COMMONWEALTH OF MASSACHUSETTS

CONTRACT DOCUMENTS AND SPECIAL PROVISIONS

PROPOSAL NO.	614254-132590
P.V. =	$2,770,000
PLANS	YES

FOR

FY 2026 CAPITAL IMPROVEMENT PROGRAM

CAPE MAIN CULVERT REPLACEMENT AT MP 63.22

in the Town of

SANDWICH, MA

In accordance with the 2025 MassDOT Highway Division Standard Specifications for Highways and Bridges Division I: General Requirements and Covenant, as amended herein, certain subsections of Division II: Construction Details and III: Materials Specifications referenced herein, Supplemental Specifications thereto (September 30, 2025), and the 2024 edition of the American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering.

This Proposal to be opened and read: **THURSDAY, February 19, 2026, at 2:00 P.M.**
(via COMMBUYS)

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NOTICE TO CONTRACTORS

Electronic proposals for the following project will be received through the internet on www.commbuys.com ("COMMBUYS") until the date and time stated below. No paper copies of bids will be accepted. Bid results will be posted on www.commbuys.com forthwith after the bid submission deadline.

Bidders must be registered with COMMBUYS in order to bid on this project. If Bidders are not currently registered with COMMBUYS, it is recommended that bidders register with COMMBUYS at least seven days prior to the scheduled bid opening date. COMMBUYS provides Seller registration functionality at no charge. To register, go to www.COMMBUYS.com and click on the "Register" link on the home or landing page.

Thursday, February 19, 2026 at 2:00PM

SANDWICH, MA

Cape Main Culvert Replacement at MP 63.22
(614254)

****Date Subject to Change**

PROJECT VALUE = $2,770,000

The Massachusetts Department of Transportation Rail and Transit Division (MassDOT or Owner) is seeking Contractors to submit an electronic Bid for the Cape Main Culvert Replacement at MP 63.22. The project consists of work to remove and reconstruct one (1) railroad culvert crossing on the Cape Main as follows:

- Removal and disposal of existing stone box culvert (approx. 36"x36") at MP 63.22;
- Furnishing and installing 48" round Class V Reinforced Concrete Pipe (RCP) culvert with precast concrete wingwalls at MP 63.22;
- Removing, resetting, surfacing and aligning track;
- All other work associated with the Cape Main Culvert Replacement at MP 63.22 as described in the Project Description and Scope of Work sections of the bid documents

It is highly recommended that bidders attend the Pre-Bid Meeting/Pre-Bid Site Walk which will be held at 10:00 AM on Wednesday, January 28, 2026, at the Sandwich Station Parking Lot located at 42 Jarves Street, Sandwich, MA 02563. It is strongly suggested that prospective Bidders have a representative attend this meeting/site walk. The purpose of this meeting/site walk is to discuss any outstanding questions relating to the proposed work, the bidding procedures, or the required contract provisions. Prospective bidders shall bring with them all personal protective equipment which must be worn to access the project site.

Bidders must be prequalified to bid on the project. Prequalification requirements, as well as supporting documentation that bidders must submit, are as follows:

1) MBTA Prequalification. Bidders must be prequalified in MBTA Class 1 – General Transit Construction (>$3,000,000 for Maximum Single Project Rating), **and** in MBTA Class 3 – Trackwork (>$3,000,000 for Maximum Single Project Rating), to bid on the above project then a subcontractor prequalified in MBTA Class 3 – Trackwork must perform the track work. The names of any proposed subcontractors to be used on the project must be submitted to the MassDOT Rail & Transit Division for approval.

   Go to the MBTA website below to find MBTA Prequalification Procedures.
   https://bc.mbta.com/uploadedfiles/Business_Center/Bidding_and_Solicitations/Design_and_Construction/Contractor%20Prequalification%20Application%202022.pdf

   Bidders must submit MBTA-issued certificates showing that they are prequalified in the required classes of work for the project.

2) MassDOT Rail & Transit Prequalification. Bidders must be prequalified in the following classes of work: General Rail Construction on or Around Active Rail Lines, and Track Work.

The definitions of the MassDOT Rail & Transit Division classes of work identified above and the MassDOT Rail & Transit Division Prequalification Procedures are set forth in the Special Provisions of the Contract.

All prospective bidders who intend to bid on this project must submit MBTA certificates showing prequalification in the required classes of work, as well as all documentation required to apply for MassDOT Rail & Transit Division prequalification in the required classes of work, to Kevin McGrath at the MassDOT Rail and Transit Division by email at kevin.mcgrath@dot.state.ma.us and William Lynch at Jacobs Engineering Group at William.J.Lynch@jacobs.com before 5:00 P.M. seven (7) calendar days prior to the bid opening date. The Project Proposal No. should be placed in the subject line. If the prequalification information is submitted late, there is no guarantee that the Rail & Transit Division will be able to complete its evaluation of the information and determine whether a bidder is prequalified to bid on the project. An award will not be made to a contractor who is not prequalified by the MassDOT Rail & Transit Division prior to the opening of Proposals.

Proposal documents, including the Contract Documents, Special Provisions, and Plans, will be posted on the COMMBUYS website on or about January 22nd, 2026 after 2:00 PM EST.

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

All bids shall be accompanied by a bid deposit in the amount of 5% of the value of the bid.

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.

The Project has an M/WBE participation goal of 7% for the work performed under this contract.

All Contractors and Subcontractors working on RAILROAD Right-of-Way must have an approved Drug and Alcohol testing plan in compliance with all statutes and regulations administered by the Federal Railroad Administration ("FRA") in implementing the required 49 CFR Part 219 Drug and Alcohol Program. Contractors are required to submit their approved Drug and Alcohol Testing Program along with their bids.

Bidders must also insert where indicated in the bid form a list of at least three (3) rail projects that the bidder performed in the field (rather than managed) and completed within the last five (5) years, each with a project value of at least $3,000,000 and each with the following scope of work: complete track construction including jointed rail and turnout installation on active rail or adjacent to live rail. In addition, bidder is required to insert where indicated in the bid form the names of the skilled labor and supervisors that will work on this project. Any subcontractors used on this project are to be submitted to MassDOT for approval.

Contractor questions concerning the Bid Package are due by 4:00 PM Wednesday, February 4, 2026. Contractor questions must be submitted through Contractor portal on COMMBUYS www.commbuys.com for this project. MassDOT and Owner's consultants will provide answers to questions by 4:00 PM Wednesday, February 11, 2026.

The apparent successful bidder will receive notification of their status on Friday, February 20, 2026, and pending approval by Owner, Contract Award / Notice to Proceed (NTP) would be anticipated by Friday, March 13, 2026.

The MassDOT Cape Main Culvert Replacement at MP 63.22 must be substantially completed by Monday, April 27, 2026, and all work must be completed by Tuesday, June 30, 2026.

Please note that Contract work includes work on an active freight rail corridor. Train Operations are dictated by MassDOT and Massachusetts Coastal Railroad (MCRR or Railroad). Contractor work hours and Railroad coordination provisions are set forth in the Contract Documents and Special Provisions.

Please note the production and equipment requirements specified in the Special Provisions as these have a direct effect on meeting the project schedule.

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: Phillip Eng, Interim Transportation Secretary, MassDOT
Meredith Slesinger, Administrator, MassDOT Rail and Transit Division
Saturday, January 17, 2026

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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.

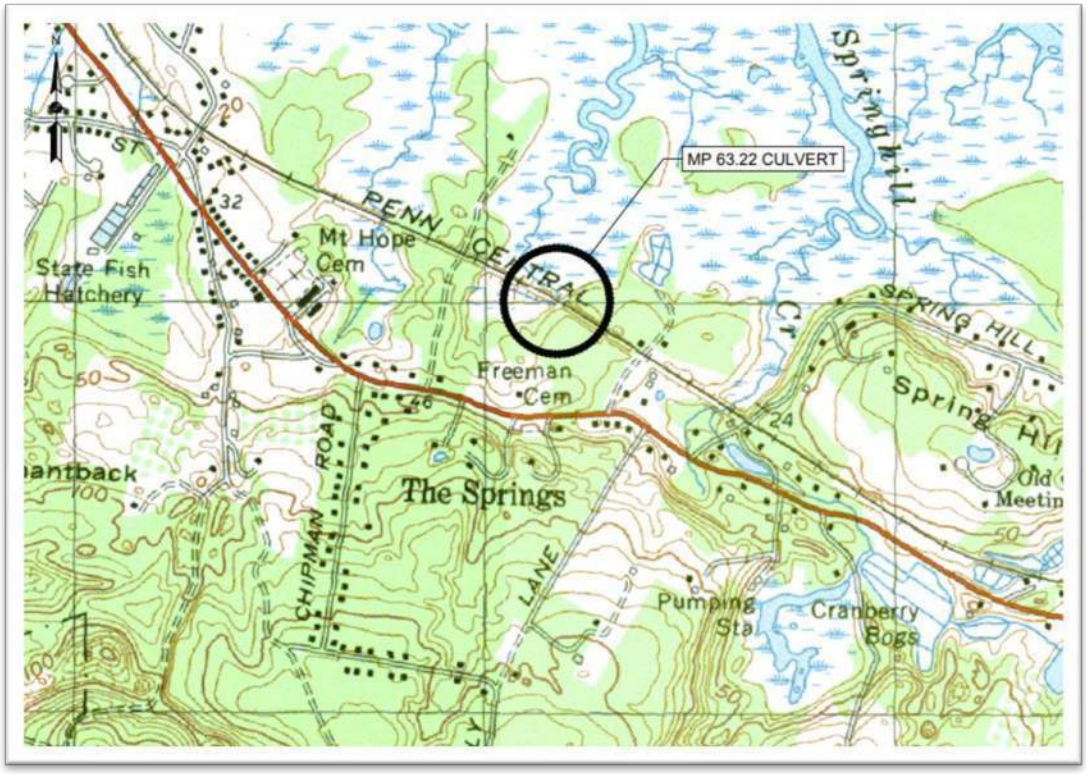
(b) The general contractor must submit the amount of a claim under provision (a) to the awarding authority in writing as soon as practicable after the end of the suspension, delay, interruption or failure to act and, in any event, not later than the date of final payment under this contract and, except 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
MASSDOT CAPE MAIN CULVERT REPLACEMENT AT MP 63.22
SANDWICH, MA



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DOCUMENT 00439

CONTRACTOR PROJECT PERFORMANCE EVALUATION FORM

CONTRACTOR PROJECT PERFORMANCE EVALUATION FORM

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION (MASSDOT)									
CONTRACTOR PROJECT PERFORMANCE EVALUATION RECORD									
DATE:	MM/DD/YYYY			INTERIM REPORT NO.: (PROJECT MANAGER ASSIGNS)					
MASSDOT CONTRACT#:				FINAL REPORT NO.: (PROJECT MANAGER ASSIGNS)					
PROJECT NAME:									
RAIL & TRANSIT PROJECT MANAGER:				GENERAL ENGINEERING CONSULTANT (IF APPLICABLE):					
GENERAL CONTRACTOR:				GENERAL CONTRACTOR PROJECT MANAGER:					
CONTRACT AWARD AMOUNT:	$ -			CONTRACT AMENDMENT ADJUSTED VALUE AMOUNT:			$ -		
PERCENT OF PROJECT COMPLETE TO DATE:	%			WORK PERFORMED BY PRIME CONTRACTOR - PERCENTAGE OF PROJECT SCHEDULE COMPLETED - MUST BE MINIMUM OF 50%					%

Partial Instructions (See Contractor Performance Evaluation Reports SOP for full instruction)

1	The Project Manager (PM) and/or Assistant Project Manager (APM) will review criteria listed for each subcategory on the Ratings Tab [Green Tab] of this workbook. The PM or APM will use the attached guidelines in determining the rating for each subcategory. These guidelines provide overall guidance for ratings of 10, 8 and 4 specific to each category. Other whole number ratings may also be used if the description of the performance falls between the upper and lower ratings (10 and 4).
2	The PM or APM will select the most appropriate whole number grade from drop down for each subcategory in the Green Shaded Box at the right side of the table. If subcategory is not applicable at this time, select "0" and note N/A in comments. Ratings will be automatically adjusted on the summary tab.
3	When all of the lines for the subcategory have been completed, the overall average for that category will automatically calculate and be shown in the Yellow Shaded Box at the bottom of that category.
4	Explanations must be entered in the green comments box on the Ratings Tab or below in the Project Managers Explanation section of the Form. If any subcategory entry is 10, or if the average for any subcategory is below 8. Please include specific examples.
5	The PM will provide the evaluation to the Deputy Administrator for Rail for review and concurrence. If the Deputy Administrator disagrees with any portion of the evaluation, the Deputy Administrator will outline their rationale and recommended changes to the PM. Further discussions will be held between the PM, APM, Deputy Administrator, Other staff and consultants (e.g., General Consulting Engineers), if appropriate. The PM or APM shall document this meeting.
6	If the group cannot reach agreement, the Deputy Administrator for Rail shall bring the matter to the attention of the attention of the Rail & Transit Administrator.
7	If the General Contractor ratings are modified, the original rating and notes shall be preserved.
8	Once review is finalized, PM forwards to General Contractor for receipt and acknowledgement.
9	General Contractor is allowed 10 days to review. If not returned, process continues. Lack of response is noted in General Contractor Signature section DOES NOT change the rating or prevent the rating from being recorded by the MassDOT Rail & Transit Division for use as an evaluation tool in future construction procurements.
10	General Contractor may request a meeting with the PM and the Deputy Administrator for Rail to discuss the ratings.

		Excellent	Average	Poor	% Rating	% Rating without C	% Rating without E	% Rating w/out C & E	Weighted average (from scoring sheet)
		10	8	4					
A.	Safety				x 2.0=	x 2.0	x 2.0=	x 2.5=	#DIV/0!
B.	Overall Quality and Workmanship				x 2.0=	x 2.5	x 2.0=	x 2.5=	#DIV/0!
C.	Resolution of Construction Deficiencies				x 1.0=	0	x 1.0=	0	#DIV/0!
D.	Project Management				x 1.0=	x 1.5	x 1.5=	x 1.5=	#DIV/0!
E.	Change Orders				x 1.0=	x 1.0=	x 1.0=	x 1.0=	#DIV/0!
F.	Home Office Support				x 0.5=	x 0.5=	x 0.5=	x 0.5=	#DIV/0!
G.	Equipment				x 0.5=	x 0.5=	x 0.5=	x 0.5=	#DIV/0!
H.	On-Site Supervisory Personnel Rating				x 1.0=	x 0.5=	x 0.5=	x 0.5=	#DIV/0!
I.	General Compliance with Contract Requirements				x 1.0=	x 0.5=	x 1.0=	x 1.0=	#DIV/0!
					Overall Rating w/o Subs (Maximum Score = 100)				#DIV/0!
J.	Subcontractor Performance & Mgmt:				x 1.0=	x 1.0=	0	0	#DIV/0!
					Add'l Rating w/Subs Only (Included if applicable by PM)				#DIV/0!

CONTRACTOR PROJECT PERFORMANCE EVALUATION FORM

	Project Manager's Signature/Date:						**DATE:**	
	Deputy Administrator for Rail Signature/Date:						**DATE:**	
	General Contractor Acknowledging Report/Date:						**DATE:**	
	General Contractor Requests Meeting - Please Enter **YES** or **NO:**							
	Contractor's Comments/Meeting Notes:							
INFORMATION FOR RAIL DIVISION RELATING TO FUTURE PROCUREMENTS								
- The Rail Division has calculated Maximum, Average & Minimum Scores that apply to the Contractor Performance Evaluation Form.								
- The Maximum Score is 100, The Average Score is 80. The Minimum acceptable Score for any Contractor is 70 for Categories A. through I.								
- A deduction **shall** be recommended for unsatisfactory performance if the "Overall Rating" Score is under 70. This may impact the Contractor on the next Procurement.								
- A deduction **may** be recommended for this project, if the Contractor completes this project late.								
RECOMMENDATIONS FOR DEDUCTIONS FROM CONTRACTORS' ASSIGNED FACTOR								
Recommend a deduction for Contractor's unstatisfactory performance - Please Enter **YES** or **NO:**								
Recommend a deduction for Project Completed Late - Please Enter **YES** or **NO:**								
	Deputy Administrator for Rail Signature/Date:							
PROJECT MANAGERS EXPLANATION - RATINGS NO. 1 - NO. 10 ABOVE: (extra sheets may be appended to this form, if needed):								

Excellent	Average	Fair
10	8	6

Score each sub category in whole numbers in the range between 10 and 4, with 10 = Excellent, 8= Average, and 4 = Poor. Overall score for each category will be the average of all questions rated below. The weights for each category on the Summary Tab set the final score.

A. Safety			
A) Using the Rating Scale noted above, please rate the Contractor's Safety on this project. Please note if there were any OSHA violations or serious safety accidents. Did the Contractor have a culture of Safety on this project? Provide specific examples to support your rating.			
10	8	4	Score
Full FRA, MassDOT, and Railroad compliance (based on results of safety requirements).	General FRA, MassDOT, and Railroad compliance (minor infractions found during safety requirements and review).	Disregard for FRA, MassDOT, and Railroad requirements (documented safety infractions).	
Full time safety manager on-site, all shifts.	Full time safety manager on-site, at least one shift.	Safety manager rarely on-site.	
Active safety program including: regular toolbox meetings, housekeeping, full fall protection.	Adequate housekeeping.	Poor onsite safety procedures.	
Regularly scheduled safety meetings.	Periodic safety meetings.	Deficient, on site safety procedures.5	
Worker injuries rare.	Occasional, minor injuries.	Frequent worker injuries or at least one serious injury.	
Workers fully engaged in safety issues.	Workers generally aware of safety issues.	Workers are unable to speak up about safety issues.	
Actively notifies MassDOT Rail Division of a safety incident onsite ASAP.	Notifies MassDOT Rail Division of a safety incident within 24 hrs.	Lack of notification to MassDOT Rail Division when safety incident occurs.	
Performs monthly safety walks with MassDOT Rail Division Project Manager.	MassDOT Rail Division occasionally (less than 20% of the time) has to remind contractor to perform monthly safety walks with MassDOT Project Manager.	No monthly safety walks with MassDOT Project Manager.	
Maintains an updated database of all required ROW and other Trainings and Certifications.	MassDOT Project Manager occasionally has to remind contractor of the required ROW Training and Certifications.	Contractor personal accessing site without the proper training and certifications.	
			Average

Excellent	Average	Fair	
10	8	6	
B. Overall Quality and Workmanship			
B) Using the Rating Scale noted above, please rate Contractor's Overall Quality and Workmanship. Were there quality or workmanship problems? Was there a culture of quality on this project: Please provide specific examples to support your rating:			
10	8	4	Score
Full compliance with the contract specifications, plans and approved quality control plan.	General conformance with the contract specifications and plans.	Substantial deviations from the contract plans and specifications.	
Quality Control Manager (QCM) on-site full time and focused exclusively on QC.	QCM on-site full time but occasionally performing non-QC related duties.	QCM frequently not on-site, or frequently not performing QC related tasks.	
QCM initiates inspections/testing without need for MassDOT staff intervention.	The Resident Engineer or staff is occasionally required to remind QCM to initiate inspections.	Requires constant oversight by the resident Engineer and Field Inspector.	
Testing/inspection performed at a greater frequent than specified ensuring higher level of quality.	Performing only minimum required testing/inspection.	Performing less than specified minimum testing and/or not fully supervising independent testing agencies.	
			Average

C. Resolution of Construction Deficiencies			
C) Using the Rating Scale noted above, please rate the rate the Contractor's ability to resolve quality issues (e.g., Construction Deficiencies). Note if Contractor identified problems independently or if MassDOT Rail & Transit Division was required to issue a Non-Conformance Report (NCR). Please indicated if the Contractor proactively proposed resolution of any deficiencies.			
10	8	4	Score
Any deficiencies quickly identified by Contractor's Quality Control process. Items reworked or marked and documented within reasonable time frame.	Deficiencies noted and isolated but not reworked or documented within a week of identification.	Repeated, substantive corrective actions required on work performed.	
NCRs complete with proposed resolution and preventive action.	NCRs typically complete. Only occasionally incomplete (i.e. 20% or less do not include preventive action or lack sufficient detail of proposed resolution).	NCRs issued by engineer and NCR defect repeatedly occurred. After repeated reminders by MassDOT, NCRs rarely complete.	
			Average

Excellent	Average	Fair	
10	8	6	
D. Project Management:			
D) Using the Rating Scale noted above, please rate the rate this Contractor's performance with regard to adhering to contract schedules and milestones.			
10	8	4	Score
Closely adhered to contract schedules and milestones.	General adherence to contract schedules and milestones.	Monthly updates are late each month and 3 week look ahead does not reflect actual work in the field.	
Provided accurate schedule updates at frequency specified (i.e.. 3 week look ahead, monthly updates, recovery).	Typically submitted schedule updates (80%+) but occasionally needed to be prompted.	Rarely revised schedule (50% or less) even when prompted or when current schedule did not reflect actual work performed.	
Contractor continued to meet schedule even when origin of delay was outside of the contractor's control.	General adherence to revised schedule with only occasional difficulty adjusting to items outside of their control.	Unable to adjust to any change in schedule regardless of cause or impact.	
			Average

E. Change Orders			
E) Using the Rating Scale noted above, please rate the Contractor's Change Order submissions (e.g., identification, scope, detail) and process. Please provide specific examples to support the rating.			
10	8	4	Score
Change Orders (COs) identified and submitted within 1 month of identification.	Some Potential Change Orders (PCOs) submissions delayed up to 5 months.	General Contractor submissions of PCOs six or more months late.	
Proposed value is essentially equal to independent cost and time estimate.	Proposed value is above independent cost and time estimate rates but willing to negotiate.	Proposed value is double or greater than estimated rates and resistance to negotiating.	
Contractor willing and able reach resolution during initial negotiations.	Some negotiations require more than two rounds of negotiations but 80% or greater do not.	All COs require three or more rounds of negotiations.	
Willing to continue work under work directive, while actively preparing CO in a short period of time. No impact to project schedule.	Willing to continue work under work directive, but CO proposals take more time than usual. No impact to project schedule.	Not willing to start the work with a work directive in place, requires CO processed. Causing schedule delay.	
			Average

Excellent	Average	Fair	
10	8	6	
F. Home Office Support			
F) Using the Rating Scale noted above, please rate the rate the Contractor's overall ability to support the fieldwork. Please provide specific examples to support rating.			
10	8	4	Score
Submittals at least 30 days in advance of the work.	Majority of submittals (90%) produced prior to scheduled work.	Majority of submittals forwarded for review less than 30 days prior to work.	
RFIs submitted once issue is recognized.	Majority of RFIs are submitted in a timely fashion, but some delay has potential to impact schedule.	RFIs not submitted in a timely fashion and contractor proceeds at their own risk without formal response.	
Paperwork includes all required information including backup.	Majority of paperwork includes required information. Any resubmissions are complete.	Paperwork consistently contains errors or missing information. Resubmissions require additional revisions.	
Submitted complete, accurate invoices each month during the last 6 months.	Submitted complete, accurate invoices during 5 of the last 6 months.	All other situations.	
No delay in acquiring materials and equipment when needed.	Occasional delay in acquiring material or equipment but not a frequent pattern.	Consistent delay in obtaining material or equipment negatively influencing schedule.	
			Average

G. Equipment			
G) Using the Rating Scale noted above, please rate the rate this Contractor's ability to provide functioning, appropriate equipment along with skilled operators. Sub-contractors equipment/operators are included in this rating.			
10	8	4	Score
Equipment available and appropriate for the task whenever needed.	Occasional delay in obtaining appropriate equipment (such as high-rail, or special track equipment) but minimal impact to planned work.	Frequent delay in obtaining proper equipment. Work plan must be changed an average of once a week due to lack of appropriate equipment.	
Equipment well maintained. Appropriate measures taken to ensure operation in extreme conditions.	Under normal conditions equipment runs properly more than 90% of time.	Frequent equipment breakdowns.	
Equipment operators are highly skilled and proficient.	Operators are proficient.	Efficiency of work impacted due to equipment limitations or not functioning more than 10% of time. Operator actions result in damage to property or "near miss" incidents.	
All required equipment submitted for inspection prior to use on MassDOT property (i.e. Hi-rail equipment inspected by MOW prior to use on rail).	All equipment submitted and in good working condition. (i.e. no oil leaks, proper safety guards in place, etc.).	Equipment not submitted for inspection by MassDOT prior to use on property.	
Specialized Equipment is as specified in the contract documents.	Specialized Equipment is in close conformance with the specified limits in the contract documents.	Specialized Equipment is not in conformance with the specified limits in the contract documents.	
			Average

Excellent	Average	Fair	
10	8	6	
H. On-Site Supervisory Personnel Rating			
H) Using the Rating Scale noted above, please rate the rate the general performance of the Contractor's on-site supervisory personnel. Please provide specific examples to support rating.			
10	8	4	Score
Demonstrates full knowledge of contract requirements and revisions.	Reasonable knowledge of contract requirements.	Does not demonstrate working knowledge of contract requirements.	
Fully cooperates with all reasonable requests.	Generally cooperates with reasonable requests.	Refuses to cooperate with reasonable requests.	
Effectively manages workforce.	Generally capable of managing workforce.	Unable to properly manage workforce.	
Fully authorized and capable of making jobsite decisions.	Able to make jobsite decisions.	Not authorized to make jobsite decisions.	
Onsite personnel have required licenses and are trained above contract requirements, i.e. superintendent's license, safety Rep has OSHA certifications in multiple disciplines, QCM has NETTCP, AWS, NACE certifications.	Onsite personnel have required licenses and certifications i.e. superintendent's license, safety Rep is familiar with OSHA regulations, but not certified, QCM has field experience, but not certified in any fields.	Onsite personnel lack field experience and/or required licenses.	
			Average

I. General Compliance with Contract Requirements			
I) Using the Rating Scale noted above, please rate the rate Contractor's general compliance with overall contract requirements. This includes ability to work well with MassDOT stakeholders, designer, municipalities and Authority Having Jurisdiction. For final payment, score should summarize ability to close out project (warranty, as-built documentation, etc.),			
10	8	4	Score
Required documentation not directly tied to work is submitted without prompting (certified payroll, as-built plan updates, material certifications, etc.).	Generally complies with administrative requirements (90%+). If information missing or error found, corrected on subsequent submission.	Administrative submittals rarely complete or accurate (less than 20% of time). Similar errors occur repeatedly.	
Good working relationship with all outside parties (MassDOT, Utilities and/or Other Authorities having Jurisdiction).	Good working relationship with majority of outside parties (MassDOT, Utilities or Other Authorities having Jurisdiction). Occasional difficulty in dealing with outside entities (less than 20% of the time).	Confrontational relationship with multiple outside parties (MassDOT Departments, Utilities and/or Other Authorities having Jurisdiction).	
Fully understands and complies with (MassDOT and Utility) requirements.	Require only occasional guidance from MassDOT regarding project requirements.	Lacks understanding of the required documents for MassDOT acceptance.	
			Average

Excellent	Average	Fair	
10	8	6	
J. Subcontractor Performance & Management:			
J) Using the Rating Scale noted above, please rate the rate this Contractor's ability, effort, and success in managing, administering, and coordinating subcontractors (if no subcontractors, rate this contractor's overall project management). Please			
10	8	4	Score
Subcontractor(s) in full compliance with requirements for safety, quality, and schedule as defined in other portions of this evaluation.	Subcontractor(s) in general compliance with requirements as defined in other portions of this evaluation.	Subcontractor(s) not complying with requirements as defined in other portions of this evaluation.	
General Contractor is actively assisting subcontractor meet requirements.	General Contractor usually (90%+) assisting subcontractor meet requirements.	No evidence the General Contractor has is actively managing the subcontractor.	
Subcontractor acceptance request submitted 30 days prior to scheduled activity.	Subcontractor acceptance submitted and approved less than 30 days but prior to scheduled activity.	Subcontractor acceptance not always submitted, before arriving onsite.	
Certified payrolls submitted in accordance with contract documents.	Certified payrolls submitted infrequently.	Constantly reminding contractor to submit certified payrolls.	Select
Using the Contractually provided information, provide below the Contractor's current DBE goal and DBE Paid Through Last percentage achieved by the Contractor. If the current DBE Paid through last is below the DBE goal, please request the Contractor to explain how they plans to achieve the DBE goal.			
		Project DBE Goal (From CMS):	%
		Current DBE Paid Through Last % (From CMS):	%
			Average

*** END OF DOCUMENT***

DOCUMENT 00710
GENERAL CONTRACT PROVISIONS
Revised: 03-21-25

NOTICE OF AVAILABILITY

The 2025 MASSACHUSETTS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES DIVISION I: GENERAL REQUIREMENTS AND COVENANTS, as amended herein, certain subsections of DIVISIONS II: CONSTRUCTION DETAILS AND III: MATERIALS SPECIFICIATONS referenced herein, the SUPPLEMENTAL SPECIFICATIONS thereto (03/31/2025), and the American Railway Engineering and Maintenance-of-Way Association ("AREMA") Manual for Railway Engineering dated 2024 are incorporated into this contract.

The 2025 MASSACHUSETTS DEPARTMENT OF TRANSPORTATION HIGHWAY DIVISION STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES and SUPPLEMENTAL SPECIFICATIONS (03/31/2025) are available online at https://www.mass.gov/massdot-highway-division-manuals-and-publications

The American Railway Engineering and Maintenance-of-Way Association ("AREMA") Manual for Railway Engineering dated 2024, incorporated by reference herein, is available for purchase at MRE.

AMENDMENTS to the 2025 MASSACHUSETTS DEPARTMENT OF TRANSPORTATION HIGHWAY STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES DIVISION I: GENERAL REQUIREMENTS AND COVENANTS

Amendments to the 2025 Massachusetts Department of Transportation Highway Division Standard Specifications for Highways and Bridges Division I: General Requirements and Covenants are set forth in Document A00801 Special Provisions, and in this Document 00710 General Contract Provisions, as follows.

SPECIAL PROVISIONS FOR RIGHT-TO-KNOW ACT REQUIREMENTS

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

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

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

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

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

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

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

ALTERNATIVE DISPUTE RESOLUTION

Forum, Choice of Law and Mediations:

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

*** END OF DOCUMENT ***

DOCUMENT 00718

SPECIAL PROVISION FOR PARTICIPATION BY MINORITY OR WOMEN'S BUSINESS ENTERPRISES AND SERVICE- DISABLED VETERAN- OWNED BUSINESS ENTERPRISES

(Implementing Chapter 102, Section 24 and
Chapter 273, Section 124, of the Acts of 1994 and Chapter 56, Sections 1 to 5 of the Acts of 2010
and subsequent Acts)
Revised: September 27, 2021

I. PARTICIPATION

M/WBE PARTICIPATION GOAL
On this Contract, the Massachusetts Department of Transportation (MassDOT) has established a goal for participation by Minority or Women Business Enterprise(s) (M/WBE). One half of the goal shall be met in the form of contractor activity. This goal shall remain in effect throughout the life of the Contract.

☒ Design-Bid-Build Projects: M/WBE Participation Goal **7 %**
(*One half of this goal shall be met in the form of Subcontractor construction activity*)

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

SDVOBE PARTICIPATION BENCHMARK
On this Contract, the Massachusetts Department of Transportation (MassDOT) has established a goal for participation by Service- Disabled Veteran- Owned Business Enterprise(s) (SDVOBE). This goal shall remain in effect throughout the life of the Contract.

☐ Design-Bid-Build Projects: SDVOBE Participation Goal **____%**

☐ Design-Build Projects: SDVOBE Design Participation Goal **___%** and SDVOBE Construction Participation Goal **___%**

II. POLICY

It is the policy of the MassDOT that Minority, Women Business Enterprises (M/WBEs) and Service- Disabled Veteran- Owned Business Enterprises (SDVOBEs) have equal opportunity to receive and participate in the performance of its state funded Contracts.

III. M/WBE and SDVOBE OBLIGATION

The Contractor agrees to take all necessary and reasonable steps to ensure that MBE, WBE, and SDVOBEs have the maximum opportunity to compete for, and to perform, Department Contracts.

IV. FAILURE TO COMPLY WITH M/WBE OR SDVOBE REQUIREMENTS

All Contractors and Subcontractors are hereby advised that failure to carry out the requirements of these Provisions constitutes a breach of Contract which may result in termination of the Contract, a determination that the Contractor or Subcontractor be barred from bidding on Department Contracts for up to three (3) years, or any other remedy as the Department may impose under Section XIV of these Special Provisions.

V. REQUIRED SUBCONTRACT PROVISIONS

The Prime Contractor shall include the Provisions of Sections II, III, and IV above in every subcontract making those provisions binding on each subcontractor, supplier, manufacturer, consultant or service provider.

VI. DEFINITIONS

For the purpose of these Special Provisions, the terms listed below are defined as follows:

Minority Business Enterprise or MBE means any individual, business organization, or non-profit corporation certified as a MBE by the Supplier Diversity Office (SDO), formerly known as the State Office of Minority and Women Business Assistance (SOMWBA), or by the Department for the purposes of a particular bid or proposal to be submitted to the Department.

Women Business Enterprise or WBE means any individual, business or organization, or non-profit corporation certified as a WBE by SDO, or by the Department for the purposes of a particular bid or proposal to be submitted to the Department.

Service- Disabled Veterans- Owned Businesses or SDVOBE means a business not less than 51 percent of which is owned by one or more service- disabled veterans or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more service-disabled veterans; and the management and daily business operations of which are controlled by one or more service- disabled veterans or, in the case of a veteran with permanent and severe disability, the spouse or permanent caregiver of such veteran.

"Contractor activity" means any work, including but not limited to, construction, demolition, renovation, survey, test boring services, or maintenance work performed under the Contract.

"Approved Joint Venture" means a joint venture between M/WBEs and non-M/WBEs, or SDVOBEs and non-SDVOBEs, which has been established for the purpose of participation on a particular contract, where:

1. The M/WBE or SDVOBE partner(s) shares in the ownership, control, management responsibilities, risks and profits of the joint venture; and

2. The Joint Venture has been approved by the Department for M/WBE or SDVOBE participation on the particular contract.

"Equipment Rental Firm" means a firm that owns equipment and assumes actual and contractual responsibility to rent said equipment to perform a useful function of the work of the contract consistent with normal industry practice.

"Material Supplier" means a vendor engaged in sales to the highway construction industry from an established place of business or source of supply, which:

(a) Manufactures goods from raw materials or substantially alters them before resale, or

(b) Provides and maintains a storage facility for materials used in the work, consistent with normal industry practice.

“Department” means the Massachusetts Department of Transportation (MassDOT).

"SDO" means the Massachusetts Supplier Diversity Office.

VII. ELIGIBILITY of M/WBEs

Only firms, *OTHER THAN THE PRIME CONTRACTOR*, which have been certified by SDO and/or the Department as eligible to participate on state funded contracts as MBEs or WBEs may be used on this contract for credit toward the toward the M/WBE participation goal.

1. SDO Directory of Certified M/WBEs: The Supplier Diversity Office publishes a Directory of certified MBE and WBEs. This Directory can be obtained from SDO at https://www.sdo.osd.state.ma.us/. This site lists those firms which have been certified as minority owned (MBEs) or women owned (WBEs) in accordance with the criteria of 425 CMR 2.00 et seq to participate as M/WBEs on state funded contracts. It also lists the kinds of work in which each firm engages but does not constitute an endorsement of the quality or performance of any business and does not represent Department subcontractor approval.

2. Application for Certification by the Department for a Particular Project: A firm which has (1) submitted a fully completed M/WBE application to SDO at least 30 days previously, (2) has provided in a timely manner, any additional information which may have been requested by SDO, and (3) can provide evidence, satisfactory to the Department, of a bidder's conditional commitment to subcontract with the firm, if certified, may apply directly to the MassDOT Office of Civil Rights to be certified for participation on the particular contract.

3. Joint Venture Approval: To obtain recognition as an approved joint venture between M/WBEs and non-/M/WBEs, the Joint Venture must provide to the MassDOT Office of Civil Rights, at least 14 business days before the bid opening date, the Joint Venture Affidavit Document B00847, and a copy of the Joint Venture Agreement, which shall include a detailed breakdown of the following:

   (a) Capital participation by the M/WBE,

   (b) Specific equipment to be provided to the Joint Venture by the M/WBE,

   (c) Specific responsibilities of the M/WBE in the management of the Joint Venture,

   (d) Workforce and specific skills to be provided to the Joint Venture by the M/WBE, and

   (e) Percentage distribution to the M/WBE of the projected profit or loss incurred by the Joint Venture.

   (f) The Joint Venture shall provide all such additional information as may be requested by the Department for the purpose of determining joint venture eligibility.

VIII. ELIGIBILITY of SDVOBEs

Only firms, *OTHER THAN THE PRIME CONTRACTOR*, which have demonstrated that they are listed as a service-disabled veteran- owned small businesses within the VetBiz database may be used on this contract for credit toward the SDVOBE participation goal.

1. VetBiz Database: The website, located at www.VetBiz.gov, listing verified service- disabled veteran- owned businesses.

2. Joint Venture Approval: To obtain recognition as an approved joint venture between SDVOBEs and non-/SDVOBEs, the joint venture must provide to the MassDOT Office of Civil Rights, at least 14 business days before the bid opening date, an application for joint venture participation approval, and a copy of the Joint Venture Agreement, which shall include a detailed breakdown of the following:

   (a) Capital participation by the SDVOBE,

   (b) Specific equipment to be provided to the joint venture by the SDVOBE,

   (c) Specific responsibilities of the SDVOBE in the management of the Joint Venture,

   (d) Workforce and specific skills to be provided to the joint venture by the SDVOBE, and

(e) Percentage distribution to the SDVOBE of the projected profit or loss incurred by the Joint Venture.

(f) The Joint Venture shall provide all such additional information as may be requested by the Department for the purpose of determining joint venture eligibility.

IX. COUNTING M/WBE PARTICIPATION AND SDVOBE BENCHMARKS TOWARDS M/WBE AND SDVOBE GOALS

In order for M/WBE participation and SDVOBE benchmarks to count toward the Contract goal, the M/WBE and SDVOBE must have independently managed, supervised and performed the Contract work with its own workforce, equipment and resources. M/WBE and SDVOBE participation which fulfills these requirements shall be counted toward meeting the M/WBE and SDVOBE goals in accordance with the following rules:

1 If a firm has been determined to be an eligible MBE, WBE or SDVOBE, the total dollar value of the contract performed by the M/WBE or SDVOBE is counted toward the applicable goal as follows:

a. Except as provided below, in Section IX (1)(g), work performed by a M/WBE or a SDVOBE Prime Contractor shall not be counted toward the M/WBE or SDVOBE goal, and all Prime Contractors, including M/WBE or SDVOBE Prime Contractors, must comply with the M/WBE and SDVOBE requirements of this Contract.

b. For a M/WBE or SDVOBE material supplier, sixty percent (60%) of the amount to be paid for materials and supplies required under this Contract shall be credited toward the goal.

c. For a M/WBE or SDVOBE who provides a bonafide service such as professional, technical, consultant or managerial services and assistance in the procurement of essential personnel, facilities, equipment, materials, or supplies required for performance of the contract, reasonable fees or commissions charged for the service shall be listed, but the cost of items themselves shall not be credited.

d. For a M/WBE or SDVOBE hauler, trucker, or delivery service, which is not also the manufacturer of or a regular dealer in the materials and supplies, reasonable fees charged for delivery of materials and supplies required on the job site shall be credited; the cost of the materials and supplies themselves shall not be credited.

e. For a M/WBE or SDVOBE who provides any bonds or insurance specifically required for the performance of the contract, reasonable fees or commissions charged for such service shall be listed, but the face amount or actual premium paid for the bond or insurance shall not be credited.

f. The Department shall determine if the fees or commissions listed in accordance with paragraphs (c), (d), and (e) are not excessive as compared with fees or commissions customarily allowed for similar services.

g. That portion of the contract total dollar value equal to the percentage of ownership and control of the M/WBE partner(s) or SDVOBE partner(s) in an approved Joint Venture shall be counted toward the Contract goal, except that credit for M/WBE and SDVOBE participation in an approved Prime Joint Venture shall not exceed one half of the Contract goal.

