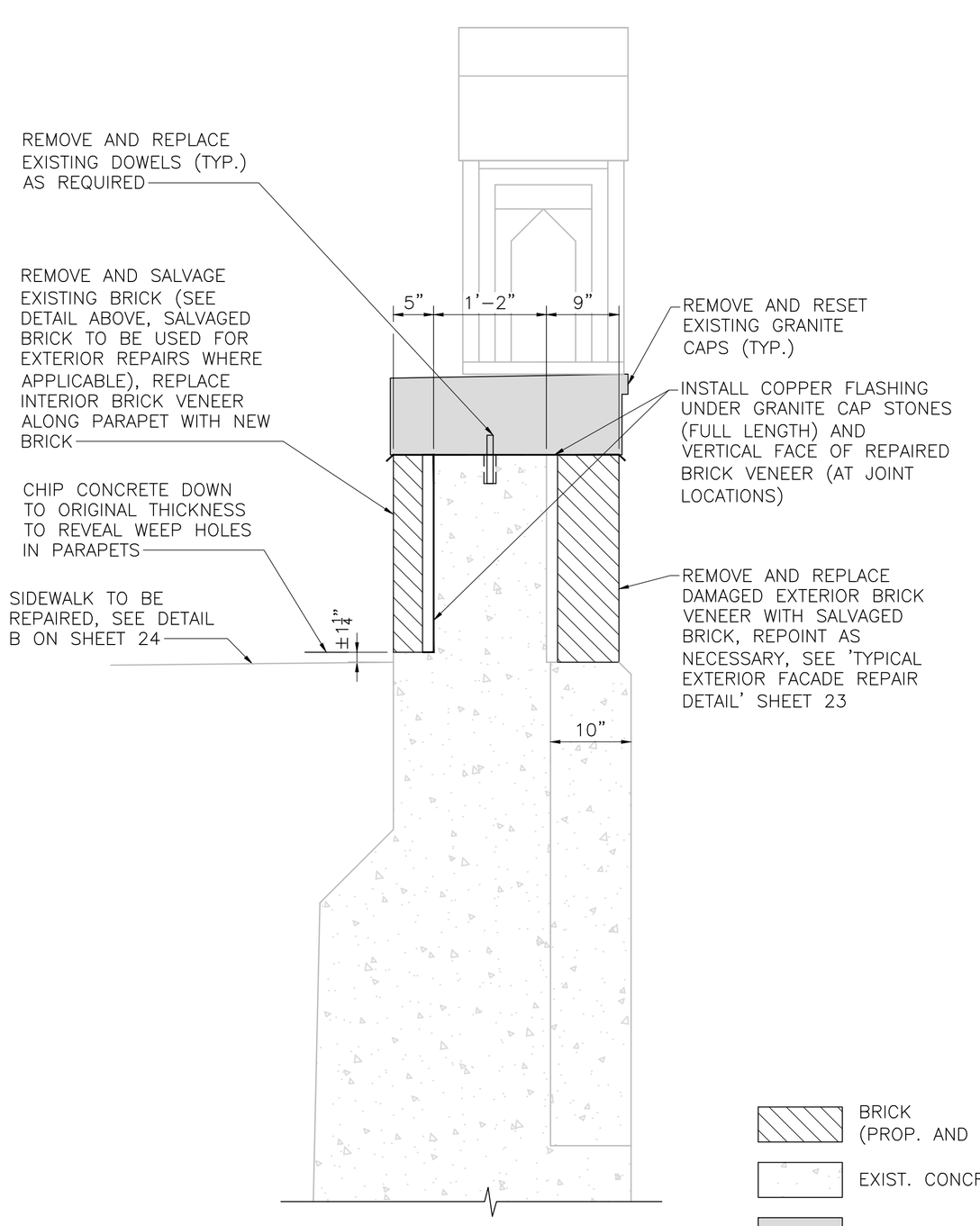
BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	25	37
PROJECT FILE NO.	608762		

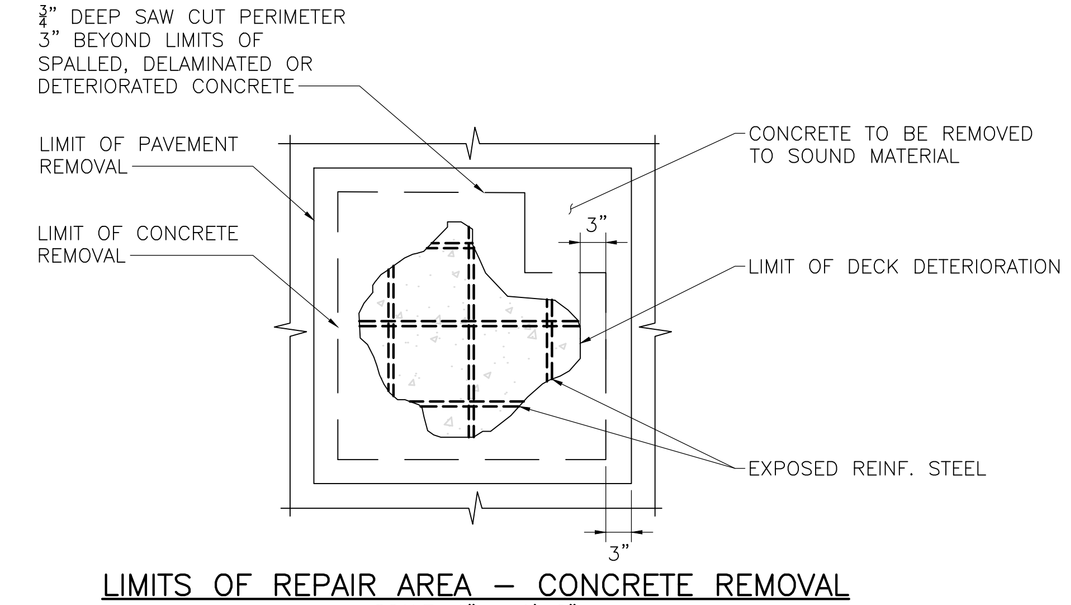
REPAIR DETAILS (SHEET □ OF □)



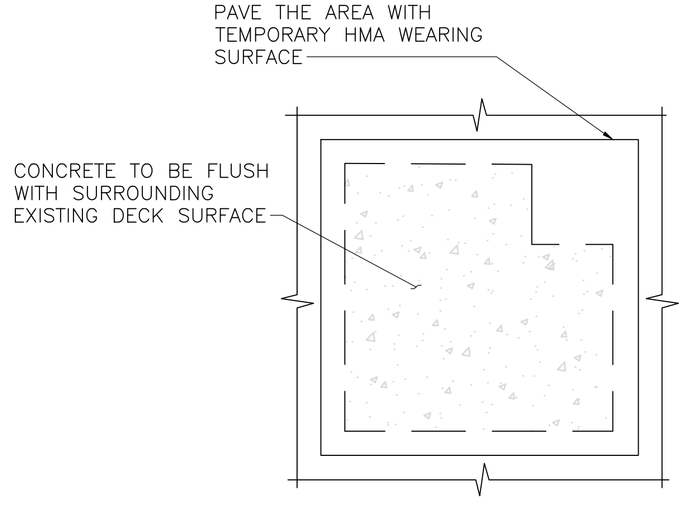
NOTES:

SEE SHEETS 17 THROUGH 20 FOR SPECIFIC LOCATIONS OF BRICK DETERIORATION.

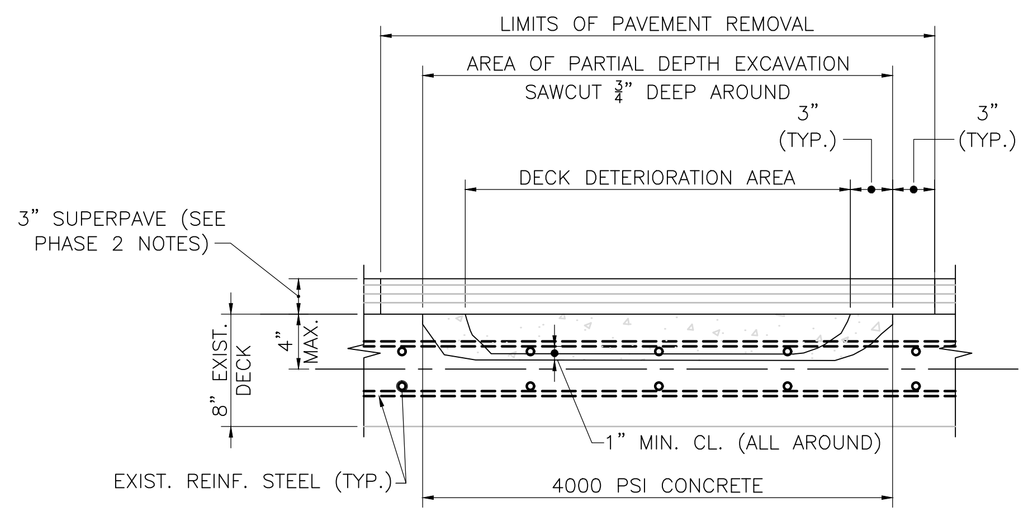
SECTION 5 / 20
SCALE: 1" = 1'-0"



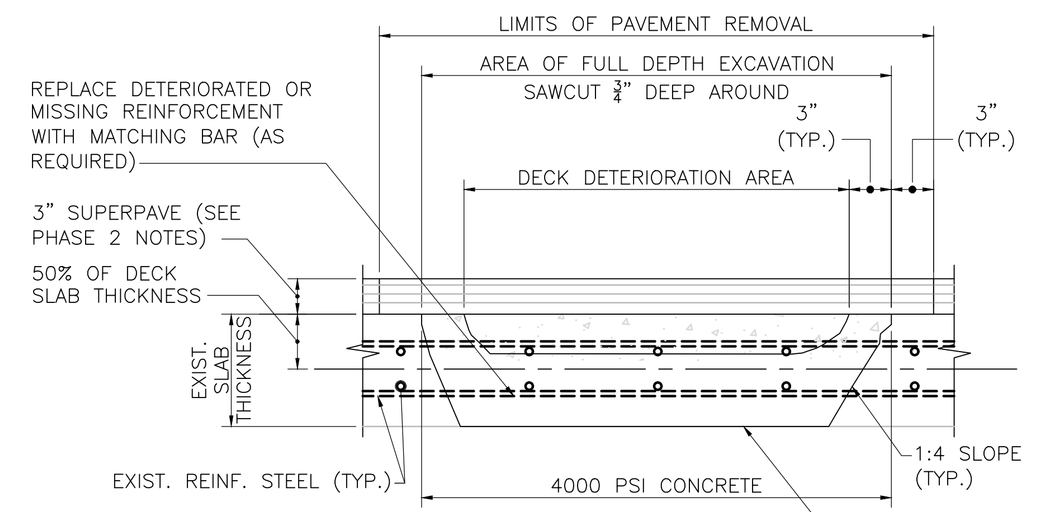
LIMITS OF REPAIR AREA – CONCRETE REMOVAL
SCALE: 1" = 1'-0"



REPAIRED AREA PRIOR TO MILL AND PAVE
SCALE: 1" = 1'-0"



PARTIAL DEPTH DECK REPAIR
SCALE: 1" = 1'-0"



NOTE:

CONTRACTOR SHALL CONTAIN ALL DEBRIS AND THAT NO DEBRIS SHALL BE ALLOWED TO FALL INTO THE CHARLES RIVER.

FULL DEPTH DECK REPAIR
SCALE: 1" = 1'-0"

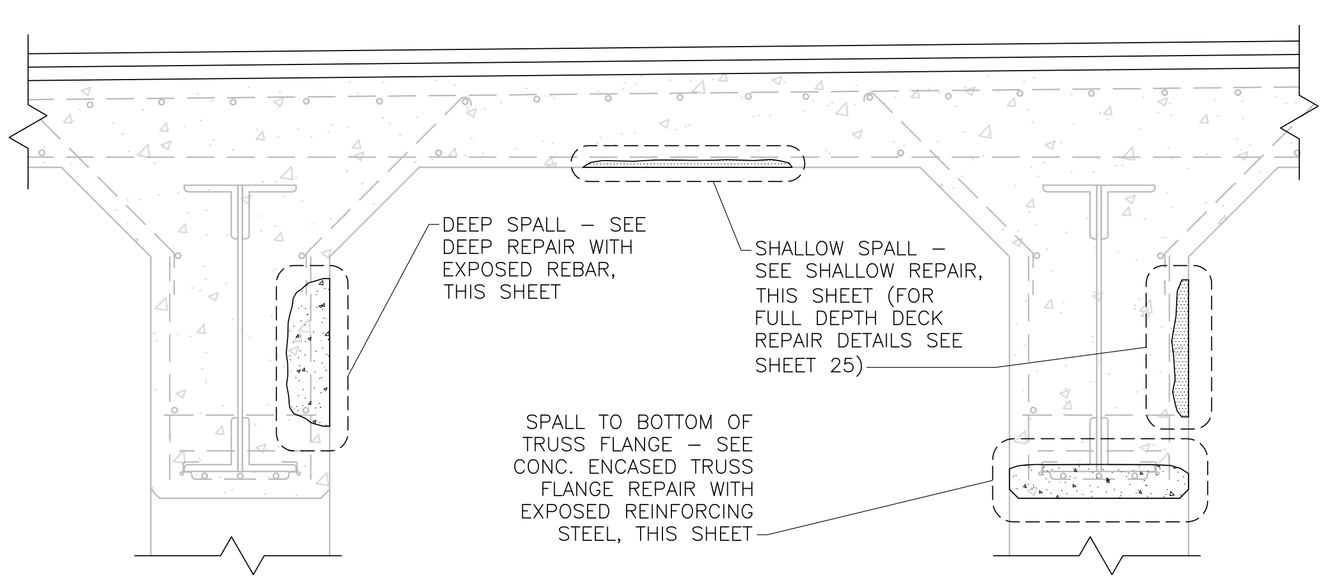
BRIDGE DECK REPAIR SEQUENCE NOTES:

PHASE 1: DETERIORATED CONCRETE REMOVAL

1. REMOVE DETERIORATED EXISTING PAVEMENT, WATERPROOFING MEMBRANE FROM THE BRIDGE DECK AREAS TO THE LIMITS DIRECTED BY THE ENGINEER. THE PERIMETERS OF THE EXCAVATED AREAS SHALL BE SAWCUT PRIOR TO THE PAVEMENT REMOVAL. THE SHAPE OF THE EXCAVATED AREAS SHALL BE RECTANGULAR WITH SQUARE CORNERS. THE PAVEMENT AND MEMBRANE REMOVAL ABOVE THE CONCRETE EXCAVATION AREAS SHALL BE CONSIDERED INCIDENTAL TO THE CONCRETE EXCAVATION.
2. EXCAVATE EXISTING TEMPORARY DECK REPAIR MATERIAL AND/OR DETERIORATED CONCRETE (FULL OR PARTIAL DEPTH) TO THE LIMITS DIRECTED BY THE ENGINEER. CLEAN AND RE-TIE THE EXPOSED STEEL REINFORCEMENT.
3. INSTALL NEW STEEL REINFORCEMENT AS DIRECTED BY THE ENGINEER.
4. MIX AND PLACE CONCRETE IN THE EXCAVATED AREAS. THE TOP SURFACE OF THE REPAIR MATERIAL SHALL BE FLUSH WITH THE SURROUNDING EXISTING DECK SURFACE.
5. PAVE REPAIR AREA WITH HMA FOR PATCHING UNTIL FINAL MILLING AND PAVING WORK. (SEE PHASE 2)

PHASE 2: FINAL PAVING

1. REPAIR AREA TO BE PERMANENTLY PAVED AS PART OF THE BRIDGE MILLING AND PAVING ITEM. REFER TO SHEET 5 FOR MILL AND PAVING NOTES AND LIMITS.
2. ALL DECK REPAIRS SHALL BE COMPLETED PRIOR TO FINAL MILL AND PAVE.

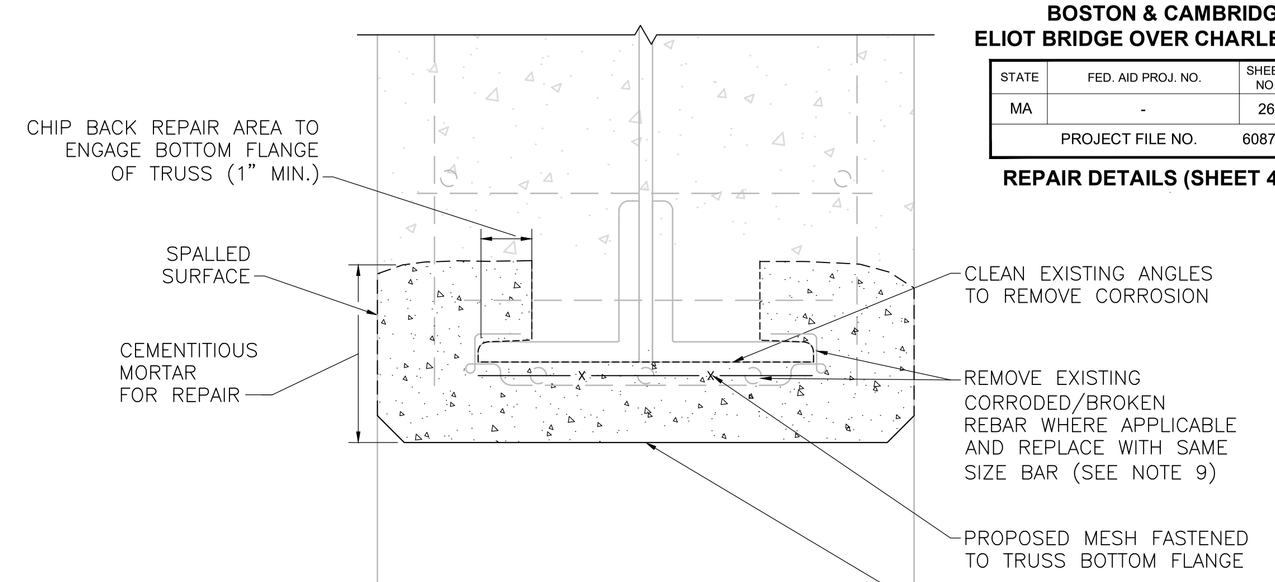


NOTES

1. SEE UNDERSIDE REPAIR AREAS, SHEETS 14 THROUGH 18 FOR LOCATIONS OF REPAIR AREAS.
2. CONTRACTOR SHALL CONTAIN ALL DEBRIS AND THAT NO DEBRIS SHALL BE ALLOWED TO FALL INTO THE CHARLES RIVER.

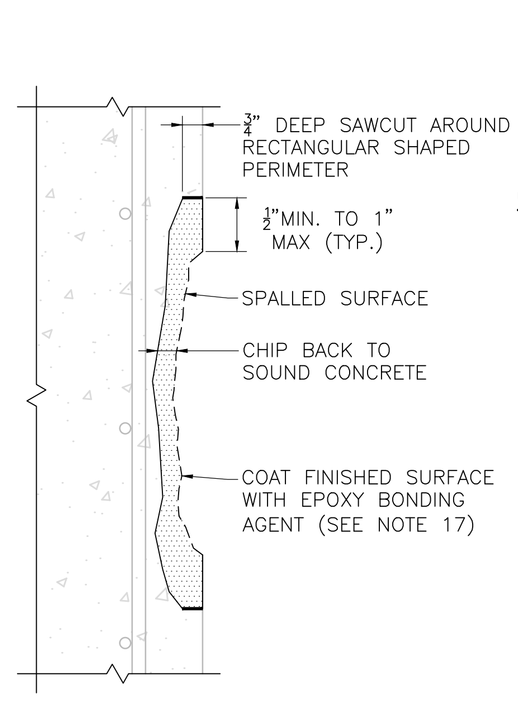
TYPICAL TRUSS AND DECK REPAIR SECTION

SCALE: 1" = 1'–0"



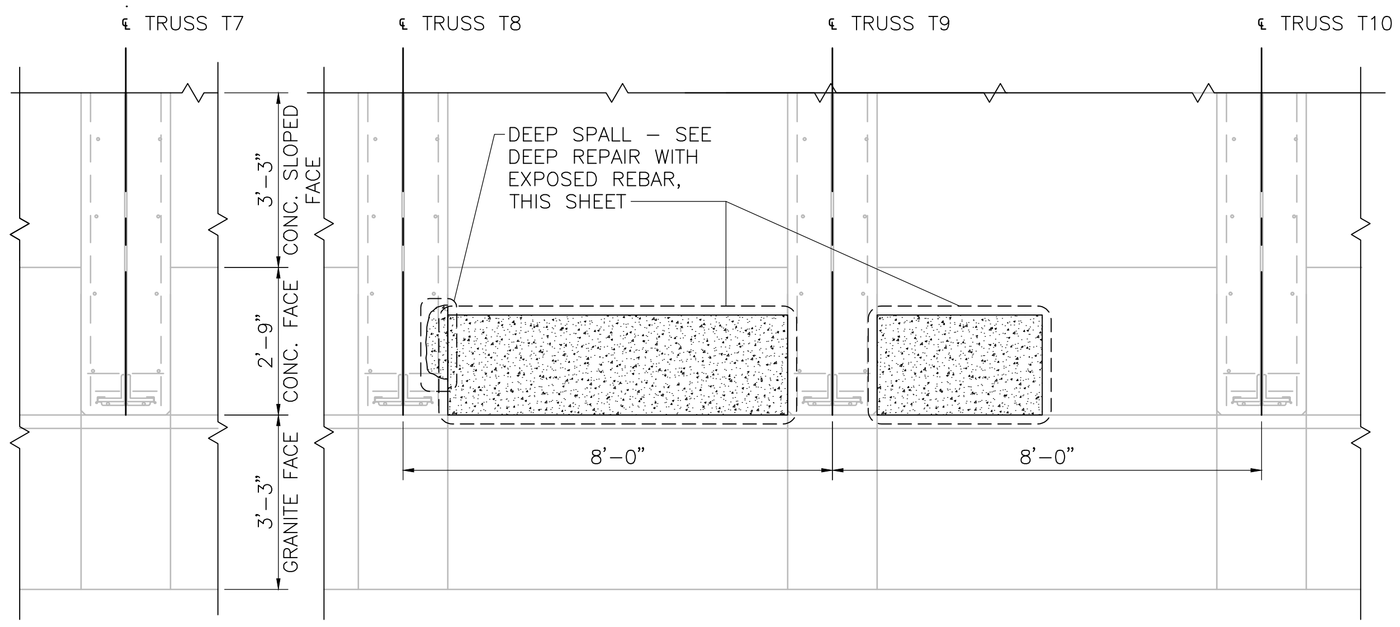
CONCRETE ENCASED TRUSS FLANGE REPAIR WITH EXPOSED REINFORCING STEEL

SCALE: 3" = 1'–0"



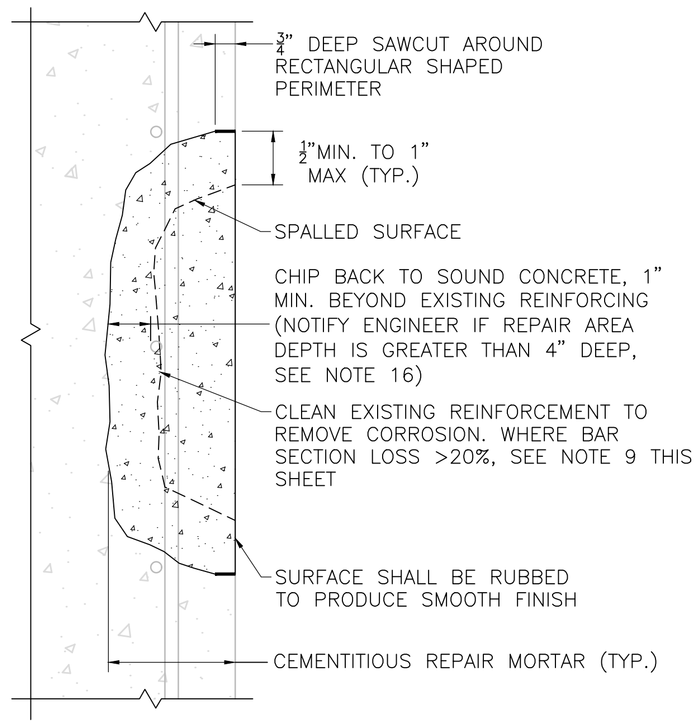
SHALLOW REPAIR

(AVERAGE DEPTH OF REPAIR IS LESS THAN 2" AND NO EXPOSED REBAR)



PIER 5 WEST FACE TRUSS BASE REPAIR ELEVATION

SCALE: ½" = 1'–0"



DEEP REPAIR WITH EXPOSED REBAR

(AVERAGE DEPTH OF REPAIR IS GREATER THAN 2" OR SPALL WITH EXPOSED REBAR)

TYPICAL SPALL AND/OR DELAMINATED CONCRETE REPAIR DETAILS

(DETAILS APPLY TO BOTH VERTICAL AND HORIZONTAL SURFACES)
SCALE: 3" = 1'–0"

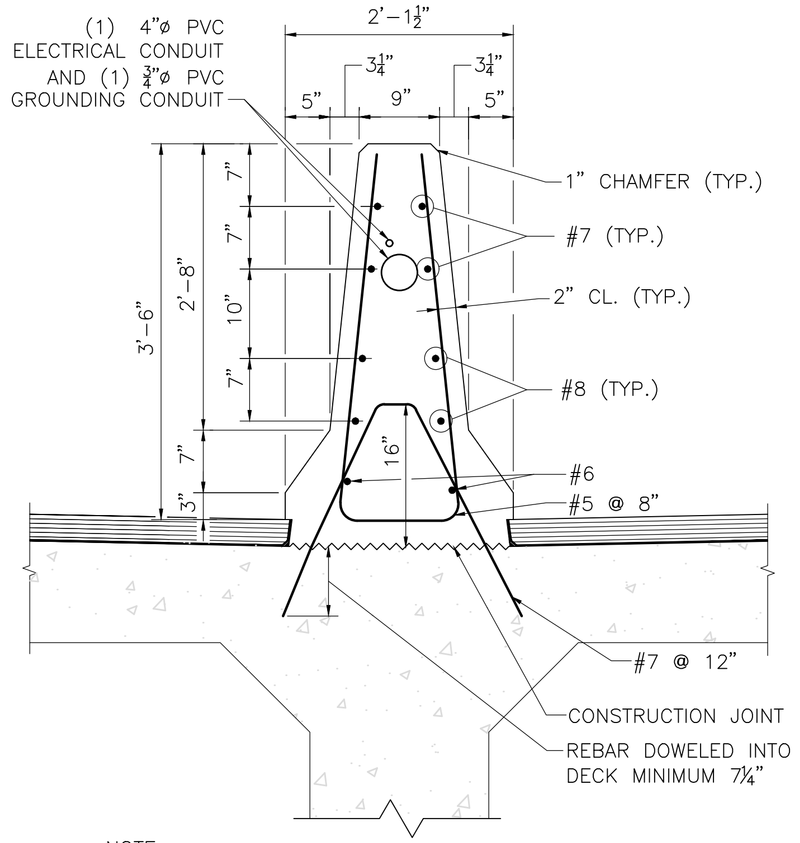
CONCRETE REPAIR NOTES:

1. FOR GENERAL NOTES, SEE SHEET 3.
2. FOR LOCATIONS OF CONCRETE REPAIRS, SEE UNDERSIDE REPAIR AREAS, SHEETS 14 THROUGH 18.
3. CONCRETE DEFICIENCIES REQUIRING REPAIR AS INDICATED ON THE PLANS HAVE BEEN DETERMINED BY A FIELD INSPECTION. ALL OF THE DEFICIENCY LOCATIONS, KNOWN TO EXIST AT THE TIME, HAVE BEEN SHOWN TO INDICATE THE APPROXIMATE EXTENT OF DETERIORATION THAT WILL HAVE TO BE REPAIRED BY THE CONTRACTOR.
4. THE ANTICIPATED EXTENT OF CONCRETE REPAIR HAS BEEN INDICATED ON THE CONTRACT PLANS. PRIOR TO COMMENCING REPAIR WORK, THE CONTRACTOR SHALL PERFORM SOUNDING AND INSPECTION OF THE EXISTING CONCRETE ENCASED TRUSSES TO DEFINE THE EXTENTS AND THE TYPES OF REPAIRS TO BE PERFORMED AND SHALL BE SUBJECT TO APPROVAL BY THE ENGINEER.
5. SAWCUT A RECTANGULAR OUTLINE AROUND THE LIMITS OF SPALLING/DELAMINATION. THE SAWCUT IS TO BE PERPENDICULAR TO THE FACE OF CONCRETE.
6. REMOVE ALL LOOSE AND DELAMINATED CONCRETE TO PROVIDE A SOUND BOND BETWEEN EXISTING CONCRETE AND NEW CONCRETE REPAIR/MORTAR. IF REQUIRED, CONTINUE CHIPPING TO PROVIDE A MINIMUM CLEAR DISTANCE OF 1" BEHIND THE INNERMOST LAYER OF EXPOSED REINFORCING BARS AS SHOWN IN THE DEEP REPAIR DETAIL.
7. CEMENTITIOUS MORTAR FOR PATCHING SHALL BE CHOSEN FROM MASSDOT QUALIFIED CONSTRUCTION MATERIALS LIST.
8. EXISTING REINFORCING STEEL, IF EXPOSED, SHALL BE THOROUGHLY CLEANED OF CORROSION. EXISTING EPOXY COATED STEEL SHALL BE COATED WITH AN EPOXY ZINC PRIMER AND THEN BONDING COMPOUND AFTER CLEANING AND IMMEDIATELY PRIOR TO INSTALLATION OF NEW CONCRETE REPAIR/MORTAR. SEE SPECIAL PROVISIONS ITEM 127.411.
9. IN DEEP REPAIRS WITH EXPOSED REINFORCEMENT WHERE BAR SECTION LOSS IS GREATER THAN 20%, ADDITIONAL REINFORCEMENT IS REQUIRED. IN SITUATIONS WHERE THE ENGINEER DETERMINES THAT THE DETERIORATED REINFORCEMENT MUST BE REPLACED, A NEW SECTION OF REBAR, MATCHING THE ORIGINAL SIZE OF THE DETERIORATED REBAR, SHALL BE SPLICED ONTO THE EXISTING BAR. NEW REINFORCEMENT SHALL MATCH EXISTING.
10. AT THE TIME THE REPAIR MORTAR IS APPLIED, THE EXISTING CONCRETE SUBSTRATE SHOULD BE SATURATED SURFACE DRY.
11. WHERE CONCRETE REMOVAL AND REPLACEMENT NECESSITATES ADJACENT SEPARATE CONCRETE PLACEMENTS, CONCRETE REMOVAL SHALL NOT BE ALLOWED WITHIN 1 FOOT OF ADJACENT REPAIR AREAS. ADJACENT AREAS WHERE THIS 1 FOOT BUFFER IS NOT ATTAINABLE SHALL BE COMBINED INTO A SINGLE REPAIR AREA.
12. IN SEQUENCING WORK, THE CONTRACTOR SHALL NOT BEGIN CONCRETE REMOVAL AT A LOCATION ADJACENT TO A COMPLETED REPAIR UNTIL A MINIMUM OF 7 CURING DAYS HAVE PASSED.
13. ALL CRACKS EQUAL TO OR GREATER THAN 0.125" IN WIDTH, OR AS OTHERWISE DIRECTED BY THE ENGINEER, SHALL BE REPAIRED.
14. EXISTING CRACKS WITH SURROUNDING SOUND CONCRETE SHALL BE REPAIRED BY EPOXY INJECTION AS DIRECTED BY THE ENGINEER. SEE SPECIFICATION ITEM 107.855.
15. EXISTING CRACKS WITH SURROUNDING UNSOUND CONCRETE SHALL BE REPAIRED AS SHOWN IN THE TYPICAL DEEP OR SHALLOW REPAIR DETAILS, AS DIRECTED BY THE ENGINEER.
16. IN AREAS WHERE CONCRETE DETERIORATION EXTENDS DEEPER THAN 4", CONTRACTOR SHALL CONTACT ENGINEER BEFORE PROCEEDING WITH ADDITIONAL CONCRETE REMOVAL.
17. CHOOSE EPOXY BONDING AGENT THAT IS COMPATIBLE WITH MANUFACTURER'S RECOMMENDATIONS FOR CEMENTITIOUS REPAIR MORTAR.

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

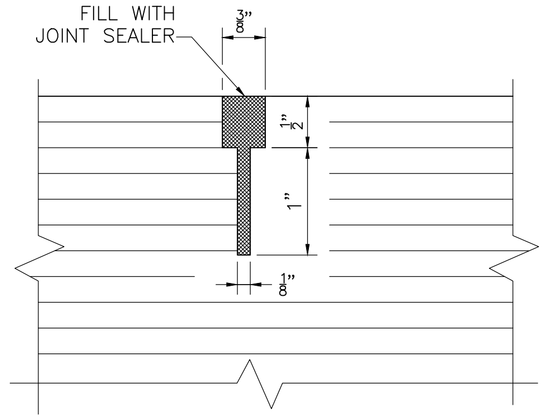
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	27	37
PROJECT FILE NO.	608762		

MEDIAN AND JOINT DETAILS

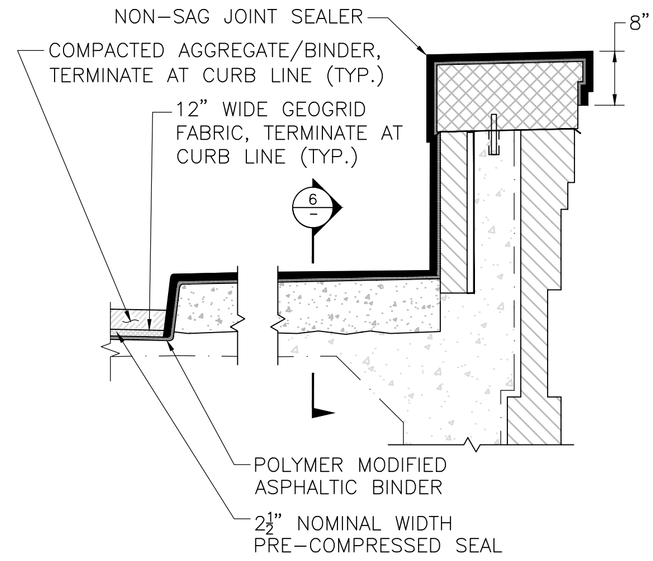


NOTE:
CAST–IN–PLACE DOUBLE FACE MEDIAN BARRIER SHALL BE 5000 PSI, ¾ IN, 685 HP CEMENT CONCRETE.

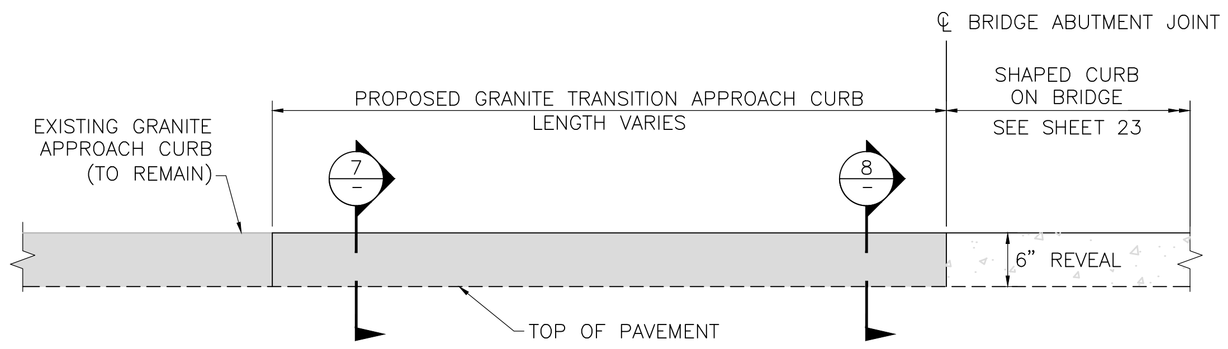
DOUBLE FACE MEDIAN BARRIER
SCALE: 1" = 1'–0"



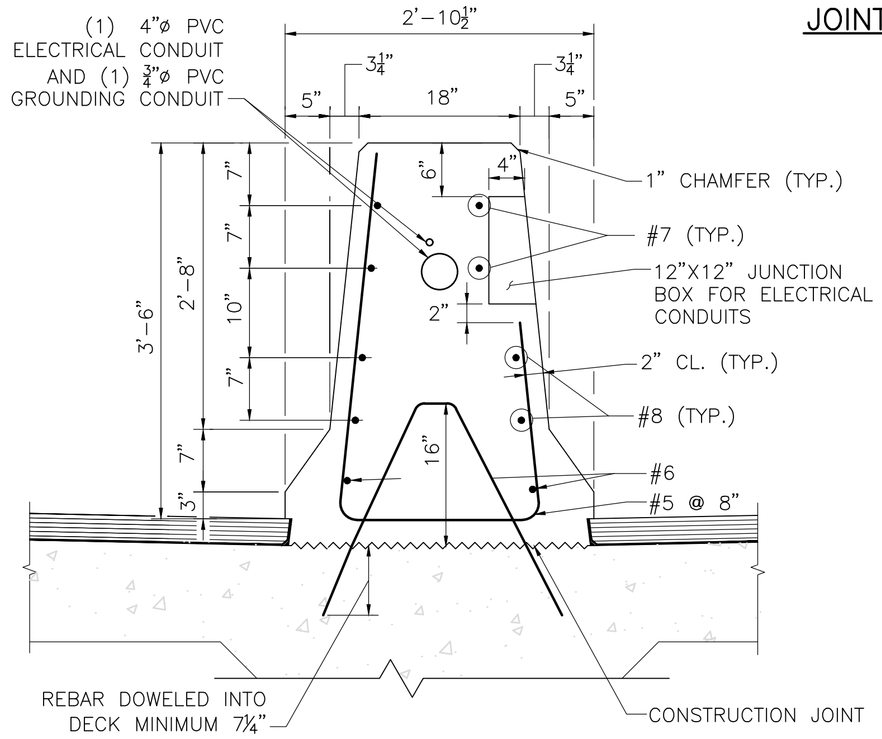
PAVEMENT SAWCUT DETAIL
FULL SIZE



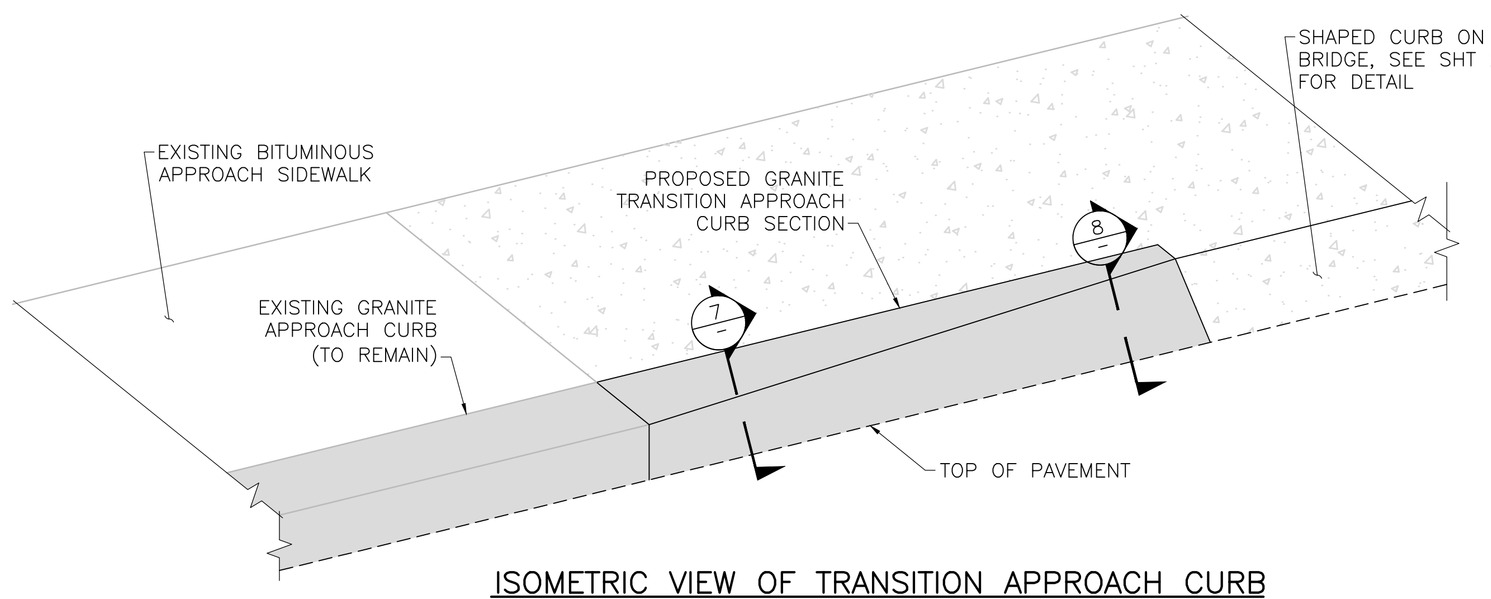
JOINT DETAIL AT BRIDGE PARAPETS
SCALE: ¾" = 1'–0"



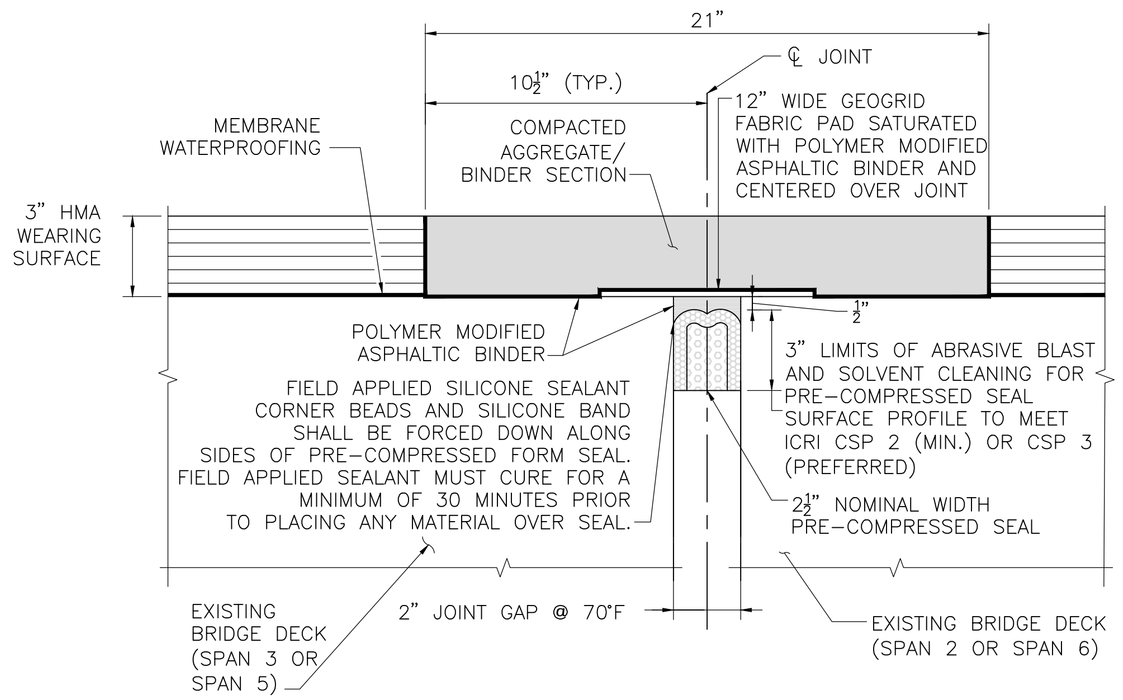
TRANSITION APPROACH CURB DETAIL – ELEVATION VIEW
SCALE: 1" = 1'–0"



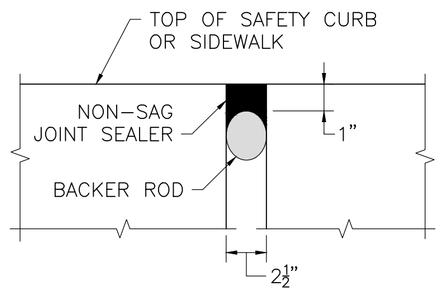
REINFORCEMENT DETAILS AT JUNCTION BOX
SCALE: 1" = 1'–0"



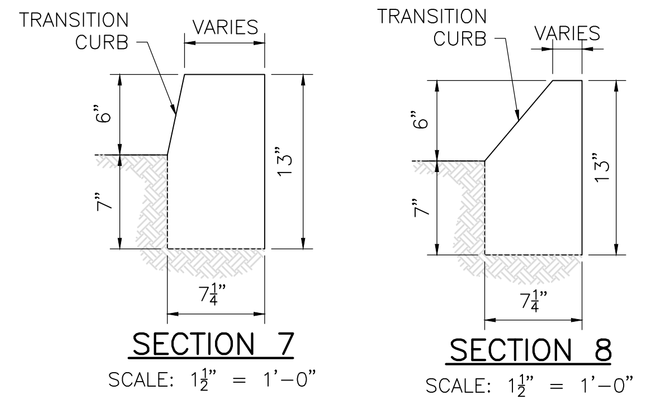
ISOMETRIC VIEW OF TRANSITION APPROACH CURB
SCALE: 1" = 1'–0"



MODIFIED ASPHALTIC PLUG SECTION
SCALE: 3" = 1'–0"



SECTION 6
SCALE: 3" = 1'–0"



SECTION 7
SCALE: 1½" = 1'–0"

SECTION 8
SCALE: 1½" = 1'–0"

MODIFIED ASPHALTIC BRIDGE JOINT CONSTRUCTION SEQUENCE:

1. EXISTING JOINT REMOVAL, DECK RECONSTRUCTION, AND WEARING SURFACE PLACEMENT SHALL BE CONSTRUCTED IN ADVANCE OF NEW JOINT INSTALLATION.
2. MARK OUT THE PROPOSED EDGES OF THE ASPHALTIC JOINT AT THE PARAPETS.
3. IMPLEMENT TRAFFIC CONTROL PLAN FOR THE EXISTING JOINT REPLACEMENT.
4. SAWCUT THE PERIMETERS OF THE PROPOSED ASPHALTIC PLUG JOINT, AND REMOVE THE HMA WEARING SURFACE, MEMBRANE WATERPROOFING, ELASTOMERIC CONCRETE, NEOPRENE STRIP SEAL, STEEL EXTRUSIONS, AND ANCHORAGES.
5. THE JOINT OPENING SHALL BE FREE OF ALL CONTAMINANTS SUCH AS GREASE, DUST, AND DIRT. PRIOR TO JOINT SYSTEM INSTALLATION, THE JOINT WALLS SHALL BE BLOWN CLEAN WITH OIL–FREE COMPRESSED AIR AND WIPED CLEAN WITH A CLEAN WET CLOTH TO THE BOTTOM OF THE PRE–COMPRESSED SEAL MATERIAL PLUS 1" TO REMOVE ANY DUST REMAINING. THE SUBSTRATE PREP SHALL FOLLOW THE ICRI CONCRETE SURFACE PROFILE STANDARDS TO ACHIEVE A SURFACE PROFILE OF CSP 2 (MIN.) OR 3 (PREFERRED) IN ORDER TO ACCEPT THE JOINT SYSTEM.
6. INSTALL THE PRE–COMPRESSED SEAL JOINT SYSTEM PER THE MANUFACTURER'S RECOMMENDATIONS.
7. COAT THE SURFACES OF THE BLOCKOUT AND THE REMAINING JOINT OPENING WITH THE POLYMER MODIFIED ASPHALTIC BINDER.
8. PLACE THE 12" WIDE GEOGRID FABRIC PAD SATURATED WITH POLYMER MODIFIED ASPHALTIC BINDER CENTER OVER THE JOINT.
9. PLACE COMPACTED AGGREGATE/BINDER TO FILL ALL VOIDS AND OBTAIN A FINAL AND EVEN SURFACE WITH THE ADJACENT WEARING SURFACE.
10. IMPLEMENT APPROVED TRAFFIC CONTROL PLAN FOR NEXT PHASE OF CONSTRUCTION AND REPEAT STEPS 3 THROUGH 8.
11. IT IS NOT NECESSARY TO CONSTRUCT THE JOINT AT MEAN TEMPERATURE; HOWEVER, THE MANUFACTURER SHOULD BE CONSULTED FOR INSTALLATION GUIDELINES FOR EXTREME CLIMATE CONDITIONS.
12. HE PRE–COMPRESSED SEAL JOINT SYSTEM SHALL BE CONTINUOUS THROUGH BARRIERS AS APPROPRIATE TO THE CONDITIONS AT HAND. CONTINUITY OF THE SEAL SHALL BE ACHIEVED THROUGH THE USE OF FACTOR–FABRICATED UNIVERSAL OR CUSTOM TRANSITIONS SUPPLIED BY THE PRE–COMPRESSED JOINT SEAL MANUFACTURER. THE FIELD SPLICE OF THE PRE–COMPRESSED SEAL SHALL BE DONE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

BRIDGE NO. B–16–246 = BRIDGE NO. C–01–029 (4EV)

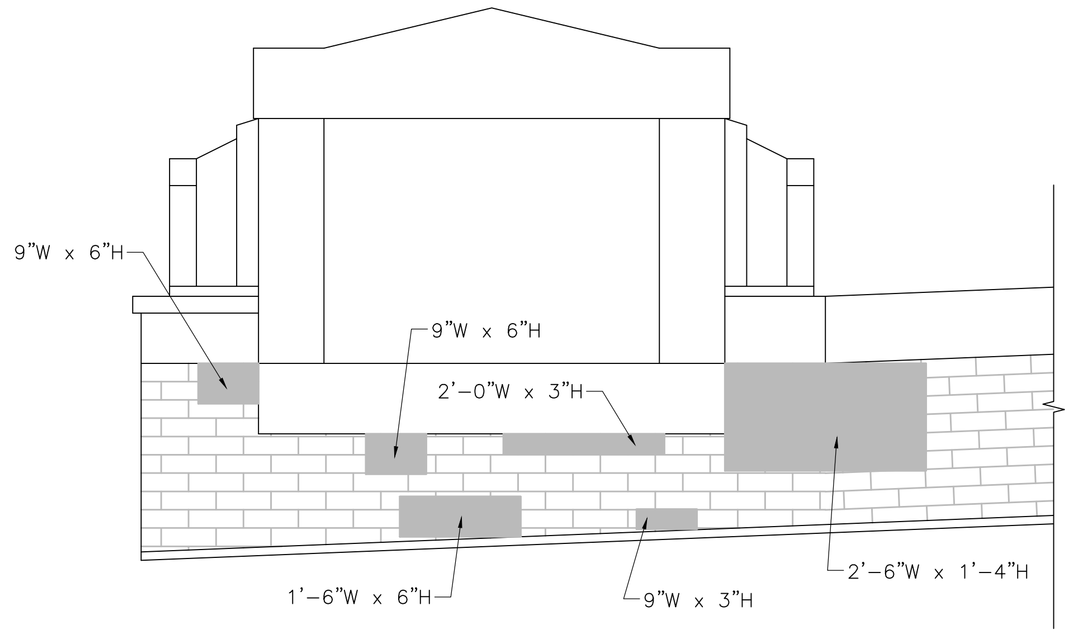
BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	28	37
PROJECT FILE NO.	608762		

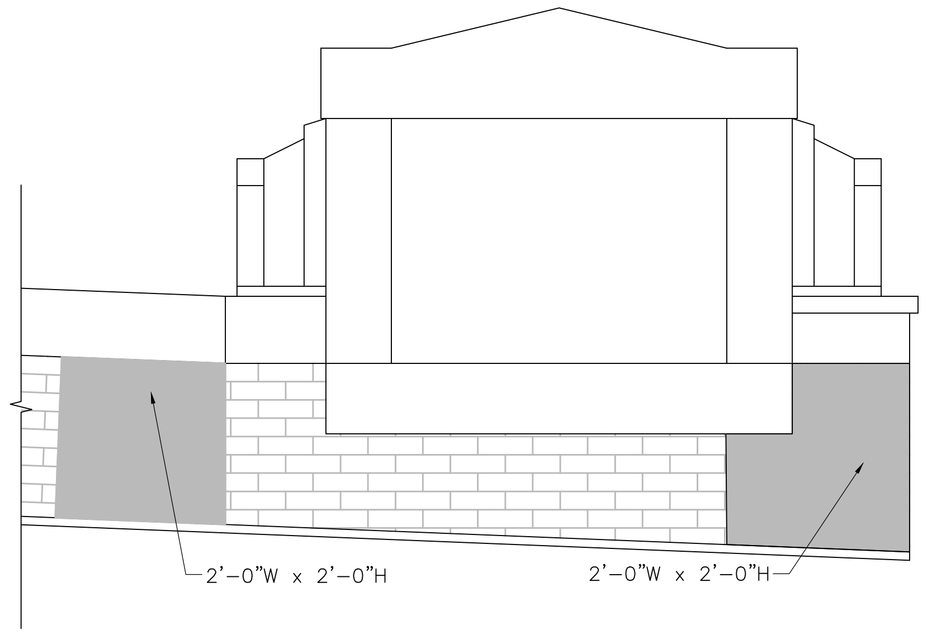
END POST DETAILS

NOTES:

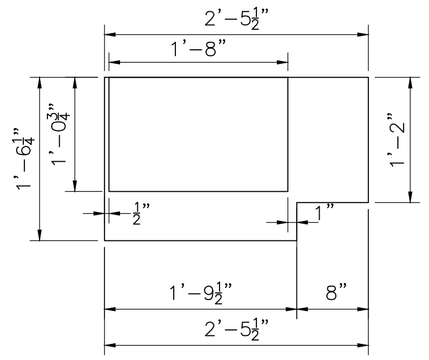
1. SEE SHEET 23 FOR REPAIR DETAILS AND REQUIREMENTS OF BRICK REMOVAL.



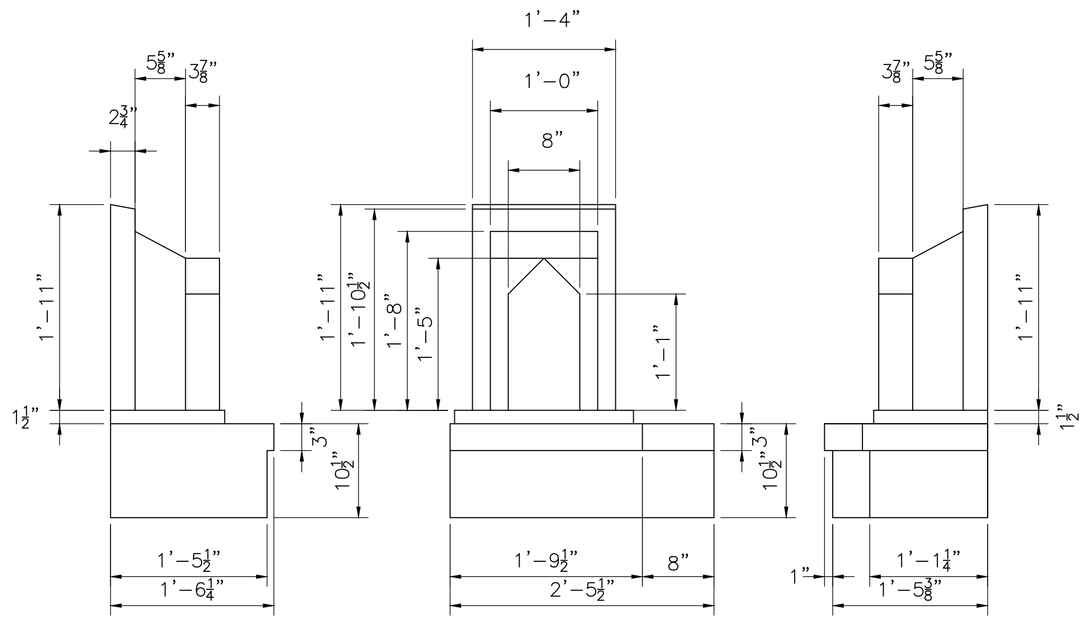
NORTH PARAPET – END CAP
WEST END (SOUTH FACE SHOWN)
SCALE: $\frac{3}{4}$" = 1'-0"



NORTH PARAPET – END CAP
EAST END (SOUTH FACE SHOWN)
SCALE: $\frac{3}{4}$" = 1'-0"

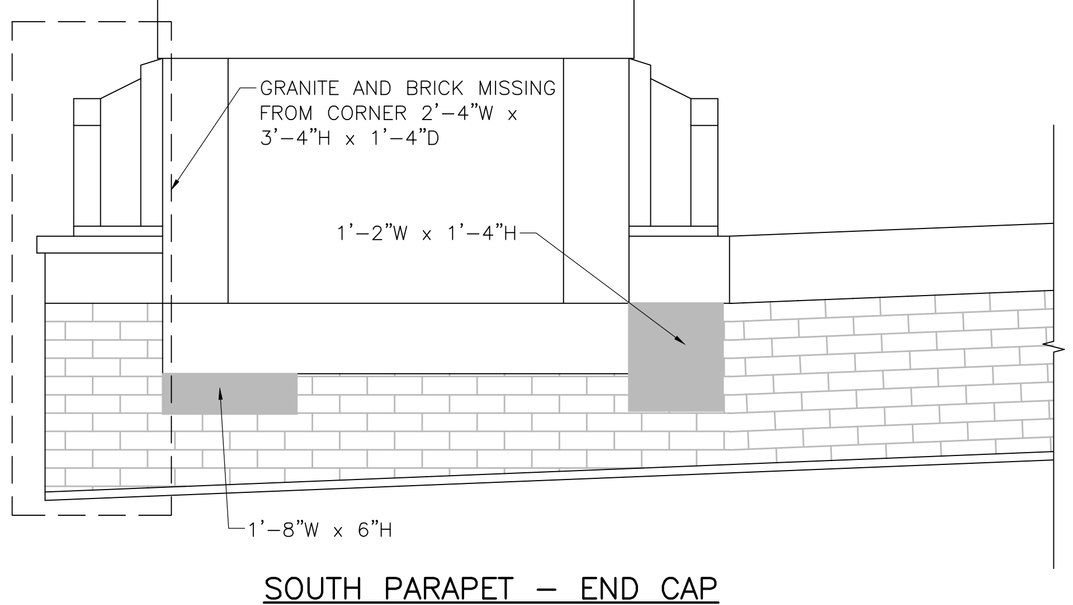


PLAN

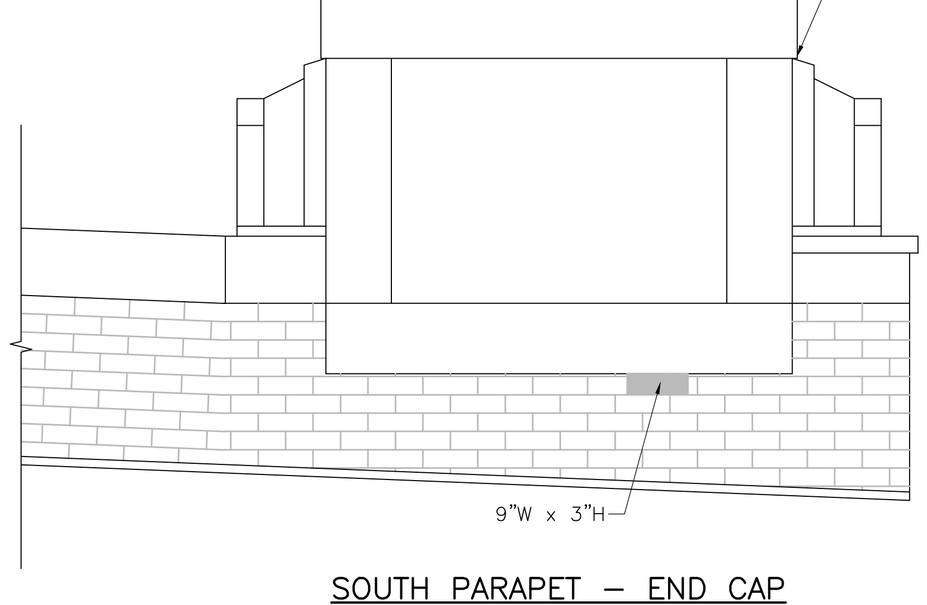


SIDE ELEVATION | FRONT ELEVATION | SIDE ELEVATION

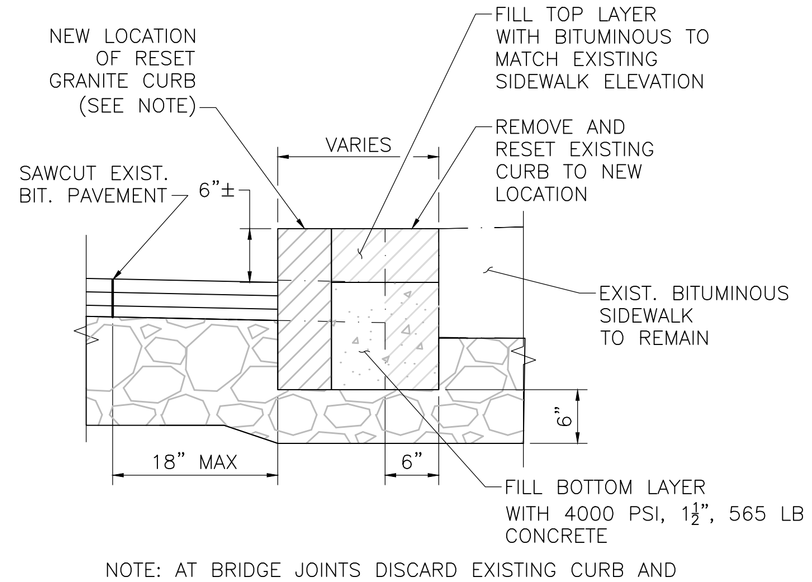
END CAP DETAILS
SCALE: 1" = 1'-0"



SOUTH PARAPET – END CAP
EAST END (NORTH FACE SHOWN)
SCALE: $\frac{3}{4}$" = 1'-0"



SOUTH PARAPET – END CAP
WEST END (NORTH FACE SHOWN)
SCALE: $\frac{3}{4}$" = 1'-0"



NOTE: AT BRIDGE JOINTS DISCARD EXISTING CURB AND REPLACE WITH TRANSITION CURB, SEE SHEET 27

GRANITE CURB – REMOVE AND RESET
SCALE: 1" = 1'-0"

LEGEND:

MISSING/DAMAGED BRICK L – LONG W – WIDE

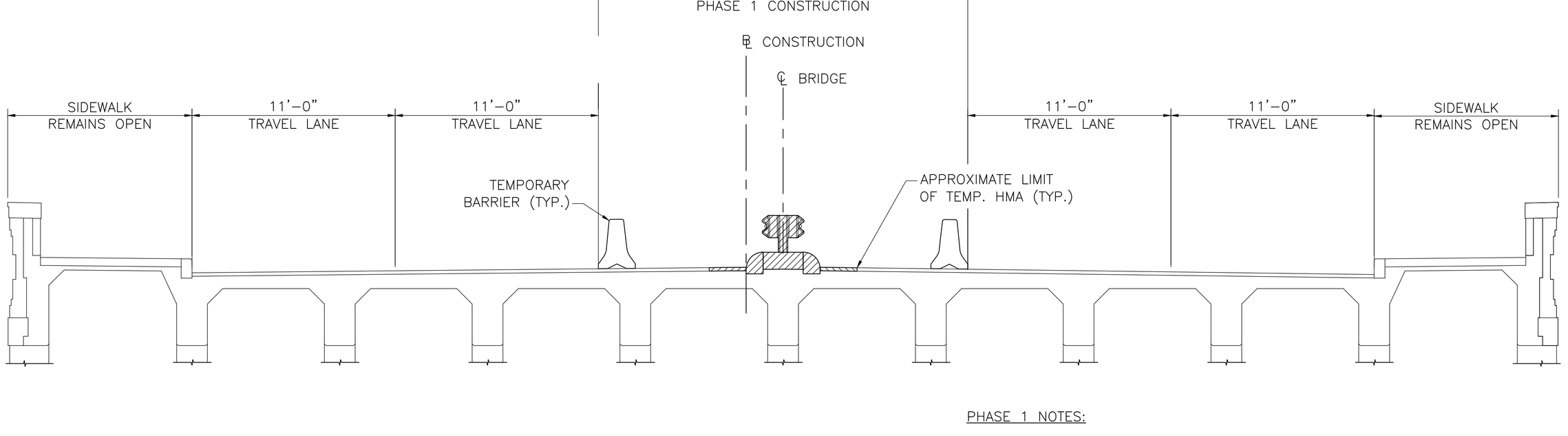
MISSING MORTAR (M.M.) H – HIGH

BRIDGE NO. B-16-246 = BRIDGE NO. C-01-029 (4EV)

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	29	37
PROJECT FILE NO.	608762		

CONSTRUCTION PHASING (1 OF 2)



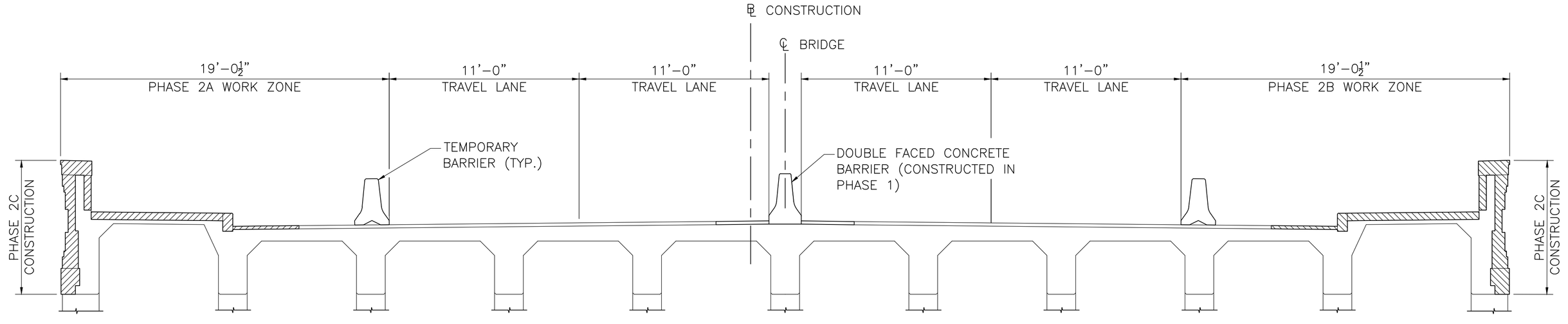
PHASE 1 CONSTRUCTION
SCALE: $\frac{1}{4}$" = 1'–0"

PHASE 1 NOTES:

1. INSTALL TEMPORARY BARRIER ALONG BOTH SIDES OF MEDIAN.
2. REMOVE AND DISCARD EXISTING MEDIAN GUARDRAIL, LIGHTING, AND DEMOLISH EXISTING CONCRETE MEDIAN.
3. CONSTRUCT PROPOSED MEDIAN BARRIER.
4. INSTALL MEDIAN LIGHTING AND END TREATMENTS.
5. PERFORM FULL DEPTH DECK REPAIRS WITHIN PHASE 1 WORK AREA. SEQUENCE SUCH THAT ALL CURING OF REPAIR CONCRETE HAS BEEN COMPLETED PRIOR TO COMPLETION OF PHASE 1.
6. PLACE TEMPORARY HMA AS REQUIRED WITHIN WORK LIMITS UNTIL FINAL MILLING AND PAVING.