X. JOINT CHECK POLICY

1. 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 M/WBE or SDVOBE third party such as a regular dealer of material or supplies. The Prime Contractor issues the check as payor to the M/WBE or SDVOBE 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 M/WBE or SDVOBE. MassDOT has established criteria to ensure that M/WBEs or SDVOBEs are in fact performing a commercially useful function ("CUF") while using a joint check arrangement. Contractors and M/WBEs or SDVOBEs must meet and conform to these conditions and criteria governing the use of joint checks.

2. In the event that a Contractor, M/WBE or SDVOBE Subcontractor desires to a use joint check, MassDOT will require prior notice and will closely monitor the arrangement for compliance. MassDOT may allow a joint check arrangement and give credit to a Contractor for use of the M/WBE or SDVOBE 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 (M/WBEs, SDVOBE and non-M/WBEs or non-SDVOBEs); 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 M/WBE or SDVOBE (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.

3. Other factors MassDOT may consider:

   - Whether there is a requirement by the Prime Contractor that a M/WBE or SDVOBE should use a specific vendor or supplier to meet their Subcontractor specifications;
   - Whether there is a requirement that a M/WBE or SDVOBE use the Prime Contractor's negotiated price;
   - The independence of the M/WBE or SDVOBE;
   - 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 M/WBE or SDVOBE has made an effort to establish alternate arrangements for following periods (i.e., the M/WBE or SDVOBE 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 M/WBE or SDVOBE remain responsible for compliance with all other elements of the Special Provisions, and must still be able to prove that a commercially useful function is being performed for the Contractor.

XI. JOINT CHECK PROCEDURES

- The M/WBE or SDVOBE 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 B00846) and by notification on the M/WBE Letter of Intent (Document B00843) or SDVOBE Letter of Intent (Document B00845), 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 Contractor and M/WBE or SDVOBE must have:
  (a) a written agreement with the material supplier/vendor;
  (b) applied for credit with the subject material supplier and has supplied the vendor's response;

(c) shown that it will place all orders to the subject material supplier/vendor;
(d) made and retains all decision-making responsibilities concerning the materials; and
(e) provided a Joint Check Agreement that is acceptable to MassDOT;

- The MassDOT Office of Civil Rights will review the request and render a decision as part of the approval process for M/WBE or SDVOBE 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 M/WBE or SDVOBE 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 M/WBE or SDVOBE (i.e. if possible, funds or the joint check should be processed by the M/WBE or SDVOBE and sent by the M/WBE or SDVOBE 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 M/WBE or SDVOBE 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 M/WBE or SDVOBE Program policies and procedures as part of the Subcontractor approval process.

XII. AWARD DOCUMENTATION AND PROCEDURES

1. The two lowest bidders/the two bidders with the lowest price per quality score point, including any M/WBE bidder or SDVOBE bidder, shall submit, by the close of business on the third business day after the bid opening, a completed Schedule of M/WBE and SDVOBE participation, in the form attached, which shall list:

   a. The full company name, address and telephone number of each M/WBE or SDVOBE with whom the bidder intends to make a commitment;

   b. The Contract item(s), by number(s) and quantity(ies), if applicable, or specific description of other business activity to be performed by each M/WBE or SDVOBE 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 Section XII of these Special Provisions.

   c. The total dollar amount to be paid to each M/WBE or SDVOBE. (Bidders are cautioned that at least one half of the participation goal must be met with Contract work.)

   d. The total dollar amount to be paid to each M/WBE or SDVOBE which is eligible for credit toward the M/WBE or SDVOBE goal under the crediting rules set out in Section IX.

   e. The total creditable M/WBE or SDVOBE participation as a percentage of the total bid price.

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

3. The two lowest bidders/the two bidders with the lowest price per quality score point shall submit with their Schedules of Participation, fully completed, signed Letters of Intent from each of the M/WBEs or SDVOBEs listed on the Schedule. The Letters of Intent shall be in the form attached and shall identify specifically the contract activity the M/WBE or SDVOBE proposes to perform, expressed as contract item number, if applicable, description of the activity, 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.

4. Evidence of good faith efforts will be evaluated by the Department in the selection of the lowest responsible bidder/best value bidder. All information requested by the Department for the purpose of evaluating the bidder's efforts to achieve the goal must be provided within three calendar days and must be accurate and complete in every detail. The apparent low bidder's/best value bidder's attainment of the M/WBE or SDVOBE goal or a satisfactory demonstration of good faith efforts is a prerequisite for Award of the Contract.

5. 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 on the Schedule of Participation, and provide the required Letters of Intent for, M/WBE or SDVOBE 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 the Department, that good faith efforts were made to achieve the goal.

6. If the Department finds that the percentage of M/WBE or SDVOBE participation submitted by the bidder on its Schedule does not meet the Contract goal, or that the 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 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.

7. If, after administrative reconsideration, the Department 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.

8. Actions which constitute evidence of good faith efforts to meet the M/WBE or SDVOBE goals include, but are not limited to, all of the following examples:

   a. Efforts made to select portions of the work proposed to be performed by M/WBEs or SDVOBEs in order to increase the likelihood of achieving the stated goal, including, where appropriate, but not limited to, breaking down contracts into economically feasible units to facilitate M/WBE and SDVOBE participation. The value of such work is required to at least equal the M/WBE and SDVOBE goal.

   b. Reasonable written notification prior to the opening of bids soliciting individual M/WBEs or SDVOBEs interested in participation in the contract as subcontractors, regular dealers, manufacturers, consultants, or service providers and identifying the specific items or type of work being solicited.

   c. Written notification to M/WBE or SDVOBE economic development assistance agencies and organizations which provide assistance in recruitment and placement of M/WBEs and SDVOBEs, describing the type of work, supplies or services being considered for M/WBE or SDVOBE subcontracting on this contract.

   d. Efforts made to negotiate with M/WBEs or SDVOBEs for specific items of work including evidence of:
      (1) The names, addresses, telephone numbers of M/WBEs or SDVOBEs who were contacted, the dates of initial contact and whether initial solicitations of interest were followed up by contacts with M/WBEs or SDVOBEs to determine with certainty whether the M/WBEs or SDVOBEs were interested. Personal or phone contacts are expected.

      (2) A description of the information provided by the M/WBEs or SDVOBEs regarding the plans and specifications and estimated quantities for portions of the work to be performed.

      (3) A statement of why additional agreements with M/WBEs or SDVOBEs were not reached.

      (4) Documentation of each M/WBE or SDVOBE contacted but rejected and the reasons for the rejection.

   e. Absence of any agreements between the Contractor and the M/WBE or SDVOBE in which M/WBE or SDVOBE promises not to provide subcontracting quotations to other bidders.

   f. Efforts made to assist the M/WBEs or SDVOBEs that need assistance in obtaining bonding, insurance, or lines of credit required by the Contractor.

g. Documentation that qualified M/WBEs or SDVOBEs are not available, or are not interested.

h. Attendance at any meeting scheduled by the Department to encourage better Contractor-M/WBE or Contractor- SDVOBE relationships and/or to inform M/WBEs or SDVOBEs of forthcoming M/WBE or SDVOBE utilization opportunities.

i. Advertisement, in general circulation media, in trade association publications and in disadvantaged business enterprise-focused media, of interest in utilizing M/WBEs or SDVOBEs and the area of interest.

j. Efforts to effectively use the services of available minority community organizations; women organizations, veteran organizations, minority, women disadvantaged and veteran contractor's groups; local, state and federal disadvantaged business assistance offices; and other organizations that provide assistance in recruitment and placement of M/WBEs or SDVOBEs.

9. The demonstration of good faith efforts must establish that the Contractor has actively and aggressively sought out M/WBEs or SDVOBEs to participate in the project and has taken all actions which could be reasonably expected to achieve the goal. Examples of circumstances or actions not acceptable as reasons for failure to meet the M/WBE or SDVOBE goal, include, but are not limited to:

a. The M/WBE or SDVOBE was unable to provide performance and/or payment bonds.

b. The M/WBEs or SDVOBEs commercially reasonable bid was rejected based on price.

c. The M/WBE or SDVOBE would not agree to perform items of work at the unit bid price.

d The Contractor does not want to subcontract a percentage of the work sufficient to meet the goal.

e. Solicitation by mail or fax only.

XIII. COMPLIANCE

1. All activity performed by a M/WBE or SDVOBE for credit toward the Contract goal must be performed, managed and supervised by the M/WBE or SDVOBE. Prime Contractor shall not enter into, or condone, any other arrangement.

2. The Prime Contractor shall not perform with its own organization, or assign to any other business, any activity designated for the M/WBEs or SDVOBEs named on the Schedule submitted by the Prime Contractor under Section IX, or under Section XII(6), without the approval of the Department in accordance with the requirements of Sections XIII(6) and XIII(10).

3. The Department may suspend payment for any activity which was not performed by the M/WBE or SDVOBE to whom the activity was committed on the approved Schedule of Participation, or which was not performed in accordance with the requirements of Section XIII(1).

4. The Department retains the right to approve or disapprove all subcontractors. Requests by the Prime Contractor for approval of participation by a M/WBE or SDVOBE subcontractor for credit toward the Contract goal must include, in addition to any other requirements for subcontractor approval, the following:

a. A copy of the proposed subcontract. The subcontract must be for at least the dollar amount, and for the work described, in the Prime Contractor's Schedule of Participation.

b. A resume stating the qualifications and experience of the M/WBE or SDVOBE 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.

c. A Schedule of Operations indicating when the M/WBE or SDVOBE is expected to perform the work.

d. A list of (1) equipment owned by the M/WBE or SDVOBE to be used on the Project, and (2) equipment to be leased by the M/WBE or SDVOBE for use on the Project.

e. A list of: (1) all projects (public and private) which the M/WBE or SDVOBE is currently performing, (2) all projects (public and private) to which the M/WBE or SDVOBE is committed, (3) all projects (public and private) to which the M/WBE or SDVOBE 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 M/WBEs or SDVOBEs work schedule for each project.

5. If, pursuant to the subcontractor approval process, the Department finds that a M/WBE or SDVOBE subcontractor does not have sufficient experience or resources to perform, manage and supervise work of the kind proposed in accordance with the requirements of Section XIII(1), approval of the M/WBE or SDVOBE subcontractor may be denied. In the event of such denial, the Prime Contractor shall proceed in accordance with the requirements of Sections XIII(6) and XIII(10).

6. If, for reasons beyond its control, the Prime Contractor cannot comply with its M/WBE or SDVOBE commitment in accordance with the Schedule of participation submitted under Section IX and the terms of these Special Provisions, the Prime Contractor shall submit to the Department the reasons for its inability to comply with its obligations under Section I and shall submit, and request approval for, a revised Schedule of Participation. If approved by the Department, the revised Schedule shall govern the Prime Contractor's performance in meeting its obligations under these special provisions.

7. A Prime Contractor's compliance with the participation goal in Section I shall be determined by reference to the required percentage of the total Contract price, including any additions and modifications thereto, provided, however, that no decrease in the dollar amount of a bidder's commitment to any M/WBE or SDVOBE shall be allowed without the approval of the Department.

8. If the Contract amount is increased, the Prime Contractor shall submit a revised Schedule of Participation in accordance with Sections XIII(6) and XIII(10).

9. In the event of the decertification of a M/WBE or SDVOBE participating or scheduled to participate on the contract for credit toward the goal, the Contractor shall proceed in accordance with Sections XIII(6) and XIII(10).

10. The Prime Contractor shall notify the Department immediately of any facts which come to its attention indicating that it may or will be unable to comply with any aspect of its M/WBE or SDVOBE obligation under this Contract.

11. Any notice required by these Special Provisions shall be given in writing to the Resident Engineer and the designated Compliance Officer with a copy to the Director of Compliance, Office of Diversity and Civil Rights, 10 Park Plaza, Room 3170, Boston MA 02116.

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

13. The Contractor shall pay each M/WBE or SDVOBE for satisfactory performance of its Contract no later than 10 days from receipt of payment for the work from the Department. Any delay or postponement of payment to the M/WBEs or SDVOBEs must be for good cause and only with the prior approval of the Department.

14. The Department may withhold the Contractor's next periodic payment if each M/WBE or SDVOBE is not paid in accordance with Section XIII(13).

15. The Department may require specific performance of the Prime Contractor's commitment under the Contract by requiring the Prime Contractor to subcontract with a M/WBE or SDVOBE for any contract or specialty item.

XIV. SANCTIONS

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

1. Retain, in connection with final acceptance and final payment, an amount determined by multiplying the total contract amount by the percentage in Section I, less the amount paid to approved M/WBEs or SDVOBEs for work performed under the Contract in accordance with the provisions of Section X. The Prime Contractor shall have the right to appeal such retention of funds in accordance with the provisions of M.G.L. c. 30A s.10.

2. 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.

3. 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 5.07.

4. Initiate debarment proceedings under M.G.L. c.29 §29F.

XV. FURTHER INFORMATION

Any proposed M/WBE, SDVOBE, bidder, Contractor or subcontractor shall provide such information as is necessary in the judgement of the Department to ascertain its compliance with the terms of this Special Provision.

XVI. LIST OF ADDITIONAL DOCUMENTS

1. The following documents shall be completed and signed by the bidder and designated M/WBEs or SDVOBEs in accordance with Section XII - Award Documentation and Procedures. These documents must be returned by the bidder to MassDOT's Bid Document Distribution Center:

   - □ Schedule of M/WBEs (Document B00842) or SDVOBE Participation (Document B00844)
   - □ Letter of Intent: M/WBEs (Document B00843) or SDVOBE (Document B00845)
   - □ M/WBEs or SDVOBE Joint Check Arrangement Approval Form (Document B00846), if Contractor and M/WBE or SDVOBE plan, or if M/WBE or SDVOBE is required to use a Joint Check (when applicable)

2. The following document shall be signed and returned by Contractor and Subcontractors/M/WBEs or SDVOBEs to the MassDOT Office overseeing the Project, as applicable:

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

3. 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:

   - □ Joint Venture Affidavit of M/WBE or SDVOBE/Non-M/WBE or Non-SDVOBE (Document B00847)

4. The following document shall be provided to MassDOT's 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 00761

SPECIAL PROVISIONS FOR CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

Revised: 02/09/16

I. Instructions for Certification - Primary Covered Transactions:

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

1. 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 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 MassDOT's determination whether to enter into this transaction. However, failure of the prospective primary participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

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

3. The prospective primary participant shall provide immediate written notice to the MassDOT if any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

4. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the MassDOT for assistance in obtaining a copy of those regulations.

5. The prospective primary 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 MassDOT.

6. The prospective primary 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 Transaction," provided by the MassDOT, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

7. 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 may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the nonprocurement portion of the "Lists of Parties Excluded From Federal Procurement or Nonprocurement Programs" (Nonprocurement List) which is compiled by the General Services Administration and the Debarment Lists compiled by both the Massachusetts Office of the Attorney General and the Department of Capital Asset Management and Maintenance (DCAMM) and published separately in the Central Register.

8. 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.

9. Except for transactions authorized under paragraph 5 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, the MassDOT may terminate this transaction for cause or default.

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion -- Primary Covered Transactions

The prospective primary 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 covered transactions by any Federal, State or local department or agency;

2. Have not within a 3-year period preceding this proposal been convicted of or had a civil judgement rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

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

4. Have not within a 3-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

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

* * * * *

II. Instructions for Certification - Lower Tier Covered Transactions:

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

1. 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 the MassDOT may pursue available remedies, including suspension and/or debarment.

2. 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.

3. The terms "covered transaction," "debarred," "suspended," "ineligible," "primary covered transaction," "participant," "person," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the MassDOT for assistance in obtaining a copy of those regulations.

4. 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 MassDOT.

5. 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.

6. 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 may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List and the Debarment Lists.

7. 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.

8. Except for transactions authorized under paragraph 4 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, the MassDOT may pursue available remedies, including suspension and/or debarment.

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions

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

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

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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

*** END OF DOCUMENT ***

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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 MassDOT Rail and Transition Divison 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 Rail and Transit Division before taking the EBO on-line training module.

Interim Reporting Requirements

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

*** END OF DOCUMENT ***

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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)** ☐ Rail & Transit Approved **S**ubcontractor

Contract No: 132590 **Project No.** 614254 **Federal Aid No.:** N/A

Location: Sandwich, MA – Cape Main MP 63.22

Project Description: Cape Main Culvert Replacement at MP 63.22

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

☐ 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.
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 12/2025

*** 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

CAPE MAIN
CULVERT REPLACEMENT AT MP 63.22
IN SANDWICH, MA

STATE SCHEDULE OF
PREVAILING WAGE RATES

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THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT
DEPARTMENT OF LABOR STANDARDS
Prevailing Wage Rates

MAURA HEALY
Governor
KIM DRISCOLL
Lt. Governor

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:	Department of Transportation	**City/Town:**	SANDWICH
Contract Number:	132590		
Description of Work:	Replace existing 36"x36" stone box culvert at MP 63.22 on the Cape Main with new 48" round RCP culvert and reinforced concrete wingwalls		
Job Location:	Sandwich, MA		

Information about Prevailing Wage Schedules for Awarding Authorities and Contractors

- The wage rates will remain in effect for the duration of the project, except in the case of multi-year public construction projects. For construction projects lasting longer than one year, awarding authorities must request an updated wage schedule no later than two weeks before the anniversary of the date the contract was executed by the awarding authority and the general contractor. For multi-year CM AT RISK projects, the awarding authority must request an annual update no later than two weeks before the anniversary date, determined as the earlier of: (a) the execution date of the GMP Amendment, or (b) the execution date of the first amendment to permit procurement of construction services. The updated wage schedule must be provided to all contractors, including general and sub-contractors, working on the construction project.
- This annual update requirement is generally not applicable to 27F "rental of equipment" contracts. For such contracts, the prevailing wage rates issued by DLS shall remain in effect for the duration of the contract term. However, if the prevailing wage rate sheet issued does not contain wage rates for each year covered by the contract term, the Awarding Authority must request updated rate sheets from DLS and provide them to the contractor to ensure the correct rates are being paid throughout the duration of the contract. Additionally, if an Awarding Authority exercises an option to renew or extend the contract term, they must request updated rate sheets form DLS and provide them to the contractor.
- This wage schedule applies only to the specific project referenced at the top of this page and uniquely identified by the "Wage Request Number" on all pages of this schedule.
- An Awarding Authority must request an updated wage schedule if it has not opened bids or selected a contractor 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: 12/11/2025 Wage Request Number: 20251210174557 Page 1 of 34

Construction

Classification	Effective Date	Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
(2 AXLE) DRIVER - EQUIPMENT TEAMSTERS JOINT COUNCIL NO. 10 TEAMSTERS JOINT COUNCIL NO. 10 ZONE B	12/1/2025	$40.95	$15.57	$21.78	$0.00	$0.00	$78.30
	1/1/2026	$40.95	$16.17	$21.78	$0.00	$0.00	$78.90
	6/1/2026	$41.95	$16.17	$21.78	$0.00	$0.00	$79.90
	12/1/2026	$41.95	$16.17	$23.52	$0.00	$0.00	$81.64
	1/1/2027	$41.95	$16.77	$23.52	$0.00	$0.00	$82.24
(3 AXLE) DRIVER - EQUIPMENT TEAMSTERS JOINT COUNCIL NO. 10 TEAMSTERS JOINT COUNCIL NO. 10 ZONE B	12/1/2025	$41.02	$15.57	$21.78	$0.00	$0.00	$78.37
	1/1/2026	$41.02	$16.17	$21.78	$0.00	$0.00	$78.97
	6/1/2026	$42.02	$16.17	$21.78	$0.00	$0.00	$79.97
	12/1/2026	$42.02	$16.17	$23.52	$0.00	$0.00	$81.71
	1/1/2027	$42.02	$16.77	$23.52	$0.00	$0.00	$82.31
(4 & 5 AXLE) DRIVER - EQUIPMENT TEAMSTERS JOINT COUNCIL NO. 10 TEAMSTERS JOINT COUNCIL NO. 10 ZONE B	12/1/2025	$41.14	$15.57	$21.78	$0.00	$0.00	$78.49
	1/1/2026	$41.14	$16.17	$21.78	$0.00	$0.00	$79.09
	6/1/2026	$42.14	$16.17	$21.78	$0.00	$0.00	$80.09
	12/1/2026	$42.14	$16.17	$23.52	$0.00	$0.00	$81.83
	1/1/2027	$42.14	$16.77	$23.52	$0.00	$0.00	$82.43
ADS/SUBMERSIBLE PILOT PILE DRIVER LOCAL 56 PILE DRIVER LOCAL 56 (ZONE 2) For apprentice rates see "Apprentice- PILE DRIVER"	8/1/2024	$117.16	$10.08	$11.62	$12.67	$0.00	$151.53
AIR TRACK OPERATOR LABORERS LABORERS - ZONE 2	12/1/2025	$41.97	$10.15	$9.50	$9.11	$0.00	$70.73
	6/1/2026	$43.41	$10.15	$9.50	$9.11	$0.00	$72.17
	12/1/2026	$44.85	$10.15	$9.50	$9.11	$0.00	$73.61
	6/1/2027	$46.30	$10.15	$9.50	$9.11	$0.00	$75.06
	12/1/2027	$47.75	$10.15	$9.50	$9.11	$0.00	$76.51
	6/1/2028	$49.25	$10.15	$9.50	$9.11	$0.00	$78.01
	12/1/2028	$50.75	$10.15	$9.50	$9.11	$0.00	$79.51
For apprentice rates see "Apprentice- LABORER"							
AIR TRACK OPERATOR (HEAVY & HIGHWAY) LABORERS LABORERS - ZONE 2 (HEAVY & HIGHWAY)	12/1/2025	$41.97	$10.15	$9.50	$9.21	$0.00	$70.83
	6/1/2026	$43.41	$10.15	$9.50	$9.21	$0.00	$72.27
	12/1/2026	$44.85	$10.15	$9.50	$9.21	$0.00	$73.71
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"							
ASBESTOS WORKER (PIPES & TANKS) HEAT & FROST INSULATORS LOCAL 6 HEAT & FROST INSULATORS LOCAL 6 (SOUTHERN MASS)	12/1/2025	$44.80	$14.50	$4.30	$6.75	$0.00	$70.35
ASPHALT RAKER LABORERS LABORERS - ZONE 2	12/1/2025	$41.47	$10.15	$9.50	$9.11	$0.00	$70.23
	6/1/2026	$42.91	$10.15	$9.50	$9.11	$0.00	$71.67
	12/1/2026	$44.35	$10.15	$9.50	$9.11	$0.00	$73.11
	6/1/2027	$45.80	$10.15	$9.50	$9.11	$0.00	$74.56
	12/1/2027	$47.25	$10.15	$9.50	$9.11	$0.00	$76.01
	6/1/2028	$48.75	$10.15	$9.50	$9.11	$0.00	$77.51
	12/1/2028	$50.25	$10.15	$9.50	$9.11	$0.00	$79.01
For apprentice rates see "Apprentice- LABORER"							

Construction

Classification	Effective Date	Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
ASPHALT RAKER (HEAVY & HIGHWAY)	12/1/2025	$41.47	$10.15	$9.50	$9.21	$0.00	$70.33
LABORERS	6/1/2026	$42.91	$10.15	$9.50	$9.21	$0.00	$71.77
LABORERS - ZONE 2 (HEAVY & HIGHWAY)	12/1/2026	$44.35	$10.15	$9.50	$9.21	$0.00	$73.21
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)							
ASPHALT/CONCRETE/CRUSHER PLANT-ON SITE	12/1/2025	$59.28	$16.05	$13.25	$3.25	$0.00	$91.83
OPERATING ENGINEERS LOCAL 4	6/1/2026	$60.58	$16.05	$13.25	$3.25	$0.00	$93.13
OPERATING ENGINEERS LOCAL 4	12/1/2026	$62.03	$16.05	$13.25	$3.25	$0.00	$94.58
For apprentice rates see "Apprentice- OPERATING ENGINEERS"							
BACKHOE/FRONT-END LOADER	12/1/2025	$59.28	$16.05	$13.25	$3.25	$0.00	$91.83
OPERATING ENGINEERS LOCAL 4	6/1/2026	$60.58	$16.05	$13.25	$3.25	$0.00	$93.13
OPERATING ENGINEERS LOCAL 4	12/1/2026	$62.03	$16.05	$13.25	$3.25	$0.00	$94.58
For apprentice rates see "Apprentice- OPERATING ENGINEERS"							
BARCO-TYPE JUMPING TAMPER	12/1/2025	$41.47	$10.15	$9.50	$9.11	$0.00	$70.23
LABORERS	6/1/2026	$42.91	$10.15	$9.50	$9.11	$0.00	$71.67
LABORERS - ZONE 2	12/1/2026	$44.35	$10.15	$9.50	$9.11	$0.00	$73.11
	6/1/2027	$45.80	$10.15	$9.50	$9.11	$0.00	$74.56
	12/1/2027	$47.25	$10.15	$9.50	$9.11	$0.00	$76.01
	6/1/2028	$48.75	$10.15	$9.50	$9.11	$0.00	$77.51
	12/1/2028	$50.25	$10.15	$9.50	$9.11	$0.00	$79.01
For apprentice rates see "Apprentice- LABORER"							
BLOCK PAVER, RAMMER / CURB SETTER	12/1/2025	$41.97	$10.15	$9.50	$9.11	$0.00	$70.73
LABORERS	6/1/2026	$43.41	$10.15	$9.50	$9.11	$0.00	$72.17
LABORERS - ZONE 2	12/1/2026	$44.85	$10.15	$9.50	$9.11	$0.00	$73.61
	6/1/2027	$46.30	$10.15	$9.50	$9.11	$0.00	$75.06
	12/1/2027	$47.75	$10.15	$9.50	$9.11	$0.00	$76.51
	6/1/2028	$49.25	$10.15	$9.50	$9.11	$0.00	$78.01
	12/1/2028	$50.75	$10.15	$9.50	$9.11	$0.00	$79.51
For apprentice rates see "Apprentice- LABORER"							
BLOCK PAVER, RAMMER / CURB SETTER (HEAVY &	12/1/2025	$41.97	$10.15	$9.50	$9.21	$0.00	$70.83
HIGHWAY)	6/1/2026	$43.41	$10.15	$9.50	$9.21	$0.00	$72.27
LABORERS	12/1/2026	$44.85	$10.15	$9.50	$9.21	$0.00	$73.71
LABORERS - ZONE 2 (HEAVY & HIGHWAY)							
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)							
BOILER MAKER	1/1/2024	$48.12	$7.07	$14.60	$6.00	$0.00	$75.79
BOILERMAKERS LOCAL 29							
BOILERMAKERS LOCAL 29							

Apprentice: BOILER MAKER

Effective Date: 1/1/2024

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	65.00	$31.28	$7.07	$9.32	$3.90	$0.00	$51.57
2	65.00	$31.28	$7.07	$9.32	$3.90	$0.00	$51.57
3	70.00	$33.68	$7.07	$10.03	$4.20	$0.00	$54.98

Construction

Classification	Effective Date	Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY WATERPROOFING)	8/1/2025	$67.95	$11.49	$15.57	$8.02	$0.00	$103.03
BRICKLAYERS LOCAL 3	2/1/2026	$69.30	$11.49	$15.57	$8.02	$0.00	$104.38
BRICKLAYERS LOCAL 3 (NEW BEDFORD)	8/1/2026	$71.50	$11.49	$15.57	$8.02	$0.00	$106.58
	2/1/2027	$72.90	$11.49	$15.57	$8.02	$0.00	$107.98

Apprentice: BOILER MAKER

Effective Date: 1/1/2024

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
4	75.00	$36.09	$7.07	$10.74	$4.50	$0.00	$58.40
5	80.00	$38.50	$7.07	$11.45	$4.80	$0.00	$61.82
6	85.00	$40.90	$7.07	$12.18	$5.10	$0.00	$65.25
7	90.00	$43.31	$7.07	$12.88	$5.40	$0.00	$68.66
8	95.00	$45.71	$7.07	$13.62	$5.70	$0.00	$72.10

Apprentice to Journeyworker Ratio: 1:4

Apprentice: BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY WATERPROOFING)

Effective Date: 8/1/2025

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	50.00	$33.98	$11.49	$15.57	$8.02	$0.00	$69.06
2	60.00	$40.77	$11.49	$15.57	$8.02	$0.00	$75.85
3	70.00	$47.57	$11.49	$15.57	$8.02	$0.00	$82.65
4	80.00	$54.36	$11.49	$15.57	$8.02	$0.00	$89.44
5	90.00	$61.16	$11.49	$15.57	$8.02	$0.00	$96.24

Apprentice: BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY WATERPROOFING)

Effective Date: 2/1/2026

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	50.00	$34.65	$11.49	$15.57	$8.02	$0.00	$69.73
2	60.00	$41.58	$11.49	$15.57	$8.02	$0.00	$76.66
3	70.00	$48.51	$11.49	$15.57	$8.02	$0.00	$83.59
4	80.00	$55.44	$11.49	$15.57	$8.02	$0.00	$90.52
5	90.00	$62.37	$11.49	$15.57	$8.02	$0.00	$97.45

Apprentice to Journeyworker Ratio: 1:5

BULLDOZER/GRADER/SCRAPER	12/1/2025	$58.62	$16.05	$13.25	$3.25	$0.00	$91.17
OPERATING ENGINEERS LOCAL 4	6/1/2026	$59.90	$16.05	$13.25	$3.25	$0.00	$92.45
OPERATING ENGINEERS LOCAL 4	12/1/2026	$61.34	$16.05	$13.25	$3.25	$0.00	$93.89
For apprentice rates see "Apprentice- OPERATING ENGINEERS"							
CAISSON & UNDERPINNING BOTTOM MAN	12/1/2025	$49.85	$10.15	$9.50	$9.80	$0.00	$79.30
LABORERS	6/1/2026	$51.40	$10.15	$9.50	$9.80	$0.00	$80.85
LABORERS - FOUNDATION AND MARINE	12/1/2026	$52.90	$10.15	$9.50	$9.80	$0.00	$82.35

Construction

Classification	Effective Date	Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- LABORER"							
CAISSON & UNDERPINNING LABORER	12/1/2025	$48.70	$10.15	$9.50	$9.80	$0.00	$78.15
LABORERS	6/1/2026	$50.25	$10.15	$9.50	$9.80	$0.00	$79.70
LABORERS - FOUNDATION AND MARINE	12/1/2026	$51.75	$10.15	$9.50	$9.80	$0.00	$81.20
For apprentice rates see "Apprentice- LABORER"							
CAISSON & UNDERPINNING TOP MAN	12/1/2025	$49.03	$10.15	$9.50	$9.80	$0.00	$78.48
LABORERS	6/1/2026	$50.58	$10.15	$9.50	$9.80	$0.00	$80.03
LABORERS - FOUNDATION AND MARINE	12/1/2026	$52.08	$10.15	$9.50	$9.80	$0.00	$81.53
For apprentice rates see "Apprentice- LABORER"							
CARBIDE CORE DRILL OPERATOR	12/1/2025	$41.47	$10.15	$9.50	$9.11	$0.00	$70.23
LABORERS	6/1/2026	$42.91	$10.15	$9.50	$9.11	$0.00	$71.67
LABORERS - ZONE 2	12/1/2026	$44.35	$10.15	$9.50	$9.11	$0.00	$73.11
	6/1/2027	$45.80	$10.15	$9.50	$9.11	$0.00	$74.56
	12/1/2027	$47.25	$10.15	$9.50	$9.11	$0.00	$76.01
	6/1/2028	$48.75	$10.15	$9.50	$9.11	$0.00	$77.51
	12/1/2028	$50.25	$10.15	$9.50	$9.11	$0.00	$79.01
For apprentice rates see "Apprentice- LABORER"							
CARPENTER	9/1/2025	$50.35	$10.33	$11.47	$8.50	$0.00	$80.65
CARPENTERS	3/1/2026	$51.60	$10.33	$11.47	$8.50	$0.00	$81.90
CARPENTERS -ZONE 2 (Eastern Massachusetts)	9/1/2026	$52.85	$10.33	$11.47	$8.50	$0.00	$83.15
	3/1/2027	$54.10	$10.33	$11.47	$8.50	$0.00	$84.40

Apprentice: CARPENTER

Effective Date: 9/1/2025

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	45.00	$22.66	$10.33	$0.00	$1.73	$0.00	$34.72
2	45.00	$22.66	$10.33	$0.00	$1.73	$0.00	$34.72
3	55.00	$27.69	$10.33	$0.00	$3.40	$0.00	$41.42
4	55.00	$27.69	$10.33	$0.00	$3.40	$0.00	$41.42
5	70.00	$35.25	$10.33	$11.41	$5.10	$0.00	$62.09
6	70.00	$35.25	$10.33	$11.41	$5.10	$0.00	$62.09
7	80.00	$40.28	$10.33	$11.44	$6.80	$0.00	$68.85
8	80.00	$40.28	$10.33	$11.44	$6.80	$0.00	$68.85

Apprentice: CARPENTER

Effective Date: 3/1/2026

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	45.00	$23.22	$10.33	$0.00	$1.73	$0.00	$35.28
2	45.00	$23.22	$10.33	$0.00	$1.73	$0.00	$35.28
3	55.00	$28.38	$10.33	$0.00	$3.40	$0.00	$42.11
4	55.00	$28.38	$10.33	$0.00	$3.40	$0.00	$42.11

Construction

Classification	Effective Date	Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
CARPENTER WOOD FRAME	10/1/2025	$27.75	$7.02	$3.80	$1.00	$0.00	$39.57
CARPENTERS	10/1/2026	$28.85	$7.02	$3.80	$1.00	$0.00	$40.67
CARPENTERS-ZONE 3 (Wood Frame)							
All Aspects of New Wood Frame Work							

Apprentice: CARPENTER

Effective Date: 3/1/2026

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
5	70.00	$36.12	$10.33	$11.41	$5.10	$0.00	$62.96
6	70.00	$36.12	$10.33	$11.41	$5.10	$0.00	$62.96
7	80.00	$41.28	$10.33	$11.44	$6.80	$0.00	$69.85
8	80.00	$41.28	$10.33	$11.44	$6.80	$0.00	$69.85

Apprentice to Journeyworker Ratio: 1:5

Apprentice: CARPENTER WOOD FRAME

Effective Date: 10/1/2025

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	60.00	$16.65	$7.02	$0.00	$0.00	$0.00	$23.67
2	60.00	$16.65	$7.02	$0.00	$0.00	$0.00	$23.67
3	65.00	$18.04	$7.02	$0.00	$1.00	$0.00	$26.06
4	70.00	$19.43	$7.02	$0.00	$1.00	$0.00	$27.45
5	75.00	$20.81	$7.02	$3.80	$1.00	$0.00	$32.63
6	80.00	$22.20	$7.02	$3.80	$1.00	$0.00	$34.02
7	85.00	$23.59	$7.02	$3.80	$1.00	$0.00	$35.41
8	90.00	$24.98	$7.02	$3.80	$1.00	$0.00	$36.80

Apprentice: CARPENTER WOOD FRAME

Effective Date: 10/1/2026

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	60.00	$17.31	$7.02	$0.00	$0.00	$0.00	$24.33
2	60.00	$17.31	$7.02	$0.00	$0.00	$0.00	$24.33
3	65.00	$18.75	$7.02	$0.00	$1.00	$0.00	$26.77
4	70.00	$20.20	$7.02	$0.00	$1.00	$0.00	$28.22
5	75.00	$21.64	$7.02	$3.80	$1.00	$0.00	$33.46
6	80.00	$23.08	$7.02	$3.80	$1.00	$0.00	$34.90
7	85.00	$24.52	$7.02	$3.80	$1.00	$0.00	$36.34
8	90.00	$25.97	$7.02	$3.80	$1.00	$0.00	$37.79

Apprentice to Journeyworker Ratio: 1:5

CEMENT MASONRY/PLASTERING	7/1/2024	$49.19	$13.35	$16.43	$7.78	$1.80	$88.55
BRICKLAYERS LOCAL 3							
BRICKLAYERS LOCAL 3 (NEW BEDFORD)							

Construction

Classification	Effective Date	Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
Apprentice: CEMENT MASONRY/PLASTERING							
Effective Date: 7/1/2024							
Step / Percent / Apprentice Base Wage							
1 / 50.00		$24.60	$13.35	$16.43	$0.00	$0.00	$54.38
2 / 60.00		$29.51	$13.35	$16.43	$2.78	$1.80	$63.87
3 / 65.00		$31.97	$13.35	$16.43	$3.78	$1.80	$67.33
4 / 70.00		$34.43	$13.35	$16.43	$4.78	$1.80	$70.79
5 / 75.00		$36.89	$13.35	$16.43	$5.78	$1.80	$74.25
6 / 80.00		$39.35	$13.35	$16.43	$6.78	$1.80	$77.71
7 / 90.00		$44.27	$13.35	$16.43	$7.78	$1.80	$83.63
Apprentice to Journeyworker Ratio: 1:3							
CHAIN SAW OPERATOR	12/1/2025	$41.47	$10.15	$9.50	$9.11	$0.00	$70.23
LABORERS	6/1/2026	$42.91	$10.15	$9.50	$9.11	$0.00	$71.67
LABORERS - ZONE 2	12/1/2026	$44.35	$10.15	$9.50	$9.11	$0.00	$73.11
	6/1/2027	$45.80	$10.15	$9.50	$9.11	$0.00	$74.56
	12/1/2027	$47.25	$10.15	$9.50	$9.11	$0.00	$76.01
	6/1/2028	$48.75	$10.15	$9.50	$9.11	$0.00	$77.51
	12/1/2028	$50.25	$10.15	$9.50	$9.11	$0.00	$79.01
For apprentice rates see "Apprentice- LABORER"							
CLAM SHELLS/SLURRY BUCKETS/HEADING MACHINES	12/1/2025	$60.48	$16.05	$13.25	$3.25	$0.00	$93.03
OPERATING ENGINEERS LOCAL 4	6/1/2026	$61.81	$16.05	$13.25	$3.25	$0.00	$94.36
OPERATING ENGINEERS LOCAL 4	12/1/2026	$63.29	$16.05	$13.25	$3.25	$0.00	$95.84
For apprentice rates see "Apprentice- OPERATING ENGINEERS"							
COMPRESSOR OPERATOR	12/1/2025	$37.97	$16.05	$13.25	$3.25	$0.00	$70.52
OPERATING ENGINEERS LOCAL 4	6/1/2026	$38.83	$16.05	$13.25	$3.25	$0.00	$71.38
OPERATING ENGINEERS LOCAL 4	12/1/2026	$39.78	$16.05	$13.25	$3.25	$0.00	$72.33
For apprentice rates see "Apprentice- OPERATING ENGINEERS"							
DELEADER (BRIDGE)	7/1/2025	$58.51	$10.30	$11.95	$12.50	$0.00	$93.26
PAINTERS LOCAL 35	1/1/2026	$59.56	$10.35	$12.00	$12.60	$0.00	$94.51
PAINTERS LOCAL 35 - ZONE 2							
Apprentice: DELEADER (BRIDGE)							
Effective Date: 7/1/2025							
Step / Percent / Apprentice Base Wage							
1 / 50.00		$29.26	$10.30	$0.00	$0.00	$0.00	$39.56
2 / 55.00		$32.18	$10.30	$0.00	$6.88	$0.00	$49.36
3 / 60.00		$35.11	$10.30	$0.00	$7.50	$0.00	$52.91
4 / 65.00		$38.03	$10.30	$0.00	$8.13	$0.00	$56.46
5 / 70.00		$40.96	$10.30	$11.95	$8.75	$0.00	$71.96
6 / 75.00		$43.88	$10.30	$11.95	$9.38	$0.00	$75.51