NOTES:

1. ROADWAY CLOSURES TO BE COORDINATED WITH MASSDOT DISTRICT 6 TRAFFIC ENGINEERS. DAYTIME OR NIGHTTIME WORK HOURS SHALL BE ALLOWED FOR PHASES 1 THROUGH 2C.
2. PHASE 1 MUST BE COMPLETED PRIOR TO THE IMPLEMENTATION OF PHASES 2A THROUGH 2C.
3. DEMOLITION OF EXISTING INTERIOR BRICK VENEER ALONG INSIDE FACE OF PARAPETS MUST BE COMPLETED PRIOR TO WORK ON BRIDGE FACADES (PHASE 2C) AS INTERIOR BRICK MUST BE SALVAGED TO REPAIR EXTERIOR FACADES, SEE REPAIR DETAILS.
4. ALL UNDERSIDE REPAIRS AT CONCRETE ENCASED TRUSSES AND DECK TO BE COORDINATED WITH DCR AND COAST GUARD. FOR REPAIRS LOCATED OUTSIDE THE CONSTRUCTION PHASES SHOWN ON THESE PLANS, CONTRACTOR SHALL DEVELOP PHASING AND TRAFFIC CONTROL PLAN TO COMPLETE FULL DEPTH REPAIRS. PHASING TO BE PER CONTRACTOR AND REPAIRS SHALL BE COORDINATED WITH WORK ON ROADWAY, BARRIER AND SIDEWALKS. STANDARD TEMPORARY LANE CLOSURES ARE SHOWN ON SHEETS 32 AND 33.
5. LIGHTING CONDUITS TO BE INSTALLED DURING PHASE 2C.
6. INSTALLATION OF BRIDGE JOINTS AND MILLING AND PAVING SHALL BE COMPLETED UTILIZING NIGHTTIME SINGLE LANE CLOSURES ONCE PHASES 1 THROUGH 2C ARE COMPLETED, SEE SHEETS 32 AND 33.



PHASE 2 CONSTRUCTION
SCALE: $\frac{1}{4}$" = 1'–0"

PHASE 2A AND 2B NOTES:

1. INSTALL TEMPORARY BARRIER ALONG FACE OF SIDEWALK.
2. REMOVE GRANITE CAP STONES AND INTERIOR BRICK. SALVAGE INTERIOR BRICK FOR USE ALONG EXTERIOR FACADES. STORE GRANITE CAP STONES.
3. REMOVE EXISTING WEARING SURFACE ALONG SIDEWALKS, CHIP AWAY DETERIORATED CONCRETE, AND REPAIR AND WIDEN CONCRETE SIDEWALK.
4. REPLACE INTERIOR BRICK VENEER ON BRIDGE PARAPET.
5. RESET GRANITE CAP STONES. NOTE THAT SOME GRANITE CAP STONES MAY NEED TO BE RESET AFTER EXTERIOR FACADE REPAIRS IN PHASE 2C, SEE PHASE 2C NOTES.
6. PERFORM FULL DEPTH DECK REPAIRS WITHIN PHASE 2 WORK AREA. SEQUENCE SUCH THAT ALL CURING OF REPAIR CONCRETE HAS BEEN COMPLETED PRIOR TO COMPLETION OF PHASE 2.
7. PLACE TEMPORARY HMA UNTIL FINAL MILLING AND PAVING.

PHASE 2C NOTES:

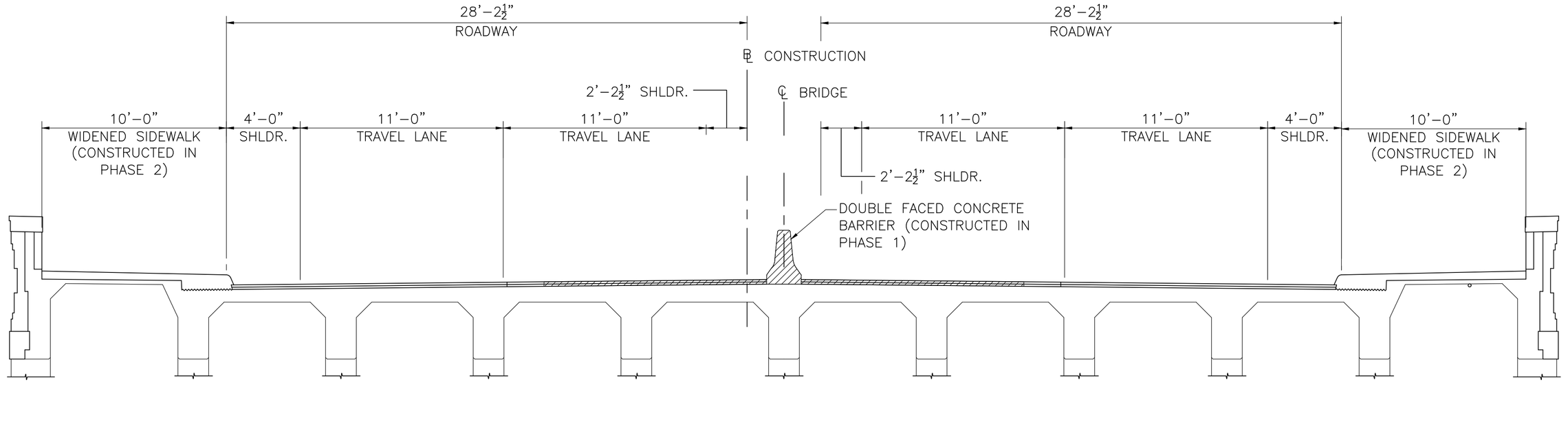
1. REMOVE AND REPLACE DETERIORATED BRICK ALONG EXTERIOR.
2. RESET REMAINING GRANITE CAP STONES AS REQUIRED.
3. REPLACE EXISTING NAVIGATION LIGHTING AND OTHER CONDUITS ON EXTERIOR FACE.

BRIDGE NO. B–16–246 = BRIDGE NO. C–01–029 (4EV)

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	30	37
PROJECT FILE NO.	608762		

CONSTRUCTION PHASING (2 OF 2)



REPAIRED BRIDGE CROSS SECTION
SCALE: ¼" = 1'–0"

NOTES:

1. ROADWAY CLOSURES TO BE COORDINATED WITH MASSDOT DISTRICT 6 TRAFFIC ENGINEERS. NIGHTTIME HOURS ONLY FOR ALL LANE CLOSURES.
2. AFTER THE COMPLETION OF PHASES 1 THROUGH 2C, CONTRACTOR MAY PERFORM SINGLE LANE CLOSURE AT NIGHT TO PERFORM REMAINING FULL DEPTH DECK REPAIRS.
3. ALL UNDERSIDE REPAIRS AT CONCRETE ENCASED TRUSSES AND DECK TO BE COORDINATED WITH DCR AND COAST GUARD.
4. INSTALLATION OF BRIDGE JOINTS AND MILLING AND PAVING SHALL BE COMPLETED UTILIZING NIGHT SINGLE LANE CLOSURES ONCE PHASES 1 THROUGH 2C ARE COMPLETED

BRIDGE NO. B–16–246 = BRIDGE NO. C–01–029 (4EV)

CONSTRUCTION SIGN SUMMARY

IDENTIFICATION NUMBER	SIZE WIDTH (IN)	SIZE HEIGHT (IN)	TEXT	DIMENSIONS (IN) LETTER HEIGHT	DIMENSIONS (IN) VERTICAL SPACING	DIMENSIONS (IN) ARROW RTE. MKR.	NUMBER OF SIGNS REQUIRED	COLOR BACK-GROUND	COLOR LEGEND	COLOR BORDER	UNIT AREA (S.F.)	TOTAL AREA (S.F.)
MA-R2-10a	48"	36"	WORK ZONE SPEEDING FINES DOUBLED	(2)	(2)	(2)	5	ORANGE/ WHITE	BLACK	BLACK	12.00	60.0
MA-R2-10e	36"	48"	END ROAD WORK / DOUBLE FINES END				2	ORANGE/ WHITE	BLACK	BLACK	12.00	48.0
MA-W20-7b	36"	36"	POLICE OFFICER AHEAD				2	FLUOR. ORANGE	BLACK	BLACK	9.00	18.0
M4-8a	24"	18"	END DETOUR	(1)	(1)	(1)	2	FLUOR. ORANGE	BLACK	BLACK	3.0	6.0
M4-9bL	30"	24"	DETOUR ←				6	FLUOR. ORANGE	BLACK	BLACK	5.0	30.0
M4-9bR	30"	24"	DETOUR →				7	FLUOR. ORANGE	BLACK	BLACK	5.0	35.0
R9-9	24"	12"	SIDEWALK CLOSED				5	WHITE	BLACK	BLACK	2.00	10.0
R9-10L	24"	12"	SIDEWALK CLOSED ← USE OTHER SIDE				1	WHITE	BLACK	BLACK	2.00	2.0
SP-1	36"	24"	ELIOT BRIDGE				5	FLUOR. ORANGE	BLACK	BLACK	6.0	30.0
W1-4bL	36"	36"					5	FLUOR. ORANGE	BLACK	BLACK	9.0	45.0
W1-4bR	36"	36"					5	FLUOR. ORANGE	BLACK	BLACK	9.0	45.0
W4-2L	36"	36"					5	FLUOR. ORANGE	BLACK	BLACK	9.0	45.0
W4-2R	36"	36"					7	FLUOR. ORANGE	BLACK	BLACK	9.0	63.0
W20-1c	36"	36"	ROAD WORK AHEAD				5	FLUOR. ORANGE	BLACK	BLACK	9.0	45.0
W20-5cL	36"	36"	LEFT LANE CLOSED AHEAD				5	FLUOR. ORANGE	BLACK	BLACK	9.0	45.0
W20-5cR	36"	36"	RIGHT LANE CLOSED AHEAD				7	FLUOR. ORANGE	BLACK	BLACK	9.0	63.0

NOTES:

1. NUMERICAL LIMITS AND JUSTIFICATION FOR SPEED & ADVISORY EXIT SPEED SIGNS SHALL BE OBTAINED FROM THE SPEED ZONING UNIT OF THE TRAFFIC ENGINEERING SECTION, MASSDOT, OR DEPARTMENT OF CONSERVATION AND RECREATION. BEFORE FABRICATION AND/OR ERECTION.
2. HIGH INTENSITY ENCAPSULATED LENS REFLECTIVE SHEETING SHALL BE USED FOR ALL SIGNS. THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" 2009 EDITION, THE 1996 MASSDOT CONSTRUCTION AND TRAFFIC STANDARD DETAILS", AND ALL AMENDMENTS SHALL GOVERN.
3. (1) SEE MUTCD 2009 EDITION, 1979 STD. HWY. SIGNS AND SECTION M9.30.0 TYPE III OF THE MASSDOT STANDARD SPECIFICATION FOR TEXT DIMENSIONS AND COLOR.

   (2) SEE MASSDOT SIGN STANDARDS.

BOSTON & CAMBRIDGE
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MA	-	31	37
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TEMPORARY TRAFFIC CONTROL PLANS
SIGN SUMMARY AND NOTES

TEMPORARY TRAFFIC CONTROL GENERAL NOTES:

1. ALL TEMPORARY TRAFFIC CONTROL WORK SHALL CONFORM TO THE LATEST EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) AND ALL REVISIONS.
2. ALL SIGN LEGENDS, BORDERS AND MOUNTING SHALL BE IN ACCORDANCE WITH THE MUTCD.
3. TEMPORARY CONSTRUCTION SIGNING AND ALL OTHER TRAFFIC CONTROL DEVICES SHALL BE IN PLACE PRIOR TO THE START OF ANY WORK.
4. TEMPORARY CONSTRUCTION SIGNING, BARRICADES AND ALL OTHER NECESSARY WORK ZONE TRAFFIC CONTROL DEVICES SHALL BE REMOVED FROM THE ROAD OR COVERED WHEN THEY ARE NOT REQUIRED FOR CONTROL OF TRAFFIC.
5. SIGNS AND SIGN SUPPORTS LOCATED ON OR NEAR THE TRAVELED WAY, AND REFLECTORIZED PLASTIC DRUMS WITH LIGHTING DEVICES MOUNTED ON THEM, MUST PASS THE CRITERIA SET FORTH IN NCHRP REPORT 350., "RECOMMENDED PROCEDURES FOR THE SAFETY PERFORMANCE EVALUATION OF HIGHWAY FEATURES" AND MASH.
6. CONTRACTORS SHALL NOTIFY EACH ABUTTER AT LEAST 24 HOURS IN ADVANCE OF THE START OF ANY WORK THAT WILL REQUIRE TEMPORARY CLOSURE OF ACCESS, SUCH AS CONDUIT INSTALLATION, EXISTING PAVEMENT EXCAVATION, TEMPORARY DRIVEWAY PAVEMENT PLACEMENT AND SIMILAR OPERATIONS.
7. CONSTRUCTION / SURVEY VEHICLE ACCESS TO BE COORDINATED WITH POLICE DETAIL.
8. THE FIRST TEN PLASTIC DRUMS OF A TAPER SHALL BE MOUNTED WITH SEQUENTIAL LIGHTS, TYPE A.
9. THE ADVISORY SPEED LIMIT, IF REQUIRED, SHALL BE DETERMINED BY THE DISTRICT TRAFFIC ENGINEER OR THE DEPARTMENT OF CONSERVATION AND RECREATION DEPENDANT ON JURISDICTION.
10. DISTANCES ARE A GUIDE AND MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER.
11. MAXIMUM SPACING OF TRAFFIC DEVICES IN A TAPER (DRUMS OF CONES) IS EQUAL IN FEET TO THE SPEED LIMIT IN M.P.H.
12. MINIMUM LANE WIDTH IS TO BE 11 FEET UNLESS OTHERWISE SHOWN. MINIMUM LANE WIDTH TO BE MEASURED FROM THE EDGE OF THE DRUMS OR MEDIAN BARRIER.
13. SEE SPECIAL PROVISIONS FOR ALL WORK HOUR RESTRICTIONS.
14. CONTRACTOR TO MAINTAIN ACCESS TO ABUTTING DRIVEWAYS AND BUSINESSES AT ALL TIMES DURING CONSTRUCTION.
15. MA-W20-7B SHALL BE USED WHENEVER POLICE OFFICERS ARE DIRECTING TRAFFIC.

WORK ZONE TAPER NOTES

1. THE FINAL LOCATION OF PROPOSED SIGNS SHALL BE DETERMINED IN THE FIELD AS DEEMED APPROPRIATE BY THE ENGINEER.
2. TYPE III BARRICADES SHALL BE USED AS REQUIRED.
3. USE FLASHING ARROW BOARD AS REQUIRED.
4. SPEED LIMIT SHALL BE APPROVED BY MASSDOT PRIOR TO INSTALLATION.

SIGNING NOTES

1. ALL SIGNS SHALL BE MOUNTED ON THEIR OWN STANDARD SIGN SUPPORTS.
2. ALL EXISTING SIGNS NOT APPLICABLE TO VARIOUS STAGES OF CONSTRUCTION SHALL BE REMOVED OR COVERED.
3. THE CONTRACTOR SHALL USE "R7-1" SIGNS IF PARKING AREAS ARE IMPACTED AND AS DIRECTED BY MASSDOT.
4. R7-1 SIGNS SHALL BE POSTED 48 HOURS PRIOR TO CONSTRUCTION START.
5. SIGNS SHALL NOT BE MOUNTED ON CHANNELIZATION DRUMS OR CONES.

LEGEND

•	REFLECTORIZED PLASTIC DRUM		IMPACT ATTENUATOR
P/F	POLICE/FLAGGER DETAIL		MEDIAN BARRIER
P	POLICE		MEDIAN BARRIER WITH WARNING LIGHTS
	TYPE III BARRICADE		WORK VEHICLE
	CHANGEABLE MESSAGE SIGN		MOVEABLE IMPACT ATTENUATOR
	FLASHING ARROW PANEL		TRUCK MOUNTED ATTENUATOR
	WORK ZONE		TRAFFIC OR PEDESTRIAN SIGNAL
	DIRECTION OF TRAFFIC		SIGN

TAPER LENGTH FORMULAS	
SPEED LIMIT (S)	TAPER LENGTH (L) FEET
40 MPH OR LESS	$L = \frac{WS^2}{60}$
45 MPH OR MORE	L = WS

L = TAPER LENGTH IN FEET
W = WIDTH OFFSET IN FEET
S = DESIGN SPEED (30 MPH)

BUFFER SPACING	
SPEED (MPH)	DISTANCE (FEET)
20	115
25	155
30	200
35	250
40	305
45	360
50	425

02-SEP-2022
100% SUBMISSION


100% SUBMISSION
02-SEP-2022
31-37_TRAFFIC MANAGEMENT PLANS.DWG
Plotted on 17-May-2023 2:02 PM
BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER
STATE
FED. AID PROJ. NO.
SHEET NO.
TOTAL SHEETS
MA
-
32
37
PROJECT FILE NO.
608762
TEMPORARY TRAFFIC CONTROL PLANS
LEFT LANE CLOSURE PLAN
MATCHLINE SEE ABOVE
MATCHLINE SEE BELOW
FLASHING RIGHT MODE
146' TAPER
124' TAPER
SOLDIERS FIELD RD
LEFT LANE CLOSED AHEAD
W20-5cL
WORK ZONE SPEEDING FINES DOUBLED
MA-R2-10a
W4-2L
ELIOT BRIDGE
SP-1
ROAD WORK AHEAD
W20-1c
END ROAD WORK
DOUBLE FINES END
MA-R2-10e
250'
500'
100'
TAPER 100'
100' TAPER
100'-150' BUFFER
LIMIT OF WORK
MEET EXISTING
STA.10+45.75
STA.5+78.25
ELIOT BRIDGE
CHARLES RIVER
GERRYS LANDING RD
GREENOUGH BLVD
LEFT LANE CLOSURE PLAN
SCALE: 1" = 50'-0"
SCALE: 1" = 50'
0
50
100
150
200
N

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	33	37
PROJECT FILE NO.	608762		

TEMPORARY TRAFFIC CONTROL PLANS
RIGHT LANE CLOSURE PLAN

N

WORK ZONE
SPEEDING FINES DOUBLED
MA-R2-10a

100'

W4-2R

RIGHT LANE CLOSED AHEAD
W20-5cR

ELIOT BRIDGE SP-1

ROAD WORK AHEAD
W20-1c

END ROAD WORK
DOUBLE FINES END

R2-10e

100' TAPER

LIMIT OF WORK
MEET EXISTING
STA.5+78.25

GERRYS LANDING RD

CHARLES RIVER

ELIOT BRIDGE

5+73.25 6 7 8 N58°22'48"E 9 10 10+45.75
467.50'

FLASHING LEFT MODE

GREENOUGH BLVD

500'

250'

250'

LIMIT OF WORK
MEET EXISTING
STA.10+45.75

TAPER
100'

MATCHLINE SEE BELOW

500'

250'

250'

MATCHLINE SEE ABOVE

L=146'
TAPER

SOLDIERS FIELD RD

L=146'
TAPER

RIGHT LANE CLOSURE PLAN

SCALE: 1" = 50'-0"

0 50 100 150 200

SCALE: 1" = 50'

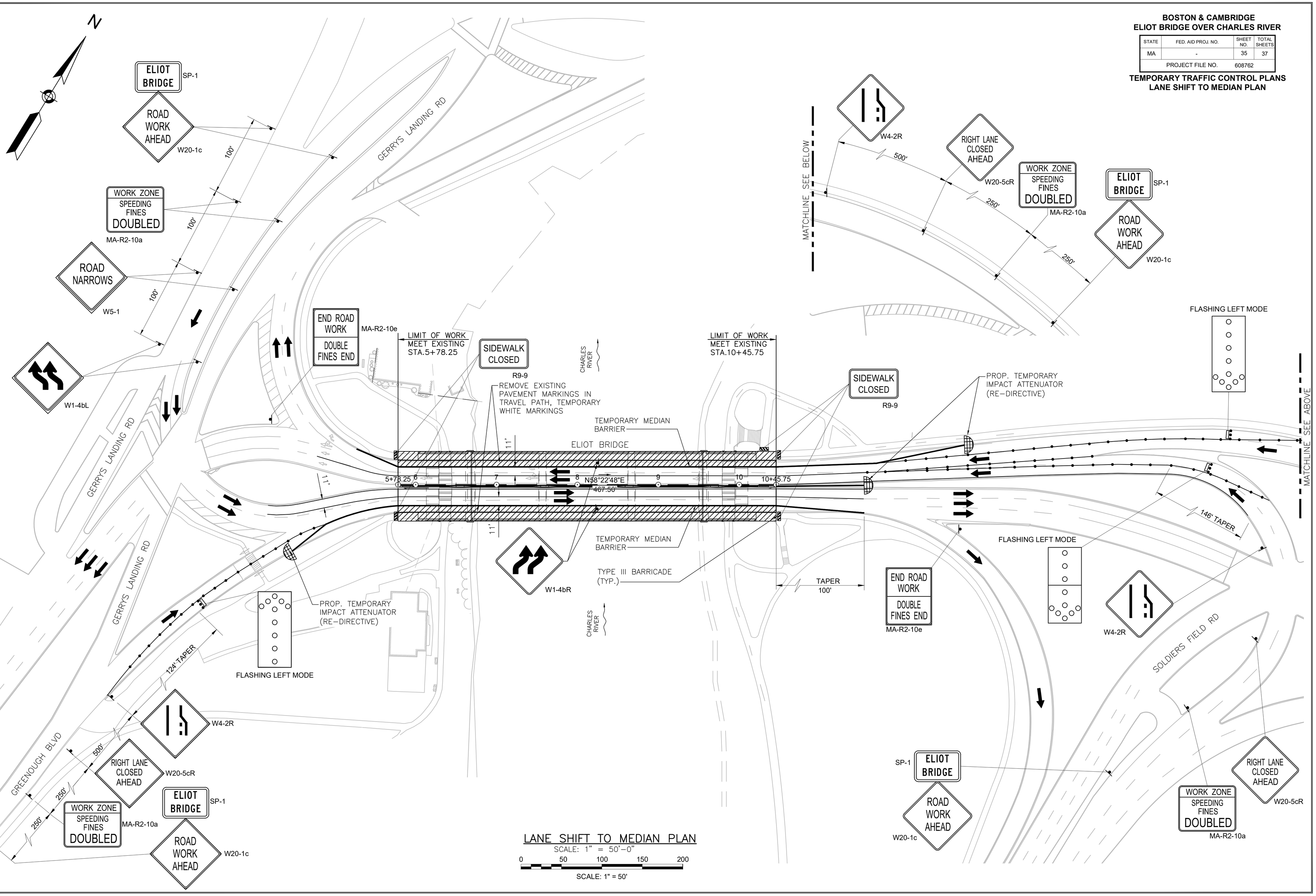
31-37_TRAFFIC MANAGEMENT PLANS.DWG Plotted on 17-May-2023 2:04 PM
Proposal No. 608762-124916
02-SEP-2022
100% SUBMISSION
A00830 - 69

100% SUBMISSION
02-SEP-2022
31-37_TRAFFIC MANAGEMENT PLANS.DWG
Plotted on 18-May-2023 11:37 AM
BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER
STATE
MA
FED. AID PROJ. NO.
-
SHEET NO.
34
TOTAL SHEETS
37
PROJECT FILE NO.
608762
TEMPORARY TRAFFIC CONTROL PLANS
MEDIAN CLOSURE PLAN
MEDIAN CLOSURE PLAN
SCALE: 1" = 50'-0"
SCALE: 1" = 50'
MATCHLINE SEE ABOVE
MATCHLINE SEE BELOW
ELIOT BRIDGE
ROAD WORK AHEAD
W20-1c
SP-1
WORK ZONE SPEEDING FINES DOUBLED
MA-R2-10a
ROAD NARROWS
W5-1
W1-4bR
LEFT LANE CLOSED AHEAD
W20-5cL
W4-2L
FLASHING RIGHT MODE
END ROAD WORK
DOUBLE FINES END
MA-R2-10e
146' TAPER
TAPER 100'
100' TAPER
100'-150' BUFFER
PROP. TEMPORARY IMPACT ATTENUATOR (RE-DIRECTIVE)
LIMIT OF WORK MEET EXISTING STA.10+45.75
LIMIT OF WORK MEET EXISTING STA.5+78.25
TEMPORARY MEDIAN BARRIER
REMOVE EXISTING PAVEMENT MARKINGS IN TRAVEL PATH, TEMPORARY WHITE MARKINGS
CHARLES RIVER
SOLDIERS FIELD RD
GERRYS LANDING RD
GREENOUGH BLVD
N

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	35	37
PROJECT FILE NO.	608762		

TEMPORARY TRAFFIC CONTROL PLANS
LANE SHIFT TO MEDIAN PLAN



LANE SHIFT TO MEDIAN PLAN
SCALE: 1" = 50'-0"
0 50 100 150 200
SCALE: 1" = 50'

A30830-51

31-37_TRAFFIC MANAGEMENT PLANS.DWG Plotted on 18-May-2023 2:25 PM

Proposal No. 608762-124916

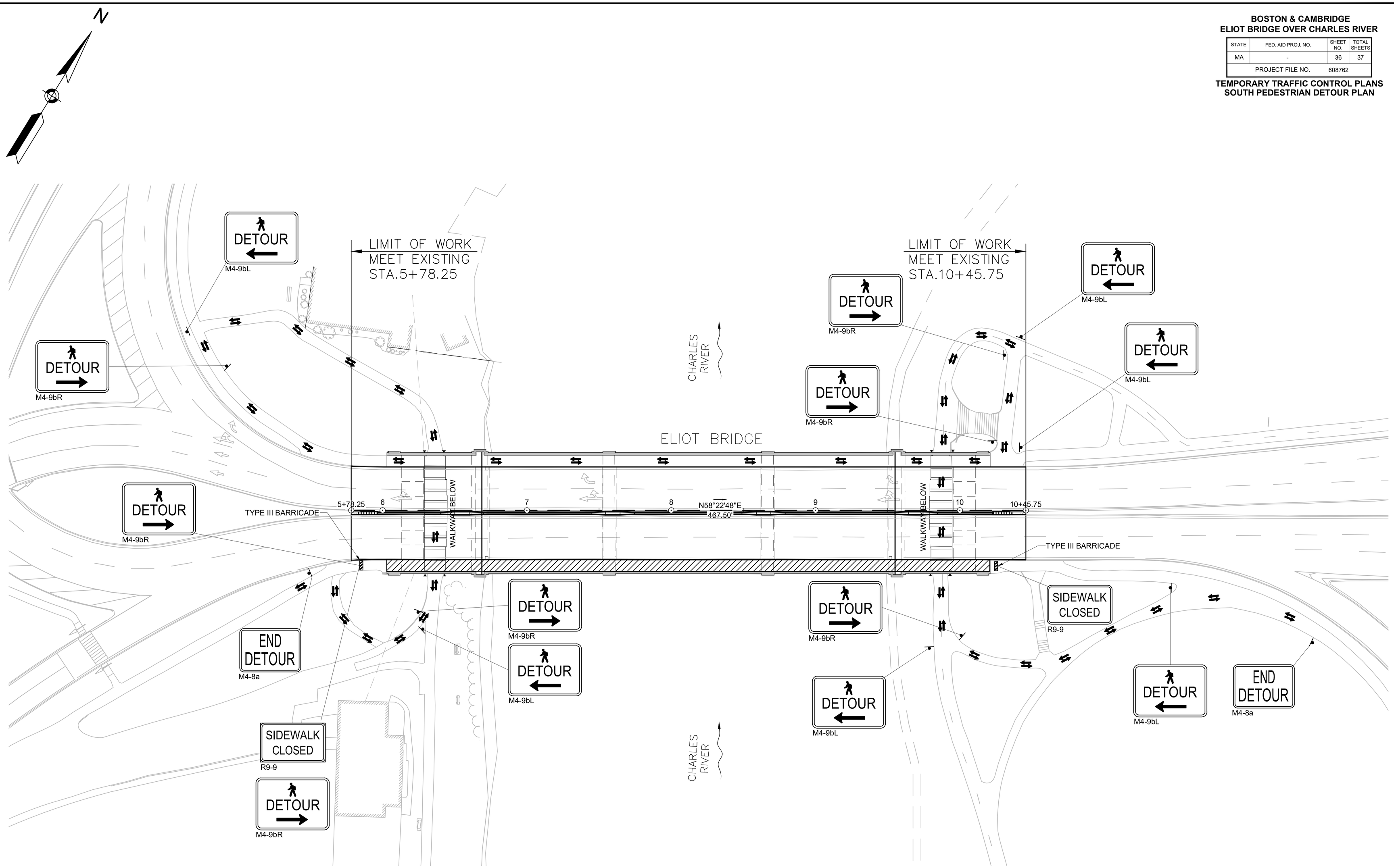
02-SEP-2022

100% SUBMISSION

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	36	37
PROJECT FILE NO.	608762		

TEMPORARY TRAFFIC CONTROL PLANS
SOUTH PEDESTRIAN DETOUR PLAN



SOUTH PEDESTRIAN DETOUR PLAN

SCALE: 1" = 30'-0"

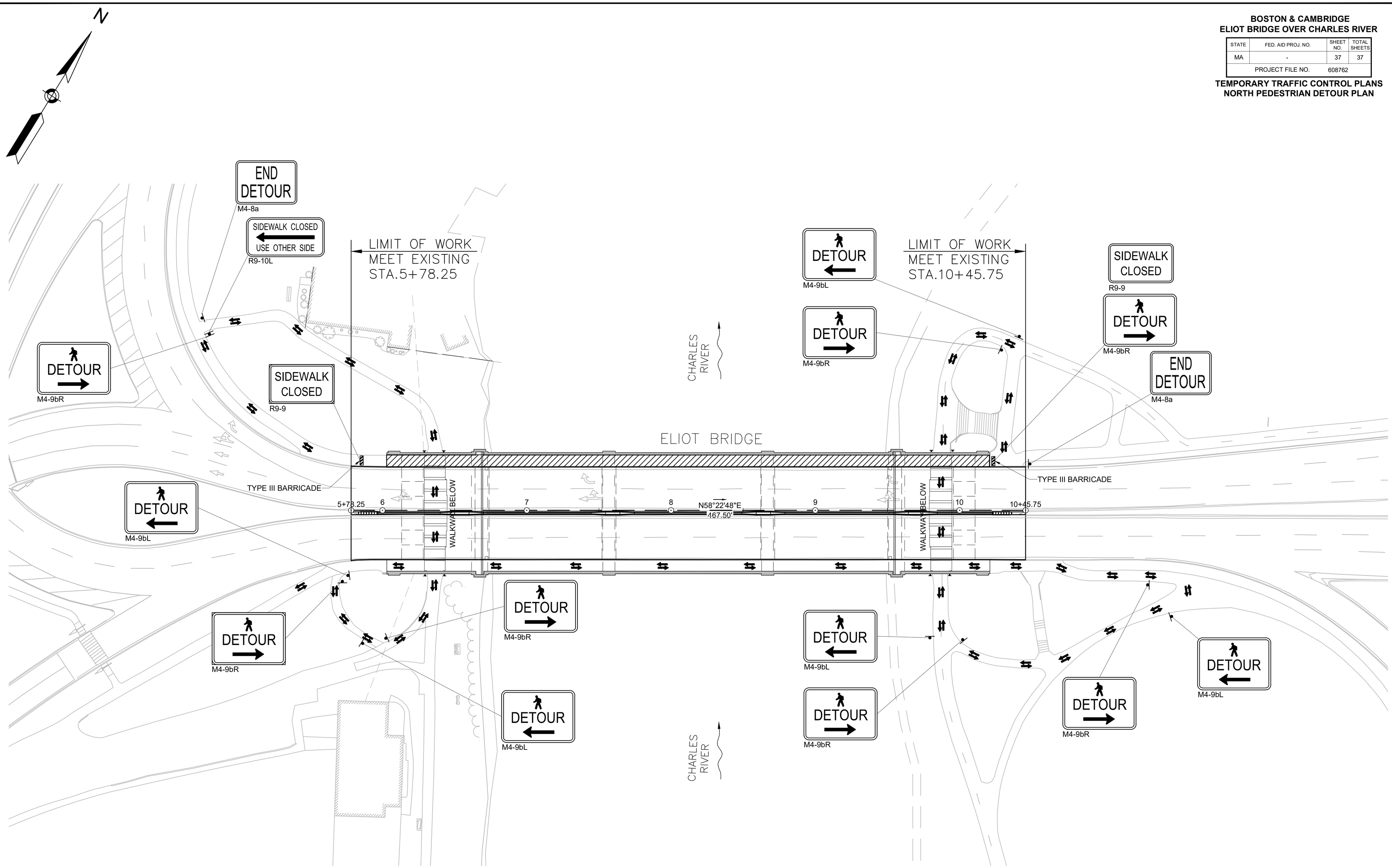
0 30 60 100

SCALE: 1" = 30'

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	37	37
PROJECT FILE NO.	608762		

TEMPORARY TRAFFIC CONTROL PLANS
NORTH PEDESTRIAN DETOUR PLAN



NORTH PEDESTRIAN DETOUR PLAN

SCALE: 1" = 30'-0"

0 30 60 100

SCALE: 1" = 30'

A00850 - 53

31-37_TRAFFIC MANAGEMENT PLANS.DWG Plotted on 17-May-2023 2:06 PM

Proposal No. 608762-124916

02-SEP-2022

100% SUBMISSION

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Jacobs

August 23, 2023

Cambridge Conservation Commission
147 Hampshire St.
Cambridge, MA 02139

Subject: Request for Determination of Applicability
Brick and Granite Cap Repair on Bridge #B-16-246 = C-01-029
(Eliot Street over the Charles River)

Dear Cambridge Conservation Commission,

On behalf of the Massachusetts Department of Transportation (MassDOT), Jacobs Engineering Group (Jacobs) is submitting this Request for Determination of Applicability for the proposed rehabilitation of Bridge #B-16-246=C-01-029 (Eliot Street over the Charles River). Minor temporary impacts are proposed within the Charles River to perform this work, resulting in approximately 38,800 square feet of impacts to Land Under Waterbodies and Waterways.

Existing Conditions

Eliot Bridge is a seven span, concrete encased, steel truss bridge built in 1950. It spans the Charles River in both the cities of Cambridge and Boston (**Figures 1 & 2**). The land use immediately adjacent to the bridge includes developed open space, open water, deciduous forest, grassland, and unconsolidated shore. The bridge carries four lanes of traffic (two lanes in each direction, westbound and eastbound), with a sidewalk on each side. The main three spans, spans 3 through 5, consist of steel trusses. The trusses are encased with cast-in-place concrete with the truss members acting as steel reinforcement. The exterior of the bridge and the interior of the railings are covered by a brick veneer, capped with granite coping stones. Spans 1, 2, 6, and 7 consist of reinforced concrete T-beams. Navigational lights are located on the bridge.

Based on MassDEP wetland mapping, the Charles River is characterized as an open water (OW). No other MassDEP wetlands were identified within the Site. The Charles River includes the following WPA resources: Land Under Water Bodies and Waterways (LUWW) and Banks of the Charles River (and accompanying Riverfront Area).

According to National Wetlands Inventory (NWI) mapping provided by the USFWS, the Charles River is identified as a riverine, lower perennial, unconsolidated bottom (sand or mud), permanently flooded waterbody (R2UBH). No other NWI wetland features were identified within the Site.

The most recently issued Flood Insurance Rate Map[1], produced by the Federal Emergency Management Agency (FEMA), indicates that the Charles River and a portion of the adjacent Bank is classified as Zone AE (1% Annual Chance of Flooding), with a base flood elevation of 4 feet above mean sea level (**Figure 3**).

The Natural Resources Conservation Service[2] soil survey for Middlesex County and Suffolk County has mapped the Project area as Water (1). The Bank located on the west side of the bridge is mapped as Urban Land (602). The Bank located on the east side of the bridge is mapped as Udorthents, wet substrate (655).

[1] Federal Emergency Management Agency, National Hazard Flood Layer, Digital Flood Insurance Rate Map. Map 25017C0557E, Effective 6/4/2010 and 25025C0057G, Effective 9/25/2009.

[2] Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey.

Jacobs

August 23, 2023
(Eliot Street over the Charles River)

The Site is not located within an Area of Critical Environmental Concern or within an area designated as an Outstanding Resource Water[3] (ORW). The Site is not located within or adjacent to any Activity Use Limitation (AUL) Sites (**Figure 4**).

The project does not lie within the Massachusetts Coastal Zone. Therefore; coordination with Massachusetts Coastal Zone Management does not apply. However, because the project will be performed within a navigable waterway, an Inspection and Repair Notice will be filed with the U.S. Coast Guard so that they can notify mariners of the anticipated construction schedule.

Proposed Project

The main focus of the work will be the brick work that runs along the interior of the bridge railings as well as across the entire façade of the structure. The bricks are heavily deteriorated along the inside face of the railings and must be completely replaced with new bricks. Bricks that are salvaged from the interior faces of the bridge railings will be used to repair localized areas of deterioration and missing bricks along the exterior of the railings and the facades. A complete reconstruction of the brick arch opening at each abutment portal will also be implemented, with an improved detail to reduce the need for future maintenance. Additionally, the Project will not alter the sea level, increase the stormwater runoff, or the frequency at which flooding occurs. The Project is a routine stabilization of an existing structure to maintain resiliency to climate change.

Specifically, the proposed rehabilitation tasks will include:

- Partial depth concrete repair and widening of the entire sidewalk to repair existing deterioration and produce a uniform appearance
- Bridge joint replacement at the east and west abutments
- Reconstruction of the median with concrete barrier
- Replacement of the navigational lighting
- Installation of end treatment for the proposed median reconstruction
- Complete reconstruction of the brick arch opening at each abutment portal
- Bridge drainage cleaning and restoration. (Previous scupper locations have been paved over by maintenance crews. Jacobs will design a repair to remove the scuppers and patch with a deck repair)
- Milling and paving of the bridge deck
- Spot deck concrete repair
- Spot truss concrete encasement repair

A barge with spuds will be temporarily placed along the bottom of the Charles River to provide stability to perform the necessary improvements to the bridge. The spuds on the barge are 18' aluminum tubes which are raised and lifted from vertical by an electric cable winch system. The proposed improvements are located within the right-of-way owned by the Commonwealth of Massachusetts and do not involve permanent fill to existing wetlands or waterbodies.

[3] MassGIS, Dec. 2017. Designated Outstanding Resource Waters of Massachusetts.

Jacobs

August 23, 2023
(Eliot Street over the Charles River)

As the Charles River is clearly depicted from aerial mapping and existing topography, field reconnaissance was deemed unnecessary as the Project would take place entirely within the Banks of the Charles River. Additionally, there are no existing bordering vegetated wetlands along the Bank within the vicinity of Eliot Bridge. For a depiction of existing conditions, please refer to the **Photographic Log**.

Wetland and Waterbody Impacts

Approximately 38,800 square feet of temporary impacts to Land Under Waterbodies and Waterways is anticipated by using a barge to perform the proposed work on the Eliot Bridge. This impact number may have been overestimated to accommodate the movement of the barge throughout the work zone. All work within the 25-foot Riverfront Area and the buffer zone to Bank will be within existing roadway and will therefore be exempt from regulation.

Regulatory Discussion

The project can be considered minor in nature as there are no anticipated permanent adverse impacts to any wetlands or waterbodies. The spud footings on the barge are used to stabilize the machine to create a safe work zone for the contractors. As a State Agency of the Commonwealth, MassDOT is exempt from the requirements of the City of Cambridge General Bylaws and local filing fees. Additionally, MassDOT is exempt from notifying abutters per regulation 310 CMR 10.05(4)(a).

Should you have any questions or comments regarding the proposed work, please feel free to contact me at susan.mcarthur@jacobs.com or (508) 904-6440.

Thank you,

Susan M. McArthur

Susan McArthur
Senior Environmental Scientist
508.904.6440
susan.mcarthur@jacobs.com

Copies to: Melissa Lenker, MassDOT
Anthony Richardson, Jacobs
MassDEP Northeast Regional Office

Massachusetts Department of Environmental Protection
Bureau of Water Resources - Wetlands

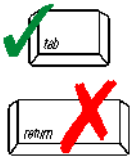
WPA Form 1- Request for Determination of Applicability

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Cambridge
Municipality

A. General 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. Applicant:

Melissa — First Name
Lenker — Last Name
Massachusetts Department of Transportation - Highway Division , 10 Park Plaza, Room 7360 — Address
Boston — City/Town
MA — State
02116 — Zip Code
(978) 429-1772 — Phone Number
melissa.lenker@dot.state.ma.us — Email Address

2. Property Owner (if different from Applicant):

First Name
Last Name
Massachusetts Department of Transportation - Highway Division , 10 Park Plaza — Address
Boston — City/Town
MA — State
02116 — Zip Code
Phone Number
Email Address (if known)

3. Representative (if any)

Susan — First Name
McArthur — Last Name
Jacobs — Company Name
120 St. James Avenue, 5th Floor — Address
Boston — City/Town
MA — State
02116 — Zip Code
(508) 904-6440 — Phone Number
susan.mcarthur@jacobs.com — Email Address (if known)

B. Project Description

1. a. Project Location (use maps and plans to identify the location of the area subject to this request):

Eliot Bridge — Street Address
Cambridge & Boston, MA 02163 — City/Town
42.37168 — Latitude (Decimal Degrees Format with 5 digits after decimal e.g. XX.XXXXX)
-71.13547 — Longitude (Decimal Degrees Format with 5 digits after decimal e.g. -XX.XXXXX)

How to find Latitude and Longitude

and how to convert to decimal degrees

Assessors' Map Number
Assessors' Lot/Parcel Number

b. Area Description (use additional paper, if necessary):

Eliot Bridge over the Charles River in the Cities of Cambridge and Boston.

c. Plan and/or Map Reference(s): (use additional paper if necessary)

Bridge Preservation Plans — Title
8/23/23 — Date
Title
Date

Massachusetts Department of Environmental Protection
Bureau of Water Resources - Wetlands

WPA Form 1- Request for Determination of Applicability

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Cambridge
Municipality

B. Project Description (cont.)

2. a. Activity/Work Description (use additional paper and/or provide plan(s) of Activity, if necessary):

The proposed work will consist of maintenance masonry repairs to the Eliot Street Bridge. The work will include the cleaning of the catch basins (4) on the easterly (Boston) and westerly (Cambridge) approach roadways.

b. Identify provisions of the Wetlands Protection Act or regulations which may exempt the applicant from having to file a Notice of Intent for all or part of the described work (use additional paper, if necessary).

10.02 (2)(a.) 2. Minor maintenance to an existing and lawfully located structure.

3. a. If this application is a Request for Determination of Scope of Alternatives for work in the Riverfront Area, indicate the one classification below that best describes the project.

- ☐ Single family house on a lot recorded on or before 8/1/96
- ☐ Single family house on a lot recorded after 8/1/96
- ☐ Expansion of an existing structure on a lot recorded after 8/1/96
- ☐ Project, other than a single-family house or public project, where the applicant owned the lot before 8/7/96
- ☐ New agriculture or aquaculture project
- ☐ Public project where funds were appropriated prior to 8/7/96
- ☐ Project on a lot shown on an approved, definitive subdivision plan where there is a recorded deed restriction limiting total alteration of the Riverfront Area for the entire subdivision
- ☐ Residential subdivision; institutional, industrial, or commercial project
- ☐ Municipal project
- ☐ District, county, state, or federal government project
- ☐ Project required to evaluate off-site alternatives in more than one municipality in an Environmental Impact Report under MEPA or in an alternatives analysis pursuant to an application for a 404 permit from the U.S. Army Corps of Engineers or 401 Water Quality Certification from the Department of Environmental Protection.

b. Provide evidence (e.g., record of date subdivision lot was recorded) supporting the classification above (use additional paper and/or attach appropriate documents, if necessary.)

Massachusetts Department of Environmental Protection
Bureau of Water Resources - Wetlands
WPA Form 1- Request for Determination of Applicability
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Cambridge
Municipality

C. Determinations

1. I request the Cambridge Conservation Commission make the following determination(s). Check any that apply:

☐ a. whether the **area** depicted on plan(s) and/or map(s) referenced above is an area subject to jurisdiction of the Wetlands Protection Act.

☐ b. whether the **boundaries** of resource area(s) depicted on plan(s) and/or map(s) referenced above are accurately delineated.

☒ c. whether the **Activities** depicted on plan(s) referenced above is subject to the Wetlands Protection Act and its regulations.

☐ d. whether the area and/or Activities depicted on plan(s) referenced above is subject to the jurisdiction of any **municipal wetlands' ordinance** or **bylaw** of:

Name of Municipality

☐ e. whether the following **scope of alternatives** is adequate for Activities in the Riverfront Area as depicted on referenced plan(s).

D. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Request for Determination of Applicability and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge.

I further certify that the property owner, if different from the applicant, and the appropriate DEP Regional Office were sent a complete copy of this Request (including all appropriate documentation) simultaneously with the submittal of this Request to the Conservation Commission.

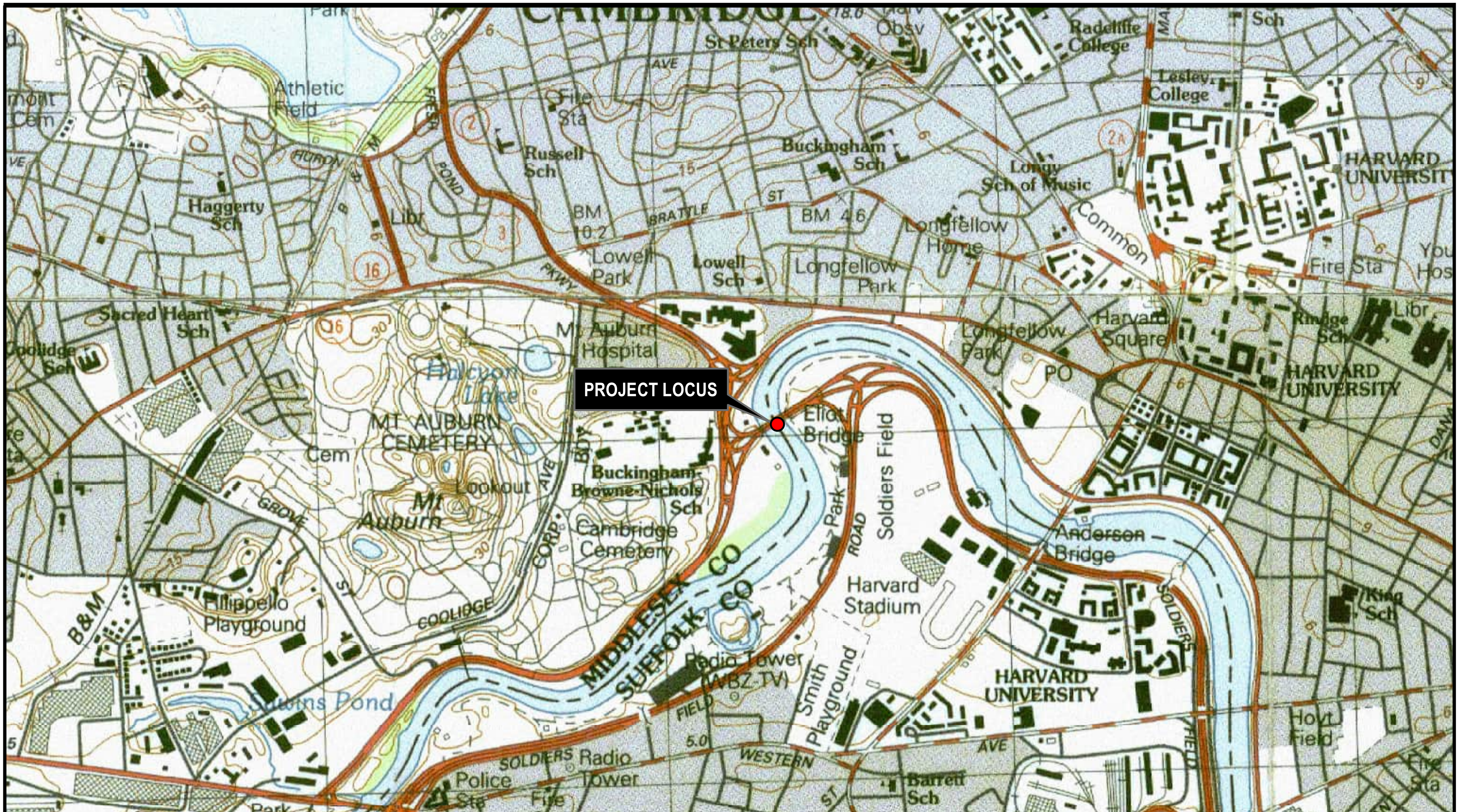
Failure by the applicant to send copies in a timely manner may result in dismissal of the Request for Determination of Applicability.

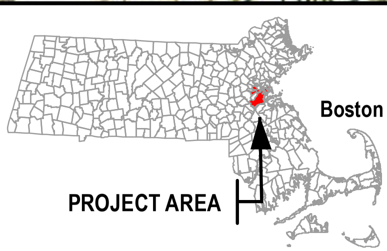
Signatures:

I also understand that notification of this Request will be placed in a local newspaper at my expense in accordance with Section 10.05(3)(b)(1) of the Wetlands Protection Act regulations.

Melissa Lenker — Signature of Applicant
August 22, 2023 — Date

Susan M. McArthur — Signature of Representative (if any)
8/23/2023 — Date





1 inch = 1,348.92 feet

0 800 1,600 3,200 Feet

NOT TO SCALE

Source: MassGIS, Commonwealth of Massachusetts, Information Technology Division: USGS Ware, MA 7.5 MinuteTopographic Quadrangle

Prepared for: massDOT Massachusetts Department of Transportation Highway Division

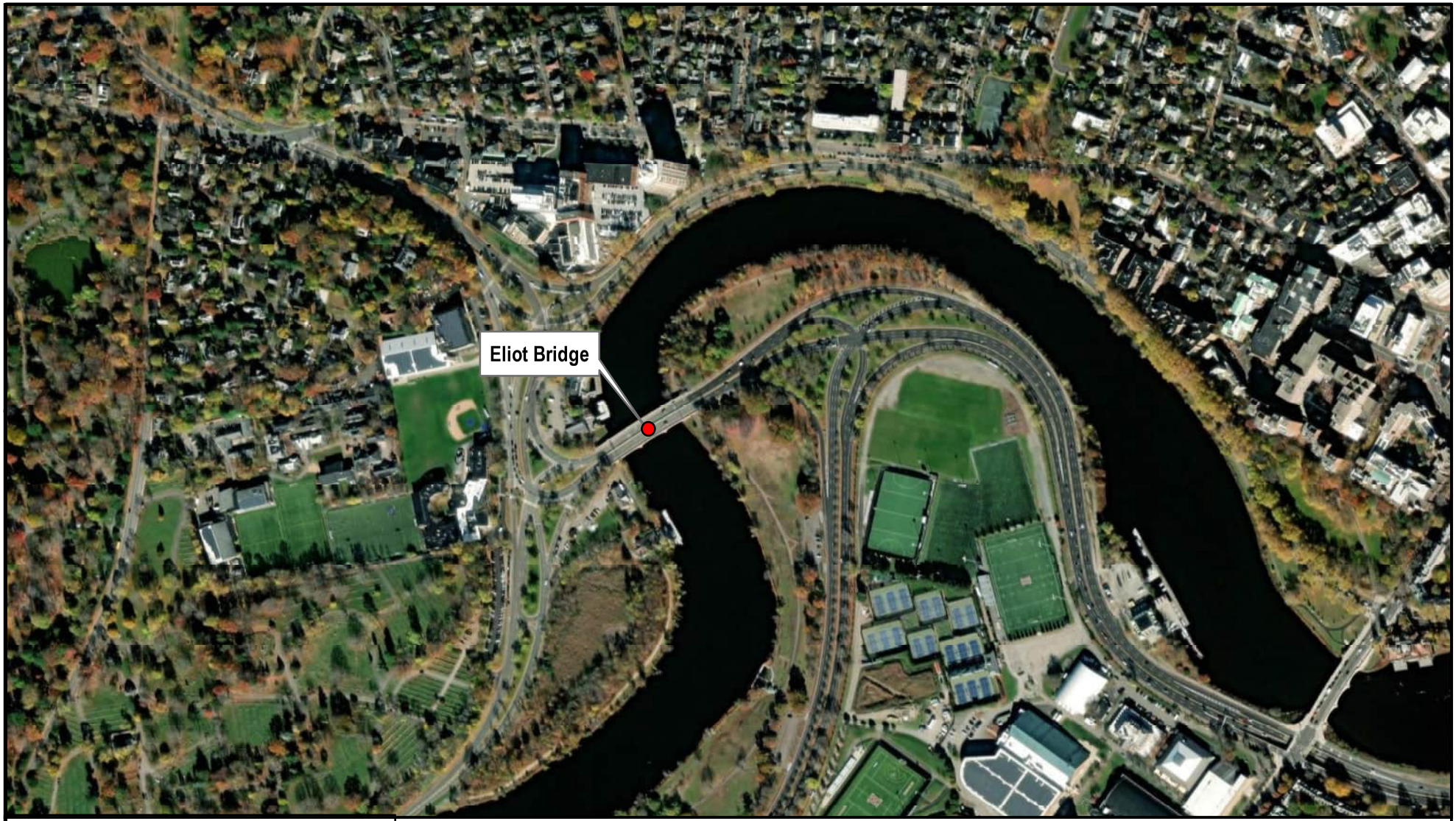
Prepared by: Jacobs

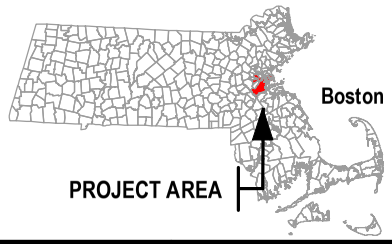
FIGURE 1 - USGS MAP

Boston – Cambridge – Brick and Granite Cap Repair and Replacement on B16-246
Eliot Street over The Charles River
Boston and Cambridge,Massachusetts

AUGUST 2023
E2X69149

FIGURE
1 OF 4





1 inch = 541.67 feet

0 325 650 1,300 Feet

NOT TO SCALE

Source: MassGIS, Commonwealth of Massachusetts, Information Technology Division: USGS Ware, MA 7.5 MinuteTopographic Quadrangle

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Prepared for: massDOT Highway Division

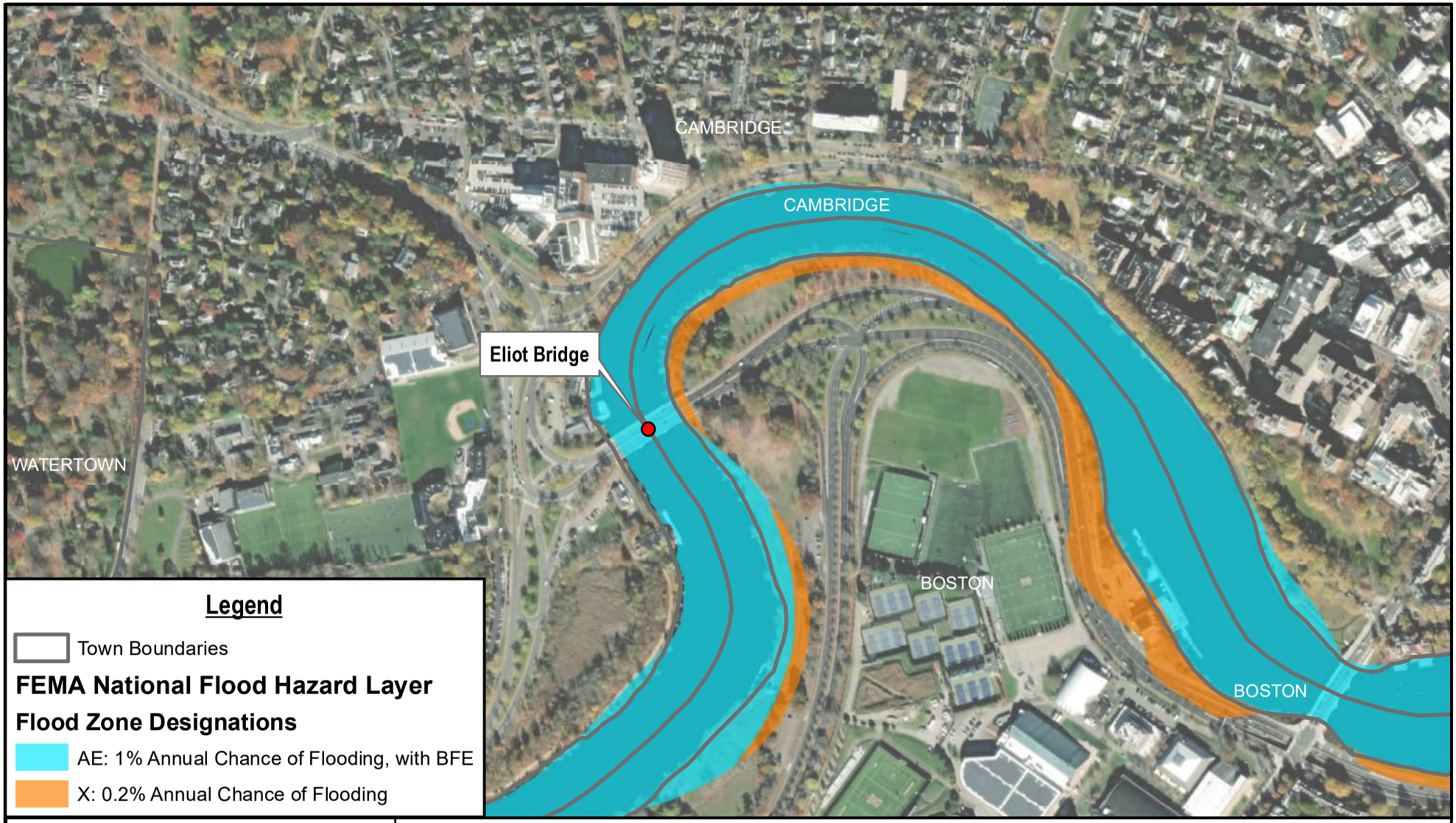
Prepared by: Jacobs

FIGURE 2 - AERIAL MAP

Boston – Cambridge – Brick and Granite Cap Repair and Replacement on B16-246
Eliot Street over The Charles River
Boston and Cambridge,Massachusetts

AUGUST 2023
E2X69149

FIGURE
2 OF 4



Legend

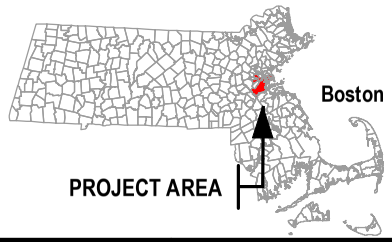
Town Boundaries

FEMA National Flood Hazard Layer

Flood Zone Designations

AE: 1% Annual Chance of Flooding, with BFE

X: 0.2% Annual Chance of Flooding



1 inch = 541.67 feet

0 325 650 1,300 Feet

NOT TO SCALE

Source: MassGIS, Commonwealth of Massachusetts, Information Technology Division: USGS Ware, MA 7.5 MinuteTopographic Quadrangle

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Prepared for: massDOT Highway Division

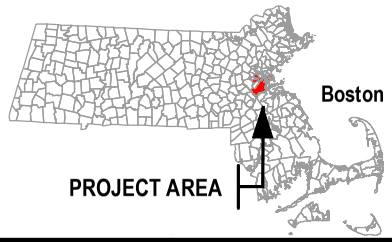
Prepared by: Jacobs

FIGURE 3 - FEMA MAP

Boston – Cambridge – Brick and Granite Cap Repair and Replacement on B16-246
Eliot Street over The Charles River
Boston and Cambridge,Massachusetts

AUGUST 2023
E2X69149

FIGURE
3 OF 4



1 inch = 541.67 feet

0 325 650 1,300 Feet

NOT TO SCALE

Source: MassGIS, Commonwealth of Massachusetts, Information Technology Division: USGS Ware, MA 7.5 MinuteTopographic Quadrangle

Resource Areas Reviewed:
AUL Points; Certified Vernal Pools; Potential Vernal Pools; NHESP Priority Habitats; NHESP Estimated Habitats; NHESP Natural Communities; Outstanding ResourceWaters; Areas of Critical Environmental Concern; DFW Coldwater Fisheries; Zone I, II, & IWPA Protection Areas

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Prepared for: massDOT Highway Division

Prepared by: Jacobs

FIGURE 4 - ENVIRONMENTAL FEATURES MAP

Boston – Cambridge – Brick and Granite Cap Repair and Replacement on B16-246
Eliot Street over The Charles River
Boston and Cambridge,Massachusetts

AUGUST 2023
E2X69149

FIGURE
4 OF 4

Jacobs

PHOTOGRAPHIC LOG

Site Location: Eliot Bridge, Boston & Cambridge, MA | **Project No.** 608762

Photo No.	**Date:**
1	09/19/20

Direction Photo Taken:
Southwest

Description:
View of Eliot Bridge and Charles River.

Photo No.	**Date:**
2	09/19/20

Direction Photo Taken:
Southeast

Description:
View northside of Eliot Bridge from the western bank of the Charles River.

Jacobs

PHOTOGRAPHIC LOG

Site Location: Eliot Bridge, Boston & Cambridge, MA | **Project No.** 608762

Photo No.	**Date:**
3	09/19/20

Direction Photo Taken:
Southeast

Description:
View of the underside of Eliot Bridge.

Photo No.	**Date:**
4	09/19/20

Direction Photo Taken:
Southwest

Description:
Underside of the Eliot Bridge.

Jacobs

PHOTOGRAPHIC LOG

Site Location: Eliot Bridge, Boston & Cambridge, MA | **Project No.** 608762

Photo No.	**Date:**
5	09/19/20

Direction Photo Taken:
Northeast

Description:
View of the southern side of Eliot bridge from the western bank of the Charles River.

Photo No.	**Date:**
6	09/19/20

Direction Photo Taken:
Northeast

Description:
View of the traveling lanes over the Eliot Bridge.

Jacobs

PHOTOGRAPHIC LOG

Site Location: Eliot Bridge, Boston & Cambridge, MA | **Project No.** 608762

Photo No.	**Date:**
7	05/05/16

Direction Photo Taken:
Northeast

Description:
Example of barge with staging tied off to the piers.

Photo No.	**Date:**
8	01/29/16

Direction Photo Taken:
Northeast

Description:
Example of barge being held in place by the two spuds.

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	1	37
PROJECT FILE NO.	608762		

TITLE SHEET & INDE

REPAIR PLANS AND DETAILS FOR

ELIOT BRIDGE

(BRIDGE NO. B-16-246 = BRIDGE NO. C-01-029)

IN THE CITY/TOWN OF

BOSTON & CAMBRIDGE

SUFFOLK & MIDDLESEX COUNTIES

FEDERAL AID PROJECT NO. -

PS&E SUBMITTAL

THE MASSACHUSETTS HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES DATED 2023, AS AMENDED, THE OCTOBER 2017 CONSTRUCTION STANDARD DETAILS, THE 2015 OVERHEAD SIGNAL STRUCTURE AND FOUNDATION STANDARD DRAWINGS, MASSDOT TRAFFIC MANAGEMENT PLANS AND DETAIL DRAWINGS, THE LATEST MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS WITH MASSACHUSETTS AMENDMENTS, THE 1990 STANDARD DRAWINGS FOR SIGNS AND SUPPORTS, THE 1968 STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING, AND THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK, WILL GOVERN.

INDEX

SHEET NO.	DESCRIPTION
1	TITLE SHEET & INDEX
2	LEGEND AND ABBREVIATIONS
3	GENERAL NOTES
4	BRIDGE CONSTRUCTION PLAN
5	PAVEMENT MARKING PLAN
6	CURB AND BASELINE TIE PLAN
7	BRIDGE LIGHTING PLAN
8	BRIDGE LIGHTING ELEVATION
9	PEDESTRIAN TUNNEL LIGHTING PLAN
10	LIGHTING DETAILS (1 OF 2)
11	LIGHTING DETAILS (2 OF 2)
12	PLAN AND PROFILE (BRIDGE)
13	TYPICAL SECTIONS
14	UNDERSIDE REPAIR AREAS (SHEET 1 OF 5)
15	UNDERSIDE REPAIR AREAS (SHEET 2 OF 5)
16	UNDERSIDE REPAIR AREAS (SHEET 3 OF 5)
17	UNDERSIDE REPAIR AREAS (SHEET 4 OF 5)
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19	BRIDGE ELEVATIONS (SHEET 1 OF 4)
20	BRIDGE ELEVATIONS (SHEET 2 OF 4)
21	BRIDGE ELEVATIONS (SHEET 3 OF 4)
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25	REPAIR DETAILS (SHEET 3 OF 3)
26	REPAIR DETAILS (SHEET 4 OF 4)
27	MEDIAN AND JOINT DETAILS
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29	CONSTRUCTION PHASING (SHEET 1 OF 2)
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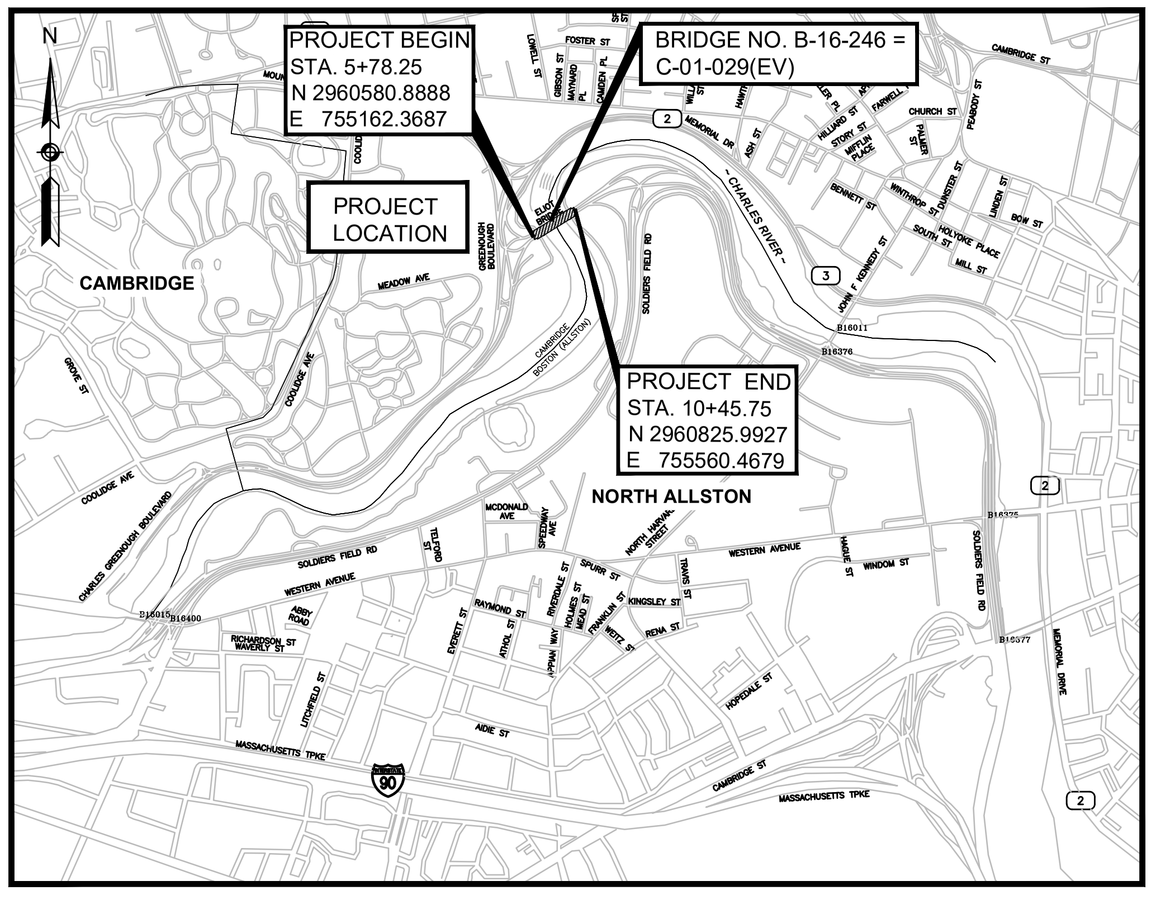
31	TTCP - SIGN SUMMARY AND NOTES
32	TTCP - LEFT LANE CLOSURE PLAN
33	TTCP - RIGHT LANE CLOSURE PLAN
34	TTCP - MEDIAN CLOSURE PLAN
35	TTCP - CLOSURE ALONG SIDEWALK PLAN
36	TTCP - SOUTH PEDESTRIAN DETOUR PLAN
37	TTCP - NORTH PEDESTRIAN DETOUR PLAN



LENGTH OF PROJECT = 467.50 FEET = 0.089 MILES

DESIGN DESIGNATION (ELIOT BRIDGE)

DESIGN SPEED	25 MPH
ADT (2020)	48,286 VPD
ADT (2040)	60,138 VPD
K	9%
D	51% NB
T (PEAK HOUR)	N/A*
T (AVERAGE DAY)	N/A*
DHV	5412
DDHV	2760 NB
FUNCTIONAL CLASSIFICATION	URBAN PRINCIPAL ARTERIAL

*HEAVY TRAFFIC PROHIBITED

COMMONWEALTH OF MASSACHUSETTS
ANTHONY M RICHARDSON
CIVIL
No. 51810
REGISTERED PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION FOR REVIE ONL

DATE	DESCRIPTION	REV #
5/18/2023	PS&E SUBMISSION	3
3/31/2023	100% RE-SUBMISSION	2
10/21/2022	100% SUBMISSION	1
12/21/2020	25% SUBMISSION	0

massDOT
Massachusetts Department of Transportation
Highway Division

RECOMMENDED FOR APPROVAL

CHIEF ENGINEER ____ DATE ____

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGH A ADMINISTRATION

APPROVED

DIVISION ADMINISTRATOR ____ DATE ____

APPROVED

HIGH A ADMINISTRATOR ____ DATE ____

GENERAL SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
JB	JB	JERSEY BARRIER
CB	CB	CATCH BASIN
		CATCH BASIN CURB INLET
FP	FP	FLAG POLE
GP	GP	GAS PUMP
MB	MB	MAIL BOX
		POST SQUARE
		POST CIRCULAR
WELL	WELL	WELL
EHH	EHH	ELECTRIC HANDHOLE
		FENCE GATE POST
GG	GG	GAS GATE
BHL #	BHL #	BORING HOLE
MW #	MW #	MONITORING WELL
TP #	TP #	TEST PIT
		HYDRANT
		LIGHT POLE
CO.BD.		COUNTY BOUND
		GPS POINT
C	C	CABLE MANHOLE
D	D	DRAINAGE MANHOLE
E	E	ELECTRIC MANHOLE
G	G	GAS MANHOLE
M	M	MISC MANHOLE
S	S	SEWER MANHOLE
T	T	TELEPHONE MANHOLE
W	W	WATER MANHOLE
MHB	MHB	MASSACHUSETTS HIGHWAY BOUND
MON		MONUMENT
SB		STONE BOUND
TB		TOWN OR CITY BOUND
△		TRAVERSE OR TRIANGULATION STATION
TPL or GUY	TPL or GUY	TROLLEY POLE OR GUY POLE
HTP		TRANSMISSION POLE
UFB	UFB	UTILITY POLE W/ FIREBOX
UPDL	UPDL	UTILITY POLE WITH DOUBLE LIGHT
ULT	ULT	UTILITY POLE W / 1 LIGHT
UPL	UPL	UTILITY POLE
		BUSH
SIZE & TYPE		TREE
		STUMP
		SWAMP / MARSH
WG	WG	WATER GATE
PM	PM	PARKING METER
		OVERHEAD CABLE/WIRE
		CURBING
100 99		CONTOURS (ON-THE-GROUND SURVEY DATA)
100 99		CONTOURS (PHOTOGRAMMETRIC DATA)
		UNDERGROUND DRAIN PIPE (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND ELECTRIC DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND GAS MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND SEWER MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND TELEPHONE DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND WATER MAIN (DOUBLE LINE 24 INCH AND OVER)
		BALANCED STONE WALL
		GUARD RAIL - STEEL POSTS
		GUARD RAIL - WOOD POSTS
		GUARD RAIL - DOUBLE FACE - STEEL POSTS
		GUARD RAIL - DOUBLE FACE - WOOD POSTS
x	x	CHAIN LINK OR METAL FENCE
		WOOD FENCE
		HAY BALES/SILT FENCE
		SEDIMENT CONTROL BARRIER
		TREE LINE
		SAWCUT LINE
		TOP OR BOTTOM OF SLOPE
		LIMIT OF EDGE OF PAVEMENT OR COLD PLANE AND OVERLAY
		BANK OF RIVER OR STREAM
		BORDER OF WETLAND
		100 FT WETLAND BUFFER
		200 FT RIVERFRONT BUFFER
		STATE HIGHWAY LAYOUT
		TOWN OR CITY LAYOUT
		COUNTY LAYOUT
		RAILROAD SIDELINE
		TOWN OR CITY BOUNDARY LINE
		PROPERTY LINE OR APPROXIMATE PROPERTY LINE
		EASEMENT

TRAFFIC SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
1	1	CONTROLLER PHASE ACTUATED
		TRAFFIC SIGNAL HEAD (SIZE AS NOTED)
		WIRE LOOP DETECTOR (6' x 6' TYP UNLESS OTHERWISE SPECIFIED)
		VIDEO DETECTION CAMERA
		MICROWAVE DETECTOR
		PEDESTRIAN PUSH BUTTON, SIGN (DIRECTIONAL ARROW AS SHOWN) AND SADDLE
	*	EMERGENCY PREEMPTION CONFIRMATION STROBE LIGHT
		VEHICULAR SIGNAL HEAD
		VEHICULAR SIGNAL HEAD, OPTICALLY PROGRAMMED
		FLASHING BEACON
		PEDESTRIAN SIGNAL HEAD, (TYPE AS NOTED OR AS SPECIFIED)
RRSG	RRSG	RAILROAD SIGNAL
OR		SIGNAL POST AND BASE (ALPHA-NUMERIC DESIGNATION NOTED)
	20'	MAST ARM, SHAFT AND BASE (ARM LENGTH AS NOTED)
		HIGH MAST POLE OR TOWER
		SIGN AND POST
		SIGN AND POST (2 POSTS)
	20'	MAST ARM WITH LUMINAIRE
		OPTICAL PRE-EMPTION DETECTOR
		CONTROL CABINET, GROUND MOUNTED
		CONTROL CABINET, POLE MOUNTED
		FLASHING BEACON CONTROL AND METER PEDESTAL
		LOAD CENTER ASSEMBLY
		PULL BOX 12"x12" (OR AS NOTED)
		ELECTRIC HANDHOLE 12"x24" (OR AS NOTED)
		TRAFFIC SIGNAL CONDUIT

PAVEMENT MARKINGS SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		PAVEMENT ARROW - WHITE
ONLY	ONLY	LEGEND "ONLY" - WHITE
	SL	STOP LINE
	CW	CROSSWALK
	SWL	SOLID WHITE LINE
	SYL	SOLID YELLOW LINE
	BWL	BROKEN WHITE LINE
	BYL	BROKEN YELLOW LINE
	DWL	DOTTED WHITE LINE
	DYL	DOTTED YELLOW LINE
	DWLEx	DOTTED WHITE LINE EXTENSION
	DYLEx	DOTTED YELLOW LINE EXTENSION
	DBWL	DOUBLE WHITE LINE
	DBYL	DOUBLE YELLOW LINE

LIGHTING SYMBOLS

PROP. LIGHT POLE

PROP. 12"X12" PULL BOX

PROP. 12"X24" HANDHOLE

PROP. 12"X12" BARRIER MOUNTED JUNCTION BOX

E — PROP. 3" PVC CONDUIT (1" PVC CONDUIT BETWEEN HH AND LIGHT POLE)

PROP. LOAD CENTER

+1.0 — RESULTANT LUMINAIRE (ALL LIGHT SOURCES)

1.0 / 0.50 — LUMINAIRE TEMPLATE - 0.5 FC & 1.0 FC (SINGLE LIGHT SOURCE)

FIXTURE #	1	*
STATION	7+52	
OFFSET	24.0' RT	
ARM LENGTH	5'	III
MOUNTING HEIGHT	27'	2X-60W

*EXISTING CIRCUIT
DISTRIBUTION TYPE
NUMBER OF FIXTURES-WATTAGE

*REFER TO PLAN FOR ACTUAL LIGHTING INFORMATON

ABBREVIATIONS

GENERAL

AADT	ANNUAL AVERAGE DAILY TRAFFIC
ABAN	ABANDON
ADJ	ADJUST
APPROX.	APPROXIMATE
A.C.	ASPHALT CONCRETE
ACCM PIPE	ASPHALT COATED CORRUGATED METAL PIPE
BIT.	BITUMINOUS
BC	BOTTOM OF CURB
BD.	BOUND
BL	BASELINE
BLDG	BUILDING
BM	BENCHMARK
BO	BY OTHERS
BOS	BOTTOM OF SLOPE
BR.	BRIDGE
CB	CATCH BASIN
CBCI	CATCH BASIN WITH CURB INLET
CC	CEMENT CONCRETE
CCM	CEMENT CONCRETE MASONRY
CEM	CEMENT
CI	CURB INLET
CIP	CAST IRON PIPE
CLF	CHAIN LINK FENCE
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
CSP	CORRUGATED STEEL PIPE
CO.	COUNTY
CONC	CONCRETE
CONT	CONTINUOUS
CONST	CONSTRUCTION
CR GR	CROWN GRADE
DHV	DESIGN HOURLY VOLUME
DI	DROP INLET
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DW	STEADY DON'T WALK - PORTLAND ORANGE
DWY	DRIVEWAY
ELEV (or EL.)	ELEVATION
EMB	EMBANKMENT
EOP	EDGE OF PAVEMENT
EXIST (or EX)	EXISTING
EXC	EXCAVATION
F&C	FRAME AND COVER
F&G	FRAME AND GRATE
FDN.	FOUNDATION
FLDSTN	FIELDSTONE
GAR	GARAGE
GD	GROUND
GG	GAS GATE
GI	GUTTER INLET
GIP	GALVANIZED IRON PIPE
GRAN	GRANITE
GRAV	GRAVEL
GRD	GUARD
HDW	HEADWALL
HMA	HOT MIX ASPHALT
HOR	HORIZONTAL
HYD	HYDRANT
INV	INVERT
JCT	JUNCTION
L	LENGTH OF CURVE
LB	LEACH BASIN
LP	LIGHT POLE
LT	LEFT
MAX	MAXIMUM
MB	MAILBOX
MH	MANHOLE
MHB	MASSACHUSETTS HIGHWAY BOUND
MIN	MINIMUM
NIC	NOT IN CONTRACT
NO.	NUMBER
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PCR	PEDSTRIAN CURB RAMP
P.G.L.	PROFILE GRADE LINE
PI	POINT OF INTERSECTION
POC	POINT ON CURVE
POT	POINT ON TANGENT
PRC	POINT OF REVERSE CURVATURE
PROJ	PROJECT
PROP	PROPOSED
PSB	PLANTABLE SOIL BORROW
PT	POINT OF TANGENCY
PVC	POINT OF VERTICAL CURVATURE
PVI	POINT OF VERTICAL INTERSECTION
PVT	POINT OF VERTICAL TANGENCY
PVMT	PAVEMENT

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	2	37
PROJECT FILE NO.	608762		

LEGEND AND ABBREVIATIONS

ABBREVIATIONS (cont.)

GENERAL

PWW	PAVED WATER WAY
R	RADIUS OF CURVATURE
R&D	REMOVE AND DISPOSE
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
RDWY	ROADWAY
REM	REMOVE
RET	RETAIN
RET WALL	RETAINING WALL
ROW	RIGHT OF WAY
RR	RAILROAD
R&R	REMOVE AND RESET
R&S	REMOVE AND STACK
RT	RIGHT
SB	STONE BOUND
SHLD	SHOULDER
SMH	SEWER MANHOLE
ST	STREET
STA	STATION
SSD	STOPPING SIGHT DISTANCE
SHLO	STATE HIGHWAY LAYOUT LINE
SW	SIDEWALK
T	TANGENT DISTANCE OF CURVE/TRUCK %
TAN	TANGENT
TEMP	TEMPORARY
TC	TOP OF CURB
TOS	TOP OF SLOPE
TYP	TYPICAL
UP	UTILITY POLE
VAR	VARIES
VERT	VERTICAL
VC	VERTICAL CURVE
WG	WATER GATE
WIP	WROUGHT IRON PIPE
WM	WATER METER/WATER MAIN
X-SECT	CROSS SECTION

TRAFFIC SIGNAL ABBREVIATIONS

CAB	CABINET
CCVE	CLOSED CIRCUIT VIDEO EQUIPMENT
DW	STEADY UPRAISED HAND
FDW	FLASHING UPRAISED HAND
FR	FLASHING CIRCULAR RED
FRL	FLASHING RED LEFT ARROW
FRR	FLASHING RED RIGHT ARROW
FY	FLASHING CIRCULAR YELLOW
FYL	FLASHING YELLOW LEFT ARROW
FYR	FLASHING YELLOW RIGHT ARROW
G	STEADY CIRCULAR GREEN
GL	STEADY GREEN LEFT ARROW
GR	STEADY GREEN RIGHT ARROW
GSL	STEADY GREEN SLASH LEFT ARROW
GSR	STEADY GREEN SLASH RIGHT ARROW
GV	STEADY GREEN VERTICAL ARROW
OL	OVERLAP
PED	PEDESTRIAN
PTZ	PAN, TILT, ZOOM
R	STEADY CIRCULAR RED
RL	STEADY RED LEFT ARROW
RR	STEADY RED RIGHT ARROW
TR SIG	TRAFFIC SIGNAL
TSC	TRAFFIC SIGNAL CONDUIT
W	STEADY WALKING PERSON
Y	STEADY CIRCULAR YELLOW
YL	STEADY YELLOW LEFT ARROW

A90850-70
2-608762_LEGEND AND ABBREVIATIONS.DWG Plotted on 17-May-2023 10:06 AM
Proposal No. 608762-124916
31-MAR-2023
100% RE-SUBMISSION

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	3	37
PROJECT FILE NO.	608762		

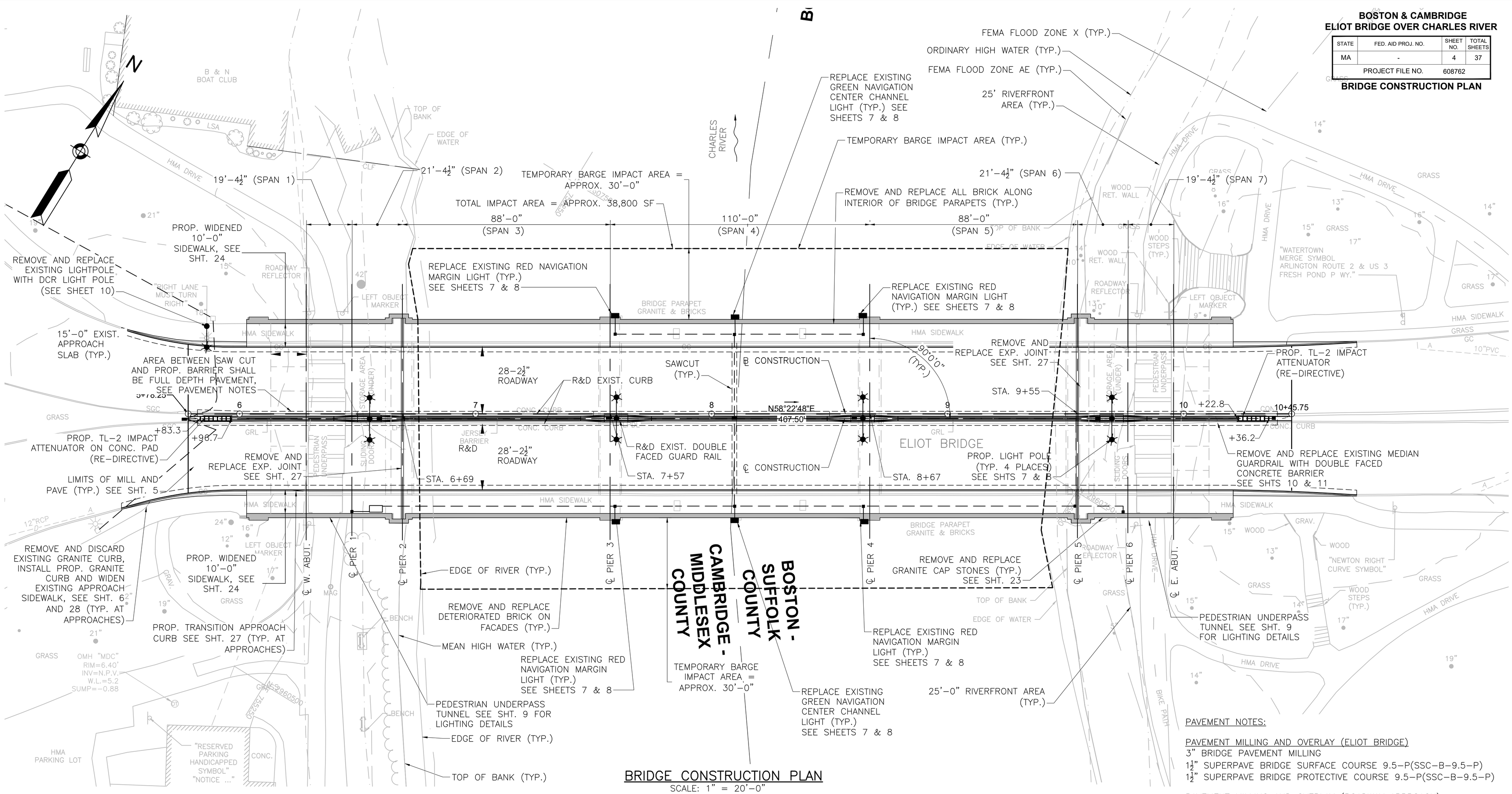
GENERAL NOTES:

1. THE EXISTING BASE MAPPING IS BASED ON FIELD SURVEY PERFORMED BY GPI IN JULY AND AUGUST 2020. TRANSVERSE TIE INFORMATION CAN BE FOUND IN FIELD BOOK 41472.
2. HORIZONTAL COORDINATES REFER TO THE MASSACHUSETTS STATE PLANE COORDINATE SYSTEM MAINLAND ZONE REFERENCED IN US FEET TO THE NORTH AMERICAN DATUM OF 1983 (NAD 83). ALL VERTICAL ELEVATIONS REFER TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
3. RIGHT OF WAYS AND PROPERTY LINES SHOWN HEREON WERE COMPILED FROM ASSESSORS MAPS, RECORDED DEEDS AND PLANS, AND FIELD EVIDENCE (PERFORMED BY GPI).
4. IT IS THE INTENT OF THE DESIGN TO PROVIDE A MINIMUM CONSTRUCTED SIDEWALK WIDTH FOR A PATH OF TRAVEL PAST ALL OBSTRUCTIONS OF 36". THE CONTRACTOR SHALL VERIFY THAT ALL POTENTIAL OBSTRUCTIONS, INCLUDING BUT NOT LIMITED TO SIGNS, MAILBOXES, UTILITY POLES, HYDRANTS, AND TRAFFIC SIGNAL EQUIPMENT ARE LOCATED AS TO PROVIDE THIS MINIMUM PATH OF TRAVEL CLEARANCE.
5. THE LOCATIONS OF THE EXISTING UTILITIES ARE SHOWN AS APPROXIMATE LOCATION ONLY. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT LOCATION OF ANY AND ALL EXISTING UTILITIES WITHIN THE PROJECT AREA PRIOR TO THE START OF CONSTRUCTION.
6. ALL EXISTING STATE HIGHWAY LAYOUT LINES, COUNTY, CITY AND TOWN LOCATION LINES, AND PROPERTY LINES HAVE BEEN ESTABLISHED FROM AVAILABLE INFORMATION AND THEIR EXACT LOCATIONS ARE NOT GUARANTEED.
7. PRIOR TO THE START OF WORK THE CONTRACTOR SHALL CONFORM TO ALL OF THE REQUIREMENTS SET FORTH IN THE SPECIFICATIONS WITH REGARD TO UTILITY NOTIFICATIONS AND TO SUBMITTALS REQUIRED BY THE CONTRACTOR REGARDING THE MAINTENANCE AND PROTECTION OF TRAFFIC.
8. THE CONTRACTOR IS HEREBY NOTIFIED THAT ADDITIONAL WORK WITHIN THE PROJECT LIMITS MAY BE PERFORMED BY OTHERS.
9. THE CONTRACTOR SHALL COORDINATE ALL ACTIVITIES WITH OTHER CONTRACTORS PERFORMING WORK WITHIN AND AT THE PROJECT LIMITS.
10. THE CONTRACTOR MAY BE REQUIRED TO PERFORM ITEMS OF WORK OUT OF NORMAL SEQUENCE AND SCHEDULE, AS DIRECTED BY THE ENGINEER, IN ORDER TO MEET THE OVERALL PROJECT SCHEDULE.
11. THE CONTRACTOR SHALL NOTIFY DIG-SAFE (1-888-344-7233), AT LEAST 72 BUSINESS HOURS BEFORE ANY CONSTRUCTION BEGINS.
12. THE CONTRACTOR SHALL BE REQUIRED TO PROCURE PROJECT RELATED ITEMS WITHOUT ADVERSELY IMPACTING THE PROJECT SCHEDULE; THEREFORE, IT IS THE CONTRACTOR'S RESPONSIBILITY TO SUBMIT THE APPROPRIATE SHOP DRAWINGS WITH SUFFICIENT LEAD TIME FOR PROCESSING IN ACCORDANCE WITH CONTRACT SPECIFICATIONS.
13. DAMAGE TO PRIVATE PROPERTIES BEYOND THE WORK LIMITS AS CAUSED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED "IN-KIND" BY THE CONTRACTOR AT THE CONTRACTOR'S SOLE EXPENSE.
14. AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED, BY THE CONTRACTOR, TO THEIR ORIGINAL CONDITION, AT THE CONTRACTOR'S SOLE EXPENSE.
15. LIMITS OF CLEARING AND GRUBBING ARE 1 FOOT BEYOND PROPOSED TOP OR TOE OF SLOPE UNLESS OTHERWISE INDICATED ON THE CONSTRUCTION PLANS.
16. GRANITE CURB: EXISTING CURB MARKED AS (R&R) SHALL BE RESET AS SHOWN IF, IN THE OPINION OF THE ENGINEER, IT IS IN GOOD CONDITION AND REUSABLE. OTHERWISE, IT SHALL BE DISCARDED BY THE CONTRACTOR AS PER DIRECTION OF THE ENGINEER.
17. ALL DISTURBED AREAS NOT DESIGNATED TO BE PAVED SHALL BE REPLANTED AS INDICATED ON THE CONSTRUCTION PLANS.
18. TREES AND SHRUBS WITHIN THE LIMITS OF WORK NOT SCHEDULED FOR REMOVAL AS INDICATED ON THE PLANS SHALL ONLY BE REMOVED UPON APPROVAL OF THE ENGINEER.
19. LIMITS OF BORDERING VEGETATED WETLANDS AND OTHER ENVIRONMENTAL RESOURCE AREAS WERE DELINEATED BY JACOBS IN SEPTEMBER 2020.
20. ALL EROSION CONTROLS MUST BE CHECKED/REPAIRED, AND ANY SILTATION REMOVED AFTER EACH RAIN EVENT.
21. THE CONTRACTOR SHALL COORDINATE ALL ARRANGEMENTS FOR THE ALTERATION AND/OR ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE AND ANY OTHER PRIVATE UTILITY THROUGH THE MASSDOT HIGHWAY DIVISION UTILITY SECTION.
22. UTILITIES: LOCATIONS OF M.H., G.G. W.G., ETC. ARE APPROXIMATE AND ARE SHOWN ONLY AS AN AID TO ASSIST BIDDERS IN DETERMINING LOCATIONS OR EXISTING UTILITIES AND SUBSURFACE STRUCTURES. THE CONTRACTOR IS FULLY RESPONSIBLE FOR MAKING REQUIRED FIELD INVESTIGATIONS AND OBTAINING INFORMATION FROM UTILITY COMPANIES AND INDIVIDUALS TO PINPOINT THE EXACT LOCATIONS AND ELEVATIONS OF ALL SUBSURFACE UTILITIES AND STRUCTURES.
23. SHOULD AN EXISTING UTILITY BE FOUND TO BE IN CONFLICT WITH THE PROPOSED WORK, THE LOCATION, SIZE AND TYPE SHALL BE ACCURATELY DETERMINED WITHOUT DELAY, BY THE CONTRACTOR, AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.
24. SHOP DRAWINGS OF ALL CASTINGS, PRECAST CONCRETE STRUCTURES, PIPE AND OTHER MANUFACTURED ITEMS SHALL BE SUBMITTED FOR APPROVAL BY THE ENGINEER, IN CONFORMANCE WITH CONTRACT SPECIFICATIONS, AND SAID APPROVAL SHALL BE REQUIRED PRIOR TO INITIATING PROCUREMENT OF MATERIALS.
25. FINAL LOCATION OF TRAFFIC SIGNS AND SUPPORTS AS SHOWN IN THE PLANS SHALL BE FIELD-CONFIRMED BY THE ENGINEER PRIOR TO INSTALLATION.
26. SAFETY CONTROLS FOR CONSTRUCTION OPERATIONS AND WORKZONE PROTECTION SHALL BE IN ACCORDANCE WITH CURRENT MASSDOT AND MUTCD REQUIREMENTS AND SPECIFICATIONS.
27. ALL CONSTRUCTION SIGNS IN PLACE BUT NOT PERTINENT TO THE ONGOING CONSTRUCTION PHASING SHALL BE "BAGGED".
28. THE CONTRACTOR SHALL PROVIDE FOR THE SAFE AND ORDERLY PASSAGE OF VEHICULAR AND PEDESTRIAN TRAFFIC IN AREAS UNDER CONSTRUCTION.
29. ANY AND ALL TRAFFIC RELATED ITEMS REQUIRED TO MAINTAIN TRAFFIC FLOW THROUGH OR AROUND THE PROJECT AREA SHALL BE MAINTAINED IN A CONDITION ACCEPTABLE TO THE ENGINEER. FURTHER, THE CONTRACTOR SHALL REPLACE THOSE ITEMS AS REQUIRED BY THE SPECIFICATIONS OR AS DEEMED NECESSARY BY THE ENGINEER.
30. ALL PROPOSED PAVEMENT MARKINGS SHALL MATCH EXISTING MARKINGS AT THE LIMITS OF WORK UNLESS DIRECTED BY THE ENGINEER.
31. ALL PROPOSED PAVEMENT MARKINGS SHALL BE WET REFLECTIVE THERMOPLASTIC.
32. ALL TRANSVERSE JOINTS, AND ALL LONGITUDINAL JOINTS BETWEEN NEW SURFACE PAVEMENT AND EXISTING SURFACE PAVEMENT TO REMAIN SHALL BE COATED WITH A HOT POURED RUBBERIZED ASPHALT SEALANT MEETING THE REQUIREMENTS OF FEDERAL SPECIFICATION NUMBER SS-S-1401.
33. ALL DISTURBED AREAS NOT DESIGNATED TO BE PAVED SHALL HAVE LOAM BORROW PLACED AND SEEDED. THE LOAM BORROW SHALL HAVE A MINIMUM DEPTH OF 4 INCHES AND SHALL BE PLACED FLUSH WITH THE TOP OF THE ADJACENT CURB, EDGING, BERM, OR PAVEMENT SURFACE.
34. CONTRACTOR SHALL SUBMIT ALL REQUIRED SHOP DRAWINGS FOR APPROVAL PRIOR TO FABRICATION OR DELIVERY OF MATERIAL TO THE SITE. THE CONTRACTOR SHALL TAKE FIELD MEASUREMENTS NECESSARY TO ENSURE PROPER FIT OF FINISHED WORK AND SHALL ASSUME FULL RESPONSIBILITY FOR THE ACCURACY WHEN SHOP DRAWINGS ARE BASED ON FIELD MEASUREMENTS ARE SUBMITTED FOR APPROVAL. THE FIELD MEASUREMENTS SHALL ALSO BE SUBMITTED FOR REFERENCE.
35. DUE TO THE NATURE OF REHABILITATION PROJECTS, THE EXACT EXTENT OF REHABILITATION WORK CANNOT ALWAYS BE ACCURATELY DETERMINED PRIOR TO THE COMMENCEMENT OF WORK. THESE CONTRACT DRAWINGS HAVE BEEN PREPARED BASE ON FIELD INSPECTIONS AND OTHER INFORMATION AVAILABLE AT THE TIME. ACTUAL FIELD CONDITIONS MAY REQUIRE MODIFICATION TO CONSTRUCTION DETAILS, DIMENSIONS AND WORK QUANTITIES. THE WORK SHALL BE PERFORMED IN ACCORDANCE WITH FIELD CONDITIONS AND AS REQUIRED BY THE ENGINEER.
36. PRIOR TO THE COMMENCEMENT OF WORK CONTRACTOR SHALL COORDINATE WITH DIG SAFE. COORDINATION WITH DIG SAFE AND SUBSEQUENT MARKING OF ROADWAY AND BRIDGE SHALL BE COMPLETED PRIOR TO ALL WORK AND ANY UTILITY DISCREPANCIES REPORTED TO THE ENGINEER IMMEDIATELY.
37. CONTRACTOR SHALL COORDINATE WITH THE COAST GUARD, DEPARTMENT OF CONSERVATION AND RECREATION (DCR) AND ANY OTHER APPLICABLE ENTITIES PRIOR TO WORK IN THE WATERWAY (ON BARGE OR OTHERWISE). AT NO TIME MAY THE CONTRACTOR WORK IN THE WATER WITHOUT COORDINATION WITH THE COAST GUARD. AT ALL TIMES WHEN WORK HAS COMMENCED, TWO OF THE THREE NAVIGABLE SPANS (SPANS 3 THROUGH 5) MUST BE MAINTAINED AS OPEN FOR NAUTICAL TRAFFIC.

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	4	37
PROJECT FILE NO.	608762		

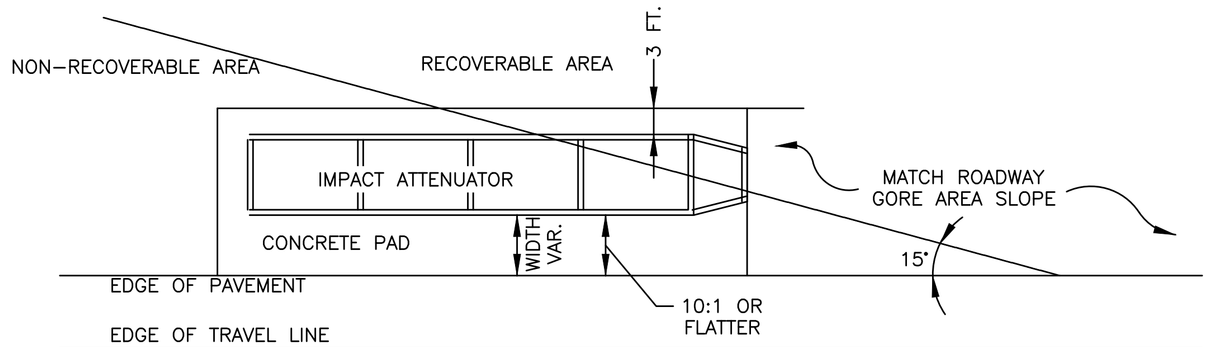
BRIDGE CONSTRUCTION PLAN



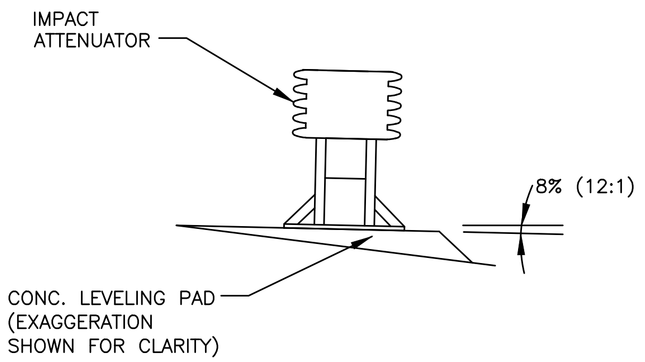
BRIDGE CONSTRUCTION PLAN
SCALE: 1" = 20'–0"

0 20 50 100

SCALE: 1" = 20'



IMPACT ATTENUATOR DETAIL
(NTS)



IMPACT ATTENUATOR LEVELING PAD DETAIL
(NTS)

PAVEMENT NOTES:

PAVEMENT MILLING AND OVERLAY (ELIOT BRIDGE)
3" BRIDGE PAVEMENT MILLING
1½" SUPERPAVE BRIDGE SURFACE COURSE 9.5–P(SSC–B–9.5–P)
1½" SUPERPAVE BRIDGE PROTECTIVE COURSE 9.5–P(SSC–B–9.5–P)

PAVEMENT MILLING AND OVERLAY (ROADWAY APPROACH)
1½" PAVEMENT MILLING
1½" SUPERPAVE SURFACE COURSE – 9.5 (SSC – 9.5)

FULL DEPTH CONSTRUCTION (ROADWAY APPROACH MEDIAN)
SURFACE COURSE: 1½" SUPERPAVE SURFACE U 12.5–P (SSC–12.5–P) OVER

INTERMEDIATE COURSE: 2" SUPERPAVE INTERMEDIATE COURSE 19.0 (SIC–19.0) OVER

BASE COURSE: 6" HIGH EARLY STRENGTH CEMENT CONCRETE BASE COURSE OVER

SUBBASE: EXISTING MATERIAL

HOT MIX ASPHALT (APPROACH SIDEWALK)
2½" HMA IN TWO LAYERS 1¼" EACH OVER EXISTING BASE.

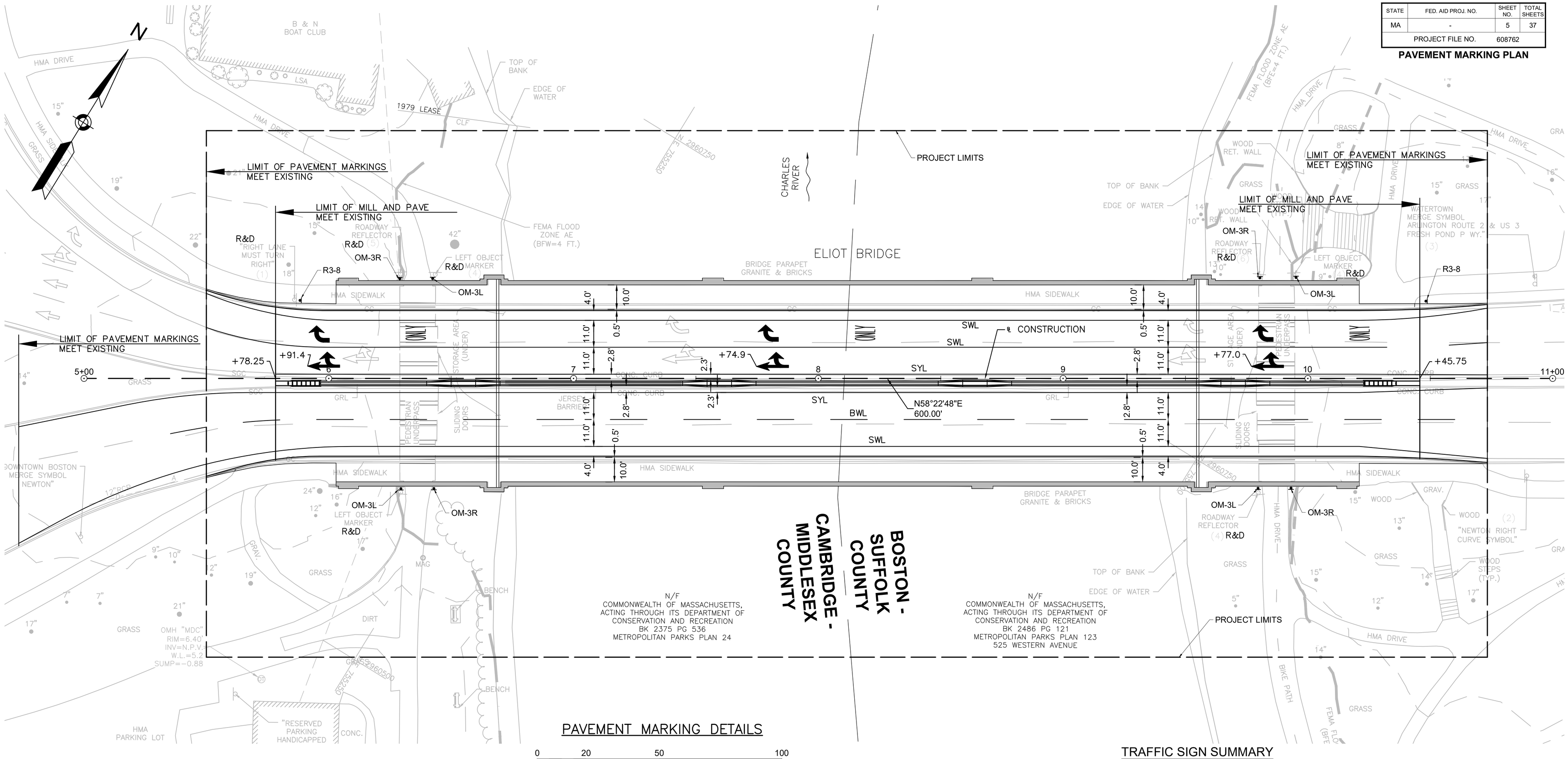
ALL SIDEWALK REPAIR SHALL INCLUDE THE FULL WIDTH OF THE SIDEWALK.

A00850_72
4-608762_BRIDGE CONSTRUCTION PLAN.DWG Plotted on 22-Aug-2023 4:16 PM
Proposal No. 608762-12416
31-MAR-2023
100% RE-SUBMISSION

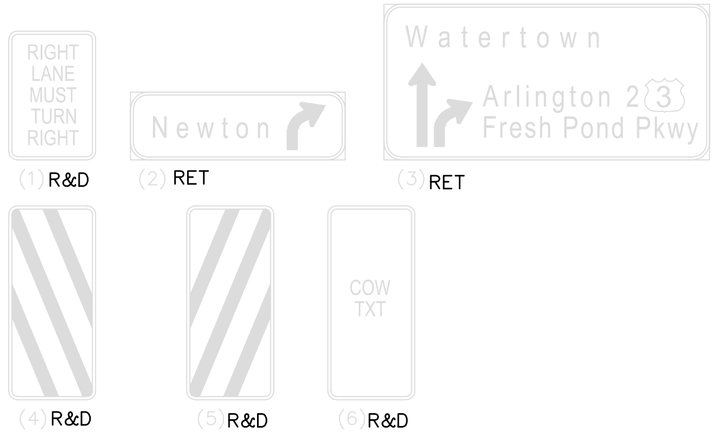
BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	5	37
PROJECT FILE NO.	608762		

PAVEMENT MARKING PLAN

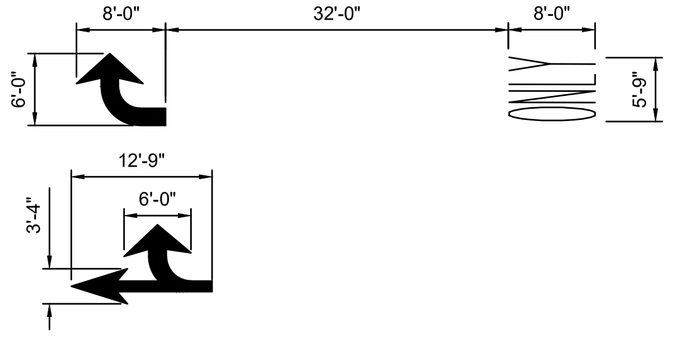


EXISTING SIGN LEGEND



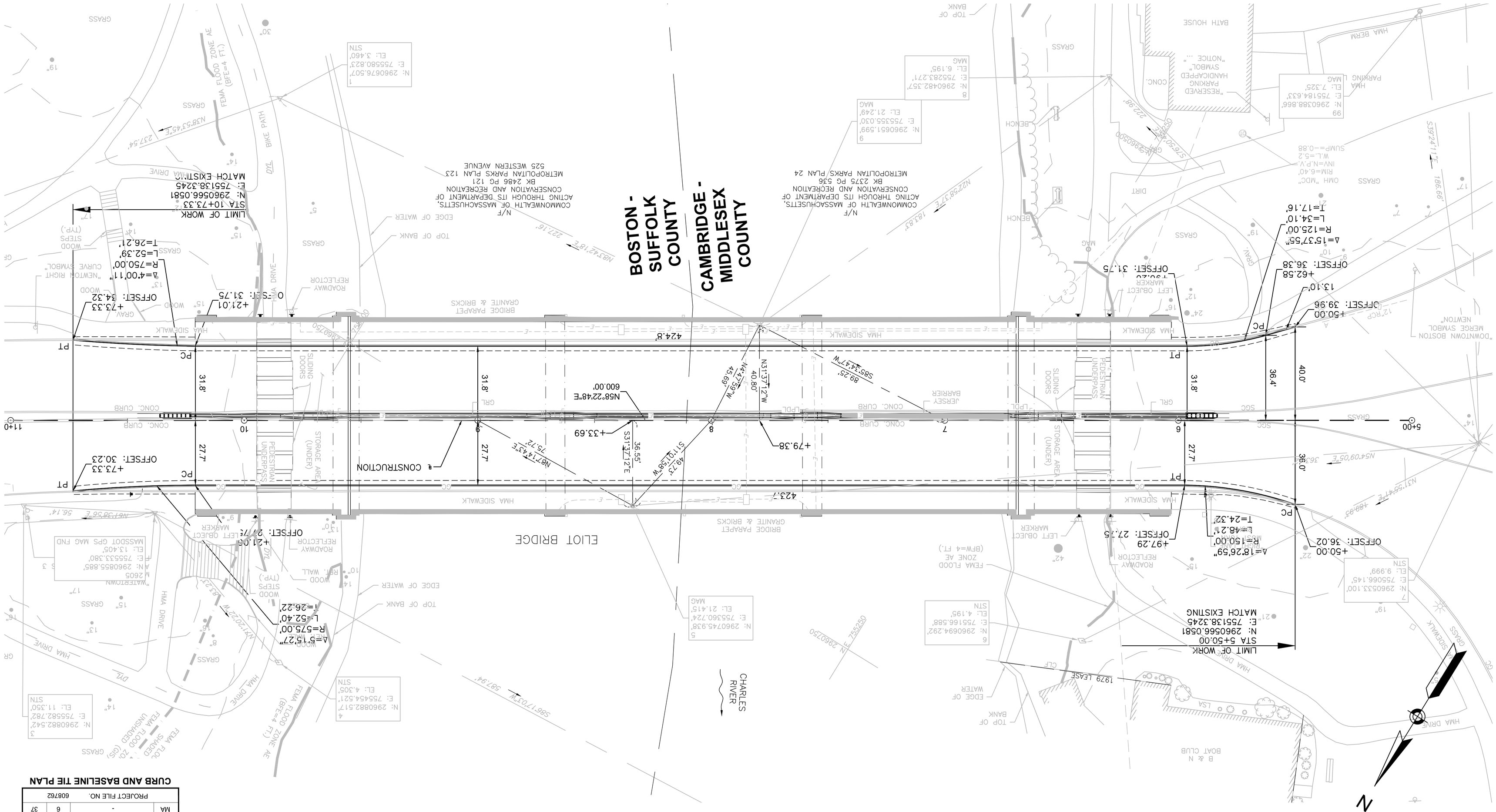
PAVEMENT MARKING DETAILS

0 20 50 100
SCALE: 1" = 20'



TRAFFIC SIGN SUMMARY

IDENTIFICATION NUMBER	SIZE WIDTH (IN)	SIZE HEIGHT (IN)	TEXT	DIMENSIONS (IN) LETTER HEIGHT	DIMENSIONS (IN) VERTICAL SPACING	DIMENSIONS (IN) ARROW RTE. MKR.	NUMBER OF SIGNS REQUIRED	POSTS	COLOR BACK-GROUND	COLOR LEGEND	COLOR BORDER	UNIT AREA (S.F.)	TOTAL AREA (S.F.)
OM-3L	12"	36"		1	1	1	4	P-5	YELLOW	BLACK	BLACK	3.00	12.0
OM-3R	12"	36"					4	P-5	YELLOW	BLACK	BLACK	3.00	12.0
R3-8	30"	30"	ONLY				2	P-5	WHITE	BLACK	BLACK	6.25	12.5



BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

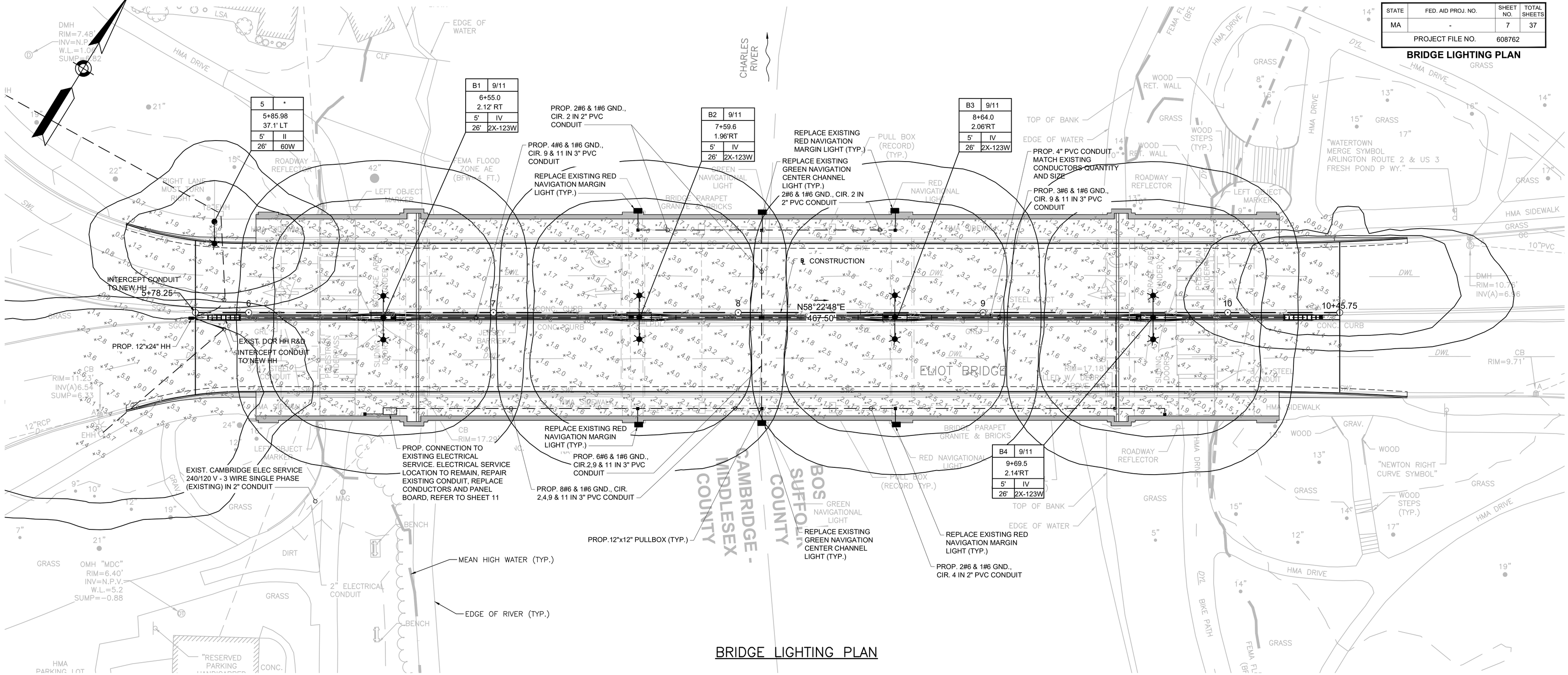
CURB AND BASELINE TIE PLAN

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	6	37
PROJECT FILE NO.	608762		

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	7	37
PROJECT FILE NO.	608762		

BRIDGE LIGHTING PLAN



BRIDGE LIGHTING PLAN

0 20 50 100

SCALE: 1" = 20'

Schedule

Symbol	Label	QTY	Manufacturer	Catalog Number	Description	Lamp	Number Lamps	Lumens per Lamp	Lumen Multiplier	LLF	Wattage	Efficiency	Distribution
	60WLEDT PROPOSED LUMINAIRE	4	Leotek Electronics USA LLC	GCM3-60J-MV-40K-4-XX-185	Gray cast aluminum housing, plastic access panel, LED board with optics installed.	123 White LEDs	1	18016	1	0.9	246	100%	IV
	60WLEDT PROPOSED LUMINAIRE	1	Leotek Electronics USA LLC		Gray cast aluminum housing, plastic access panel, LED board with optics installed.	60 White LEDs	1	9709	1	0.9	58.68	100%	IV
	150hps EXISTING COBRAHEAD	1	GE LIGHTING SOLUTIONS www.gelighting solutions.com	M2RC15S___GMC3	M-250R2 CUTOFF	1; 150W HPS, CLEAR ED23.5, HORZ	1	16000	1	0.65	183	70%	MC3
	400hps EXISTING COBRAHEAD	1	GE LIGHTING SOLUTIONS www.gelighting solutions.com	M_RL40S____RMS3_	M-400	1; 400W HPS, CLEAR ED18, HORZ	1	51000	1	1	468	73%	MS3
	EXISTING DCR PENDANT	1	King Luminaire	K800-P4SH-III-150(SSL)-8084		SWITCHBOX 222D1829, SETTING: POS 1 - 100K	1	14954	1	0.9	149	100%	

LEGEND

- PROP. LIGHT POLE
- PROP. DOUBLE LIGHT POLE
- PROP. 12"X12" PULL BOX
- PROP. 12"X24" HANDHOLE
- PROP. 12"X12" BARRIER MOUNTED JUNCTION BOX
- PROP. 3" PVC CONDUIT (1" PVC CONDUIT BETWEEN HH AND LIGHT POLE)
- PROP. LOAD CENTER

FIXTURE #	1 | *	*USE EXISTING CIRCUIT
STATION	7+52	
OFFSET	24.0' RT	
ARM LENGTH	5' | III	DISTRIBUTION TYPE
MOUNTING HEIGHT	27' | 2X-60W	NUMBER OF FIXTURES/WATTAGE

* REFER TO PLAN FOR ACTUAL LIGHT INFORMATION

Statistics

Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min
Elliot Bridge Roadway	+	3.3 fc	8.0 fc	0.9 fc	8.9:1	3.7:1
North Sidewalk	+	1.7 fc	2.7 fc	0.6 fc	4.5:1	2.8:1
South Sidewalk	+	1.7 fc	2.6 fc	1.0 fc	2.6:1	1.7:1
Camb. Approach	+	3.1 fc	13.4 fc	0.7 fc	19.1:1	4.4:1

GENERAL NOTES:

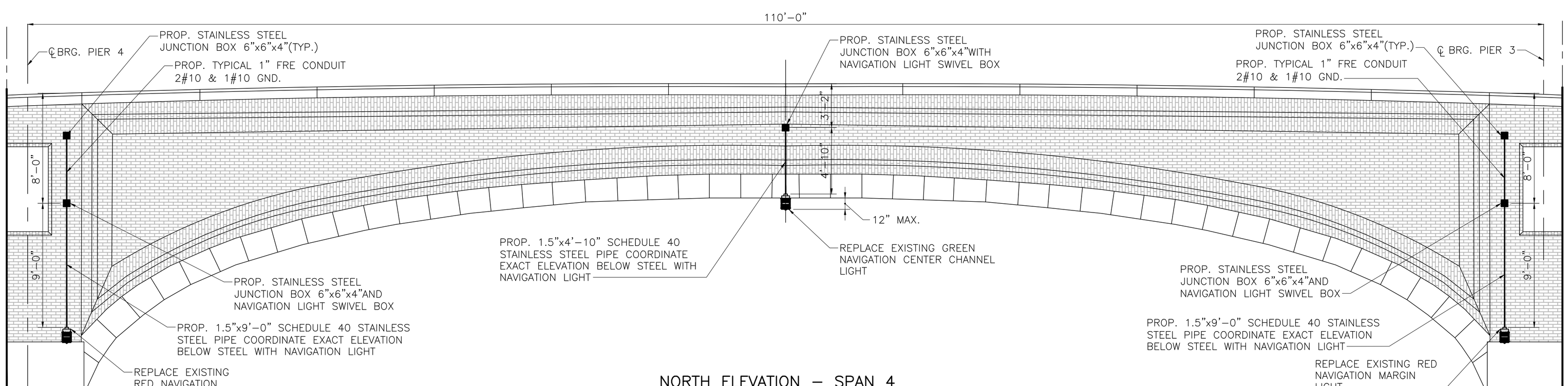
1. ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRIC CODE.
2. ALL CONDUIT UNDER GROUND SHALL BE 3" PVC UNLESS OTHERWISE NOTED. CONDUIT BETWEEN THE POLE AND THE ADJACENT HANDHOLE SHALL BE 1" PVC. ALL EXPOSED CONDUIT ON THE BRIDGE SHALL BE RTRC.
3. ALL WIRING SHALL BE WIRE TYPE 7 RHW.
4. ALL PROPOSED LIGHTING POLES SHALL HAVE MINIMUM 2 FEET CLEARANCE TO THE CURB FACE. UNLESS ON BARRIER.
5. CONDUIT SHOWN ON THESE PLANS IS DIAGRAMMATIC AND THE EXACT ROUTE AND MOUNTING SHALL BE DETERMINED BY THE CONTRACTOR.
6. POLE FOUNDATION SHALL BE PER MANUFACTURER'S REQUIREMENTS. MASSDOT STANDARD DRAWINGS AND/OR BARRIER DETAILS.
7. A GROUND ROD SHALL BE INSTALLED AT EACH POLE INSIDE THE ADJACENT HANDHOLE. EXCEPT LIGHT POLES ON THE BRIDGE WHICH SHALL BE BONDED.
8. THE LIGHT FIXTURES SHALL BE EQUIPPED WITH 7 PIN RECEPTACLES WITH SHORTING CAPS AND PHOTOCELLS.
9. SEE BRIDGE CONSTRUCTION PLAN FOR SIDEWALK AND TRENCH REPAIR AREAS.

7-608762_BRIDGE LIGHTING PLAN.DWG Plotted on 22-Aug-2023 4:22 PM
Proposal No. 608762-124916
A00850 - 75
31-MAR-2023
100% RE-SUBMISSION

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

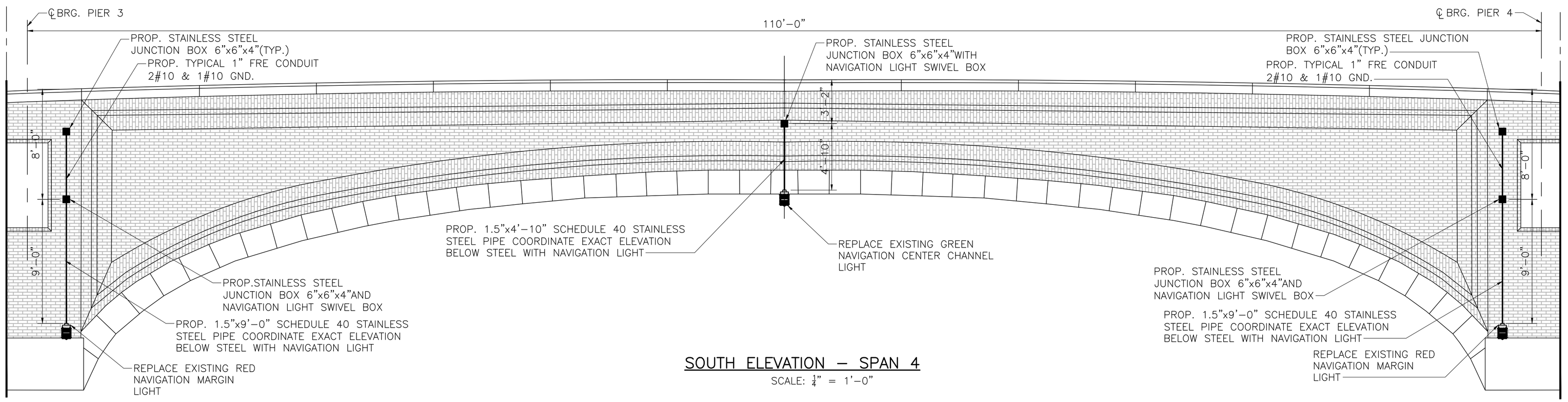
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	8	37
PROJECT FILE NO.	608762		

BRIDGE LIGHTING ELEVATION



NORTH ELEVATION – SPAN 4

SCALE: ¼" = 1'-0"



SOUTH ELEVATION – SPAN 4

SCALE: ¼" = 1'-0"

A00850 - 76

8-608762_BRIDGE LIGHTING ELEVATION.DWG Plotted on 22-Aug-2023 4:28 PM

Proposal No. 608762-124916

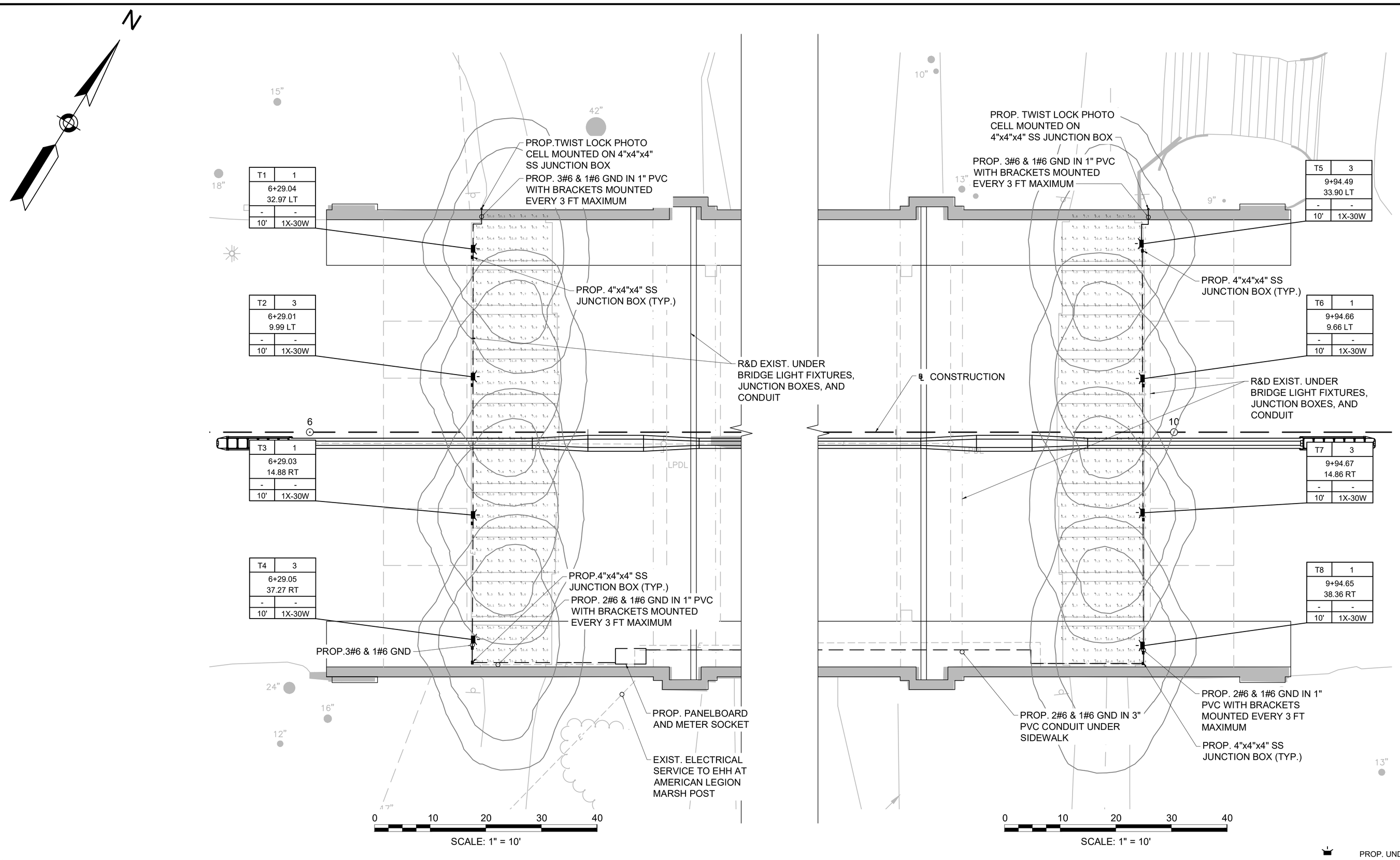
31-MAR-2023

100% RE-SUBMISSION

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	9	37
PROJECT FILE NO.	608762		

PEDESTRIAN TUNNEL LIGHTING PLAN



Schedule

Symbol	Label	QTY	Manufacturer	Catalog Number	Description	Lamp	Number Lamps	Lumens per Lamp	Lumen Multiplier	LLF	Wattage	Efficiency	Distribution
	Wall	8	Lumecon	BLS-FTW-62-1-ADJ-D-G	FIXTURE PROVIDED WITH ADJUSTABLE SYSTEM WATTS AND COLOR TEMPERATURE. SETTINGS ARE FROM 40% TO 100%. CALCULATION BASED ON 60%, 37.17 WATTS/5187 LUMENS AT 5,000K WITH GLASS DIFFUSER.	LED	1	5186	1	0.99	39.17	100%	

Statistics

Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min
Bos Ped Tunnel 0 Ft	+	8.9 fc	15.5 fc	5.4 fc	2.87	1.65
Camb Ped Tunnel 0 FT	+	8.63 fc	14.9 fc	5.4 fc	2.76	1.60

LEGEND

- PROP. UNDERPASS FIXTURE
- PROP. 6"X6"X4" JUNCTION BOX
- PROP. 1" CONDUIT

FIXTURE #	T1	3	CIRCUIT NUMBER
STATION	7+52		
OFFSET	24.0' RT		
ARM LENGTH	-	-	DISTRIBUTION TYPE
MOUNTING HEIGHT	10'	1X-30W	NUMBER OF FIXTURES/WATTAGE

* REFER TO PLAN FOR ACTUAL LIGHT INFORMATION

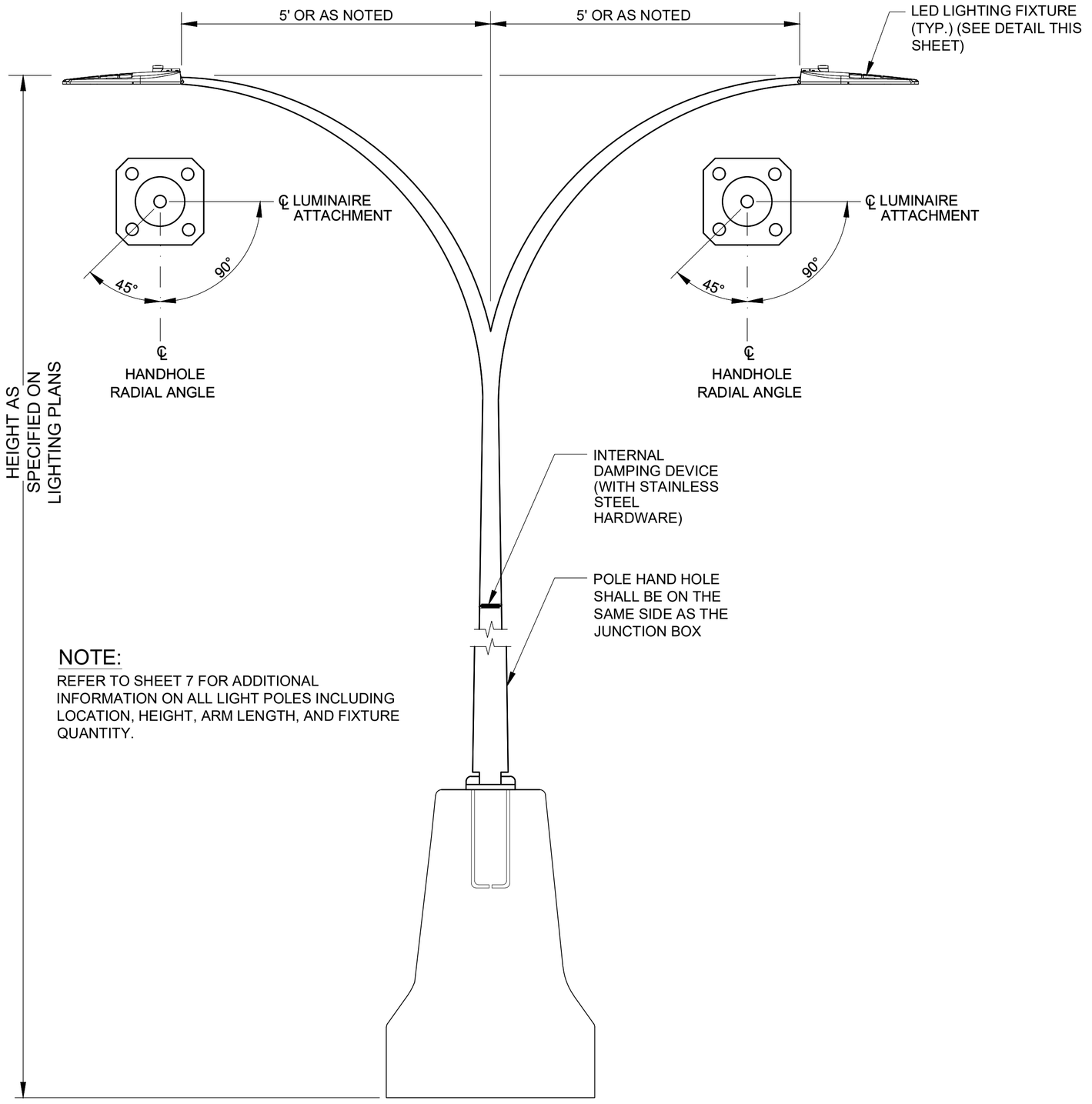
GENERAL NOTES:

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRIC CODE.
2. ALL CONDUIT UNDER SIDEWALK SHALL BE 3" PVC UNLESS OTHERWISE NOTED. CONDUIT BETWEEN THE POLE AND THE ADJACENT HANDHOLE SHALL BE 1" PVC.
3. ALL WIRING SHALL BE WIRE TYPE 7 XHHW2 WITH XLP JACKET.
4. CONDUIT SHOWN ON THESE PLANS IS DIAGRAMMATIC AND THE EXACT ROUTE AND MOUNTING SHALL BE DETERMINED BY THE CONTRACTOR.
5. LIGHT POLE FIXTURES SHALL BE INSTALLED PER MANUFACTURER'S REQUIREMENTS. MASSDOT STANDARD DRAWINGS AND/OR BARRIER DETAILS.
6. SEE BRIDGE CONSTRUCTION PLAN FOR SIDEWALK AND TRENCH REPAIR AREAS.
7. PHOTOCELL SHALL BE POINTED TOWARD THE NORTHERN SKY.
8. R&D EXISTING UNDER BRIDGE LIGHTING IN THE PEDESTRIAN TUNNEL INCLUDING ALL CONDUIT AND JUNCTION BOXES.