Construction

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

Apprentice: DELEADER (BRIDGE)

Effective Date: 7/1/2025

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
7	80.00	$46.81	$10.30	$11.95	$10.00	$0.00	$79.06
8	90.00	$52.66	$10.30	$11.95	$11.25	$0.00	$86.16

Apprentice: DELEADER (BRIDGE)

Effective Date: 1/1/2026

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	50.00	$29.78	$10.35	$0.00	$0.00	$0.00	$40.13
2	55.00	$32.76	$10.35	$0.00	$6.93	$0.00	$50.04
3	60.00	$35.74	$10.35	$0.00	$7.56	$0.00	$53.65
4	65.00	$38.71	$10.35	$0.00	$8.19	$0.00	$57.25
5	70.00	$41.69	$10.35	$12.00	$8.82	$0.00	$72.86
6	75.00	$44.67	$10.35	$12.00	$9.45	$0.00	$76.47
7	80.00	$47.65	$10.35	$12.00	$10.08	$0.00	$80.08
8	90.00	$53.60	$10.35	$12.00	$11.34	$0.00	$87.29

Apprentice to Journeyworker Ratio: 1:1

DEMO: ADZEMAN LABORERS LABORERS - ZONE 2	12/1/2025	$48.75	$10.15	$9.50	$9.65	$0.00	$78.05
	6/1/2026	$50.30	$10.15	$9.50	$9.65	$0.00	$79.60
	12/7/2026	$51.80	$10.15	$9.50	$9.65	$0.00	$81.10
	6/7/2027	$53.40	$10.15	$9.50	$9.65	$0.00	$82.70
	12/6/2027	$55.00	$10.15	$9.50	$9.65	$0.00	$84.30
	6/5/2028	$56.68	$10.15	$9.50	$9.65	$0.00	$85.98
	12/4/2028	$58.35	$10.15	$9.50	$9.65	$0.00	$87.65
For apprentice rates see "Apprentice- LABORER"							
DEMO: BACKHOE/LOADER/HAMMER OPERATOR LABORERS LABORERS - ZONE 2	12/1/2025	$49.75	$10.15	$9.50	$9.65	$0.00	$79.05
	6/1/2026	$51.30	$10.15	$9.50	$9.65	$0.00	$80.60
	12/7/2026	$52.80	$10.15	$9.50	$9.65	$0.00	$82.10
	6/7/2027	$54.40	$10.15	$9.50	$9.65	$0.00	$83.70
	12/6/2027	$56.00	$10.15	$9.50	$9.65	$0.00	$85.30
	6/5/2028	$57.68	$10.15	$9.50	$9.65	$0.00	$86.98
	12/4/2028	$59.35	$10.15	$9.50	$9.65	$0.00	$88.65
For apprentice rates see "Apprentice- LABORER"							
DEMO: BURNERS LABORERS LABORERS - ZONE 2	12/1/2025	$49.50	$10.15	$9.50	$9.65	$0.00	$78.80
	6/1/2026	$51.05	$10.15	$9.50	$9.65	$0.00	$80.35
	12/7/2026	$52.55	$10.15	$9.50	$9.65	$0.00	$81.85
	6/7/2027	$54.15	$10.15	$9.50	$9.65	$0.00	$83.45
	12/6/2027	$55.75	$10.15	$9.50	$9.65	$0.00	$85.05
	6/5/2028	$57.43	$10.15	$9.50	$9.65	$0.00	$86.73
	12/4/2028	$59.10	$10.15	$9.50	$9.65	$0.00	$88.40
For apprentice rates see "Apprentice- LABORER"							

Construction

Classification	Effective Date	Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
DEMO: CONCRETE CUTTER/SAWYER	12/1/2025	$49.75	$10.15	$9.50	$9.65	$0.00	$79.05
LABORERS	6/1/2026	$51.30	$10.15	$9.50	$9.65	$0.00	$80.60
LABORERS - ZONE 2	12/7/2026	$52.80	$10.15	$9.50	$9.65	$0.00	$82.10
	6/7/2027	$54.40	$10.15	$9.50	$9.65	$0.00	$83.70
	12/6/2027	$56.00	$10.15	$9.50	$9.65	$0.00	$85.30
	6/5/2028	$57.68	$10.15	$9.50	$9.65	$0.00	$86.98
	12/4/2028	$59.35	$10.15	$9.50	$9.65	$0.00	$88.65
For apprentice rates see "Apprentice- LABORER"							
DEMO: JACKHAMMER OPERATOR	12/1/2025	$49.50	$10.15	$9.50	$9.65	$0.00	$78.80
LABORERS	6/1/2026	$51.05	$10.15	$9.50	$9.65	$0.00	$80.35
LABORERS - ZONE 2	12/7/2026	$52.55	$10.15	$9.50	$9.65	$0.00	$81.85
	6/7/2027	$54.15	$10.15	$9.50	$9.65	$0.00	$83.45
	12/6/2027	$55.75	$10.15	$9.50	$9.65	$0.00	$85.05
	6/5/2028	$57.43	$10.15	$9.50	$9.65	$0.00	$86.73
	12/4/2028	$59.10	$10.15	$9.50	$9.65	$0.00	$88.40
For apprentice rates see "Apprentice- LABORER"							
DEMO: WRECKING LABORER	12/1/2025	$48.75	$10.15	$9.50	$9.65	$0.00	$78.05
LABORERS	6/1/2026	$50.30	$10.15	$9.50	$9.65	$0.00	$79.60
LABORERS - ZONE 2	12/7/2026	$51.80	$10.15	$9.50	$9.65	$0.00	$81.10
	6/7/2027	$53.40	$10.15	$9.50	$9.65	$0.00	$82.70
	12/6/2027	$55.00	$10.15	$9.50	$9.65	$0.00	$84.30
	6/5/2028	$56.68	$10.15	$9.50	$9.65	$0.00	$85.98
	12/4/2028	$58.35	$10.15	$9.50	$9.65	$0.00	$87.65
For apprentice rates see "Apprentice- LABORER"							
DIRECTIONAL DRILL MACHINE OPERATOR	12/1/2025	$58.62	$16.05	$13.25	$3.25	$0.00	$91.17
OPERATING ENGINEERS LOCAL 4	6/1/2026	$59.90	$16.05	$13.25	$3.25	$0.00	$92.45
OPERATING ENGINEERS LOCAL 4	12/1/2026	$61.34	$16.05	$13.25	$3.25	$0.00	$93.89
For apprentice rates see "Apprentice- OPERATING ENGINEERS"							
DIVER	8/1/2024	$78.11	$10.08	$11.62	$12.67	$0.00	$112.48
PILE DRIVER LOCAL 56							
PILE DRIVER LOCAL 56 (ZONE 2)							
as of 8-1-24, Apprentices with diving licenses begin at second year. % of Diver wage 70/80/90 2A $69.83, 3A $91.79,4A $102.14 Total Rate							
DIVER TENDER	8/1/2024	$51.97	$10.08	$11.62	$12.67	$0.00	$86.34
PILE DRIVER LOCAL 56							
PILE DRIVER LOCAL 56 (ZONE 2)							
as of 8-1-24, Apprentices with diving licenses begin at second year. % of Piledriver wage 70/80/90 2A $54.20, 3A $73.93,4A $82.05 Total Rate							
DIVER TENDER (EFFLUENT)	8/1/2024	$83.69	$10.08	$11.62	$12.67	$0.00	$118.06
PILE DRIVER LOCAL 56							
PILE DRIVER LOCAL 56 (ZONE 2)							
For apprentice rates see "Apprentice- PILE DRIVER"							
DIVER/SLURRY (EFFLUENT)	8/1/2024	$117.16	$10.08	$11.62	$12.67	$0.00	$151.53
PILE DRIVER LOCAL 56							
PILE DRIVER LOCAL 56 (ZONE 2)							
For apprentice rates see "Apprentice- PILE DRIVER"							

Construction

Classification	Effective Date	Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
DRAWBRIDGE OPERATOR (Construction) DRAWBRIDGE - SEIU LOCAL 888 DRAWBRIDGE - SEIU LOCAL 888	7/1/2020	$26.77	$6.67	$3.93	$0.00	$0.16	$37.53
ELECTRICIAN ELECTRICIANS LOCAL 223 ELECTRICIANS LOCAL 223	9/1/2025	$52.25	$12.25	$14.86	$3.75	$0.00	$83.11
	9/1/2026	$54.72	$12.50	$15.56	$4.00	$0.00	$86.78

Apprentice: ELECTRICIAN

Effective Date: 9/1/2025

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	40.00	$20.90	$12.25	$0.63	$0.00	$0.00	$33.78
2	45.00	$23.51	$12.25	$0.71	$0.00	$0.00	$36.47
3	50.00	$26.13	$12.25	$0.78	$0.00	$0.00	$39.16
4	55.00	$28.74	$12.25	$6.61	$2.50	$0.00	$50.10
5	60.00	$31.35	$12.25	$7.21	$2.50	$0.00	$53.31
6	65.00	$33.96	$12.25	$7.82	$2.50	$0.00	$56.53
7	70.00	$36.58	$12.25	$8.41	$2.50	$0.00	$59.74
8	75.00	$39.19	$12.25	$9.02	$2.50	$0.00	$62.96

Apprentice: ELECTRICIAN

Effective Date: 9/1/2026

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	40.00	$21.89	$12.50	$0.66	$0.00	$0.00	$35.05
2	45.00	$24.62	$12.50	$0.74	$0.00	$0.00	$37.86
3	50.00	$27.36	$12.50	$0.82	$0.00	$0.00	$40.68
4	55.00	$30.10	$12.50	$6.92	$2.75	$0.00	$52.27
5	60.00	$32.83	$12.50	$7.54	$2.75	$0.00	$55.62
6	65.00	$35.57	$12.50	$8.18	$2.75	$0.00	$59.00
7	70.00	$38.30	$12.50	$8.81	$2.75	$0.00	$62.36
8	75.00	$41.04	$12.50	$9.43	$2.75	$0.00	$65.72

Apprentice to Journeyworker Ratio: 2:3

ELEVATOR CONSTRUCTOR ELEVATOR CONSTRUCTORS LOCAL 4 ELEVATOR CONSTRUCTORS LOCAL 4	1/1/2025	$74.17	$16.28	$10.96	$10.40	$0.00	$111.81
	1/1/2026	$77.26	$16.38	$11.06	$10.70	$0.00	$115.40
	1/1/2027	$80.55	$16.48	$11.16	$11.00	$0.00	$119.19

Apprentice: ELEVATOR CONSTRUCTOR

Effective Date: 1/1/2025

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	50.00	$37.09	$0.00	$0.00	$0.00	$0.00	$37.09
2	55.00	$40.79	$16.28	$10.96	$10.40	$0.00	$78.43
3	65.00	$48.21	$16.28	$10.96	$10.40	$0.00	$85.85

Construction

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

Apprentice: ELEVATOR CONSTRUCTOR

Effective Date: 1/1/2025

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
4	70.00	$51.92	$16.28	$10.96	$10.40	$0.00	$89.56
5	80.00	$59.34	$16.28	$10.96	$10.40	$0.00	$96.98

Apprentice: ELEVATOR CONSTRUCTOR

Effective Date: 1/1/2026

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	50.00	$38.63	$0.00	$0.00	$0.00	$0.00	$38.63
2	55.00	$42.49	$16.38	$11.06	$10.70	$0.00	$80.63
3	65.00	$50.22	$16.38	$11.06	$10.70	$0.00	$88.36
4	70.00	$54.08	$16.38	$11.06	$10.70	$0.00	$92.22
5	80.00	$61.81	$16.38	$11.06	$10.70	$0.00	$99.95

Apprentice to Journeyworker Ratio: 1:1

ELEVATOR CONSTRUCTOR HELPER	1/1/2025	$51.92	$16.28	$10.96	$10.40	$0.00	$89.56
ELEVATOR CONSTRUCTORS LOCAL 4	1/1/2026	$54.08	$16.38	$11.06	$10.07	$0.00	$91.59
ELEVATOR CONSTRUCTORS LOCAL 4	1/1/2027	$56.39	$16.48	$11.16	$11.00	$0.00	$95.03
For apprentice rates see "Apprentice - ELEVATOR CONSTRUCTOR"							
FENCE & GUARD RAIL ERECTOR (HEAVY & HIGHWAY)	12/1/2025	$41.47	$10.15	$9.50	$9.21	$0.00	$70.33
LABORERS	6/1/2026	$42.91	$10.15	$9.50	$9.21	$0.00	$71.77
LABORERS - ZONE 2 (HEAVY & HIGHWAY)	12/1/2026	$44.35	$10.15	$9.50	$9.21	$0.00	$73.21
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)							
FIELD ENG.INST.PERSON-BLDG,SITE,HVY/HWY	11/1/2025	$53.56	$16.05	$13.25	$3.25	$0.00	$86.11
OPERATING ENGINEERS LOCAL 4	5/1/2026	$55.00	$16.05	$13.25	$3.25	$0.00	$87.55
OPERATING ENGINEERS LOCAL 4	11/1/2026	$56.29	$16.05	$13.25	$3.25	$0.00	$88.84
	5/1/2027	$57.72	$16.05	$13.25	$3.25	$0.00	$90.27
For apprentice rates see "Apprentice- OPERATING ENGINEERS"							
FIELD ENG.PARTY CHIEF-BLDG,SITE,HVY/HWY	11/1/2025	$55.17	$16.05	$13.25	$3.25	$0.00	$87.72
OPERATING ENGINEERS LOCAL 4	5/1/2026	$56.62	$16.05	$13.25	$3.25	$0.00	$89.17
OPERATING ENGINEERS LOCAL 4	11/1/2026	$57.92	$16.05	$13.25	$3.25	$0.00	$90.47
	5/1/2027	$59.37	$16.05	$13.25	$3.25	$0.00	$91.92
For apprentice rates see "Apprentice- OPERATING ENGINEERS"							
FIELD ENG.ROD PERSON-BLDG,SITE,HVY/HWY	11/1/2025	$26.03	$16.05	$13.25	$3.25	$0.00	$58.58
OPERATING ENGINEERS LOCAL 4	5/1/2026	$26.88	$16.05	$13.25	$3.25	$0.00	$59.43
OPERATING ENGINEERS LOCAL 4	11/1/2026	$27.64	$16.05	$13.25	$3.25	$0.00	$60.19
	5/1/2027	$28.49	$16.05	$13.25	$3.25	$0.00	$61.04
For apprentice rates see "Apprentice- OPERATING ENGINEERS"							
FIRE ALARM INSTALLER	9/1/2025	$52.25	$12.25	$14.86	$3.75	$0.00	$83.11

Construction

Classification	Effective Date	Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
ELECTRICIANS LOCAL 223 ELECTRICIANS LOCAL 223	9/1/2026	$54.72	$12.50	$15.56	$4.00	$0.00	$86.78
For apprentice rates see "Apprentice- ELECTRICIAN"							
FIRE ALARM REPAIR / MAINTENANCE / COMMISSIONING ELECTRICIANS LOCAL 223 ELECTRICIANS LOCAL 223	9/1/2025	$52.25	$12.25	$14.86	$3.75	$0.00	$83.11
	9/1/2026	$54.72	$12.50	$15.56	$4.00	$0.00	$86.78
For apprentice rates see "Apprentice- TELECOMMUNICATIONS TECHNICIAN"							
FIREMAN (ASST. ENGINEER) OPERATING ENGINEERS LOCAL 4 OPERATING ENGINEERS LOCAL 4	12/1/2025	$47.69	$16.05	$13.25	$3.25	$0.00	$80.24
	6/1/2026	$48.75	$16.05	$13.25	$3.25	$0.00	$81.30
	12/1/2026	$49.93	$16.05	$13.25	$3.25	$0.00	$82.48
For apprentice rates see "Apprentice- OPERATING ENGINEERS"							
FLAGGER & SIGNALER (HEAVY & HIGHWAY) LABORERS LABORERS - ZONE 2 (HEAVY & HIGHWAY)	12/1/2025	$28.09	$10.15	$9.50	$9.21	$0.00	$56.95
	6/1/2026	$29.21	$10.15	$9.50	$9.21	$0.00	$58.07
	12/1/2026	$29.21	$10.15	$9.50	$9.21	$0.00	$58.07
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"							
FLOORCOVERER FLOORCOVERERS LOCAL 2168 FLOORCOVERERS LOCAL 2168 ZONE II	3/1/2024	$48.93	$10.33	$11.47	$8.80	$0.00	$79.53

Apprentice: FLOORCOVERER

Effective Date: 3/1/2024

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	50.00	$24.47	$10.33	$0.00	$1.76	$0.00	$36.56
2	55.00	$26.91	$10.33	$0.00	$1.76	$0.00	$39.00
3	60.00	$29.36	$10.33	$0.00	$3.52	$0.00	$43.21
4	65.00	$31.80	$10.33	$0.00	$3.52	$0.00	$45.65
5	70.00	$34.25	$10.33	$11.47	$5.28	$0.00	$61.33
6	75.00	$36.70	$10.33	$11.47	$5.28	$0.00	$63.78
7	80.00	$39.14	$10.33	$11.47	$7.04	$0.00	$67.98
8	85.00	$41.59	$10.33	$11.47	$7.04	$0.00	$70.43

Apprentice Notes

Steps are 750 hrs.

Apprentice to Journeyworker Ratio: 1:1

FORK LIFT/CHERRY PICKER OPERATING ENGINEERS LOCAL 4 OPERATING ENGINEERS LOCAL 4	12/1/2025	$59.28	$16.05	$13.25	$3.25	$0.00	$91.83
	6/1/2026	$60.58	$16.05	$13.25	$3.25	$0.00	$93.13
	12/1/2026	$62.03	$16.05	$13.25	$3.25	$0.00	$94.58
For apprentice rates see "Apprentice- OPERATING ENGINEERS"							
GENERATOR/LIGHTING PLANT/HEATERS OPERATING ENGINEERS LOCAL 4 OPERATING ENGINEERS LOCAL 4	12/1/2025	$37.97	$16.05	$13.25	$3.25	$0.00	$70.52
	6/1/2026	$38.83	$16.05	$13.25	$3.25	$0.00	$71.38
	12/1/2026	$39.78	$16.05	$13.25	$3.25	$0.00	$72.33

Construction

Classification	Effective Date	Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- OPERATING ENGINEERS"							
GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS)	6/1/2025	$43.13	$10.80	$8.25	$5.50	$0.00	$67.68
GLAZIERS LOCAL 1333	6/1/2026	$44.73	$11.20	$8.40	$6.05	$0.00	$70.38
GLAZIERS LOCAL 1333	6/1/2027	$46.73	$11.60	$8.55	$6.60	$0.00	$73.48
	6/1/2028	$48.73	$12.00	$8.70	$7.20	$0.00	$76.63

Apprentice: GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS)

Effective Date: 6/1/2025

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	50.00	$21.57	$10.80	$8.25	$5.50	$0.00	$46.12
2	56.25	$24.26	$10.80	$8.25	$5.50	$0.00	$48.81
3	62.50	$26.96	$10.80	$8.25	$5.50	$0.00	$51.51
4	68.75	$29.65	$10.80	$8.25	$5.50	$0.00	$54.20
5	75.00	$32.35	$10.80	$8.25	$5.50	$0.00	$56.90
6	81.25	$35.04	$10.80	$8.25	$5.50	$0.00	$59.59
7	87.50	$37.74	$10.80	$8.25	$5.50	$0.00	$62.29
8	93.75	$40.43	$10.80	$8.25	$5.50	$0.00	$64.98

Apprentice: GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS)

Effective Date: 6/1/2026

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	50.00	$22.37	$11.20	$8.40	$6.05	$0.00	$48.02
2	56.25	$25.16	$11.20	$8.40	$6.05	$0.00	$50.81
3	62.50	$27.96	$11.20	$8.40	$6.05	$0.00	$53.61
4	68.75	$30.75	$11.20	$8.40	$6.05	$0.00	$56.40
5	75.00	$33.55	$11.20	$8.40	$6.05	$0.00	$59.20
6	81.25	$36.34	$11.20	$8.40	$6.05	$0.00	$61.99
7	87.50	$39.14	$11.20	$8.40	$6.05	$0.00	$64.79
8	93.75	$41.93	$11.20	$8.40	$6.05	$0.00	$67.58

Apprentice to Journeyworker Ratio: 3:1

HOISTING ENGINEER/CRANES/GRADALLS	12/1/2025	$59.28	$16.05	$13.25	$3.25	$0.00	$91.83
OPERATING ENGINEERS LOCAL 4	6/1/2026	$60.58	$16.05	$13.25	$3.25	$0.00	$93.13
OPERATING ENGINEERS LOCAL 4	12/1/2026	$62.03	$16.05	$13.25	$3.25	$0.00	$94.58

Apprentice: HOISTING ENGINEER/CRANES/GRADALLS

Effective Date: 12/1/2025

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	55.00	$32.88	$0.00	$0.00	$0.00	$0.00	$32.88
2	60.00	$35.87	$16.05	$13.25	$3.25	$0.00	$68.42
3	65.00	$38.86	$16.05	$13.25	$3.25	$0.00	$71.41
4	70.00	$41.85	$16.05	$13.25	$3.25	$0.00	$74.40

Construction

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

Apprentice: HOISTING ENGINEER/CRANES/GRADALLS

Effective Date: 12/1/2025

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
5	75.00	$44.84	$16.05	$13.25	$3.25	$0.00	$77.39
6	80.00	$47.82	$16.05	$13.25	$3.25	$0.00	$80.37
7	85.00	$50.81	$16.05	$13.25	$3.25	$0.00	$83.36
8	90.00	$53.80	$16.05	$13.25	$3.25	$0.00	$86.35

Apprentice: HOISTING ENGINEER/CRANES/GRADALLS

Effective Date: 6/1/2026

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	55.00	$33.32	$0.00	$0.00	$0.00	$0.00	$33.32
2	60.00	$36.35	$16.05	$13.25	$3.25	$0.00	$68.90
3	65.00	$39.38	$16.05	$13.25	$3.25	$0.00	$71.93
4	70.00	$42.41	$16.50	$13.25	$3.25	$0.00	$75.41
5	75.00	$45.44	$16.50	$13.25	$3.25	$0.00	$78.44
6	80.00	$48.46	$16.50	$13.25	$3.25	$0.00	$81.46
7	85.00	$51.49	$16.50	$13.25	$3.25	$0.00	$84.49
8	90.00	$54.52	$16.50	$13.25	$3.25	$0.00	$87.52

Apprentice to Journeyworker Ratio: 1:6

HVAC (DUCTWORK)	10/1/2025	$44.05	$14.91	$13.35	$6.15	$2.24	$80.70
SHEETMETAL WORKERS LOCAL 17	4/1/2026	$45.55	$14.91	$13.35	$6.15	$2.24	$82.20
SHEETMETAL WORKERS LOCAL 17 - B							
For apprentice rates see "Apprentice- SHEET METAL WORKER"							
HVAC (ELECTRICAL CONTROLS)	9/1/2025	$52.25	$12.25	$14.86	$3.75	$0.00	$83.11
ELECTRICIANS LOCAL 223	9/1/2026	$54.72	$12.50	$15.56	$4.00	$0.00	$86.78
ELECTRICIANS LOCAL 223							
For apprentice rates see "Apprentice- ELECTRICIAN"							
HVAC (TESTING AND BALANCING - AIR)	10/1/2025	$44.05	$14.91	$13.35	$6.15	$2.24	$80.70
SHEETMETAL WORKERS LOCAL 17	4/1/2026	$45.55	$14.91	$13.35	$6.15	$2.24	$82.20
SHEETMETAL WORKERS LOCAL 17 - B							
For apprentice rates see "Apprentice- SHEET METAL WORKER"							
HVAC (TESTING AND BALANCING -WATER)	8/25/2025	$55.24	$10.80	$16.80	$4.60	$0.00	$87.44
PLUMBERS & PIPEFITTERS LOCAL 51							
PLUMBERS & PIPEFITTERS LOCAL 51							
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"							
HVAC MECHANIC	8/25/2025	$55.24	$10.80	$16.80	$4.60	$0.00	$87.44
PLUMBERS & PIPEFITTERS LOCAL 51							
PLUMBERS & PIPEFITTERS LOCAL 51							
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"							
HYDRAULIC DRILLS	12/1/2025	$41.97	$10.15	$9.50	$9.11	$0.00	$70.73

Construction

Classification	Effective Date	Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
LABORERS	6/1/2026	$43.41	$10.15	$9.50	$9.11	$0.00	$72.17
LABORERS - ZONE 2	12/1/2026	$44.85	$10.15	$9.50	$9.11	$0.00	$73.61
	6/1/2027	$46.30	$10.15	$9.50	$9.11	$0.00	$75.06
	12/1/2027	$47.75	$10.15	$9.50	$9.11	$0.00	$76.51
	6/1/2028	$49.25	$10.15	$9.50	$9.11	$0.00	$78.01
	12/1/2028	$50.75	$10.15	$9.50	$9.11	$0.00	$79.51
For apprentice rates see "Apprentice- LABORER"							
HYDRAULIC DRILLS (HEAVY & HIGHWAY)	12/1/2025	$41.97	$10.15	$9.50	$9.21	$0.00	$70.83
LABORERS	6/1/2026	$43.41	$10.15	$9.50	$9.21	$0.00	$72.27
LABORERS - ZONE 2 (HEAVY & HIGHWAY)	12/1/2026	$44.85	$10.15	$9.50	$9.21	$0.00	$73.71
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"							
INSULATOR (PIPES & TANKS)	9/1/2025	$54.31	$14.75	$9.52	$10.09	$0.00	$88.67
HEAT & FROST INSULATORS LOCAL 6	9/1/2026	$57.38	$14.75	$9.52	$10.09	$0.00	$91.74
HEAT & FROST INSULATORS LOCAL 6 (SOUTHERN MASS)							

Apprentice: INSULATOR (PIPES & TANKS)

Effective Date: 9/1/2025

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	50.00	$27.16	$14.75	$9.27	$5.05	$0.00	$56.23
2	60.00	$32.59	$14.75	$9.32	$6.05	$0.00	$62.71
3	70.00	$38.02	$14.75	$9.37	$7.06	$0.00	$69.20
4	80.00	$43.45	$14.75	$9.42	$8.07	$0.00	$75.69

Apprentice: INSULATOR (PIPES & TANKS)

Effective Date: 9/1/2026

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	50.00	$28.69	$14.75	$9.27	$5.05	$0.00	$57.76
2	60.00	$34.43	$14.75	$9.32	$6.05	$0.00	$64.55
3	70.00	$40.17	$14.75	$9.37	$7.06	$0.00	$71.35
4	80.00	$45.90	$14.75	$9.42	$8.07	$0.00	$78.14

Apprentice to Journeyworker Ratio: 1:4

IRONWORKER/WELDER	3/16/2021	$42.46	$7.70	$12.10	$5.00	$0.00	$67.26
IRONWORKERS LOCAL 37							
IRONWORKERS LOCAL 37							

Apprentice: IRONWORKER/WELDER

Effective Date: 3/16/2021

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	70.00	$29.72	$7.70	$12.10	$5.00	$0.00	$54.52
2	75.00	$31.85	$7.70	$12.10	$5.00	$0.00	$56.65

Construction

Classification	Effective Date	Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
Apprentice: IRONWORKER/WELDER							
Effective Date: 3/16/2021							
Step / Percent / Apprentice Base Wage							
3 / 80.00		$33.97	$7.70	$12.10	$5.00	$0.00	$58.77
4 / 85.00		$36.09	$7.70	$12.10	$5.00	$0.00	$60.89
5 / 90.00		$38.21	$7.70	$12.10	$5.00	$0.00	$63.01
6 / 95.00		$40.34	$7.70	$12.10	$5.00	$0.00	$65.14
Apprentice to Journeyworker Ratio: 1:4							
JACKHAMMER & PAVING BREAKER OPERATOR LABORERS LABORERS - ZONE 2	12/1/2025	$41.47	$10.15	$9.50	$9.11	$0.00	$70.23
	6/1/2026	$42.91	$10.15	$9.50	$9.11	$0.00	$71.67
	12/1/2026	$44.35	$10.15	$9.50	$9.11	$0.00	$73.11
	6/1/2027	$45.80	$10.15	$9.50	$9.11	$0.00	$74.56
	12/1/2027	$47.25	$10.15	$9.50	$9.11	$0.00	$76.01
	6/1/2028	$48.75	$10.15	$9.50	$9.11	$0.00	$77.51
	12/1/2028	$50.25	$10.15	$9.50	$9.11	$0.00	$79.01
For apprentice rates see "Apprentice- LABORER"							
LABORER LABORERS LABORERS - ZONE 2	12/1/2025	$41.22	$10.15	$9.50	$9.11	$0.00	$69.98
	6/1/2026	$42.66	$10.15	$9.50	$9.11	$0.00	$71.42
	12/1/2026	$44.10	$10.15	$9.50	$9.11	$0.00	$72.86
	6/1/2027	$45.55	$10.15	$9.50	$9.11	$0.00	$74.31
	12/1/2027	$47.00	$10.15	$9.50	$9.11	$0.00	$75.76
	6/1/2028	$48.50	$10.15	$9.50	$9.11	$0.00	$77.26
	12/1/2028	$50.00	$10.15	$9.50	$9.11	$0.00	$78.76
Apprentice: LABORER							
Effective Date: 12/1/2025							
Step / Percent / Apprentice Base Wage							
1 / 60.00		$25.03	$10.15	$9.50	$9.11	$0.00	$53.79
2 / 70.00		$29.20	$10.15	$9.50	$9.11	$0.00	$57.96
3 / 80.00		$33.38	$10.15	$9.50	$9.11	$0.00	$62.14
4 / 90.00		$37.55	$10.15	$9.50	$9.11	$0.00	$66.31
Apprentice: LABORER							
Effective Date: 6/1/2026							
Step / Percent / Apprentice Base Wage							
1 / 60.00		$25.60	$10.15	$9.50	$9.11	$0.00	$54.36
2 / 70.00		$29.86	$10.15	$9.50	$9.11	$0.00	$58.62
3 / 80.00		$34.13	$10.15	$9.50	$9.11	$0.00	$62.89
4 / 90.00		$38.39	$10.15	$9.50	$9.11	$0.00	$67.15
Apprentice to Journeyworker Ratio: 1:5							

Construction

Classification	Effective Date	Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
LABORER (HEAVY & HIGHWAY)	12/1/2025	$41.22	$10.15	$9.50	$9.21	$0.00	$70.08
LABORERS	6/1/2026	$42.66	$10.15	$9.50	$9.21	$0.00	$71.52
LABORERS - ZONE 2 (HEAVY & HIGHWAY)	12/1/2026	$44.10	$10.15	$9.50	$9.21	$0.00	$72.96

Apprentice: LABORER (HEAVY & HIGHWAY)

Effective Date: 12/1/2025

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	60.00	$25.03	$10.15	$9.50	$9.21	$0.00	$53.89
2	70.00	$29.20	$10.15	$9.50	$9.21	$0.00	$58.06
3	80.00	$33.38	$10.15	$9.50	$9.21	$0.00	$62.24
4	90.00	$37.55	$10.15	$9.50	$9.21	$0.00	$66.41

Apprentice: LABORER (HEAVY & HIGHWAY)

Effective Date: 6/1/2026

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	60.00	$25.60	$10.15	$9.50	$9.21	$0.00	$54.46
2	70.00	$29.86	$10.15	$9.50	$9.21	$0.00	$58.72
3	80.00	$34.13	$10.15	$9.50	$9.21	$0.00	$62.99
4	90.00	$38.39	$10.15	$9.50	$9.10	$0.00	$67.14

Apprentice to Journeyworker Ratio: 1:5

LABORER: CARPENTER TENDER	12/1/2025	$41.22	$10.15	$9.50	$9.11	$0.00	$69.98
LABORERS	6/1/2026	$42.66	$10.15	$9.50	$9.11	$0.00	$71.42
LABORERS - ZONE 2	12/1/2026	$44.10	$10.15	$9.50	$9.11	$0.00	$72.86
	6/1/2027	$45.55	$10.15	$9.50	$9.11	$0.00	$74.31
	12/1/2027	$47.00	$10.15	$9.50	$9.11	$0.00	$75.76
	6/1/2028	$48.50	$10.15	$9.50	$9.11	$0.00	$77.26
	12/1/2028	$50.00	$10.15	$9.50	$9.11	$0.00	$78.76

For apprentice rates see "Apprentice- LABORER"

LABORER: CEMENT FINISHER TENDER	12/1/2025	$41.22	$10.15	$9.50	$9.11	$0.00	$69.98
LABORERS	6/1/2026	$42.66	$10.15	$9.50	$9.11	$0.00	$71.42
LABORERS - ZONE 2	12/1/2026	$44.10	$10.15	$9.50	$9.11	$0.00	$72.86
	6/1/2027	$45.55	$10.15	$9.50	$9.11	$0.00	$74.31
	12/1/2027	$47.00	$10.15	$9.50	$9.11	$0.00	$75.76
	6/1/2028	$48.50	$10.15	$9.50	$9.11	$0.00	$77.26
	12/1/2028	$50.00	$10.15	$9.50	$9.11	$0.00	$78.76

For apprentice rates see "Apprentice- LABORER"

LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER	12/1/2025	$41.31	$10.15	$9.50	$9.65	$0.00	$70.61
LABORERS	6/1/2026	$42.75	$10.15	$9.50	$9.65	$0.00	$72.05
LABORERS - ZONE 2	12/7/2026	$44.19	$10.15	$9.50	$9.65	$0.00	$73.49
	6/7/2027	$45.64	$10.15	$9.50	$9.65	$0.00	$74.94
	12/6/2027	$47.09	$10.15	$9.50	$9.65	$0.00	$76.39
	6/5/2028	$48.59	$10.15	$9.50	$9.65	$0.00	$77.89

Construction

Classification	Effective Date	Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
	12/4/2028	$50.09	$10.15	$9.50	$9.65	$0.00	$79.39
For apprentice rates see "Apprentice- LABORER"							
LABORER: MASON TENDER	12/1/2025	$41.47	$10.15	$9.50	$9.11	$0.00	$70.23
LABORERS	6/1/2026	$42.91	$10.15	$9.50	$9.11	$0.00	$71.67
LABORERS - ZONE 2	12/1/2026	$44.35	$10.15	$9.50	$9.11	$0.00	$73.11
	6/1/2027	$45.80	$10.15	$9.50	$9.11	$0.00	$74.56
	12/1/2027	$47.25	$10.15	$9.50	$9.11	$0.00	$76.01
	6/1/2028	$48.75	$10.15	$9.50	$9.11	$0.00	$77.51
	12/1/2028	$50.25	$10.15	$9.50	$9.11	$0.00	$79.01
For apprentice rates see "Apprentice- LABORER"							
LABORER: MASON TENDER (HEAVY & HIGHWAY)	12/1/2025	$41.47	$10.15	$9.50	$9.21	$0.00	$70.33
LABORERS	6/1/2026	$42.91	$10.15	$9.50	$9.21	$0.00	$71.77
LABORERS - ZONE 2 (HEAVY & HIGHWAY)	12/1/2026	$44.35	$10.15	$9.50	$9.21	$0.00	$73.21
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"							
LABORER: MULTI-TRADE TENDER	12/1/2025	$41.22	$10.15	$9.50	$9.11	$0.00	$69.98
LABORERS	6/1/2026	$42.66	$10.15	$9.50	$9.11	$0.00	$71.42
LABORERS - ZONE 2	12/1/2026	$44.10	$10.15	$9.50	$9.11	$0.00	$72.86
	6/1/2027	$45.55	$10.15	$9.50	$9.11	$0.00	$74.31
	12/1/2027	$47.00	$10.15	$9.50	$9.11	$0.00	$75.76
	6/1/2028	$48.50	$10.15	$9.50	$9.11	$0.00	$77.26
	12/1/2028	$50.00	$10.15	$9.50	$9.11	$0.00	$78.76
For apprentice rates see "Apprentice- LABORER"							
LABORER: TREE REMOVER	12/1/2025	$41.22	$10.15	$9.50	$9.11	$0.00	$69.98
LABORERS	6/1/2026	$42.66	$10.15	$9.50	$9.11	$0.00	$71.42
LABORERS - ZONE 2	12/1/2026	$44.10	$10.15	$9.50	$9.11	$0.00	$72.86
	6/1/2027	$45.55	$10.15	$9.50	$9.11	$0.00	$74.31
	12/1/2027	$47.00	$10.15	$9.50	$9.11	$0.00	$75.76
	6/1/2028	$48.50	$10.15	$9.50	$9.11	$0.00	$77.26
	12/1/2028	$50.00	$10.15	$9.50	$9.11	$0.00	$78.76
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	12/1/2025	$41.47	$10.15	$9.50	$9.11	$0.00	$70.23
LABORERS	6/1/2026	$42.91	$10.15	$9.50	$9.11	$0.00	$71.67
LABORERS - ZONE 2	12/1/2026	$44.35	$10.15	$9.50	$9.11	$0.00	$73.11
	6/1/2027	$45.80	$10.15	$9.50	$9.11	$0.00	$74.56
	12/1/2027	$47.25	$10.15	$9.50	$9.11	$0.00	$76.01
	6/1/2028	$48.75	$10.15	$9.50	$9.11	$0.00	$77.51
	12/1/2028	$50.25	$10.15	$9.50	$9.11	$0.00	$79.01
For apprentice rates see "Apprentice- LABORER"							
LASER BEAM OPERATOR (HEAVY & HIGHWAY)	12/1/2025	$41.47	$10.15	$9.50	$9.21	$0.00	$70.33
LABORERS	6/1/2026	$42.91	$10.15	$9.50	$9.21	$0.00	$71.77
LABORERS - ZONE 2 (HEAVY & HIGHWAY)	12/1/2026	$44.35	$10.15	$9.50	$9.21	$0.00	$73.21
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"							
MARBLE & TILE FINISHERS	8/1/2025	$52.08	$11.49	$15.57	$6.05	$0.00	$85.19

Construction

Classification	Effective Date	Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
BRICKLAYERS LOCAL 3	2/1/2026	$53.16	$11.49	$15.57	$6.05	$0.00	$86.27
BRICKLAYERS LOCAL 3 - MARBLE & TILE	8/1/2026	$54.92	$11.49	$15.57	$6.05	$0.00	$88.03
	2/1/2027	$56.04	$11.49	$15.57	$6.05	$0.00	$89.15

Apprentice: MARBLE & TILE FINISHERS

Effective Date: 8/1/2025

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	50.00	$26.04	$11.49	$15.57	$6.05	$0.00	$59.15
2	60.00	$31.25	$11.49	$15.57	$6.05	$0.00	$64.36
3	70.00	$36.46	$11.49	$15.57	$6.05	$0.00	$69.57
4	80.00	$41.66	$11.49	$15.57	$6.05	$0.00	$74.77
5	90.00	$46.87	$11.49	$15.57	$6.05	$0.00	$79.98

Apprentice: MARBLE & TILE FINISHERS

Effective Date: 2/1/2026

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	50.00	$26.58	$11.49	$15.57	$6.05	$0.00	$59.69
2	60.00	$31.90	$11.49	$15.57	$6.05	$0.00	$65.01
3	70.00	$37.21	$11.49	$15.57	$6.05	$0.00	$70.32
4	80.00	$42.53	$11.49	$15.57	$6.05	$0.00	$75.64
5	90.00	$47.84	$11.49	$15.57	$6.05	$0.00	$80.95

Apprentice to Journeyworker Ratio: 1:5

MARBLE MASONS,TILELAYERS & TERRAZZO MECH	8/1/2025	$67.97	$11.49	$15.57	$7.99	$0.00	$103.02
BRICKLAYERS LOCAL 3	2/1/2026	$69.32	$11.49	$15.57	$7.99	$0.00	$104.37
BRICKLAYERS LOCAL 3 - MARBLE & TILE	8/1/2026	$71.52	$11.49	$15.57	$7.99	$0.00	$106.57
	2/1/2027	$72.92	$11.49	$15.57	$7.99	$0.00	$107.97

Apprentice: MARBLE MASONS,TILELAYERS & TERRAZZO MECH

Effective Date: 8/1/2025

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	50.00	$33.99	$11.49	$15.57	$7.99	$0.00	$69.04
2	60.00	$40.78	$11.49	$15.57	$7.99	$0.00	$75.83
3	70.00	$47.58	$11.49	$15.57	$7.99	$0.00	$82.63
4	80.00	$54.38	$11.49	$15.57	$7.99	$0.00	$89.43
5	90.00	$61.17	$11.49	$15.57	$7.99	$0.00	$96.22

Apprentice: MARBLE MASONS,TILELAYERS & TERRAZZO MECH

Effective Date: 2/1/2026

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate

Construction

Classification	Effective Date	Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
Apprentice: MARBLE MASONS,TILELAYERS & TERRAZZO MECH							
Effective Date: 2/1/2026							
Step / Percent / Apprentice Base Wage							
1 / 50.00		$34.66	$11.49	$15.57	$7.99	$0.00	$69.71
2 / 60.00		$41.59	$11.49	$15.57	$7.99	$0.00	$76.64
3 / 70.00		$48.52	$11.49	$15.57	$7.99	$0.00	$83.57
4 / 80.00		$55.46	$11.49	$15.57	$7.99	$0.00	$90.51
5 / 90.00		$62.39	$11.49	$15.57	$7.99	$0.00	$97.44
Apprentice to Journeyworker Ratio: 1:5							
MECH. SWEEPER OPERATOR (ON CONST. SITES)	12/1/2025	$58.62	$16.05	$13.25	$3.25	$0.00	$91.17
OPERATING ENGINEERS LOCAL 4	6/1/2026	$59.90	$16.05	$13.25	$3.25	$0.00	$92.45
OPERATING ENGINEERS LOCAL 4	12/1/2026	$61.34	$16.05	$13.25	$3.25	$0.00	$93.89
For apprentice rates see "Apprentice- OPERATING ENGINEERS"							
MECHANICS MAINTENANCE	12/1/2025	$58.62	$16.05	$13.25	$3.25	$0.00	$91.17
OPERATING ENGINEERS LOCAL 4	6/1/2026	$59.90	$16.05	$13.25	$3.25	$0.00	$92.45
OPERATING ENGINEERS LOCAL 4	12/1/2026	$61.34	$16.05	$13.25	$3.25	$0.00	$93.89
For apprentice rates see "Apprentice- OPERATING ENGINEERS"							
MILLWRIGHT (Zone 2)	1/6/2025	$45.03	$10.08	$11.47	$10.00	$0.00	$76.58
MILLWRIGHTS LOCAL 1121	1/5/2026	$47.36	$10.08	$11.47	$10.00	$0.00	$78.91
MILLWRIGHTS LOCAL 1121 - Zone 2							

Apprentice: MILLWRIGHT (Zone 2)

Effective Date: 1/6/2025

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	55.00	$24.77	$10.08	$0.00	$5.50	$0.00	$40.35
2	65.00	$29.27	$10.08	$0.00	$6.50	$0.00	$45.85
3	75.00	$33.77	$10.08	$11.47	$7.50	$0.00	$62.82
4	85.00	$38.28	$10.08	$11.47	$8.50	$0.00	$68.33

Apprentice: MILLWRIGHT (Zone 2)

Effective Date: 1/5/2026

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	55.00	$26.05	$10.08	$0.00	$5.50	$0.00	$41.63
2	65.00	$30.78	$10.08	$0.00	$6.50	$0.00	$47.36
3	75.00	$35.52	$10.08	$11.47	$7.50	$0.00	$64.57
4	85.00	$40.26	$10.08	$11.47	$8.50	$0.00	$70.31

Apprentice Notes

Step 1&2 Appr. indentured after 1/6/2020 receive no pension.

Construction

Classification	Effective Date	Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
Apprentice to Journeyworker Ratio: 1:4							
MORTAR MIXER	12/1/2025	$41.47	$10.15	$9.50	$9.11	$0.00	$70.23
LABORERS	6/1/2026	$42.91	$10.15	$9.50	$9.11	$0.00	$71.67
LABORERS - ZONE 2	12/1/2026	$44.35	$10.15	$9.50	$9.11	$0.00	$73.11
	6/1/2027	$45.80	$10.15	$9.50	$9.11	$0.00	$74.56
	12/1/2027	$47.25	$10.15	$9.50	$9.11	$0.00	$76.01
	6/1/2028	$48.75	$10.15	$9.50	$9.11	$0.00	$77.51
	12/1/2028	$50.25	$10.15	$9.50	$9.11	$0.00	$79.01
For apprentice rates see "Apprentice- LABORER"							
OILER (OTHER THAN TRUCK CRANES,GRADALLS)	12/1/2025	$25.68	$16.05	$13.25	$3.25	$0.00	$58.23
OPERATING ENGINEERS LOCAL 4	6/1/2026	$26.27	$16.05	$13.25	$3.25	$0.00	$58.82
OPERATING ENGINEERS LOCAL 4	12/1/2026	$26.94	$16.05	$13.25	$3.25	$0.00	$59.49
For apprentice rates see "Apprentice- OPERATING ENGINEERS"							
OILER (TRUCK CRANES, GRADALLS)	12/1/2025	$31.65	$16.05	$13.25	$3.25	$0.00	$64.20
OPERATING ENGINEERS LOCAL 4	6/1/2026	$32.37	$16.05	$13.25	$3.25	$0.00	$64.92
OPERATING ENGINEERS LOCAL 4	12/1/2026	$33.17	$16.05	$13.25	$3.25	$0.00	$65.72
For apprentice rates see "Apprentice- OPERATING ENGINEERS"							
OTHER POWER DRIVEN EQUIPMENT - CLASS II	12/1/2025	$58.62	$16.05	$13.25	$3.25	$0.00	$91.17
OPERATING ENGINEERS LOCAL 4	6/1/2026	$59.90	$16.05	$13.25	$3.25	$0.00	$92.45
OPERATING ENGINEERS LOCAL 4	12/1/2026	$61.34	$16.05	$13.25	$3.25	$0.00	$93.89
For apprentice rates see "Apprentice- OPERATING ENGINEERS"							
PAINTER (BRIDGES/TANKS)	7/1/2025	$58.51	$10.30	$11.95	$12.50	$0.00	$93.26
PAINTERS LOCAL 35	1/1/2026	$59.56	$10.35	$12.00	$12.50	$0.00	$94.41
PAINTERS LOCAL 35 - ZONE 2							

Apprentice: PAINTER (BRIDGES/TANKS)

Effective Date: 7/1/2025

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	50.00	$29.26	$10.30	$0.00	$0.00	$0.00	$39.56
2	55.00	$32.18	$10.30	$0.00	$6.88	$0.00	$49.36
3	60.00	$35.11	$10.30	$0.00	$7.50	$0.00	$52.91
4	65.00	$38.03	$10.30	$0.00	$8.13	$0.00	$56.46
5	70.00	$40.96	$10.30	$11.95	$8.75	$0.00	$71.96
6	75.00	$43.88	$10.30	$11.95	$9.38	$0.00	$75.51
7	80.00	$46.81	$10.30	$11.95	$10.00	$0.00	$79.06
8	90.00	$52.66	$10.30	$11.95	$11.25	$0.00	$86.16

Apprentice: PAINTER (BRIDGES/TANKS)

Effective Date: 1/1/2026

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate

Construction

Classification	Effective Date	Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
PAINTER (SPRAY OR SANDBLAST, NEW) *	7/1/2025	$49.41	$10.30	$11.95	$12.50	$0.00	$84.16
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.	1/1/2026	$50.46	$10.35	$12.00	$12.60	$0.00	$85.41
PAINTERS LOCAL 35							
PAINTERS LOCAL 35 - ZONE 2							

Apprentice: PAINTER (BRIDGES/TANKS)

Effective Date: 1/1/2026

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	50.00	$29.78	$10.35	$0.00	$0.00	$0.00	$40.13
2	55.00	$32.76	$10.35	$0.00	$6.93	$0.00	$50.04
3	60.00	$35.74	$10.35	$0.00	$7.56	$0.00	$53.65
4	65.00	$38.71	$10.35	$0.00	$8.19	$0.00	$57.25
5	70.00	$41.69	$10.35	$12.00	$8.82	$0.00	$72.86
6	75.00	$44.67	$10.35	$12.00	$9.45	$0.00	$76.47
7	80.00	$47.65	$10.35	$12.00	$10.08	$0.00	$80.08
8	90.00	$53.60	$10.35	$12.00	$11.34	$0.00	$87.29

Apprentice to Journeyworker Ratio: 1:1

Apprentice: PAINTER (SPRAY OR SANDBLAST, NEW) *

Effective Date: 7/1/2025

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	50.00	$24.71	$10.30	$0.00	$0.00	$0.00	$35.01
2	55.00	$27.18	$10.30	$0.00	$6.88	$0.00	$44.36
3	60.00	$29.65	$10.30	$0.00	$7.50	$0.00	$47.45
4	65.00	$32.12	$10.30	$0.00	$8.13	$0.00	$50.55
5	70.00	$34.59	$10.30	$11.95	$8.75	$0.00	$65.59
6	75.00	$37.06	$10.30	$11.95	$9.38	$0.00	$68.69
7	80.00	$39.53	$10.30	$11.95	$10.00	$0.00	$71.78
8	90.00	$44.47	$10.30	$11.95	$11.25	$0.00	$77.97

Apprentice: PAINTER (SPRAY OR SANDBLAST, NEW) *

Effective Date: 1/1/2026

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	50.00	$25.23	$10.35	$0.00	$0.00	$0.00	$35.58
2	55.00	$27.75	$10.35	$0.00	$6.93	$0.00	$45.03
3	60.00	$30.28	$10.35	$0.00	$7.56	$0.00	$48.19
4	65.00	$32.80	$10.35	$0.00	$8.19	$0.00	$51.34
5	70.00	$35.32	$10.35	$12.00	$8.82	$0.00	$66.49
6	75.00	$37.85	$10.35	$12.00	$9.45	$0.00	$69.65
7	80.00	$40.37	$10.35	$12.00	$10.08	$0.00	$72.80
8	90.00	$45.41	$10.35	$12.00	$11.34	$0.00	$79.10

Apprentice to Journeyworker Ratio: 1:1

Construction

Classification	Effective Date	Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
PAINTER (SPRAY OR SANDBLAST, REPAINT)	7/1/2025	$47.47	$10.30	$11.95	$12.50	$0.00	$82.22
PAINTERS LOCAL 35	1/1/2026	$48.52	$10.35	$12.00	$12.60	$0.00	$83.47
PAINTERS LOCAL 35 - ZONE 2							

Apprentice: PAINTER (SPRAY OR SANDBLAST, REPAINT)

Effective Date: 7/1/2025

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	50.00	$23.74	$10.30	$0.00	$0.00	$0.00	$34.04
2	55.00	$26.11	$10.30	$0.00	$6.88	$0.00	$43.29
3	60.00	$28.48	$10.30	$0.00	$7.50	$0.00	$46.28
4	65.00	$30.86	$10.30	$0.00	$8.13	$0.00	$49.29
5	70.00	$33.23	$10.30	$11.95	$8.75	$0.00	$64.23
6	75.00	$35.60	$10.30	$11.95	$9.38	$0.00	$67.23
7	80.00	$37.98	$10.30	$11.95	$10.00	$0.00	$70.23
8	90.00	$42.72	$10.30	$11.95	$11.25	$0.00	$76.22

Apprentice: PAINTER (SPRAY OR SANDBLAST, REPAINT)

Effective Date: 1/1/2026

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	50.00	$24.26	$10.35	$0.00	$0.00	$0.00	$34.61
2	55.00	$26.69	$10.35	$0.00	$6.93	$0.00	$43.97
3	60.00	$29.11	$10.35	$0.00	$7.56	$0.00	$47.02
4	65.00	$31.54	$10.35	$0.00	$8.19	$0.00	$50.08
5	70.00	$33.96	$10.35	$12.00	$8.82	$0.00	$65.13
6	75.00	$36.39	$10.35	$12.00	$9.45	$0.00	$68.19
7	80.00	$38.82	$10.35	$12.00	$10.08	$0.00	$71.25
8	90.00	$43.67	$10.35	$12.00	$11.34	$0.00	$77.36

Apprentice to Journeyworker Ratio: 1:1

PAINTER / TAPER (BRUSH, NEW) *	7/1/2025	$48.01	$10.30	$11.95	$12.50	$0.00	$82.76
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.	1/1/2026	$49.06	$10.35	$12.00	$12.60	$0.00	$84.01
PAINTERS LOCAL 35							
PAINTERS LOCAL 35 - ZONE 2							

Apprentice: PAINTER / TAPER (BRUSH, NEW) *

Effective Date: 7/1/2025

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	50.00	$24.01	$10.30	$0.00	$0.00	$0.00	$34.31
2	55.00	$26.41	$10.30	$0.00	$6.88	$0.00	$43.59
3	60.00	$28.81	$10.30	$0.00	$7.50	$0.00	$46.61
4	65.00	$31.21	$10.30	$0.00	$8.13	$0.00	$49.64
5	70.00	$33.61	$10.30	$11.95	$8.75	$0.00	$64.61
6	75.00	$36.01	$10.30	$11.95	$9.38	$0.00	$67.64

Construction

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

Apprentice: PAINTER / TAPER (BRUSH, NEW) *

Effective Date: 7/1/2025

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
7	80.00	$38.41	$10.30	$11.95	$10.00	$0.00	$70.66
8	90.00	$43.21	$10.30	$11.95	$11.25	$0.00	$76.71

Apprentice: PAINTER / TAPER (BRUSH, NEW) *

Effective Date: 1/1/2026

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	50.00	$24.53	$10.35	$0.00	$0.00	$0.00	$34.88
2	55.00	$26.98	$10.35	$0.00	$6.93	$0.00	$44.26
3	60.00	$29.44	$10.35	$0.00	$7.56	$0.00	$47.35
4	65.00	$31.89	$10.35	$0.00	$8.19	$0.00	$50.43
5	70.00	$34.34	$10.35	$12.00	$8.82	$0.00	$65.51
6	75.00	$36.80	$10.35	$12.00	$9.45	$0.00	$68.60
7	80.00	$39.25	$10.35	$12.00	$10.08	$0.00	$71.68
8	90.00	$44.15	$10.35	$12.00	$11.34	$0.00	$77.84

Apprentice to Journeyworker Ratio: 1:1

PAINTER / TAPER (BRUSH, REPAINT) PAINTERS LOCAL 35 PAINTERS LOCAL 35 - ZONE 2	7/1/2025	$46.07	$10.30	$11.95	$12.50	$0.00	$80.82
	1/1/2026	$47.12	$10.35	$12.00	$12.60	$0.00	$82.07

Apprentice: PAINTER / TAPER (BRUSH, REPAINT)

Effective Date: 7/1/2025

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	50.00	$23.04	$10.30	$0.00	$0.00	$0.00	$33.34
2	55.00	$25.34	$10.30	$0.00	$6.88	$0.00	$42.52
3	60.00	$27.64	$10.30	$0.00	$7.50	$0.00	$45.44
4	65.00	$29.95	$10.30	$0.00	$8.13	$0.00	$48.38
5	70.00	$32.25	$10.30	$11.95	$8.75	$0.00	$63.25
6	75.00	$34.55	$10.30	$11.95	$9.38	$0.00	$66.18
7	80.00	$36.86	$10.30	$11.95	$10.00	$0.00	$69.11
8	90.00	$41.46	$10.30	$11.95	$11.25	$0.00	$74.96

Apprentice: PAINTER / TAPER (BRUSH, REPAINT)

Effective Date: 1/1/2026

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	50.00	$23.56	$10.35	$0.00	$0.00	$0.00	$33.91
2	55.00	$25.92	$10.35	$0.00	$6.93	$0.00	$43.20

Construction

Classification	Effective Date	Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
Apprentice: PAINTER / TAPER (BRUSH, REPAINT)							
Effective Date: 1/1/2026							
Step / Percent		**Apprentice Base Wage**					
3 / 60.00		$28.27	$10.35	$0.00	$7.56	$0.00	$46.18
4 / 65.00		$30.63	$10.35	$0.00	$8.19	$0.00	$49.17
5 / 70.00		$32.98	$10.35	$12.00	$8.82	$0.00	$64.15
6 / 75.00		$35.34	$10.35	$12.00	$9.45	$0.00	$67.14
7 / 80.00		$37.70	$10.35	$12.00	$10.08	$0.00	$70.13
8 / 90.00		$42.41	$10.35	$12.00	$11.34	$0.00	$76.10
Apprentice to Journeyworker Ratio: 1:1							
PAINTER TRAFFIC MARKINGS (HEAVY/HIGHWAY) LABORERS LABORERS - ZONE 2 (HEAVY & HIGHWAY)	12/1/2025	$41.22	$10.15	$9.50	$9.21	$0.00	$70.08
	6/1/2026	$42.66	$10.15	$9.50	$9.21	$0.00	$71.52
	12/1/2026	$44.10	$10.15	$9.50	$9.21	$0.00	$72.96
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)							
PANEL & PICKUP TRUCKS DRIVER TEAMSTERS JOINT COUNCIL NO. 10 TEAMSTERS JOINT COUNCIL NO. 10 ZONE B	12/1/2025	$40.78	$15.57	$21.78	$0.00	$0.00	$78.13
	1/1/2026	$40.78	$16.17	$21.78	$0.00	$0.00	$78.73
	6/1/2026	$41.78	$16.17	$21.78	$0.00	$0.00	$79.73
	12/1/2026	$41.78	$16.17	$23.52	$0.00	$0.00	$81.47
	1/1/2027	$41.78	$16.77	$23.52	$0.00	$0.00	$82.07
PIER AND DOCK CONSTRUCTOR (UNDERPINNING AND DECK) PILE DRIVER LOCAL 56 PILE DRIVER LOCAL 56 (ZONE 2)	8/1/2024	$51.97	$10.08	$11.62	$12.67	$0.00	$86.34
For apprentice rates see "Apprentice- PILE DRIVER"							
PILE DRIVER PILE DRIVER LOCAL 56 PILE DRIVER LOCAL 56 (ZONE 2)	8/1/2024	$51.97	$10.08	$11.62	$12.67	$0.00	$86.34
Apprentice: PILE DRIVER							
Effective Date: 8/1/2024							
Step / Percent		**Apprentice Base Wage**					
1 / 45.00		$23.39	$10.08	$0.00	$2.53	$0.00	$36.00
2 / 55.00		$28.58	$10.08	$0.00	$5.07	$0.00	$43.73
3 / 70.00		$36.38	$10.08	$11.62	$7.60	$0.00	$65.68
4 / 80.00		$41.58	$10.08	$11.62	$10.14	$0.00	$73.42
Apprentice to Journeyworker Ratio: 1:5							
PIPELAYER LABORERS LABORERS - ZONE 2	12/1/2025	$41.47	$10.15	$9.50	$9.11	$0.00	$70.23
	6/1/2026	$42.91	$10.15	$9.50	$9.11	$0.00	$71.67
	12/1/2026	$44.35	$10.15	$9.50	$9.11	$0.00	$73.11
	6/1/2027	$45.80	$10.15	$9.50	$9.11	$0.00	$74.56
	12/1/2027	$47.25	$10.15	$9.50	$9.11	$0.00	$76.01

Construction

Classification	Effective Date	Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
	6/1/2028	$48.75	$10.15	$9.50	$9.11	$0.00	$77.51
	12/1/2028	$50.25	$10.15	$9.50	$9.11	$0.00	$79.01
For apprentice rates see "Apprentice- LABORER"							
PIPELAYER (HEAVY & HIGHWAY)	12/1/2025	$41.47	$10.15	$9.50	$9.21	$0.00	$70.33
LABORERS LABORERS - ZONE 2 (HEAVY & HIGHWAY)	6/1/2026	$42.91	$10.15	$9.50	$9.21	$0.00	$71.77
	12/1/2026	$44.35	$10.15	$9.50	$9.21	$0.00	$73.21
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"							
PLUMBER & PIPEFITTER PLUMBERS & PIPEFITTERS LOCAL 51 PLUMBERS & PIPEFITTERS LOCAL 51	8/25/2025	$55.24	$10.80	$16.80	$4.60	$0.00	$87.44

Apprentice: PLUMBER & PIPEFITTER

Effective Date: 8/25/2025

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	40.00	$22.10	$10.15	$2.50	$0.00	$0.00	$34.75
2	50.00	$27.62	$10.15	$2.50	$0.00	$0.00	$40.27
3	60.00	$33.14	$10.15	$8.40	$0.50	$0.00	$52.19
4	70.00	$38.67	$10.15	$13.44	$0.80	$0.00	$63.06
5	80.00	$44.19	$10.15	$16.80	$1.00	$0.00	$72.14

Apprentice to Journeyworker Ratio: 1:3

PNEUMATIC CONTROLS (TEMP.) PLUMBERS & PIPEFITTERS LOCAL 51 PLUMBERS & PIPEFITTERS LOCAL 51	8/25/2025	$55.24	$10.80	$16.80	$4.60	$0.00	$87.44
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"							
PNEUMATIC DRILL/TOOL OPERATOR	12/1/2025	$41.47	$10.15	$9.50	$9.11	$0.00	$70.23
LABORERS LABORERS - ZONE 2	6/1/2026	$42.91	$10.15	$9.50	$9.11	$0.00	$71.67
	12/1/2026	$44.35	$10.15	$9.50	$9.11	$0.00	$73.11
	6/1/2027	$45.80	$10.15	$9.50	$9.11	$0.00	$74.56
	12/1/2027	$47.25	$10.15	$9.50	$9.11	$0.00	$76.01
	6/1/2028	$48.75	$10.15	$9.50	$9.11	$0.00	$77.51
	12/1/2028	$50.25	$10.15	$9.50	$9.11	$0.00	$79.01
For apprentice rates see "Apprentice- LABORER"							
PNEUMATIC DRILL/TOOL OPERATOR (HEAVY & HIGHWAY)	12/1/2025	$41.47	$10.15	$9.50	$9.21	$0.00	$70.33
LABORERS LABORERS - ZONE 2 (HEAVY & HIGHWAY)	6/1/2026	$42.91	$10.15	$9.50	$9.21	$0.00	$71.77
	12/1/2026	$44.35	$10.15	$9.50	$9.21	$0.00	$73.21
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"							
POWDERMAN & BLASTER	12/1/2025	$42.22	$10.15	$9.50	$9.11	$0.00	$70.98
LABORERS LABORERS - ZONE 2	6/1/2026	$43.66	$10.15	$9.50	$9.11	$0.00	$72.42
	12/1/2026	$45.10	$10.15	$9.50	$9.11	$0.00	$73.86
	6/1/2027	$46.55	$10.15	$9.50	$9.11	$0.00	$75.31
	12/1/2027	$48.00	$10.15	$9.50	$9.11	$0.00	$76.76
	6/1/2028	$49.50	$10.15	$9.50	$9.11	$0.00	$78.26

Construction

Classification	Effective Date	Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
	12/1/2028	$51.00	$10.15	$9.50	$9.11	$0.00	$79.76
For apprentice rates see "Apprentice- LABORER"							
POWDERMAN & BLASTER (HEAVY & HIGHWAY)	12/1/2025	$42.22	$9.90	$9.50	$9.21	$0.00	$70.83
LABORERS	6/1/2026	$43.66	$9.90	$9.50	$9.21	$0.00	$72.27
LABORERS - ZONE 2 (HEAVY & HIGHWAY)	12/1/2026	$45.10	$9.90	$9.50	$9.21	$0.00	$73.71
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"							
POWER SHOVEL/DERRICK/TRENCHING MACHINE	12/1/2025	$59.28	$16.05	$13.25	$3.25	$0.00	$91.83
OPERATING ENGINEERS LOCAL 4	6/1/2026	$60.58	$16.05	$13.25	$3.25	$0.00	$93.13
OPERATING ENGINEERS LOCAL 4	12/1/2026	$62.03	$16.05	$13.25	$3.25	$0.00	$94.58
For apprentice rates see "Apprentice- OPERATING ENGINEERS"							
PUMP OPERATOR (CONCRETE)	12/1/2025	$58.62	$16.05	$13.25	$3.25	$0.00	$91.17
OPERATING ENGINEERS LOCAL 4	6/1/2026	$59.90	$16.05	$13.25	$3.25	$0.00	$92.45
OPERATING ENGINEERS LOCAL 4	12/1/2026	$61.34	$16.05	$13.25	$3.25	$0.00	$93.89
For apprentice rates see "Apprentice- OPERATING ENGINEERS"							
PUMP OPERATOR (DEWATERING, OTHER)	12/1/2025	$37.97	$16.05	$13.25	$3.25	$0.00	$70.52
OPERATING ENGINEERS LOCAL 4	6/1/2026	$38.83	$16.05	$13.25	$3.25	$0.00	$71.38
OPERATING ENGINEERS LOCAL 4	12/1/2026	$39.78	$16.05	$13.25	$3.25	$0.00	$72.33
For apprentice rates see "Apprentice- OPERATING ENGINEERS"							
READY-MIX CONCRETE DRIVER	8/1/2023	$25.00	$13.91	$6.90	$0.00	$0.00	$45.81
TEAMSTERS 653							
TEAMSTERS 653 - Southeastern Concrete (Weymouth)							
RECLAIMERS	12/1/2025	$58.62	$16.05	$13.25	$3.25	$0.00	$91.17
OPERATING ENGINEERS LOCAL 4	6/1/2026	$59.90	$16.05	$13.25	$3.25	$0.00	$92.45
OPERATING ENGINEERS LOCAL 4	12/1/2026	$61.34	$16.05	$13.25	$3.25	$0.00	$93.89
For apprentice rates see "Apprentice- OPERATING ENGINEERS"							
RIDE-ON MOTORIZED BUGGY OPERATOR	12/1/2025	$41.47	$10.15	$9.50	$9.11	$0.00	$70.23
LABORERS	6/1/2026	$42.91	$10.15	$9.50	$9.11	$0.00	$71.67
LABORERS - ZONE 2	12/1/2026	$44.35	$10.15	$9.50	$9.11	$0.00	$73.11
	6/1/2027	$45.80	$10.15	$9.50	$9.11	$0.00	$74.56
	12/1/2027	$47.25	$10.15	$9.50	$9.11	$0.00	$76.01
	6/1/2028	$48.75	$10.15	$9.50	$9.11	$0.00	$77.51
	12/1/2028	$50.25	$10.15	$9.50	$9.11	$0.00	$79.01
For apprentice rates see "Apprentice- LABORER"							
ROLLER/SPREADER/MULCHING MACHINE	12/1/2025	$58.62	$16.05	$13.25	$3.25	$0.00	$91.17
OPERATING ENGINEERS LOCAL 4	6/1/2026	$59.90	$16.05	$13.25	$3.25	$0.00	$92.45
OPERATING ENGINEERS LOCAL 4	12/1/2026	$61.34	$16.05	$13.25	$3.25	$0.00	$93.89
For apprentice rates see "Apprentice- OPERATING ENGINEERS"							
ROOFER (Inc.Roofer Waterproofng &Roofer Damproofg)	8/1/2025	$53.53	$13.28	$12.67	$9.03	$0.00	$88.51
ROOFERS LOCAL 33	2/1/2026	$54.78	$13.28	$12.67	$9.03	$0.00	$89.76
ROOFERS LOCAL 33							

Construction

Classification	Effective Date	Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
ROOFER SLATE / TILE / PRECAST CONCRETE ROOFERS LOCAL 33 ROOFERS LOCAL 33	8/1/2025	$53.78	$13.28	$12.67	$9.03	$0.00	$88.76
	2/1/2026	$55.03	$13.28	$12.67	$9.03	$0.00	$90.01
For apprentice rates see "Apprentice- ROOFER"							
SHEETMETAL WORKER SHEETMETAL WORKERS LOCAL 17 SHEETMETAL WORKERS LOCAL 17 - B	10/1/2025	$44.05	$14.91	$13.35	$6.15	$2.24	$80.70
	4/1/2026	$45.55	$14.91	$13.35	$6.15	$2.24	$82.20

Apprentice: ROOFER (Inc.Roofer Waterproofng &Roofer Damproofg)

Effective Date: 8/1/2025

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	50.00	$26.77	$13.28	$6.52	$9.03	$0.00	$55.60
2	60.00	$32.12	$13.28	$12.67	$9.03	$0.00	$67.10
3	65.00	$34.79	$13.28	$12.67	$9.03	$0.00	$69.77
4	75.00	$40.15	$13.28	$12.67	$9.03	$0.00	$75.13
5	85.00	$45.50	$13.28	$12.67	$9.03	$0.00	$80.48

Apprentice: ROOFER (Inc.Roofer Waterproofng &Roofer Damproofg)

Effective Date: 2/1/2026

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	50.00	$27.39	$13.28	$6.52	$9.03	$0.00	$56.22
2	60.00	$32.87	$13.28	$12.67	$9.03	$0.00	$67.85
3	65.00	$35.61	$13.28	$12.67	$9.03	$0.00	$70.59
4	75.00	$41.09	$13.28	$12.67	$9.03	$0.00	$76.07
5	85.00	$46.56	$13.28	$12.67	$9.03	$0.00	$81.54

Apprentice Notes

** 1:5, 2:6-10, the 1:10; Reroofing: 1:4, then 1:1

Apprentice to Journeyworker Ratio: 1:5

Apprentice: SHEETMETAL WORKER

Effective Date: 10/1/2025

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	40.00	$17.62	$14.91	$4.27	$0.00	$1.09	$37.89
2	45.00	$19.82	$14.91	$4.80	$0.00	$1.17	$40.70
3	50.00	$22.03	$14.91	$12.28	$0.00	$1.45	$50.67
4	55.00	$24.23	$14.91	$12.28	$0.00	$1.52	$52.94
5	60.00	$26.43	$14.91	$12.28	$3.69	$1.64	$58.95
6	65.00	$28.63	$14.91	$12.28	$4.00	$1.71	$61.53
7	70.00	$30.84	$14.91	$12.28	$4.31	$1.78	$64.12
8	75.00	$33.04	$14.91	$12.28	$4.61	$1.86	$66.70

Construction

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

Apprentice: SHEETMETAL WORKER

Effective Date: 10/1/2025

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
9	80.00	$35.24	$14.91	$12.28	$4.92	$1.93	$69.28
10	85.00	$37.44	$14.91	$12.28	$5.23	$2.00	$71.86

Apprentice: SHEETMETAL WORKER

Effective Date: 4/1/2026

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	40.00	$18.22	$14.91	$4.27	$0.00	$1.09	$38.49
2	45.00	$20.50	$14.91	$4.80	$0.00	$1.17	$41.38
3	50.00	$22.78	$14.91	$12.28	$0.00	$1.45	$51.42
4	55.00	$25.05	$14.91	$12.28	$0.00	$1.52	$53.76
5	60.00	$27.33	$14.91	$12.28	$3.69	$1.64	$59.85
6	65.00	$29.61	$14.91	$12.28	$4.00	$1.71	$62.51
7	70.00	$31.89	$14.91	$12.28	$4.31	$1.78	$65.17
8	75.00	$34.16	$14.91	$12.28	$4.61	$1.86	$67.82
9	80.00	$36.44	$14.91	$12.28	$4.92	$1.93	$70.48
10	85.00	$38.72	$14.91	$12.28	$5.23	$2.00	$73.14

Apprentice to Journeyworker Ratio: 1:4

SPECIALIZED EARTH MOVING EQUIP < 35 TONS TEAMSTERS JOINT COUNCIL NO. 10 TEAMSTERS JOINT COUNCIL NO. 10 ZONE B	12/1/2025	$41.24	$15.57	$21.78	$0.00	$0.00	$78.59
	1/1/2026	$41.24	$16.17	$21.78	$0.00	$0.00	$79.19
	6/1/2026	$42.24	$16.17	$21.78	$0.00	$0.00	$80.19
	12/1/2026	$42.24	$16.17	$23.52	$0.00	$0.00	$81.93
	1/1/2027	$42.24	$16.77	$23.52	$0.00	$0.00	$82.53
SPECIALIZED EARTH MOVING EQUIP > 35 TONS TEAMSTERS JOINT COUNCIL NO. 10 TEAMSTERS JOINT COUNCIL NO. 10 ZONE B	12/1/2025	$41.53	$15.57	$21.78	$0.00	$0.00	$78.88
	1/1/2026	$41.53	$16.17	$21.78	$0.00	$0.00	$79.48
	6/1/2026	$42.53	$16.17	$21.78	$0.00	$0.00	$80.48
	12/1/2026	$42.53	$16.17	$23.52	$0.00	$0.00	$82.22
	1/1/2027	$42.53	$16.77	$23.52	$0.00	$0.00	$82.82
SPRINKLER FITTER SPRINKLER FITTERS LOCAL 550 SPRINKLER FITTERS LOCAL 550 - (Section B) Zone 2	10/1/2025	$64.85	$12.25	$7.40	$19.50	$0.00	$104.00
	1/1/2026	$64.85	$13.45	$7.45	$18.25	$0.00	$104.00

Apprentice: SPRINKLER FITTER

Effective Date: 10/1/2025

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	35.00	$22.70	$12.25	$14.22	$0.00	$0.00	$49.17
2	0.00	$25.94	$12.25	$15.20	$0.00	$0.00	$53.39
3	0.00	$29.18	$12.25	$16.18	$0.00	$0.00	$57.61

Construction

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

Apprentice: SPRINKLER FITTER

Effective Date: 10/1/2025

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
4	0.00	$32.43	$12.25	$17.15	$0.00	$0.00	$61.83
5	0.00	$35.67	$12.25	$18.12	$0.00	$0.00	$66.04
6	0.00	$38.91	$12.25	$19.10	$0.00	$0.00	$70.26
7	65.00	$42.15	$12.25	$20.08	$0.00	$0.00	$74.48
8	0.00	$45.40	$12.25	$21.05	$0.00	$0.00	$78.70
9	0.00	$48.64	$12.25	$22.02	$0.00	$0.00	$82.91
10	0.00	$51.88	$12.25	$23.00	$0.00	$0.00	$87.13

Apprentice: SPRINKLER FITTER

Effective Date: 1/1/2026

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	0.00	$22.70	$13.45	$13.84	$0.00	$0.00	$49.99
2	0.00	$25.94	$13.45	$14.75	$0.00	$0.00	$54.14
3	0.00	$29.18	$13.45	$15.67	$0.00	$0.00	$58.30
4	0.00	$32.43	$13.45	$16.57	$0.00	$0.00	$62.45
5	0.00	$35.67	$13.45	$17.49	$0.00	$0.00	$66.61
6	0.00	$38.91	$13.45	$18.40	$0.00	$0.00	$70.76
7	0.00	$42.15	$13.45	$19.32	$0.00	$0.00	$74.92
8	0.00	$45.40	$13.45	$20.22	$0.00	$0.00	$79.07
9	0.00	$48.64	$13.45	$21.15	$0.00	$0.00	$83.24
10	0.00	$51.88	$13.45	$22.05	$0.00	$0.00	$87.38

Apprentice Notes

Apprentice entered prior 9/30/10:

Apprentice to Journeyworker Ratio: 1:3

STEAM BOILER OPERATOR	12/1/2025	$58.62	$16.05	$13.25	$3.25	$0.00	$91.17
OPERATING ENGINEERS LOCAL 4	6/1/2026	$59.90	$16.05	$13.25	$3.25	$0.00	$92.45
OPERATING ENGINEERS LOCAL 4	12/1/2026	$61.34	$16.05	$13.25	$3.25	$0.00	$93.89
For apprentice rates see "Apprentice- OPERATING ENGINEERS"							
TAMPERS, SELF-PROPELLED OR TRACTOR DRAWN	12/1/2025	$58.62	$16.05	$13.25	$3.25	$0.00	$91.17
OPERATING ENGINEERS LOCAL 4	6/1/2026	$59.90	$16.05	$13.25	$3.25	$0.00	$92.45
OPERATING ENGINEERS LOCAL 4	12/1/2026	$61.34	$16.05	$13.25	$3.25	$0.00	$93.89
For apprentice rates see "Apprentice- OPERATING ENGINEERS"							
TELECOMMUNICATION TECHNICIAN	9/1/2025	$42.52	$12.00	$12.05	$3.25	$0.00	$69.82
TELECOMMUNICATION TECHNICIAN	9/1/2026	$44.41	$12.25	$12.59	$3.50	$0.00	$72.75
ELECTRICIANS LOCAL 223	9/1/2027	$46.51	$12.50	$13.18	$3.75	$0.00	$75.94
ELECTRICIANS LOCAL 223							
For apprentice rates and ratios see "Apprentice- ELECTRICIAN"							