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	10	37
PROJECT FILE NO.	608762		

LIGHTING DETAILS
SHEET 1 OF 2

10-11-608762_LIGHTING DETAILS.DWG Plotted on 17-May-2023 12:44 PM

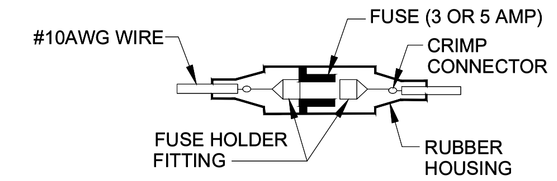


NOTE:
REFER TO SHEET 7 FOR ADDITIONAL INFORMATION ON ALL LIGHT POLES INCLUDING LOCATION, HEIGHT, ARM LENGTH, AND FIXTURE QUANTITY.

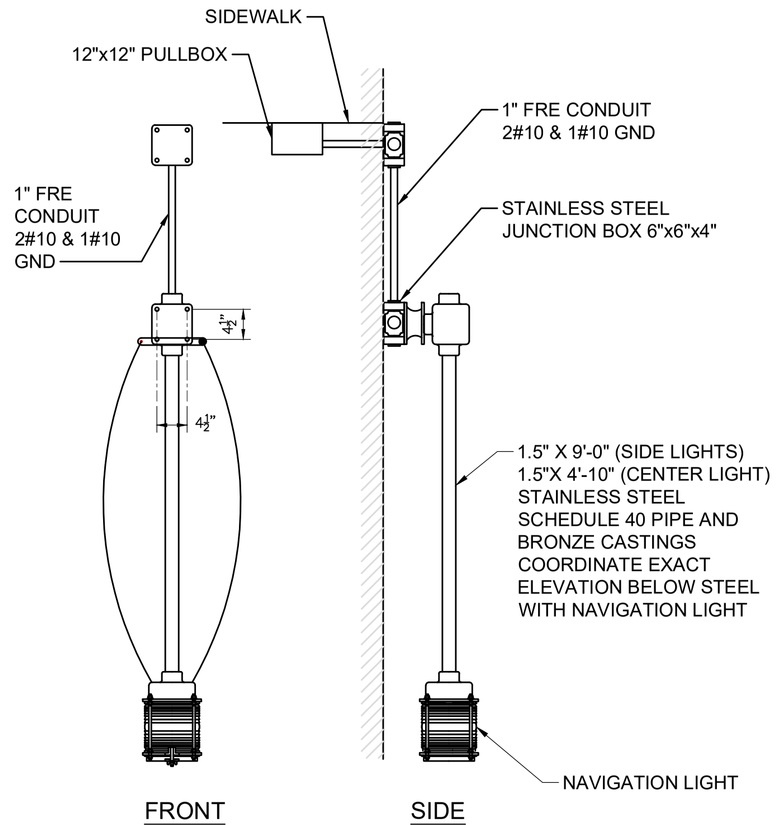
ROADWAY LIGHTING - DOUBLE ARM
POLE ASSEMBLY (STEEL)
N.T.S.

NOTES:

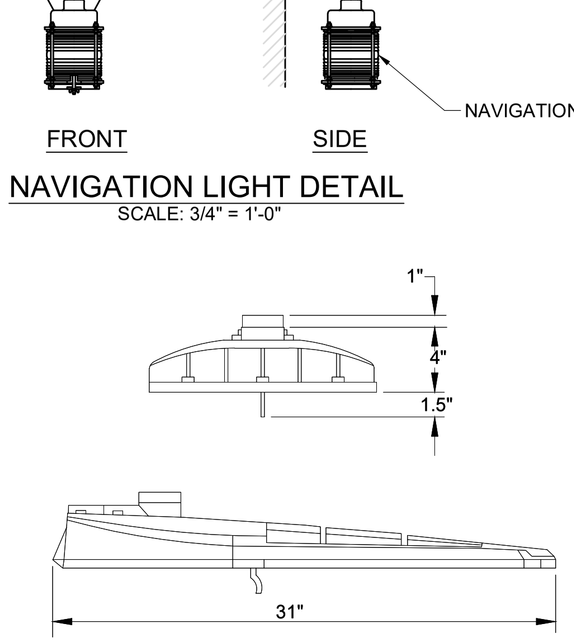
1. REFER TO SHEET 10 FOR MEDIAN BARRIER MOUNTED LIGHT POLE FOUNDATION DETAILS.



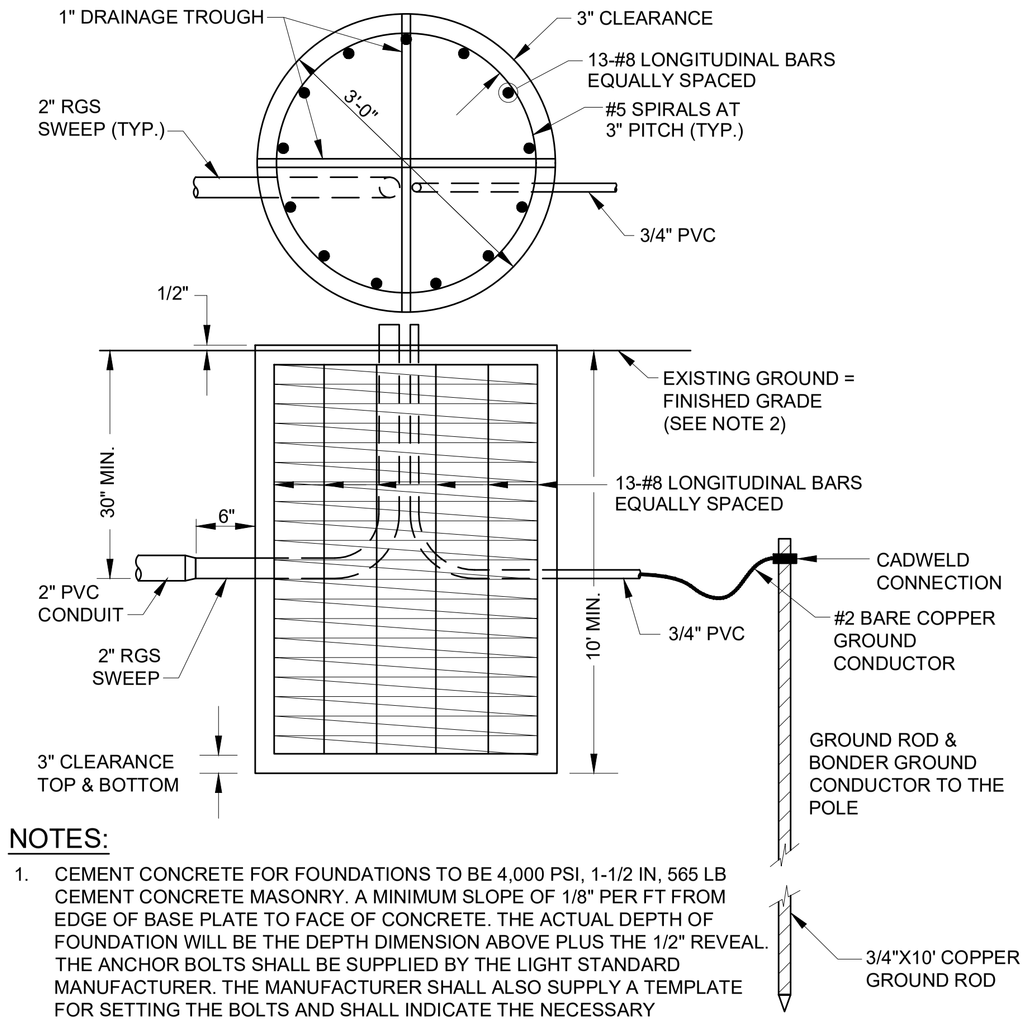
FUSE DETAIL FOR LUMINAIRE
N.T.S.



NAVIGATION LIGHT DETAIL
SCALE: 3/4" = 1'-0"



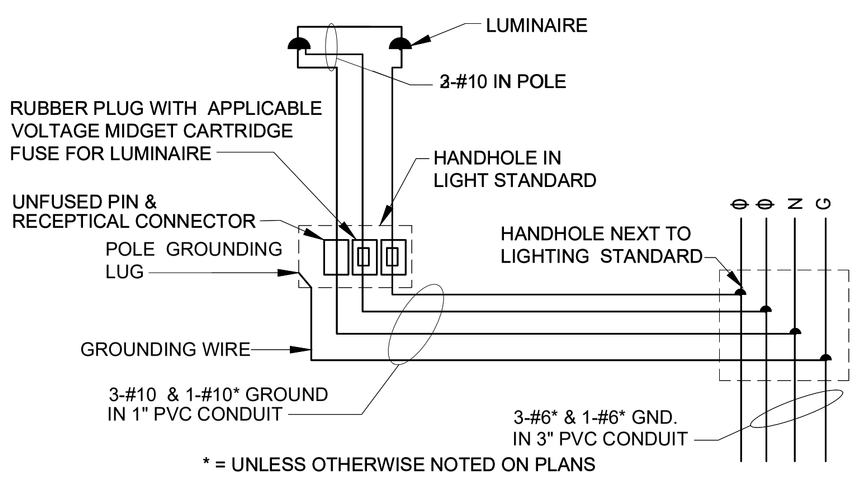
LED LIGHTING FIXTURE
N.T.S.



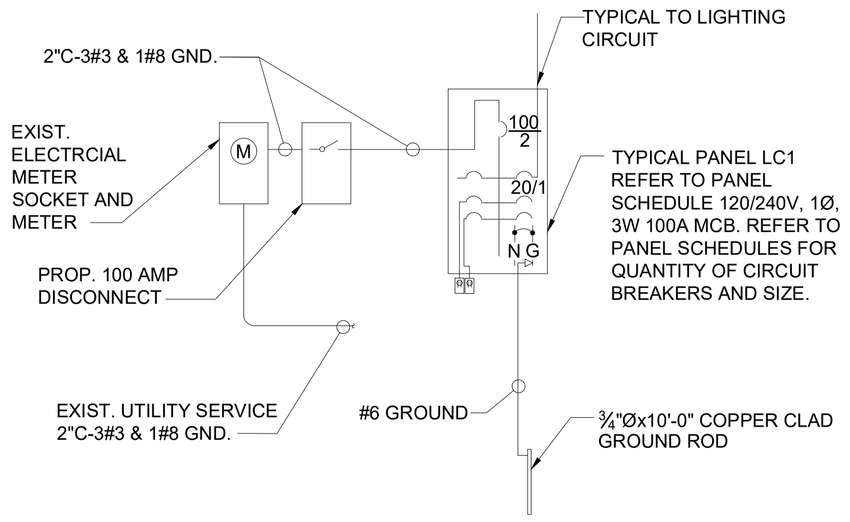
NOTES:

1. CEMENT CONCRETE FOR FOUNDATIONS TO BE 4,000 PSI, 1-1/2 IN, 565 LB CEMENT CONCRETE MASONRY. A MINIMUM SLOPE OF 1/8" PER FT FROM EDGE OF BASE PLATE TO FACE OF CONCRETE. THE ACTUAL DEPTH OF FOUNDATION WILL BE THE DEPTH DIMENSION ABOVE PLUS THE 1/2" REVEAL. THE ANCHOR BOLTS SHALL BE SUPPLIED BY THE LIGHT STANDARD MANUFACTURER. THE MANUFACTURER SHALL ALSO SUPPLY A TEMPLATE FOR SETTING THE BOLTS AND SHALL INDICATE THE NECESSARY PROJECTION.
2. LEVEL GRADES SHOWN. FOR AREAS WITH SLOPED EXISTING GRADE MAINTAIN A $\frac{1}{2}$ INCH REVEAL ON THE HIGH SIDE OF SLOPE AT FOUNDATION. MEASURE MINIMUM 10-FOOT EMBEDMENT FROM THE LOW SIDE OF SLOPE AT FOUNDATION AND INCREASE LENGTH ACCORDINGLY.
3. ALL REINFORCING STEEL SHALL BE ASTM A615 GRADE 60, EPOXY COATED.

LIGHT STANDARD FOUNDATION
N.T.S.



WIRING DIAGRAM FOR LUMINAIRE
N.T.S.



LOAD CENTER WIRING DETAIL
NOT TO SCALE

PANEL "LC1" (LIGHTING PANEL)

AIC 18,000 MIN.

SPACES	MOUNTING SURFACE	LOCATION LGT. CABINET	MAIN BREAKER 100A - 2P	VOLTAGE 120/240V.	MAIN BUS RAT. 225AMP	FEED BOTTOM
20						

CKT. NO.	DESCRIPTION	LOADS A Ø	LOADS B Ø	BKR SIZE	POLE	A B	BKR SIZE	POLE	LOADS A Ø	LOADS B Ø	DESCRIPTION	CKT. NO.
1	PED TUNNEL LIGHTS CAMB. SIDE	*254		20	1		20	1	10		NAVIGATION LIGHTS NORTH SIDE	2
3	PED TUNNEL LIGHTS BOSTON SIDE		*254	20	1		20	1		10	NAVIGATION LIGHTS SOUTH SIDE	4
5	PANEL GFCI 1	2000		20	1		20	1	1000		**INSIDE LIGHTS CAMBRIDGE SIDE	6
7	PANEL GFCI 2		2000	20	1		20	1		1000	**INSIDE LIGHTS BOSTON SIDE	8
9	MEDIAN LIGHTS	492		20	1		20	1	-		SPARE	10
11	MEDIAN LIGHTS		492	20	1		20	1		-	SPARE	12
13							20	1	-		SPARE	14
15							20	1		-	SPARE	16
17												18
19												20
	TOTAL	2612	2612				TOTAL		1010	1010		
									3622	3622		

(3622+3622=7244VA x 1.25 = 9055 VA)

** EXISTING LIGHT LOCATED WITH IN EXISTING STORAGE ROOM UNDER BRIDGE
* LOAD ARE BASED ON FIXTURE SETTING OF 100%

Proposal No. 608762-124916

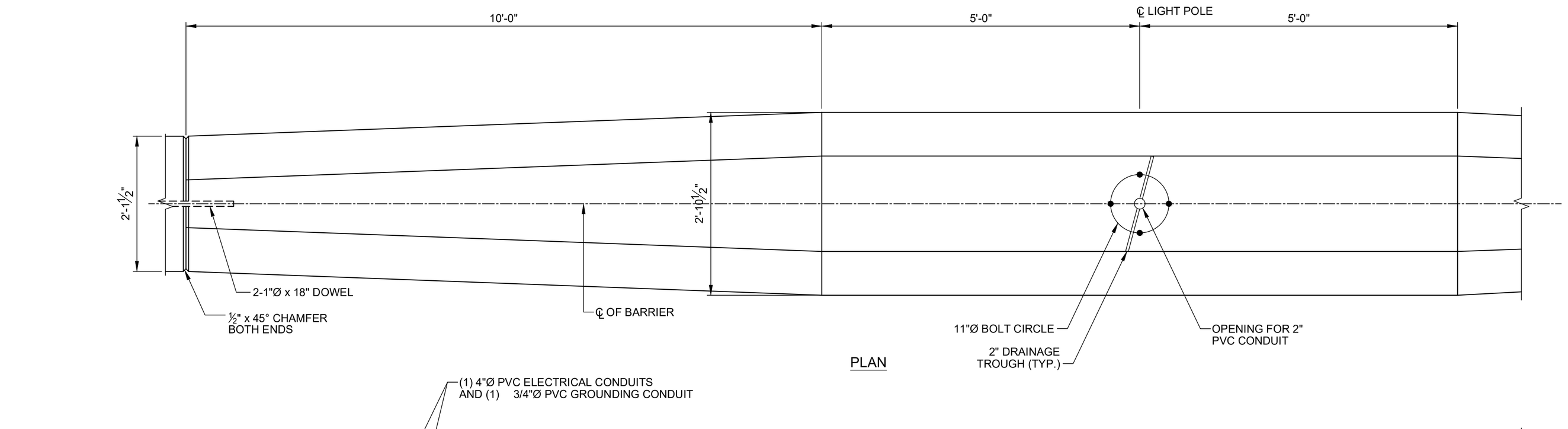
02-SEP-2022

100% SUBMISSION

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	11	37
PROJECT FILE NO.	608762		

LIGHTING DETAILS
SHEET 2 OF 2

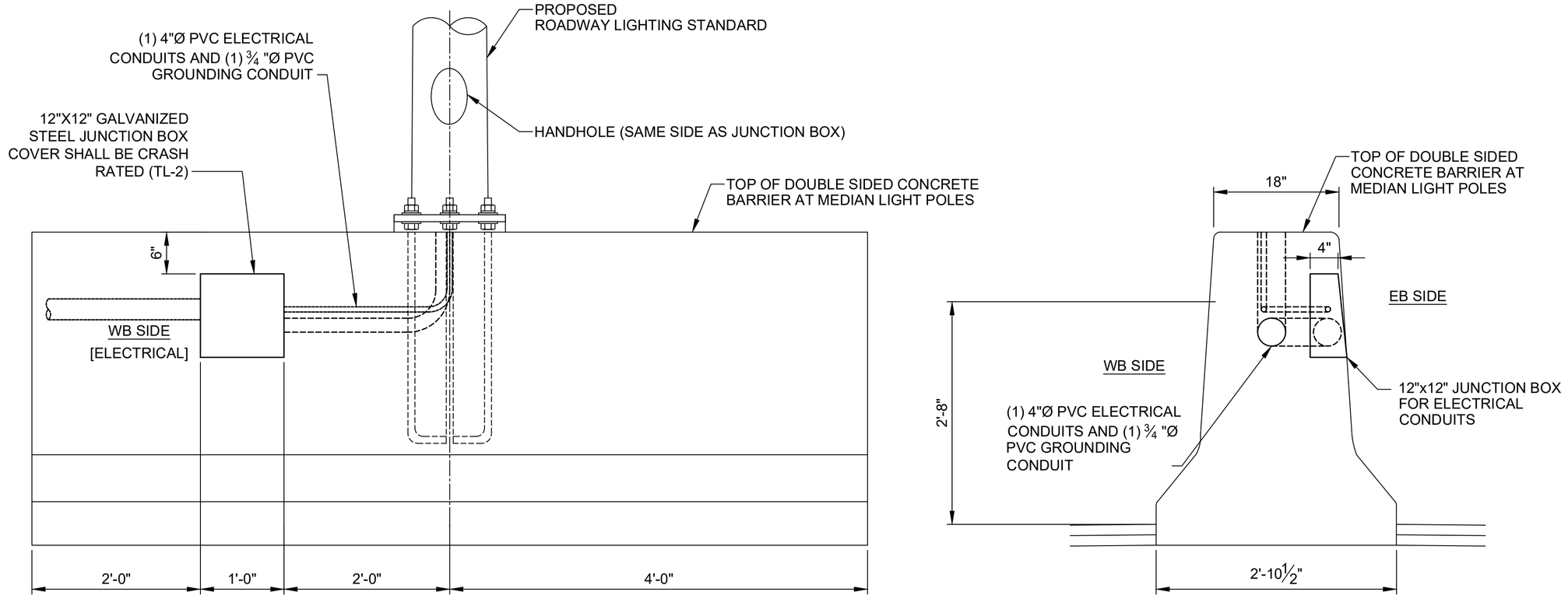


PLAN

ELEVATION

MEDIAN BARRIER AT LIGHT POLE

SCALE: 1" = 1'-0"

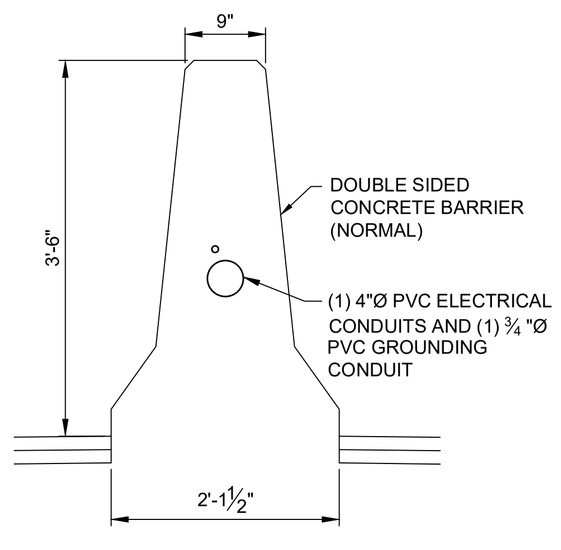


ELEVATION

SECTION

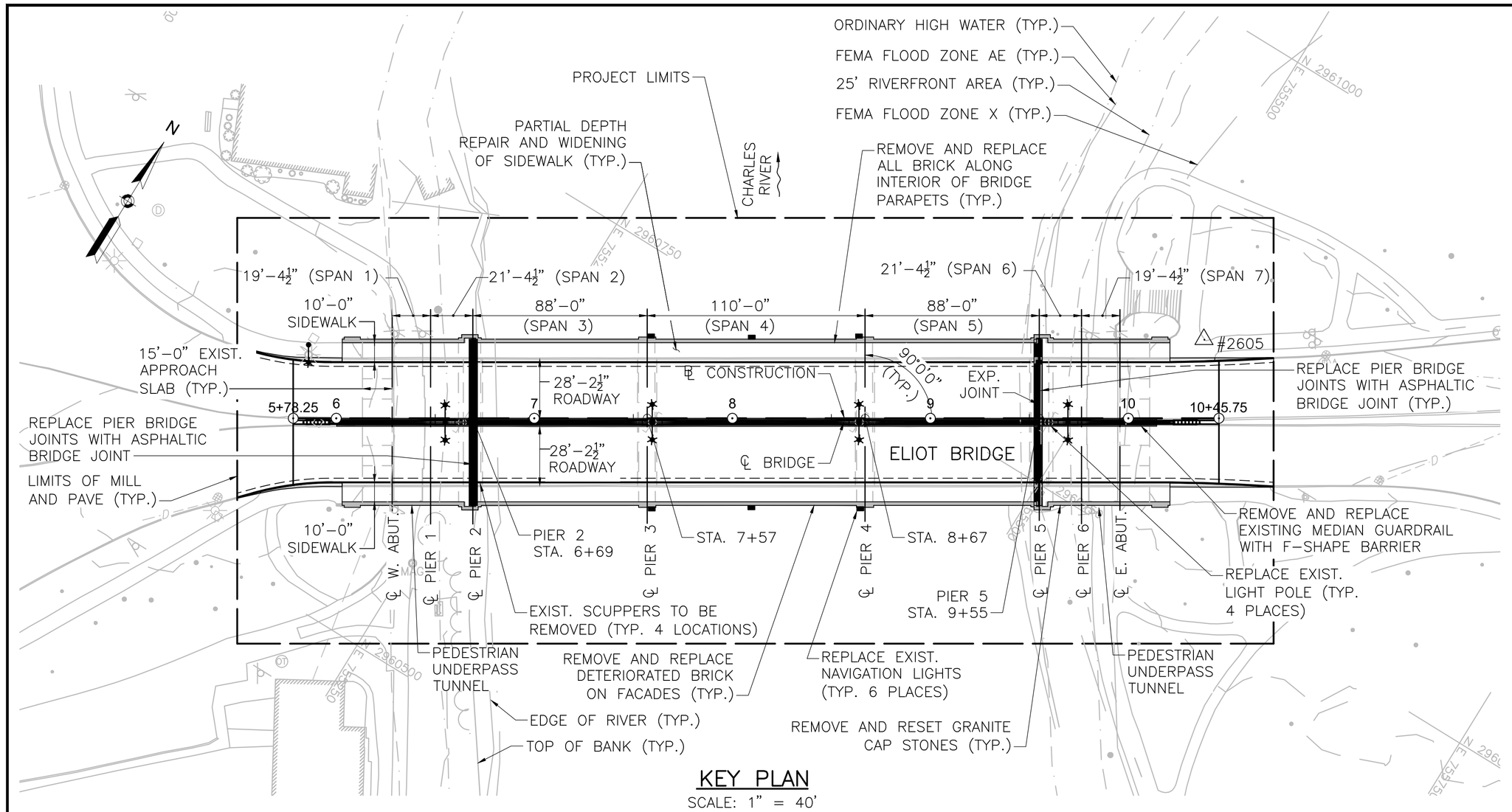
MEDIAN BARRIER JUNCTION BOX AND CONDUIT FEED DETAILS AT LIGHT POLE

SCALE: 1" = 1'-0"

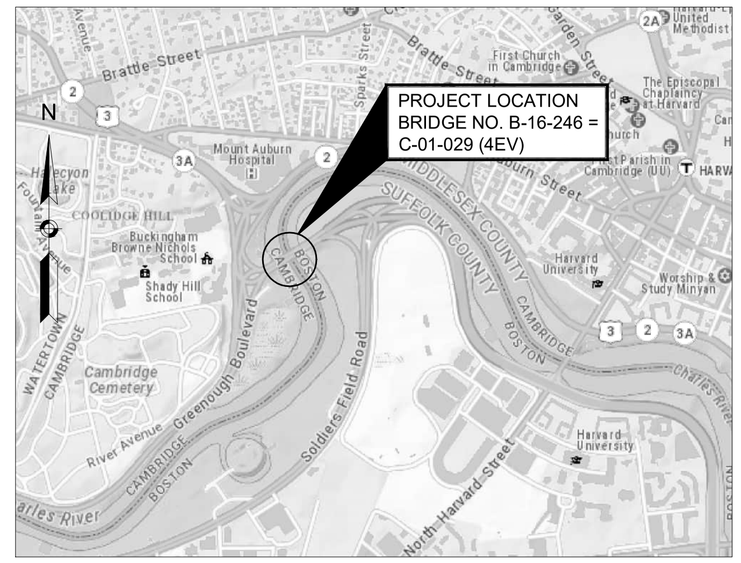


MEDIAN BARRIER DETAIL

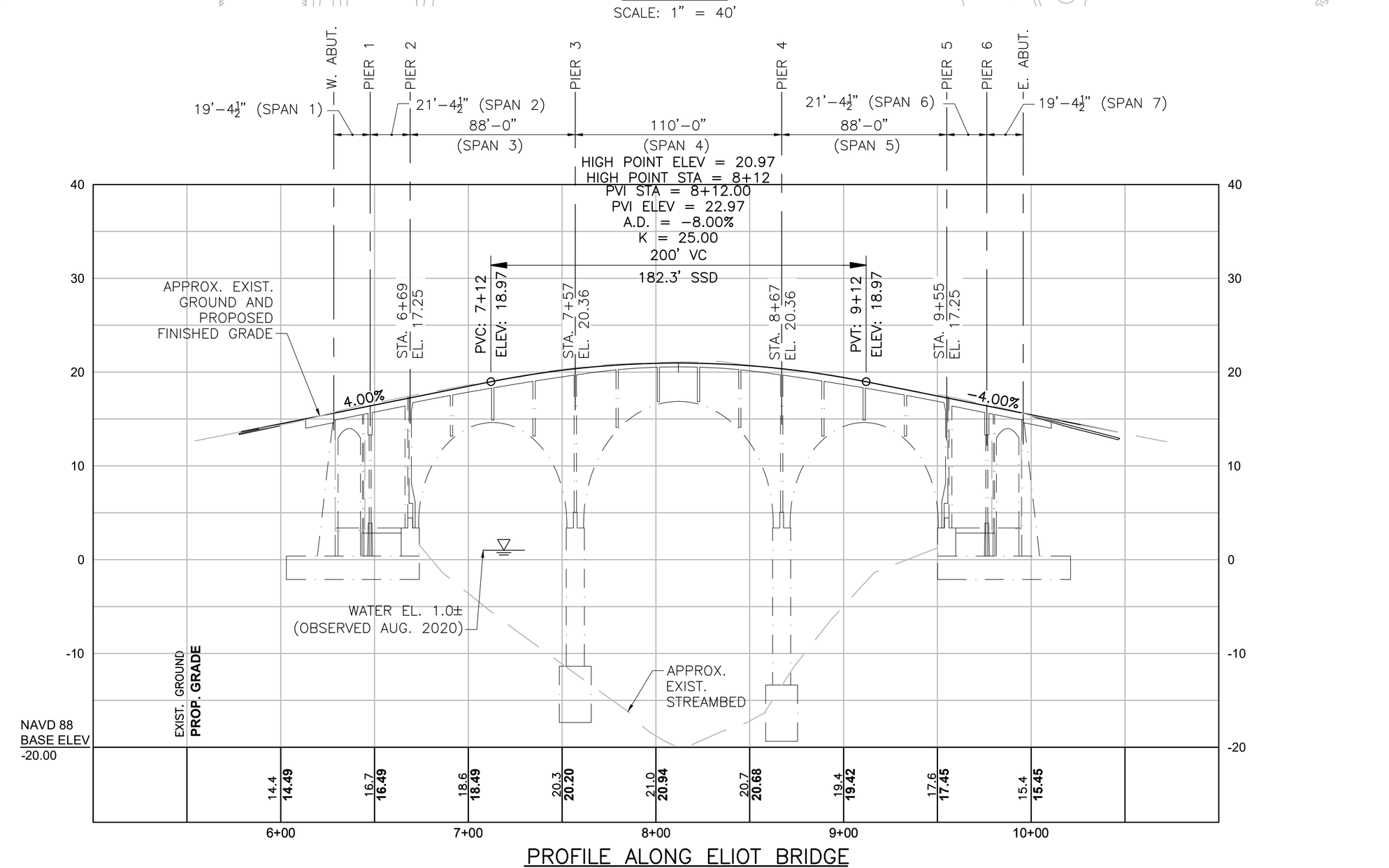
SCALE: 1" = 1'-0"



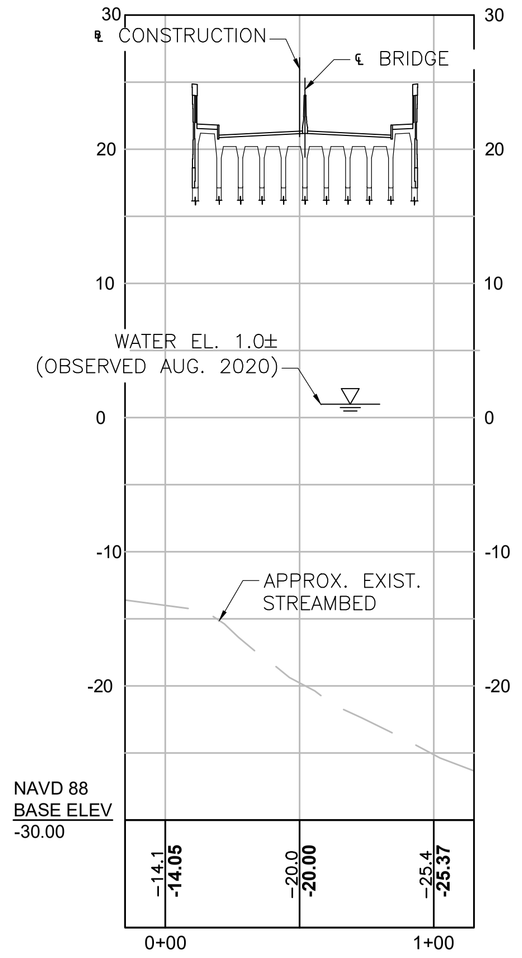
KEY PLAN
SCALE: 1" = 40'



LOCUS
SCALE: 1" = 1000'



PROFILE ALONG ELIOT BRIDGE
HORIZ. SCALE: 1" = 40'
VERT. SCALE: 1" = 8'



PROFILE ALONG CHARLES RIVER
HORIZ. SCALE: 1" = 40'
VERT. SCALE: 1" = 8'

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	12	37
PROJECT FILE NO.		608762	

PLAN AND PROFILE (BRIDGE)

PROJECT INFORMATION

PROJECT FILE NO.:	608762
PROJECT DESCRIPTION:	PROPOSED BRIDGE REPAIR
BRIDGE DESIGN LOADING:	H-15
SURVEY:	FIELD BOOK NO. 41472
ELEVATION REFERENCE:	NAVD OF 1988
BENCH MARK:	#2605 N: 2960855.885, E: 755533.380, EL.=13.405' (MASSDOT GPS MAG FND)

TRAFFIC DATA

	ROADWAY OVER	ROADWAY UNDER
DESIGN YEAR	2024	
AVERAGE DAILY TRAFFIC – PRESENT	45729	
AVERAGE DAILY TRAFFIC – DESIGN YEAR	45729	
DESIGN HOURLY VOLUME	4394	
DIRECTIONAL DISTRIBUTION	51%	
TRUCK PERCENTAGE – AVERAGE DAY	9%	
TRUCK PERCENTAGE – PEAK HOUR	9%	
DESIGN SPEED	35	
DIRECTIONAL DESIGN HOURLY VOLUME	2582	

SEISMIC DESIGN CRITERIA

DESIGN RETURN PERIOD:	1000 YEARS
DESIGN SPECTRA	
As	0.096
SDs	0.217
SD1	0.069
SITE CLASS	D
SEISMIC DESIGN CATEGORY (SDC)	A

DESIGN:

ALL REPAIRS INTENDED TO RESTORE FUNCTION AND CAPACITY OF ORIGINAL CONSTRUCTION. BRIDGE WAS DESIGNED TO AASHTO H-15 LOADING.

NOTES:

1. DUE TO THE LIMITED NATURE OF THE PROPOSED WORK, NO GEOTECHNICAL OR HYDRAULIC REPORTS HAVE BEEN PREPARED FOR THIS PROJECT.
2. NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988 IS USED THROUGHOUT.
3. PLAN AND PROFILE ARE BASED ON SURVEY DATED AUGUST 2020 AND SUPPLEMENTED WITH PROFILE INFORMATION FROM EXISTING DESIGN DRAWINGS.

Jacobs.
120 ST. JAMES AVENUE, 5TH FLOOR
BOSTON, MA 02116

massDOT Massachusetts Department of Transportation Highway Division

PROPOSED BRIDGE REPAIRS
BOSTON & CAMBRIDGE
ELIOT BRIDGE
OVER CHARLES RIVER

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION

APPROVED BY	DATE
STRUCTURAL ELEMENTS:	
TITLE:	
HIGHWAY ELEMENTS:	
TITLE:	

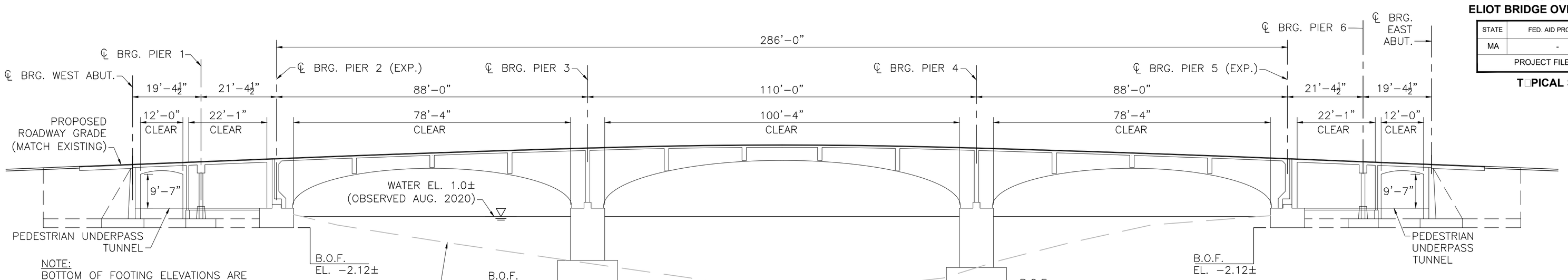
BRIDGE NO. B-16-246 = BRIDGE NO. C-01-029 (4EV)

100% RE-SUBMISSION 31-MAR-2023

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

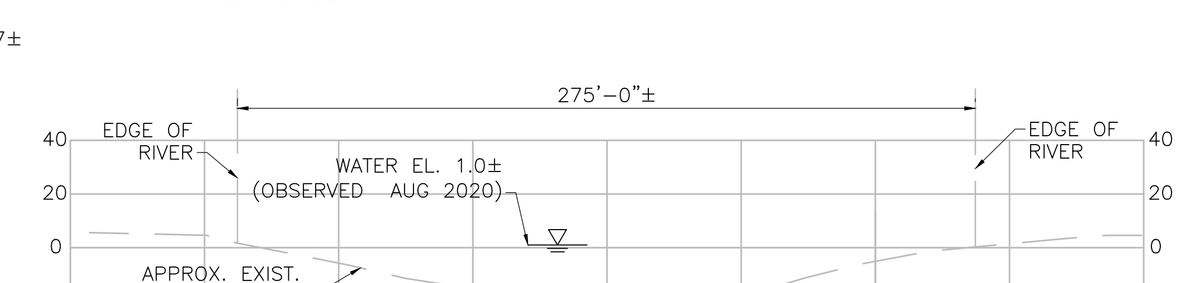
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	13	37
PROJECT FILE NO.	608762		

TYPICAL SECTIONS

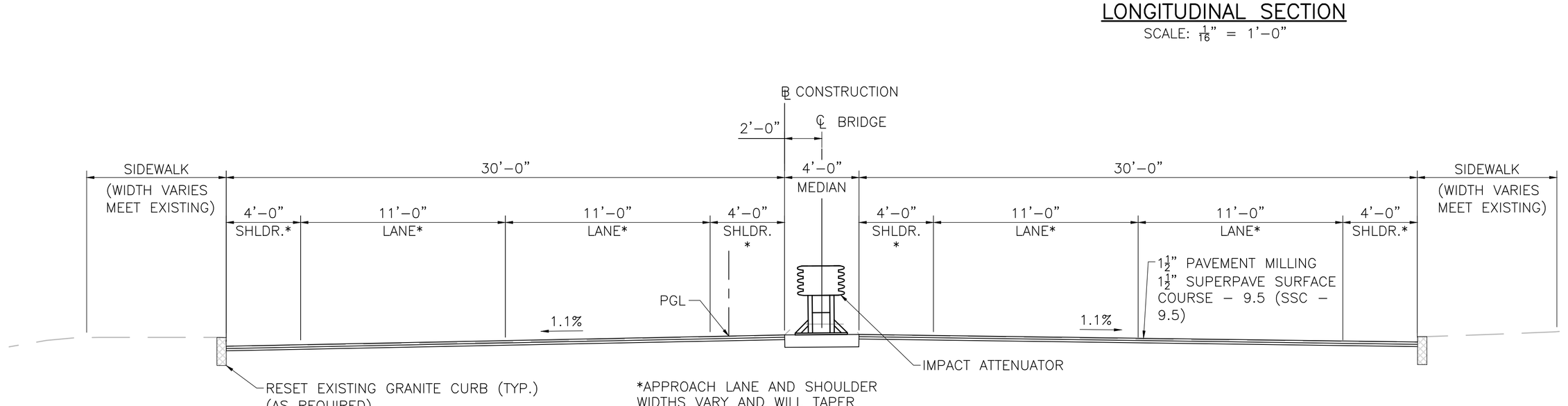


NOTE:
BOTTOM OF FOOTING ELEVATIONS ARE APPROXIMATE AND BASED OFF EXISTING PLANS DUE TO LIMITED SCOPE OF SURVEY. NO WORK BELOW WATER LINE IS ANTICIPATED WITH THIS REPAIR PROJECT.

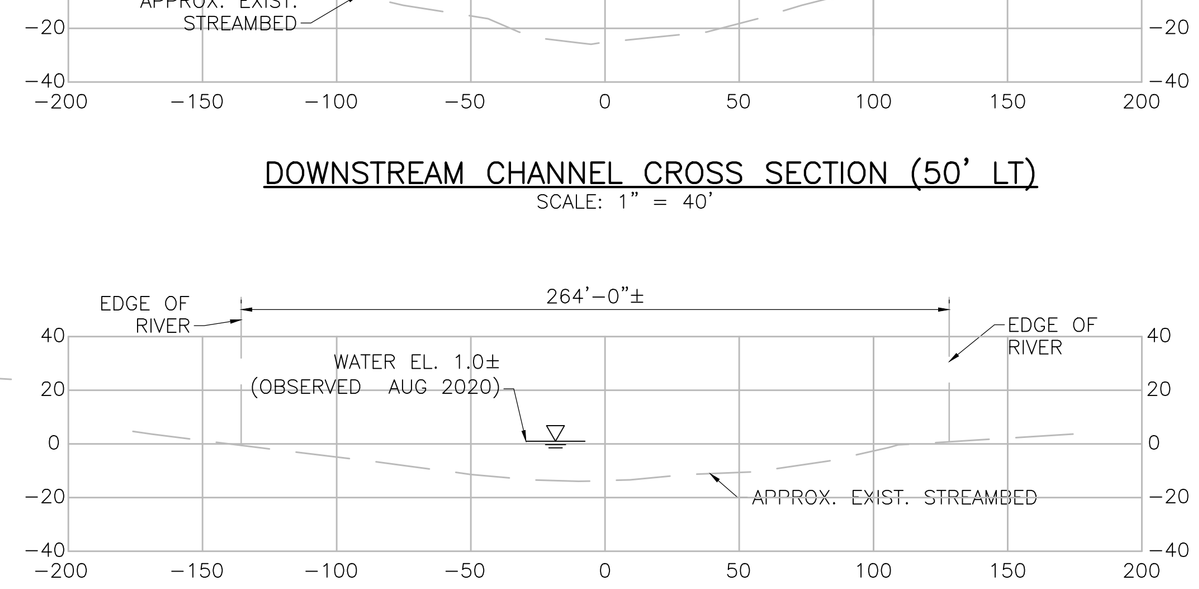
LONGITUDINAL SECTION
SCALE: $\frac{1}{16}$" = 1'–0"



DOWNSTREAM CHANNEL CROSS SECTION (50' LT)
SCALE: 1" = 40'

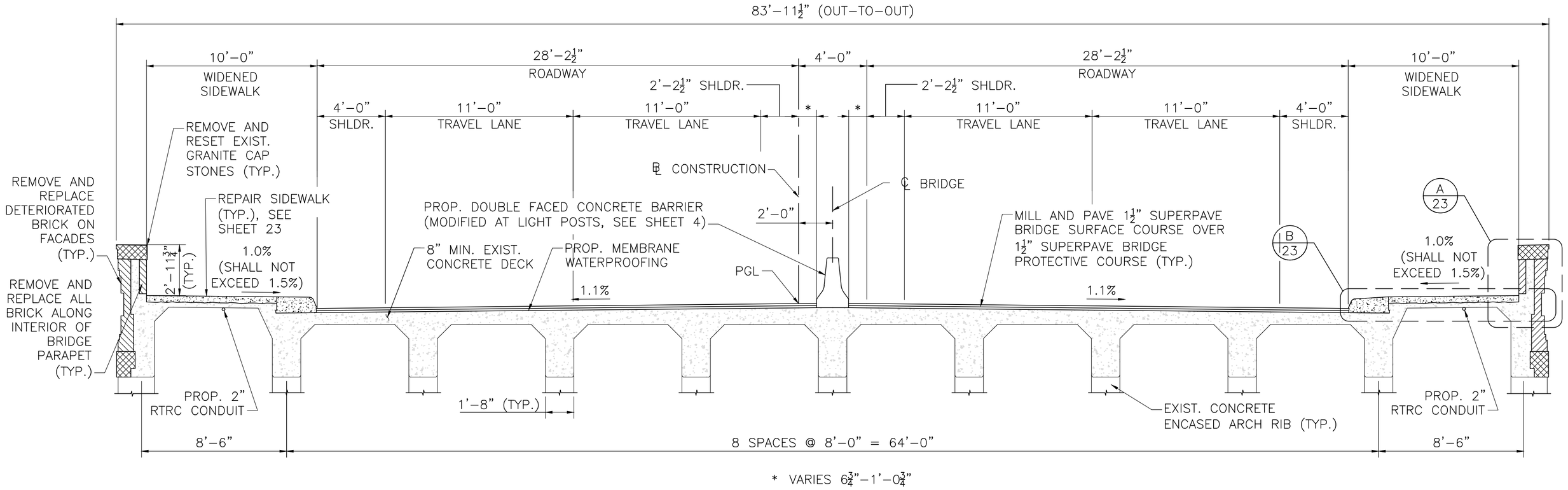


APPROACH SECTION
SCALE: $\frac{1}{4}$" = 1'–0"



UPSTREAM CHANNEL CROSS SECTION (50' RT)
SCALE: 1" = 40'

NOTE:
HYDRAULIC INFORMATION LIMITED. THERE IS NO WORK PROPOSED BELOW THE WATER LINE. ALL INFORMATION SHOWN IS TAKEN FROM EXISTING DRAWINGS OR OBSERVED WATER DURING SURVEY.



* VARIES 6¾"–1'–0¾"

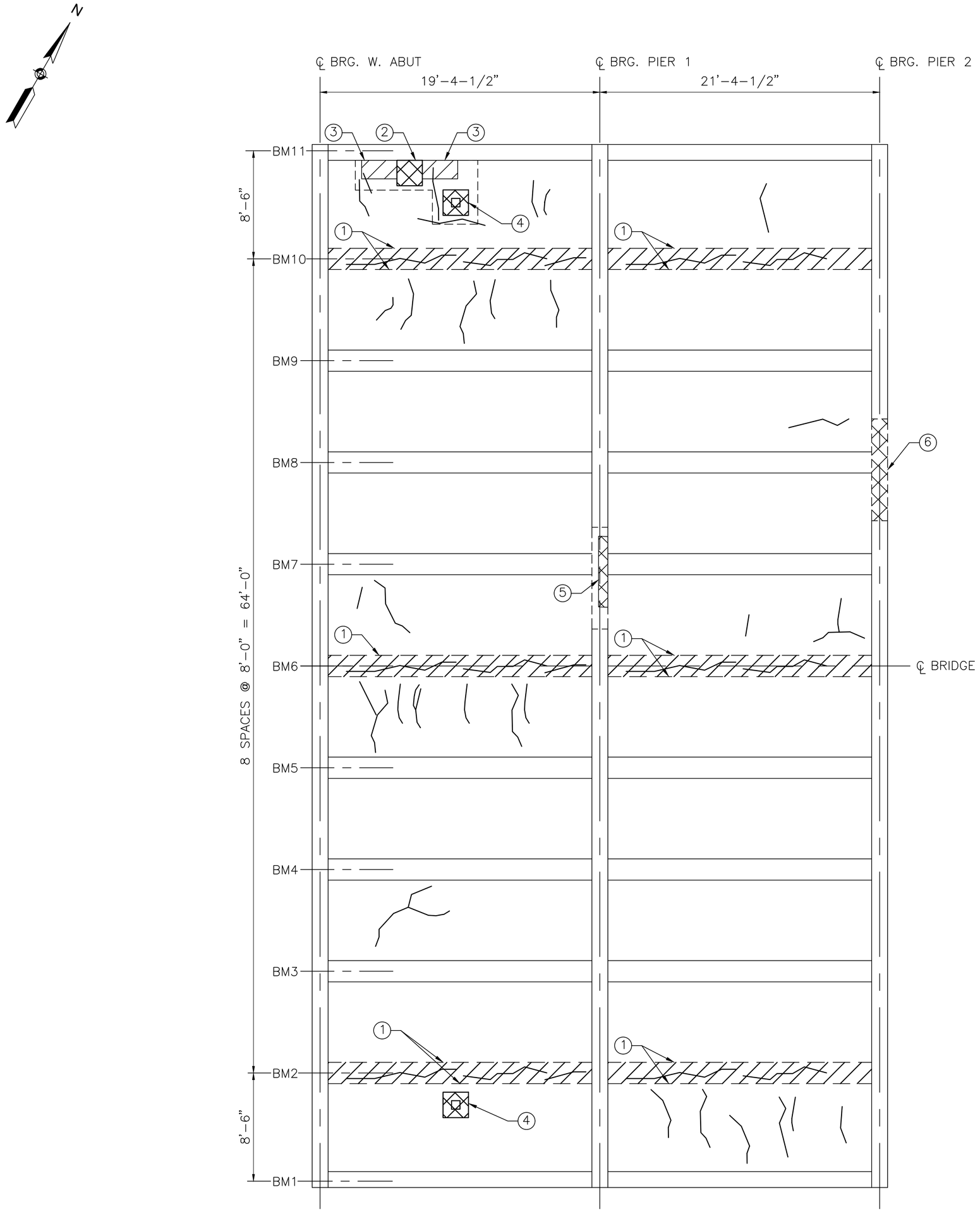
TRANSVERSE SECTION (BRIDGE SPANS 3, 4 AND 5)
SCALE: $\frac{1}{4}$" = 1'–0"

BRIDGE NO. B–16–246 = BRIDGE NO. C–01–029 (4EV)

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	14	37
PROJECT FILE NO.	608762		

UNDERSIDE REPAIR AREAS (SHEET 1 OF 5)



SPANS 1 AND 2
SCALE: 3/16" = 1'-0"

REPAIR AREA #	LOCATION	LENGTH	WIDTH	DEPTH	DEFICIENCY	REPAIR TYPE
1	BEAM	FULL LENGTH	FULL WIDTH	N/A	DELAMINATION	SHALLOW
2	DECK	1'-3"	0'-8"	0'-1"	SPALL WITH EXPOSED REBAR	FULL DEPTH
3	DECK	2'-0"	2'-0"	N/A	DELAMINATION	FULL DEPTH
4	DECK	1'-6"	0'-9"	0'-1 1/2"	SPALL WITH EXPOSED REBAR/DELAMINATION	FULL DEPTH
5	DIAPHRAGM	2'-6"	0'-2"	0'-2"	SPALL	DEEP
6	DIAPHRAGM	1'-6"	0'-6"	0'-3"	SPALL	DEEP

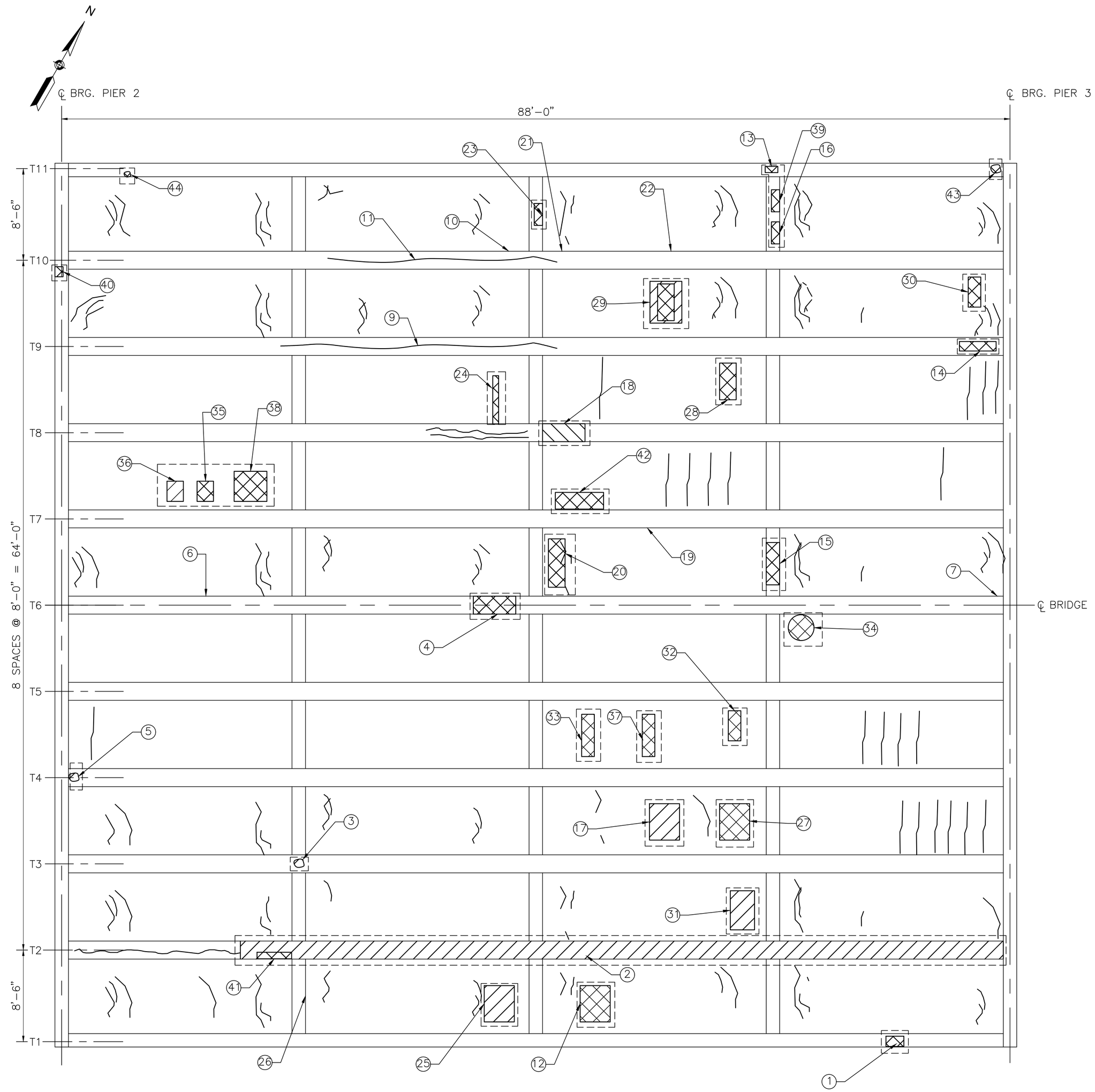
UNDERSIDE REPAIR NOTES:

1. REPAIR AREAS ARE APPROXIMATE AND BASED ON ROUTINE BRIDGE INSPECTION CONDUCTED IN AUGUST 2021.
2. ALL REPAIR AREAS SHALL BE CONFIRMED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
3. ALL AREAS SHALL BE SOUNDED FOR LOOSE CONCRETE AND MARKED PRIOR TO REPAIR.
4. SEE SHEETS 23 TO 26 FOR REPAIR DETAILS.