Construction

Classification	Effective Date	Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
TERRAZZO FINISHERS	8/1/2025	$66.89	$11.49	$15.57	$8.02	$0.00	$101.97
BRICKLAYERS LOCAL 3	2/1/2026	$68.24	$11.49	$15.57	$8.02	$0.00	$103.32
BRICKLAYERS LOCAL 3 - MARBLE & TILE	8/1/2026	$70.44	$11.49	$15.57	$8.02	$0.00	$105.52
	2/1/2027	$71.84	$11.49	$15.57	$8.02	$0.00	$106.92

Apprentice: TERRAZZO FINISHERS

Effective Date: 8/1/2025

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	50.00	$33.45	$11.49	$15.57	$8.02	$0.00	$68.53
2	60.00	$40.13	$11.49	$15.57	$8.02	$0.00	$75.21
3	70.00	$46.82	$11.49	$15.57	$8.02	$0.00	$81.90
4	80.00	$53.51	$11.49	$15.57	$8.02	$0.00	$88.59
5	90.00	$60.20	$11.49	$15.57	$8.02	$0.00	$95.28

Apprentice: TERRAZZO FINISHERS

Effective Date: 2/1/2026

Step	Percent	Apprentice Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
1	50.00	$34.12	$11.49	$15.57	$8.02	$0.00	$69.20
2	60.00	$40.94	$11.49	$15.57	$8.02	$0.00	$76.02
3	70.00	$47.77	$11.49	$15.57	$8.02	$0.00	$82.85
4	80.00	$54.59	$11.49	$15.57	$8.02	$0.00	$89.67
5	90.00	$61.42	$11.49	$15.57	$8.02	$0.00	$96.50

Apprentice to Journeyworker Ratio: 1:5

TEST BORING DRILLER	12/1/2025	$52.70	$10.15	$9.50	$9.80	$0.00	$82.15
LABORERS	6/1/2026	$54.25	$10.15	$9.50	$9.80	$0.00	$83.70
LABORERS - FOUNDATION AND MARINE	12/1/2026	$55.75	$10.15	$9.50	$9.80	$0.00	$85.20
For apprentice rates see "Apprentice- LABORER"							
TEST BORING DRILLER HELPER	12/1/2025	$48.82	$10.15	$9.50	$9.80	$0.00	$78.27
LABORERS	6/1/2026	$50.37	$10.15	$9.50	$9.80	$0.00	$79.82
LABORERS - FOUNDATION AND MARINE	12/1/2026	$51.87	$10.15	$9.50	$9.80	$0.00	$81.32
For apprentice rates see "Apprentice- LABORER"							
TEST BORING LABORER	12/1/2025	$48.70	$10.15	$9.50	$9.80	$0.00	$78.15
LABORERS	6/1/2026	$50.25	$10.15	$9.50	$9.80	$0.00	$79.70
LABORERS - FOUNDATION AND MARINE	12/1/2026	$51.75	$10.15	$9.50	$9.80	$0.00	$81.20
For apprentice rates see "Apprentice- LABORER"							
TRACTORS/PORTABLE STEAM GENERATORS	12/1/2025	$58.62	$16.05	$13.25	$3.25	$0.00	$91.17
OPERATING ENGINEERS LOCAL 4	6/1/2026	$59.90	$16.05	$13.25	$3.25	$0.00	$92.45
OPERATING ENGINEERS LOCAL 4	12/1/2026	$61.34	$16.05	$13.25	$3.25	$0.00	$93.89
For apprentice rates see "Apprentice- OPERATING ENGINEERS"							
TRAILERS FOR EARTH MOVING EQUIPMENT	12/1/2025	$41.82	$15.57	$21.78	$0.00	$0.00	$79.17

Construction

Classification	Effective Date	Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
TEAMSTERS JOINT COUNCIL NO. 10 TEAMSTERS JOINT COUNCIL NO. 10 ZONE B	1/1/2026	$41.82	$16.17	$21.78	$0.00	$0.00	$79.77
	6/1/2026	$42.82	$16.17	$21.78	$0.00	$0.00	$80.77
	12/1/2026	$42.82	$16.17	$23.52	$0.00	$0.00	$82.51
	1/1/2027	$42.82	$16.77	$23.52	$0.00	$0.00	$83.11
TUNNEL WORK - COMPRESSED AIR LABORERS LABORERS (COMPRESSED AIR)	12/1/2025	$60.93	$10.15	$9.50	$10.25	$0.00	$90.83
	6/1/2026	$62.48	$10.15	$9.50	$10.25	$0.00	$92.38
	12/1/2026	$63.98	$10.15	$9.50	$10.25	$0.00	$93.88
For apprentice rates see "Apprentice- LABORER"							
TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE) LABORERS LABORERS (COMPRESSED AIR)	12/1/2025	$62.93	$10.15	$9.50	$10.25	$0.00	$92.83
	6/1/2026	$64.48	$10.15	$9.50	$10.25	$0.00	$94.38
	12/1/2026	$65.98	$10.15	$9.50	$10.25	$0.00	$95.88
For apprentice rates see "Apprentice- LABORER"							
TUNNEL WORK - FREE AIR LABORERS LABORERS (FREE AIR TUNNEL)	12/1/2025	$53.00	$10.15	$9.50	$10.25	$0.00	$82.90
	6/1/2026	$54.55	$10.15	$9.50	$10.25	$0.00	$84.45
	12/1/2026	$56.05	$10.15	$9.50	$10.25	$0.00	$85.95
For apprentice rates see "Apprentice- LABORER"							
TUNNEL WORK - FREE AIR (HAZ. WASTE) LABORERS LABORERS (FREE AIR TUNNEL)	12/1/2025	$55.00	$10.15	$9.50	$10.25	$0.00	$84.90
	6/1/2026	$56.55	$10.15	$9.50	$10.25	$0.00	$86.45
	12/1/2026	$58.05	$10.15	$9.50	$10.25	$0.00	$87.95
For apprentice rates see "Apprentice- LABORER"							
VAC-HAUL TEAMSTERS JOINT COUNCIL NO. 10 TEAMSTERS JOINT COUNCIL NO. 10 ZONE B	12/1/2025	$41.24	$15.57	$21.78	$0.00	$0.00	$78.59
	1/1/2026	$41.24	$16.17	$21.78	$0.00	$0.00	$79.19
	6/1/2026	$42.24	$16.17	$21.78	$0.00	$0.00	$80.19
	12/1/2026	$42.24	$16.17	$23.52	$0.00	$0.00	$81.93
	1/1/2027	$42.24	$16.77	$23.52	$0.00	$0.00	$82.53
WAGON DRILL OPERATOR LABORERS LABORERS - ZONE 2	12/1/2025	$41.47	$10.15	$9.50	$9.11	$0.00	$70.23
	6/1/2026	$42.91	$10.15	$9.50	$9.11	$0.00	$71.67
	12/1/2026	$44.35	$10.15	$9.50	$9.11	$0.00	$73.11
	6/1/2027	$45.80	$10.15	$9.50	$9.11	$0.00	$74.56
	12/1/2027	$47.25	$10.15	$9.50	$9.11	$0.00	$76.01
	6/1/2028	$48.75	$10.15	$9.50	$9.11	$0.00	$77.51
	12/1/2028	$50.25	$10.15	$9.50	$9.11	$0.00	$79.01
For apprentice rates see "Apprentice- LABORER"							
WAGON DRILL OPERATOR (HEAVY & HIGHWAY) LABORERS LABORERS - ZONE 2 (HEAVY & HIGHWAY)	12/1/2025	$41.47	$10.15	$9.50	$9.21	$0.00	$70.33
	6/1/2026	$42.91	$10.15	$9.50	$9.21	$0.00	$71.77
	12/1/2026	$44.35	$10.15	$9.50	$9.21	$0.00	$73.21
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"							
WASTE WATER PUMP OPERATOR OPERATING ENGINEERS LOCAL 4 OPERATING ENGINEERS LOCAL 4	12/1/2025	$59.28	$16.05	$13.25	$3.25	$0.00	$91.83
	6/1/2026	$60.58	$16.05	$13.25	$3.25	$0.00	$93.13
	12/1/2026	$62.03	$16.05	$13.25	$3.25	$0.00	$94.58
For apprentice rates see "Apprentice- OPERATING ENGINEERS"							

Construction

Classification	Effective Date	Base Wage	Health	Pension	Annuity	Supplemental Unemployment	Total Rate
WATER METER INSTALLER PLUMBERS & PIPEFITTERS LOCAL 51 PLUMBERS & PIPEFITTERS LOCAL 51	8/25/2025	$55.24	$10.80	$16.80	$4.60	$0.00	$87.44

For apprentice rates see "Apprentice- PLUMBER/PIPEFITTER" or "PLUMBER/GASFITTER"

Additional Apprentice Information

All apprentices must be registered with the Division of Apprenticeship Training(DAS) in accordance with M.G.L.c. 23, §§ 11E-11L. Minimum wage rates for apprentices employed on public works projects are listed above as a percentage of the hourly prevailing wage rate established by the Commissioner under the provisions of M.G.L.c. 149, §§ 26-27D.

Apprentice ratios are established by DAS pursuant to M.G.L.c. 23, §§ 11E-11L. Ratios are expressed as the allowable number of apprentices to journeymen or fraction thereof, unless otherwise specified. The ratios listed herein have been taken from relevant private collective bargaining agreements(CBAs) and are provided for illustrative purposes only. They have not been independently verified as being accurate or continuing to be accurate.

Parties having questions regarding what ratio to use should contact DAS.

DOCUMENT A00801

SPECIAL PROVISIONS

CAPE MAIN
CULVERT REPLACEMENT AT MP 63.22

Labor Participation goals for this project shall be 15.9% for minorities and 6.3% 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.

PROJECT DESCRIPTION

The Cape Main is owned by the Commonwealth of Massachusetts Department of Transportation (MassDOT or Owner) and is inspected, operated and maintained by Massachusetts Coastal Railroad, LLC (MCRR or Railroad) under contract. The Cape Main is approximately 42.7 miles long and runs from Bay interlocking in Middleboro at MP 36.3 to its terminus in Hyannis at MP 79.0. Existing Cape Main track east (railroad south) of the Cape Cod Canal Moveable Bridge at MP 54.84 consists mainly of 107NH jointed rail ballasted track with a typical normal operating speed of 30 MPH for passenger trains and 25 MPH for freight. Existing Cape Main track west (railroad north) of the Cape Cod Canal Moveable Bridge at MP 54.84 consists mainly of 115RE continuous welded rail with a typical normal operating speed of 55 MPH for passenger trains and 30 MPH for freight

The project is located at MP 63.22 on the Cape Main in Sandwich, MA. The culvert is located between Great Island Road (Private) grade crossing located just north of the project at MP 63.08 and Spring Hill Road grade crossing just south of the project at MP 63.27. The Cape Main in the area of the culvert location currently operates at 30 MPH for Passenger Trains and 25 MPH for Freight Trains

The Project work consists of the removal and disposal of the existing 36" x 36" stone box culvert and the furnishing and installation of a 48" reinforced concrete Class V pipe (RCP) culvert, precast concrete wingwalls and appurtenances at MP 63.22 in Sandwich, MA. This work includes, but is not limited to: installation and removal of any Contractor required temporary shoring and excavation support; installation of erosion control system; construction of coffer dams, water diversion and temporary work area dewatering system; removal and stockpiling of existing track (for re-installation) if required by Contractor means and methods; excavating/stockpiling and wasting of excavated material along railroad right-of-way; removal and disposal of existing culvert; placement/preparing crushed stone base; design, furnish and installation of new 48" round Class V Reinforced Concrete Pipe (RCP) culvert, installation of precast concrete wingwalls; backfill and compaction of culvert; grading; preparation of subgrade and ballast; re-installing previously removed track material if required by Contractor's means and methods; ballast and tamping and clean-up of materials.

SCOPE OF WORK

The Scope of Work for this Project is to remove and replace one existing railroad culvert located at Mile Post 63.22 on the Cape Main including removal and disposal of all nearby existing lumber and debris at the same location Sandwich, MA. This list has been compiled to provide Contractor with an order of magnitude work scope and to attempt to describe the complexity of the work required. Contractor is advised that it is the sole responsibility of Contractor to perform all the work in conformance with the Contract Documents and to satisfactorily complete the work on time and to the standards of MassDOT (Owner) and pursuant to the direction of MCRR (Railroad).

The project includes, but is not limited to, the following work items:

1. Perform pre-construction survey.
2. Furnish, install and maintain erosion control measures and maintain water resource shorelines.
3. Furnish, install and maintain coffer dams, temporary dewatering system, and diversion pump.
4. Remove and stockpile existing track for re-installation (if required by the Contractor's excavation means and methods).
5. Remove and dispose of existing wood retaining wall and tie pad.
6. Excavate, stockpile for reinstall and/or and waste excavated track bed and subgrade material along railroad right-of-way at a designated location as identified in the field during excavation by the MassCoastal Railroad Inspector.
7. Remove and dispose of existing culvert at MP 63.22.
8. Furnish and install compacted crushed stone bedding course on undisturbed substrate for culverts.
9. Furnish and install new 48" Class V RCP culvert, with precast concrete wingwalls at MP 63.22.
10. Backfill and compact new culvert.
11. Backfill and fine grade embankments.
12. Furnish and install and tamp track ballast.
13. Reinstall track previously removed as part of excavation (if required by the Contractor's excavation means and methods), install ballast, and surface replacement piece of track.
14. Ballast, surface, line and tamp the existing and reconstructed track.
15. Restore disturbed shoreline areas to match pre-disturbed conditions.
16. Remove coffer dams, temporary dewatering system, and erosion control measures.
17. Furnish, install and compact rip rap stone pads at new culvert ends and stone revetment protection during low tide conditions only along the embankment toe of slope to limits as shown in the plans
18. Restore and clean up materials from railroad right-of-way and any access areas disturbed during construction activities.
19. Perform as built survey.

Environmental Permitting

Contractor shall be aware that the work area for this project includes adjacent natural ocean and bay waterbodies to be suitably protected under the US Clean Water Act (33 USC 1251). A Section 401 Water Quality Certification (WQC) BRP WW 10 permit application (Transmittal No.

X289061) has been filed with the Massachusetts Department of Environmental Protection (MassDEP) and a Section 404 Pre-Construction Notification (PCN) General Permit has been filed with the Department of the Army, US Army Corps of Engineers, New England District.

Contractor shall be responsible for any, and all, permitting conditions and/or requirements stipulated upon issuance of the Section 401 Water Quality Certificate permit by the Massachusetts Department of Environmental Protection and the Section 404 Pre-Construction Notification (PCN) General Permit by the Department of the Army, US Army Corps of Engineers, New England District.

Contractor shall obtain the services of a qualified Society of Wetland Scientist, Certified Professional Wetland Scientist (PWS). All water resource protection work shall be observed and supervised by the PWS. The PWS shall be on site as necessary to verify water resource protection efforts; coffer dam installation and removal; temporary dewatering method installation and removal; erosion control installation and removal; and shoreline restoration work meets the requirements of the Contract Documents and in accordance with the conditions of the permits. Contractor shall comply with all recommendations of the PWS.

Preliminary Submittals.

Contractor shall submit a Construction Schedule, Water Control/Management Plan, and Sequencing Plan to Railroad and Owner for review and approval before commencing work.

Pre-Construction Survey

Contractor is responsible for performing a pre-construction site survey, to be reviewed and approved by Engineer, to determine horizontal and vertical alignment of the existing track structure at the location of the culvert to be removed and at the locations of the new culverts to be installed. The survey must include existing track alignment and profile; limits of culverts, with existing invert elevations; and verification of dimensions and material types. The survey shall include topo, including pipe invert elevations at ends of the culverts, of the existing track features within the work limits, and wetland flag locations. Contractor shall submit to the Engineer a survey plan and CAD files for review and approval by the Owner and Railroad.

Contractor shall coordinate with Mass Coastal Railroad (MCRR) to schedule the necessary ROW access for the pre-construction survey.

Erosion Control, Stream Diversion, Dewatering and Coffer Dams

Contractor is responsible for any, and all, permitting conditions and/or requirements stipulated within the project environmental permit. Contractor shall submit a detailed plan of the temporary culvert flow dewatering and erosion/sedimentation controls to the Railroad/Owner's Engineer for approval prior to the start of any work.

Prior to the start of work, Contractor shall furnish and install all erosion and sedimentation control devices in accordance with the Contract Plans, Scope of Work, Technical Specifications, Special Conditions and all Federal and State DEP Regulations. Contractor shall install coffer dams in

accordance with the Contract Plans, Scope of Work, Technical Specifications, and Special Conditions on the inlet and outlet ends of the existing culvert crossing at MP 63.22.

The temporary pump dewatering systems shall be designed and installed to accommodate construction of the work as shown in the Plans. Contractor shall coordinate with MCRR for access to the site on the Railroad Right-of-Way.

Removal and Reinstallation of Existing Jointed Track

Contractor shall optionally remove, store and reinstall a segment of the existing track rail, ties, and other track materials as needed to facilitate the removal and replacement of the existing culvert in accordance with the plans, permitting conditions and/or requirements stipulated within the project environmental permit.

Excavation, Stockpiling, Reinstalling and/or Wasting Trackbed and Subgrade Material

The limits of excavation for culvert replacement are shown on the Contract Plans. Excavation within the limits of disturbance shown in plan shall be accomplished in accordance with the Contract Plans, Scope of Work, Technical Specifications, and Special Conditions and stockpiled separately from other excavated materials.

The excavated track bed material is to be reused and any excess material will be disposed of along the Railroad Right-of-Way within five (5) miles of the work site at a location(s) designated by the Engineer.

Removal and Disposal Existing Culvert, Wood Retaining wall and Tie Pad

Contractor shall remove and properly dispose of the existing culvert in its entirety, including the careful removal of the nearby existing lumber and debris for legal offsite disposal. Contractor shall then grade, compact and prepare the subbase soil layer for installation of the bedding stone and the new replacement culvert installation in accordance with the Contract Plans, Scope of Work, Technical Specifications, and Special Conditions.

Installation of New Class V RCP Culvert and Precast concrete Wingwalls

Contractor shall prepare crushed stone pipe bedding in accordance with the Contract Plans, Scope of Work, Technical Specifications, and Special Conditions. Contractor shall produce design shop drawings for review and approval, furnish and install the proposed wingwalls and culvert pipe, backfill and compact the pipe and wingwalls using stockpiled material from the excavation. Contractor shall restore disturbed embankment and shoreline edges per contract documents to the limits as indicated on the drawings.

Backfill and Compaction

Contractor shall backfill areas within the limits of work with materials and compaction in accordance with the Contract Plans and Technical Specifications. Contractor shall restore disturbed embankment and shoreline areas per Contract Documents to the limits indicated by the contours indicated on the Contract Plans and as directed by the PWS.

Install the Rip Rap Stone Pads at Culvert Ends and Stone Revetment Along Embankment Slope

Contractor shall install the rip rap stone pads at the new pipe ends within the limits of work with materials and compaction in accordance with the Contract Plans and Technical Specifications. Contractor shall install stone revetment protection along the restored embankment toe of slope line; during low tide conditions only, per Contract Documents to the limits indicated by the revetment limits indicated on the Contract Plans and as directed by the Engineer and per acceptance of the on-site Professional Wetland Scientist.

Reinstall Track, Ties and Ballast and Tamp Ballast

Contractor shall reinstall the ballast, ties and track to the accepted inspection and approval of the Engineer within the limits of work with materials and acceptable methods in accordance with the Technical Specifications of MassCoastal Railroad.

Contractor shall remove dewatering equipment and coffer dams after culvert installation has been completed and accepted by MCRR/MassDOT. The excavated subgrade area for the replaced track ballast shall be thoroughly compacted per the Technical Specifications before installation of any ballast section.

Disturbed track bed is to be flooded with ballast and surfaced lined and tamped in accordance with the Technical Specifications. All ballast shall be property regulated even with the top of ties and broomed so that no ballast remains on the top of the ties, base of rail and plates. Shoulders are to be graded in accordance with the Contract Plans, Scope of Work, Technical Specifications, and Special Conditions.

Track construction shall consist of all work necessary to complete the task, including but not limited to, subgrade preparation, spot ditching, installation of subballast and ballast, and track surfacing and aligning. A full-time dedicated Safety Supervisor and a full-time dedicated Quality Supervisor are required to be on site during all work under this contract. See Special Provision Items for qualifications required of these personnel.

Removal of Coffer Dams, Temporary Dewatering and Erosion Control Measures

Contractor shall remove coffer dams and dewatering system equipment after the replacement culvert has been installed and inspected by the Railroad/Owner and then opened to flow.

Contractor shall remove all erosion control measures at the direction of and following final inspection of the completed project by the Engineer and the Professional Wetland Scientist.

As-Built Condition Survey

Contractor shall perform an as-built condition site survey, to be reviewed and approved by Engineer, to determine final horizontal and vertical alignment of the track structure at the locations of both the newly installed and the nearby existing culvert. The survey must include: existing track alignment and profile; limits of wingwalls, show both the existing and new culverts, with invert elevations. The as-built survey shall include topo, including contour elevations from the

edges of the track and throughout the limits of the rework area within the work limits, and the limits of restored shoreline edges. Contractor shall submit to the Engineer a survey plan and CAD files for review and approval by the Railroad and Owner.

The survey data shall be obtained by Global Positioning Survey (GPS) and certified by a Professional Land Surveyor registered in Massachusetts. A complete digital base plan shall be provided in AutoCAD DWG format Release 2018 or later on a Compact Disk (CD) or portable USB drive, properly referenced to the coordinate system established in the contract.

MATERIALS FOR PROJECT

1. MATERIALS FURNISHED BY MASSDOT(OWNER)/MCRR(RAILROAD)

MassDOT (Owner) will not be supplying any material for Contractor to use as part of this project. Contractor is to supply all material necessary to perform the work of this project in accordance with the provisions of the Contract Drawings, Scope of Work, and Technical Specifications.

2. MATERIALS FURNISHED BY CONTRACTOR

Contractor shall supply all material necessary to perform the work of this project in accordance with the provisions of the Contract Drawings, Scope of Work, and Technical Specifications.

A. 3/4" Crushed Stone Subbase

Contractor shall furnish and install ¾" crushed stone base on the prepared subgrade in preparation for installation of the reinforced concrete pipe (RCP) culverts in accordance with the provisions of the Contract Drawings, Scope of Work, and Technical Specifications.

B. Reinforced Concrete Pipe, Class V

Contractor shall furnish and install the new 48" RCP Class V pipe culvert on the prepared crushed stone base in accordance with the Contract Plans, Scope of Work, Technical Specifications, and Special Conditions.

C. Reinforced Concrete Culvert Headwalls

Contractor shall supply all 4000 psi concrete and steel reinforcement bars required to construct and install headwalls for the RCP culverts in accordance with the provisions of the Contract Drawings, Scope of Work, and Technical Specifications.

D. Armor Stone

Contractor shall supply all armor stones in size ranging from 18 inches to 24 inches in diameter to be used as embankment slope protection and also stones in size ranging from 6 inches to 8 inches in diameter to be used at splash pads at both ends of new culverts in accordance with the provisions of the Contract Drawings, Scope of Work, and Technical Specifications.

E. Track Spikes, Track Bolt Assemblies, Joint Bars, and Other Track Material (OTM)

Contractor shall furnish and install all track spikes, bolt assemblies, joint bars and OTM damaged during the temporary track removal and re-installation if required by Contractor's means and methods for the culvert installations. All track spikes used by Contractor shall be new, five-eighths of an inch (5/8") x six inches (6") long, cut spikes conforming to the requirements of the AREMA Manual for Railway Engineering, Volume 1, Chapter 5, Part 2 and are considered incidental to the removal and re-installation of the track. Contractor shall install three (3) spikes per plate in accordance with the provisions of the Contract Drawings, Scope of Work, Technical Specifications, AREMA Recommended Practices, and the MassDOT MW-1.

Contractor shall replace all damaged track bolt assemblies with new track bolts, nuts and spring washers. Contractor shall replace in kind any joint bars and OTM damaged during track removal and re-installation (if part of Contractor's means and methods). Railroad requires that each joint installed have a minimum two (2) bolts installed in each rail. Track bolts, nuts and spring washers shall be of proper size for drilling of the rail section (107NH) to be re-installed and conforming to AREMA Specifications for Heat-Treated Carbon Steel Bolts, Nuts and Spring Washers, Chapter 4, Sections 3.5 and 3.6 and are considered incidental to the removal and re-installation of the track. Contractor shall install all bolts assemblies, joint bars and OTM in accordance with the provisions of the Contract Drawings, Project Description, Scope of Work, Technical Specifications, MassDOT MW-1, and AREMA Recommended Practices.

The installation of track spikes, track bolt assemblies, joint bars and OTM in this contract is considered incidental to the installation of culverts if track removal and re-installation is required by Contractor's means and methods.

F. Ballast

Contractor shall furnish install all stone track ballast required for this project. Ballast shall meet the requirements of AREMA No. 4, maximum size 1-1/2", durable, full-face fractured granite rock in accordance with AREMA Manual for Railway Engineering, Volume 1, Chapter 1, Part 2. Contractor shall provide ballast from quarries pre-approved by MassDOT. Contractor will be responsible for all loading, unloading, handling and safeguarding of the material prior to installation. Ballast for all work in this contract shall be installed in accordance with the provisions of the Contract Drawings, Project Description, Scope of Work, Technical Specifications, MassDOT MW-1, and AREMA Recommended Practices.

CONTRACTOR RESPONSIBILITIES

Contractor work to be done under this Contract consists of furnishing all required labor, materials, tools, equipment, and services as indicated in accordance with the provisions of the Contract Documents. The RAILROAD is responsible for providing railroad services such as an Employee-in-Charge (EIC), flagging or signal support. These Specifications describe requirements for construction and for the procurement of materials to be used in the subject project.

The Contractor is responsible for completing all track work necessary to perform the work. MassDOT and RAILROAD will furnish certain materials and products as further described in the Special Provision Items.

Contractor will be responsible for the removal of all trash, trackwork packaging materials, construction debris and all other project-related equipment and supplies from the right-of-way and adjacent areas at the end of each shift and upon completion of the project work.

All work done under this Contract shall be in conformance with the 2025 Massachusetts Department of Transportation Highway Division Standard Specifications for Highways and Bridges Division I: General Requirements and Covenants, as amended herein, certain subsections of Divisions II: Construction Details and III: Materials Specifications referenced herein, the Supplemental Specifications thereto (03/31/2025), Special Provisions contained in this book, the 2024 AREMA Manual for Railway Engineering, MassDOT's MW-1, RAILROAD procedures for the installation, adjustment, maintenance, and inspection of CWR, the Plans, and these Special Provisions. Each of the foregoing is incorporated by reference herein. In case of conflict among the foregoing documents, the most stringent provisions or standard will take precedence.

Protection of Work and Property

Contractor shall provide temporary protection of work and property during the Contract period. This includes existing mainlines, sidings, yard tracks, culverts, bridges, grade crossings, access paths, utility easements, and private crossings. Railroad equipment within the work area, including existing ties, rails, switches, and OTM inside and outside the reconstruction limits shall also be protected. Contractor shall remove all trash, packaging materials, extracted pipe silts and sediments, construction debris and all other project-related equipment and supplies from the right-of-way and adjacent areas at the completion of the project work.

After the work is properly completed, Contractor shall be responsible for protecting work and for repairing, replacing, and cleaning of damaged work, so that all work is complete at the time of acceptance of the work. Contractor to remove all temporary protection and coverings at the completion of the Work.

Equipment

Contractor shall provide, maintain, and operate all required types and quantities of equipment required for the Work. Contractor will be required to utilize, at a minimum, the following pieces of equipment (with qualified operators) in the culvert replacement and installation process:

- (1) - Hi-Rail Excavator
- (1) to (2) - Hi-Rail Dump Trucks
- (1) - Hi-Rail Grapple Truck
- (1) - Tamper
- (1) – Rail Flat Car for Transporting Critical Equipment as needed
- (2) – Sump Pumps and Hose Runs

A qualified mechanic shall be on site at all times during construction operations. The mechanic shall be equipped with a truck that contains sufficient tools, replacement parts, and fluids for the equipment being.

RAILROAD COORDINATION

The Cape Main is operated by MassCoastal Railroad (MCRR Operator) and typically makes round trip moves on multiple occasions weekly, Monday through Sunday. MCRR operations are flexible and exact scheduling information can be available directly from MCRR. Arrangements to tie up

equipment on the main track are at the discretion of MCRR. Mass Coastal Railroad (MCRR or Railroad) maintains the Cape Main under contract with MassDOT (Owner).

Daily meetings will be required between the on-site representatives of Contractor, Owner's Authorized Representative, Railroad, and Operator to ensure coordination of work activities and train service. At the end of each shift: any in service track must meet FRA Class 2 criteria (Class 5 upon completion of a turnout); all personnel, equipment and materials shall be cleared and secured from the track, and all switches shall be normalized, in working order and secured as directed by Railroad EIC.

The protection of trains, overall safe operations and the protection of workmen and railroad personnel are paramount objectives in executing the Work. All personnel entering the Railroad Right-of-Way must have Roadway Worker Protection (RWP) training in accordance with MCRR's Roadway Worker Protection Manual and On-Track Safety Program.

ENVIRONMENTAL COMPLIANCE

In order to comply with environmental permitting commitments and requirements, the following Special Provisions shall be incorporated into Contractor's work plan and execution of the culvert replacement and culvert installations:

Quality Assurance

Contractor shall obtain the services of a qualified Society of Wetland Scientists Certified Professional Wetland Scientist (PWS). All wetland restoration and mitigation work shall be observed and supervised by the qualified Society of Wetland Scientists Certified Professional Wetland Scientist (PWS). The PWS shall available to address any issues that may arise during all wetland mitigation efforts; coffer dam installation and removal; temporary dewatering method installation and removal; and erosion control installation and removal to ensure compliance with all conditions of environmental permits. PWS shall be on site as necessary to verify wetland mitigation efforts; coffer dam installation and removal; temporary dewatering method installation and removal; erosion control installation and removal; and wetland replication work meets the requirements of the Contract Documents and in accordance with the conditions of the permits. Contractor shall comply with the recommendations of the PWS.

All costs associated with the service of the Professional Wetlands Scientist (PWS), and any work recommended by him/her, shall be considered incidental to the overall Project. These costs shall be the responsibility of Contractor.

Submittals. Contractor shall provide the following submittals to ensure environmental compliance prior to performing the work:

- A proposed Construction Phasing Plan, including identification of any stockpiling, storage and/or laydown areas shall be submitted to Engineer for review and approval.
- A proposed Water Control/Management Plan, including measures to control erosion and sedimentation, shall be submitted to the Engineer for review and approval.
- Qualifications, experience, and proof of Certification of Professional Wetland Scientist shall be submitted to Engineer for review and approval.

DESIGNER/PROJECT MANAGER

DESIGNER
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PROJECT MANAGER
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COMMONWEALTH OF MASSACHUSETTS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFIATIONS FOR HIGHWAYS AND BRIDGES – DIVISION I

Amend Subsections of the Highway Division Standard Specifications for Highways and Bridges – Division I as follows:

SECTION 1.00: DEFINITION OF TERMS

Amend Section 1.00 Definition of Terms of the Highway Division Standard Specifications for Highways and Bridges as follows:

SUBSECTION 1.03 - DEFINED TERMS

- The definition of "Engineer" is deleted and replaced with the following definition: "Engineer/Chief Engineer: The MassDOT Rail & Transit Division, acting directly or through an authorized representative, such representative acting within the scope of the particular duties entrusted to them."
- The following definition of "Owner" is added: "Owner: The Massachusetts Department of Transportation ("MassDOT"), acting through its authorized representative, such representative acting within the scope of the particular duties entrusted to them."
- The following definition of "RAILROAD" is added: "RAILROAD: Massachusetts Coastal Railroad, LLC (MCRR or Mass Coastal Railroad), as authorized as operator, dispatcher, and maintainer under contract with owner. The RAILROAD is responsible for the safety and regulatory compliance of Owner's railroad right-of-way, track and related facilities where the Work will take place. Owner shall notify Contractor in writing upon any change to the identity or description of RAILROAD during the term of the Contract. The term "RAILROAD", when used in the text of these Contract Documents, shall also mean any duly authorized representative of RAILROAD when authorized in accordance with these Contract Documents.

SECTION 2.00: PROPOSAL REQUIEMENTS AND CONDITIONS

Amend Section 2.00 Proposal Requirements and Conditions of the Highway Division Standard Specifications for Highways and Bridges as follows:

SUBSECTION 2.01 – PROPOSAL FORMS AND PLANS

Amend Subsection 2.01.A of the Highway Division Standard Specifications for Highways and Bridges is deleted and replaced with the following:

2.01.A. PREQUALIFICATION TO BID.

All prospective Bidders who intend to bid on this project must provide the following required pre-qualification information to Kevin McGrath at the MassDOT Rail and Transit Division by email at kevin.mcgrath@dot.state.ma.us and William Lynch at Jacobs engineering Group, William.J.Lynch@jacobs.com, before 4:00pm seven (7) days prior to the bid opening date.

1. Bidders must be pre-qualified under MBTA Class 1 – General Transit Construction (>$3,000,000 for Maximum Single Project Rating) **and** in MBTA Class 3 – Trackwork

(>$3,000,000 for Maximum Single Project Rating) to bid on the above project. An award will not be made to a Contractor who is not pre-qualified by the MBTA prior to the opening of Proposals.

Go to the MBTA website below to find MBTA Prequalification Procedures.

https://bc.mbta.com/uploadedfiles/Business_Center/Bidding_and_Solicitations/Design_and_Construction/Contractor%20Prequalification%20Application%202022.pdf

Bidders must submit MBTA-issued certificates showing that they are prequalified in the required classes of work for the project.

2. MassDOT Rail & Transit Prequalification. Bidders must be prequalified in the following classes of work: General Rail Construction on or Around Active Rail Lines, and Trackwork.

A. Bidders, as the prime contractors, must have satisfactorily performed in the field, managed and completed within the last five (5) years, as determined by MassDOT, three (3) projects, each with a project value of at least $3,000,000 with the following scope of work: track drainage and culvert improvement work.

Bidders must submit the following:

- Documentation describing the above-described required project experience.
- Names of the skilled labor and supervisors that will perform the project track drainage and culvert improvement work.
- Resumes of key project personnel.
- Number of staff and crews employed by the bidder who will work on the project.
- A reference for each project, which includes the following information: name, title and affiliation of the reference; address of the reference; phone number and email address of the reference.

2.01.A-1. MASSDOT RAIL & TRANSIT DIVISION PREQUALIFICATION CLASSES OF WORK

General Rail Construction on or Around Active Rail Lines

Heavy rail line construction projects including the following work: site preparation, excavation backfill, support of excavation, grading, storm drainage, utilities, sewage and water systems, gravel base courses, bituminous and cement pavements, retaining walls, steel reinforced concrete structures, precast concrete structures, steel structures, timber structures, landscaping, access roadways, fencing, signing and incidental site work. This Class of work is intended to only include the contractor's ability to work on or around active facilities without causing disruption. In preparing the Contractor's bid proposal the contractor must exhibit, on previously completed projects that the scope of work for the project required the contractor to perform or manage work on or around active rapid transit, light rail, commuter rail and/or freight tracks without causing disruption to service.

Trackwork

Projects consisting of the rehabilitation of, or new construction of trackwork for a railroad. Work includes the placement of track support structure, ballast, wood or concrete ties, direct fixation,

rail fastening, switches and turnouts, rail welding placement, tamping, CWR installation, jointed rail installation, alignment, maintenance and testing, and track drainage and culvert work.

2.01.B. ISSUANCE OF PROPOSAL FORMS AND PLANS

Subsection 2.01.B Issuance of Proposal Forms and Plans in the Highway Division Standard Specifications for Highways and Bridges is deleted and replaced with the following:

"Modifications to any proposal documents will be made through the addendum process and posted on www.commbuys.com."

SUBSECTION 2.04 – PREPARATION OF PROPOSALS

Subsection 2.04 Preparation of Proposals in the Highway Division Standard Specifications for Highways and Bridges is deleted and replaced with the following:

Electronic proposals for the following project will be received through the internet using on www.commbuys.com ("COMMBUYS") until the date and time stated below. Bid documents will be posted on www.commbuys.com forthwith after the bid submission deadline. No paper copies of bids will be accepted.

All bidders must be registered with COMMBUYS in order to bid on this project. If Bidders are not currently registered with COMMBUYS, it is recommended that they register with COMMBUYS at least seven-days prior to the scheduled bid opening date. To register, go to www.commbuys.com and click on the "Register" link on the home or landing page.

A. At the designated time of the bid opening MassDOT will accept, as the official bid, the set of proposal forms submitted by the bidder which includes the documents identified in Document B00420 PROPOSAL.

B. MassDOT will not be responsible for any communications or hardware breakdowns, transmission interruptions, delays, or any other problems that interfere with the receipt or withdrawal of proposals as required above either at the Bidder's transmitting location, at www.commbuys.com, or anywhere between these locations will not be considered grounds for a bid protest. MassDOT will not be held responsible if the bidder cannot complete and submit a bid due to failure or incomplete delivery of the files submitted via the Internet.

C. CONTRACTOR QUESTIONS AND ADDENDUM ACKNOWLEDGEMENTS

Prospective bidders are required to submit all questions to the Project Designer by 4:00 P.M. on Wednesday, February 4, 2026 Any questions received after this time will not be considered for review by MassDOT. MassDOT and Owner's consultants will provide answers to questions by 4:00 PM Wednesday, February 11, 2026.

Contractor questions and addendum acknowledgements must be submitted through COMMBUYS by the deadline listed. Contractors are also requested to email questions and addendum acknowledgements to the following email address at William.J.Lynch@jacobs.com. Please put the MassDOT project file number in the subject line.

D. PREBID CONFERENCE

A Prebid Conference will be held on project site see Section E.

E. PREBID SITEWALK

A Pre-Bid Meeting/Pre-Bid Site Walk will be held at 10:00 AM on January 28th, 2026. Meeting will be held at the Sandwich Station Parking Lot located at 42 Jarves Street, Sandwich, MA 02563, with sitewalk to follow. Prospective bidders shall bring with them all personal protective equipment which must be worn to access the project site.

F. PROPOSAL REQUIREMENTS

1. To be approved for bidding, prospective bidders must submit the prequalification documents outlined in SUBSECTION 2.01 PROPOSAL FORMS AND PLANS
2. The completed and signed documents identified and inserted in Document B00420 PROPOSAL must be included in the bid proposal submittal.

SUBSECTION 2.08: PUBLIC OPENING OF PROPOSALS.

Subsection 2.08 of the Massachusetts Department of Transportation Highway Division Standard Specifications for Highways and Bridges is deleted and replaced with the following:

The total price of each compliant proposal submitted by the deadline indicated in the Notice to Contractors will be posted on COMMBUYS forthwith after the bid submission deadline. Bids may be examined at MassDOT after the bid submission deadline and posting of the results on COMMBUYS.

SUBSECTION 2.09 – REJECTION OF PROPOSALS

Modify Subsection 2.09 as follows: In the third paragraph, the following text is deleted: "In accordance with 700 CMR 14."

SECTION 3.00: AWARD AND EXECUTION OF CONTRACT

Amend Section 3.00 Award an Execution of Contract of the Highway Division Standard Specifications for Highways and Bridges as follows:

SUBSECTION 3.02 - AWARD OF CONTRACT

Modify Subsection 3.02 as follows: In the fourth paragraph, the following text is deleted: ", and is otherwise in compliance with 700 CMR 14.00 *Prequalification of contractors and subcontractors."*

SUBSECTION 3.05 – EXECUTION OF CONTRACT

Modify Subsection 3.05 as follows: The first paragraph is deleted and replaced with the following paragraph: "Forms to be submitted by the successful bidder are in Contract Document B00421. The successful Bidder shall execute and deliver the contract and furnish the required forms and surety to the Department within **3 days** after the date of the notice of award."

SECTION 4.00: SCOPE OF WORK

Amend Section 4.00 Scope of Work of the Highway Division Standard Specifications for Highways and Bridges as follows:

SUBSECTION 4.10 – FINAL CLEANING UP

Amend Subsection 4.10 of the Standard Specifications by adding the following:

Disposal of Excess Material. Surplus materials obtained from any type of excavation, and all existing and other materials not required to be removed and stacked or stockpiled, or otherwise needed for use on the project, as identified in these Special Provisions or determined by the Engineer, shall become the property of the Contractor and disposed of subject to the regulations and requirements of local authorities governing the disposal of such materials, at no additional compensation.

Removing and Stacking of Materials. Contractor is responsible for obtaining their own yard for storage of all existing and other materials required to be removed and stacked. No separate payment will be made for this work, but all costs in connection there with shall be included in the prices bid for various Contract 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.

SECTION 5.00: CONTROL OF WORK

Amend Section 5.00 Control of Work of the Highway Division Standard Specifications for Highways and Bridges as follows:

SUBSECTION 5.02 – PLANS AND DETAIL DRAWINGS

Modify Subsection 5.02 as follows: Delete "The Engineer shall make all copies of approved shop drawings as indicated in Table 5.02-1" in Paragraph 8 and Table 5.02-1.

SUBSECTION 5.04 – ORDER OF PRECEDENCE

Modify Subsection 5.04 as follows: In the first paragraph of Subsection 5.04, the order of precedence of various contract documents is deleted and replaced with the following text:

1) Contract Amendments (e.g., Extra Work Orders and Time Extensions)
2) Contract (in the following order)
    - Addenda, including bid questions and responses
    - Special Provisions, Detail Sheets and Permits
    - Plans
    - Contract Documents
    - AREMA
    - Supplemental Specifications to the Highway Division Standard Specifications for Highways and Bridges
    - Highway Division Standard Specifications for Highways and Bridges

SUBSECTION 5.06 – ADJACENT CONTRACTS

Amend Subsection 5.06 – Adjacent Contracts Highway Division Standard Specifications for Highways and Bridges by adding the following:

Concurrent Work may be in progress in the project area by the MassDOT, the local municipalities, utility companies, another Contractor hired by the owner, or other Contractors hired by private parties. The Contractor is required to coordinate his activities with these parties.

No additional payments will be allowed for any disruption of Work schedule caused by or required to coordinate Work in this Contract with Work to be performed by others, as described above or which may be encountered during the prosecution of the Work.

SECTION 6.00: CONTROL OF MATERIALS

Amend Section 6.00 Control of Materials of the Highway Division Standard Specifications for Highways and Bridges as follows:

SUBSECTION 6.03 – DELIVERY AND STORAGE OF MATERIALS

Amend Subsection 6.03 of the Highway Division Standard Specifications for Highways and Bridges as follows:

The fourth paragraph is deleted and replaced with the following paragraph: "The Contractor may opt to obtain storage outside of the project limits if required. No areas shall be used for storage outside the project limits within the Right-Of-Way layout without written permission of the Engineer. No additional compensation shall be given for the design, construction, preparation, or restoration of the storage site(s) which may include but is not limited to a Traffic Management Plan (TMP), utilities, and lighting."

SECTION 7.00: LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC

Amend Section 7.00 Legal Relations and Responsibility to Public of the Highway Division Standard Specifications for Highways and Bridges as follows:

COMPLIANCE WITH THE NATIONAL DEFENSE AUTHORIZATION ACT

(Supplementing Subsection 7.01)

On all projects, the "Prohibition on Certain Telecommunications and Video Surveillance Services or Equipment" Regulation (2 CFR 200.216) prohibits the Contractor from using or furnishing the following telecommunications equipment or services:

- Telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities).
- For the purpose of public safety, security of government facilities, physical security surveillance of critical infrastructure, and other national security purposes, video surveillance and telecommunications equipment produced by Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities).
- Telecommunications or video surveillance services provided by such entities or using such equipment.
- Telecommunications or video surveillance equipment or services produced or provided by an entity that the Secretary of Defense, in consultation with the Director of the National Intelligence or the Director of the Federal Bureau of Investigation, reasonably believes to be an entity owned or controlled by, or otherwise connected to, the government of a covered foreign country.

This prohibition applies to all products manufactured by the aforementioned companies, including any individual components or parts.

By submitting a bid on a project, the Contractor certifies that all work will be in compliance with the terms of 2 CFR 200.216. The Contractor shall submit a COC indicating compliance with the above provisions for all telecommunications equipment or services included in the Contract.

Payment for the item in which the materials are incorporated may be withheld until these COCs are received. Any cost involved in furnishing the certificate(s) shall be borne by the Contractor.

SUBSECTION 7.02: POLLUTION PREVENTION

Amend Subsection 7.02.B – Water Pollution Requirements of the Highway Division Standard Specifications for Highways and Bridges by adding the following:

7.02.B.7: Erosion and Sediment Control

The Engineer has the authority to limit the surface areas of erodible earth material exposed by excavation, borrow and fill, or any such operations, and to direct the Contractor to provide immediate, permanent, or temporary control measures to prevent contamination of any adjacent bodies of water or drainage systems. Such measures will involve the installation of compost filter tubes, staked hay bales, sedimentation basins, silt fences or other control devices or methods as necessary to control erosion and sedimentation.

The erosion and sediment control features installed by the Contractor shall be satisfactorily maintained by the Contractor until acceptance of work under this Contract. In the event of conflict between these Specifications and Laws, Rules, or Regulations of local agencies, the more restrictive requirements shall apply.

If temporary erosion and sediment control measures are required due to the Contractor's negligence or carelessness, the control measures shall be performed by the Contractor at his/her own expense. Construction of temporary erosion and sediment control measures, which are not attributed to the Contractor's negligence, carelessness, or failure to install permanent controls, will be performed as shown on the Plans and/or as ordered by the Engineer.

Repeated failures by the Contractor to control erosion, pollution, and/or siltation, shall be cause for the Engineer to employ outside assistance or to use his/her own forces to provide the necessary corrective measures. The cost of such assistance plus project engineering costs will be charged to the Contractor and appropriate deductions made from the Contractor's monthly progress estimate.

Payment for temporary soil erosion and sedimentation control work will be included under the various items in this Contract.

SUBSECTION 7.04: MOTOR VEHICLES

Amend Subsection 7.04 – Motor Vehicles of the Highway Division Standard Specifications for Highways and Bridges by adding the following:

TRUCK SAFETY DEVICES

All motor vehicles subject to Section 7 of Chapter 90 to be operated under this Contract shall be equipped with safety devices as provided therein and in 540 CMR 4.00.

By March 31, 2026, the Contractor shall certify to the Registry of Motor Vehicles, in a manner prescribed by the Registrar, that all applicable vehicles are equipped with Lateral Protective Devices, Convex Mirrors, Cross Over Mirror(s) and Back Up Cameras in accordance with the requirements of 540 CMR 4.00.

The Contractor shall provide evidence satisfactory to the Department to demonstrate compliance with the above certification requirement for all applicable vehicles operated under this Contract by the Contractor and its subcontractors and vendors in a manner set forth by the Department.

Thereafter, the Contractor shall have an affirmative obligation to continue to provide such evidence of compliance on an ongoing basis and no later than 7 days after certification with the Registry of Motor Vehicles of any additional vehicles operated under this Contract by the Contractor and its subcontractors and vendors.

Non-compliance with respect to a vehicle that is subject to 540 CMR 4.00 may subject the Contractor to statutory fines as established in M.G.L. c. 90, § 7 and/or contractual remedies up to and including termination of the Contract.

SUBSECTION 7.05 INSURANCE REQUIREMENTS

Amend Subsection 7.05 – Insurance Requirements of the Highway Division Standard Specifications for Highways and Bridges as follows:

7.05.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 the Massachusetts Coastal Railroad (MCRR or Railroad) shall be the named insureds.

Paragraph 3 – Railroad's Protective Liability Insurance and Protective Property Damage Liability Insurance.

Due to the nature of the project, Railroad Protective Insurance will be required for this project with a limit of not less than five Million Dollars ($5,000,000) per occurrence. Such insurance shall also contain an aggregate of not less than ten Million Dollars ($10,000,000) for damages arising out of more than one occurrence.
MassDOT and Massachusetts Coastal Railroad (MCRR or RAILROAD) shall be the named insureds.

SUBSECTION 7.09 – PUBLIC SAFETY AND CONVENIENCE

Amend Subsection 7.09 – Public Safety and Convenience of the Highway Division Standard Specifications for Highways and Bridges by adding the following:

The Contractor shall protect all work areas from unauthorized access by methods acceptable to the Engineer.

The Contractor shall repair any damage to public or private property adjacent to the Project caused by the Contractor's operations and shall leave the property in a condition equal to or better than what it was in prior to commencement of the work.

SUBSECTION 7.14 – RESPONSIBILITY FOR DAMAGE CLAIMS

Delete Subsection 7.14 – Responsibility for Damage Claims of the Highway Division Standard Specifications for Highways and Bridges and Replace Subsection with the Following:

7.14: Responsibility For Damage Claims

The Contractor shall indemnify, defend, and save harmless the Commonwealth, the Department, the Railroad (including Railroad's parent company, affiliates, and subsidiaries), the Municipality and all of its offices, agents, and employees from and against all claims, damages, losses, and expenses, including attorney's fees, for or on account of any injuries to persons or damages to property arising out of or in consequence of the acts of the Contractor in the performance of the work covered under the contract or failure to comply with the terms and conditions of said contract, and is caused in whole or in part by any negligent act or omission of the Contractor, any subcontractor, anyone indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder.

The Contractor will be held responsible for any and all claims for damage to underground structures such as, but not restricted to, water or gas mains, pipes, conduits, manholes or catch basins, due to their operation or to the operations of any of their Subcontractors.

The Commonwealth agrees to indemnify the Contractor against loss by reason of the liability to pay damages to others for entry upon any land included within the boundaries of the area within which the work is to be performed as set forth in the construction Contract and the plans and specifications applying to such Contract or any approved changes thereof or for damage sustained upon any lands adjoining said land by reason of the flowage or drainage of water thereto or therefrom. In any case wherein such damages result from the failure of the Commonwealth to take an interest or easement in such adjoining area, provided that the Commonwealth acting by an authorized representative thereof has issued a notice in writing to the Contractor prior to the making of an entry upon such premises directing or permitting them to proceed with their Contract and to make such entry upon the premises for the purpose of performing the work required by said Contract, or any approved alteration thereof, and provided, further, that the Contractor has given notice in writing to the contracting authority within 15 days after receiving notice of any claim to come in and settle the same and upon the commencement of any action against them to come in and defend said action, but in no event shall any such damage claim be compromised or adjusted without the written consent of the Commonwealth. The provisions of this section shall in no way relieve the Contractor from any liability for damage to property of others caused by their negligence or that of their employees nor shall they be construed to require the Commonwealth to indemnify the Contractor against any loss resulting from such acts of negligence.

SUBSECTION 7.16 – CLAIMS OF CONTRACTOR FOR COMPENSATION

Amend Subsection 7.16 – Claims of Contractor for Compensation of the Highway Division Standard Specifications for Highways and Bridges as follows:

7.16.B – Construction Claims Committee Determination (Step 2)

Delete Subsection 7.16.B – Construction Claims Committee Determination (Step 2) of the Highway Division Standard Specifications for Highways and Bridges and Replace Subsection with the Following:

7.16.B: Determination by Administrator (Step 2)

Within 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 Deputy Administrator of the Rail & Transit Division. The Contractor shall also provide any additional information, at the Department's request, that the Division's Deputy Administrator determines is necessary for 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 Deputy Administrator 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 of each claim made.

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.

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

Modify Subsection 7.16.C – Appeal too the Administrative Law Judge (Step 3) of the Highway Division Standard Specifications for Highways and Bridges as follows:

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

Delete the first two paragraphs**.**

The first sentence of the third paragraph is deleted and replaced with the following sentence: At any time after the determination by the Engineer, the Contractor at its sole discretion may appeal the Engineer's determination to the Superior Court Department of the Commonwealth of Massachusetts in the County of Suffolk for further consideration.

The last paragraph is deleted and replaced with the following paragraph: 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, as well as the Railroad, 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 Extension).

SUBSECTION 7.20: NO WAIVER OF LEGAL RIGHTS

Amend Subsection 7.20 – No Waiver of Legal Rights of the Highway Division Standard Specifications for Highways and Bridges as follows:

The third sentence must be modified as follows: "Neither the acceptance by the Department, or any representative of the Department, nor any payment for any acceptance of the whole or any part of the work, nor any extension of time, nor any possession taken by the Department **or by the Railroad**, shall operate as a waiver of any portion of the Contract, or of any power herein reserved, or of any right to damages."

ACCESS MASSDOT INFORMATION ON WEBSITE

Access MassDOT information related to Construction, Design/Engineering, Contractor/Vendor Information, Approved Materials and Fabricators, Manuals, Publications and Forms at:

Massachusetts Department of Transportation | Mass.gov

PROTECTION OF UNDERGROUND FACILITIES

The Contractor's attention is directed to the necessity of making his own investigation in order to assure that no damage to existing structures, drainage lines, traffic signal conduits, etcetera, will occur.

The Contractor shall notify Massachusetts DIG SAFE and procure a Dig Safe Number for each location prior to disturbing existing ground in any way. Contact the Dig Safe Call Center by 811 or 1-888-344-7233 or online at www.digsafe.com.

ENVIRONMENTAL PERMITTING

The proposed work occurs in an area with adjacent natural ocean and bay waterbodies suitably protected under the US Clean Water Act (33 USC 1251). A Section 401 Water Quality Certification (WQC) BRP WW 10 permit application (Transmittal No. X289061) has been filed with the Massachusetts Department of Environmental Protection (MassDEP) and a Section 404 Pre-Construction Notification (PCN) General Permit has been filed with the Department of the Army, US Army Corps of Engineers, New England District.

Contractor shall be responsible for any, and all, permitting conditions and/or requirements stipulated upon issuance of the Section 401 Water Quality Certificate permit by the Massachusetts Department of Environmental Protection and the Section 404 Pre-Construction Notification (PCN) General Permit by the Department of the Army, US Army Corps of Engineers, New England District. The Contractor is advised that all terms and conditions within said permits shall be strictly adhered to.

Contractor shall obtain the services of a qualified Society of Wetland Scientist, Certified Professional Wetland Scientist (PWS). All water resource protection work shall be observed and

supervised by the PWS. The PWS shall be on site as necessary to verify water resource protection efforts; coffer dam installation and removal; temporary dewatering method installation and removal; erosion control installation and removal; and shoreline restoration work meets the requirements of the Contract Documents and in accordance with the conditions of the permits. Contractor shall comply with all recommendations of the PWS.

If Contractor erection, demolition, storage, or other procedures require work to occur in or otherwise impact water, wetland resource areas, buffer zones, etc., the Contractor is advised that no associated work can occur until all required environmental permits have been obtained. The Contractor must notify the MassDOT Rail and Transit Division in writing at least 60 days prior to desired commencement of the proposed activity. All environmental submittals, including any contact with Local, State, or Federal environmental agencies, must be coordinated through the MassDOT Rail and Transit Division Environmental Engineer. The Contractor is expected to fully cooperate with requests for information and provide same in a timely manner.

The Contractor is further advised that the Department will not entertain a delay claim due to the time required to obtain the environmental permits.

As a supplement to Section 7.00 of the Standard Specifications, the Contractor is reminded that no debris of any type shall be allowed to enter water or wetland resource areas, either temporarily or permanently.

Precautions for Protection of the Environment

During the execution of work under this Contract, the Contractor shall exercise care in the placement and storage of equipment, materials and debris as some areas of the site are in environmentally sensitive areas. No equipment, materials or debris can be placed or stored in or near a resource or drainage area leading to a resource as required by the Engineer. The Contractor shall neither stockpile material or equipment nor perform maintenance or refueling of equipment in a wetland area, within 100 feet of a wetland, or within 200 feet of a river, stream, pond or drainage area leading to a resource or other similar open body of water.

Oil and Hazardous Material Spill Prevention

Measures must be taken by the Contractor to prevent spills and leaks of oils and other hazardous materials to the environment. Such measures include but are not limited to properly maintaining construction equipment, establishing fuel and hazardous material handling areas that are designed to prevent releases to the environment (include containment structures if needed), instructing personnel in proper waste handling procedures and strictly prohibiting disposal into drains, water ways or receptacles, such as dumpsters, designed for non-hazardous waste. Spills or leaks of oil or hazardous materials must be reported to the DEP in accordance with the reportable quantities and criteria for "spills" as designed by the DEP in 310 CMR 40.370. Notification to the Engineer and to DEP must be made as soon as possible, but not more than two (2) hours after a spill or leak occurs. For various locations projects with work on or around existing steel or bearing areas. Also for designed projects involving full demolition, superstructure demolition, or superstructure demolition with modifications to the substructures.

WORK SCHEDULE & NOISE CONTROL

Use every effort and every means possible to minimize noises caused by construction operations, which the Engineer may consider as objectionable. Provide working machinery and equipment designed to operate with the least possible noise, and when gearing is used, such gearing shall be of a type designed to reduce noise to a minimum. Equip compressors with silencers on intake lines. Equip gas or oil operated equipment with silencers or mufflers on intake and exhaust lines.

Wherever practicable, electricity shall be used for power to reduce noise. Dumping bins, hoppers, and trucks used for disposal of excavated materials shall be lined with wood or other sound deadening material if required. Where required by agencies having jurisdiction, certain noise producing work may have to be performed during specified periods only.

The Contractor shall make all reasonable effort to minimize community disruption that might result from construction, including safety and security problems; the creation of noise, vibration, truck traffic on residential streets, traffic diversions, dust, storage and removal of materials; the choice of location of construction staging, the movement of construction equipment; provision of site cleanup; and hours of operation. Construction activities that may cause community disruption must be agreed upon in consultation with the Engineer prior to the start of construction.

Contractor shall be aware of the codes from the municipalities of Sandwich, MA and shall comply with the codes, regulation of construction hours, and construction noise levels.

The Town of Sandwich, within which are the project limits have ordinances which control various activities such as work hours. While Railroad believes that the ICC Termination Act exempts railroad activities from local regulation, Railroad has adopted a “Good Neighbor Policy” and one element of that policy limits, to the extent consistent with efficiency and safety, early morning and late-night operations. MassDOT and Massachusetts Coastal Railroad have established Project work hours of Monday through Friday, from 7:00 AM through 3:30 PM. Any changes to these days/hours must be approved by MassDOT and the Railroad. Accordingly, unless otherwise controlled or allowed by local ordinances, work will not start before 6:30AM and will end before 7:00PM daily. Work on weekends and Holidays is encouraged due to no train operations on those days.

Noise control is a part of Railroad’s “Good Neighbor Policy” and includes many of the activities discussed above. Noise from trackwork operations shall be controlled to the extent possible, including the sounding of horns and warning devices on railway maintenance and construction machinery. Nothing set forth in this Section shall relieve Contractors from full compliance with FRA and Commonwealth regulations regarding sounding of horns, whistles and/or bells at crossings and approaching and passing through work zones.

The Contractor shall give notice to the Engineer at least 48 hours in advance of beginning any work affecting the maintenance of traffic and shall not proceed with surfacing operations without specific notice to, and the approval of, the Engineer.

The Contractor shall coordinate with the Engineer and the municipality of Sandwich to provide access and accommodation for these events. Work on a holiday or on the day before or after a long weekend which involves a holiday requires prior approval by the Engineer. Times will need to be

submitted in advance for approval.

TRAIN OPERATIONS & RAILROAD COORDINATION

The Cape Main is an active freight rail line serving all of Cape Cod Massachusetts. Service to the Cape Cod destinations shall remain operational throughout the duration of the project (except during specified construction windows). The Cape Main is owned by the Commonwealth of Massachusetts Department of Transportation (MassDOT) and is operated by and maintained under contract with Massachusetts Coastal Railroad (MCRR or Railroad).

The Cape Main is typically operated from four up to six days per week to service Cape Cod trash collection, scenic tours and the Cape Flyer commuter train depending on demand. Contractor shall coordinate work windows and train moves with MassCoastal Railroad directly. Contractor shall coordinate with MCRR on scheduling any necessary track outages required to perform the work.

No work will be permitted by the contractor without the RAILROAD EIC (Employee in Charge) being present. Each workday will begin with the required Job Briefing which will be given by the RAILROAD EIC.

Frequent and ongoing communication between the Contractor, the Engineer, and RAILROAD representatives is highly encouraged to enable efficient coordination of work activities and train service.

Daily meetings will be required between the on-site representatives of Contractor, Owner's Authorized Representative and Railroad to ensure coordination of work activities and train service. During working hours, the track shall remain passable for scheduled freight train moves. All personnel, equipment and material shall be cleared and secured from the track, and all switches shall be normalized and properly lined up as directed by Railroad EIC. At the end of each shift: any in service track must meet FRA Class 2 criteria (Class 5 upon completion of a turnout); all personnel, equipment and materials shall be cleared and secured from the track, and all switches shall be normalized, in working order and secured as directed by Railroad EIC.

The Railroad determination of work schedules will take precedence over all other planning and scheduling efforts. The protection of trains, overall safe operations, and the protection of workmen and railroad personnel are paramount objectives in prosecuting the Work.

The protection of trains, overall safe operations and the protection of workmen and railroad personnel are paramount objectives in executing the Work. All personnel entering the Railroad Right-of-Way must have Roadway Worker Protection (RWP) training in accordance with Massachusetts Coastal Railroad On-Track Safety Manual.

SECTION 8.00: PROSECUTION AND PROGRESS

Amend Section 8.00 Prosecution and Progress of the Highway Division Standard Specifications for Highways and Bridges as follows:

SUBSECTION 8.02: SCHEDULE OF OPERATIONS

Subsection 8.02 Schedule of Operations in the Highway Division Standard Specifications for Highways and Bridges is deleted and replaced 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.

CONTRACTUAL MILESTONES AND DURATIONS:

Contractual Milestones: This Contract contains the following Contractual Milestones that are to be included in the Contractor's Baseline Contract Progress Schedule submission. The Contractor shall identify the completion of the work pertaining to each Contractual Milestone through the inclusion of a Finish Milestone and hammock activities in the accepted baseline Contract Progress Schedule using the stated description.

MS#01 – Contractor Field Completion: The Contractor shall achieve Contractor Field Completion by June 30th, 2026. Contractor Field Completion is defined as the completion of all physical contract work including the completion of the punch-list work, and the Contractor has fully demobilized from the field operations

SUBSECTION 8.03 PROSECUTION OF WORK

Amend Subsection 8.03 of the Highway Division Standard Specifications for Highways and Bridges by adding the following:

Prior to the start of any work, the Contractor shall submit the required Scheduling in accordance with Section 722 of these Special Provisions. In addition to Section 722, the Contractor shall comply with the following:

The Contractor shall meet with MassDOT to review their work plan on how they intend to approach the various work items including the number of crews they intend to utilize, and the level of railroad support that they anticipate will be needed.

The Contractor is responsible to restore areas used for site access to their previous condition, which costs shall be considered incidental to the various Contract pay items, unless specific restoration work items are shown on the Plans.

SCHEDULE OF OPERATIONS - SCHEDULE TYPE

The applicable schedule type for this project is Type D.

SUBSECTION 8.06 – LIMITATIONS OF OPERATIONS

Amend Subsection 8.06 of the Highway Division Standard Specifications for Highways and Bridges by adding the following:

The Contractor shall review the weekday and weekend work windows and confirm with RAILROAD, for agreement and approval of the work windows. Changes to these work windows will require approval of all railroad entities. Any cost associated with additional outages or time shall be borne by the Contractor. The Contractor shall comply with the limits of work windows and shall clear the tracks and return the site to The Railroad before the specified work windows expire. The site and the track shall conform to FRA standards for safe operation of trains at the end of the work windows. The RAILROAD Chief Engineer, or representative thereof, shall be the sole judge of the condition of the site and tracks.

The Contractor must clearly identify all aspects of this work in the preparation of the Construction Schedule and throughout the contract duration. The Contractor is reminded that, in bidding this work, the Contractor is obligated to meet the Contract Milestones and Durations (Time) and is obligated to plan the successful completion of Work, prior to submitting the bid.

In submitting a bid price for this contract, the Contractor acknowledges that a detailed plan, has been developed to meet the Contract Time for all aspects of the Contact; including shift work; extended work hour requirements/restrictions; as well as the planning of all subcontractor and supplier operations.

TRAFFIC CONTROL

Contractor shall coordinate all requests for traffic control with MassDOT contact.

For any work that may impact traffic, the Contractor shall be responsible for the scheduling and coordination of the work with the RAILROAD, municipality, any affected abutters, and MassDOT. All traffic management arrangements shall be the responsibility of the Contractor including all advance notification that may be required and all signage, traffic barricades and police details that may be necessary. Streets and driveways adjacent to the work area shall remain open at all times.

The Contractor may be required to access project locations through adjacent properties. The Contractor shall coordinate with the property owners and provide a minimum advanced notice of 2 weeks prior to the start of work at these locations.

NOTICE TO OWNERS OF UTILITIES

(Supplementing Subsection 7.13)

Written notice shall be given by the Contractor to all public service corporations or officials owning or having charge of publicly or privately owned utilities of the Contractor's intention to

commence operations affecting such utilities at least one (1) week in advance of the commencement of such operations in accordance with Chapter 82, Section 40 of the General Laws, as amended, and the Contractor shall at that time file a copy of such notice with the Engineer.

Any damage to these utilities caused by negligence of the Contractor shall be repaired by the Contractor at their own expense and to the satisfaction of the Engineer.

It is the intent of these Special Provisions that the Contractor having been given due notice hereof will safeguard the utilities during construction and shall assume liability for damage, relieving the Department from any liability.

A list of public and private utilities can be found on the MassDOT – Highway website at:
https://www.mass.gov/info-details/utility-contacts-by-district-and-municipality

Select District 5
Select Town of Sandwich
Locate the utility contact

The Contractor shall inform the following officials in each area that he assigned to work:

Superintendent, Department of Public Works or Town Engineer,
Superintendent, Water Department,
Superintendent, Sewer Department,
Police and Fire Department,
Electric Department

Town officials are shown at website https://www.mass.gov/lists/cities-and-town.
Select "Choose Sandwich" from the "pull down" menu.
Press "Go" and locate the official Municipality Home Page.

District Utility/Construction Engineer:
Christopher Lockett
857-368-5073
Christopher.lockett@state.ma.us

Railroad Engineer:
Chris Podgurski
508-291-2116
cpodgurski@capetrain.com
Mass Coastal Railroad
12 Harding Street, Unit 202, Lakeville, MA, 02347

HOLIDAY & WEATHER WORK RESTRICTIONS

(Supplementing Subsection 7.09)

The Engineer may authorize work to continue during these specified time periods if it is determined by the Engineer that the work will not negatively impact the traveling public or the quality of the work.

Below are the holiday work restrictions:

1. New Years Day (Federal Holiday)
2. Martin Luther King's Birthday (Federal Holiday)
3. President's Day (Federal Holiday)
4. Patriot's Day (State Holiday)
5. Memorial Day (Federal Holiday)
6. Juneteenth (Federal Holiday)
7. Independence Day (Federal Holiday)
8. Labor Day (Federal Holiday)
9. Columbus Day (Federal Holiday)
10. Veterans' Day (Federal Holiday)
11. Thanksgiving Day (Federal Holiday)
12. Christmas Day (Federal Holiday)

Tie replacement in CWR track is restricted between November 15 and March 15.

ROADWAY WORKER PROTECTION FOR RAILROAD CONTRACTORS

RAILROAD strictly adheres to the practice of operating a safe railroad and mandates that all Contractors and their Subcontractors, their Officers, employees, agents and all personnel employed or engaged by them in the performance of the Work or activity while on or adjacent to Railroad property operate and perform all activities in a safe manner and in strict accordance with RAILROAD On-Track Safety Manual and all Provisions of 49 CFR Parts 214, 219 and 243, as promulgated by the Federal Railroad Administration (FRA). See ITEM 180.1 HEALTH AND SAFETY PLAN for additional information on 49 CFR Parts 219 and 243.

All employees, agents and any personnel employed by and or engaged by the Contractor or his Subcontractors shall attend Roadway Worker Protection (RWP) training conducted by the RAILROAD, prior to entry upon Railroad property. RWP training provided online by the RAILROAD shall be completed prior to initiation of work activities and at other times to accommodate the project schedules. The training will be conducted in English. If the Contractor has employees who may not be able to adequately understand the content of the training in English, then the Contractor will be responsible to provide the appropriate translation to ensure that their employees are in compliance with FRA requirements.

Personal Protective Equipment (PPE) requirements are specified in the FRA Regulations and the RAILROAD On-Track Safety Manual. The manual is included in the bid documents. Wearing and use of PPE shall be mandatory and strictly enforced. Failure to adhere to the PPE requirements may be grounds for removal of an individual from Railroad property and prohibition from work.

Continual disregard for safety and failure to obey and adhere to safety directives of the Railroad shall be cause for termination of the Contract.

ROADWAY WORKER PROTECTION AND CWR TRAINING AND QUALIFICATION

1. RAILROAD strictly adheres to the practice of operating a safe railroad and mandates that all Contractors and their Subcontractors, their Officers, employees, agents and all personnel employed or engaged by them in the performance of the Work or activity while on or adjacent to Railroad property operate and perform all activities in a safe manner and in strict accordance with the RAILROAD On-Track Safety Program and applicable Provisions of 49 CFR Parts 214, 219 and 243 Railroad Workplace Safety, as promulgated by the Federal Railroad Administration (FRA), in particular:

   - Subpart C-Roadway Worker Protection
   - Subpart D-Track Roadway Maintenance machines and Hi-Rail Vehicles

   See Health and Safety Program for additional information of 49 CFR Parts 219 and 243.

2. RAILROAD RWP training is provided by RAILROAD (MCRR) to each Contractor and/or Subcontractor employee on the Project site. All employees, agents and personnel employed by and or engaged by the Contractor or his Subcontractors working on the Project are required to successfully complete RWP training and to have their training and qualification card on their person while on site. All costs for training are the responsibility of the Contractor.

3. RAILROAD CWR – Installation, Adjustment, Maintenance and Inspection of Continuous Welded Rail is provided online through the RailPros website. See ITEM 492.12.1 CROSSTIE REPLACEMENT for training requirements. All costs for training are the responsibility of the Contractor.

4. Personal Protective Equipment (PPE) requirements are specified in the FRA Regulations and the Railroad On-Track Safety Program. Wearing and use of PPE shall be mandatory and strictly enforced. Failure to adhere to the PPE requirements may be grounds for removal of an individual from Railroad property and prohibition from work. Continual disregard for safety and failure to obey and adhere to safety directives of the Railroad shall be cause for termination of the Contract.

5. RWP and CWR training and qualification are required on an annual basis.

RAILROAD PROVIDED SUPPORT SERVICES

Coordination of on-track safety protection for the Contractor and/or Subcontractor's personnel and equipment. Contractors will be provided the following required Railroad Support Services by Massachusetts Coastal Railroad (MCRR or Railroad) personnel:

A. Railway Worker Protection ("RWP") training will be provided by Railroad to each Contractor and/or Subcontractor employee on the Project site. RWP Training is mandatory and must be successfully completed prior to accessing the ROW. Contractor will be charged a nominal fee by Railroad for each

worker trained in RWP. Contractor shall be responsible for all other costs incurred by workers related to the RWP training.

B. Daily onsite worker safety inspections by MCRR.

C. One full-time EIC person and additional personnel as required supplied by MCRR for the duration of the Contractor and/or Subcontractor's presence on site. The EIC person will provide the following services to the Contractor and/or Subcontractor:

1. Daily Job Briefings at the beginning of each workday and anytime work conditions change.
2. Coordination of on-track safety protection for the Contractor and/or Subcontractor's personnel and equipment.
3. Flagging of all train movements through Contractor and/or Subcontractor's work location.
4. Flagging of all vehicles at highway crossings fouled by Contractor and/or Subcontractor's personnel and/or equipment; and
5. Daily end of work track inspections required to place track worked on by Contractor and/or Subcontractor back in service.

PROJECT OVERSIGHT

MassDOT and MassDOT representatives will be present on site at times throughout the project for the purpose of representing the Owner's interests with regard to this project and will provide:

1. Oversight and Construction Inspection Services.
2. Act as a liaison between RAILROAD and Contractor
3. Daily end of day employee production reporting.

SUBMITTALS

Prior to beginning any work, the Contractor shall submit to the Engineer for its review and approval proposed work plans, schedules and materials to be used in the Work as required in the specifications and special provisions. Contractor shall not commence any work requiring an approved submittal, including but not limited to schedules, work plans, materials and change orders without having first received approval by the Engineer.

Contractor shall also be required to submit, as part of their proposal, evidence of Dig Safe notification at project site.

CONDITIONS OF ACCEPTANCE

Materials that do not fully meet the requirements of these Specifications shall be rejected, removed from MassDOT property (if rejected following shipment) and replaced at no additional costs to MassDOT. It is the responsibility of the Contractor to meet the Specifications and in no case is rejection of materials a cause for a change in the contract completion date.

WARRANTY OF WORK

1. Neither final acceptance, final payment nor any provision in the Contract Documents nor partial or entire use or occupancy of the premises by MassDOT or the RAILROAD shall constitute an acceptance of work not done in accordance with the Contract Documents or relieve the Contractor of liability with respect to any express warranties or responsibility for faulty materials or workmanship.
2. Except where longer periods of warranty are specified for certain items, the Contractor warrants all work done under the Contract to be free from faulty materials and workmanship for a period of one year from date of Final Acceptance.
3. Upon receiving notification from MassDOT, the Contractor shall immediately make the required repairs or replacements to any work found defective. If repairs or replacements are not started within 10 days from the date of notification and prosecuted to completion, the MassDOT reserves the right to employ others to complete the work. The Contractor agrees, upon demand, to pay MassDOT all amounts which it expends for such repairs or replacements.
4. All remedied work shall carry the same warranty as the original work starting with the date of accepted replacement or repair.

SUBSECTION 8.11 FAILURE TO COMPLETE WORK ON TIME.

Remove Table 8.11-1 and amend Subsection 8.11 of the Highway Division Standard Specifications for Highways and Bridges by adding the following:

If the Contractor fails to comply with the schedule for occupancy which results in MCRR (RAILROAD) being unable to operate trains or other on-track equipment within the project territory, said Contractor shall pay to the following liquidated damages:

The Liquidated Damages for the Contract is $15,000 per day.

Contractor and MassDOT agree that the liquidated damages established herein are not a penalty but rather constitute an estimate of damages that Railroad will sustain by reason of delayed completion. These liquidated damages are intended as compensation for losses that are difficult to estimate. The Contractor and MassDOT agree that this $15,000 per day liquidated damages amount would compensate the Railroad for loss of revenue service. In addition, in the event that the Contractor fails to complete a portion(s) or the whole of the Contract Work by the above-stated times, the Contractor recognizes that MassDOT may incur other expenses which are not covered by the payment of the Liquidated Damages referenced above, including, but not limited to, costs to defend and/or pay third party claims brought against MassDOT for damages.

As a consequence and in addition to the payment of the above referenced Liquidated Damages, the Contractor agrees that it will defend, indemnify and hold MassDOT Harmless from all claims, damages and expenses, other than the construction engineering inspection costs referenced above, which arise, in whole or in part, out of the Contractor's failure to complete a portion(s) or the whole of the Contract Work by the above-stated times.

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.

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.

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 o 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.

SECTION 9.00: MEASUREMENT AND PAYMENT

Amend Section 9.00 Measurement and Payment of the Highway Division Standard Specifications for Highways and Bridges as follows:

SUBSECTION 9.03 – PAYMENT FOR EXTRA WORK

Amend Subsection 9.03 of the Highway Division Standard Specifications for Highways and Bridges with the following:

No extra work shall be started without written authorization by MassDOT. Any extra work involving time and materials shall have a MassDOT representative on site while work is being performed.

GENERAL REQUIREMENTS FOR DEMOLITION AND WORK INVOLVING PAINTED STEEL

Demolition and work involving painted steel shall conform to the requirements of Subsection 961 of the Standard Specifications.

Work Involving Painted Steel.

Hazardous materials shall be removed in the immediate area of any intended welding, heating, saw cutting or burning of steel. Hazardous material removal is required to allow the demolition of structural steel, railings, drainage systems, utility supports, steel lamp posts, etc.

The contractor shall assume that the coatings on the steel contain lead (Pb), unless otherwise determined by testing. The contractor shall certify in writing to the Engineer the results of all testing, and shall also certify that any lead (Pb) coated steel removed from the project was not reused or buried, but was sent to a scrap metal recycling facility.

Implement and maintain programs and procedures, which comply with the requirements of this specification and all applicable standards and regulations. Comply with all applicable regulations even if the regulation is not specifically referenced herein. If a state or local regulation is more restrictive than the regulation of this specification, follow the more restrictive requirements.

This requirement is intended only for the demolition and preparation prior to repair and does not include provisions for recoating of steel.

Environmental

All applicable portions of Subsections 961.65 "Worker Protection" and 961.66 "Environmental Protection and Monitoring" shall be followed when performing this work.

During chemical stripping a hand washing facility may be used in lieu of a decontamination/changing facility.

Hazardous material shall be collected during the disassembly and disposed of as outlined in Subsection 961.68 "Handling of Hazardous Waste and Reporting Release Programs".

The applicable submittals shall be according to Subsection 961.69 "Submittals".

Cleaning/Removal

Cutting Or Burning Of Steel

All surfaces to be welded, heated, saw cut or burned shall be cleaned so as to remove all contaminants and/or hazardous materials, which could be discharged to the environment as a function of the subsequent operations.

Lead paint shall be removed in its entirety in an area prescribed by a 6 inch (15 cm) minimum offset from the required work. The paint removal operation may be dry abrasive blasting, wet abrasive blasting or chemical stripping.

Proper level of containment shall be used when performing this work in accordance with Subsection 961.67 "Containment". Full containment is not required during chemical stripping operation however; the Contractor shall install proper shielding and/or tarpaulins under the chemical stripping operations in order to catch all debris generated during this procedure. A cleaned area must be inspected and approved before the demolition operations are started.
During cleaning operations the Contractor shall be required to furnish and erect temporary floodlights illuminating the steel surface at a minimum of 30-foot candles. This lighting shall be used in areas where there is insufficient lighting for proper cleaning operations and inspection. The Contractor shall supply electrical power.