LEGEND:

~~~ = HAIRLINE CRACK WITH EFFLORESCENCE
XXXX = SPALL
//// = HOLLOW SOUNDING AREA
BM = BEAM
[- - -] = PROPOSED REPAIR AREA

BRIDGE NO. B-16-246 = BRIDGE NO. C-01-029 (4EV)
~~~



SPAN 3

SCALE: 3/16" = 1'-0"

REPAIR AREA #	LOCATION	LENGTH	WIDTH	DEPTH	DEFICIENCY	REPAIR TYPE
1	TRUSS	1'-6"	0'-1 1/2"	0'-2 1/2"	HOLLOW AREA/SPALL	FLANGE
2	TRUSS	45'-0"	FULL WIDTH	N/A	HOLLOW AREA	SHALLOW
3	TRUSS	1'-4"	0'-9"	0'-1 1/2"	SPALL W/EXPOSED REBAR	FLANGE
4	TRUSS	6'-0"	1'-6"	0'-3 1/2"	SPALL	FLANGE
5	TRUSS	0'-8"	N/A	N/A	POPOUT	DEEP
6	TRUSS	0'-8"	0'-3"	0'-4"	SPALL	DEEP
7	TRUSS	0'-8"	0'-8"	N/A	HOLLOW AREA	SHALLOW
8	TRUSS	8'-6"	FULL WIDTH	0'-3"	HOLLOW AREA	SHALLOW
9	TRUSS	13'-0"	0'-1"	N/A	SPALL	SHALLOW
10	TRUSS	1'-0"	N/A	N/A	POPOUT	DEEP
11	TRUSS	2'-8"	0'-2"	0'-4 1/2"	SPALL	DEEP
12	DECK	1'-5"	0'-10"	0'-0 1/2"	SPALL	FULL DEPTH
13	TRUSS	1'-5"	0'-8"	0'-1 1/2"	SPALL	FLANGE
14	TRUSS	2'-0"	0'-10"	0'-0 1/2"	SPALL	FLANGE
15	DIAPHR.	0'-9"	2'-6"	0'-2"	SPALL	FLANGE
16	DIAPHR.	0'-10"	0'-6"	0'-1"	SPALL	SHALLOW
17	DECK	3'-0"	1'-2"	N/A	HOLLOW AREA	SHALLOW
18	TRUSS	4'-0"	0'-4"	N/A	DELAMINATION	SHALLOW
19	TRUSS	0'-5"	0'-3"	0'-0 1/2"	POPOUT	DEEP
20	DECK	0'-7"	0'-7"	0'-2"	3 SPALLS	FULL DEPTH
21	TRUSS	0'-6 1/2"	0'-1 1/2"	N/A	POPOUT	DEEP
22	TRUSS	1'-8"	0'-2 1/2"	N/A	POPOUT	DEEP
23	DIAPHR.	0'-6"	0'-4"	0'-0 1/2"	SPALL	SHALLOW
24	DECK	0'-6"	1'-6"	0'-1"	SPALL	SHALLOW
25	DECK	2'-8"	0'-5"	0'-0 1/2"	POPOUT	FULL DEPTH
26	DIAPHR.	0'-7"	1'-5"	0'-0 1/2"	SPALL	SHALLOW
27	DECK	3'-6"	1'-1"	0'-1"	SPALL/HOLLOW AREA	SHALLOW
28	DECK	1'-5"	0'-4"	0'-1"	SPALL	SHALLOW
29	DECK	2'-10"	3'-4"	0'-2"	SPALL	FULL DEPTH
30	DECK	1'-4"	2'-6"	0'-2"	SPALL	FULL DEPTH
31	DECK	0'-6"	1'-8"	N/A	HOLLOW AREA	SHALLOW
32	DECK	1'-0"	2'-4"	0'-2"	SPALL	FULL DEPTH
33	DECK	3'-11"	1'-6"	0'-1 1/2"	SPALL	FULL DEPTH
34	DECK	0'-6"	0'-6"	0'-2"	SPALL	FULL DEPTH
35	DECK	2'-4"	0'-6"	0'-1"	SPALL	SHALLOW
36	DECK	1'-0"	0'-3"	N/A	HOLLOW AREA	SHALLOW
37	DECK	1'-5"	0'-7"	0'-1"	SPALL	SHALLOW
38	DECK	3'-4"	0'-8"	0'-1"	SPALL	SHALLOW
39	DECK	2'-0"	1'-6"	0'-1"	SPALL	SHALLOW
40	DIAPHR.	1'-0"	1'-6"	1'-2"	SPALL W/EXPOSED REBAR	DEEP
41	DIAPHR.	6'-3"	1'-6"	0'-8"	SPALL	DEEP
42	DECK	N/A	N/A	N/A	POPOUTS	DEEP
43	TRUSS	N/A	N/A	N/A	POPOUTS	DEEP
44	TRUSS	0'-4"	N/A	1'-2"	POPOUT	DEEP

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	15	37
PROJECT FILE NO.	608762		

UNDERSIDE REPAIR AREAS (SHEET 2 OF 5)

UNDERSIDE REPAIR NOTES:

1. FOR UNDERSIDE REPAIR NOTES SEE SHEET 14.

LEGEND:

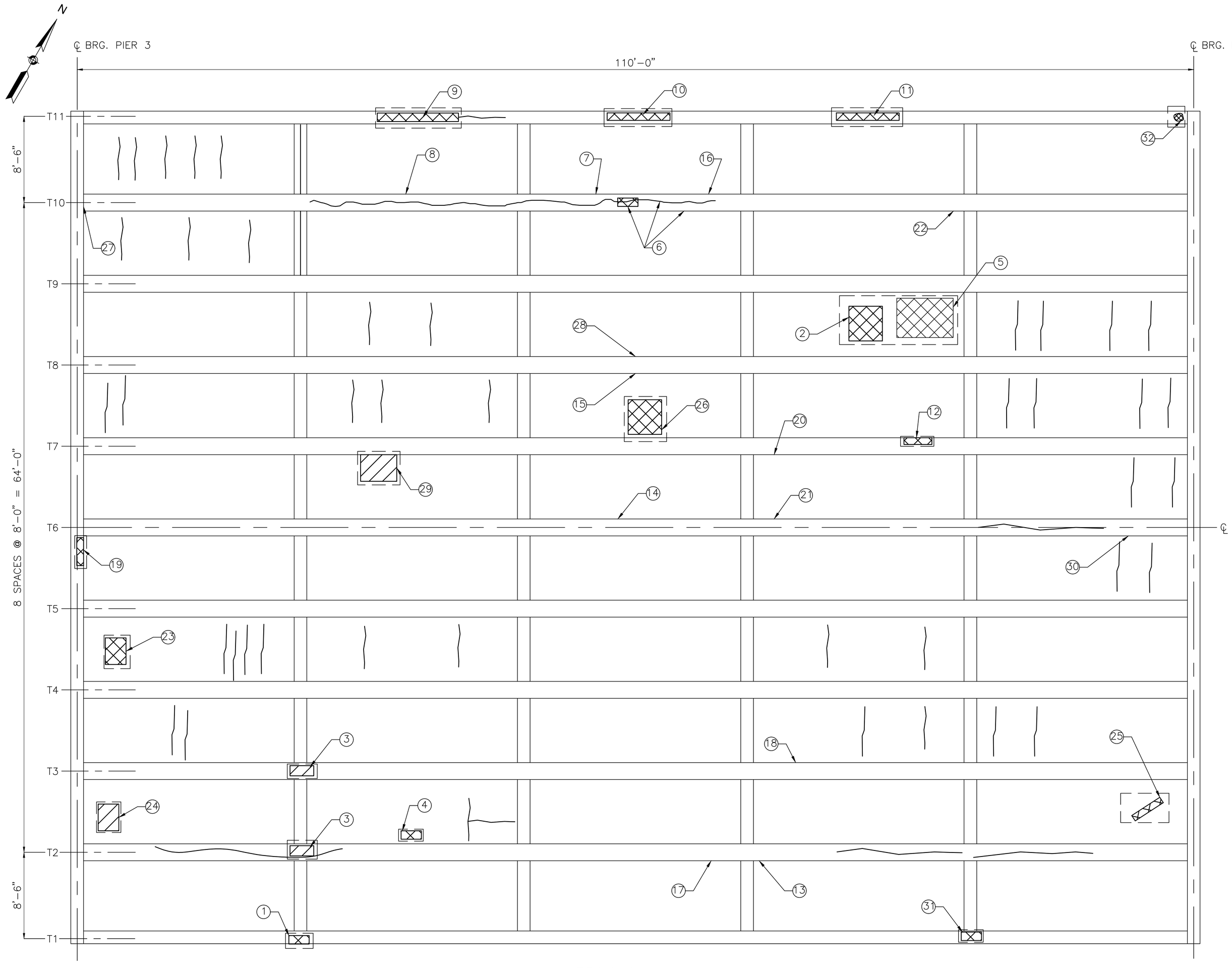
- ~~~ = HAIRLINE CRACK WITH EFFLORESCENCE
- XXXX = SPALL
- //// = HOLLOW SOUNDING AREA
- T = TRUSS
- [ ] = PROPOSED REPAIR AREA

BRIDGE NO. B-16-246 = BRIDGE NO. C-01-029 (4EV)

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	16	37
PROJECT FILE NO.	608762		

UNDERSIDE REPAIR AREAS (SHEET 3 OF 5)



SPAN 4
SCALE: 3/16" = 1'–0"

LEGEND:

= HAIRLINE CRACK WITH EFFLORESCENCE
= SPALL
= HOLLOW SOUNDING AREA
T = TRUSS
= PROPOSED REPAIR AREA

UNDERSIDE REPAIR NOTES:

1. FOR UNDERSIDE REPAIR NOTES SEE SHEET 14.

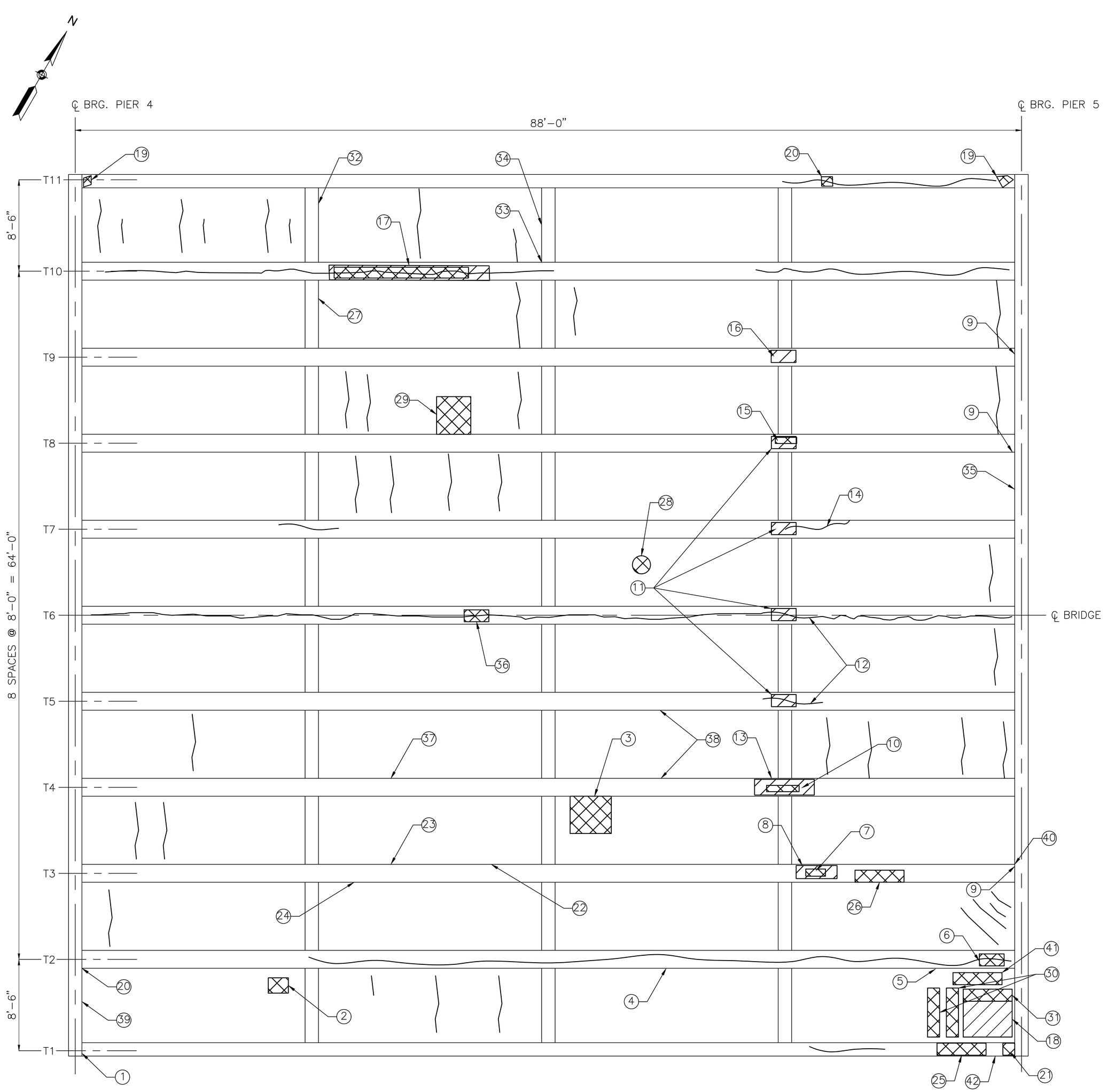
REPAIR AREA #	LOCATION	LENGTH	WIDTH	DEPTH	DEFICIENCY	REPAIR TYPE
1	TRUSS	2'-6"	0'-10"	1-1/2"	SPALL	FLANGE
2	DECK	2'-6"	1'-9"	0'-1 1/2"	SPALL	FULL DEPTH
3	TRUSS	2'-4"	1'-0"	N/A	HOLLOW AREA	SHALLOW
4	DECK	0'-9"	0'-9"	0'-0 1/2"	SPALL	SHALLOW
5	DECK	3'-6"	2'-0"	0'-1"	SPALL	FULL DEPTH
6	TRUSS	7'-0"	FULL WIDTH	0'-3"	SPALL	DEEP
7	TRUSS	0'-7"	N/A	N/A	HOLLOW AREA	SHALLOW
8	TRUSS	8'-0"	2'-6"	0'-6"	SPALL/HOLLOW AREA	DEEP
9	TRUSS	10'-0"	0'-11"	0'-3"	SPALL	FLANGE
10	TRUSS	6'-0"	0'-8"	0'-1 1/2"	SPALL	FLANGE
11	TRUSS	7'-0"	1'-0"	0'-1 1/2"	SPALL	FLANGE
12	TRUSS	3'-0"	0'-7"	0'-1"	SPALL	FLANGE
13	TRUSS	1'-3"	0'-4"	0'-3"	SPALL	DEEP
14	TRUSS	6'-0"	FULL WIDTH	0'-4"	SPALL/HOLLOW AREA	DEEP
15	TRUSS	1'-6"	0'-6"	0'-1"	6 SPALLS/ POPOUTS	DEEP
16	TRUSS	1'-6"	0'-8"	0'-0 1/2"	SPALL	SHALLOW
17	TRUSS	1'-3"	0'-2"	0'-2"	SPALL	DEEP
18	TRUSS	0'-4"	0'-2"	0'-0 1/2"	POPOUT	DEEP
19	DIAPHR.	1'-8"	1'-0"	0'-1"	2 SPALLS	SHALLOW
20	TRUSS	0'-6"	0'-6"	0'-0 1/2"	SPALL	SHALLOW
21	TRUSS	1'-9"	0'-3"	0'-0 1/2"	SPALL	SHALLOW
22	TRUSS	0'-9"	0'-9"	0'-1 1/2"	SPALL	SHALLOW
23	DECK	0'-8"	1'-0"	0'-1"	SPALL	SHALLOW
24	DECK	1'-0"	2'-0"	N/A	HOLLOW AREA	SHALLOW
25	DECK	1'-0"	N/A	N/A	POPOUT	SHALLOW
26	DECK	2'-0"	1'-4"	0'-1 1/2"	SPALL	FULL DEPTH
27	DIAPHR.	0'-9"	0'-9"	0'-1"	SPALL	SHALLOW
28	TRUSS	1'-4"	0'-6"	0'-2"	SPALL W/EXPOSED REBAR	DEEP
29	DECK	0'-9"	0'-9"	N/A	HOLLOW AREA	SHALLOW
30	TRUSS	0'-6"	0'-6"	0'-2"	SPALL	DEEP
31	TRUSS	0'-10"	0'-10"	0'-4"	SPALL	FLANGE
32	TRUSS	N/A	N/A	N/A	SPALL	FLANGE

BRIDGE NO. B–16–246 = BRIDGE NO. C–01–029 (4EV)

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	17	37
PROJECT FILE NO.	608762		

UNDERSIDE REPAIR AREAS (SHEET 4 OF 5)



SPAN 5
SCALE: 3⁄16" = 1'–0"

LEGEND:

- ~~~ = HAIRLINE CRACK WITH EFFLORESCENCE
- ▨ = SPALL
- ▨ = HOLLOW SOUNDING AREA
- T = TRUSS
- ▭ = PROPOSED REPAIR AREA

UNDERSIDE REPAIR NOTES:

1. FOR UNDERSIDE REPAIR NOTES SEE SHEET 14.

REPAIR AREA #	LENGTH	WIDTH	DEPTH	DEFICIENCY	REPAIR TYPE
1	0'-8"	N/A	N/A	SPALL	SHALLOW
2	1'-0"	0'-4"	0'-0 1/2"	SPALL	SHALLOW
3	2'-10"	2'-0"	0'-1 1/2"	SPALL WITH EXPOSED REBAR	DEEP
4	2'-6"	0'-4"	0'-2"	SPALL	DEEP
5	12'-0"	1'-2"	0'-4"	SPALL	DEEP
6	2'-8"	1'-0"	0'-1"	SPALL	SHALLOW
7	4'-4"	1'-1"	0'-5"	SPALL	DEEP
8	5'-0"	N/A	N/A	DELAMINATION	SHALLOW
9	2'-0"	N/A	N/A	SPALL	SHALLOW
10	2'-0"	0'-11"	0'-4"	SPALL	DEEP
11	N/A	N/A	0'-4"	SPALL	DEEP
12	1'-6"	1'-0"	0'-4"	SPALL	DEEP
13	6'-0"	FULL WIDTH	N/A	DELAMINATON	SHALLOW
14	5'-0"	FULL WIDTH	0'-4"	SPALL	DEEP
15	6'-0"	1'-8"	0'-4"	SPALL	DEEP
16	N/A	FULL WIDTH	N/A	HOLLLOW AREA	SHALLOW
17	18'-0"	FULL WIDTH	0'-4"	SPALL	DEEP
18	3'-0"	2'-0"	N/A	HOLLOW AREA	SHALLOW
19	1'-4"	0'-8"	0'-1"	SPALL	SHALLOW
20	1'-6"	0'-6"	0'-5"	SPALL	DEEP
21	0'-10"	1'-4 1/2"	0'-6"	SPALL	DEEP
22	1'-6"	0'-4"	0'-1"	SPALL WITH EXPOSED REBAR	DEEP

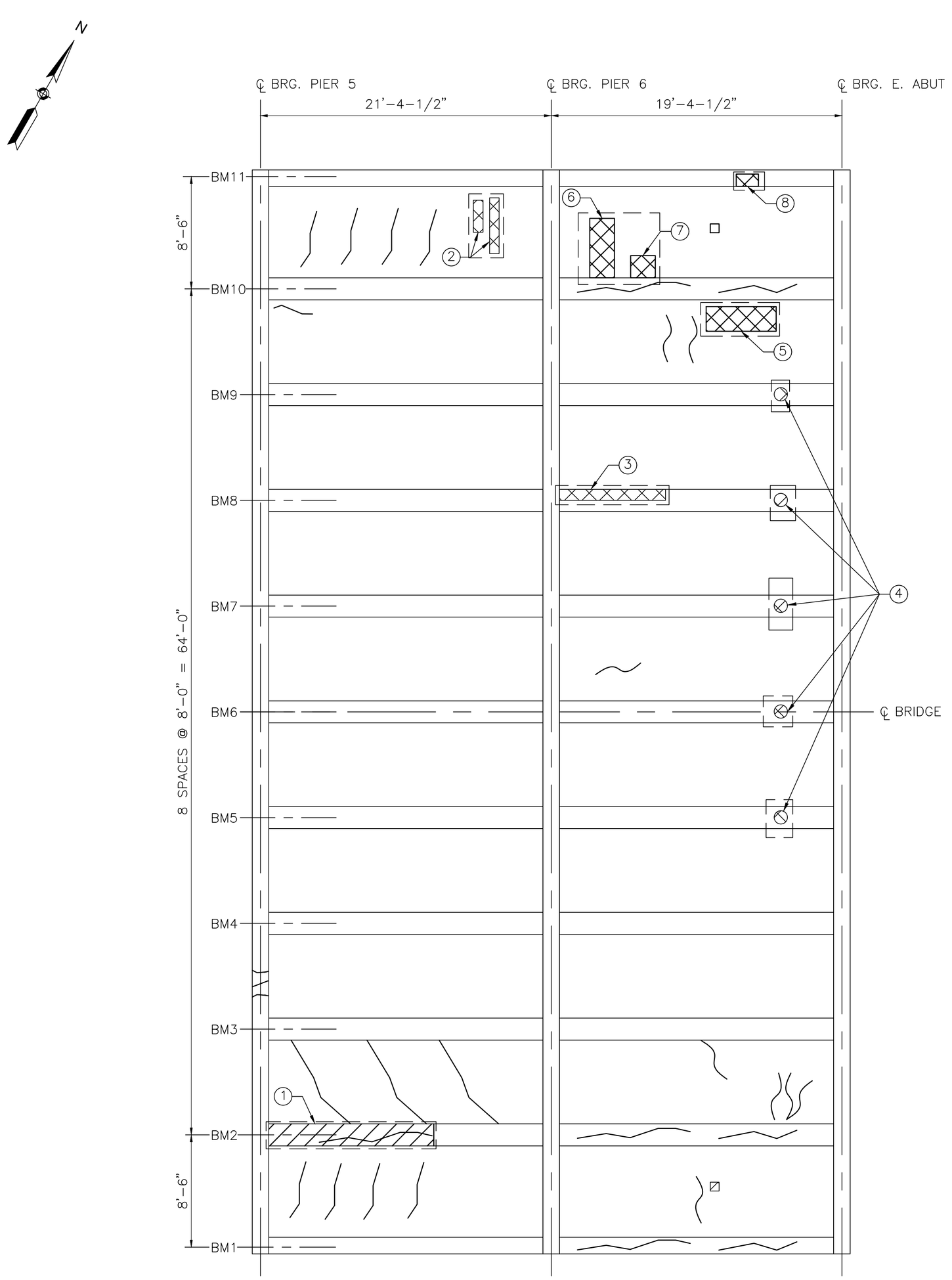
REPAIR AREA #	LENGTH	WIDTH	DEPTH	DEFICIENCY	REPAIR TYPE
23	1'-1"	1'-1"	0'-1"	SPALL	SHALLOW
24	1'-11"	0'-7"	0'-1"	9 POPUTS	DEEP
25	3'-0"	0'-5"	0'-1"	SPALL	SHALLOW
26	2'-8"	0'-6"	0'-3"	SPALL	DEEP
27	1'-10"	0'-4"	0'-0 1/2"	POPOUTS	DEEP
28	1'-3"	1'-3"	0'-3"	SPALL	SHALLOW
29	2'-0"	1'-0"	0'-1 1/2"	SPALL WITH EXPOSED REBAR	SHALLOW
30	2'-8"	0'-5"	0'-1"	2 SPALLS/ DELAMINATION	DEEP
31	0'-6"	1'-0"	0'-1"	SPALL	SHALLOW
32	2'-0"	0'-4"	0'-0 1/2"	POPOUT	DEEP
33	0'-9"	0'-6"	0'-0 1/2"	SPALL	SHALLOW
34	0'-6"	0'-3"	0'-0 1/2"	3 POPOUTS	DEEP
35	3'-0"	FULL WIDTH	0'-2"	SPALL WITH EXPOSED REBAR	DEEP
36	1'-3"	0'-6"	0'-1"	SPALL WITH EXPOSED REBAR	DEEP
37	0'-6"	0'-6"	0'-1"	6 POPOUTS	DEEP
38	1'-6"	0'-2"	0'-0 1/2"	6 POPOUTS	DEEP
39	0'-5"	1'-0"	0'-0 1/2"	2 SPALLS WITH EXPOSED REBAR	DEEP
40	3'-0"	2'-0"	0'-2"	SPALL WITH EXPOSED REBAR	DEEP
41	8'-0"	1'-6"	0'-5"	SPALL WITH EXPOSED REBAR	DEEP
42	1'-0"	0'-4"	0'-9"	SPALL	SHALLOW

BRIDGE NO. B–16–246 = BRIDGE NO. C–01–029 (4EV)

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	18	37
PROJECT FILE NO.	608762		

UNDERSIDE REPAIR AREAS (SHEET 5 OF 5)



SPANS 6 AND 7
SCALE: 3/16" = 1'-0"

REPAIR AREA #	LOCATION	LENGTH	WIDTH	DEPTH	DEFICIENCY	REPAIR TYPE
1	BEAM	8'-0"	FULL WIDTH	N/A	CRACK WITH DELAMINATION	SHALLOW
2	DECK	3'-0"	0'-4"	0'-1"	2 SPALLS WITH EXPOSED REBAR	FULL DEPTH
3	BEAM	0'-9"	0'-6"	0'-3/4"	5 SPALLS WITH EXPOSED REBAR	DEEP
4	BEAM	0'-6"	0'-6"	0"-1/2"	5 SPALLS	SHALLOW
5	DECK	2'-0"	2'-0"	0'-1 3/4"	SPALL WITH EXPOSED REBAR/DELAMINATION	FULL DEPTH
6	DECK	4'-6"	0'-8"	1'-0"	SPALL WITH EXPOSED REBAR	FULL DEPTH
7	DECK	1'-8"	0'-4"	0'-1"	SPALL WITH EXPOSED REBAR	FULL DEPTH
8	BEAM	0'-9"	0'-6"	0'-1"	SPALL WITH EXPOSED REBAR	DEEP

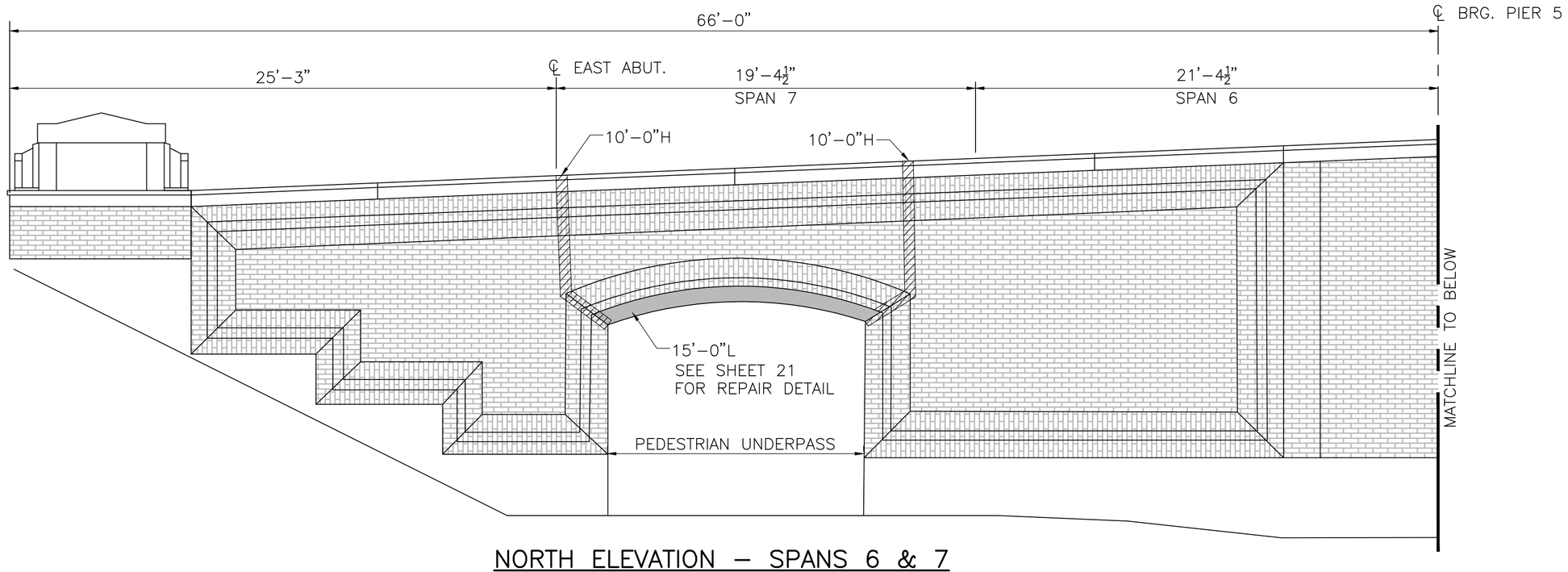
UNDERSIDE REPAIR NOTES:

1. FOR UNDERSIDE REPAIR NOTES SEE SHEET 14.

LEGEND:

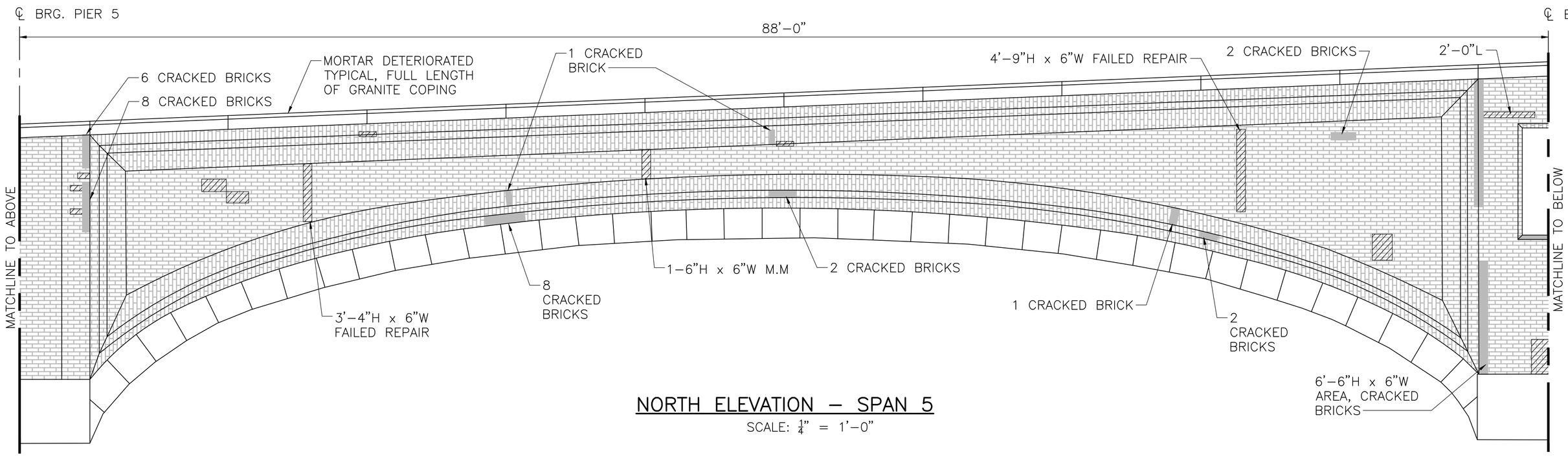
~~~ = HAIRLINE CRACK WITH EFFLORESCENCE
XXXX = SPALL
//// = HOLLOW SOUNDING AREA
BM = BEAM
[- - -] = PROPOSED REPAIR AREA

BRIDGE NO. B-16-246 = BRIDGE NO. C-01-029 (4EV)
~~~



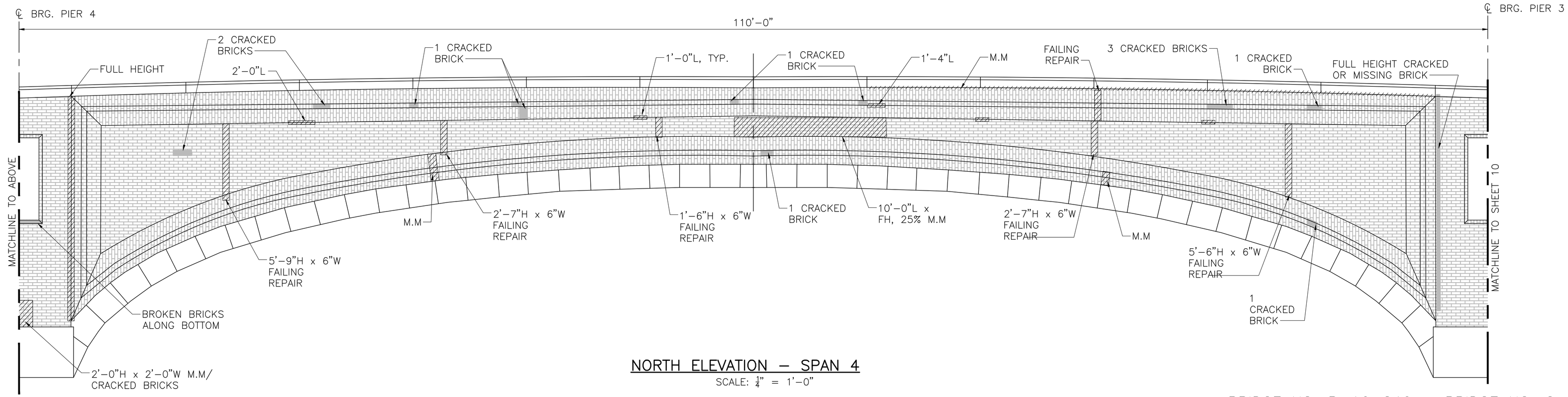
NORTH ELEVATION – SPANS 6 & 7

SCALE: ¼" = 1'-0"



NORTH ELEVATION – SPAN 5

SCALE: ¼" = 1'-0"



NORTH ELEVATION – SPAN 4

SCALE: ¼" = 1'-0"

BRIDGE NO. B-16-246 = BRIDGE NO. C-01-029 (4EV)

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	19	37
PROJECT FILE NO.	608762		

BRIDGE ELEVATIONS (SHEET 1 OF 4)

BRICK REPAIR NOTES:

1. REPAIR AREAS ARE APPROXIMATE AND BASED ON ROUTINE BRIDGE INSPECTION CONDUCTED IN AUGUST 2019.
2. CONTRACTOR SHALL LOCATE ALL AREAS OF DETERIORATION PRIOR TO START OF WORK.
3. AREAS OF REPAIR ON FACADES SHALL USE SALVAGED BRICK FROM INTERIOR OF BRIDGE PARAPET.
4. SEE SHEETS 23 TO 26 FOR REPAIR DETAILS.

LEGEND:

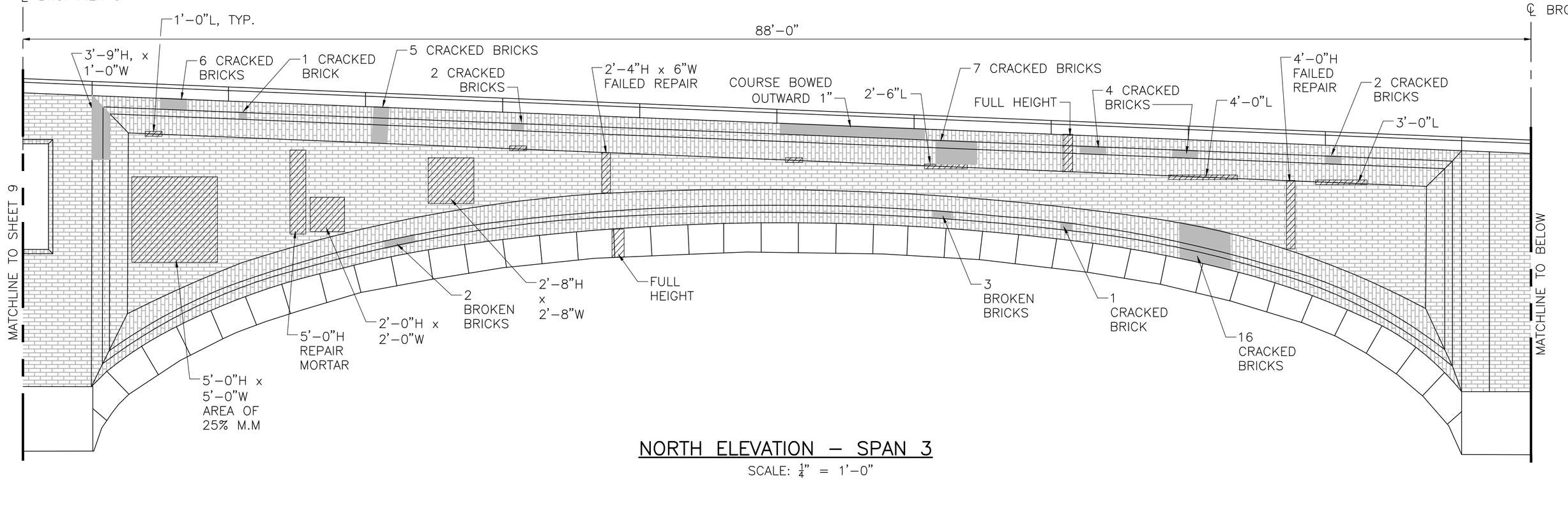
- MISSING/DAMAGED BRICK
- MISSING MORTAR (M.M.)
- L – LONG
- H – HIGH
- W – WIDE

A90850 - 87
19-22-608762_BRIDGE ELEVATIONS.DWG Plotted on 17-May-2023 1:20 PM
Proposal No. 608762-124916
DD-Month-YYYY
Sketch Plans Submittal (SP2)

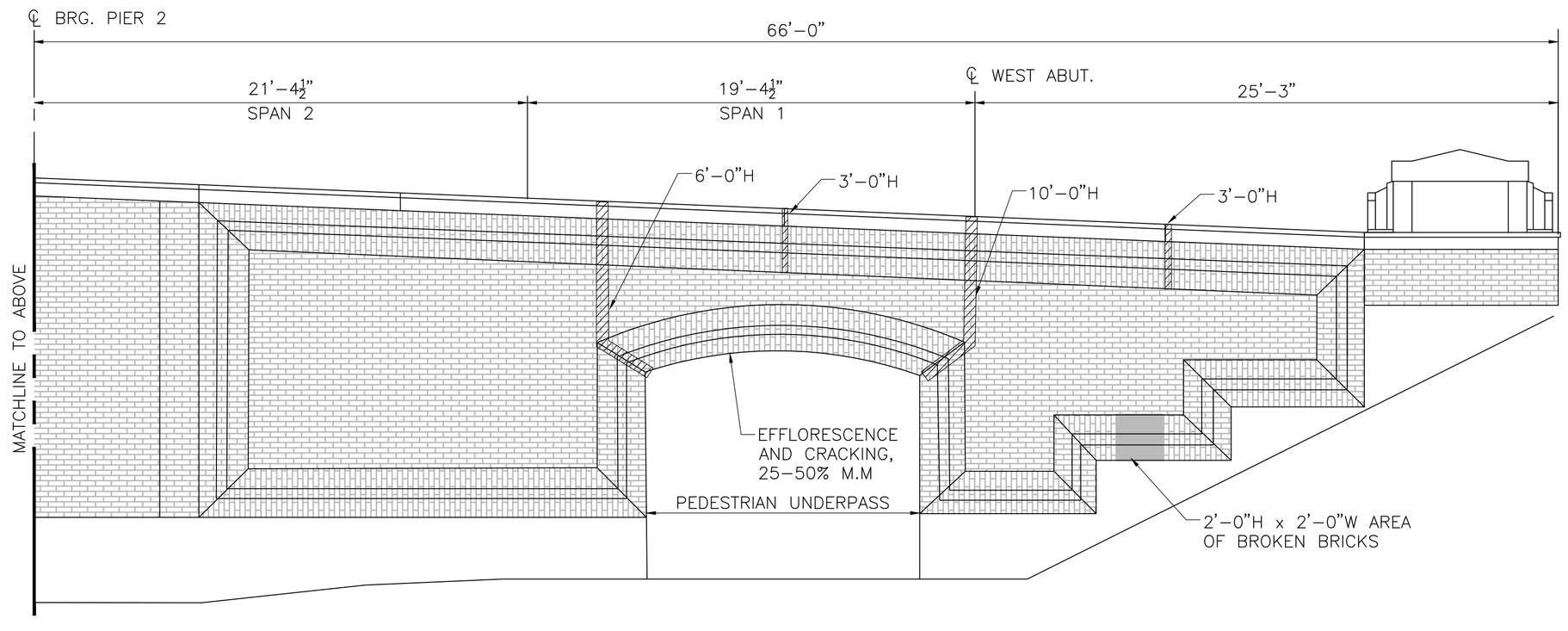
BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	20	37
PROJECT FILE NO.	608762		

BRIDGE ELEVATIONS (SHEET 2 OF 4)



NORTH ELEVATION – SPAN 3
SCALE: $\frac{1}{4}$" = 1'–0"



NORTH ELEVATION – SPANS 1 & 2
SCALE: $\frac{1}{4}$" = 1'–0"

REPAIR NOTES:

1. SEE SHEET 19 FOR NOTES.

LEGEND:

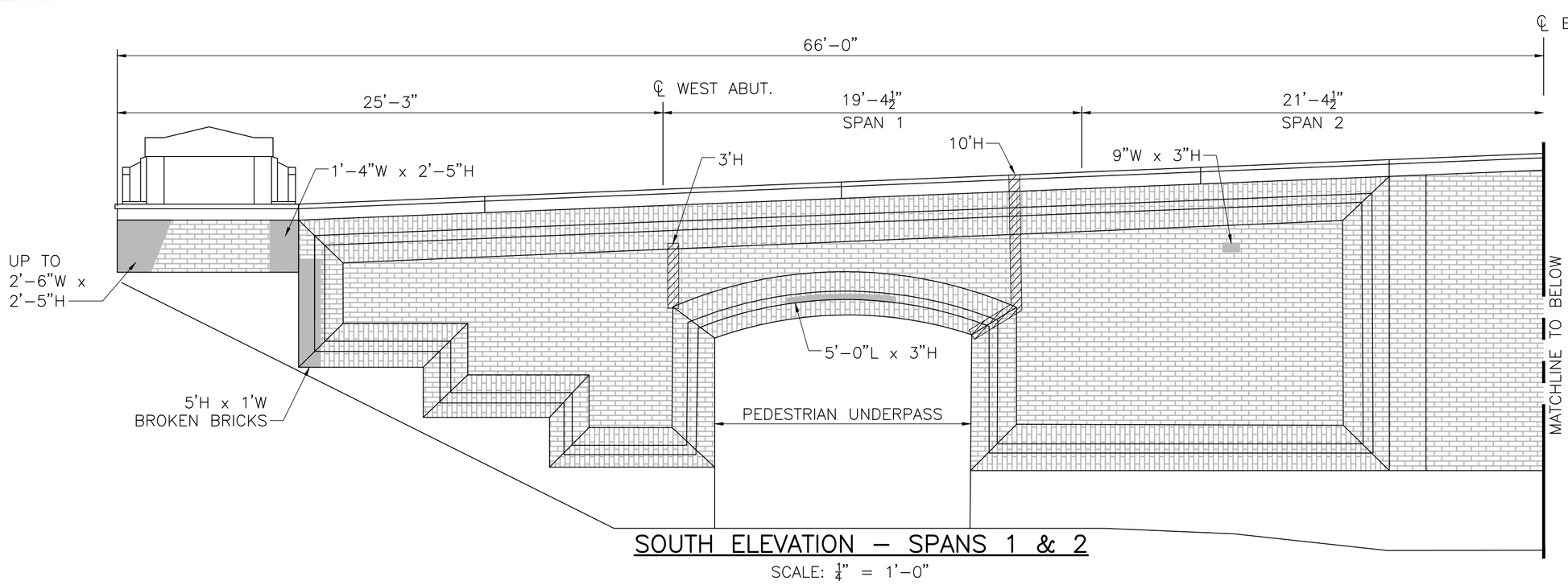
- MISSING/DAMAGED BRICK
- MISSING MORTAR (M.M.)
- L – LONG
- H – HIGH
- W – WIDE

BRIDGE NO. B–16–246 = BRIDGE NO. C–01–029 (4EV)

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	21	37
PROJECT FILE NO.		608762	

BRIDGE ELEVATIONS (SHEET 3 OF 4)



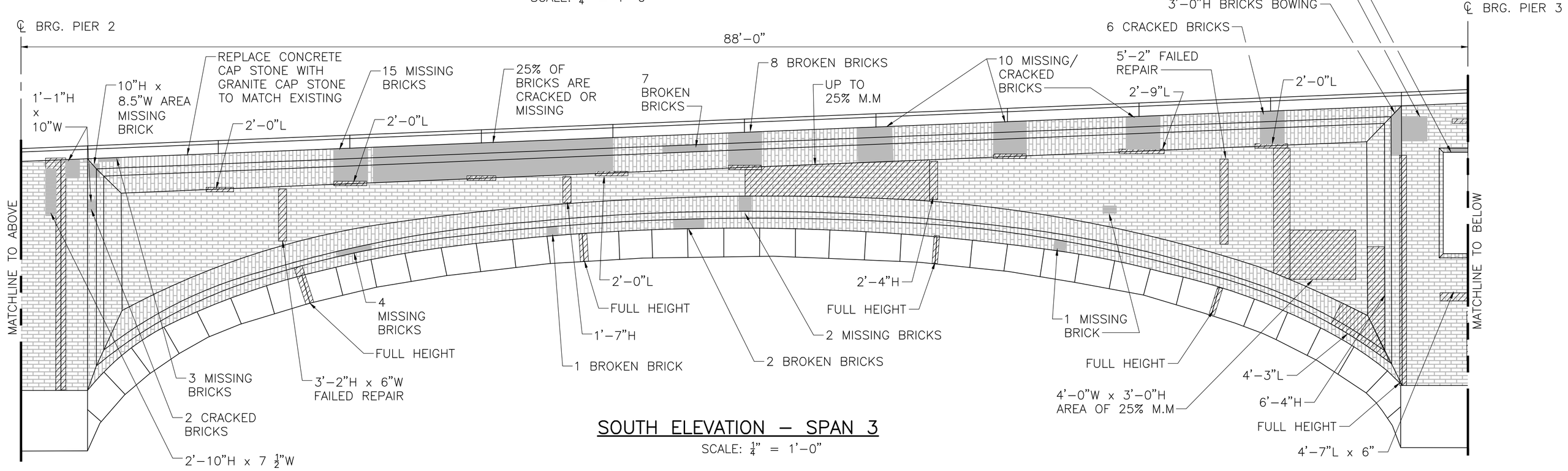
SOUTH ELEVATION – SPANS 1 & 2
SCALE: ¼" = 1'–0"

REPAIR NOTES:

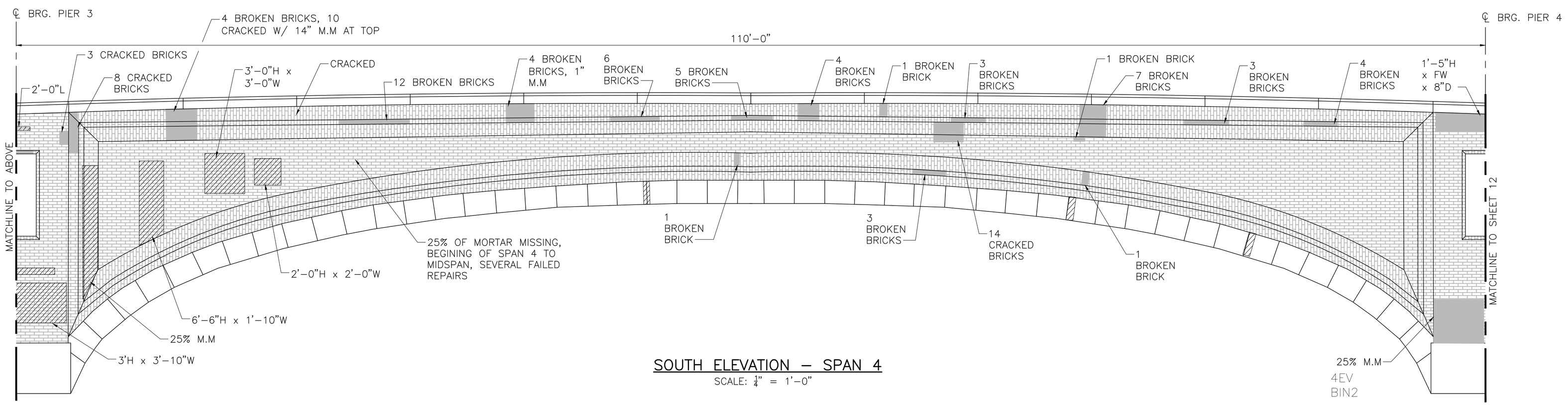
1. SEE SHEET 19 FOR NOTES.

LEGEND:

- MISSING/DAMAGED BRICK
- MISSING MORTAR (M.M.)
- L – LONG
- H – HIGH
- W – WIDE



SOUTH ELEVATION – SPAN 3
SCALE: ¼" = 1'–0"



SOUTH ELEVATION – SPAN 4
SCALE: ¼" = 1'–0"

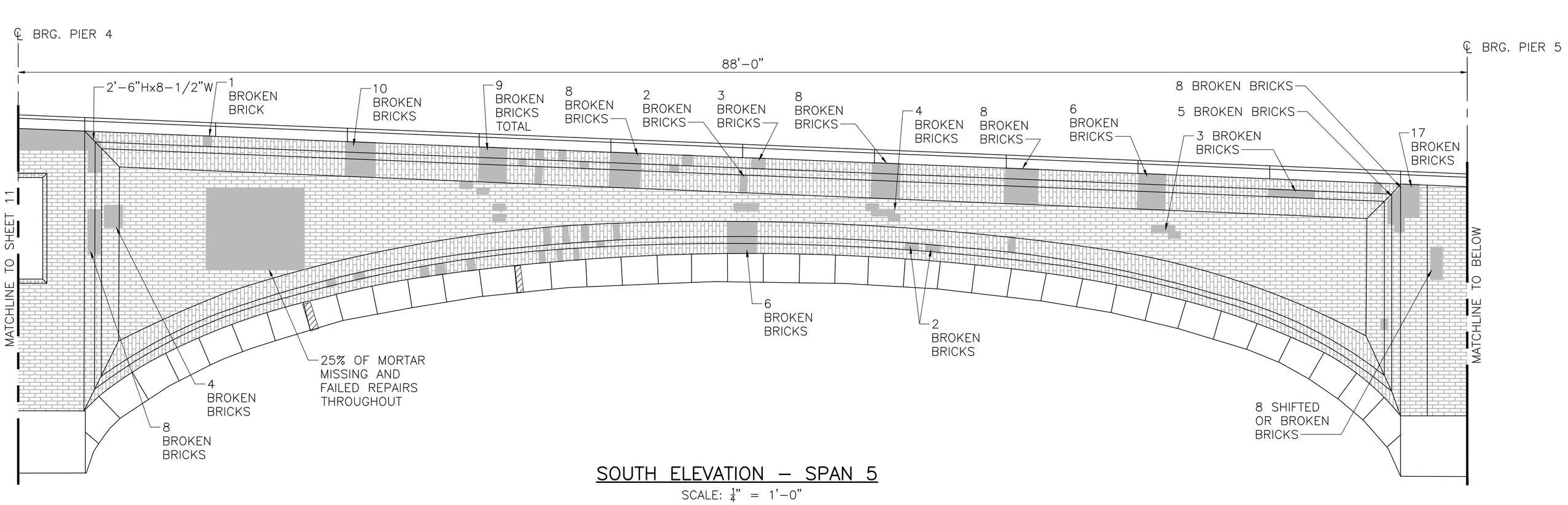
4EV
BIN2

BRIDGE NO. B–16–246 = BRIDGE NO. C–01–029 (4EV)

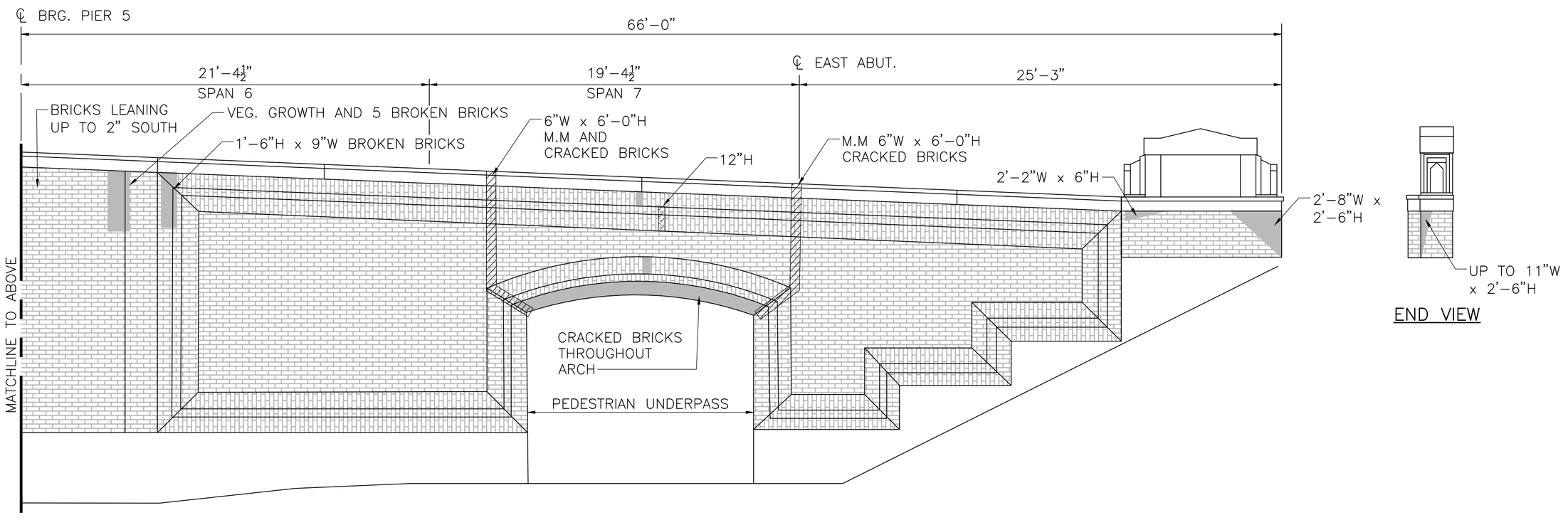
BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	22	37
PROJECT FILE NO.	608762		

BRIDGE ELEVATIONS (SHEET 4 OF 4)



SOUTH ELEVATION – SPAN 5
SCALE: ¼" = 1'-0"



SOUTH ELEVATION – SPANS 6 & 7
SCALE: ¼" = 1'-0"

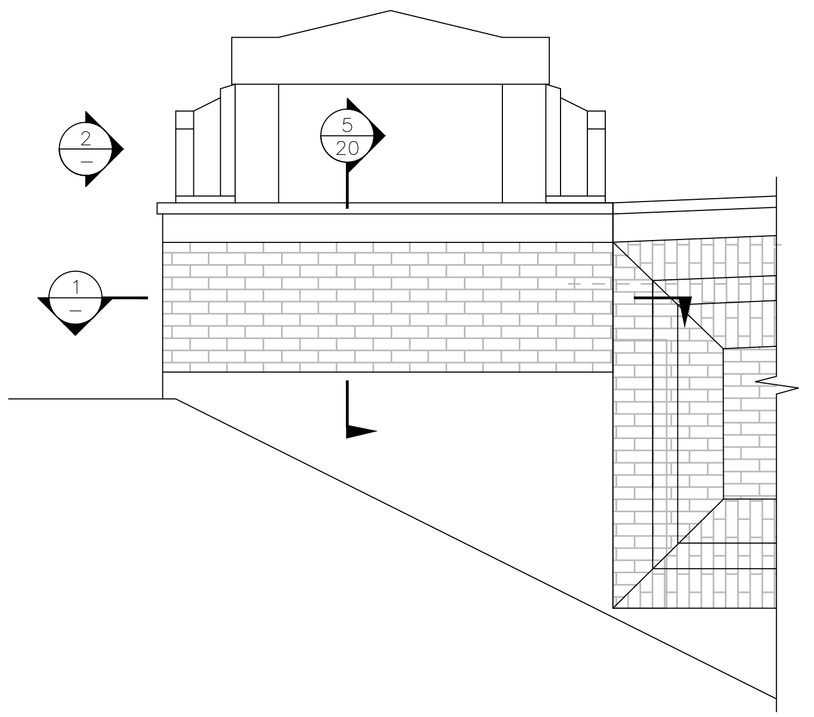
END VIEW

REPAIR NOTES:

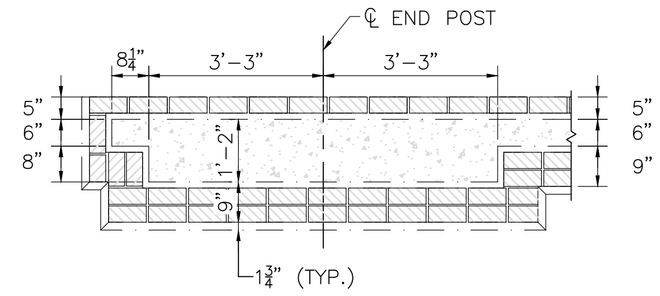
1. SEE SHEET 19 FOR NOTES.

LEGEND:

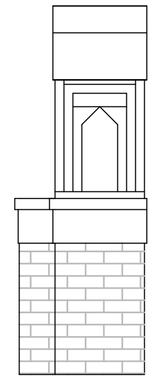
- MISSING/DAMAGED BRICK
- MISSING MORTAR (M.M.)
- L – LONG
- H – HIGH
- W – WIDE



TYPICAL END POST ELEVATION
SCALE: ½" = 1'-0"



SECTION 1 – SCALE: ½" = 1'-0"



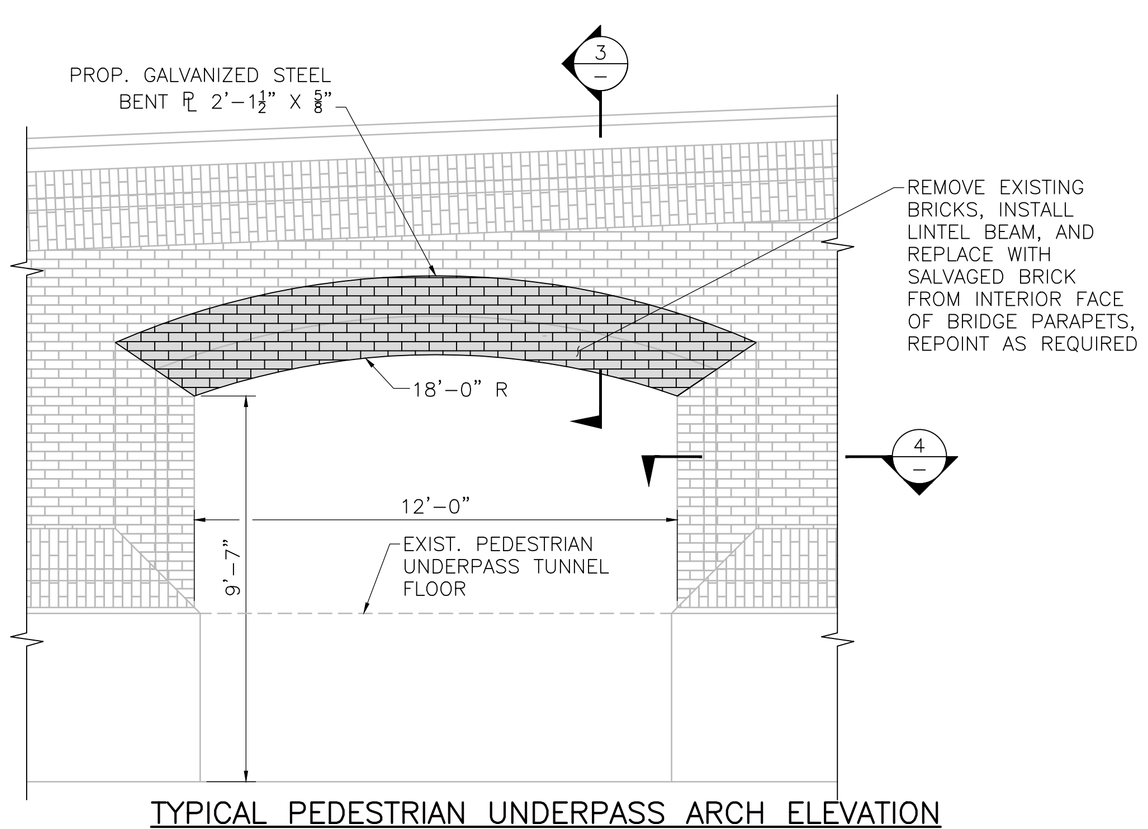
ELEVATION 2 – SCALE: ½" = 1'-0"

BRIDGE NO. B-16-246 = BRIDGE NO. C-01-029 (4EV)

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

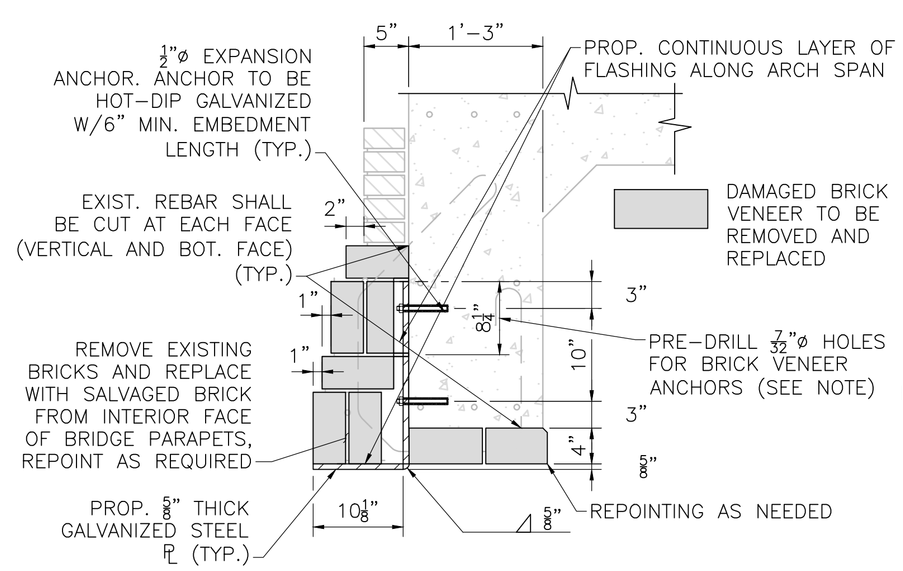
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	23	37
PROJECT FILE NO.	608762		

REPAIR DETAILS (SHEET □ OF □)

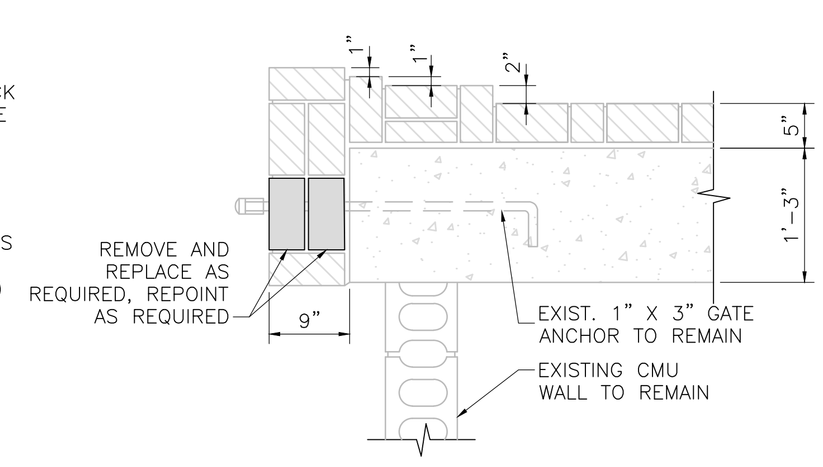


TYPICAL PEDESTRIAN UNDERPASS ARCH ELEVATION

SCALE: ⅜" = 1'–0"



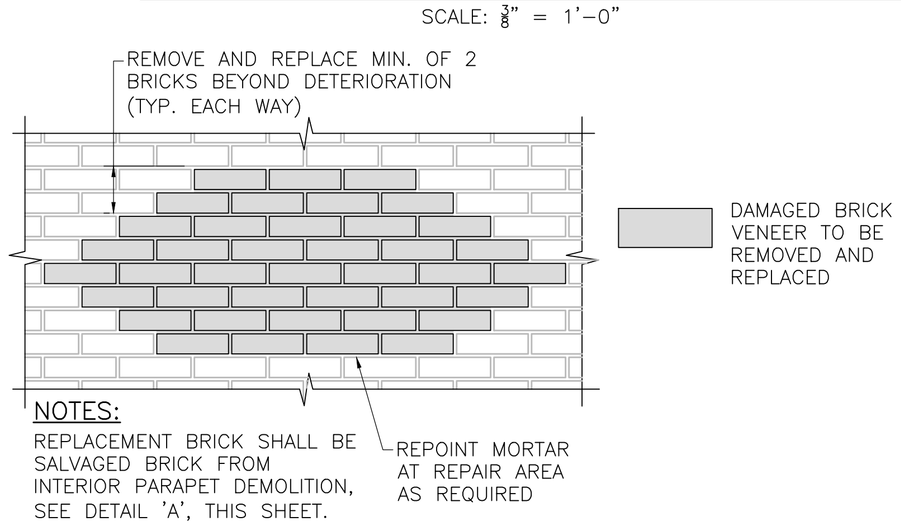
SECTION 3 — SCALE: 1" = 1'–0"



SECTION 4 — SCALE: 1" = 1'–0"

BRICK REPAIR NOTES:

1. SEE SHEETS 19 THROUGH 22 FOR SPECIFIC LOCATIONS OF BRICK DETERIORATION.
2. BRICK USED FOR INTERIOR FACE OF RAILING SHALL BE NEW BRICK PER ITEM 706.41. NO SALVAGED BRICK SHALL BE USED FOR INTERIOR FACE OF PARAPET REPAIRS.
3. SALVAGED BRICK SHALL BE USED FOR ALL EXTERIOR FACADE REPAIRS. IF NO SALVAGED BRICK IS AVAILABLE, NEW BRICK MAY BE USED.

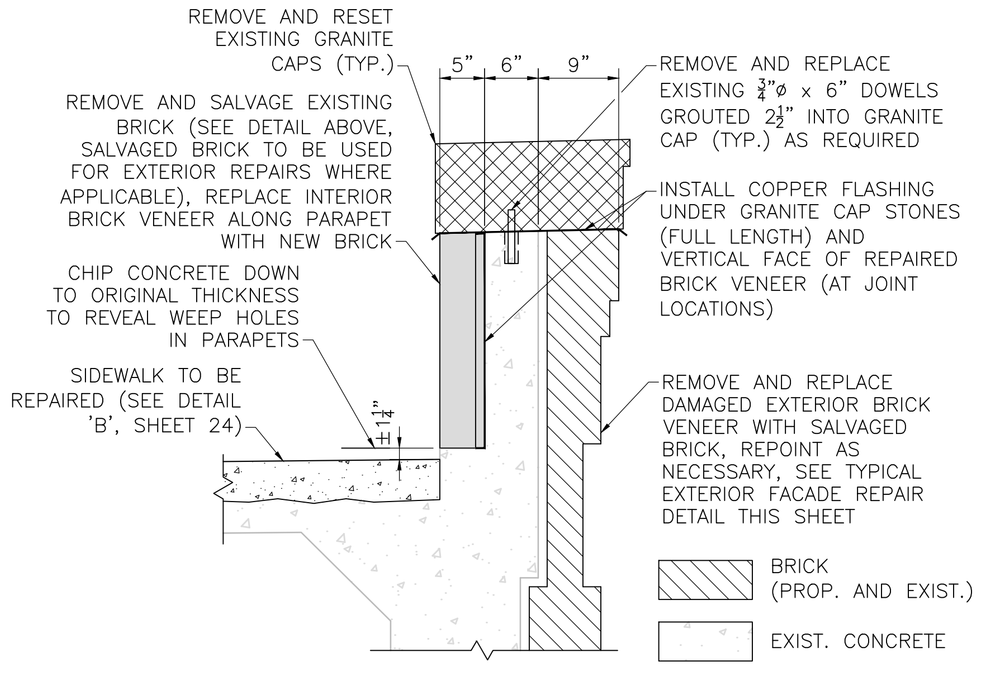


NOTES:

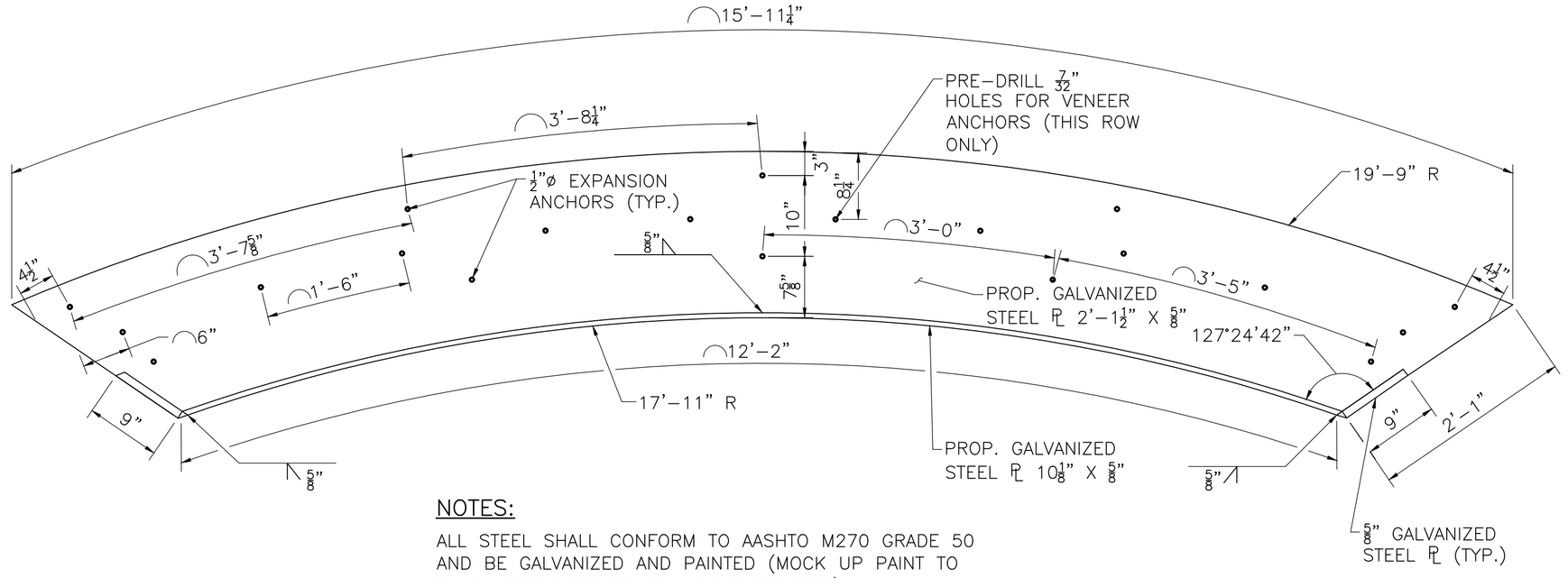
REPLACEMENT BRICK SHALL BE SALVAGED BRICK FROM INTERIOR PARAPET DEMOLITION, SEE DETAIL 'A', THIS SHEET.

TYPICAL EXTERIOR FACADE REPAIR DETAIL

SCALE: 1" = 1'–0"



DETAIL A — SCALE: 1" = 1'–0" — 13



NOTES:

ALL STEEL SHALL CONFORM TO AASHTO M270 GRADE 50 AND BE GALVANIZED AND PAINTED (MOCK UP PAINT TO MATCH BRICK COLOR. SEE SPECIFICATIONS).

STEEL LINTEL DETAIL

SCALE: 1" = 1'–0"

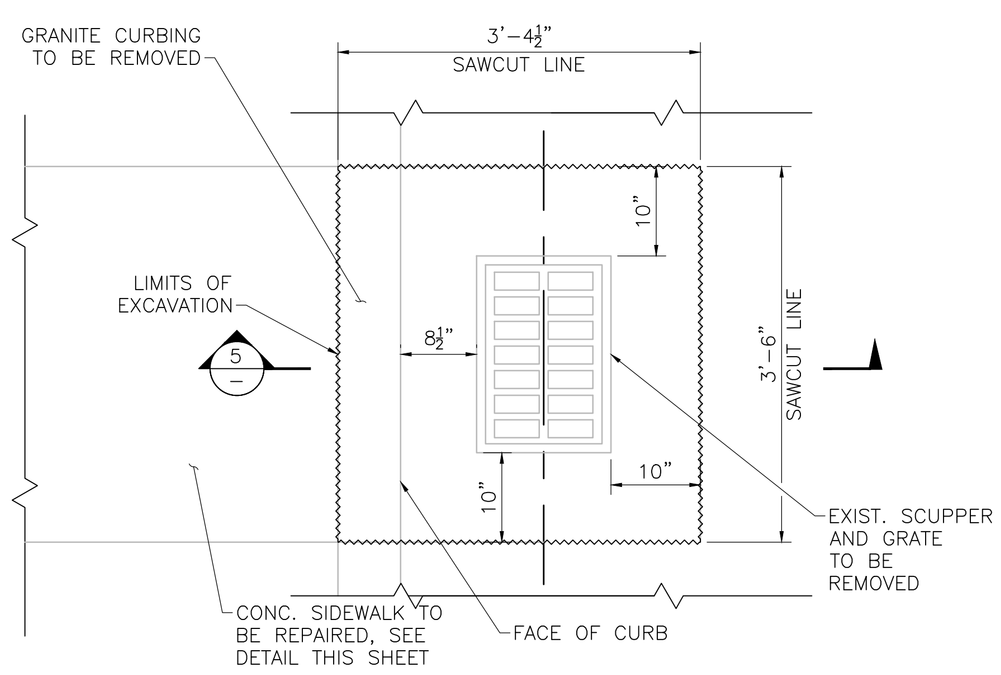
STEEL LINTEL INSTALLATION NOTES:

1. INSTALL TEMPORARY SHORING FOR THE BOTTOM LAYERS OF BRICK UNDER THE ARCH. TEMPORARY SHORING PLAN SHALL BE DESIGNED BY THE CONTRACTOR AND SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO INSTALLATION.
2. REMOVE AND DISCARD BROKEN BRICKS FROM THE ARCH RING AND REMOVE AND SALVAGE INTACT BRICKS FOR FUTURE USE.
3. INSTALL EXPANSION ANCHORS AS SHOWN ABOVE. CONTRACTOR SHALL AVOID EXISTING REBAR WHEN INSTALLING ANCHORS.
4. INSTALL 9" LONG STEEL PLATES FLUSH TO THE TOP OF THE LINTEL PLATE TO COVER THE REMAINDER OF THE CONCRETE SURFACE.
5. INSTALL FLASHING ONTO THE PLATES. OVERLAP THE FLASHING AND SEAL WITH MASTIC PAPER.
6. CONTRACTOR SHALL PRE–DRILL HOLES AS REQUIRED TO PLACE VENEER ANCHORS. VENEER ANCHORS SHALL BE HOT–DIP GALVANIZED STEEL AND SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO INSTALLATION.

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

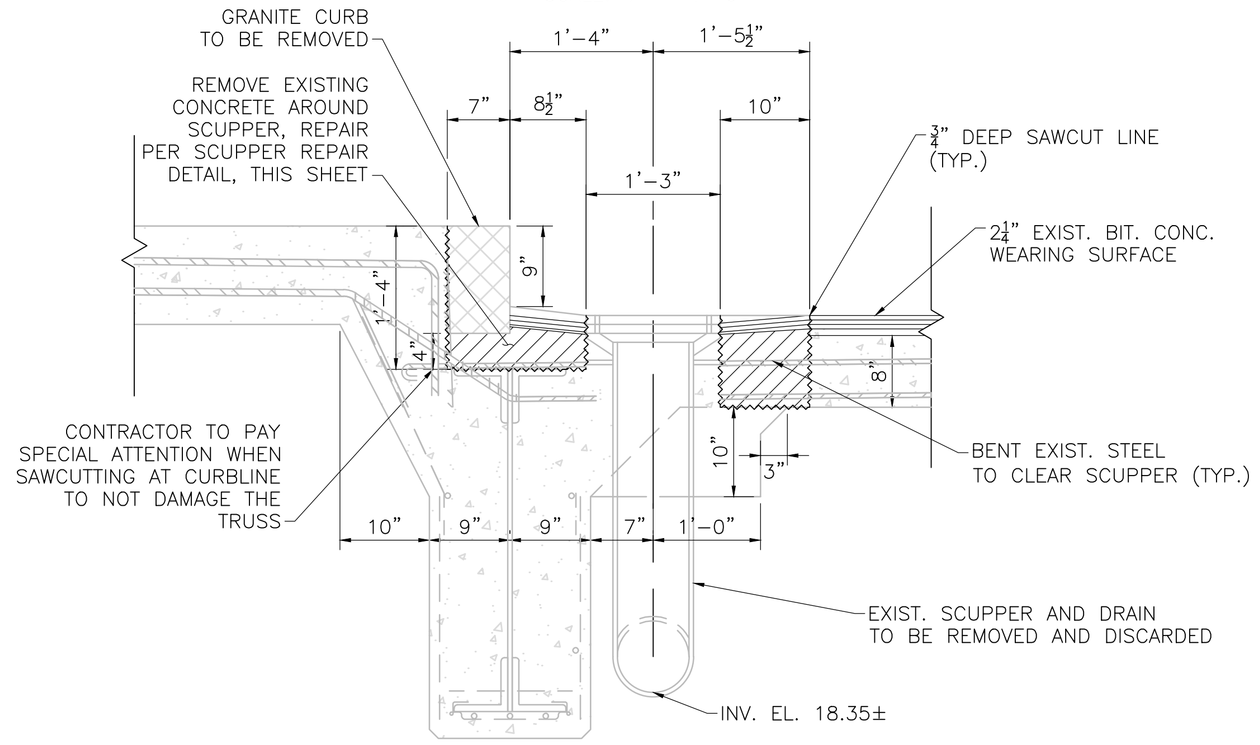
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	24	37
PROJECT FILE NO.	608762		

REPAIR DETAILS (SHEET 2 OF □)



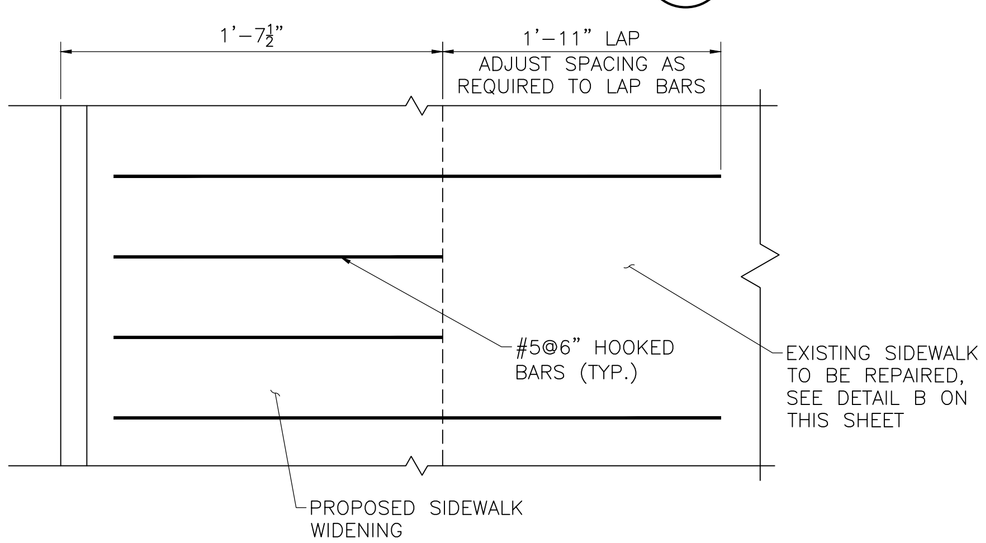
SCUPPER REMOVAL PLAN

SCALE: 1" = 1'–0"



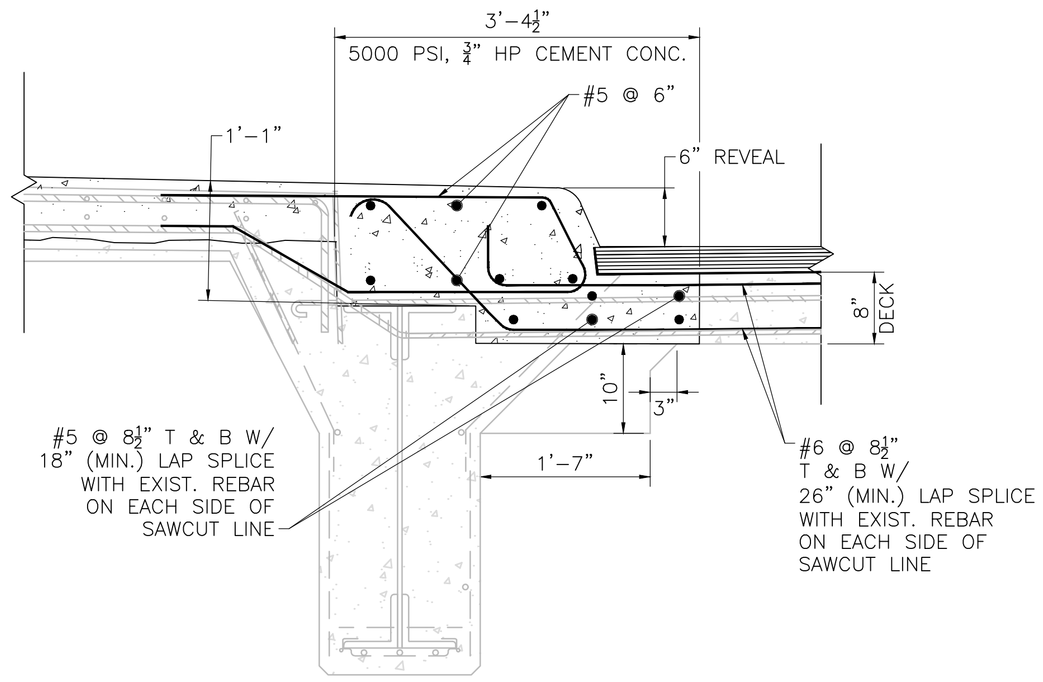
SECTION 5 / –

SCALE: 1" = 1'–0"



SIDEWALK WIDENING PLAN

SCALE: 1½" = 1'–0"

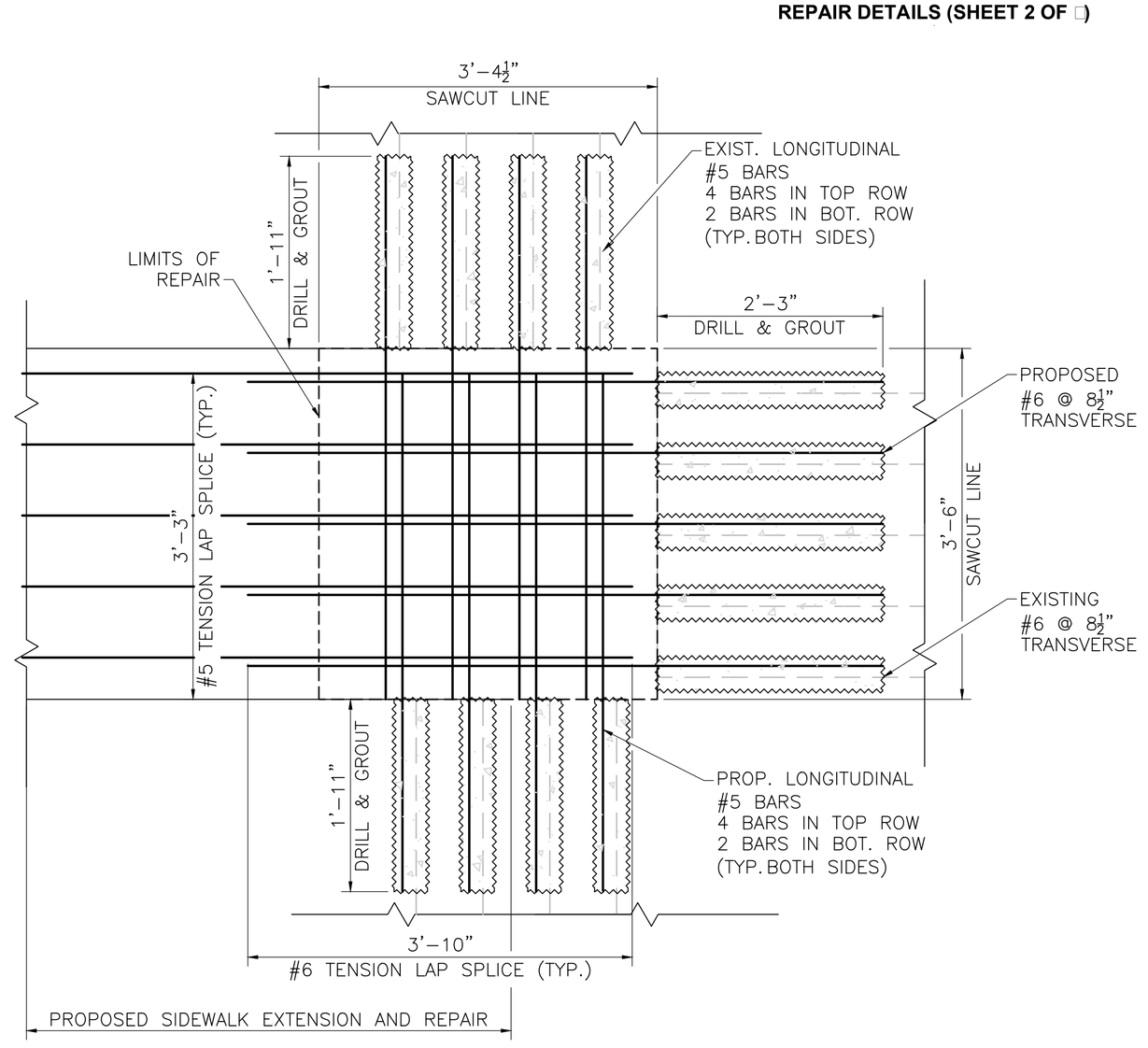


SCUPPER REPAIR DETAIL

SCALE: 1" = 1'–0"

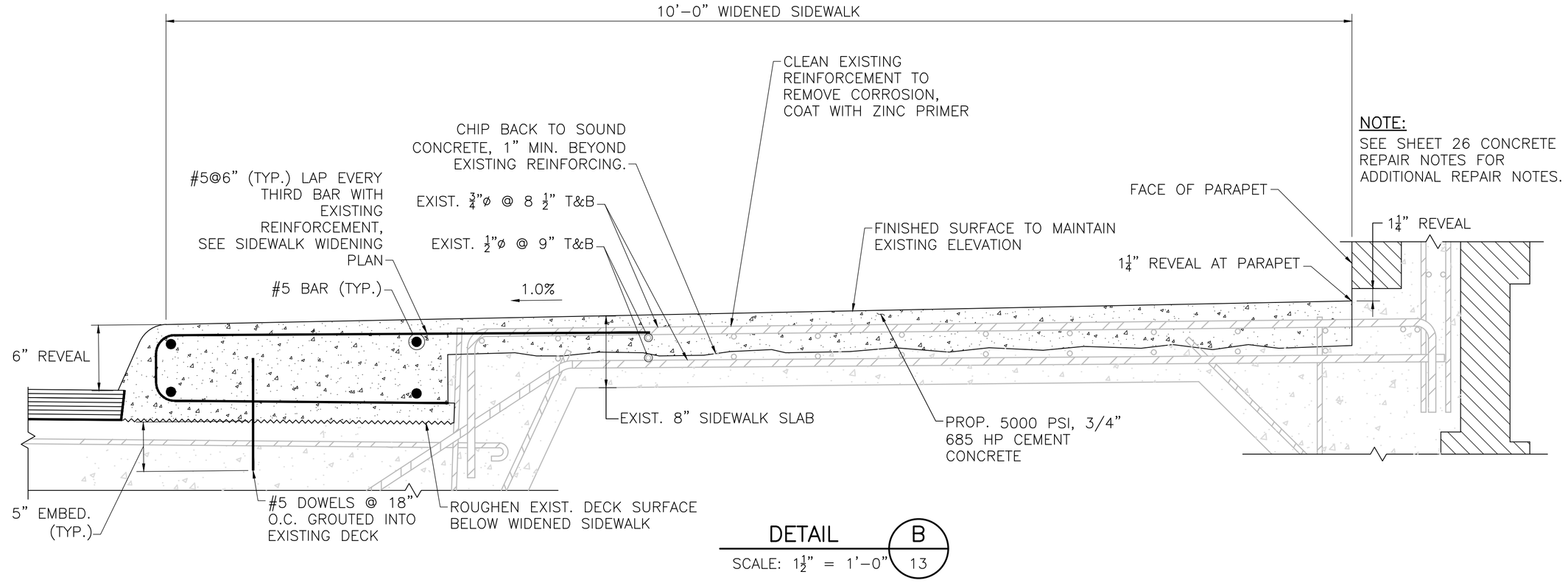
SCUPPER REPAIR SEQUENCE NOTES:

1. THERE ARE FOUR (4) SCUPPER LOCATIONS ON THE ELIOT BRIDGE.
2. REMOVE DETERIORATED EXISTING PAVEMENT, WATERPROOFING MEMBRANE FROM THE BRIDGE DECK AREAS TO THE LIMITS DIRECTED BY THE ENGINEER. THE PERIMETERS OF THE EXCAVATED AREAS SHALL BE SAWCUT PRIOR TO THE PAVEMENT REMOVAL. THE SHAPE OF THE EXCAVATED AREAS SHALL BE RECTANGULAR WITH SQUARE CORNERS. THE PAVEMENT AND MEMBRANE REMOVAL ABOVE THE CONCRETE EXCAVATION AREAS SHALL BE CONSIDERED INCIDENTAL TO THE CONCRETE EXCAVATION.
3. EXCAVATE CONCRETE (FULL OR PARTIAL DEPTH) TO THE LIMITS DIRECTED ON THE REMOVAL DETAIL OR UNTIL SOUND CONCRETE. LIMITS SHALL BE APPROVED BY THE ENGINEER. CLEAN AND RE–TIE THE EXPOSED STEEL REINFORCEMENT IF NECESSARY.
4. REMOVE AND DISPOSE OF THE EXISTING SCUPPER, RELATED STEEL SUPPORT MATERIALS, AND DRAINAGE MATERIALS FROM THE DECK.
5. FORM THE REPAIR AREA AND INSTALL NEW STEEL REINFORCEMENT AS DIRECTED BY THE ENGINEER.
6. MIX AND PLACE CONCRETE IN THE EXCAVATED AREAS ASSOCIATED WITH FULL OR PARTIAL DEPTH REPAIR NOTES ON THE FOLLOWING SHEETS. THE TOP SURFACE OF THE CONCRETE SHALL BE FLUSH WITH THE SURROUNDING EXISTING DECK SURFACE.



SCUPPER REPAIR PLAN

SCALE: 1" = 1'–0"



DETAIL B / 13

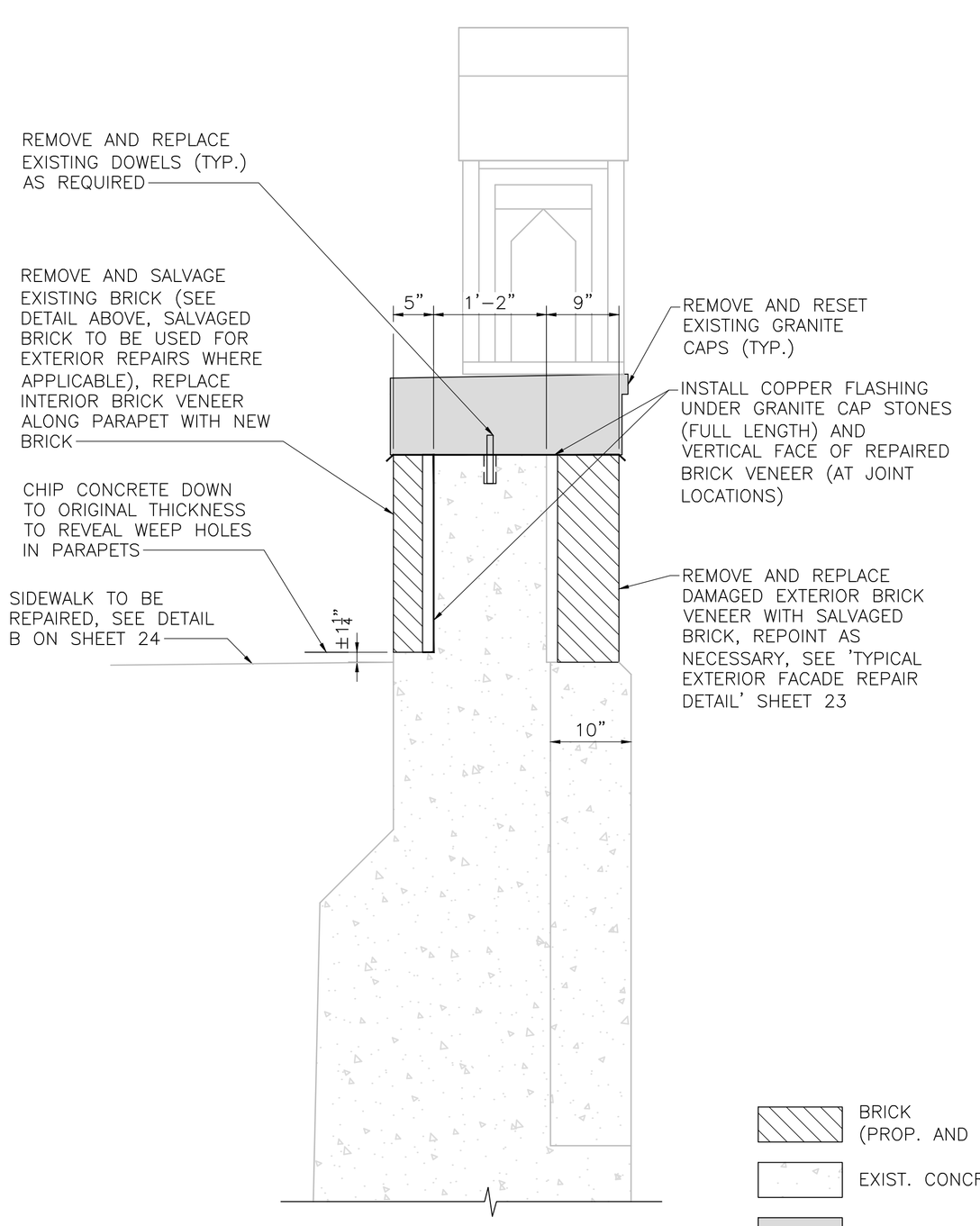
SCALE: 1½" = 1'–0"

BRIDGE NO. B–16–246 = BRIDGE NO. C–01–029 (4EV)

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	25	37
PROJECT FILE NO.	608762		

REPAIR DETAILS (SHEET □ OF □)



BRICK (PROP. AND EXIST.)

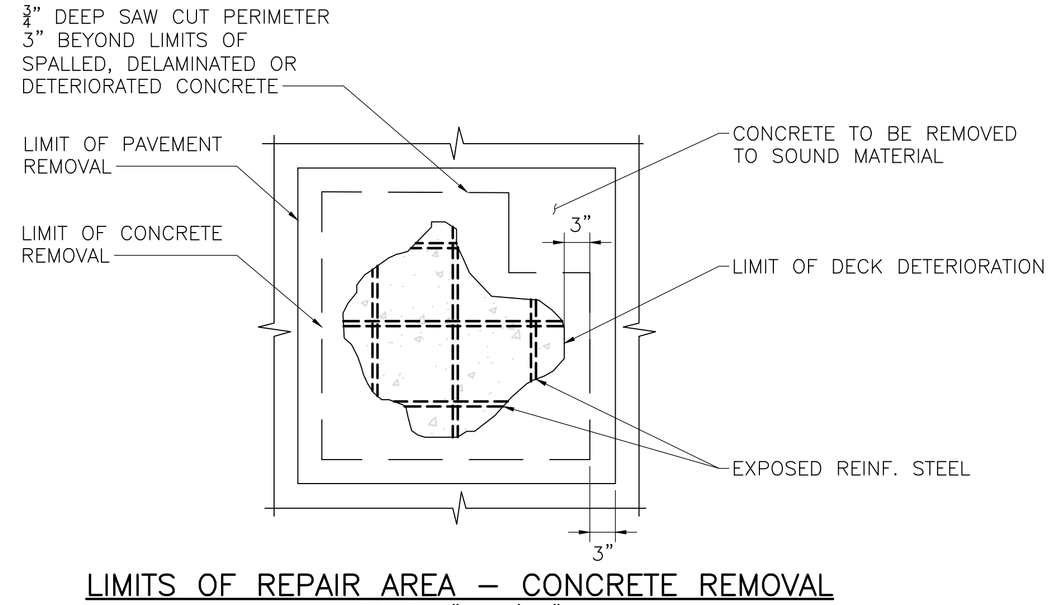
EXIST. CONCRETE

EXIST. GRANITE

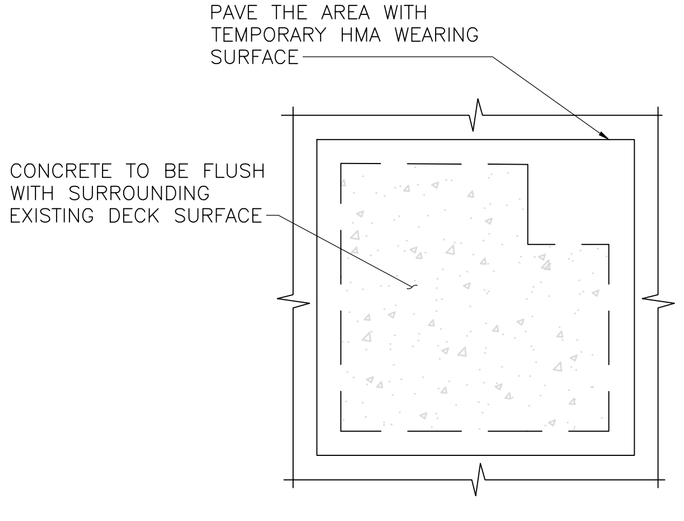
NOTES:

SEE SHEETS 17 THROUGH 20 FOR SPECIFIC LOCATIONS OF BRICK DETERIORATION.

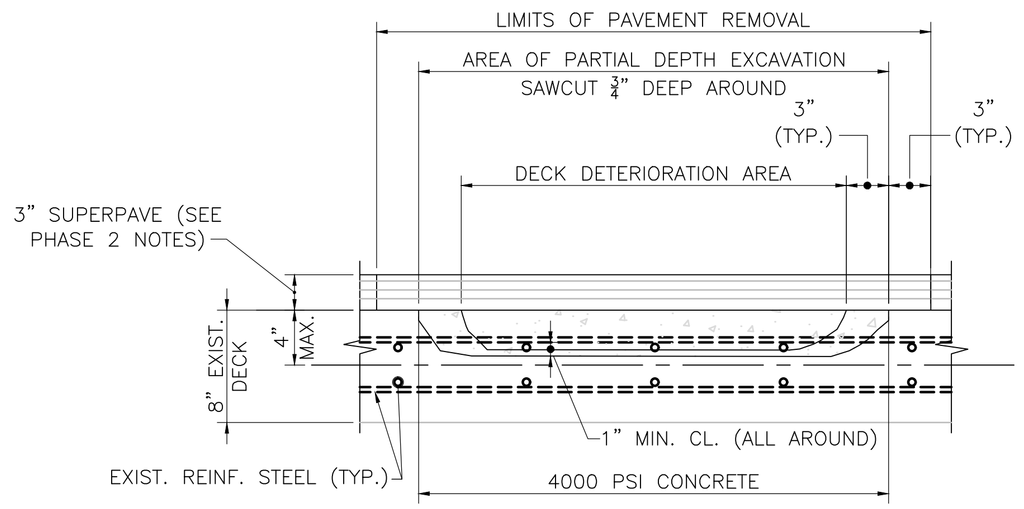
SECTION 5 / SCALE: 1" = 1'-0" 20



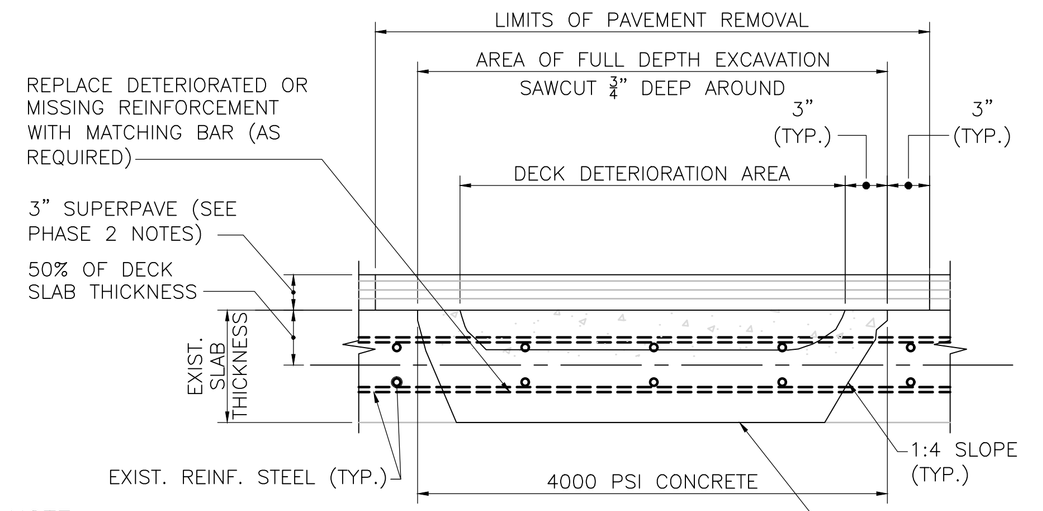
LIMITS OF REPAIR AREA – CONCRETE REMOVAL
SCALE: 1" = 1'-0"



REPAIRED AREA PRIOR TO MILL AND PAVE
SCALE: 1" = 1'-0"



PARTIAL DEPTH DECK REPAIR
SCALE: 1" = 1'-0"



NOTE:

CONTRACTOR SHALL CONTAIN ALL DEBRIS AND THAT NO DEBRIS SHALL BE ALLOWED TO FALL INTO THE CHARLES RIVER.

FULL DEPTH DECK REPAIR
SCALE: 1" = 1'-0"

BRIDGE DECK REPAIR SEQUENCE NOTES:

PHASE 1: DETERIORATED CONCRETE REMOVAL

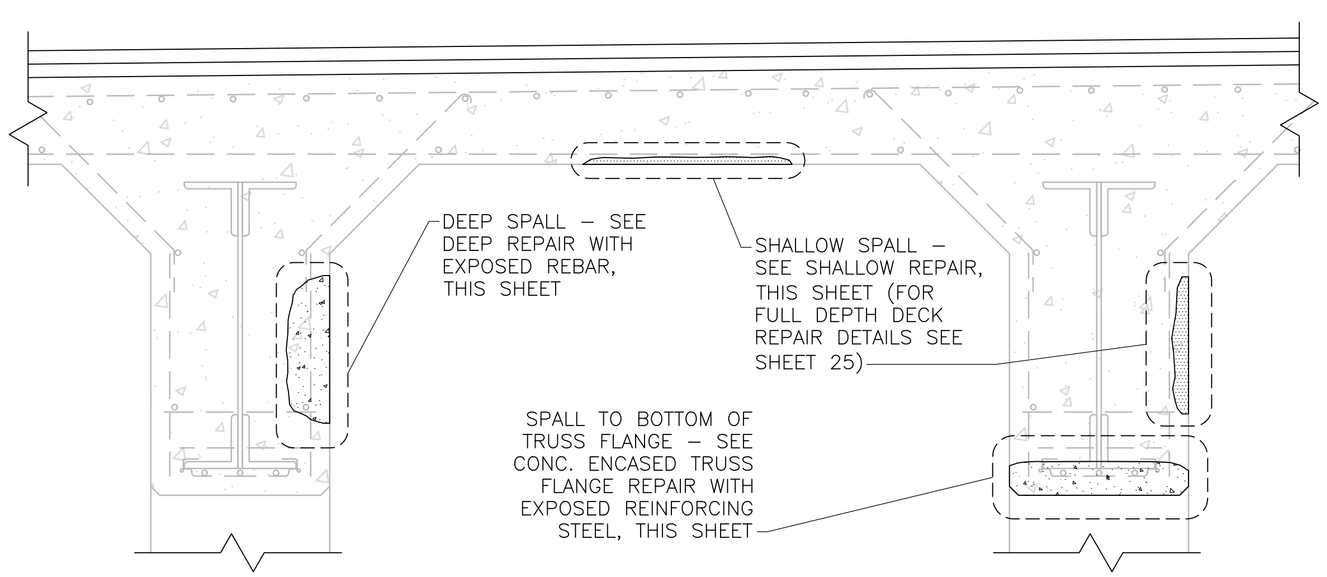
1. REMOVE DETERIORATED EXISTING PAVEMENT, WATERPROOFING MEMBRANE FROM THE BRIDGE DECK AREAS TO THE LIMITS DIRECTED BY THE ENGINEER. THE PERIMETERS OF THE EXCAVATED AREAS SHALL BE SAWCUT PRIOR TO THE PAVEMENT REMOVAL. THE SHAPE OF THE EXCAVATED AREAS SHALL BE RECTANGULAR WITH SQUARE CORNERS. THE PAVEMENT AND MEMBRANE REMOVAL ABOVE THE CONCRETE EXCAVATION AREAS SHALL BE CONSIDERED INCIDENTAL TO THE CONCRETE EXCAVATION.
2. EXCAVATE EXISTING TEMPORARY DECK REPAIR MATERIAL AND/OR DETERIORATED CONCRETE (FULL OR PARTIAL DEPTH) TO THE LIMITS DIRECTED BY THE ENGINEER. CLEAN AND RE-TIE THE EXPOSED STEEL REINFORCEMENT.
3. INSTALL NEW STEEL REINFORCEMENT AS DIRECTED BY THE ENGINEER.
4. MIX AND PLACE CONCRETE IN THE EXCAVATED AREAS. THE TOP SURFACE OF THE REPAIR MATERIAL SHALL BE FLUSH WITH THE SURROUNDING EXISTING DECK SURFACE.
5. PAVE REPAIR AREA WITH HMA FOR PATCHING UNTIL FINAL MILLING AND PAVING WORK. (SEE PHASE 2)

PHASE 2: FINAL PAVING

1. REPAIR AREA TO BE PERMANENTLY PAVED AS PART OF THE BRIDGE MILLING AND PAVING ITEM. REFER TO SHEET 5 FOR MILL AND PAVING NOTES AND LIMITS.
2. ALL DECK REPAIRS SHALL BE COMPLETED PRIOR TO FINAL MILL AND PAVE.

BRIDGE NO. B-16-246 = BRIDGE NO. C-01-029 (4EV)

23-26-608762_REPAIR DETAILS.DWG Plotted on 18-May-2023 6:26 PM
Proposal No. 608762-124916
02-SEP-2022
100% SUBMISSION
A90850-93

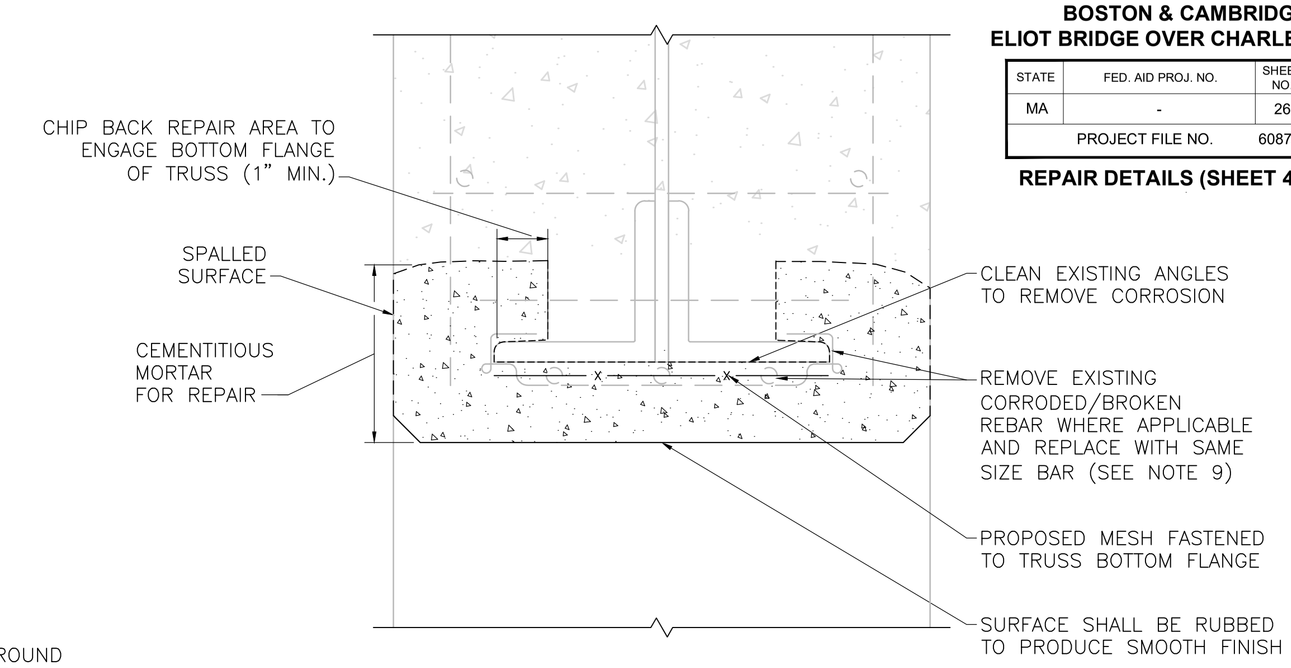


NOTES

1. SEE UNDERSIDE REPAIR AREAS, SHEETS 14 THROUGH 18 FOR LOCATIONS OF REPAIR AREAS.
2. CONTRACTOR SHALL CONTAIN ALL DEBRIS AND THAT NO DEBRIS SHALL BE ALLOWED TO FALL INTO THE CHARLES RIVER.

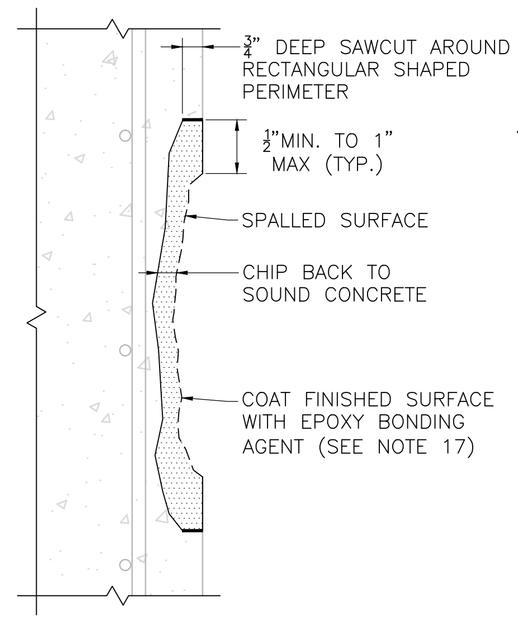
TYPICAL TRUSS AND DECK REPAIR SECTION

SCALE: 1" = 1'–0"



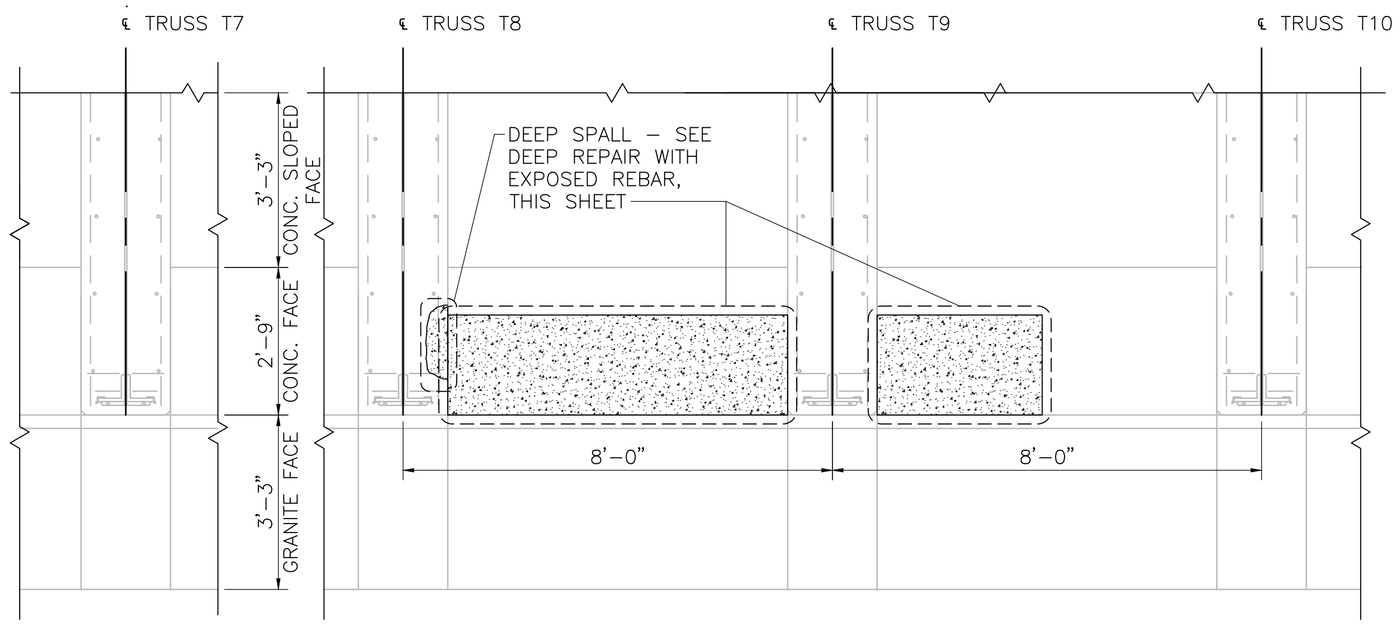
CONCRETE ENCASED TRUSS FLANGE REPAIR WITH EXPOSED REINFORCING STEEL

SCALE: 3" = 1'–0"



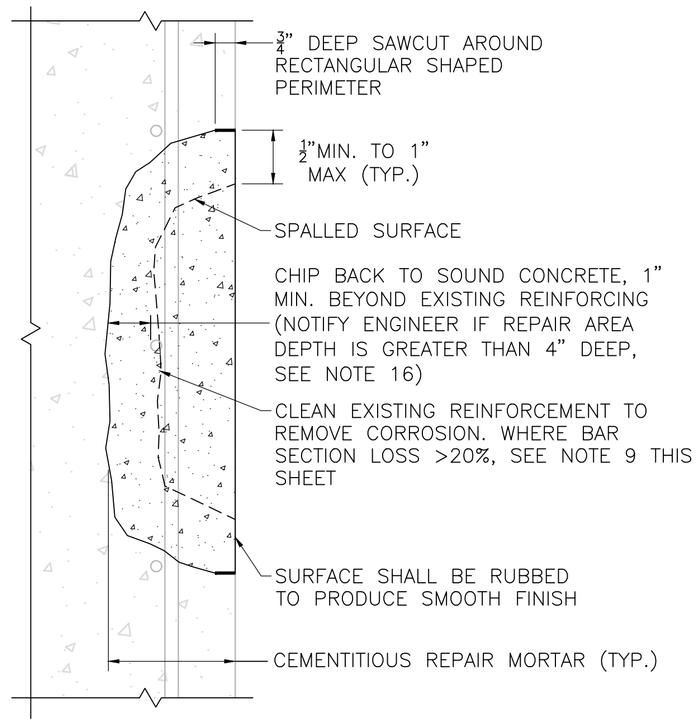
SHALLOW REPAIR

(AVERAGE DEPTH OF REPAIR IS LESS THAN 2" AND NO EXPOSED REBAR)



PIER 5 WEST FACE TRUSS BASE REPAIR ELEVATION

SCALE: ½" = 1'–0"



DEEP REPAIR WITH EXPOSED REBAR

(AVERAGE DEPTH OF REPAIR IS GREATER THAN 2" OR SPALL WITH EXPOSED REBAR)

TYPICAL SPALL AND/OR DELAMINATED CONCRETE REPAIR DETAILS

(DETAILS APPLY TO BOTH VERTICAL AND HORIZONTAL SURFACES)
SCALE: 3" = 1'–0"

CONCRETE REPAIR NOTES:

1. FOR GENERAL NOTES, SEE SHEET 3.
2. FOR LOCATIONS OF CONCRETE REPAIRS, SEE UNDERSIDE REPAIR AREAS, SHEETS 14 THROUGH 18.
3. CONCRETE DEFICIENCIES REQUIRING REPAIR AS INDICATED ON THE PLANS HAVE BEEN DETERMINED BY A FIELD INSPECTION. ALL OF THE DEFICIENCY LOCATIONS, KNOWN TO EXIST AT THE TIME, HAVE BEEN SHOWN TO INDICATE THE APPROXIMATE EXTENT OF DETERIORATION THAT WILL HAVE TO BE REPAIRED BY THE CONTRACTOR.
4. THE ANTICIPATED EXTENT OF CONCRETE REPAIR HAS BEEN INDICATED ON THE CONTRACT PLANS. PRIOR TO COMMENCING REPAIR WORK, THE CONTRACTOR SHALL PERFORM SOUNDING AND INSPECTION OF THE EXISTING CONCRETE ENCASED TRUSSES TO DEFINE THE EXTENTS AND THE TYPES OF REPAIRS TO BE PERFORMED AND SHALL BE SUBJECT TO APPROVAL BY THE ENGINEER.
5. SAWCUT A RECTANGULAR OUTLINE AROUND THE LIMITS OF SPALLING/DELAMINATION. THE SAWCUT IS TO BE PERPENDICULAR TO THE FACE OF CONCRETE.
6. REMOVE ALL LOOSE AND DELAMINATED CONCRETE TO PROVIDE A SOUND BOND BETWEEN EXISTING CONCRETE AND NEW CONCRETE REPAIR/MORTAR. IF REQUIRED, CONTINUE CHIPPING TO PROVIDE A MINIMUM CLEAR DISTANCE OF 1" BEHIND THE INNERMOST LAYER OF EXPOSED REINFORCING BARS AS SHOWN IN THE DEEP REPAIR DETAIL.
7. CEMENTITIOUS MORTAR FOR PATCHING SHALL BE CHOSEN FROM MASSDOT QUALIFIED CONSTRUCTION MATERIALS LIST.
8. EXISTING REINFORCING STEEL, IF EXPOSED, SHALL BE THOROUGHLY CLEANED OF CORROSION. EXISTING EPOXY COATED STEEL SHALL BE COATED WITH AN EPOXY ZINC PRIMER AND THEN BONDING COMPOUND AFTER CLEANING AND IMMEDIATELY PRIOR TO INSTALLATION OF NEW CONCRETE REPAIR/MORTAR. SEE SPECIAL PROVISIONS ITEM 127.411.
9. IN DEEP REPAIRS WITH EXPOSED REINFORCEMENT WHERE BAR SECTION LOSS IS GREATER THAN 20%, ADDITIONAL REINFORCEMENT IS REQUIRED. IN SITUATIONS WHERE THE ENGINEER DETERMINES THAT THE DETERIORATED REINFORCEMENT MUST BE REPLACED, A NEW SECTION OF REBAR, MATCHING THE ORIGINAL SIZE OF THE DETERIORATED REBAR, SHALL BE SPLICED ONTO THE EXISTING BAR. NEW REINFORCEMENT SHALL MATCH EXISTING.
10. AT THE TIME THE REPAIR MORTAR IS APPLIED, THE EXISTING CONCRETE SUBSTRATE SHOULD BE SATURATED SURFACE DRY.
11. WHERE CONCRETE REMOVAL AND REPLACEMENT NECESSITATES ADJACENT SEPARATE CONCRETE PLACEMENTS, CONCRETE REMOVAL SHALL NOT BE ALLOWED WITHIN 1 FOOT OF ADJACENT REPAIR AREAS. ADJACENT AREAS WHERE THIS 1 FOOT BUFFER IS NOT ATTAINABLE SHALL BE COMBINED INTO A SINGLE REPAIR AREA.
12. IN SEQUENCING WORK, THE CONTRACTOR SHALL NOT BEGIN CONCRETE REMOVAL AT A LOCATION ADJACENT TO A COMPLETED REPAIR UNTIL A MINIMUM OF 7 CURING DAYS HAVE PASSED.
13. ALL CRACKS EQUAL TO OR GREATER THAN 0.125" IN WIDTH, OR AS OTHERWISE DIRECTED BY THE ENGINEER, SHALL BE REPAIRED.
14. EXISTING CRACKS WITH SURROUNDING SOUND CONCRETE SHALL BE REPAIRED BY EPOXY INJECTION AS DIRECTED BY THE ENGINEER. SEE SPECIFICATION ITEM 107.855.
15. EXISTING CRACKS WITH SURROUNDING UNSOUND CONCRETE SHALL BE REPAIRED AS SHOWN IN THE TYPICAL DEEP OR SHALLOW REPAIR DETAILS, AS DIRECTED BY THE ENGINEER.
16. IN AREAS WHERE CONCRETE DETERIORATION EXTENDS DEEPER THAN 4", CONTRACTOR SHALL CONTACT ENGINEER BEFORE PROCEEDING WITH ADDITIONAL CONCRETE REMOVAL.
17. CHOOSE EPOXY BONDING AGENT THAT IS COMPATIBLE WITH MANUFACTURER'S RECOMMENDATIONS FOR CEMENTITIOUS REPAIR MORTAR.

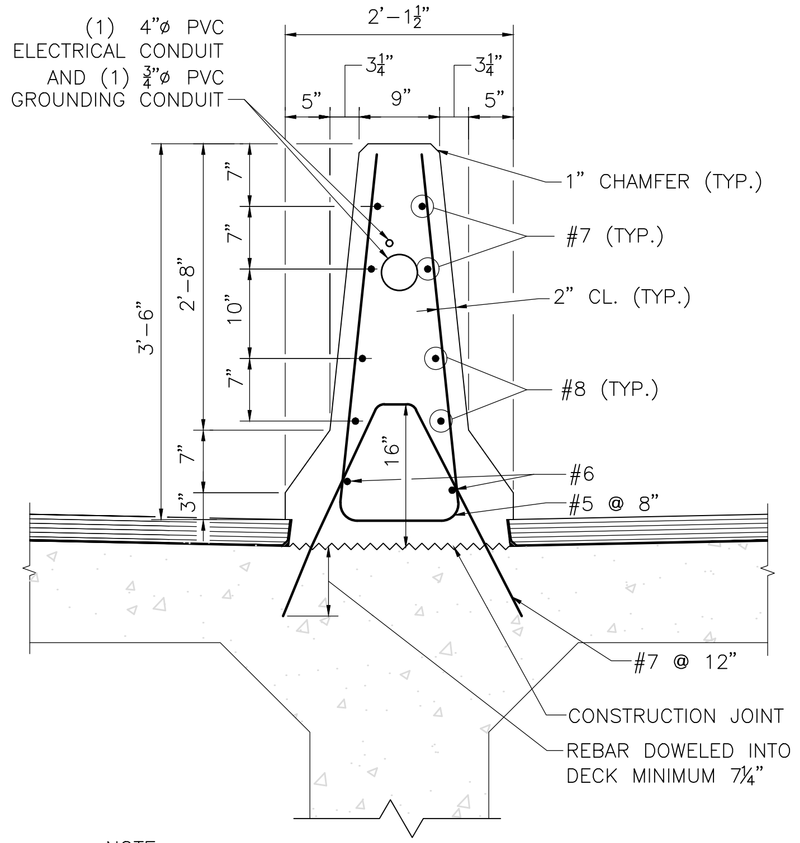
BRIDGE NO. B–16–246 = BRIDGE NO. C–01–029 (4EV)

23-26-608762_REPAIR DETAILS.DWG Plotted on 17-May-2023 1:35 PM
Proposal No. 608762-124916
02-SEP-2022
100% SUBMISSION
A08050 - 94

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

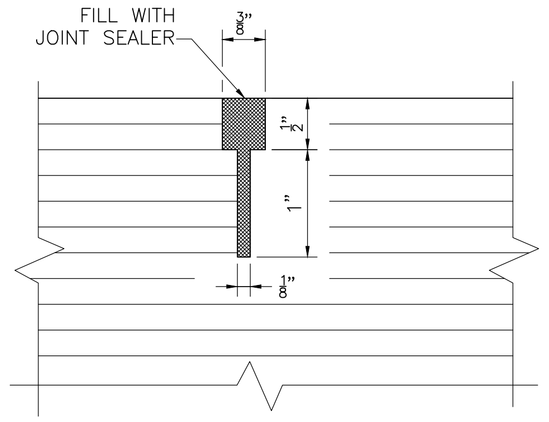
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	27	37
PROJECT FILE NO.	608762		

MEDIAN AND JOINT DETAILS

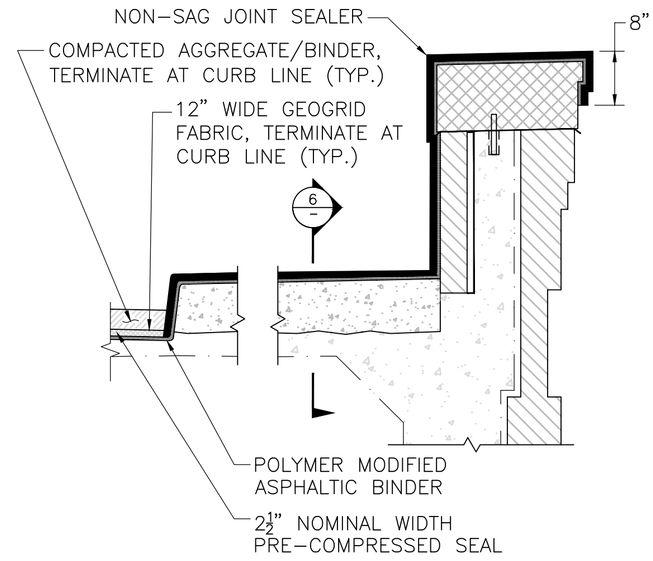


NOTE:
CAST-IN-PLACE DOUBLE FACE MEDIAN BARRIER SHALL BE 5000 PSI, ¾ IN, 685 HP CEMENT CONCRETE.

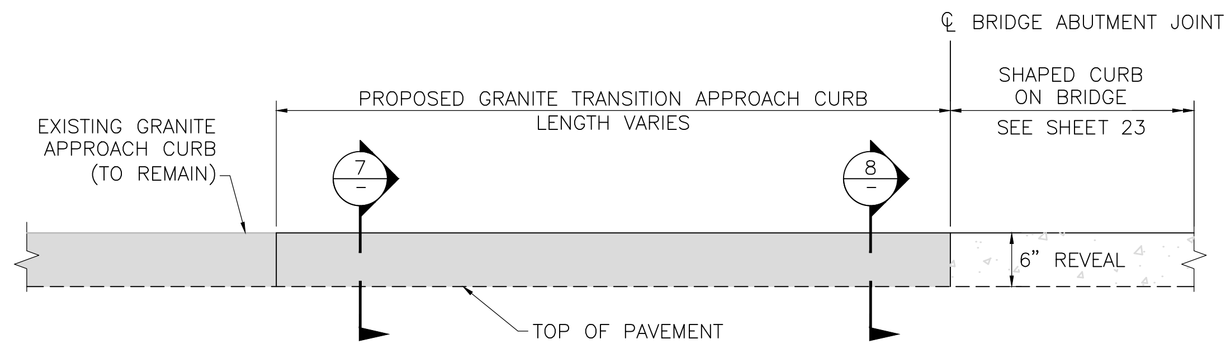
DOUBLE FACE MEDIAN BARRIER
SCALE: 1" = 1'-0"



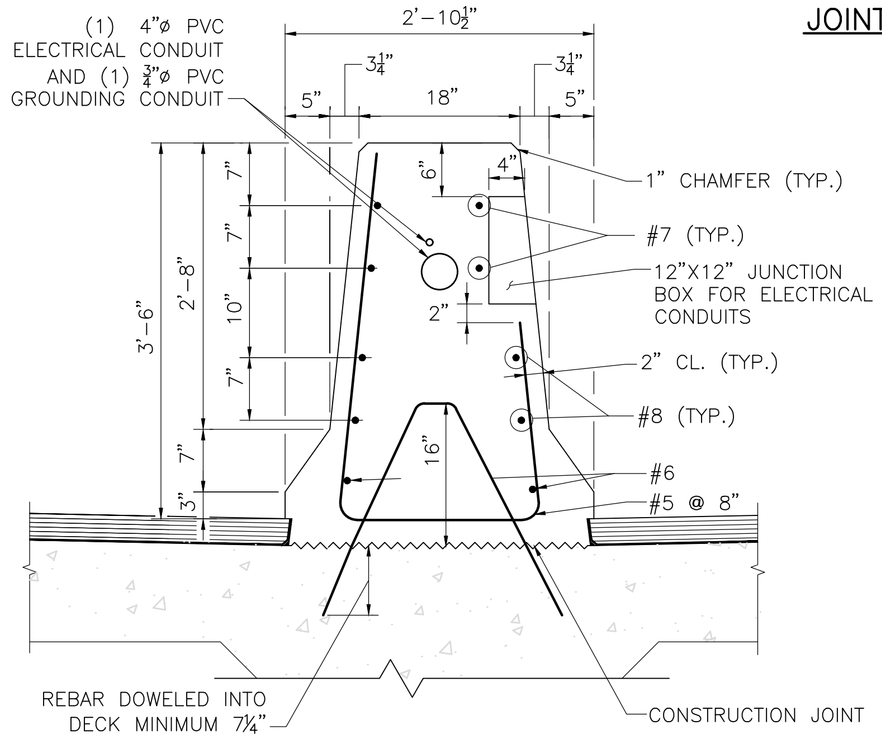
PAVEMENT SAWCUT DETAIL
FULL SIZE



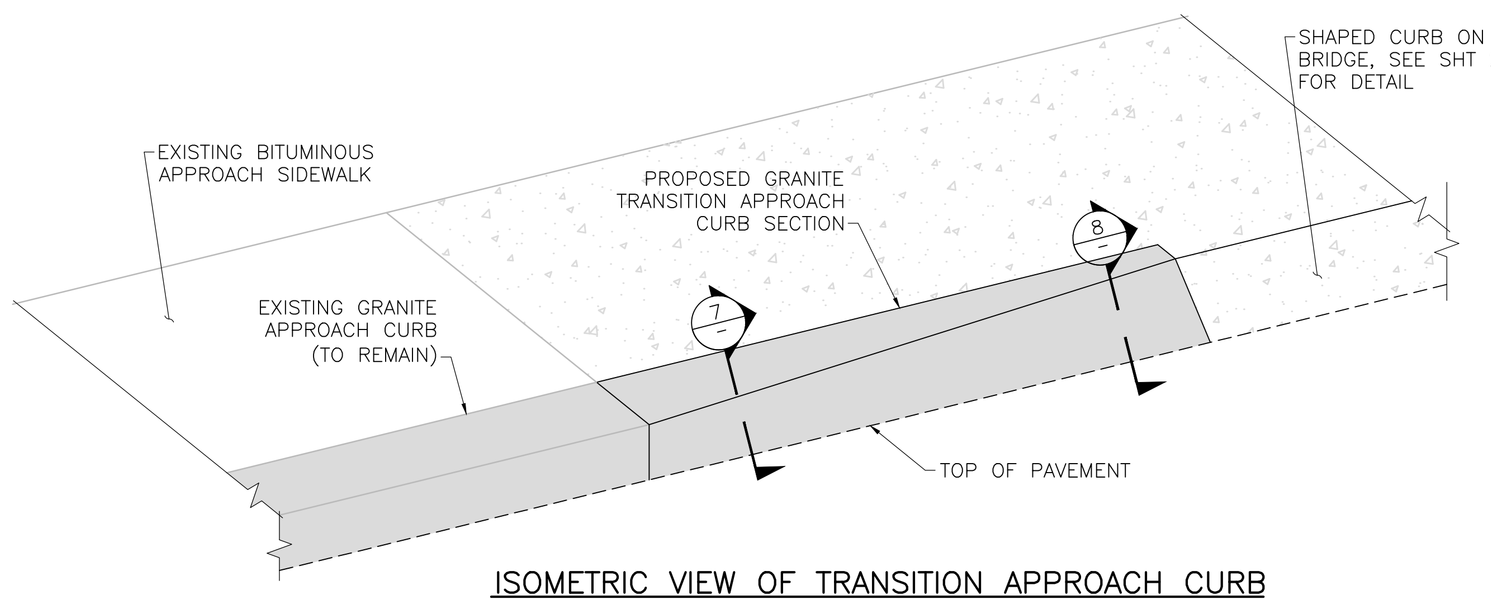
JOINT DETAIL AT BRIDGE PARAPETS
SCALE: ¾" = 1'-0"



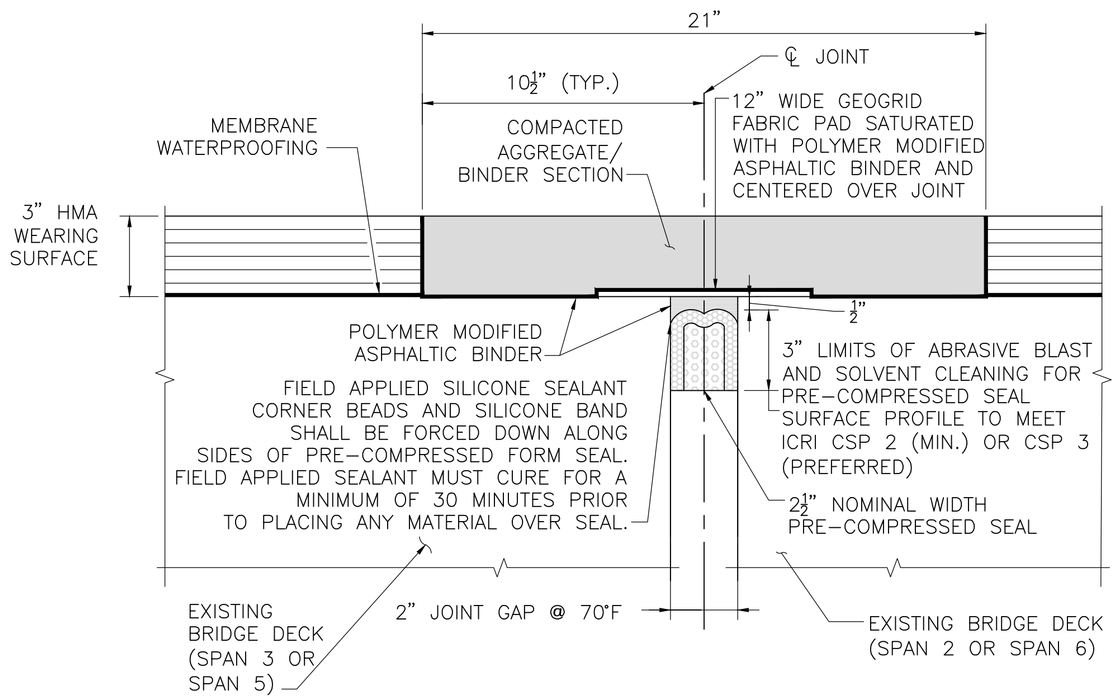
TRANSITION APPROACH CURB DETAIL – ELEVATION VIEW
SCALE: 1" = 1'-0"



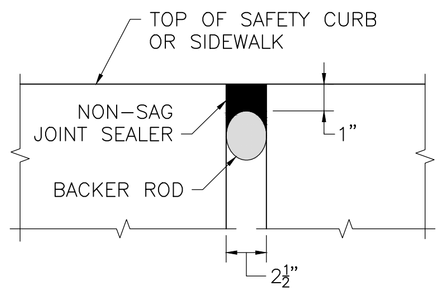
REINFORCEMENT DETAILS AT JUNCTION BOX
SCALE: 1" = 1'-0"



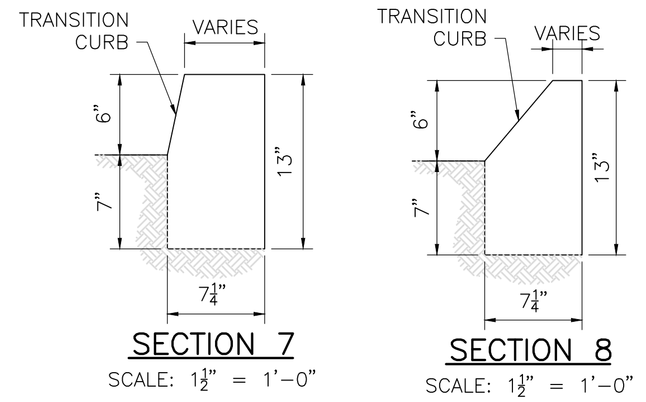
ISOMETRIC VIEW OF TRANSITION APPROACH CURB
SCALE: 1" = 1'-0"



MODIFIED ASPHALTIC PLUG SECTION
SCALE: 3" = 1'-0"



SECTION 6
SCALE: 3" = 1'-0"



SECTION 7
SCALE: 1½" = 1'-0"

SECTION 8
SCALE: 1½" = 1'-0"

MODIFIED ASPHALTIC BRIDGE JOINT CONSTRUCTION SEQUENCE:

1. EXISTING JOINT REMOVAL, DECK RECONSTRUCTION, AND WEARING SURFACE PLACEMENT SHALL BE CONSTRUCTED IN ADVANCE OF NEW JOINT INSTALLATION.
2. MARK OUT THE PROPOSED EDGES OF THE ASPHALTIC JOINT AT THE PARAPETS.
3. IMPLEMENT TRAFFIC CONTROL PLAN FOR THE EXISTING JOINT REPLACEMENT.
4. SAWCUT THE PERIMETERS OF THE PROPOSED ASPHALTIC PLUG JOINT, AND REMOVE THE HMA WEARING SURFACE, MEMBRANE WATERPROOFING, ELASTOMERIC CONCRETE, NEOPRENE STRIP SEAL, STEEL EXTRUSIONS, AND ANCHORAGES.
5. THE JOINT OPENING SHALL BE FREE OF ALL CONTAMINANTS SUCH AS GREASE, DUST, AND DIRT. PRIOR TO JOINT SYSTEM INSTALLATION, THE JOINT WALLS SHALL BE BLOWN CLEAN WITH OIL-FREE COMPRESSED AIR AND WIPED CLEAN WITH A CLEAN WET CLOTH TO THE BOTTOM OF THE PRE-COMPRESSED SEAL MATERIAL PLUS 1" TO REMOVE ANY DUST REMAINING. THE SUBSTRATE PREP SHALL FOLLOW THE ICRI CONCRETE SURFACE PROFILE STANDARDS TO ACHIEVE A SURFACE PROFILE OF CSP 2 (MIN.) OR 3 (PREFERRED) IN ORDER TO ACCEPT THE JOINT SYSTEM.
6. INSTALL THE PRE-COMPRESSED SEAL JOINT SYSTEM PER THE MANUFACTURER'S RECOMMENDATIONS.
7. COAT THE SURFACES OF THE BLOCKOUT AND THE REMAINING JOINT OPENING WITH THE POLYMER MODIFIED ASPHALTIC BINDER.
8. PLACE THE 12" WIDE GEOGRID FABRIC PAD SATURATED WITH POLYMER MODIFIED ASPHALTIC BINDER CENTER OVER THE JOINT.
9. PLACE COMPACTED AGGREGATE/BINDER TO FILL ALL VOIDS AND OBTAIN A FINAL AND EVEN SURFACE WITH THE ADJACENT WEARING SURFACE.
10. IMPLEMENT APPROVED TRAFFIC CONTROL PLAN FOR NEXT PHASE OF CONSTRUCTION AND REPEAT STEPS 3 THROUGH 8.
11. IT IS NOT NECESSARY TO CONSTRUCT THE JOINT AT MEAN TEMPERATURE; HOWEVER, THE MANUFACTURER SHOULD BE CONSULTED FOR INSTALLATION GUIDELINES FOR EXTREME CLIMATE CONDITIONS.
12. HE PRE-COMPRESSED SEAL JOINT SYSTEM SHALL BE CONTINUOUS THROUGH BARRIERS AS APPROPRIATE TO THE CONDITIONS AT HAND. CONTINUITY OF THE SEAL SHALL BE ACHIEVED THROUGH THE USE OF FACTOR-FABRICATED UNIVERSAL OR CUSTOM TRANSITIONS SUPPLIED BY THE PRE-COMPRESSED JOINT SEAL MANUFACTURER. THE FIELD SPLICE OF THE PRE-COMPRESSED SEAL SHALL BE DONE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

BRIDGE NO. B-16-246 = BRIDGE NO. C-01-029 (4EV)

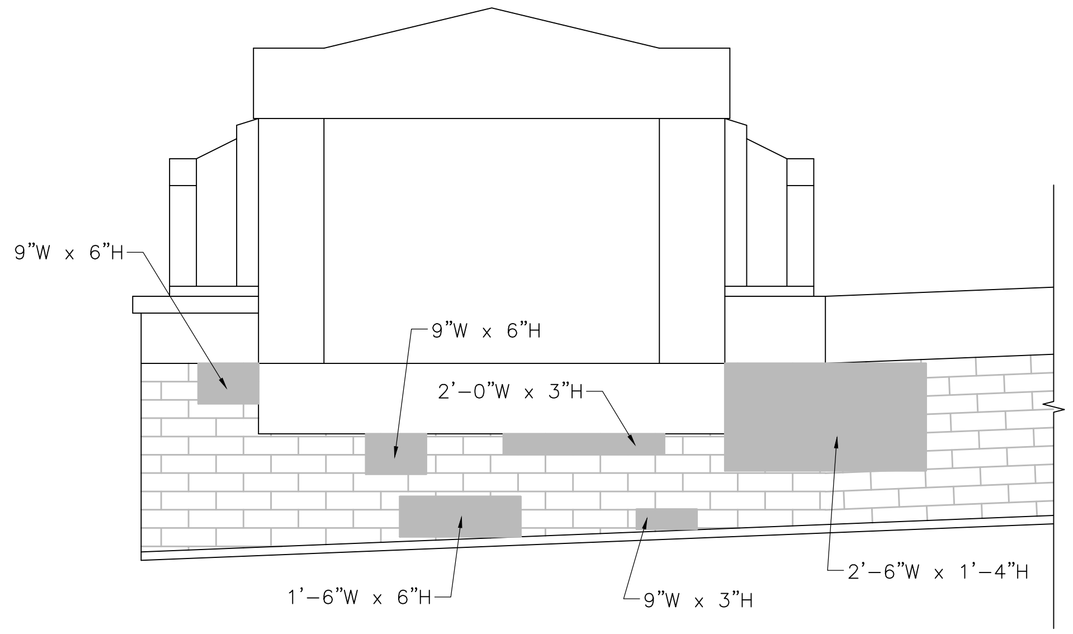
BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	28	37
PROJECT FILE NO.	608762		

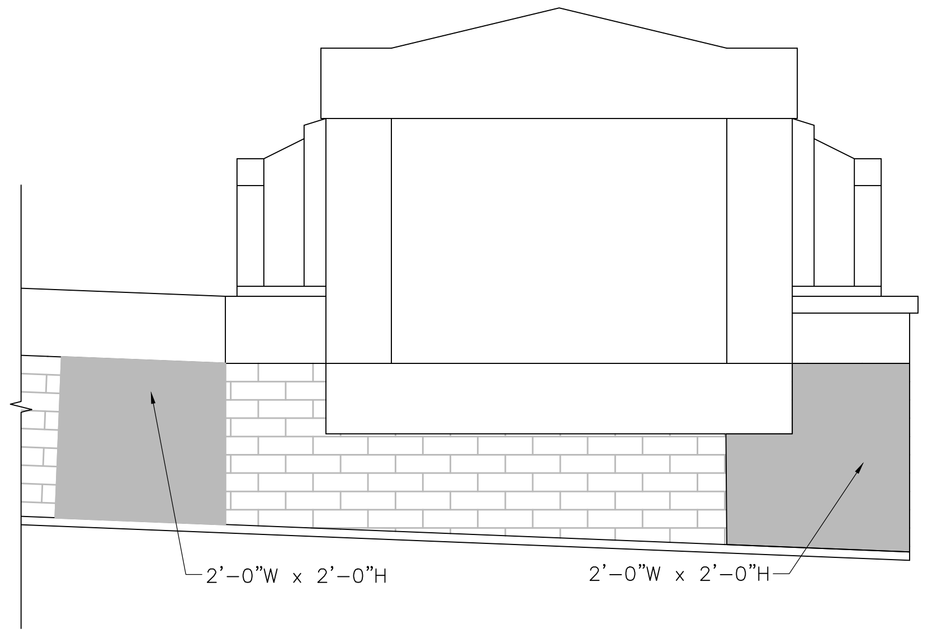
END POST DETAILS

NOTES:

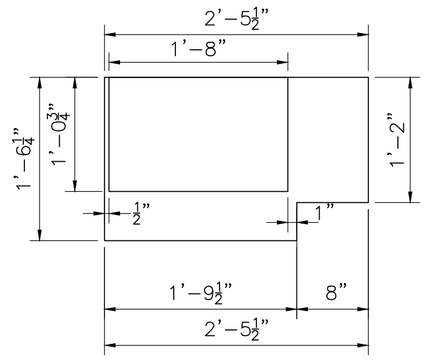
1. SEE SHEET 23 FOR REPAIR DETAILS AND REQUIREMENTS OF BRICK REMOVAL.