The Contractor shall provide support for interim and final inspection of the bridge during cleaning operations. This support shall include the necessary traffic controls and safe access to the work.

Mechanical Disassembly Of Steel

All surfaces to be mechanically disassembled by shear cutting or removing bolts or rivets shall not require deleading. When shear cutting or removing bolts or rivets, the Contractor shall not use any method that will cause dust and/or particles to be emitted and/or dispersed into the environment to an extent that would expose the workers above the Action Levels of 30µg/m3.

For purposes of limiting the lead (Pb) dust, the Contractor will be required to dampen the lead paint work areas.

The contractor shall install a proper shielding and/or tarpaulins under all lead-paint-coated surfaces to be shear cut or bolts or rivets ordered removed in order to catch any loose lead paint chips, dust or particles.

PROVISIONS FOR TRAVEL AND PROSECUTION OF WORK

The Contractor shall coordinate their work with the work done by Utility Companies/Utility Owners who will be performing relocations and other work within the project limits, and they shall so schedule their operations as to cause the least interruption to the normal flow of traffic on the existing road.

Following provisions shall apply, unless otherwise required by the Engineer:

Prior to commencing work, the Contractor shall place protective shielding/work platforms/containment under the demolition locations so as not to allow debris to fall to the waterway or ground below.

The Contractor shall not start any operation until all materials required for the operation are at the site or until the Engineer is satisfied that the materials will be delivered in such order that there will be no interruption to continuous and efficient progress.

Under no circumstance should a Contractor close a travel lane or in any way affect traffic outside the specified work hours. All travel lanes of the roadway must be fully open to traffic prior to the start and after the end of the approved work schedule. In no case will operations commence prior to the specified work hours. This includes traffic set-ups that restrict the flow of traffic.

The Contractor's schedule of operations shall be of sufficient detail to show all work elements and stages and shall account for all facets of the job, including but not limited to: traffic management control deployment and subsequent restoration, and anticipated restrictions due to weather.

The Contractor shall notify the Engineer in writing two (2) weeks in advance of any proposed temporary roadway closures required to complete the work. Before starting any work under this Contract, the Contractor shall submit a Schedule of Operations. Work on the roadway shall proceed only on such sections and widths thereof as will be approved by the Engineer.

The Contractor shall serve written notice to all abutters one week in advance of any reconstruction work adjacent to their property, and during such time that construction is in progress, provide safe access to the abutting properties.

Signs having messages that are irrelevant to normal traffic conditions will be removed or properly covered at the end of each work period. Signs are to be kept clean at all times, and legends shall be distinctive and unmarred.

The Contractor may opt to obtain storage outside of the project limits if required. No areas shall be used for storage outside the project limits within the Right-Of-Way layout without written permission of the Engineer.

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 as defined by the schedule type set forth below. These requirements are in addition to any requirements imposed in other sections.

This section establishes the requirement for scheduling submissions. There are four schedule types identified as types A, B, C and D. The schedule type applicable to this project is established in the project special provisions.

All schedules shall be prepared and submitted in accordance with this specification and 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.

Type A –

- Schedule Planning Session
- Baseline CPM Schedule
- Monthly Update CPM Schedule
- Short-term Construction Schedule
- Contract Schedule Update Meeting
- Cost-loaded & Resource Loaded CPM
- Resources Graphic Reporting
- Cash Flow Projections from the CPM
- Cash Flow Charts
- Monthly Projected Spending Report (PSR)
- Contractor-furnished CPM software and computer

Type B –

- Schedule Planning Session
- Baseline CPM Schedule
- Monthly Update CPM Schedule
- Short-term Construction Schedule
- Contract Schedule Update Meeting
- Cost-loaded & Resource Loaded CPM
- Monthly Projected Spending Report (PSR)
- Contractor-furnished CPM software and computer

Type C –

- 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 and computer

SECTION 722 (Continued)

Type D -

- Bar chart schedule updated monthly or at the request of the Engineer
- Short-term Construction Schedule
- Monthly Projected Spending Report (PSR)

EQUIPMENT, PERSONNEL

722.40 General

A. Software Requirements

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. The computer and software shall be maintained and serviced at no additional cost to the Department.

B. Scheduler Requirements

The Scheduler shall be approved 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.

SCHEDULING METHODS

722.60 General

A. Schedule Planning Session

The Contractor shall conduct a schedule planning session 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 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.

SECTION 722 (Continued)

B. Schedule Reviews by the Department

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. Rejected Baseline Schedules shall be resubmitted within fifteen (15) Calendar Days after receipt of the Engineer's comments.
2. Contract Progress Schedule / Monthly Update Reviews / Recovery Schedules
   The Engineer will respond to each submittal within twenty-one (21) Calendar Days. Rejected schedules shall be resubmitted by the Contractor within five (5) Calendar Days after receipt of the Engineer's comments.

The Engineer's review comments shall not be construed as direction to change the Contractor's means and methods. The review and acceptance of the CPM schedule does not relieve the Contractor of the responsibility for accomplishing the work within the contract required completion dates. Omissions and errors in the accepted CPM schedule shall not excuse performance less than that required by the Contract.

722.61 Schedule Content and Preparation Requirements

All schedules 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
and the following:

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 schedule shall clearly define the progression of the Work from the Notice to Proceed (NTP) to Contractor Field Completion (CFC) by using separate activities, or including attributes within appropriate activities, to address each of the following:

1. Notice to Proceed
2. Work Breakdown Structure
3. The Critical Path is clearly defined and organized.
4. Float shall be clearly identified.
5. Detailed activities to satisfy permit requirements.
6. Subcontractor approvals at fifteen (15) Calendar Days from submittal to response
7. 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.

SECTION 722 (Continued)

8. 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.
9. Procurement of fabricated materials and equipment with long lead times, including time for review and approval of submittals required before procuring and fabricating.
10. Each component of the Work defined by specific activities.
11. Right-of-Way (ROW) takings that have been identified in the Contract.
12. Early Utility Relocation (by others) that has been identified in the Contract.
13. Interfaces with adjacent work, utility companies, other public agencies, sensitive abutters, and/or any other third-party work affecting the Contract.
14. 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
15. 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
16. Limitations of Work – time of year restrictions and any other limitations identified in the contract
17. Traffic work zone set-up and removal, night work and phasing
18. Material Certifications
19. Milestones listed in Subsection 8.03 - Prosecution of Work or elsewhere in the Contract Documents
20. For Type A and B Contracts only: All items to be paid for, 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.
21. Contractor's request for validation of FBU (ready to open to traffic)
22. Full Beneficial Use (FBU) Contract Milestone per the following requirements: The majority of contract Work has been completed and the asset(s) has been opened for full multi-modal transportation use, except for limited contract work items that do not materially impair or hinder the intended public use of the transportation facility. All anticipated lane takings have been completed, except for minor, short term work items and as defined in Subsection 8.03 - Prosecution of Work
23. The Department's confirmation of completed work to allow for FBU.
24. Contractor's request for validation of Substantial Completion
25. Department generated punch list of twenty-one (21) Calendar Days
26. Substantial Completion Contract Milestone as defined in the standard specifications.
27. Punch list 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
28. Contractor confirmation that all punchlist work and documentation has been completed.

SECTION 722 (Continued)

29. Physical Completion of the Work Contract Milestone per the requirements of Subsections 5.11 - Final Acceptance and 8.03 - Prosecution of Work
30. Documentation Completion per the requirements of Subsections 5.11 - Final Acceptance and 8.03 - Prosecution of Work
31. Contractor Field Completion Contract Milestone (which can also be considered the completion date) per the following requirements: All physical contract Work is complete including punchlist. The Contractor has fully de-mobilized from field operations and as defined in Subsection 5.11

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.

D. DURATIONS

Activity durations shall be in Work Days. Planned Original Durations shall be established with consideration of 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

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.

G. ACTIVITY IDENTIFICATION NUMBERS

The Contractor shall use the activity identification numbering system specified in the MassDOT Highway Division Contractor Construction Schedule Toolkit.

SECTION 722 (Continued)

H. ACTIVITY CODES

The Contractor shall use the activity codes specified in the MassDOT Highway Division Contractor Construction Schedule Toolkit.

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. All calendars shall extend two years beyond the current project completion date.

Project Special Provisions identify specific calendar restrictions some 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.
- Planting seasons for trees, shrubs and grasses and wetlands mitigation work.
- 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. 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.
- 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.
- Night-time paving and striping operations, traffic, and temperature 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.

SECTION 722 (Continued)

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.
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.

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.
6. Leads such as leads, lags, SS, SF, & FF relationships without the expressed permission of the Department.

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.

Each Submission shall, at a minimum, include the following:

a. Narrative
b. Schedule submittals shall be signed by the Scheduler
c. Schedule Printout - All Activities

SECTION 722 (Continued)

d. Schedule Printout - Critical Path Layout
e. Schedule Printout - Remaining Work
f. Schedule Printout - Top 3 Float Path
g. Work Breakdown Structure (WBS) Summary
h. Project Spending Report (PSR) in Portable Document Format (.PDF)
i. Project Spending Report (PSR) in Microsoft Excel spreadsheet (.XLS)
j. Oracle Primavera P6 Schedule File (.XER)

All digital file submittals will be labeled with the following information.

- Contract Number
- Project Number
- Project locations (i.e., town(s))
- Brief description
- Submittal description (i.e., UP07)
- Data Date (MM-DD-YY)
- File Description (i.e., Critical Path)

Example: C110464 (P606309) - Orange Route 2 over 202 – UP23 (07-15-22) - Critical Path

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.

SECTION 722 (Continued)

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.
13. include and describe any notifications, communications and coordination meetings with third-parties such as utility companies that occurred from the last update including personnel names, job titles and contact information, date of meeting(s)/correspondence(s), topics discussed, and reasons the third party provided for deviations from the PUC form.

B. CPM Bar Charts

One (1) timescaled 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 timescaled 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.

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.

SECTION 722 (Continued)

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.
4. 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.

F. Projected Spending Reports

A Projected Spending Report (PSR) shall be prepared and submitted monthly. 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. The Projected Spending Report (PSR) shall be depicted in a tabular format and provided in both an .XLS and .PDF.

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.

SECTION 722 (Continued)

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.

C. Contract Progress Schedules / Monthly Updates

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 two months (approximately 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 asbuilt sequencing and asbuilt dates for completed and inprogress activities. Asbuilt 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.

SECTION 722 (Continued)

Contract Progress Schedules that extend performance beyond the Contract Time or beyond any Contract Milestone shall not be approved by the Engineer. The Contractor shall submit a Recovery Schedule, or a Time Entitlement Analysis, 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 spreadsheet format. The daily activities shall directly correspond to the Contract Progress Schedule activities, with a matching reference to the activity identification number in the Contract Progress Schedule and may be at a greater level of detail. The Short-Term Construction Schedule shall be submitted every two weeks. It shall display all work for a thirty-five (35) Calendar Day period consisting of completed work for the two (2) week period prior and all planned work for the following three (3) week period. The initial submission shall be provided no later than thirty (30) Calendar Days after NTP or as required by the Engineer.

The Contractor shall be prepared to discuss the Short-Term Construction Schedule, in detail, with the Engineer in order to coordinate field inspection staff requirements, the schedule of work affecting abutters and any corresponding work with affected utilities. Short-Term Construction Schedules shall be prepared and submitted in accordance with Subsections 722.61 - Schedule Content and Preparation Requirements and 722.62 - Submittal Requirements.

722.64 Impacted Schedule Requirements

A. Notice of Delay

The Contractor shall notify the Engineer in writing, with copies to the Rail and Transit Division Project Manager, within fifteen (15) 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 a delay continue for more than one (1) week, the Contractor shall note it in the Schedule Narrative until the delay is no longer impacting the Critical Path for the completion of the Contract Milestones. The Engineer will evaluate the alleged delay and its impact and will respond to the Contractor within ten (10) Calendar Days after receipt of a notice of delay.

B. Time Entitlement Analysis

A Time Entitlement Analysis (TEA) shall consist of a descriptive narrative, prepared in accordance with Subsection 722.62.A - Narratives, and an as-built CPM schedule, which may be in the form of a schedule fragnet that has been developed from the project's Contract Progress Schedule of Record, and illustrates the impact of a delay to the Critical Path, Contract Milestones and/or Contract Completion Date as required in Subsection 8.10 - Determination and Extension of Contract Time for Completion. TEAs shall also be used to determine the schedule impact of proposed Extra Work Orders (EWO) as also required in Subsection 8.10.

SECTION 722 (Continued)

TEAs shall be prepared and submitted in accordance with the requirements of Subsections 722.61 - Schedule Content and Preparation Requirements and 722.62 - Submittal Requirements and shall be based on the Contract Progress Schedule of Record applicable at the start of the delay or impact from an EWO. A TEA 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.

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 fifteen (15) 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 demonstrate the schedule impacts most efficiently 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 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. 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 or Contract Progress Schedule.

C. Recovery Schedules

The Contractor shall promptly report to the Engineer all schedule delays during the prosecution of the Work. Contract Progress Schedules that predict performance extended beyond the Contract Time or beyond any Contract Milestone shall not be approved as the schedule of record. This requirement is critical to the Department's ability to make informed decisions regarding Contract Time and costs.

SECTION 722 (Continued)

The Contractor shall submit a Recovery Schedule within fifteen (15) Calendar Days of a Contract Progress Schedule submission that shows failure to meet the Contract Dates unless a recovery schedule is waived by the Department. Waiving the recovery schedule does not relieve the contractor of the responsibility for the delay. The Department may revoke the waiver of a Recovery Schedule, at which time a Recovery Schedule shall be submitted within fifteen (15) Calendar Days of the Contractor being notified.

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 or 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 acceleration including 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. Proposal Schedules that contain a cost element shall be submitted with a separate Cost Proposal.

Changes represented in the accepted Proposal Schedules shall be incorporated into the next Contract Progress Schedule. During the review of any Proposal Schedule, all Contract Progress Schedules shall continue to be required every month.

E. Disputes

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.

The Contractor may dispute a decision by the Engineer by filing a claim notice within seven (7) 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. 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. A determination on the Contractor’s claim shall be in accordance with Subsection 7.16 Claims of Contractor for Compensation. Pending resolution of any dispute, the last schedule accepted by the Engineer will remain the Contract Schedule of Record.

SECTION 722 (Continued)

722.65 Schedule Type D Requirements

This section is to detail the requirements for Type D Schedules and is separate from the requirements listed above. These schedules are intended for a project in which a more formal schedule would not be practical.

Schedules for Type D projects shall be submitted for each work assignment. The Schedule Type D shall be submitted electronically in .XLS and .PDF format and meet the following requirements. The schedule requirements for work assignments that are anticipated to last three weeks or less shall conform to the requirements for Short-term Construction Schedules below.

Work assignments that are anticipated to last longer than three weeks shall submit a bar chart baseline and provided update schedules upon request of the engineer as required under Bar Chart Schedule below in addition to meeting the Short-term Construction schedule requirements.

A. Bar Chart Schedule

A Bar Chart that shall include the following:

- Work Assignment start date.
- Activities to identify.
  - Major work operations broken down to be no longer than 14 days.
  - Procurement of fabricated materials and equipment with long lead times, including time for review and approval of submittals required before procuring and fabricating.
  - 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.
  - The review and return of shop drawings, procedures, and other required submittals, approved or with comments, the duration of which shall be shown as thirty (30) Calendar Days,
  - Detailed activities to satisfy permit requirements.
  - Subcontractor approvals at fifteen (15) Calendar Days from submittal to response
  - Project Close out activities including a 21-calendar day creation of a punchlist activity and 30 calendar day minimum completion of punchlist activity.
- Interfaces with adjacent work, utility companies, other public agencies, sensitive abutters, and/or any other third-party work affecting the Contract.
- Access Restraints – restrictions on access to areas of the Work
- Traffic work zone set-up and removal, night work and phasing
- Contract Milestones including Full beneficial Use, Substantial Completion and Contractor Field Completion

The Bar Char Schedule shall be provided at the beginning of the project and updated with each work order created for the project.

SECTION 722 (Continued)

B. 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 spreadsheet 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. See schedule toolkit for suggested format.

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 on the assignment for the two week period prior and all planned work for the following three 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.

C. Project Spending Report (PSR)

A Projected Spending Report (PSR) shall be prepared and submitted monthly. The PSR shall be for all active work assignments, broken down by work assignment. 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. The Projected Spending Report (PSR) shall be depicted in a tabular format and provided in both an .XLS and .PDF

COMPENSATION

722.80 Method of Measurement

Schedule of Operations (Type A, B and C)

The project bid documents specify the fixed-price amounts to be paid to the Contractor for the Project Schedule requirements contained herein. Each bidder shall include this fixed price bid item amounts in their bid. Failure to do so may be grounds for the rejection of the bid.

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.

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.

Twenty percent (20%) of this pay item will be paid upon the Engineer's acceptance of the Contractor's Baseline Schedule, prepared and submitted in accordance with Subsection 722.63.A.

SECTION 722 (Continued)

The remaining eighty percent (80%) of this pay item will be paid in equal monthly installments distributed across the Contract Duration from Notice to Proceed (NTP) to Contractor Field Completion (CFC), less the 2 months required for the submittal and review of the Baseline Schedule in accordance with the following formula:

$$\text{Monthly Payment} = \frac{\text{Remaining Fixed Price amount (80\% of the Item Cost.)}}{\text{Contract Duration in whole months} - 2 \text{ months}}$$

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.

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. The monthly payment will be the basis for this Equitable Adjustment.

Schedule of Operations (Type D)

For projects assigned with Type D schedule requirements, all scheduling work shall be considered incidental to the project with no separate payment under this section.

722.81 Basis of Payment

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.

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 (including monthly progress schedules, short-term schedules, project spending reports, TEAs, recovery schedules or impacted schedules) shall be included in this work.

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. The late submission of Impacted schedules, including TEAs, recovery schedules and proposal schedules will result in the forfeiture of the monthly payment for the month in which they were due and subsequent months until the submission is made. Late submission of missed submittals 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.

SECTION 722 (Continued)

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 Engineer withholding of full or partial payments of all work performed.

722.82 Payment Items

NONE - For projects assigned with Type D schedule requirements, all scheduling work shall be considered incidental to the project with no separate payment under this section.

ITEM 102 SELECTIVE CLEARING AND THINNING N/A

GENERAL

The work under these items shall conform to the relevant provisions of Section 8.08, Section 101 of the Standard Specifications, as shown on the plans and the following:

Trees less than six inches in diameter may be removed as necessary for construction. Any tree greater than or equal to six inches in diameter shall be retained and protected; however, if any trees conflict with construction operations, these trees may be removed as required by direction of the Engineer.

The Contractor shall perform selective clearing and thinning in areas within 10 feet of the centerline of culverts and 20 feet by 20 feet beyond each end of the culverts to be replaced or cleaned. Roots of brush and trees within 6' to ends of culverts and the headwalls shall be removed and restore the areas with loam and seed. Remove trees as indicated on the Contract Plans.

The Contractor shall trim low hanging tree limbs in areas adjacent to both sides of the bridges which may conflict with construction operations by direction of the Engineer.

Prior to selective clearing and thinning and tree trimming operations, the Contractor shall identify all trees to be removed. The Contractor shall review all proposed work with the Engineer and no work shall begin without approval of the Engineer.

The method of disposal of all materials shall be the responsibility of the Contractor and shall be submitted to the Engineer for approval. All methods of disposal shall be accomplished in accordance with all applicable federal, state and local ordinances.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 102. Selective Clearing and Thinning is incidental to Items 129.51 for Track Excavation and item 146.1 for Drainage Structure Culvert Removal. No payment will be made under this Item.

ITEM 129.51 TRACK EXCAVATION CUBIC YARD

GENERAL

Work Included: This Section specifies the following items.

1. Preparing subgrades for culvert installation, ballast and track.
2. Excavating, backfilling and compacting for culvert installation, ballast and track.
3. Disposal of excess excavated material will be along the railroad right-of-way within five (5) miles of the work site at a location(s) designated by Engineer.
4. Placement and compaction of ballast. The placement of ballast for the base course shall be in accordance with the Contract Drawings, Scope of Work, AREMA Recommended Practices, and the MassDOT MW-1 except as modified herein. Crushed stone shall be installed only in areas directed by Engineer.

RESPONSIBILITY OF CONTRACTOR

Contractor shall be responsible for adhering to regulations, specifications, and recognized standard practices related to soil and rock excavation during excavation and removal activities. MCRR (Railroad) and MassDOT (Owner) will not be responsible at any time for Contractor's violation of pertinent state or federal regulations or endangerment of laborers or others.

It is the responsibility of Contractor to protect all existing utilities within the Contract Limits. Coordination with the various utility companies shall be required for the protection of these lines as stated within these Technical Specifications.

Contractor shall be responsible for all costs associated with protection, repair, or relocation of utility lines within the Contract Limits.

PREPARATION AND PROTECTION

Protect structures, track structure, utilities, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by excavation operations.

Preparation of subgrade including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Site Preparation section of the Technical Specifications.

Protect and maintain erosion and sedimentation controls when needed, which are specified in the Site Preparation and Erosion and Sedimentation Controls sections of the Technical Specifications, during excavation operations.

EXPLOSIVES

Use explosives is prohibited.

EXCAVATION, GENERAL

Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include bituminous and cement concrete sidewalks and roadways, bricks and cobbles, old ballast, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

STORAGE OF SOIL MATERIALS

Temporary Stockpiling of excavated old ballast and soil material within the railroad Right-of-Way (ROW) is acceptable until material is reused or disposed of along railroad ROW. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

Stockpile soil materials away from edge of excavations.

Do not store within drip line of remaining trees.

MATERIAL TRANSPORT

All soils transported on and along track shall be loaded by Contractor into properly licensed and permitted hi-rail vehicles.

Hi-rail trucks used to transport the materials shall be constructed and loaded so as to prevent any of the load from dropping, sifting, leaking, or otherwise escaping during transport. All trucks shall be equipped with tarps or other substantial type covers which shall be used to prevent any materials from spilling during transport.

BACKFILL & COMPACTION

Use existing excavated materials that have been stockpiled to backfill new culvert(s) to the grades and lines as indicated on the plans. If additional material is required to complete backfill operations, said new backfill will meet the requirements of gravel borrow as per MassDOT Materials Specification.

All backfill shall be placed in maximum eight (8) inch lifts and compacted to 95% of the soils maximum dry density.

EMBANKMENT FILL

Existing excavated materials shall be used as embankment fill.

Plow, scarify, bench, or break up railroad Right-of-Way sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

Where possible, place excavated material on subgrades free of mud, frost, snow, or ice.

GRADING

General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

Site Grading: Slope grades to direct water away from track and to prevent ponding. Finish subgrades to required elevations.

DISPOSAL OF SURPLUS AND WASTE MATERIALS

Disposal: Contractor shall remove unsatisfactory waste material from excavated material, including trash, and debris, and legally dispose of it off the site.

Surplus: If surplus of satisfactory excavated material exists, Contractor is to dispose of the material within the railroad Right-of-Way as directed by Engineer.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Measurement and Payment of the work items included in this contract are defined under the bid items listed in Document B00420 Proposal. All costs associated with the work in accordance with the requirements specified under this Section shall be included in the bid price for the respective bid item.

Item 129.51. Track Excavation – Excavate, Stockpile, Reinstall/Waste Material shall be paid under Item 129.51 and shall be paid for at the Contract Unit Price per CY up to 1000 CY of Material excavated, which shall include all labor, tools, equipment, materials, testing, loading, transportation, access, approvals, permits and incidental work necessary for the completion of the work.

ITEM 146.1 DRAINAGE STRUCTURE CULVERT REMOVED LUMP SUM

GENERAL

Work specified under this Section includes existing culvert removal work identified on the Contract Documents and as follows:

1. Demolition and disposal of existing culvert box/pipe and headwalls if it is in conflict with new culvert installation.
2. Demolition and disposal of existing wood retaining wall and tie pad as determined in the field by Engineer.
3. If found, removing below-grade construction, such as old foundations or buried equipment.
4. If found, disconnecting, capping or sealing, and removing site utilities.
5. Salvaging items for reuse by the Massachusetts Coastal Railroad, LLC (MCRR or Railroad) and MassDOT (Owner).

MATERIALS OWNERSHIP

Unless otherwise indicated in the Contract Documents or directed by Engineer, non-track related demolition waste becomes property of Contractor.

Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to MCRR and MassDOT that may be uncovered during demolition remain the property of MassDOT.

1. Carefully salvage in a manner to prevent damage and promptly return to MassDOT.

SUBMITTALS

Schedule of Demolition Activities. Indicate the following:

1. Detailed sequence of demolition work, with starting and ending dates for each activity.
2. Temporary interruption of utility services and railroad operations.
3. Shutoff and capping or re-routing of any utility services, if necessary.

Inventory: Submit a list of items to be removed and salvaged to Railroad and Owner prior to start of demolition.

PROJECT CONDITIONS

On-site storage or sale of removed items or materials is not permitted.

Construction Access and Staging:

1. Special attention shall be given to sequenced demolition staging work so that operations are not affected with respect to safety, operation and schedule.

2. All non-track materials removed as part of this demolition shall become the property of Contractor and are to be disposed of properly in accordance with applicable local, State and Federal regulations, unless otherwise specified by Engineer.

Arrange demolition schedule so as not to interfere with MCRR operations or in any way disturb or impact the conduct of business by abutting or neighboring concerns.

EXECUTION

PREPARATION

Existing Utilities. Locate, identify, disconnect, and seal or cap off indicated utilities as shown on the plans and as directed by Engineer.

1. Arrange to confirm locations and shut off indicated utilities with utility companies.
2. Cut off pipe or conduit a minimum of 24 inches below grade. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing according to requirements of authorities having jurisdiction.

Salvaged Items. Comply with the following:

1. Clean salvaged items of dirt and demolition debris.
2. Store items in a secure area until delivery to MCRR and MassDOT.
3. Transport items to storage area within 75 miles of the project site as designated by MCRR and MassDOT.
4. Protect items from damage during transport and storage.

PROTECTION

Existing Facilities: Protect adjacent walkways, yard track, platforms, loading docks, station or building entries, other building facilities, culverts, and other structures during demolition operations. Maintain exits from existing buildings.

Existing Utilities: Maintain utility services to remain and protect from damage during demolition operations.

1. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by MCRR and MassDOT and authorities having jurisdiction.
2. Provide temporary services during interruptions to existing utilities, as acceptable to MCRR and MassDOT and authorities having jurisdiction.

Temporary Protection: Erect temporary protection, where required by authorities having jurisdiction and as indicated.

1. Protect adjacent buildings and facilities from damage due to demolition activities.
2. Protect existing site improvements, appurtenances, and landscaping to remain.

3. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
4. Provide protection to ensure safe passage of people around demolition area and to and from occupied portions of adjacent buildings and structures.
5. Limit dust, noise, and dirt migration to occupied portions of adjacent buildings.
6. Protect existing natural tree and or wetland areas from impacts due to construction activity and dust, noise, dirt and litter migration from the construction work zone.

Remove temporary barriers, protections, and bracing where hazards no longer exist. Where open excavations or other hazardous conditions remain, leave temporary barriers and protections in place.

DEMOLITION, GENERAL

General: Demolish indicated items completely or to limits shown on the Contract Documents. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire-suppression devices during flame-cutting and rail saw operations.
2. Maintain fire watch during and for at least four hours after flame cutting and rail saw operations.
3. Maintain adequate ventilation when using cutting torches and rail saw.

Temporary Controls: Conduct demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities. Any disturbance to adjacent facilities shall be restored to the satisfaction of MassDOT.

1. Do not close or obstruct streets, walks, walkways, platforms or other adjacent occupied or used facilities without permission from Railroad, MassDOT and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
2. Use water mist and other suitable methods to limit spread of dust and dirt within project work area.

Temporary Site Access: Contractor shall make arrangements for temporary site access with abutting property owners if needed. Any temporary access roadway construction shall be at Contractor's expense and shall be removed at the conclusion of the project construction. Contractor shall restore site completely to pre-construction condition to the satisfaction of Owner.

DEMOLITION BY MECHANICAL MEANS

Proceed with demolition systematically.

Salvage: Items to be salvaged as directed by Engineer.

Below-Grade Construction: Demolish foundation walls and other below-grade construction that are within footprint of new construction and extending five (5) feet outside footprint indicated for new construction. Abandon below-grade construction outside this area.

1. Remove below-grade construction, including any foundation walls, signal foundations, and footings if encountered, to at least the depths indicated.

Existing Utilities: Abandon existing utilities and below-grade utility structures if any encountered.

SITE RESTORATION

Below-Grade Areas: Rough grade below-grade areas ready for further excavation or new construction.

Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades.

REPAIRS

Promptly repair damage to adjacent buildings, utilities, fences, culverts, or other structures caused by demolition operations.

All repairs made to remediate damage caused by demolition operations shall be made at no additional cost to Railroad and MassDOT.

DISPOSAL OF DEMOLISHED MATERIALS

Remove demolition waste materials from Project site and legally dispose of them in location acceptable to authorities having jurisdiction.

1. Do not allow demolished materials to accumulate on-site nor be illegally dumped in wooded areas adjacent to the railroad corridor. All waste shall be disposed of off-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. All scrap tie, and switch timbers and wood retaining wall shall be disposed of at a MassDEP approved facility. MassDOT will require Contractor to submit the weight slips for payment.

Do not burn demolished materials.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Measurement and Payment of the work items included in this contract are defined under the bid items listed in Document B00420 Proposal. All costs associated with the work in accordance with the requirements specified under this Section shall be included in the bid price for the respective bid item.

Item 146.1. Drainage Structure Culvert Removal – Excavation and Removal of Overburden and Culvert at MP 63.22 shall be paid under Item 146.1 and shall be paid for at the Contract Lump Sum price for the respective item. The work described under this section shall include all labor, tools, equipment, materials, testing, loading, transportation, access, approvals, permits and incidental work necessary for the completion of the work.

ITEM 157.1.1 WETLAND GABIONS LUMP SUM

GENERAL

Work specified under this Section includes existing culvert removal work identified on the Contract Documents and as follows:

1. Furnish afabricate and install Wetland Gabion Baskets as indicated on the contract drawings.
2. Preparing subgrades for wetland gabions installation.
3. Excavating, backfilling and compacting for wetland gabions installation.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Measurement and Payment of the work items included in this contract are defined under the bid items listed in Document B00420 Proposal. All costs associated with the work in accordance with the requirements specified under this Section shall be included in the bid price for the respective bid item.

Item 157.1.1. Wetland Gabions shall be paid under Item 157.1.1 and shall be paid for at the Contract Lump Sum price for the respective item. The work described under this section shall include all labor, tools, equipment, materials, testing, loading, transportation, access, approvals, permits and incidental work necessary for the completion of the work.

ITEM 180.01 HEALTH AND SAFETY PLAN N/A

GENERAL

It is the Contractor's ultimate responsibility to ensure the health and safety of all the Contractor's employees and subcontracting personnel, the Engineer and his/her representatives, and the public from any on-site chemical contamination.

The Health and Safety Program shall include the components required by OSHA 29 CFR 1910.120(b), be designed to identify, evaluate, and control health and safety hazards and provide for emergency response if needed, and be a dynamic document with provisions for change to reflect new information, new practices or procedures, changing site environmental conditions or other situations which may affect site workers and the public.

The Health and Safety Program provided by the Contractor shall comply with all the appropriate regulations that address employee working conditions (e.g. OSHA, RCRA, CERCLA). In addition, guidelines of NIOSH, OSHA, USCG, EPA, etc., shall be followed. Equipment used for the purpose of health and safety shall be approved and meet pertinent standards and specifications of the appropriate regulatory agencies.

The Health and Safety Program (HASP) shall be submitted to the Engineer for acceptance at least two weeks prior to commencement of Work. The review and acceptance of the HASP by MassDOT does not relieve the Contractor of the responsibility for attaining the required degree of protection and training, or to comply with all laws, rules, regulations, standards or guidelines in effect during the execution of the contract.

A copy of the Health and Safety Program shall be maintained on-site at all times by the Contractor. The on-site copy shall contain the signature of the Engineer and each on-site employee of MassDOT, Contractor and sub-Contractors. The employee's signature on the Health and Safety Plan shall be deemed prima facie evidence that the employee has read and understands the plan. A copy of the plan with signatures shall be submitted to the Engineer at the conclusion of the contract, or at the Engineer's request. Signature sheets shall be submitted monthly, or at the request of the Engineer.

49 CFR PART 219 & 243 COMPLIANCE

FRA's rule requires the Contractors and Subcontractors working on a railroad right-of-way be subject to all 49 CFR Part 219 testing and 49 CFR Part 243 training. MassDOT requires certification that the Contractor and Subcontractors are in compliance with the requirements of 49 CFR Parts 219 and 243. The Contractor and Subcontractor must submit receipt (not approval) of each plan. Once received, a copy of each FRA acknowledgement letter is to be immediately forward to MassDOT, along with certification from the Contractor and Subcontractors that their plan complies with the requirements of 49 CFR Part 219 or 49 CFR Part 243. The FRA acknowledgement letters and contractor certifications will be part of the compliance records.

The Contractor and Subcontractors will be prohibited from performing work until they are in compliance with 49 CFR Parts 219 and 243. Any delays related to failure to comply with these requirements will be considered a non-excused delay under the contract.

SITE SPECIFIC INFORMATION

This site has not been evaluated for contamination.

For all construction activities that require handling or exposure to regulated soils, the Health and Safety Plan (HASP) shall specify an on-site Health and Safety Officer. The on-site Health and Safety Officer duties shall include but are not limited to: implementation of the site Health and Safety Plan, training, evaluating risks, safety oversight, determining levels of personnel protection required, and performing any required monitoring at the site. A Daily Log shall be kept by the on-site Safety Officer and provided weekly to the Engineer. This log shall be used to record a description of the weather conditions, levels of personnel protection being employed, monitoring data and any other information relevant to on-site safety conditions. The on-site Health and Safety officer shall sign and date the Daily Log.

The level of protection, relative to respiratory and dermal hazards, required to ensure the health and safety of on-site personnel will be stipulated in the Health and Safety Plan and will be subject to modification by the on-site Safety Officer based on changing site and weather conditions and the following factors: type of operation or activity, chemical compounds identified on-site, concentration of the chemicals, physical state of the hazardous materials, potential duration of exposure to hazardous materials, dexterity required to perform work, decontamination procedures, necessary personnel and equipment, and type of equipment to be utilized.

The Contractor shall be required to provide appropriate personnel protective equipment for anyone who is working in an area either containing or suspected of containing a hazardous environment. This work will include both individuals physically working in these areas and those directing the work of same. Contingencies for upgrading the level of protection for on-site workers will be identified in the Health and Safety Plan and the Contractor shall have the necessary materials/equipment on hand to implement the level of protection upgrade in a timely manner.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Separate Measurement and Payment will not be made for the work of this Special Provision. All costs for Item 180.1 Health and Safety Plan shall be incidental to the project.

ITEM 180.04 LICENSED SITE PROFESSIONAL SERVICES LUMP SUM
PRE-CONSTRUCTION SURVEY AND AS-BUILT CONSTRUCTION PLANS

GENERAL

Contractor shall conduct a preconstruction survey and shall furnish, upon completion of the work, as-built plans for all Work. As-built plans shall show as-built information for all plans contained in the Contract Documents originally issued and/or updated by Owner or Railroad.

Contractor shall perform a pre-construction site survey, to be reviewed and approved by Engineer, to determine existing horizontal and vertical alignment of the existing track structure. The survey must include the existing top of rail elevations, existing track alignment bearing and verification of dimensions and material types. The survey shall include topo within the work limits, existing top of rail elevations, and wetland flag locations. Contractor shall submit to Engineer a survey plan and CAD files for review and approval by MassDOT and Railroad.

Contractor shall develop as-built plans to document the post construction condition of the bridge and track structure. Contractor shall submit post-construction, hard copy and CAD, as-built plans to MassDOT upon completion of the project. The as-built plans are to include, at a minimum, final: rail weld locations; track line and grade; bridge substructure and superstructure component locations and elevations; and all other pertinent information. The as-built plans shall identify any variations or deviations from the original design, verify the track alignment and profile installed, and verify the locations, dimensions and materials installed for the bridge and track structures.

This Section specifies the general requirements and procedures for preparing As-Built Construction Plans. As-Built plans are not intended to document final quantities but are intended to show approved revisions to the contract design including, but not limited to revised profiles and cross sections; revised typical sections; revised drainage and utilities installations; revised track and signal design; and/or any changes to the demolition and removal items and any other changes to the original design or details.

The survey data shall be obtained by Global Positioning Survey (GPS) and certified by a Professional Land Surveyor registered in Massachusetts.

Contractor shall furnish paper “AS BUILT” plans, two (2) paper 11x17 bound copies of the completed project plans, and two (2) electronic file in AutoCAD 2018 civil 3D on a labeled disk or portable USB drive to Engineer. These “AS BUILT” plans shall be furnished prior to the date of the final acceptance. Engineer will make the original drawings available to Contractor for the making of duplicates for use in preparing the as-built drawings.

The following standards shall be applicable:

1. Text: Text shall be drawn using a STYLE of "L100-XX" (where XX refers to the plotted scale) and a font file of "SIMPLEX" as defined in the AutoCAD survey template provided by the Engineer. The style shall be defined as a "fixed height" style and have a height of 0.10 times the drawing plotted scale. (i.e. 4.0 for 40 scale plan, 2.0 for 20 scale etc.).

2. Precision and Accuracy:
   a. Horizontal Survey:
      1) Precision: Horizontal control and surveyed points shall maintain a minimum precision of 1:10,000.
      2) Accuracy: No more than 10% of the survey points shall be in error by more than 1/100 inch or 0.25 mm when viewed at the requested scale.
   b. Vertical Survey:
      1) Precision: Vertical Control shall have a maximum error of closure no greater than .075 feet or .02 meters.
      2) Accuracy: No more than 10% of elevations when interpolated from a Surface shall be in error of more than 1/2 a contour interval.
3. Surface Data: The data format shall conform to Autodesk Civil 3D Project files. If the Contractor uses a different software product to create a surface, then the surface must be represented as a TIN (Triangulated Irregular Network) of 3D lines on a separate, distinct layer within the AutoCAD drawing file. 3D faces or 2 dimensional.

Drawings shall include approved design changes during construction. The plan sheets (or any other "job site record document") revised after award of contract shall include a complete account and detail of the revisions and design changes. The party responsible for the revisions shall have a Professional Engineer (P.E.) seal each altered plan sheet (or any other "job site record document" with a seal). This documented information is to be part of the As-Built Plan requirements.

As-built plans shall be neat, legible and of the correct size. MassDOT Rail and Transit Projects and any projects which include Plan, Profile, Cross-Section and Detail Sheets shall be full size. As-built plan size shall match the issued plan set size. In general, if the plan set was issued at 11"x17", the As-Built shall be 11"x17".

All revisions to the original plans shall be delineated in red, located properly on the drawing, they shall be legible and true to scale.

As-built plan, profile, cross section and detail sheets shall be designated as such by note or stamp "As-Built" in black. As-built plans shall be bound in the same manner as they were issued.