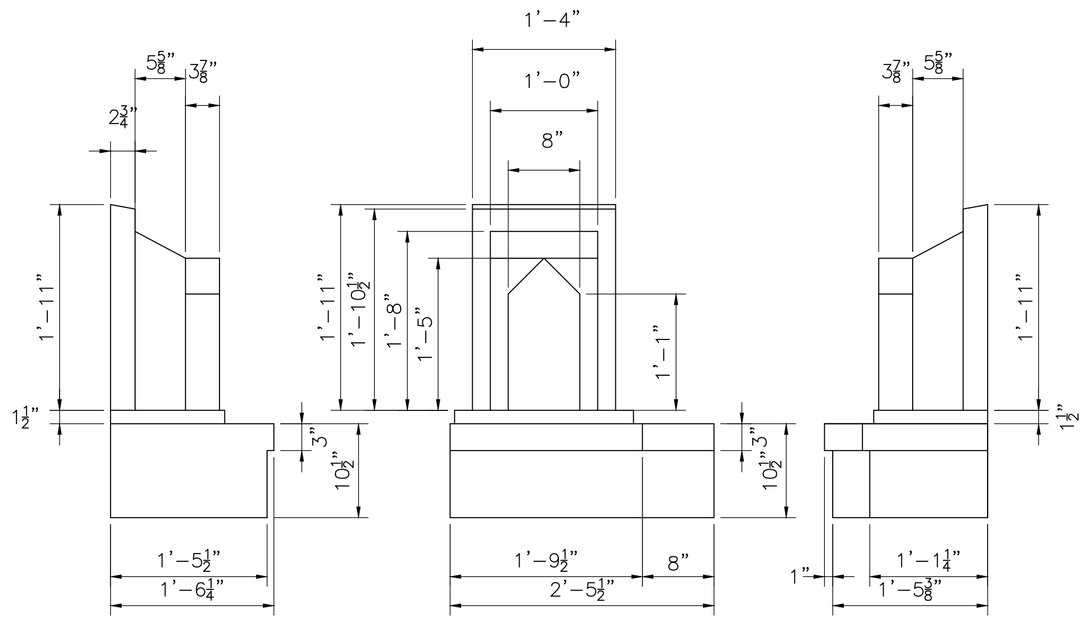
NORTH PARAPET – END CAP
WEST END (SOUTH FACE SHOWN)
SCALE: $\frac{3}{4}$" = 1'–0"



NORTH PARAPET – END CAP
EAST END (SOUTH FACE SHOWN)
SCALE: $\frac{3}{4}$" = 1'–0"



PLAN

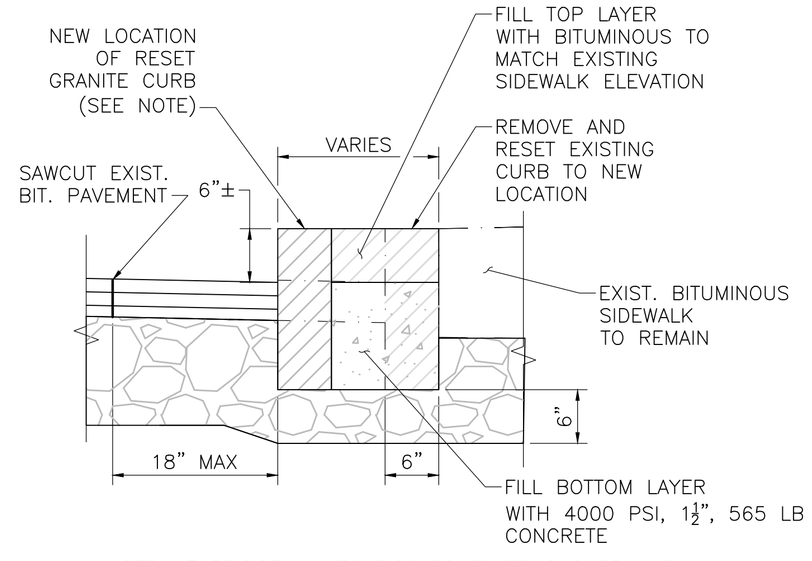


SIDE ELEVATION | FRONT ELEVATION | SIDE ELEVATION

END CAP DETAILS
SCALE: 1" = 1'–0"

SOUTH PARAPET – END CAP
EAST END (NORTH FACE SHOWN)
SCALE: $\frac{3}{4}$" = 1'–0"

SOUTH PARAPET – END CAP
WEST END (NORTH FACE SHOWN)
SCALE: $\frac{3}{4}$" = 1'–0"



NOTE: AT BRIDGE JOINTS DISCARD EXISTING CURB AND REPLACE WITH TRANSITION CURB, SEE SHEET 27

GRANITE CURB – REMOVE AND RESET
SCALE: 1" = 1'–0"

LEGEND:

MISSING/DAMAGED BRICK L – LONG W – WIDE

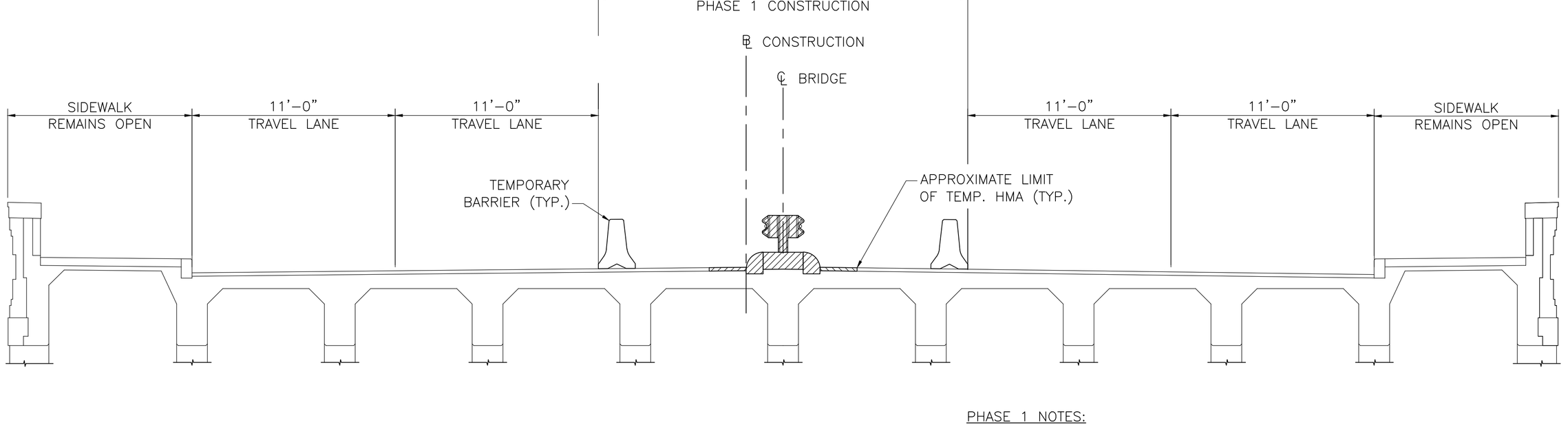
MISSING MORTAR (M.M.) H – HIGH

27-28-608762_MEDIAN, JOINT & END POST DETAILS.DWG Plotted on 19-May-2023 5:03 PM
Proposal No. 608762-124916
02-SEP-2022
100% SUBMISSION
A00830 - 96

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	29	37
PROJECT FILE NO.	608762		

CONSTRUCTION PHASING (1 OF 2)



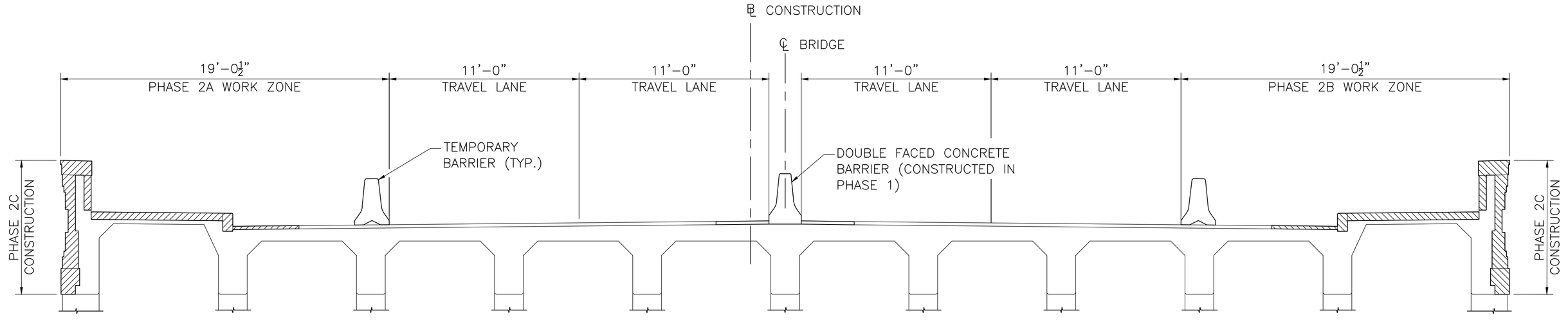
PHASE 1 CONSTRUCTION
SCALE: ¼" = 1'–0"

PHASE 1 NOTES:

1. INSTALL TEMPORARY BARRIER ALONG BOTH SIDES OF MEDIAN.
2. REMOVE AND DISCARD EXISTING MEDIAN GUARDRAIL, LIGHTING, AND DEMOLISH EXISTING CONCRETE MEDIAN.
3. CONSTRUCT PROPOSED MEDIAN BARRIER.
4. INSTALL MEDIAN LIGHTING AND END TREATMENTS.
5. PERFORM FULL DEPTH DECK REPAIRS WITHIN PHASE 1 WORK AREA. SEQUENCE SUCH THAT ALL CURING OF REPAIR CONCRETE HAS BEEN COMPLETED PRIOR TO COMPLETION OF PHASE 1.
6. PLACE TEMPORARY HMA AS REQUIRED WITHIN WORK LIMITS UNTIL FINAL MILLING AND PAVING.

NOTES:

1. ROADWAY CLOSURES TO BE COORDINATED WITH MASSDOT DISTRICT 6 TRAFFIC ENGINEERS. DAYTIME OR NIGHTTIME WORK HOURS SHALL BE ALLOWED FOR PHASES 1 THROUGH 2C.
2. PHASE 1 MUST BE COMPLETED PRIOR TO THE IMPLEMENTATION OF PHASES 2A THROUGH 2C.
3. DEMOLITION OF EXISTING INTERIOR BRICK VENEER ALONG INSIDE FACE OF PARAPETS MUST BE COMPLETED PRIOR TO WORK ON BRIDGE FACADES (PHASE 2C) AS INTERIOR BRICK MUST BE SALVAGED TO REPAIR EXTERIOR FACADES, SEE REPAIR DETAILS.
4. ALL UNDERSIDE REPAIRS AT CONCRETE ENCASED TRUSSES AND DECK TO BE COORDINATED WITH DCR AND COAST GUARD. FOR REPAIRS LOCATED OUTSIDE THE CONSTRUCTION PHASES SHOWN ON THESE PLANS, CONTRACTOR SHALL DEVELOP PHASING AND TRAFFIC CONTROL PLAN TO COMPLETE FULL DEPTH REPAIRS. PHASING TO BE PER CONTRACTOR AND REPAIRS SHALL BE COORDINATED WITH WORK ON ROADWAY, BARRIER AND SIDEWALKS. STANDARD TEMPORARY LANE CLOSURES ARE SHOWN ON SHEETS 32 AND 33.
5. LIGHTING CONDUITS TO BE INSTALLED DURING PHASE 2C.
6. INSTALLATION OF BRIDGE JOINTS AND MILLING AND PAVING SHALL BE COMPLETED UTILIZING NIGHTTIME SINGLE LANE CLOSURES ONCE PHASES 1 THROUGH 2C ARE COMPLETED, SEE SHEETS 32 AND 33.



PHASE 2 CONSTRUCTION
SCALE: ¼" = 1'–0"

PHASE 2A AND 2B NOTES:

1. INSTALL TEMPORARY BARRIER ALONG FACE OF SIDEWALK.
2. REMOVE GRANITE CAP STONES AND INTERIOR BRICK. SALVAGE INTERIOR BRICK FOR USE ALONG EXTERIOR FACADES. STORE GRANITE CAP STONES.
3. REMOVE EXISTING WEARING SURFACE ALONG SIDEWALKS, CHIP AWAY DETERIORATED CONCRETE, AND REPAIR AND WIDEN CONCRETE SIDEWALK.
4. REPLACE INTERIOR BRICK VENEER ON BRIDGE PARAPET.
5. RESET GRANITE CAP STONES. NOTE THAT SOME GRANITE CAP STONES MAY NEED TO BE RESET AFTER EXTERIOR FACADE REPAIRS IN PHASE 2C, SEE PHASE 2C NOTES.
6. PERFORM FULL DEPTH DECK REPAIRS WITHIN PHASE 2 WORK AREA. SEQUENCE SUCH THAT ALL CURING OF REPAIR CONCRETE HAS BEEN COMPLETED PRIOR TO COMPLETION OF PHASE 2.
7. PLACE TEMPORARY HMA UNTIL FINAL MILLING AND PAVING.

PHASE 2C NOTES:

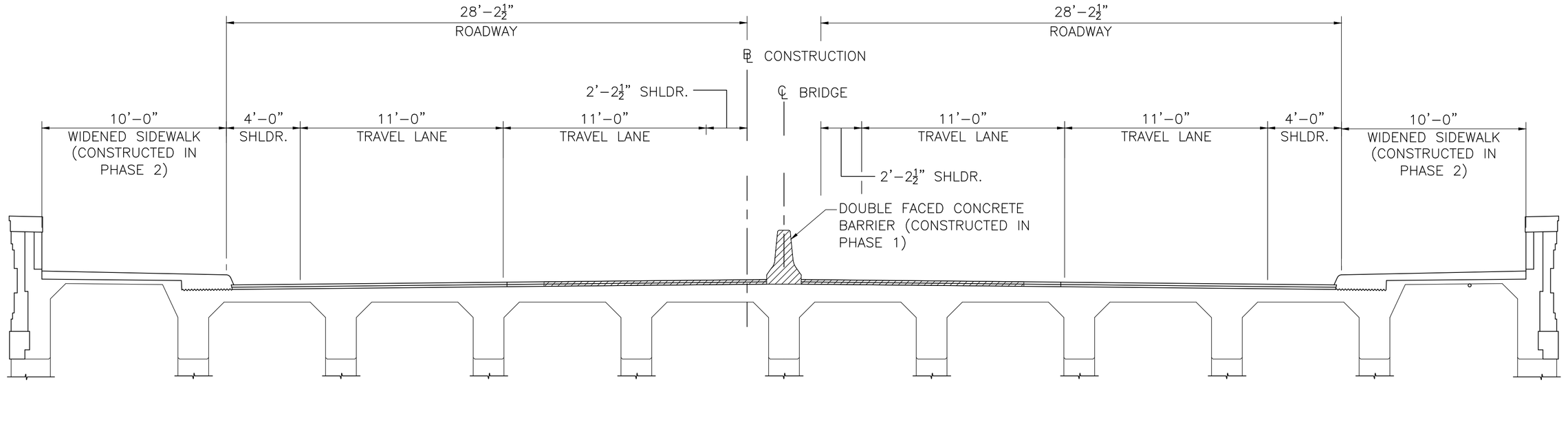
1. REMOVE AND REPLACE DETERIORATED BRICK ALONG EXTERIOR.
2. RESET REMAINING GRANITE CAP STONES AS REQUIRED.
3. REPLACE EXISTING NAVIGATION LIGHTING AND OTHER CONDUITS ON EXTERIOR FACE.

BRIDGE NO. B–16–246 = BRIDGE NO. C–01–029 (4EV)

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	30	37
PROJECT FILE NO.	608762		

CONSTRUCTION PHASING (2 OF 2)



REPAIRED BRIDGE CROSS SECTION
SCALE: ¼" = 1'–0"

NOTES:

1. ROADWAY CLOSURES TO BE COORDINATED WITH MASSDOT DISTRICT 6 TRAFFIC ENGINEERS. NIGHTTIME HOURS ONLY FOR ALL LANE CLOSURES.
2. AFTER THE COMPLETION OF PHASES 1 THROUGH 2C, CONTRACTOR MAY PERFORM SINGLE LANE CLOSURE AT NIGHT TO PERFORM REMAINING FULL DEPTH DECK REPAIRS.
3. ALL UNDERSIDE REPAIRS AT CONCRETE ENCASED TRUSSES AND DECK TO BE COORDINATED WITH DCR AND COAST GUARD.
4. INSTALLATION OF BRIDGE JOINTS AND MILLING AND PAVING SHALL BE COMPLETED UTILIZING NIGHT SINGLE LANE CLOSURES ONCE PHASES 1 THROUGH 2C ARE COMPLETED

BRIDGE NO. B–16–246 = BRIDGE NO. C–01–029 (4EV)

CONSTRUCTION SIGN SUMMARY

IDENTIFICATION NUMBER	SIZE WIDTH (IN)	SIZE HEIGHT (IN)	TEXT	DIMENSIONS (IN) LETTER HEIGHT	DIMENSIONS (IN) VERTICAL SPACING	DIMENSIONS (IN) ARROW RTE. MKR.	NUMBER OF SIGNS REQUIRED	COLOR BACK-GROUND	COLOR LEGEND	COLOR BORDER	UNIT AREA (S.F.)	TOTAL AREA (S.F.)
MA-R2-10a	48"	36"	WORK ZONE SPEEDING FINES DOUBLED	(2)	(2)	(2)	5	ORANGE/ WHITE	BLACK	BLACK	12.00	60.0
MA-R2-10e	36"	48"	END ROAD WORK / DOUBLE FINES END				2	ORANGE/ WHITE	BLACK	BLACK	12.00	48.0
MA-W20-7b	36"	36"	POLICE OFFICER AHEAD				2	FLUOR. ORANGE	BLACK	BLACK	9.00	18.0
M4-8a	24"	18"	END DETOUR	(1)	(1)	(1)	2	FLUOR. ORANGE	BLACK	BLACK	3.0	6.0
M4-9bL	30"	24"	DETOUR ←				6	FLUOR. ORANGE	BLACK	BLACK	5.0	30.0
M4-9bR	30"	24"	DETOUR →				7	FLUOR. ORANGE	BLACK	BLACK	5.0	35.0
R9-9	24"	12"	SIDEWALK CLOSED				5	WHITE	BLACK	BLACK	2.00	10.0
R9-10L	24"	12"	SIDEWALK CLOSED ← USE OTHER SIDE				1	WHITE	BLACK	BLACK	2.00	2.0
SP-1	36"	24"	ELIOT BRIDGE				5	FLUOR. ORANGE	BLACK	BLACK	6.0	30.0
W1-4bL	36"	36"					5	FLUOR. ORANGE	BLACK	BLACK	9.0	45.0
W1-4bR	36"	36"					5	FLUOR. ORANGE	BLACK	BLACK	9.0	45.0
W4-2L	36"	36"					5	FLUOR. ORANGE	BLACK	BLACK	9.0	45.0
W4-2R	36"	36"					7	FLUOR. ORANGE	BLACK	BLACK	9.0	63.0
W20-1c	36"	36"	ROAD WORK AHEAD				5	FLUOR. ORANGE	BLACK	BLACK	9.0	45.0
W20-5cL	36"	36"	LEFT LANE CLOSED AHEAD				5	FLUOR. ORANGE	BLACK	BLACK	9.0	45.0
W20-5cR	36"	36"	RIGHT LANE CLOSED AHEAD				7	FLUOR. ORANGE	BLACK	BLACK	9.0	63.0

NOTES:

1. NUMERICAL LIMITS AND JUSTIFICATION FOR SPEED & ADVISORY EXIT SPEED SIGNS SHALL BE OBTAINED FROM THE SPEED ZONING UNIT OF THE TRAFFIC ENGINEERING SECTION, MASSDOT, OR DEPARTMENT OF CONSERVATION AND RECREATION. BEFORE FABRICATION AND/OR ERECTION.
2. HIGH INTENSITY ENCAPSULATED LENS REFLECTIVE SHEETING SHALL BE USED FOR ALL SIGNS. THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" 2009 EDITION, THE 1996 MASSDOT CONSTRUCTION AND TRAFFIC STANDARD DETAILS", AND ALL AMENDMENTS SHALL GOVERN.
3. (1) SEE MUTCD 2009 EDITION, 1979 STD. HWY. SIGNS AND SECTION M9.30.0 TYPE III OF THE MASSDOT STANDARD SPECIFICATION FOR TEXT DIMENSIONS AND COLOR.

   (2) SEE MASSDOT SIGN STANDARDS.

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	31	37
PROJECT FILE NO.	608762		

TEMPORARY TRAFFIC CONTROL PLANS
SIGN SUMMARY AND NOTES

TEMPORARY TRAFFIC CONTROL GENERAL NOTES:

1. ALL TEMPORARY TRAFFIC CONTROL WORK SHALL CONFORM TO THE LATEST EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) AND ALL REVISIONS.
2. ALL SIGN LEGENDS, BORDERS AND MOUNTING SHALL BE IN ACCORDANCE WITH THE MUTCD.
3. TEMPORARY CONSTRUCTION SIGNING AND ALL OTHER TRAFFIC CONTROL DEVICES SHALL BE IN PLACE PRIOR TO THE START OF ANY WORK.
4. TEMPORARY CONSTRUCTION SIGNING, BARRICADES AND ALL OTHER NECESSARY WORK ZONE TRAFFIC CONTROL DEVICES SHALL BE REMOVED FROM THE ROAD OR COVERED WHEN THEY ARE NOT REQUIRED FOR CONTROL OF TRAFFIC.
5. SIGNS AND SIGN SUPPORTS LOCATED ON OR NEAR THE TRAVELED WAY, AND REFLECTORIZED PLASTIC DRUMS WITH LIGHTING DEVICES MOUNTED ON THEM, MUST PASS THE CRITERIA SET FORTH IN NCHRP REPORT 350., "RECOMMENDED PROCEDURES FOR THE SAFETY PERFORMANCE EVALUATION OF HIGHWAY FEATURES" AND MASH.
6. CONTRACTORS SHALL NOTIFY EACH ABUTTER AT LEAST 24 HOURS IN ADVANCE OF THE START OF ANY WORK THAT WILL REQUIRE TEMPORARY CLOSURE OF ACCESS, SUCH AS CONDUIT INSTALLATION, EXISTING PAVEMENT EXCAVATION, TEMPORARY DRIVEWAY PAVEMENT PLACEMENT AND SIMILAR OPERATIONS.
7. CONSTRUCTION / SURVEY VEHICLE ACCESS TO BE COORDINATED WITH POLICE DETAIL.
8. THE FIRST TEN PLASTIC DRUMS OF A TAPER SHALL BE MOUNTED WITH SEQUENTIAL LIGHTS, TYPE A.
9. THE ADVISORY SPEED LIMIT, IF REQUIRED, SHALL BE DETERMINED BY THE DISTRICT TRAFFIC ENGINEER OR THE DEPARTMENT OF CONSERVATION AND RECREATION DEPENDANT ON JURISDICTION.
10. DISTANCES ARE A GUIDE AND MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER.
11. MAXIMUM SPACING OF TRAFFIC DEVICES IN A TAPER (DRUMS OF CONES) IS EQUAL IN FEET TO THE SPEED LIMIT IN M.P.H.
12. MINIMUM LANE WIDTH IS TO BE 11 FEET UNLESS OTHERWISE SHOWN. MINIMUM LANE WIDTH TO BE MEASURED FROM THE EDGE OF THE DRUMS OR MEDIAN BARRIER.
13. SEE SPECIAL PROVISIONS FOR ALL WORK HOUR RESTRICTIONS.
14. CONTRACTOR TO MAINTAIN ACCESS TO ABUTTING DRIVEWAYS AND BUSINESSES AT ALL TIMES DURING CONSTRUCTION.
15. MA-W20-7B SHALL BE USED WHENEVER POLICE OFFICERS ARE DIRECTING TRAFFIC.

WORK ZONE TAPER NOTES

1. THE FINAL LOCATION OF PROPOSED SIGNS SHALL BE DETERMINED IN THE FIELD AS DEEMED APPROPRIATE BY THE ENGINEER.
2. TYPE III BARRICADES SHALL BE USED AS REQUIRED.
3. USE FLASHING ARROW BOARD AS REQUIRED.
4. SPEED LIMIT SHALL BE APPROVED BY MASSDOT PRIOR TO INSTALLATION.

SIGNING NOTES

1. ALL SIGNS SHALL BE MOUNTED ON THEIR OWN STANDARD SIGN SUPPORTS.
2. ALL EXISTING SIGNS NOT APPLICABLE TO VARIOUS STAGES OF CONSTRUCTION SHALL BE REMOVED OR COVERED.
3. THE CONTRACTOR SHALL USE "R7-1" SIGNS IF PARKING AREAS ARE IMPACTED AND AS DIRECTED BY MASSDOT.
4. R7-1 SIGNS SHALL BE POSTED 48 HOURS PRIOR TO CONSTRUCTION START.
5. SIGNS SHALL NOT BE MOUNTED ON CHANNELIZATION DRUMS OR CONES.

LEGEND

•	REFLECTORIZED PLASTIC DRUM		IMPACT ATTENUATOR
P/F	POLICE/FLAGGER DETAIL		MEDIAN BARRIER
P	POLICE		MEDIAN BARRIER WITH WARNING LIGHTS
	TYPE III BARRICADE		WORK VEHICLE
	CHANGEABLE MESSAGE SIGN		MOVEABLE IMPACT ATTENUATOR
	FLASHING ARROW PANEL		TRUCK MOUNTED ATTENUATOR
	WORK ZONE		TRAFFIC OR PEDESTRIAN SIGNAL
	DIRECTION OF TRAFFIC		SIGN

TAPER LENGTH FORMULAS	
SPEED LIMIT (S)	TAPER LENGTH (L) FEET
40 MPH OR LESS	$L = \frac{WS^2}{60}$
45 MPH OR MORE	L = WS

L = TAPER LENGTH IN FEET
W = WIDTH OFFSET IN FEET
S = DESIGN SPEED (30 MPH)

BUFFER SPACING	
SPEED (MPH)	DISTANCE (FEET)
20	115
25	155
30	200
35	250
40	305
45	360
50	425

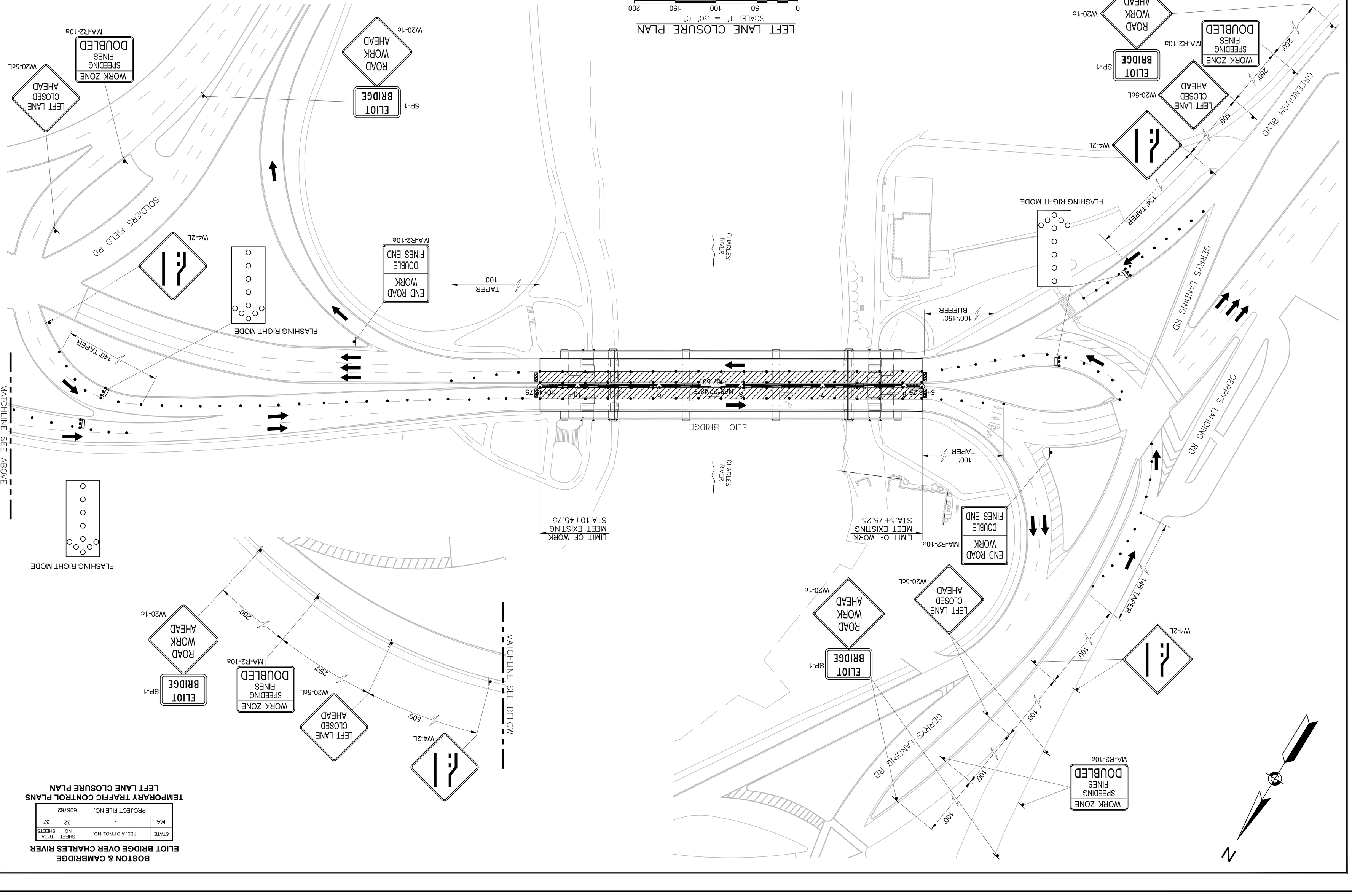
02-SEP-2022
100% SUBMISSION

LEFT LANE CLOSURE PLAN

SCALE: 1" = 50'-0"

0 50 100 150 200

SCALE: 1" = 50'



BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

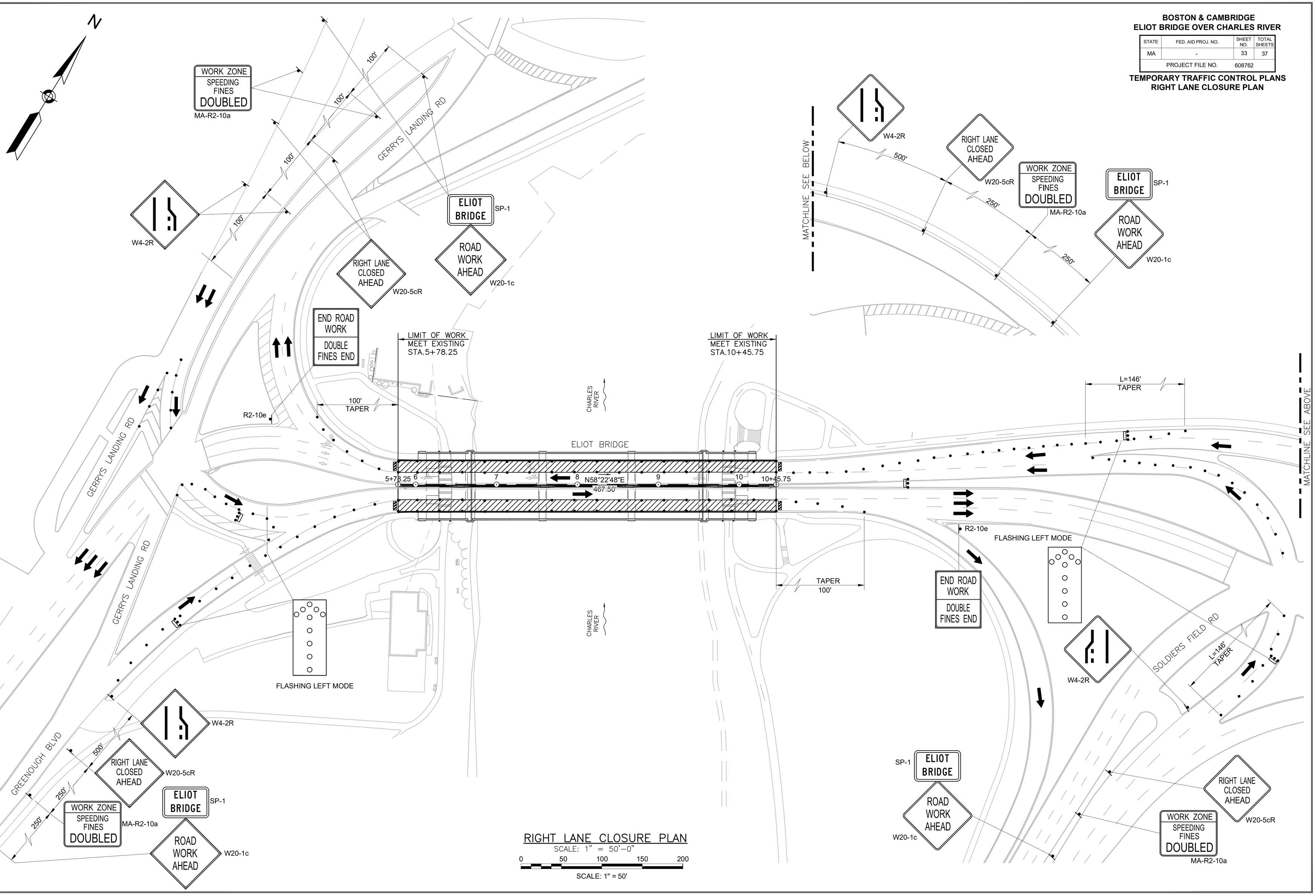
TEMPORARY TRAFFIC CONTROL PLANS
LEFT LANE CLOSURE PLAN

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	32	37
PROJECT FILE NO.	608762		

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	33	37
PROJECT FILE NO.	608762		

TEMPORARY TRAFFIC CONTROL PLANS
RIGHT LANE CLOSURE PLAN

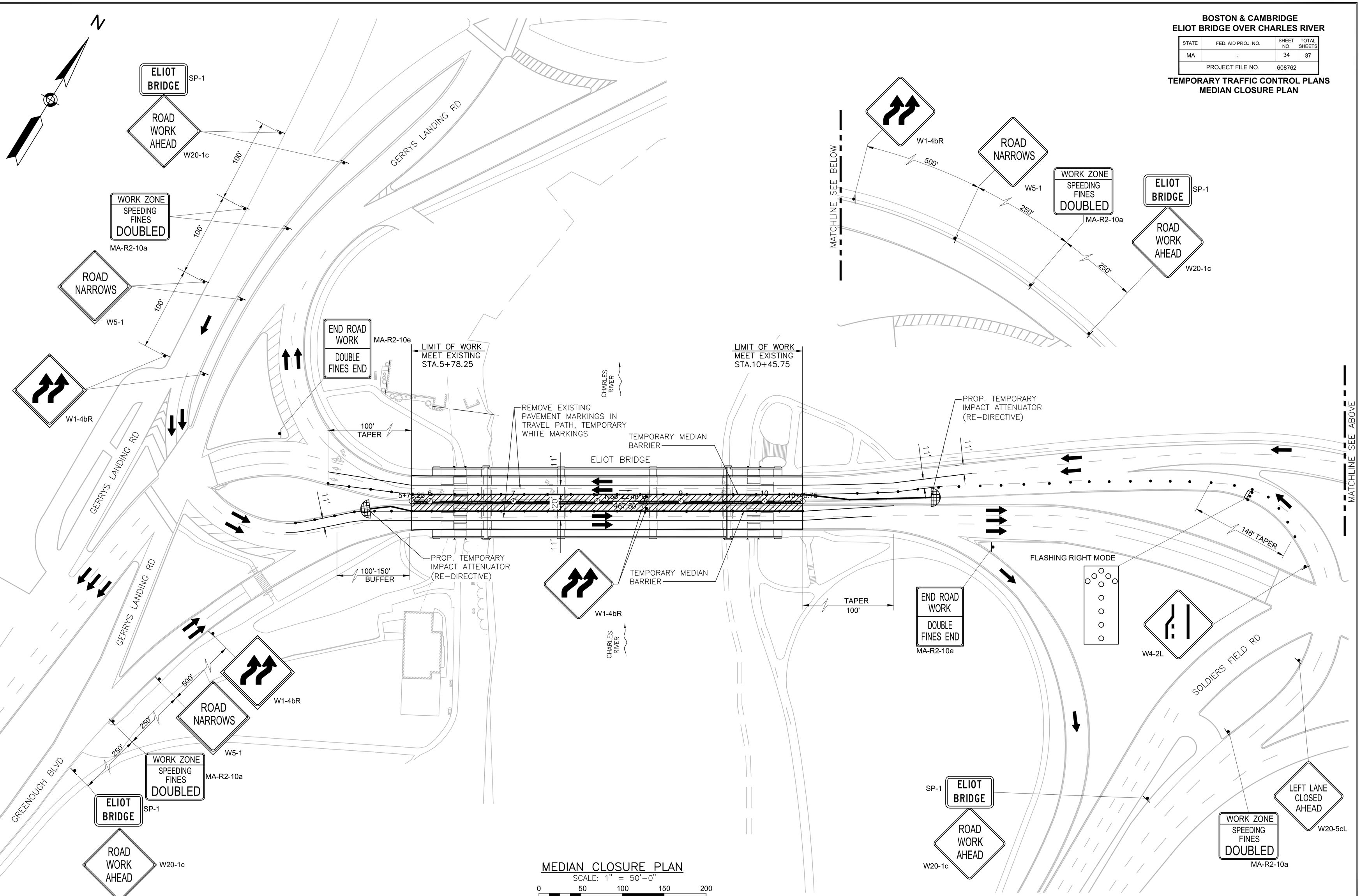


RIGHT LANE CLOSURE PLAN
SCALE: 1" = 50'-0"
0 50 100 150 200
SCALE: 1" = 50'

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	34	37
PROJECT FILE NO.	608762		

TEMPORARY TRAFFIC CONTROL PLANS
MEDIAN CLOSURE PLAN

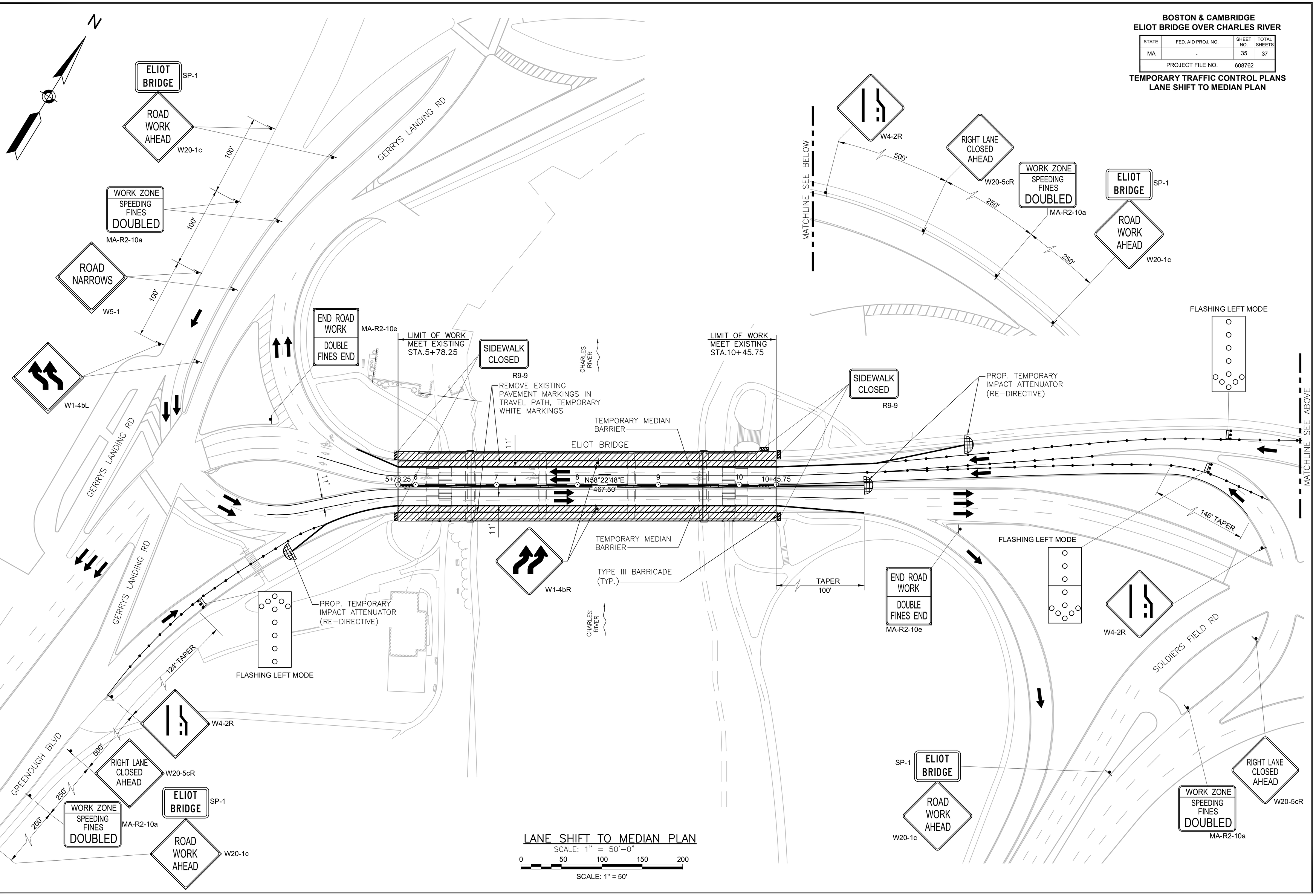


MEDIAN CLOSURE PLAN
SCALE: 1" = 50'-0"
0 50 100 150 200
SCALE: 1" = 50'

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	35	37
PROJECT FILE NO.	608762		

TEMPORARY TRAFFIC CONTROL PLANS
LANE SHIFT TO MEDIAN PLAN

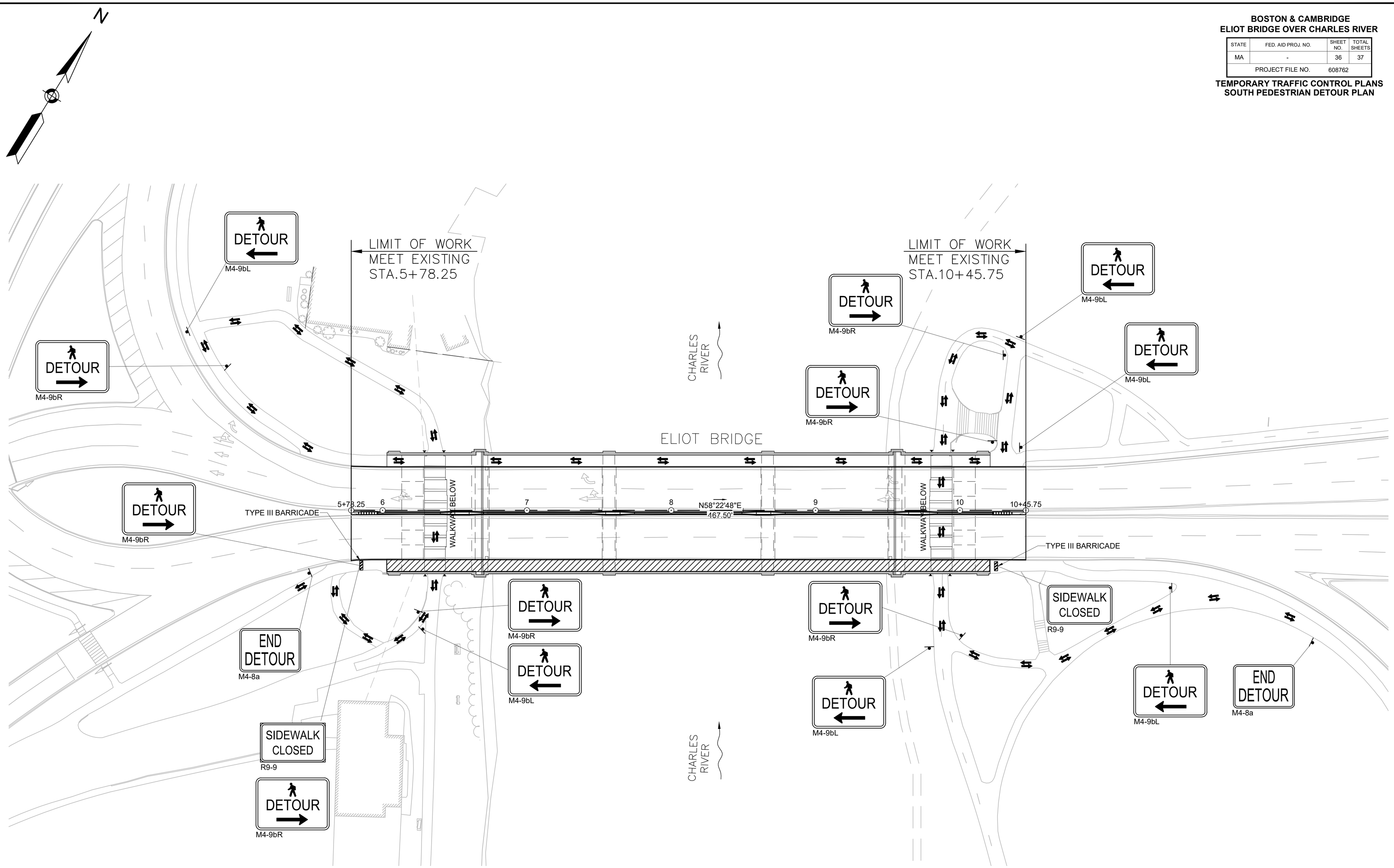


LANE SHIFT TO MEDIAN PLAN
SCALE: 1" = 50'-0"
0 50 100 150 200
SCALE: 1" = 50'

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	36	37
PROJECT FILE NO.	608762		

TEMPORARY TRAFFIC CONTROL PLANS
SOUTH PEDESTRIAN DETOUR PLAN



SOUTH PEDESTRIAN DETOUR PLAN

SCALE: 1" = 30'-0"

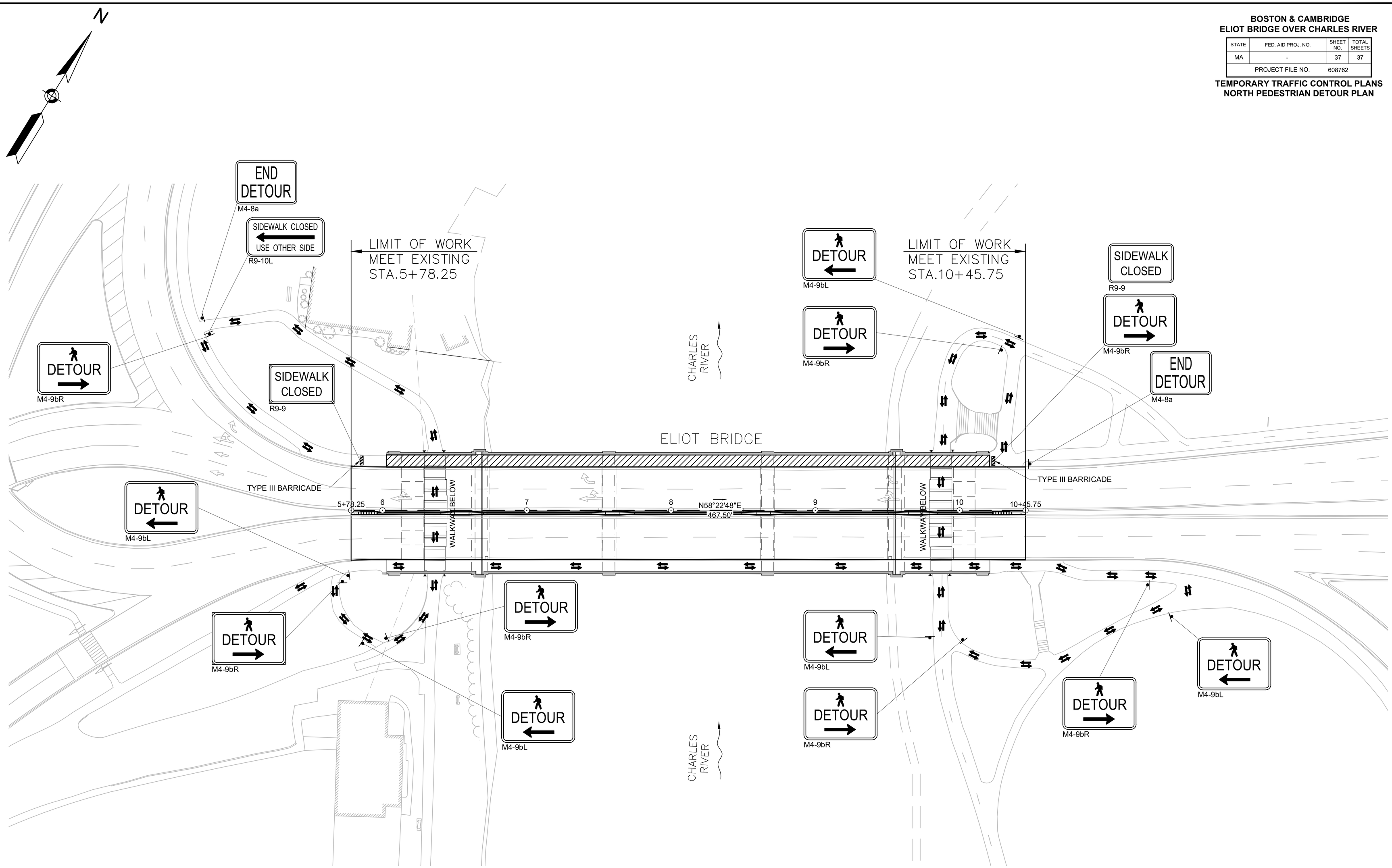
0 30 60 100

SCALE: 1" = 30'

BOSTON & CAMBRIDGE
ELIOT BRIDGE OVER CHARLES RIVER

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	37	37
PROJECT FILE NO.	608762		

TEMPORARY TRAFFIC CONTROL PLANS
NORTH PEDESTRIAN DETOUR PLAN



NORTH PEDESTRIAN DETOUR PLAN

SCALE: 1" = 30'-0"

0 30 60 100

SCALE: 1" = 30'

A90860-105

31-37_TRAFFIC MANAGEMENT PLANS.DWG Plotted on 17-May-2023 2:06 PM

Proposal No. 608762-124916

02-SEP-2022

100% SUBMISSION

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Request for Determination of Applicability
Brick and Granite Cap Repair on Bridge #B-16-246 = C-01-029
(Eliot Street over the Charles River)
Addendum

The following information is being submitted as an addendum to the Request for Determination of Applicability (RDA) that was filed on 8/23/2023 with the Boston Conservation Commission. It includes the regulatory compliance performance standards for work within Land Under Waterbodies and Waterways under the Massachusetts Wetlands Protection Act Regulations 310 CMR 10.56 (4). In addition, this addendum addresses the City of Boston's Climate and Resiliency

Land Under Waterbodies and Waterways

Work in LUWW associated with proposed work is limited to temporary impacts due to the spud feet on the bottom of the barge. Although the barge may not utilize the entire work zone as shown on the Site Plans, this area is estimated at approximately 38,800 sf. As indicated in 310 CMR 10.56(4), work in LUWW may not impair any of the following:

1. *The water carrying capacity within the defined channel, which is provided by said land in conjunction with the banks;*

   The spud feet on barge will be used to stabilize the structure so that the undersides of the Eliot Bridge area accessible. This work will not alter the carrying capacity of the channel.

2. *Ground and surface water quality;*

   The spud feet on the barge will not impair ground and surface water quality.

3. *The capacity of said land to provide breeding habitat, escape cover and food for fisheries*

   The portion of the LUWW where work is proposed at any one time is small and impacts will be minimal. The barge will not block the channel or be a detriment to fisheries resources.

4. *The capacity of said land to provide important wildlife habitat functions.*
   A project or projects on a single lot, for which Notice(s) of Intent is filed on or after November 1, 1987, that (cumulatively) alter(s) up to 10% or 5,000 square feet (whichever is less) of land in this resource are found to be significant to the protection of wildlife habitat, shall not be deemed to impair its capacity to provide important wildlife habitat functions. Additional alterations beyond the above threshold may be permitted if they will have no adverse effects on wildlife habitat, as determined by procedures established under 310 CMR 10.60.

   The estimated work zone area is approximately is approximately 38,800 square feet in size. The project is located within the Charles River and not on a single lot.

   Additionally, projects within LUWW must comply with performance standard 310 CMR 10.56(4)(c) which states:

(c) Notwithstanding the provisions of 310 CMR 10.56 (4)(a) or (b), no project may be permitted which will have an adverse effect on specified habitat sites of rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.59.

As previously stated, no priority habitats of rare species, estimated habitats of rare wildlife, or certified vernal pools occur on or near the project site.

Climate Resiliency

MassDOT is exempt from local bylaws and ordinances, however, to address Boston's Climate Change Resiliency policy, MassDOT has stated in the RDA cover letter that the proposed work on the Eliot Bridge shall not have any adverse impacts to coastal or inland flooding, sea level rise, or shall result in an increase in stormwater runoff.

DOCUMENT A00851

Massachusetts Department of Environmental Protection

Determination of Applicability

Boston \ Cambridge

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City of Boston Environment

CITY of BOSTON Conservation Commission

September 13, 2023

Susan McArthur
Jacobs
120 St. James Avenue, 5th Floor
Boston MA 02116

CERTIFIED MAIL: 7022 2410 0001 6777 8857

RE: Request for a Determination of Applicability from Jacobs on behalf of the Massachusetts Department of Transportation for the proposed masonry repairs to the Eliot Street Bridge and associated maintenance improvements located in Allston, MA.

Dear Ms. McArthur,

Pursuant to the Massachusetts Wetlands Protection Act, G.L. c. 131, § 40 (the "Act") and the Boston Wetlands Ordinance, Boston City Code, Ordinances, Chapter 7-1.4 (the "Ordinance"), I have enclosed the Determination of Applicability (the "Determination") for the above referenced project as voted by the Conservation Commission at the June 21, 2023 public meeting. The Determination is negative, as the Commission affirmed that while the work described in the Request is within a resource area, as defined in the regulations, it will not remove, fill, dredge, or alter an area subject to protection under the Act or Ordinance.

As such, the project does not require the filing of a Notice of Intent and the work may proceed. The Determination shall be valid for three years from the date of issuance in accordance with 310 CMR 10.05 (3)(b)(1).

If you have any questions regarding the Determination, I may be contacted at 617-635-3850.

For the Commission,

Elena Itämeri, Conservation Agent
Boston Conservation Commission
Enclosure: WPA Form 2
CC: DEP NERO

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 2 – Determination of Applicability

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

A. General Information

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.

From:

Boston
Conservation Commission

To: Applicant

Melissa Lenker, MassDOT Hwy Div.
Name

10 Park Plaza, Room 7360
Mailing Address

Boston | MA | 02116
City/Town | State | Zip Code

Property Owner (if different from applicant):

Name

Mailing Address

City/Town | State | Zip Code

1. Title and Date (or Revised Date if applicable) of Final Plans and Other Documents:

Bridge Preservation Plans — Title — 8/23/23 — Date

Title — Date

Title — Date

2. Date Request Filed:

August 23, 2023

B. Determination

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 2 – Determination of Applicability

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Pursuant to the authority of M.G.L. c. 131, § 40, the Conservation Commission considered your Request for Determination of Applicability, with its supporting documentation, and made the following Determination.

Project Description (if applicable):

Masonry repairs to the Eliot Street Bridge and associated maintenance improvements.

Project Location:

Eliot Bridge Street Address	Cambridge + Boston City/Town
42.37168 Assessors Map/Plat Number	-71.13547 Parcel/Lot Number

B. Determination (cont.)

The following Determination(s) is/are applicable to the proposed site and/or project relative to the Wetlands Protection Act and regulations:

Positive Determination
Note: No work within the jurisdiction of the Wetlands Protection Act may proceed until a final Order of Conditions (issued following submittal of a Notice of Intent or Abbreviated Notice of Intent) or Order of Resource Area Delineation (issued following submittal of Simplified Review ANRAD) has been received from the issuing authority (i.e., Conservation Commission or the Department of Environmental Protection).

☐ 1. The area described on the referenced plan(s) is an area subject to protection under the Act. Removing, filling, dredging, or altering of the area requires the filing of a Notice of Intent.

☐ 2a. The boundary delineations of the following resource areas described on the referenced plan(s) are confirmed as accurate. Therefore, the resource area boundaries confirmed in this Determination are binding as to all decisions rendered pursuant to the Wetlands Protection Act and its regulations regarding such boundaries for as long as this Determination is valid.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 2 – Determination of Applicability
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

☐ 2b. The boundaries of resource areas listed below are not confirmed by this Determination, regardless of whether such boundaries are contained on the plans attached to this Determination or to the Request for Determination.

☐ 3. The work described on referenced plan(s) and document(s) is within an area subject to protection under the Act and will remove, fill, dredge, or alter that area. Therefore, said work requires the filing of a Notice of Intent.

☐ 4. The work described on referenced plan(s) and document(s) is within the Buffer Zone and will alter an Area subject to protection under the Act. Therefore, said work requires the filing of a Notice of Intent or ANRAD Simplified Review (if work is limited to the Buffer Zone).

☐ 5. The area and/or work described on referenced plan(s) and document(s) is subject to review and approval by:

Name of Municipality

Pursuant to the following municipal wetland ordinance or bylaw:

Name | Ordinance or Bylaw Citation

B. Determination (cont.)

☐ 6. The following area and/or work, if any, is subject to a municipal ordinance or bylaw but not subject to the Massachusetts Wetlands Protection Act:

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 2 – Determination of Applicability
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

☐ 7. If a Notice of Intent is filed for the work in the Riverfront Area described on referenced plan(s) and document(s), which includes all or part of the work described in the Request, the applicant must consider the following alternatives. (Refer to the wetland regulations at 10.58(4)c. for more information about the scope of alternatives requirements):

- ☐ Alternatives limited to the lot on which the project is located.
- ☐ Alternatives limited to the lot on which the project is located, the subdivided lots, and any adjacent lots formerly or presently owned by the same owner.
- ☐ Alternatives limited to the original parcel on which the project is located, the subdivided parcels, any adjacent parcels, and any other land which can reasonably be obtained within the municipality.
- ☐ Alternatives extend to any sites which can reasonably be obtained within the appropriate region of the state.

Negative Determination

Note: No further action under the Wetlands Protection Act is required by the applicant. However, if the Department is requested to issue a Superseding Determination of Applicability, work may not proceed on this project unless the Department fails to act on such request within 35 days of the date the request is post-marked for certified mail or hand delivered to the Department. Work may then proceed at the owner's risk only upon notice to the Department and to the Conservation Commission. Requirements for requests for Superseding Determinations are listed at the end of this document.

☐ 1. The area described in the Request is not an area subject to protection under the Act or the Buffer Zone.

☑ 2. The work described in the Request is within an area subject to protection under the Act, but will not remove, fill, dredge, or alter that area. Therefore, said work does not require the filing of a Notice of Intent.

☑ 3. The work described in the Request is within the Buffer Zone, as defined in the regulations, but will not alter an Area subject to protection under the Act. Therefore, said work does not require the filing of a Notice of Intent, subject to the following conditions (if any).

See attached.

☐ 4. The work described in the Request is not within an Area subject to protection under the Act (including the Buffer Zone). Therefore, said work does not require the filing of a Notice of Intent, unless and until said work alters an Area subject to protection under the Act.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 2 – Determination of Applicability

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

B. Determination (cont.)

☐ 5. The area described in the Request is subject to protection under the Act. Since the work described therein meets the requirements for the following exemption, as specified in the Act and the regulations, no Notice of Intent is required:

Exempt Activity (site applicable statuatory/regulatory provisions)

☐ 6. The area and/or work described in the Request is not subject to review and approval by:

Name of Municipality

Pursuant to a municipal wetlands ordinance or bylaw.

Name

Ordinance or Bylaw Citation

C. Authorization

This Determination is issued to the applicant and delivered as follows:

☐ by hand delivery on

Date

☑ by certified mail, return receipt requested on

9/13/23

Date

This Determination is valid for **three years** from the date of issuance (except Determinations for Vegetation Management Plans which are valid for the duration of the Plan). This Determination does not relieve the applicant from complying with all other applicable federal, state, or local statutes, ordinances, bylaws, or regulations.

This Determination must be signed by a majority of the Conservation Commission. A copy must be sent to the appropriate DEP Regional Office (see https://www.mass.gov/service-details/massdep-regional-offices-by-community) and the property owner (if different from the applicant).

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 2 – Determination of Applicability

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

C. Authorization (cont.)

Boston

Signatures:

Michael W. Parker (Sep 7, 2023 16:59 EDT)	Michael W. Parker
Signature	Printed Name
Alice E Richmond (Sep 7, 2023 22:18 EDT)	Alice E Richmond
Signature	Printed Name
John Sullivan (Sep 7, 2023 19:14 EDT)	John Sullivan
Signature	Printed Name
Kannan Thiruvengadam (Sep 8, 2023 00:28 EDT)	Kannan Thiruvengadam
Signature	Printed Name
Nicholas Long (Sep 7, 2023 17:11 EDT)	Nicholas Long
Signature	Printed Name
Signature	Printed Name
Signature	Printed Name
Signature	Printed Name

D. Appeals

The applicant, owner, any person aggrieved by this Determination, any owner of land abutting the land upon which the proposed work is to be done, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate Department of Environmental Protection Regional Office (see https://www.mass.gov/service-details/massdep-regional-offices-by-community) to issue a Superseding Determination of Applicability. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and Fee Transmittal Form (see Request for Departmental Action Fee Transmittal Form) as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Determination. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant if he/she is not the appellant. The request shall state clearly and concisely the objections to the Determination which is being appealed. To the extent that the Determination is based on a municipal ordinance or bylaw and not on the Massachusetts Wetlands Protection Act or regulations, the Department of Environmental Protection has no appellate jurisdiction.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

Request for Departmental Action Fee Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

DEP File Number:

Provided by DEP

A. Request Information

1. Location of Project

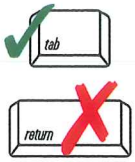
a. Street Address

b. City/Town, Zip

c. Check number

d. Fee amount

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



2. Person or party making request (if appropriate, name the citizen group's representative):

Name

Mailing Address

City/Town

State

Zip Code

Phone Number

Fax Number (if applicable)

3. Applicant (as shown on Determination of Applicability (Form 2), Order of Resource Area Delineation (Form 4B), Order of Conditions (Form 5), Restoration Order of Conditions (Form 5A), or Notice of Non-Significance (Form 6)):

Name

Mailing Address

City/Town

State

Zip Code

Phone Number

Fax Number (if applicable)

4. DEP File Number:

B. Instructions

1. When the Departmental action request is for (check one):

☐ Superseding Order of Conditions – Fee: $120.00 (single family house projects) or $245 (all other projects)

☐ Superseding Determination of Applicability – Fee: $120

☐ Superseding Order of Resource Area Delineation – Fee: $120

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

Request for Departmental Action Fee Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

DEP File Number:

Provided by DEP

Send this form and check or money order, payable to the *Commonwealth of Massachusetts,* to:

Department of Environmental Protection
Box 4062
Boston, MA 02211

B. Instructions (cont.)

2. On a separate sheet attached to this form, state clearly and concisely the objections to the Determination or Order which is being appealed. To the extent that the Determination or Order is based on a municipal bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.

3. Send a **copy** of this form and a **copy** of the check or money order with the Request for a Superseding Determination or Order by certified mail or hand delivery to the appropriate DEP Regional Office (see https://www.mass.gov/service-details/massdep-regional-offices-by-community).

4. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

Attachment A - Special Conditions
Determination of Applicability
Masonry repairs to the Eliot Street Bridge and associated maintenance improvements, Allston, MA.

1. There shall be no discharge or spillage of fuel, oil, or any other pollutant from this project into adjacent wetlands resource areas or associated 100-foot Buffer Zone ("buffer zone"). Any equipment used in the resource area or buffer zone that uses fuel, oil or hydraulic fluid shall be inspected daily for leakage. Any equipment requiring repair shall be repaired outside of the resource area and the buffer zone. Any vehicles, trucks or equipment that uses fuel, oil and/or hydraulic fluid shall be staffed at all times while operational within resource areas or buffer zone.

2. The "proponent" or their contractor shall be prepared to effectively deal with spillage of fuel or hydraulic fluids from equipment. A quick-absorbent material, such as "Speedy Dry" or equivalent, must be stored in a dry readily available area, and used in the event petroleum-based fluids are spilled or leaked. The spent material is then to be containerized and disposed of properly. An emergency fuel boom or absorbent pads shall be readily available in case any such spill threatens wetland resources.

3. The proponent or their contractor shall clean the work area at the end of each workday to prevent accumulation of debris in the buffer zone or in wetland resource areas.

4. All project-related materials shall be contained from migration into the resource area and all practical precautions shall be used during any water-based construction work. The applicant and/or their contractor shall be responsible for the removal of any project-related debris, material, machinery or equipment lost, dumped, thrown into, or otherwise entering the waterway, regardless of whether it is within or outside of the project limits. The proponent must seek Commission approval for any remedial action involving substantial impacts to wetland resource areas.

5. Prior to the commencement of construction and site clearing, an erosion and sediment control barrier must be installed along the limit of activity between all work areas and wetland resource areas. Hay bales or straw bales should be double staked (where possible) with bales butted against each other. If straw wattles or filter sox are used, they should be secured in place. If specified, geotextile siltation fence should be installed no further than twelve (12) inches from the down-gradient side of the barrier. These barriers must be inspected daily and after significant rain events (greater than 0.5 inches of precipitation) and maintained as necessary, including the removal of accumulated sediments. The contractor will ensure that additional erosion and sediment control materials are available for immediate installation to replace those that are damaged or degraded. Erosion control measures should be removed upon completion of work and after disturbed areas are stabilized. The geotextile fence will constitute a limit-of-work line, beyond which no work or clearing of vegetation may occur.

6. Prior to the commencement of work, the Applicant must submit a debris control plan for Staff approval.

7. In advance of construction start-up on any section of this project, the Applicant must notify the Commission and, at the request of the Commission, may arrange an on-site conference of representatives of the Commission, the contractor, the project engineer and the Applicant to ensure that all the conditions of this Order are understood. The Commission must be notified at least 48 hours in advance of the date upon which construction activities on the site are to proceed. All appropriate construction impact mitigation measures must be in place prior to initiation of work on the project site.

Attachment A - Special Conditions
Determination of Applicability
Masonry repairs to the Eliot Street Bridge and associated maintenance improvements, Allston, MA.

8. The Commission reserves the right to amend this decision at any time upon evidence of alteration of wetland resource areas.

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THE CAMBRIDGE DEPARTMENT OF PUBLIC WORKS

City of Cambridge
Conservation Commission

147 Hampshire Street
Cambridge, MA 02139
theworks@cambridgema.gov
P: 617 349 4680
F: 617 349 4868

Jennifer Letourneau, Conservation Commission Director

October 10, 2023

Susan McArthur
Jacobs
120 St. James Avenue, 5th Floor
Boston, MA 02116

Re: Conservation Commission Paperwork
Negative Determination for Eliot Bridge, Cambridge, MA

Ms. McArthur,

Attached is the original negative determination referenced above. This determination is valid for 3 years. Please contact me 72 hours prior to the start of work to review the scope of work and schedule. Erosion and sedimentation controls should be installed and ready to be inspected at that time.

I am available by phone or email if you have any questions or concerns.

Thank you,

Jennifer Letourneau
jletourneau@cambridgema.gov
857-233-8749

CC: File
DEP NERO

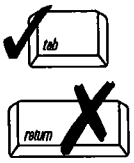
Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 2 – Determination of Applicability

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

A. General Information

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



From:

Cambridge
Conservation Commission

To: Applicant

MassDOT
Name

10 park Plaza, Room 7360
Mailing Address

Boston | MA | 02116
City/Town | State | Zip Code

Property Owner (if different from applicant):

Name

Mailing Address

City/Town | State | Zip Code

1. Title and Date (or Revised Date if applicable) of Final Plans and Other Documents:

See RDA — Title — 08/2023 — Date

Title — Date

Title — Date

2. Date Request Filed:

08/29/2023

B. Determination

Pursuant to the authority of M.G.L. c. 131, § 40, the Conservation Commission considered your Request for Determination of Applicability, with its supporting documentation, and made the following Determination.

Project Description (if applicable):

The proposed work will consist of maintenance masonry repairs to the Eliot Bridge over the Charles River. The work will include the cleaning of stormwater system on the bridge approach, joint replacement, median barrier reconstruction, replace navigational lighting, and milling/paving of the bridge deck.

Project Location:

Eliot Bridge — Street Address

Cambridge — City/Town

Assessors Map/Plat Number

Parcel/Lot Number

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 2 – Determination of Applicability

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

B. Determination (cont.)

The following Determination(s) is/are applicable to the proposed site and/or project relative to the Wetlands Protection Act and regulations:

Positive Determination
Note: No work within the jurisdiction of the Wetlands Protection Act may proceed until a final Order of Conditions (issued following submittal of a Notice of Intent or Abbreviated Notice of Intent) or Order of Resource Area Delineation (issued following submittal of Simplified Review ANRAD) has been received from the issuing authority (i.e., Conservation Commission or the Department of Environmental Protection).

☐ 1. The area described on the referenced plan(s) is an area subject to protection under the Act. Removing, filling, dredging, or altering of the area requires the filing of a Notice of Intent.

☐ 2a. The boundary delineations of the following resource areas described on the referenced plan(s) are confirmed as accurate. Therefore, the resource area boundaries confirmed in this Determination are binding as to all decisions rendered pursuant to the Wetlands Protection Act and its regulations regarding such boundaries for as long as this Determination is valid.

_____

_____

_____

☐ 2b. The boundaries of resource areas listed below are not confirmed by this Determination, regardless of whether such boundaries are contained on the plans attached to this Determination or to the Request for Determination.

_____

_____

_____

☐ 3. The work described on referenced plan(s) and document(s) is within an area subject to protection under the Act and will remove, fill, dredge, or alter that area. Therefore, said work requires the filing of a Notice of Intent.

☐ 4. The work described on referenced plan(s) and document(s) is within the Buffer Zone and will alter an Area subject to protection under the Act. Therefore, said work requires the filing of a Notice of Intent or ANRAD Simplified Review (if work is limited to the Buffer Zone).

☐ 5. The area and/or work described on referenced plan(s) and document(s) is subject to review and approval by:

_____
Name of Municipality

Pursuant to the following municipal wetland ordinance or bylaw:

_____ _____
Name Ordinance or Bylaw Citation

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 2 – Determination of Applicability
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

B. Determination (cont.)

☐ 6. The following area and/or work, if any, is subject to a municipal ordinance or bylaw but not subject to the Massachusetts Wetlands Protection Act:

☐ 7. If a Notice of Intent is filed for the work in the Riverfront Area described on referenced plan(s) and document(s), which includes all or part of the work described in the Request, the applicant must consider the following alternatives. (Refer to the wetland regulations at 10.58(4)c. for more information about the scope of alternatives requirements):

- ☐ Alternatives limited to the lot on which the project is located.
- ☐ Alternatives limited to the lot on which the project is located, the subdivided lots, and any adjacent lots formerly or presently owned by the same owner.
- ☐ Alternatives limited to the original parcel on which the project is located, the subdivided parcels, any adjacent parcels, and any other land which can reasonably be obtained within the municipality.
- ☐ Alternatives extend to any sites which can reasonably be obtained within the appropriate region of the state.

Negative Determination
Note: No further action under the Wetlands Protection Act is required by the applicant. However, if the Department is requested to issue a Superseding Determination of Applicability, work may not proceed on this project unless the Department fails to act on such request within 35 days of the date the request is post-marked for certified mail or hand delivered to the Department. Work may then proceed at the owner's risk only upon notice to the Department and to the Conservation Commission. Requirements for requests for Superseding Determinations are listed at the end of this document.

☐ 1. The area described in the Request is not an area subject to protection under the Act or the Buffer Zone.

☒ 2. The work described in the Request is within an area subject to protection under the Act, but will not remove, fill, dredge, or alter that area. Therefore, said work does not require the filing of a Notice of Intent.

☒ 3. The work described in the Request is within the Buffer Zone, as defined in the regulations, but will not alter an Area subject to protection under the Act. Therefore, said work does not require the filing of a Notice of Intent, subject to the following conditions (if any).
see attachment

☐ 4. The work described in the Request is not within an Area subject to protection under the Act (including the Buffer Zone). Therefore, said work does not require the filing of a Notice of Intent, unless and until said work alters an Area subject to protection under the Act.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 2 – Determination of Applicability

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

B. Determination (cont.)

☐ 5. The area described in the Request is subject to protection under the Act. Since the work described therein meets the requirements for the following exemption, as specified in the Act and the regulations, no Notice of Intent is required:

Exempt Activity (site applicable statuatory/regulatory provisions)

☐ 6. The area and/or work described in the Request is not subject to review and approval by:

Name of Municipality

Pursuant to a municipal wetlands ordinance or bylaw.

Name

Ordinance or Bylaw Citation

C. Authorization

This Determination is issued to the applicant and delivered as follows:

☒ by hand delivery on 10/13/2023
Date

☐ by certified mail, return receipt requested on
Date

This Determination is valid for **three years** from the date of issuance (except Determinations for Vegetation Management Plans which are valid for the duration of the Plan). This Determination does not relieve the applicant from complying with all other applicable federal, state, or local statutes, ordinances, bylaws, or regulations.

This Determination must be signed by a majority of the Conservation Commission. A copy must be sent to the appropriate DEP Regional Office (see http://www.mass.gov/eea/agencies/massdep/about/contacts/) and the property owner (if different from the applicant).

Signatures:

Jennifer Letourneau, Director on behalf of the Con Com

10/16/2023
Date

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 2 – Determination of Applicability
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

D. Appeals

The applicant, owner, any person aggrieved by this Determination, any owner of land abutting the land upon which the proposed work is to be done, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate Department of Environmental Protection Regional Office (see http://www.mass.gov/eea/agencies/massdep/about/contacts/) to issue a Superseding Determination of Applicability. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and Fee Transmittal Form (see Request for Departmental Action Fee Transmittal Form) as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Determination. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant if he/she is not the appellant. The request shall state clearly and concisely the objections to the Determination which is being appealed. To the extent that the Determination is based on a municipal ordinance or bylaw and not on the Massachusetts Wetlands Protection Act or regulations, the Department of Environmental Protection has no appellate jurisdiction.

Eliot Bridge – Cambridge, MA
Negative Determination
Special Conditions

Documents and Plans:
A request for Determination of Applicability dated August 29, 2023, associated with the above referenced project. The complete file is available for review in the Cambridge Conservation Commission office.

Special Conditions:

18. Work shall conform to the RDA submittal under the Massachusetts Wetlands Protection Act, M.G.L. ch. 131, sec. 40, submitted to the Cambridge Conservation Commission on **August 29, 2023,** and the additional information and modifications outlined in the supplemental documents and plans provided by the applicant and approved.

19. Any further proposed or executed changes in the plans approved under this permit shall require the applicant to seek a new filing, or to inquire of the Cambridge Conservation Commission in writing whether the change or changes is/are substantial enough to require a new filing. Any errors in the plans or information by the applicant shall be considered changes and the above procedures shall be followed.

20. This permit shall be included in all construction contracts and subcontracts dealing with the work proposed and shall supersede all conflicting contract requirements that are less protective of Wetland Resource Areas.

21. The applicant or its agent shall specify to the Commission, prior to commencement of activity on the site, the name and telephone number of the person(s) designated by the applicant to be responsible for compliance with the conditions of this Order on the site and his/her alternate. A pre-construction site meeting shall be scheduled 72 hours in advance of starting work. Erosion/sedimentation controls and tree protection should be installed prior to the site meeting.

22. The applicant shall provide to the Conservation Commission copies of project inspectional reports during construction including but not limited to maintenance and operation and vegetation monitoring.

23. The members and agents of the Conservation Commission shall have the right to enter the site to verify compliance with this Order and to require the submittal of additional data deemed necessary by the Commission for that verification. The Commission understands that construction-site safety procedures must be followed during site visits.

24. During project construction and operations, the applicant or its contractors shall provide and maintain free and safe passage for pedestrians and bicyclists along the roads or walkways adjacent to the site.

25. If some unexpected or unforeseen event occurs, that needs to be addressed, all work shall stop until the event can be brought to the attention of the Director of the Commission and a decision made by the Director as to whether it needs to be brought before the Commission.

26. If a workday commences with heavy rain, no work shall take place in the buffer zone or resource area that day. If heavy rain commences after the start of work, all work shall cease in the buffer zone or resource area for that day, and appropriate sedimentation and erosion control shall be in place, to prevent any sedimentation to the river and other resource areas.

27. Trucks entering and leaving the site shall have their loads completely covered in compliance with M.G.L. Chapter 85 section 36. The applicant shall also instruct all drivers on site that vehicles shall not idle for longer than 5 minutes in compliance with M.G.L. Chapter 90 section 16A.

28. There shall be no discharge or spillage of fuel, oil, or any other pollutant from this project into the adjacent wetlands resource areas or associated buffer zones.

29. All project-related materials shall be contained from migration into the resource areas and all practical precautions shall be used during any water-based construction work.

DOCUMENT A00869

UNITED STATES DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE

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Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), and Federal Transit Administration (FTA)

Range-wide Programmatic Consultation for
Indiana Bat and Northern Long-eared Bat

Project Submittal Form

Updated June 2019

The use of the Assisted Determination Key in the U.S. Fish and Wildlife Service (Service) Information for Planning and Conservation (IPaC) System is strongly recommended for submitting project-level information to the Service for use of the range-wide programmatic consultation covering actions that may affect the Indiana bat and/or northern long-eared bat (NLEB). However, if not using the key, transportation agencies must provide this submittal form (or a comparable Service approved form) with project-level information to the Service. The completed form should be submitted to the appropriate Service Field Office prior to project commencement. For more information, see the Standard Operating Procedure for Site Specific Project(s) Submission in the User's Guide (Section 3).

By submitting this form, the transportation agency ensures that each component of the proposed project(s) adheres to the criteria and conditions of the range-wide programmatic consultation, as outlined in the biological assessment (BA) and biological opinion (BO). Upon submittal of this form, the appropriate Service Field Office may review the project-specific information provided and request additional information. For projects that may affect, but are not likely to adversely affect (NLAA) the Indiana bat and/or NLEB, if the applying transportation agency is not contacted by the Service with any questions or concerns within 14 calendar days of form submittal, it may proceed under the range-wide programmatic consultation and assume concurrence of the NLAA determination made by the Service in the BO. For projects that may affect, and are likely to adversely affect (LAA) the Indiana bat and/or the NLEB, the appropriate Service Field Office will respond[1] within 30 calendar days of receiving a complete project-level submission, which includes, but may not be limited to this completed form.

Further instructions on completing the submittal form can be found by hovering your cursor over each text box.

---

1. Date: 07/22/2022

2. Lead agency: FHWA
*This refers to the **Federal governmental** lead action agency initiating consultation; select **FHWA, FRA or FTA** as appropriate.*

3. Requesting agency: MassDOT Highway Division
This refers to the transportation agency completing the form (it may or may not be the same as the Lead Agency.

   - Name: Tim Dexter

[1] Service Field Offices should use the response letter template for projects that may affect, and are likely to adversely affect the Indiana bat and/or NLEB.

- Title: Program Engineer for Major Projects
- Phone: (857) 274-8735
- Email: timothy.dexter@dot.state.ma.us

4. Consultation code:[2] 2022-0066568

5. Project name(s): BOSTON- BRICK AND GRANITE CAP REPAIR AND REPLACE

6. Project description:
Please attach additional documentation or explanatory text if necessary.

Includes concrete and masonry repairs, new wearing surface and new bridge joints

7. Project location (county, state): Boston, MA
If not delineated in IPaC, attach shape files.

8. For species other than Indiana bat and NLEB (from IPaC official species list):

N/A

☑ No effect – project(s) are inside the range, but no suitable habitat (see additional information attached).

☐ May affect – see additional information provided for those species (see attached or forthcoming).

Monarch butterfly - candidate only

Please confirm and identify how each component of the proposed project(s) adheres to the criteria of the BO by completing the following (see User Guide Section 2.0):

[2] Available through IPaC System Official Species List: https://ecos.fws.gov/ipac/

NO EFFECT

9. For Indiana bat/NLEB, if applicable, select your no effect determination:

☐ No effect – project(s) are outside the species' range.

☑ No effect – project(s) are inside the species range with no suitable summer habitat within the project action area; project(s) must also be greater than 0.5 miles from any hibernaculum unless meeting exceptions listed below.

☐ No effect – project(s) do not involve any construction activities[3] (e.g., bridge/ abandoned structure assessments, surveys, planning and technical studies, property inspections, and property sales).

☐ No effect – project(s) do not cause any stressors to the bat species, including as described in the BA/BO (i.e., do not involve habitat removal, tree removal/ trimming, bridge or structure activities, temporary or permanent lighting, or use of percussives (e.g., lining roadways, unlighted signage, rail road crossing signals, signal lighting, and minor road repair such as asphalt fill of potholes, etc.)).

☐ No effect - project(s) within 0.5 mile of hibernacula that are limited to the maintenance of the surrounding landscape at existing facilities (e.g., rest areas, stormwater detention basins) located outside suitable summer habitat – no new ground disturbance.[4]

☐ No effect – project(s) are within 300 feet from the existing road/rail surface surface (must also be greater than 0.5 miles of a hibernacula) that include percussives or other activities that increase noise above existing traffic/background levels:

- o within areas that contain suitable habitat **(documented or undocumented),**
- o conducted during the **inactive season**, and
- o does not involve tree removal/trimming or bridge/structure work.

☐ No effect – project(s) includes removal, replacement, or maintenance of bridge(s) and/or structure(s) without any signs of bats (bridge/structure assessment documents no sign of bat use (bats, guano, etc.)) and does not impact suitable summer habitat within the project action area.

Proceed with this form to identify how other components of the proposed project adhere to the criteria of the BO.

[3] Construction refers to activities involving ground disturbance, percussive noise, and/or lighting.

[4] Ground disturbance is defined as any activity that compacts or disturbs the ground. Ground disturbance can be caused by the use of hand tools (shovels, pick axe, posthole digger, etc.), heavy equipment (excavators, backhoes, bulldozers, trenching and earthmoving equipment, etc.), and heavy trucks (large four wheel drive trucks, dump trucks and tractor trailers, etc.). Note that ground disturbance can be a component of other actions (e.g., bulldozing trees). Contact the local Service Field Office, as needed, to assist in determining if and how ground disturbance may affect bat hibernacula.

MAY AFFECT, NOT LIKELY TO ADVERSELY EFFECT – W/O AMMS

10. For Indiana bat/NLEB, if applicable, select your may affect, NLAA determination (without implementation of AMMs):

☐ NLAA – project(s) are inside the species range and within suitable bat habitat, but **negative** bat presence/absence (P/A) surveys; must also be greater than 0.5 miles from any hibernaculum.

☐ NLAA – project(s) are within 300 feet of the existing road/rail surface (must also be greater than 0.5 miles of a hibernacula) that include percussives or other activities that increase noise above existing traffic/background levels:

- o within areas that contain **undocumented** habitat
- o conducted during the **active season**
- o does not involve tree removal/trimming or bridge/structure work.

☐ NLAA – project(s) are limited to slash pile burning (must also be greater than 0.5 miles from any hibernaculum).

☐ NLAA – project(s) are limited to wetland or stream protection activities associated with compensatory wetland/stream mitigation that do not clear suitable habitat (must also be greater than 0.5 miles from any hibernaculum).

☐ NLAA – project(s) within 0.5 mile of hibernacula that are limited to the maintenance of the surrounding landscape at existing facilities (e.g., rest areas, stormwater detention basins) located within suitable summer habitat – no new ground disturbance or tree removal/trimming.

Proceed with this form to identify how other components of the proposed project adhere to the criteria of the BO.

MAY EFFECT, NOT LIKELY TO ADVERSELY AFFECT – WITH AMMs

11. For Indiana bat/NLEB, if applicable, document your may affect, NLAA determination (**with implementation of AMMs)** by completing the following section; use #13 to document AMMs).

Affected Resource/Habitat Type:

a. Trees

☐ Verify that the project is within 100 feet of existing road/rail surfaces.

☐ Verify that all tree removal/trimming occurs greater than 0.5 mile from any hibernaculum.

☐ Verify that all trees to be removed/trimmed are clearly demarcated.

☐ Verify that no documented Indiana bat and/or NLEB roosts and/or surrounding summer habitat within 0.25 mile of documented roosts will be impacted.

☐ Verify that all tree removal/trimming will occur outside the active season (i.e., will occur in winter):[5]

Or

☐ Verify that tree removal/trimming will include 10 or fewer trees[6] per project during the active season, and visual emergence survey[7] observed no bats. Acres of trees 0-100 feet of existing road/rail surface proposed for removal/ trimming:

☐ Verify that all applicable lighting minimization measures will be implemented.

b. Bridge/Structure Work

Projects Proposed work:

Timing of work:

Signs of bat activity on/in bridge/structure? Yes: ◯ No: ◯

☐ Verify that work will be conducted outside the active season, or if during the active season, verify that no roosting bats will be harmed or disturbed in any way:[8]

☐ Verify that work will maintain suitable roosting habitat.[9]

☐ Verify that all applicable lighting minimization measures will be implemented.

Proceed with this form to identify how other components of the proposed project adhere to the criteria of the BO.

MAY AFFECT, LIKELY TO ADVERSELY AFFECT

12. For Indiana bat/NLEB, if applicable, document your may affect, LAA determination by completing the following section (use #13 to document AMMs).

[5] Coordinate with the local Service Field Office for appropriate dates.

[6] Areas containing more than 10 trees will be assessed by the local Service Field Office on a case-by-case basis with the project proponent.

[7] Refer to http://www.fws.gov/midwest/endangered/mammals/inba/inbasummersurveyguidance.html

[8] See page 12 of the User Guide for a description of activities that are NLAA roosting bats during the active season.

[9] This only applies when assessment documents signs of bat use of when bat use is assumed.

Affected Resource/Habitat Type:

a. Trees

Project Location:

☐ 0-100 feet from edge of existing road/rail surface

☐ 100-300 feet from edge of existing road/rail surface

☐ Verify that all tree removal/trimming occurs greater than 0.5 mile from any hibernaculum

Timing of tree removal/trimming:

☐ Verify that no documented Indiana bat roosts or surrounding summer habitat within 0.25 mile of documented roosts will be impacted between May 1 and July 31.

☐ Verify that no documented NLEB roosts or surrounding summer habitat within 150 feet of documented roosts will be impacted between June 1 and July 31.

Acres of trees 0-100 feet of existing road/rail surface proposed for removal/trimming:

Acres of trees 100-300 feet of existing road/rail surface proposed for removal/ trimming:

☐ Verify that all applicable lighting minimization measures will be implemented.

b. Bridge/Structure Work Projects

Proposed work:

Timing of work:

☐ Verify no signs of a maternity colony.

☐ Verify that work will maintain suitable roosting habitat.[10]

☐ Verify that all applicable lighting minimization measures will be implemented.

13. For Indiana bat/NLEB, if applicable to the action type, the following AMMs will be implemented[11] unless P/A surveys and/or bridge/structure assessments document that

[10] This only applies when assessment documents signs of bat use or when bat use is assumed.

[11] See AMMs Fact Sheet (Appendix C) for more information on AMMs.

the species are not likely to be present:

☐ General AMM 1 (required for all projects)

☐ Tree Removal AMM 1
☐ Tree Removal AMM 2 (required for NLAA)
☐ Tree Removal AMM 3 (required for all projects)
☐ Tree Removal AMM 4 (required for NLAA)
☐ Tree Removal AMM 5 (required for LAA)
☐ Tree Removal AMM 6 (required for LAA)
☐ Tree Removal AMM 7 (required for LAA)

☐ Bridge AMM 1
☐ Bridge AMM 2 (required for NLAA during active season)
☐ Bridge AMM 3 (required for NLAA during active season)
☐ Bridge AMM 4 (required for all projects)

☐ Structure AMM 1 (required for all projects for Indiana bat and required for NLAA for NLEB)
☐ Structure AMM 2 (required for NLAA for both bat species) or
☐ Structure AMM 3 (required for NLAA for both bat species)
☐ Structure AMM 4 (required for all projects for Indiana bat and required for NLAA for NLEB)

☐ Lighting AMM 1 (required for all projects during the active season)
☐ Lighting AMM 2 (required for all projects)

☐ Hibernacula AMM 1 (required for all projects)

14. For Indiana bat, if applicable, compensatory mitigation measures will also be required to offset adverse effects on the species (see Section 2.10 of the BA). Please verify the mechanism in which compensatory mitigation will be implemented and that sufficient information is provided to the Service.

Range-wide In-Lieu Fee Program, The Conservation Fund ☐

State, Regional, Recovery Unit-Specific In-Lieu Fee
Program Name:

Conservation Bank
Name:
Location:

Local Conservation Site(s)
Name:
Location:
Description:

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104

In Reply Refer To: July 22, 2022
Project Code: 2022-0066568
Project Name: 608762 - BOSTON CAMBRIDGE- BRIDGE PRESERVATION OF B-16-246=C-01-029, ELIOT STREET OVER CHARLES RIVER

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

Please review this letter each time you request an Official Species List, we will continue to update it with additional information and links to websites may change.

About Official Species Lists

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Federal and non-Federal project proponents have responsibilities under the Act to consider effects on listed species.

The enclosed species list identifies threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested by returning to an existing project's page in IPaC.

Endangered Species Act Project Review

Please visit the "**New England Field Office Endangered Species Project Review and**

Consultation" website for step-by-step instructions on how to consider effects on listed species and prepare and submit a project review package if necessary:

https://www.fws.gov/office/new-england-ecological-services/endangered-species-project-review

NOTE Please do not use the **Consultation Package Builder** tool in IPaC except in specific situations following coordination with our office. Please follow the project review guidance on our website instead and reference your **Project Code** in all correspondence.

Northern Long-eared Bat Update - Additionally, please note that on March 23, 2022, the Service published a proposal to reclassify the northern long-eared bat (NLEB) as endangered under the Endangered Species Act. The U.S. District Court for the District of Columbia has ordered the Service to complete a new final listing determination for the NLEB by November 2022 (Case 1:15-cv-00477, March 1, 2021). The bat, currently listed as threatened, faces extinction due to the range-wide impacts of white-nose syndrome (WNS), a deadly fungal disease affecting cave-dwelling bats across the continent. The proposed reclassification, if finalized, would remove the current 4(d) rule for the NLEB, as these rules may be applied only to threatened species. Depending on the type of effects a project has on NLEB, the change in the species' status may trigger the need to re-initiate consultation for any actions that are not completed and for which the Federal action agency retains discretion once the new listing determination becomes effective (anticipated to occur by December 30, 2022). If your project may result in incidental take of NLEB after the new listing goes into effect this will first need to be addressed in an updated consultation that includes an Incidental Take Statement. If your project may require re-initiation of consultation, please contact our office for additional guidance.

Additional Info About Section 7 of the Act
Under section 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to determine whether projects may affect threatened and endangered species and/or designated critical habitat. If a Federal agency, or its non-Federal representative, determines that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Federal agency also may need to consider proposed species and proposed critical habitat in the consultation. 50 CFR 402.14(c)(1) specifies the information required for consultation under the Act regardless of the format of the evaluation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/service/section-7-consultations

In addition to consultation requirements under Section 7(a)(2) of the ESA, please note that under sections 7(a)(1) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species. Please contact NEFO if you would like more information.

Candidate species that appear on the enclosed species list have no current protections under the ESA. The species' occurrence on an official species list does not convey a requirement to consider impacts to this species as you would a proposed, threatened, or endangered species. The ESA does not provide for interagency consultations on candidate species under section 7, however, the Service recommends that all project proponents incorporate measures into projects to benefit candidate species and their habitats wherever possible.

Migratory Birds

In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see:

https://www.fws.gov/program/migratory-bird-permit

https://www.fws.gov/library/collections/bald-and-golden-eagle-management

Please feel free to contact us at **newengland@fws.gov** with your **Project Code** in the subject line if you need more information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat.

Attachment(s): Official Species List

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

Project Summary

Project Code: 2022-0066568
Event Code: None
Project Name: 608762 - BOSTON CAMBRIDGE- BRIDGE PRESERVATION OF B-16-246=C-01-029, ELIOT STREET OVER CHARLES RIVER
Project Type: Bridge - Maintenance
Project Description: 608762 - BOSTON- CAMBRIDGE- BRIDGE PRESERVATION OF B-16-246=C-01-029, ELIOT STREET OVER THE CHARLES RIVER
Includes concrete and masonry repairs, new wearing surface and new bridge joints
Monarch Butterfly: Candidate Species only, no conservation measures at this time.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@42.3717129,-71.1329237160327,14z

Counties: Middlesex and Suffolk counties, Massachusetts

Endangered Species Act Species

There is a total of 1 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

IPaC User Contact Information

Agency: Massachusetts Department of Transportation
Name: Hana Isihara
Address: 10 Park Plaza
City: Boston
State: MA
Zip: 02116
Email hana.l.isihara@dot.state.ma.us
Phone: 6178964454

Lead Agency Contact Information

Lead Agency: Federal Highway Administration

DOCUMENT A00875

POLICY DIRECTIVE P-22-001
AND
POLICY DIRECTIVE P-22-002

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massDOT Massachusetts Department of Transportation Highway Division

Number: P-22-001
Date: 9/23/22

POLICY DIRECTIVE

Jonathan Gulliver (signature on original)
HIGHWAY ADMINISTRATOR

Off-Site Stockpiling of Soil from MassDOT Construction Projects

Purpose

The purpose of this Policy Directive is to formally establish a policy and procedures for managing and stockpiling soil generated and transported from MassDOT construction projects. This Policy Directive does not supersede any Federal, State, or Local regulations.

Date of Effect

This Policy Directive is effective immediately for all projects, including active construction projects.

For active construction projects and for other projects advertised prior to October 15, 2022, changes to the contract documents needed to implement the requirements of this Policy Directive will be considered on a case-by-case basis and shall be approved by the District Highway Director, as necessary.

For projects advertised on or after October 15, 2022, MassDOT will include the requirements and implementation procedures of this Policy Directive in the construction contract documents.

Policy Requirements

This policy is intended to prevent the off-site relocation of excavated soil generated from MassDOT projects to areas near residential receptors and to control potential fugitive dusts and/or contaminants. To that end, excavated soil may not be moved from the project site without knowledge of the content of the material. Knowledge may include visual field observations for presence of staining, odor, and/or debris, screening with a photoionization detector (PID), laboratory analysis, and/or site history. Pavement millings and other non-soil materials are not subject to the requirements of this Policy Directive.

Moving soil from a MassDOT project site to a temporary off-site storage location must be approved in writing by the District Highway Director.

The Contractor must select a storage location that is at least 500 feet away from residential receptors, as defined herein to include, but not be limited to, residential dwellings, residentially

zoned property, schools, daycare facilities, playgrounds, parks, recreational areas, hospitals, elderly housing and convalescent facilities.

Temporary off-site storage of excavated soil from a MassDOT project is only permissible at a location approved and permitted by MassDOT. The temporary storage location should be located within the same municipality where the soil was excavated, where possible. Stockpiled soil must be securely covered, and appropriate measures must be taken to minimize fugitive dust and erosion.

Signs indicating the source of the soil, the date the soil was generated, and contact information must be erected and maintained until the stockpiled soils are transported to a disposal facility or reused on the project site.

Implementation Procedures

To ensure that off-site storage of excavated soils is managed properly on MassDOT projects, this policy requires the following:

1. **Off-Site Stockpile Storage Locations**
    a. The Contractor shall provide proposed off-site storage locations to the Engineer for approval at least 30 days prior to transporting soil off site. Off-site storage locations should be in the same municipality as the work site.
    b. The Contractor shall keep excavated soil on site until adequately characterized to the satisfaction of the Engineer.
    c. The Contractor shall provide notification of the approved off-site storage location to the local Board of Health and the Town Manager's/Mayor's Office at least 7-days prior to transporting soil off site.
    d. The Contractor shall provide the Engineer with at least 3-days' notice prior to transporting soil off site.
    e. For off-site storage locations on MassDOT property, the Contractor is required to obtain an Access Permit through the District Permits Office prior to storage of soil or other materials. MassDOT will issue these permits at no cost to the Contractor. Information to be submitted by the Contractor as part of the permit application shall include:
        i. A description of material to be stored off-site, including available analytical data;
        ii. A figure of the location with distances to residences and residential receptors; and
        iii. Anticipated duration of temporary storage.
    f. Stockpile locations should not be within 500 feet of residential receptors (e.g., residential dwellings, residentially zoned property, schools, daycare facilities, playgrounds, parks, recreational areas, hospitals, elderly housing and convalescent facilities).
        i. If the stockpile location must be within 500 feet of residential receptors, then soil must be less than RCS-1 (per 310 CMR 40.1600) and free of potentially hazardous or regulated items.

g. For off-site storage locations on non-MassDOT property, the Contractor must notify the property owner(s) at least 7 days prior to transporting material.
h. Exceptions to these rules will be reviewed by MassDOT and may be approved by the District Highway Director on a case-by-case basis.

2. Off-Site Stockpile Management

a. The Contractor shall keep soil stockpiles on impermeable surfaces (e.g., asphalt or concrete) or on 10-mil polyethylene sheeting.
b. The Contractor shall cover soil stockpiles with 10-mil polyethylene sheeting and surround with a berm made of hay bales, straw wattles, or similar.
    i. Piles that are actively being worked on must be covered and re-secured at the end of the work shift.
c. The Contractor shall label stockpiles with signs, including:
    i. Location of origin (including any Release Tracking Numbers)
    ii. Stockpile ID number (including MassDOT District office-assigned tracking ID, if different)
    iii. Date of initial accumulation
    iv. Applicable telephone numbers for the Contractor and MassDOT.
d. The Contractor shall mitigate fugitive dust at storage locations under the direction of an appropriately trained/certified environmental professional.
e. The Contractor shall remedy noncompliance with this policy within 48 hours.
f. The Contractor shall remedy noncompliance with this policy on the SAME DAY for potentially hazardous material, as determined by the Engineer.
g. The Contractor shall handle excavated soil according to federal, state, and local regulations.
h. The Contractor shall use appropriate shipping documents for all movements of excavated soil on public roadways (e.g., Bill of Lading, Material Shipping Record, Manifest, Asbestos Waste Shipment Record, etc.).

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massDOT Massachusetts Department of Transportation Highway Division

Number: P-22-002
Date: 9/23/22

POLICY DIRECTIVE

Jonathan Gulliver (signature on original)
HIGHWAY ADMINISTRATOR

Use of MassDOT Property for Staging and other Construction-Related Operations

Purpose

This Policy Directive is intended to address the use of MassDOT property by MassDOT Contractors for construction staging and other construction-related operations that are not specifically defined in the construction contract. Such use of MassDOT property will only be allowed if permitted by the District Office in accordance with 700 CMR 13.00, Approval of Access to MassDOT Highways and Other Property. This includes the use of MassDOT property for staging, laydown, and storage of equipment and materials, including soil excavated from a project site.

This Policy Directive requires the Contractor/applicant to obtain a Non-Vehicular Access Permit from MassDOT to use MassDOT property for these purposes.

This Policy Directive is effective immediately and applies to all MassDOT construction projects.

General Permit Considerations and Conditions

In addition to other normal MassDOT Access Permit procedures, MassDOT shall consider the following during the application, review, implementation and monitoring processes of Access Permits required by this Policy Directive:

- Storage and placement of the Contractor's equipment and materials should not be allowed within the clear zone of the roadway.
- Stockpiled soils should not be located within 500 feet of residential receptors, as defined herein to include, but not be limited to, residential dwellings, residentially zoned property, schools, daycare facilities, playgrounds, parks, recreational areas, hospitals, elderly housing and convalescent facilities.
- The Contractor/applicant shall identify the access/egress locations of the proposed storage areas. MassDOT will only approve locations determined to be safe for roadway users, construction workers and the general public.
- The Contractor may be required to submit a Traffic Management Plan and/or Lighting Plan for MassDOT review and approval as part of the permit application, depending on the proposed use of the area.

- The Contractor shall submit the permit application through MassDOT's online State Highway Access Permit System (SHAPS).
- MassDOT will waive the permit application fee for any application received from a MassDOT Contractor for any permit required by this Policy Directive and will waive any subsequent amendment and extension fees that may otherwise be required.
- MassDOT will review the permit application in accordance with applicable standard procedures and will apply standard permit terms and conditions, as necessary.
- The Resident Engineer will verify that the permit is approved before allowing the Contractor to use the affected area for the requested purpose.
- Areas permitted are for use by the approved applicant only and are not to be shared with or used by other vendors. Subcontractors specifically engaged with the applicant working on the specific MassDOT project will be allowed to use the area in accordance with the terms of the permit.
- Permits are issued on an annual basis and will require the Contractor to file for an extension each year to continue use.

Exemptions from Permit Requirements

Equipment and materials being used for active construction operations and located within the work zone of the construction contract are exempt from this permit requirement, provided they do not interfere with the safety or operation of the roadway or the work zone. Examples of these types of exempt uses are:

- Equipment and materials parked or stored within a protected (barriered) work zone.
- Materials placed in the work zone prior to same-day installation or use.
- Soils excavated temporarily and scheduled to be replaced, such as for trenching operations or for installation of drainage structures.

DOCUMENT B00420

PROPOSAL

BOSTON-CAMBRIDGE

For: **Bridge Preservation of B-16-246=C-01-029,**
Eliot Street over the Charles River

COMMONWEALTH OF MASSACHUSETTS

LOCATION

The work referred to herein is in the Cities of BOSTON and CAMBRIDGE in Suffolk and Middlesex Counties, in the Commonwealth of Massachusetts, and is shown by the locus map (Document 00331) in the Proposal Pamphlet, the work locations extend as follows:

Eliot Bridge **Bridge No. B-16-246 = C-01-029 (4EV)**

Beginning – Station 5+78.25
Ending –Station 10+45.75

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 **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.

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Project # 608762	Contract # 124916			
Location : BOSTON - CAMBRIDGE				
Description : Bridge Preservation of B-16-246=C-01-029, Eliot Street over the Charles River				
ITEM #	**QUANTITY**	**ITEM WITH UNIT BID PRICE WRITTEN IN WORDS**	**UNIT PRICE**	**AMOUNT**
100.	1	SCHEDULE OF OPERATIONS - FIXED PRICE $49000 AT Forty Nine Thousand Dollars LUMP SUM	$49,000.00	$49,000.00
100.711	2,010	BRICK VENEER FLASHING, INTERIOR OF PARAPETS, SHEET TYPE AT _____ PER SQUARE FOOT		
100.722	2,010	GRANITE CAP STONE FLASHING, COPPER FLASHING AT _____ PER SQUARE FOOT		
102.1	100	TREE TRIMMING AT _____ PER FOOT		
102.511	20	TREE PROTECTION - ARMORING AND PRUNING AT _____ EACH		
102.522	300	TREE AND PLANT PROTECTION FENCE - CHAIN LINK AT _____ PER FOOT		
107.855	1,500	PRESSURE INJECTION OF CRACKS AT _____ PER FOOT		
119.	1	RODENT CONTROL AT _____ LUMP SUM		
127.1	50	REINFORCED CONCRETE EXCAVATION AT _____ PER CUBIC YARD		

Project # 608762 Contract # 124916				
Location : BOSTON - CAMBRIDGE				
Description : Bridge Preservation of B-16-246=C-01-029, Eliot Street over the Charles River				
ITEM #	**QUANTITY**	**ITEM WITH UNIT BID PRICE WRITTEN IN WORDS**	**UNIT PRICE**	**AMOUNT**
127.4	20	REINFORCED CONCRETE DECK EXCAVATION (FULL DEPTH) AT _____ PER SQUARE YARD		
127.41	115	REINFORCED CONCRETE DECK EXCAVATION (PARTIAL DEPTH) AT _____ PER CUBIC YARD		
127.5	840	GRANITE CAP STONE REMOVE AND RESET AT _____ PER FOOT		
127.61	2,010	BRICK VENEER REMOVAL, INTERIOR OF PARAPETS AT _____ PER SQUARE FOOT		
127.62	2,400	BRICK VENEER REMOVAL, EXTERIOR FACADES AT _____ PER SQUARE FOOT		
127.63	1,600	BRICK VENEER REMOVAL, EXTERIOR FACADES, TOOTHING AT _____ PER SQUARE FOOT		
129.6	920	BRIDGE PAVEMENT EXCAVATION AT _____ PER SQUARE YARD		
303.081	80	8 INCH DUCTILE IRON WATER PIPE (MECHANICAL JOINT) REMOVAL AT _____ PER FOOT		
415.4	9,400	BRIDGE PAVEMENT MILLING AT _____ PER SQUARE YARD		

Project # 608762	Contract # 124916			
Location : BOSTON - CAMBRIDGE				
Description : Bridge Preservation of B-16-246=C-01-029, Eliot Street over the Charles River				
ITEM #	**QUANTITY**	**ITEM WITH UNIT BID PRICE WRITTEN IN WORDS**	**UNIT PRICE**	**AMOUNT**
431.	680	HIGH EARLY STRENGTH CEMENT CONCRETE BASE COURSE AT _____ PER SQUARE YARD		
450.231	80	SUPERPAVE SURFACE COURSE - 12.5 POLYMER (SSC - 12.5 - P) AT _____ PER TON		
450.32	100	SUPERPAVE INTERMEDIATE COURSE - 19.0 (SIC - 19.0) AT _____ PER TON		
450.601	260	SUPERPAVE BRIDGE SURFACE COURSE - 9.5 POLYMER (SSC-B - 9.5 - P) AT _____ PER TON		
450.701	260	SUPERPAVE BRIDGE PROTECTIVE COURSE - 9.5 POLYMER (SPC-B - 9.5 - P) AT _____ PER TON		
451.	50	HMA FOR PATCHING AT _____ PER TON		
452.	290	ASPHALT EMULSION FOR TACK COAT AT _____ PER GALLON		
453.	1,100	HMA JOINT ADHESIVE AT _____ PER FOOT		
472.	198	TEMPORARY ASPHALT PATCHING AT _____ PER TON		

Project # 608762 Contract # 124916				
Location : BOSTON - CAMBRIDGE				
Description : Bridge Preservation of B-16-246=C-01-029, Eliot Street over the Charles River				
ITEM #	**QUANTITY**	**ITEM WITH UNIT BID PRICE WRITTEN IN WORDS**	**UNIT PRICE**	**AMOUNT**
504.	320	GRANITE CURB TYPE VA4 - STRAIGHT AT _____ PER FOOT		
504.21	8	TRANSITION GRANITE CURB - SPECIAL TYPE AT _____ EACH		
594.	1,840	CURB REMOVED AND DISCARDED AT _____ PER FOOT		
628.312	2	PERMANENT IMPACT ATTENUATOR, REDIRECTIVE, TL-2 AT _____ EACH		
628.314	3	TEMPORARY IMPACT ATTENUATOR, REDIRECTIVE, TL-2 AT _____ EACH		
629.4	430	CAST-IN-PLACE CONCRETE MEDIAN BARRIER - DOUBLE FACED AT _____ PER FOOT		
630.2	430	HIGHWAY GUARD REMOVED AND DISCARDED AT _____ PER FOOT		
685.11	3	GRANITE CAP STONE REPLACEMENT AT _____ EACH		
701.3	8,800	CAST-IN-PLACE SIDEWALK - REPAIR AND WIDEN AT _____ PER SQUARE FOOT		

Project # 608762 Contract # 124916				
Location : BOSTON - CAMBRIDGE				
Description : Bridge Preservation of B-16-246=C-01-029, Eliot Street over the Charles River				
ITEM #	**QUANTITY**	**ITEM WITH UNIT BID PRICE WRITTEN IN WORDS**	**UNIT PRICE**	**AMOUNT**
702.	20	HOT MIX ASPHALT SIDEWALK OR DRIVEWAY AT _____ PER TON		
706.41	2,010	BRICK VENEER NEW, INTERIOR OF PARAPETS AT _____ PER SQUARE FOOT		
706.42	4,000	BRICK VENEER REPAIR, EXTERIOR FACADES AT _____ PER SQUARE FOOT		
706.43	1	BRICK MASONRY/GRANITE END POST RECONSTRUCTION AT _____ LUMP SUM		
706.44	4,500	BRICK VENEER, MASONRY REPOINTING AT _____ PER SQUARE FOOT		
706.45	4	BRICK VENEER - ARCH REPAIR AT _____ EACH		
740.	27	ENGINEERS FIELD OFFICE AND EQUIPMENT (TYPE A) AT _____ PER MONTH		
748.	1	MOBILIZATION AT _____ LUMP SUM		
751.	10	LOAM FOR ROADSIDES AT _____ PER CUBIC YARD		

Project # 608762 Contract # 124916				
Location : BOSTON - CAMBRIDGE				
Description : Bridge Preservation of B-16-246=C-01-029, Eliot Street over the Charles River				
ITEM #	**QUANTITY**	**ITEM WITH UNIT BID PRICE WRITTEN IN WORDS**	**UNIT PRICE**	**AMOUNT**
758.	1	CONSTRUCTION NOISE CONTROL AT _____ LUMP SUM		
765.	4,000	SEEDING AT _____ PER SQUARE YARD		
765.2	2,000	SEEDING FOR SHORT TERM EROSION CONTROL AT _____ PER SQUARE YARD		
767.121	4,000	SEDIMENT CONTROL BARRIER AT _____ PER FOOT		
804.1	20	1 INCH ELECTRICAL CONDUIT TYPE NM - PLASTIC -(UL) AT _____ PER FOOT		
804.4	450	4 INCH ELECTRICAL CONDUIT TYPE NM - PLASTIC -(UL) AT _____ PER FOOT		
806.111	100	1 INCH RTCC CONDUIT AT _____ PER FOOT		
806.211	450	2 INCH RTCC CONDUIT AT _____ PER FOOT		
811.40	10	JUNCTION BOX 6 X 6 X 4 INCHES AT _____ EACH		

Project # 608762 Contract # 124916				
Location : BOSTON - CAMBRIDGE				
Description : Bridge Preservation of B-16-246=C-01-029, Eliot Street over the Charles River				
ITEM #	**QUANTITY**	**ITEM WITH UNIT BID PRICE WRITTEN IN WORDS**	**UNIT PRICE**	**AMOUNT**
811.61	4	JUNCTION BOX 12 X 12 X 6 INCHES AT _____ EACH		
812.09	1	LIGHT STANDARD FOUNDATION PRECAST AT _____ EACH		
813.30	2,500	WIRE TYPE 7 NO. 10 GENERAL PURPOSE AT _____ PER FOOT		
813.32	2,700	WIRE TYPE 7 NO. 6 GENERAL PURPOSE AT _____ PER FOOT		
813.80	1	SERVICE CONNECTION (OVERHEAD) AT _____ LUMP SUM		
820.2	1	NAVIGATION LIGHTS AT _____ LUMP SUM		
821.111	1	DCR LIGHT AT _____ EACH		
822.211	4	HIGHWAY LIGHTING POLE - TWIN 5 FOOT BRACKET ON DCR STYLE POLE AT _____ EACH		
823.811	9	LUMINAIRE AT _____ EACH		

Project # 608762 Contract # 124916				
Location : BOSTON - CAMBRIDGE				
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ITEM #	**QUANTITY**	**ITEM WITH UNIT BID PRICE WRITTEN IN WORDS**	**UNIT PRICE**	**AMOUNT**
832.	37	WARNING-REGULATORY AND ROUTE MARKER - ALUMINUM PANEL (TYPE A) AT _____ PER SQUARE FOOT		
847.1	10	SIGN SUP (N/GUIDE)+RTE MKR W/1 BRKWAY POST ASSEMBLY - STEEL AT _____ EACH		
851.1	60	TRAFFIC CONES FOR TRAFFIC MANAGEMENT AT _____ PER DAY		
851.3	1	MAINTENANCE OF WATERWAY/CONSTRUCTION BARGE RENTAL AT _____ LUMP SUM		
852.	900	SAFETY SIGNING FOR TRAFFIC MANAGEMENT AT _____ PER SQUARE FOOT		
852.11	500	TEMPORARY PEDESTRIAN BARRICADES AT _____ PER FOOT		
852.12	8	TEMPORARY PEDESTRIAN CURB RAMPS AT _____ EACH		
853.2	2,200	TEMPORARY BARRIER (TL-2) AT _____ PER FOOT		
853.8	180	TEMPORARY ILLUMINATION FOR WORK ZONE AT _____ PER DAY		

Project # 608762 Contract # 124916				
Location : BOSTON - CAMBRIDGE				
Description : Bridge Preservation of B-16-246=C-01-029, Eliot Street over the Charles River				
ITEM #	**QUANTITY**	**ITEM WITH UNIT BID PRICE WRITTEN IN WORDS**	**UNIT PRICE**	**AMOUNT**
854.1	1,700	PAVEMENT MARKING REMOVAL AT _____ PER SQUARE FOOT		
856.	3,700	ARROW BOARD AT _____ PER DAY		
856.12	2,600	PORTABLE CHANGEABLE MESSAGE SIGN AT _____ PER DAY		
859.	47,780	REFLECTORIZED DRUM AT _____ PER DAY		
859.1	3,700	REFLECTORIZED DRUMS WITH SEQUENTIAL FLASHING WARNING LIGHTS AT _____ PER DAY		
860.106	4,440	6 INCH REFLECTORIZED WHITE LINE (PAINTED) AT _____ PER FOOT		
861.106	2,200	6 INCH REFLECTORIZED YELLOW LINE (PAINTED) AT _____ PER FOOT		
864.04	260	PAVEMENT ARROWS AND LEGENDS REFLECTORIZED WHITE (THERMOPLASTIC) AT _____ PER SQUARE FOOT		
866.106	2,220	6 INCH REFLECTORIZED WHITE LINE (THERMOPLASTIC) AT _____ PER FOOT		

Project # 608762 Contract # 124916				
Location : BOSTON - CAMBRIDGE				
Description : Bridge Preservation of B-16-246=C-01-029, Eliot Street over the Charles River				
ITEM #	**QUANTITY**	**ITEM WITH UNIT BID PRICE WRITTEN IN WORDS**	**UNIT PRICE**	**AMOUNT**
867.106	1,100	6 INCH REFLECTORIZED YELLOW LINE (THERMOPLASTIC) AT _____ PER FOOT		
874.41	25	TRAFFIC SIGNS REMOVED AND DISCARDED AT _____ EACH		
900.411	10	TRUSS ENCASEMENT REPAIRS - DEEP AT _____ PER CUBIC YARD		
900.412	50	TRUSS ENCASEMENT REPAIRS - SHALLOW AT _____ PER SQUARE YARD		
900.413	10	CONCRETE BEAM REPAIRS AT _____ PER CUBIC YARD		
900.414	10	CONCRETE DIAPHRAGM REPAIRS AT _____ PER CUBIC YARD		
905.	5	4000 PSI, 3/8 INCH, 660 CEMENT CONCRETE AT _____ PER CUBIC YARD		
910.1	23,550	STEEL REINFORCEMENT FOR STRUCTURES - EPOXY COATED AT _____ PER POUND		
912.5	48	DRILLED AND GROUTED #5 DOWELS AT _____ EACH		

Project # 608762 Contract # 124916				
Location : BOSTON - CAMBRIDGE				
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ITEM #	**QUANTITY**	**ITEM WITH UNIT BID PRICE WRITTEN IN WORDS**	**UNIT PRICE**	**AMOUNT**
912.6	20	DRILLED AND GROUTED #6 DOWELS AT _____ EACH		
912.7	427	DRILLED AND GROUTED #7 DOWELS AT _____ EACH		
960.2	230	GRANITE CAP STONE DOWELS, SS AT _____ EACH		
966.	25,100	MEMBRANE WATERPROOFING FOR BRIDGE DECK REPAIRS AT _____ PER SQUARE FOOT		
968.4	4	SCUPPER-REMOVED AT _____ EACH		
973.	170	BRIDGE EXPANSION JOINT REPLACEMENT AT _____ PER FOOT		
998.	1	STUDY AND ANALYSIS OF MASONRY MATERIALS AND PROCEDURES AT _____ LUMP SUM		
Total Qty:	188,312			

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DOCUMENT B00853

SCHEDULE OF PARTICIPATION BY DISADVANTAGED BUSINESS ENTERPRISES (DBES)

PRIME BIDDER: _____

DATE OF BID OPENING: _____ PROJECT NO.: 608762

FEDERAL AID PROJECT NO. HIP(BR)-0036(018)X

PROJECT LOCATION: BOSTON-CAMBRIDGE

Name, Address, and Phone Number(s) of DBE	Name of Activity	(a)† DBE Contractor Activity Amount *Construction Work*	(b) DBE Other Business Amount *Services, Supplies, Material*	(c) Total amount eligible for credit under rules in Section 6 of Document 00719 - DBE Special Provisions
Total Bid Amount	TOTALS:	$	$	$
$	DBE Percentage of Total Bid:	%	%	%

†*Column (a) must be at least one-half of the DBE participation goal. Attach additional sheets as necessary.*

Is MassDOT Document B00855 (Joint Check Approval) being submitted for any of the above? ☐ Yes ☐ No ☐ Not Known at This Time

Will any of the contractors listed above be using a third party (i.e. manufacturer) to deliver materials or perform any portion of work by a third party? ☐ Yes ☐ No

CERTIFICATION: I HEREBY DECLARE, TO THE BEST OF MY KNOWLEDGE, THAT **I HAVE READ THE SPECIAL PROVISIONS FOR PARTICIPATION BY DISADVANTAGED BUSINESS ENTERPRISES - DOCUMENT 00719.** BOTH THIS SCHEDULE AND THE RELEVANT AND ACCOMPANYING LETTER(S) OF INTENT ARE IN FULL COMPLIANCE WITH THE PROVISIONS OF, AND IN ACCORDANCE WITH, TITLE 49 CODE OF FEDERAL REGULATIONS, PART 26 (49 CFR Part 26).

SIGNATURE:_____ DATE_____

NAME AND TITLE (*PRINT*):_____

EMAIL ADDRESS: _____TEL NO.:_____

*** END OF DOCUMENT ***

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DOCUMENT B00854

DISADVANTAGED BUSINESS ENTERPRISES (DBE) PARTICIPATION
LETTER OF INTENT
(To be completed by the DBE – Page 1 of 2)

TO: _____ (Prime Bidder)

FROM: _____ (DBE Firm)

RE: PROJECT NO.: 608762 FEDERAL AID PROJECT NO.: HIP(BR)-0036(018)X

PROJECT LOCATION: BOSTON-CAMBRIDGE

DATE OF BID OPENING: _____

I, _____, authorized signatory of the above-referenced DBE firm hereby declare:
Print Name

1. My company is currently certified as a Disadvantaged Business Enterprise (DBE) by the Massachusetts Supplier Diversity Office ("SDO"), formerly known as the State Office of Minority and Women Business Assistance (SOMWBA), as a: (check all applicable, see Section 1 of the Special Provisions For Participation By Disadvantaged Business Enterprises, MassDOT Document 00719 additional guidance is available at Title 49, Code of Federal Regulations, Part 26.55 (49 CFR Part 26.55)):

   ( ) CONTRACTOR ( ) REGULAR DEALER ( ) BROKER
   ( ) MANUFACTURER ( ) TRUCKING OPERATIONS ( ) PROFESSIONAL SERVICES

2. My firm has the ability to manage, supervise and perform the activity described on page 2 of this Letter of Intent. If you are awarded the contract, my company intends to enter into a contract with your firm to perform the items of work or other activity described on the following sheet for the prices indicated.

3. There have been no changes affecting the ownership, control or independence of my company since my last certification review on _____ ___, 20___. If any such change is planned or occurs prior to my company's completion of this proposed work, I will give prior written notification to your firm and to the Massachusetts Department of Transportation ("MassDOT") Office of Civil Rights and SDO.

4. I have read the MassDOT proposal for the Project which may be entitled "Project Contract Documents and Special Provisions" or the draft "Contract" which includes MassDOT Document 00719, and acknowledge that my company will comply with that document and the requirements of 49 CFR Part 26.

5. For the purpose of obtaining subcontractor approval from MassDOT, my firm will provide to you:

   A. ***The following construction work:***
      (i) a resume, stating the qualifications and experience, of the superintendent or foreperson who will supervise on site-work;
      (ii) a list of equipment owned or leased by my firm for use on this project; and
      (iii) a list of all projects (public or private) upon which my firm is currently performing, is committed to perform, or intends to make a commitment to perform. I shall also include, for each project: the name and telephone number of a contact person for the contracting authority, person, or organization; the dollar value of the work; a description of the work; and my firm's work schedule for the project.

   B. ***The following services, materials or supplies***:
      (i) a written agreement and invoices for the materials or supplies, and any other documents evidencing the terms of providing such items;
      (ii) information concerning brokers fees and commissions for providing services or materials; and
      (iii) a statement concerning whether my firm intends or will be required to use a joint check arrangement; and any other documents that may be required by MassDOT.

_____ Date_____
DBE Company Authorized Signature

DISADVANTAGED BUSINESS ENTERPRISES (DBE) PARTICIPATION
LETTER OF INTENT
(To be completed by the DBE – Page 2 of 2)

DATE OF BID OPENING: _____

PROJECT NUMBER: 608762

FEDERAL AID PROJECT NUMBER: HIP(BR)-0036(018)X

PROJECT LOCATION: BOSTON-CAMBRIDGE

PRIME BIDDER: _____

DBE COMPANY NAME: _____

Item number if applicable	NAICS Code	Description of Activity with notations such as Services, or Brokerage, Installation Only, Material Only, or Complete	Quantity	Unit Price	Amount
			TOTAL AMOUNT:		

Please give full explanations, attach additional sheets if necessary.

I HEREBY VERIFY THAT _____ WILL SOLELY
(DBE company name)
PERFORM THE WORK, OR PROVIDE THE SERVICES OR MATERIALS, AS DESCRIBED ABOVE.

DBE AUTHORIZED SIGNATURE: _____

NAME AND TITLE (PRINT):_____

TELEPHONE NUMBER: _____FAX NUMBER: _____

EMAIL ADDRESS: _____

Rev'd 9/20/19

*** END OF DOCUMENT ***

DOCUMENT B00855

DBE JOINT CHECK ARRANGEMENT APPROVAL FORM

(to be submitted by Prime Contractor)

Contract No: 124916 **Project No.** 608762 **Federal Aid No.:** HIP(BR)-0036(018)X

Location: BOSTON-CAMBRIDGE **Bid Opening Date:** _____

Project Description: Bridge Preservation of B-16-246=C-01-029, Eliot Street over the Charles River

We have received the attached request for the use of a joint check arrangement from _____ _____ , a DBE on the above- referenced Contract and _____ _____, a Material Supplier/Vendor for the subject Contract. The DBE has complied with the requirements of 49 CFR Part 26.55(c)(1). In particular, the DBE has:

- a written agreement with the material supplier/vendor;
- applied for credit with the subject material supplier and has supplied the vendor's response;
- shown that it will place all orders to the subject material supplier/vendor;
- made and retains all decision-making responsibilities concerning the materials; and
- provided a Joint Check Agreement that is acceptable to MassDOT;

As the Contractor for the Project, we agree to issue joint checks (made payable to the Material Supplier/Vendor and the DBE) for payment of sums due pursuant to invoices from the Supplier/Vendor and DBE.

Contractor:

_____ _____
Company Name Signature
Duly Authorized

_____
Printed Name

_____ _____
Date Title

SubContractor:

_____ _____
Company Name Signature –
Duly Authorized

_____
Printed Name

_____ _____
Date Title

*** END OF DOCUMENT ***

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DOCUMENT B00856

JOINT VENTURE AFFIDAVIT

(All Firms)

- All Information Requested By This Schedule Must Be Answered. Additional Sheets May Be Attached.
- If, there is any change in the information submitted, the Joint Venture parties must inform MassDOT Pre-Qualifications Office (and, if one of the companies is a DBE, the Director of Contract Compliance, Office of Civil Rights) *prior* to such change, in writing, either directly or through the Prime Contractor if the Joint Venture is a subcontractor.
- If the Joint Venture Entity will be the bidder on a prime Contract, it must bid and submit all required documents (insurance, worker's compensation, bonds, etc.) in the name of the Joint Venture Entity.

I. Name of Joint Venture: _____

Type of Entity if applicable (Corp., LLC):_____Filing State _____

Address of joint venture: _____

_____

Phone No(s) for JV Entity: _____E-mail:_____

Contact Person(s)_____

Tax ID/EIN of Joint Venture: _____Vendor Code:_____

II. Identify each firm or party to the Joint Venture:

Name of Firm: _____

Address: _____

Phone : _____E-mail:_____

Contact person(s) _____

Name of Firm: _____

Address: _____

Phone: _____E-mail:_____

Contact Person(s)_____

III. Describe the role(s) of the each party to the Joint Venture:

_____

_____

IV. Attach a copy of the Joint Venture Agreement. The proposed Joint Venture Agreement should include specific details including, but not limited to: (1) the contributions of capital and equipment; (2) work items to be performed by each company's forces, (3) work items to be performed under the supervision of any DBE Venturer; (4) the commitment of management, supervisory and operative personnel employed by the DBE to be dedicated to the performance of the Project; and (5) warranty, guaranty, and indemnification clauses.

V. Attach any applicable Corporate or LLC Votes, Authorizations, etc.

VI. Ownership of the Joint Venture:

A. What is the percentage(s) of each company's ownership in the Joint Venture?

ownership percentage(s): _____

ownership percentage(s): _____

B. Specify percentages for each of the following (provide narrative descriptions and other detail as applicable):

1. Sharing of profit and loss: _____
2. Capital contributions:

(a) Dollar amounts of initial contribution: _____

(b) Dollar amounts of anticipated on-going contributions: _____

(c) Contributions of equipment (specify types, quality and quantities of equipment to be provided by each firm): _____

_____

4. Other applicable ownership interests, including ownership options or other agreements, which restrict or limit ownership and/or control:

_____

_____

5. Provide copies of all other written agreements between firms concerning bidding and operation of this Project or projects or contracts.

6. Identify all current contracts and contracts completed during the past two (2) years by either of the Joint Venture partners to this Joint Venture:

_____

_____

VII. Control of and Participation in the Joint Venture. Identify by name and firm those individuals who are, or will be, responsible for and have the authority to engage in the following management functions and policy decisions. (Indicate any limitations to their authority such as dollar limits and co-signatory requirements.):

A. Joint Venture check signing:

_____

_____

B. Authority to enter Contracts on behalf of the Joint Venture:

_____

_____

C. Signing, co-signing and/or collateralizing loans:

_____

_____

D. Acquisition of lines of credit:

_____

_____

E. Acquisition and indemnification of payment and performance bonds:

_____

_____

F. Negotiating and signing labor agreements:

_____

_____

G. Management of contract performance. *(Identify by name and firm only)*:

1. Supervision of field operations: _____
2. Major purchases: _____
3. Estimating: _____
4. Engineering: _____

VIII. Financial Controls of Joint Venture:

A. Which firm and/or individual will be responsible for keeping the books of account?

_____

_____

B. Identify the "Managing Partner," if any, and describe the means and measure of their compensation:

_____

_____

C. What authority does each firm have to commit or obligate the other to insurance and bonding companies, financing institutions, suppliers, subcontractors, and/or other parties participating in the performance of this Contract or the work of this Project?

_____

IX. Personnel of Joint Venture: State the approximate number of personnel (by trade) needed to perform the Joint Venture's work under this Contract. Indicate whether they will be employees of the majority firm, DBE firm, or the Joint Venture.

	Firm 1 (number)	Firm 2 (number)	Joint Venture (number)
Trade			
Professional			
Administrative/Clerical			
Unskilled Labor			

Will any personnel proposed for this Project be employees of the Joint Venture?: _____

If so, who: _____

A. Are any proposed Joint Venture employees currently employed by either firm?

Employed by Firm 1: _____ Employed by firm 2 _____

B. Identify by name and firm the individual who will be responsible for Joint Venture hiring: ____

_____

X. Additional Information. Please state any material facts and additional information pertinent to the control and structure of this Joint Venture.

_____

_____

XI. AFFIDAVIT OF JOINT VENTURE PARTIES. The undersigned affirm that the foregoing statements and attached documents are correct and include all material information necessary to identify and explain the terms and operations of our Joint Venture and the intended participation of each firm in the undertaking. Further, the undersigned covenant and agree to provide to MassDOT current, complete and accurate information regarding actual Joint Venture work, payments, and any proposed changes to any provisions of the Joint Venture, or the nature, character of each party to the Joint Venture. We understand that any material misrepresentation will be grounds for terminating any Contract awarded and for initiating action under Federal or State laws concerning false statements.

Firm 1	Firm 2
Signature Duly Authorized	Signature Duly Authorized
Printed Name and Title	Printed Name and Title
Date	Date

*** END OF DOCUMENT ***