Changes to the issued design by any outside agency shall have their plans added to the As-built plan set. This includes but is not limited to: encroachment permit projects, enhancements, procurements, inter-governmental agreements (IGA), local public agency (LPA) projects and any other agency, private or public, making changes to the existing infrastructure or design. For each new or relocated utility installed, including those installed or relocated by others in the project area, perform an as-built location survey by coordinates prior to backfilling the excavation.

SUBMITTALS

The person or agency responsible for the work shall submit to MassDOT (Owner) a set of As-built plans which meet the requirements of this specification.

A complete digital base plan shall be provided in AutoCAD Civil 3D DWG format Release 2018 or later on a Compact Disk (CD) or portable USB drive, properly referenced to the proper

coordinate system. The final As-built plans shall be submitted within forty-five (45) days following the substantial work complete date of the project.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Measurement and Payment of the work items included in this contract are defined under the bid items listed in Document B00420 Proposal. All costs associated with the work in accordance with the requirements specified under this Section shall be included in the bid price for the respective bid item.

Item 180.04. Pre-Construction Survey and As-Built Construction Plans shall be paid under Item 180.04 and shall be paid for at the Contract Lump Sum price for the respective items. The work described under this section shall include all labor, tools, equipment, materials, testing, loading, transportation, access, approvals, permits and incidental work necessary for the completion of the work.

ITEM 244.48 48 INCH REINFORCED CONCRETE PIPE CLASS V FT
ITEM 244.48.1 PRECAST CONCRETE WINGWALLS/HEADWALLS EA

GENERAL

This work shall consist of the construction of culverts, hereinafter referred to as "Pipe", in accordance with these specifications and in close conformity with the lines and grades shown on the plans.

Reinforced concrete pipe for culverts shall be design to support Cooper E-80 loading as per AREMA, latest Edition.

MATERIALS

All pipes shall be subject to inspection at the site of the work. The purpose of the inspection shall be to reject pipes which, independent of the physical tests, fail to conform to the specification in the particulars of dimension, workmanship, finish, blisters, cracks or fractures.

Reinforced concrete pipe shall at a minimum conform to the requirements of AASHTO-M170 for Standard Strength Reinforced Concrete Culvert Pipe for Class V, unless otherwise designated on the plans. Pipes shall be of the tongue and groove or bell and spigot type.

Marking. The following shall be clearly marked on both the interior and exterior surface of the pipe:

1. Appropriate ASTM 76 Specification: ASTM 76, ASTM C361 or ASTM C507.
2. Class and size.
3. Date of manufacture.
4. Name a trade mark of manufacturer.

Diameter of the Pipe: The diameter of the pipe indicated on the drawings shall mean the inside diameter of the pipe.

Fittings and Specials: Fittings and specials shall be made of pipe segments having the same structural qualities as the adjoining pipe and shall have the interior treated the same as the pipe.

1. Pipe Handling: Pipe and accessories furnished by Contractor shall be delivered to unload and distribute at the site by Contractor.
2. Pipe fittings, specials, valves and appurtenances shall be unloaded and stored in a manner that precludes shock and damage. Such materials shall not be dropped.
3. Pipe shall be handled in a manner intended to prevent damage to the pipe ends or to any coating or lining. Damaged pipes shall be replaced by Contractor at no cost to MassDOT.
4. All pipe trenches shall be kept free of water during pipe laying and other related work.
5. The method for dewatering shall provide for a dry foundation at the final grades of excavation in accordance to the Temporary Dewatering section of these Technical Specifications.

Gasket Storage: All gaskets shall be stored in a cool place; preferably at a temperature of less than seventy degrees Fahrenheit (70 degrees F), and in no case shall the gaskets be stored in the open nor in direct sunlight.

CONSTRUCTION METHODS

For excavation to install new pipe refer to Excavation and Backfill section of these Technical Specification.

The bedding for the pipe shall be crushed stone over geotextile fabric shaped to conform reasonably close to the lower 10% of the pipe and recesses excavated for the bells of bell and spigot pipes. All pipes shall be laid to the specified line and grade, with a firm bearing throughout each length and with bell ends uphill.

The joints of the pipe shall be water tight and shall be joined using flexible water tight rubber gaskets conforming to ASTM C 443. In addition the outer surface of each pipe joint shall be wrapped with 2 layers of geotextile fabric as indicated on the plans.

Contractor shall clean the culverts of all debris and obstructions. This shall include removal of any formwork, concrete and mortar droppings, construction debris and dirt. No debris shall be flushed into the wetlands or streams.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Measurement and Payment of the work items included in this contract are defined under the bid items listed in Document B00420 Proposal. All costs associated with the work in accordance with the requirements specified under this Section shall be included in the bid price for the respective bid items.

Item 244.48 - 48 Inch Reinforced Concrete Pipe (RCP) Class V will be paid under Item 244.48 and shall be paid for at the Contract Unit Price per FT up to 51 FT of 48-Inch RCP Class V, which price shall include full compensation for all work performed under the task and shall include all labor, tools, equipment, materials, installation, testing, loading, transportation, approvals, permits, and all incidental work necessary for the completion of the work.

Item 244.48.1 – Culvert Structure – MP 62.33 Precast Concrete Wingwalls will be paid under Item 244.48.1 and shall be paid for at the Contract Unit Price per EA for two (2) concrete wingwalls/headwalls, which price shall include full compensation for all work performed under the task and shall include all labor, tools, equipment, materials, installation, testing, loading, transportation, approvals, permits, and all incidental work necessary for the completion of the work.

Contractor shall provide all necessary labor, equipment and materials to be incorporated into the work as indicated in the Contract Drawings and in these Special Provisions.

ITEM 402.1 DENSE GRADED CRUSHED STONE FOR SUBBASE TON

GENERAL

The work under this item shall conform to the relevant provisions of Section 150 of the MassDOT Standard Specifications and as identified in the Contract Drawings and in these Special Provisions.

Work to include furnishing and installing up to 150 TON of ¾" crushed stone base course on existing undisturbed subsoils to provide bedding for the new reinforced concrete pipe culvert.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Measurement and Payment of the work items included in this contract are defined under the bid items listed in Document B00420 Proposal. All costs associated with the work in accordance with the requirements specified under this Section shall be included in the bid price for the respective bid item.

Item 402.1. Dense Graded Crushed Stone for Subbase (3/4" crushed stone) for RCP bedding shall be paid under Item 402.1 and shall be paid for at the Contract Unit Price per TON up to 150 TON of ¾" crushed stone stubbase. The work described under this section shall include all labor, tools, equipment, materials, testing, loading, transportation, access, approvals, permits and incidental work necessary for the completion of the work.

ITEM 458.6.1 FURNISH BALLAST TON

GENERAL

Contractor shall employ an independent, certified laboratory, acceptable to Massachusetts Coastal Railroad, LLC (MCRR or Railroad) and MassDOT (Owner), to perform the specified testing of the ballast stone.

These Specifications describe requirements for the furnishing, testing, and procurement of ballast to be used in track construction and for aligning and surfacing track. Ballast shall meet, in every respect, specifications of the American Railway Engineering and Maintenance-of-Way Association (AREMA) contained in the Manual for Railway Engineering, Volume 1, Chapter 1, Part 2 – Ballast, Sections 2.2 through 2.6 standards. Ballast shall be installed at locations per the Contract Drawings and at the direction of the Engineer.

SUBMITTALS

Prior to shipment of ballast, submit the name of the ballast supplier, processing facility and testing laboratory that will sample and test the ballast as in AREMA, Chapter 1, Tables 1.2.1 and 1.2.2 to the Engineer for review and approval.

Prior to shipment of ballast, submit inspection reports certifying that all required tests and inspections as specified herein have been made and that the ballast being shipped is in full compliance with AREMA specifications and as specified herein to the Engineer for review and approval.

Prior to shipment of ballast, submit a certification that field samples were secured in accordance with the current ASTM Methods of Sampling Designation D75, and that test samples were reduced from field samples by the means of ASTM C702 to the Engineer for review and approval.

Required testing includes, but is not limited to:

1. Sieve Analysis: ASTM Method of Test Designation C136
2. Material Finer than No. 200 Sieve: ASTM Method of Test Designation C117
3. Bulk Specific Gravity: ASTM Method of Test Designation C127
4. Absorption: ASTM Method of Test Designation C127
5. Percentage of Clay Lumps and Friable Particles: ASTM Method of Test Designation C142
6. Resistance to Degradation: ATSM Method of Test
7. Designation C535 - Material gradations with particles retained on 1” sieve
8. Designation C131 - Material gradations with 100% passing the 1” sieve
9. Sodium Sulfate Soundness: ASTM Method of Test Designation C88
10. Unit Weight: ASTM Method of Test Designation C29
11. Percent of Flat and/or Elongated Particles: ASTM Method of Test Designation D4791

For each ballast sample obtained, test results shall be entered in the Field Inspection Summary Report included in this specification and submitted to the Engineer for review and approval prior to the shipment of ballast.

Sampling and testing of ballast as specified herein shall not be billed separately but are included in the cost per ton of ballast supplied to MassDOT.

Submit the following for review and approval by the Engineer before ballast work is started:

1. List of proposed equipment for use in construction. The list shall be submitted to the Engineer twenty-one (21) days prior to the start of work and shall include the name of the manufacturer, dimensions and weights of the equipment and the intended use of each of piece of equipment.
2. Proposed construction and installation procedures for ballast installation, and track surface and alignment.
3. Manufacturer's certificate of compliance to the Engineer for all materials that are incorporated into the work.

QUALITY ASSURANCE

Provide certified test results of ballast quality and grading as conducted by the approved testing laboratory.

In addition, provide tests for gradation (sieve analysis) for every 1,000 tons of ballast delivered to the job site.

Testing, as defined by this specification, shall be performed at least two (2) times a year or as directed by the Engineer, to ensure the quality of the material being produced. If the supplier changes the location of the source or encounters changes within the supply source, laboratory testing shall be performed on the new material to ensure compliance with specifications.

Field samples shall be secured in accordance with the current ASTM Methods of Sampling, Designation D75. Test samples shall be reduced from field samples by the means of ASTM C702.

If the source of ballast changes during ballast installation, additional certified test results (in accordance with the requirements included under Submittals and Quality Assurance) shall be provided to the Engineer for review and approval prior to the shipment of the ballast from the new source.

Supplier shall certify with billing that the ballast delivered is typical of the ballast which has been tested and that has been approved by the Engineer.

Perform sampling and tests of the ballast material to determine compliance with specified requirements. Samples shall be initially taken from the supplier's source (quarry). Additional samples may be taken from the site at the direction of the Engineer.

PRODUCTS

PRODUCTS AND MATERIALS TO BE PROVIDED BY HRRC OR MASSDOT

None

PRODUCTS AND MATERIALS TO BE PROVIDED BY THE CONTRACTOR

All Ballast

MATERIALS

Ballast shall conform to AREMA Number 4 Gradation, as modified by these specifications.

Ballast shall be crushed, quarried, and washed Granite or Traprock composed of hard, strong, angular, and durable particles, free from frozen lumps, foreign materials, and injurious amounts of substances and conforming to all of the requirements of these specifications.

Ballast samples shall be obtained in accordance with ASTM D75.

Ballast shall conform to the following Limiting Values:

No.	**Property**	**Granite Ballast**
1.	Sieve Analysis	AREMA No. 4
2.	Percent Material Passing No. 200 Sieve (ASTM C117)	0.5%
3.	Bulk Specific Gravity See Note 1 Below	2.60
4.	Absorption (ASTM C127)	0.4pcf
5.	Percent Clay Lumps and Friable Particles (ASTM C142)	0.5%
6.	Degradation Percent (LA Abrasion Machine ASTM C535, grading No. 2)	18%
7.	Soundness (Sodium Sulfate) (ASTM C88) 10 Cycles (Percent Material Loss)	1.5%
8.	Unit Weight (lb/ft^3) (ASTM C29)	By Engineer
9.	Percent Flat and/or Elongated Particles	5.0%
Notes:	1. Use ASTM Test Designation most representative of ballast material gradation as specified above. 2. The limit for bulk specific gravity is a minimum value. Limits for remainder of the tests are maximum values.	

Cementing value of the ballast shall not exceed an average value of 320 pounds per square inch for five specimens when tested in accordance with the Logan Walter Page Method (U.S. Department of Agriculture, Bulletin No. 347, 1916, Pg. 15) except as modified as follows:

1. A sufficient amount of pea size pieces of the rock, amounting to about 500 grams (1.1 pounds) is revolved in Los Angeles Abrasion Cylinder with three cast iron balls 4.76 cm. (1.875 inch) diameter and weighing approximately 0.43 kilograms (0.95 pounds) at the rate

of 30 and 33 revolutions per minute, and the stiff dough at room temperature resulting from about 500 grains (17.64 oz.) of dust screened through a 100 mesh sieve, mixed with sufficient water, thoroughly kneaded for five minutes, allowed to stand in an air tight container for two hours, is molded into cylindrical briquettes 2.54 cm. (1 inch) diameter by 2.54 cm. (1 inch) in height under a pressure of 132 Kgs. per sq. cm. (1877.5 pounds per square inch), after which they are dried for 20 hours in air at room temperature, 4 hours in a hot air bath at a temperature of 100˚C (212˚F), then cooled for 20 minutes in a desiccator and immediately tested in a compression testing machine for static crushing strength, the bearing heads being suspended by pivots to secure uniform distribution of load, which is applied at 600 pounds per minute, approximately.

EXECUTION

DELIVERY OF BALLAST

1. Contractor is responsible for coordinating delivery of ballast, including the delivery schedule. Contractor shall coordinate delivery windows and track access required for ballast delivery with MCRR.
2. Contractor shall provide MCRR written notice a minimum of two weeks prior to the date ballast will be delivered to the site.
3. The Contractor is responsible for all ballast delivered by rail or truck.
4. Contractor is responsible for all scheduling and coordination for ballast delivery. MassDOT is not responsible for delays or any additional costs associated with delivery of ballast, all costs shall be the responsibility of the Contractor.

PRODUCTION AND HANDLING

1. The ballast production facility shall be of such a design to permit production and or blending without excessive working of the materials. The capacity of the production facility shall be adequate to efficiently produce the anticipated daily loadings providing sufficient stockpiles to facilitate loadings without any delays.
2. Blending, stockpiling and other production and handling operations shall be managed by the producer to keep ballast clean and minimize segregation of the finished product. Stockpiling operations shall minimize the breakage or excessive fall in stockpiling operations. The movement of wheeled or tracked machines over stockpiled materials shall be limited.
3. Processed ballast shall be washed and/or rescreened as necessary to remove fine particle contamination as defined by the specification prior to stockpiling in operations using stockpiles or immediately prior to loading operations.
4. Handle prepared ballast at production plant, during shipment and at work site so that it is kept clean and free from segregation. Do not make repeated passes of equipment over same level in stock pile area.

LOADING

1. Processed ballast shall be loaded only into rail cars or trucks which are in good order, tight enough to prevent leakage and waste of material, and clean and free from rubbish or any substance which would foul the ballast.

INSPECTION

1. MassDOT, or its representatives, reserve the right to make unscheduled visits to the supplier's facility during normal business hours for the following purposes:
   a. Observe sampling and testing procedures to assure compliance with the requirements of these specifications.
   b. Obtain representative samples of the prepared material being produced and shipped.
   c. Review plant inspection, methods, quality control procedures, and equipment and review test results of both current and previous tests.
2. The supplier shall provide MassDOT or its representative with such assistance, materials, and laboratory testing equipment as necessary to perform so called "on site production tests" consisting of site gradation and percent passing No. 200 sieve.
3. Performance of these tests at the time of an unscheduled inspection visit is the right, but not the duty of the inspector.

CONSTRUCTION QUALITY CONTROL AND ASSURANCE

BALLAST PRODUCTION SITE TESTING:

1. Notify Engineer of proposed source and location of crushed stone ballast no less than 5 days prior to shipment of any ballast to the work site. Engineer shall observe the taking of samples of proposed material and the testing of them for conformance to classification, quality, and grading requirements. Samples of ballast for testing shall be taken from each 500 tons of prepared ballast. Sample shall be representative and shall weigh not less than 150 pounds.

2. Contractor will notify Engineer of test results. Failure of ballast to meet the requirements of this Specification shall mean rejection of ballast quarry.

3. If, during ballast installation, the source of ballast changes, Contractor shall immediately notify Engineer and perform tests of new production site in accordance with these Specifications. Ballast shall have the same or higher classification, quality, and grading as former ballast used. Work site delivery shall not commence until Engineer has approved, in writing, the new ballast source.

BALLAST JOB-SITE TESTING

1. Periodically during progress of trackwork, Railroad or Owner will test samples of ballast obtained from in-place locations designated by Engineer to ensure a uniform quality of ballast.

2. If ballast in-place does not conform to requirements of these Specifications Engineer will notify Contractor to stop further loading of ballast until fault has been corrected and to dispose of defective material without cost to Railroad or Owner.

3. Engineer reserves the right to reject any load of ballast arriving at work site for unloading that does not conform to this specification. The load shall be disposed of without cost to Railroad or Owner.

ACCEPTANCE/REJECTION

1. To be accepted, ballast offered shall conform to this specification in all respects. Ballast is also subject to inspection at delivery and is at the supplier's risk until acceptance. Ballast rejected for non-compliance with this specification will be picked up, loaded, and transported off-site at the Contractor's expense. Ballast installed prior to acceptance and subsequently rejected for non-compliance with this specification shall be removed and replaced at the Contractor's expense. MassDOT is not responsible for any costs associated with rejection of ballast.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Measurement and Payment of the work items included in this contract are defined under the bid items listed in Document B00420 Proposal. All costs associated with the work in accordance with the requirements specified under this Section shall be included in the bid price for the respective bid item.

The Contractor shall provide all necessary labor, equipment, and materials to be incorporated into the work as indicated in the Contract Drawings and in these Special Provisions.

Work under ITEM 458.6.1 TRACK BALLAST – Furnish, Deliver, Install and Compact shall be measured and paid at the contract unit price per TON under ITEM 458.6.1 TRACK BALLAST. Contractor shall submit weight tickets to the Engineer for all ballast furnished. No payment will be made without weight tickets being submitted to Engineer.

MassDOT Rail Division
FIELD INSPECTION SUMMARY REPORT
To Be Submitted by Supplier

Ballast Supplier:	**Sample Location:**
Quarry Location:	**Sample No./Type:**
Date Sampled:	**Testing Company:**

Field samples were secured in accordance with the current ASTM Methods of Sampling Designation D75. Test samples were reduced from field samples by the means of ASTM C702.

Supplier's Authorized Signature

TEST	ASTM STANDARD		ALLOWABLE RESULT/RANGE		TEST RESULT	PASS/ FAIL	COMMENTS
1. Sieve analysis AREMA No. 4	C136		UL %	LL %			
Ballast Material ❑ Granite (G) ❑ Traprock (T)	% Passing	2"	-	100%			
		1 ½"	100%	90%			
		1"	55%	20%			
		¾"	15%	0			
		½"	N/A	N/A		N/A	
		⅜"	5%	0			

TEST	ASTM STANDARD	LIMITING VALUE	TEST VALUE	PASS/ FAIL	COMMENTS
2. Percent Material Passing No. 200 Sieve	C117	1.0%			
3. Bulk Specific Gravity	C127	2.60			
4. Absorption Percent	C127	1.0			
5. Percent Clay Lumps and Friable Particles	C142	0.5%			
6. Degradation Percent	❑C131/❑C535	G-35% /T-25%			
7. Soundness (Sodium Sulfate) 5 Cycles (Percent Material Loss)	C88	5.0%			
8. Unit Weight (lb/ft^3)	C29	By Engineer			
9. Percent Flat and/or Elongated Particles	D4791	5.0%			

ITEM 492.1 TRACK REMOVAL, STORAGE & RECONSTRUCTION LUMP SUM

GENERAL

This section specifies removal and re-installation of existing track. The Contractor shall carefully remove, dismantle, and stockpile all track material for reuse. Alternatively, if the Contractor determines by means and methods that removal of the tracks is not necessary to install the culverts below the tracks, and this is approved by the Owner, then the existing tracks shall be maintained and fully protected during removal and replacement of the sub soil and ballast layers and ties.

Trackwork consists of removal, dismantling, salvaging, stockpiling, and re-installation of existing rails and crossties and placement of new ballast.

Removal, dismantling, salvaging, and stockpiling of existing track for reconstruction of track.

Existing track materials deemed not reusable by Engineer shall be disposed of in accordance with all ordinances, rules and regulations, including environmental regulations, of the authorities having jurisdictional.

Excavation for new track bed construction and the reuse of excavated material as fill material. All extra fill material will be wasted (disposed of) along the railroad right-of-way within five (5) miles of the work site at a location(s) designated by Engineer.

Preparation of track roadbed and construction of ballasted track. The approximate limits of the above types of track construction are defined on the Contract Drawings and described in the Scope of Work.

APPLICABLE STANDARDS

Pertinent provisions of the following listed standards and publications shall apply to the Contract, except as they may be modified herein, and are hereby made part of these Specifications to the extent required.

1. American Railway Engineering and Maintenance Association, Manual for Railway Engineering, latest edition, herein referred to as the AREMA Manual.
2. American Railway Engineering and Maintenance Association, Portfolio of Trackwork Plans, latest edition, herein referred to as the AREMA Portfolio.
3. MBTA Railroad Operations Book of Standard Plans.
4. MassDOT MW-1 Specification for Construction and Maintenance of Track.

SUBMITTALS

Contractor shall submit a detailed construction schedule, including dates for commencement and completion of all sections of track construction and surfacing and lining of track.

QUALITY ASSURANCE

Contractor shall perform all measures necessary to assure quality of the Work. This shall include source quality control and field quality control requirements specified in these Special Provisions.

Contractor shall be experienced in the construction of the various types of trackwork included in this Contract. Such experience shall have been gained on at least three previous contracts of similar volume of work with other North American transit properties or railroads.

SURVEYING REQUIREMENTS

Employ a qualified surveyor to establish the baseline and perform the survey required within the project limits and assume full responsibility for all dimensions and elevations taken and the setting of lines and grades relating thereto.

Furnish and place markers for a minimum of six control points for use as reference points of the track centerlines, as needed to re-build track to its designated alignment and surface

Maintain control points and reference points for the duration of the work and include these as part of As-Built Drawings to be submitted.

EXECUTION

BALLAST

Ballasted mainline track shall be constructed using AREMA No. 4 ballast in accordance with the Special Conditions.

The Contractor will supply the stone ballast as specified in the Special Conditions and as shown on plans.

PLACEMENT OF BALLAST

Compact the finished subgrade prior to installation of ballast. Distribute and compact a six inch (6”) layer of bottom ballast uniformly over the finished subgrade prior to tie distribution. Distribute and compact bottom ballast in three inch lifts uniformly over the finished subgrade. Total bottom ballast shall not exceed six inches (6”). Each bottom ballast layer shall not exceed four inches compacted depth. The finished grade of the compacted bottom ballast shall be two inches (2”) below bottom of tie final grade, plus or minus one inch (+/- 1”).

Thoroughly compact ballast until stones are firmly interlocked and surface is true and unyielding. Compact ballast using vibratory compactors of either the roller or pad type. Dynamic force for either type shall not be less than 20,000 pounds and the frequency range shall be 1100 to 1500 vpm. Use machines equipped with a governor which can be set and locked to control rate of impulse. Provide a tachometer or other suitable device for accurately checking the frequency of vibration during the compacting operation.

Top surface of initial layers of ballast shall be smooth, flat and uniformly compacted prior to distributing ties.

The ballast shall be installed and compacted to the cross-sections indicated on the Contract Drawings.

WOOD CROSSTIES

Carefully distribute and properly space existing or new crossties on the compacted layer of new ballast. Space all crossties at 19 1/2" on center. All crossties shall be installed perpendicular to the centerline of the track and in-line with the existing ends of ties on the line side

Place timber ties so that heartwood is down. Do not adze ties unless approved. Handle treated ties in a manner to avoid breaking and bruising. Do not throw ties from cars or trucks onto rails or rocks.

Place ties normal to centerline of track unless shown otherwise on Contract Drawings or as directed by Railroad. Properly space and align ties prior to rail installation. In placing or spacing treated ties, handle only with tongs or suitable devices. Do not use chisels, forks, mauls, picks, punches, shovels, or sledges for moving ties or placing them in position beneath rails. Avoid unnecessary handling, redistribution, and reloading of ties. To extent practical, distribute ties in proper position for use without further handling.

MassDOT will supply new ties for the ties that are deemed not reusable by Engineer as specified in the Special Conditions and as shown on plans

TIE PLATES

Existing timber crossties shall have tie plates still installed. MassDOT will supply the Contractor with relay tie plates to replace tie plates that are missing or have been deemed not reusable by Engineer for the project. Contractor will be responsible for loading, transportation, unloading and the security of all tie plates

Prior to installation of tie plates, clean contact surfaces to allow proper bearing of tie plate on tie.

Locate centerline of tie plates on 8 feet 6 inch ties so that the line side of the tie is properly located from outer edge of base of rail. Tie plate shall be centered on the crosstie under the rail.

Locate tie plates on longitudinal centerline of each tie and place square to centerline of rail so that outside shoulder of plate bears fully against rail base. Place plate with the downward cant toward center of track.

TRACK GAGE

Track gage shall be 56-½" +/- 1/8" measured at a right angle to the rail from inside face to inside face of the rails between points 5/8-inch below the top of rail. If the track gage of adjacent, existing ties and switch timber vary outside the 56-3/8" to 56-5/8" range, then gage of adjacent, existing ties and switch timber must be adjusted to conform to the limits given above. Any gage transition into existing conditions must be approved by MCRR (Railroad) or MassDOT (Owner's) Authorized Representative. It is mandatory that Contractor run the spiker with the gage function on.

Each tie shall have three (3) spikes per plate in tangent track, four (4) spikes per plate in curved track. Spiking pattern shall be uniform and as directed by Railroad. Joint ties shall be installed so

that spikes will not be driven within 2" of the ends of joint bars. Spikes are not to be driven in the slots of toed/slotted joint bars.

The Contractor will supply all spikes as specified in the Special Conditions.

BOLTED JOINTED RAIL

Standard bolted joints shall be in accordance with the Contract Drawings, Scope of Work and Special Conditions. Standard bolted joints on opposite rails shall be staggered a minimum of four ties.

Secure rail on line end of ties to tie, in proper relation to tie end, before securing opposite rail. Use line rail as reference in securing opposite rail to proper gauge.

RAIL ANCHORS

All anchors removed during track dismantling are to be properly re-installed during track re-installation. Anchors for all work in this contract are considered to be incidental to the removal and re-installation of the track. Contractor shall install all anchors in accordance with the provisions of the Contract Drawings, Scope of Work, Technical Specifications, AREMA Recommended Practices, and the MassDOT MW-1

Rail anchors are to be re-installed on all re-used and new crossties when the crosstie being replaced was anchored. Unusable or damaged anchors shall be replaced with new anchors designed for the rail section being anchored. Rail anchor installation shall be in accordance with current AREMA and MassDOT MW-1 Standards.

Crossties shall be box anchored and anchors shall be fully engaged with the rail base with full bearing against both sides of the crosstie. All requirements of these Technical Specifications with respect to track gage, material, tie installation and finished track condition following tie installation shall apply to rail anchor installation.

TRACKWORK CONSTRUCTION EQUIPMENT REQUIREMENTS

Contractor shall submit a list of construction equipment to be used during the trackwork construction including its weights and dimensions. The equipment will not be permitted on MCRR/MassDOT property until it has been inspected and approved.

Contractor shall verify that his track-mounted or hi-rail equipment complies with these specifications and the standards set by the AAR Mechanical Division.

Contractor shall operate only equipment in a good state of repair and with all safety appliances and protective devices in place and functional.

Contractor's equipment shall not exceed the design loads for any track or structure. Contractor shall verify that proposed equipment meets these requirements.

Contractor's equipment shall physically clear all fixed obstructions within the limit of the project, including signal and power installations. Any damage caused by the Contractor will be repaired or replaced as determined by Railroad and at no additional cost to MassDOT.

TRACK GEOMETRY

Track shall be re-installed in conformance with the Contract Drawings, Scope of Work, AREMA Recommended Practices and the MassDOT MW-1.

For tangent track, the alignment is to be based on the established centerline of the North Dartmouth Industrial Track (NDIT), equidistant between the gauge sides of the running rails.

For curved track, the alignment is to be based on the centerline of track with the outside rail located 2 feet 4-1/4 inches radial from the centerline measured in the plane of the rails. Track gage shall be measured as specified in the Track Gage section of this technical specification. Gage shall be 4 feet 8-1/2 inches.

Rail Cant:

1. Ballasted track shall be constructed with rail cant at 40 to 1 inward inclination of the rails.
2. Rail in special trackwork shall be constructed with no cant.

Superelevation:

1. Primary track curves shall be superelevated as shown on the Contract Drawings.
2. Elevation, or superelevation, is the vertical distance of the outer rail of a curve above the inner rail. It is provided to overcome or partially overcome the effects of curvature and speed. Superelevation shall be as shown on the plans. Tangent track shall not be superelevated, except as provided in the paragraph below.
3. Superelevation shall be attained gradually and uniformly over the length of the spiral or as indicated. Superelevation shall change no more than one inch (1”) in 62 feet. Full elevation shall be achieved at the start of the body of the curve. If necessary, up to one inch may be run off in tangent track. The outer rail shall be superelevated above the inner rail; the inner rail shall be at the required profile.
4. Spirals - The superelevation at the point of tangency shall be zero and shall increase uniformly through the length of the spiral to full elevation of the outer rail at the spiral-to-curve point. This spiral shall be provided at the ends of simple curves and segments of compound curves as measured in the field.
5. Turnouts and crossovers shall not be superelevated, unless specifically noted on the plans.
6. Prior to final surfacing, brass tags attached to the ties shall be used to mark the beginning and ending points of superelevation and shall be located at 1/4 inch increments between the beginning and ending points of the superelevation transition. Tags shall be placed to be read while facing along the track excepting the tag at full elevation which shall be placed to read facing the high rail, to plainly indicate the authorized full elevation. The amount of superelevation shall be as indicated on the plans.

Track Surface:

1. Track surface is the relationship of opposite rails to each other in profile and cross level. Track profile is the running surface along the top of the grade rail. Cross level is the difference in elevation of the tops of heads of opposite rails measured at right angles to the track alignment. The ideal surface is a uniform profile consisting of straight gradients connected by vertical curves, with zero cross level on tangents and predetermined cross level on curves.

TRACK CONSTRUCTION TOLERANCES

The track construction tolerances shall be as specified in Table I below.

TABLE I

TRACK CONSTRUCTION TOLERANCES

Gage:	
Variation from requirements of section	± 1/8-inch
Track Gage Difference in 62’	1/8-inch
Cross Level:	
Variation from zero at any point in tangent track	± 1/8-inch
Variation from computed value in spirals and curves	± 1/8-inch
Rate of change of permissible variation from requirements of section Track Geometry shall not exceed	3/16-inch in 62 feet
Horizontal Track Alignment: (1) (2)	
Maximum deviation from tangent or permissible variation from uniform curvature on curves shall not exceed	±1/4-inch
Rate of change of permissible variation shall not exceed	3/16-inch middle ordinate to a 62-foot chord on curves, and 1/16-inch middle ordinate to a 62-foot chord on tangent
Vertical Track Profile: (1)	
Rate of change of permissible variation shall not exceed	1/8-inch middle ordinate of a 62-foot chord

NOTES:

(1) Measured on the line rail. Use either rail as the line rail on tangent track, except that the same rail shall be used for the full length of the tangent. Use the outer rail as the line rail on curved track.

(2) Total deviation in station areas to be ±1/8 inch vertical and ±1/4 inch horizontal to insure ADA/MAAB compliance.

SURFACING AND ALIGNING

Contractor shall distribute sufficient top ballast to tamp and raise reconstructed track to match the profile of the proposed finished top of rail grade as determined by the pre-construction survey.

Top of rail shall be within ½" of proposed final top of rail grade for all tracks/rails with specified final grades on contract plans.

At the conclusion of the track construction, Contractor shall perform surface and alignment of all tracks within the project limits using approved on-track equipment. A surfacing lift of 1" to 2" shall be made to completed track to meet final track profile.

Surface and Lining of all tracks must meet FRA Class 2 Geometry and all turnouts must meet FRA Class 5 Geometry. Surfacing and lining with a non-production machine is permissible provided that it is done under the direction of a surveyor and approval of Railroad.

Following this work, Contractor shall perform Quality Control (QC) work to correct track defects created by the surfacing and lining work. QC corrections will address defect both with existing and newly installed ties and include high spikes, tie plates not centered, plate shoulder or other object (stone, spike head, etc.) bearing under rail base, and down ties.

Both sides of all switches shall be surfaced, lined and tamped. Track surface shall be run out at least 100 feet beyond switches and the ends of the re-alignment areas or as directed by Railroad.

Following the completion of surfacing, lining and tamping, Contractor shall plow/sweep remaining ballast so that all track is completely swept, all cribs are filled to at least 1" below top of tie, no ballast remains on the top of ties, and all areas outside switches are smooth and level.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Measurement and Payment of the work items included in this contract are defined under the bid items listed in Document B00420 Proposal. All costs associated with the work in accordance with the requirements specified under this Section shall be included in the bid price for the respective bid item.

Item 492.1 will be paid for at the Contract Lump Sum Price for Track Removal, Storage and Reconstruction, which price shall include full compensation for all work performed under the task and shall include all labor, tools, equipment, materials, installation, testing, loading, transportation, maintenance, dismantling, removal, approvals, permits, and all incidental work necessary for the completion of the work.

Contractor shall provide all necessary labor, equipment and materials to be incorporated into the work as indicated in the Contract Drawings and in these Special Provisions.

ITEM 492.8.1 SURFACE AND ALIGN BALLASTED TRACK LUMP SUM

GENERAL

At the conclusion of the Project's associated trackwork, Contractor shall perform surface and alignment of all tracks within the project limits using approved on-track equipment. A surfacing lift of 2" to 3" shall be made to completed constructed or rehabilitated track. For tie replacement/installation projects, a skim lift of the entire track section subject tie installation shall be performed to resolve vertical deviations in the track after all ties have been installed.

A production Mark IV Tamper or approved equal is required for this work.

Surface and lining of all tracks must meet FRA Class 2 geometry criteria.

Surface and lining of all turnouts, at-grade crossings and 100' at-grade crossing approaches must meet FRA Class 5 geometry criteria.

Contractor shall tamp, surface and align track working away from any open deck bridge. DO not surface into the bridge

Following this work, Contractor shall perform Quality Control (QC) work to correct track defects created by the surfacing and lining work. QC corrections will address defects and include high spikes, tie plates not centered, plate shoulder or other object (stone, spike head, etc.) bearing under rail base, and down ties.

Both sides of all switches and at-grade crossings within work limits shall be surfaced, lined and tamped. Track surface shall be run out at least 100 feet beyond switches and the ends of the re- alignment areas or as directed by Massachusetts Central Railroad (MCER or Railroad).

Following the completion of surfacing, lining and tamping, Contractor shall plow/sweep remaining ballast so that all track is completely swept, all cribs are filled to at least 1" below top of tie, no ballast remains on the top of ties, and all areas outside switches are smooth and level.

EXECUTION

Tamping operations shall be performed with an approved 16 tool vibratory squeeze type power tamper with a liner attachment. The power tamper shall have tamping tools with a tamping tip of sufficient area to tamp each tie to the satisfaction of Engineer. Tamping tips shall be repaired or replaced after 30% wear of the working surface.

Cross ties and switch timbers shall be tamped from a point 15 inches from the gage side of each rail to point 15 inches from the field side of each rail on both ends of the tie. The center of each tie shall also be tamped within the limits of paved areas. Tamping will not be permitted at the center of tie outside of paved areas. Both ends of the tie shall be tamped simultaneously and tamping inside and outside of the rail shall be done at the same time. All cross ties shall be tamped tightly to provide good bearing against the base of rail after the track is raised to a true surface. All "down" ties shall be brought up to the base of rail and machine tamped by Contractor before final acceptance. Tamping of track in snow and frozen ballast conditions will not be permitted.

Ballast shall be unloaded only in the amount required for the final track raise and for ballast section restoration which shall include shoulder restoration. Contractor shall distribute the stone ballast in sufficient quantity for tamping the track and for restoring the ballast section which shall conform to the typical sections in MassDOT MW-1. Contractor shall avoid mixing sod, vegetation, and other foreign matter onto

the track structure or shoulders for the purpose of tamping or dressing the ballast section. All track work constructed and rehabilitated shall be finally surfaced and aligned to the curvature and elevations shown on the Project Plans.

Deviation from smooth or uniform profile on either rail at the mid-ordinate of a 62 foot chord may not exceed ¼ inch. Deviation for zero cross level on may not exceed ¼ inch. The difference or change in cross level between any two points 62 feet apart may not exceed ¼ inch. Deviation from uniform or smooth alignment between any two points less than 62 feet apart may not exceed ¼ inch.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Measurement and Payment of the work items included in this contract are defined under the bid items listed in Document B00420 Proposal. All costs associated with the work in accordance with the requirements specified under this Section shall be included in the bid price for the respective bid item.

ITEM 492.3 CLEANUP AND DISPOSAL OF DEFECTIVE CROSSTIES, TIMBERS, AND WOOD MATERIALS LUMP SUM

DISPOSAL REGULATIONS

Wood materials are to be disposed in accordance with local, State and Federal regulations. The Contractor shall notify MassDOT which facility will be used to dispose of crossties and wood materials. A copy of the Mass DEP certification showing that it is an approved disposal facility along with all weight slips for crossties/timbers sent to an approved facility shall be provided to MassDOT.

1. REMOVALS/DEMOLITION

   The Contractor shall remove and dispose of materials to the limits indicated in the Contract Drawings and these Special Provisions.

   a. Non-contaminated and contaminated materials shall be disposed of at a certified disposal facility. The Contractor shall provide the weight slips and other documentation as required for the disposal of all materials.
   b. Disposal of all ties/timber removed from track during general tie/timber replacement and track rehabilitation at a certified and registered facility. Pieces of ties may have to be picked up by hand and/or raked up to be loaded out for disposal.

DISPOSAL OF OLD CROSSTIES

The Contractor is responsible for the cleanup of all crossties on the right-of-way including those from previous crosstie installation projects. All old crossties and timbers are to be picked up and disposed of at a Mass DEP approved disposal site as specified in the Special Provisions. Wood pickup is to be done concurrently with installation of crossties.

1. Disposal of Materials

   a. Dispose of scrap ties and timber.
   b. Disposal of all ties/timber removed from track during general tie replacement and track reconstruction at a certified and registered facility.
   c. The Contractor to obtain:

      i. Weight tickets from certified facility giving tie tonnage, trucker, truck number and date brought to the plant.
      ii. Corresponding truck tickets used by haulers to remove ties from project and transferred to certified facility.
      iii. Tickets from (a) and (b) must match and will be used to determine actual payment to the Contractor.

   d. Small pieces of removed ties will not be allowed to remain on the right-of-way. Pieces of ties may have to be picked up by hand and/or raked up to be loaded out for disposal.

PRODUCTION RATES

Scrap crossties and other wood products shall be removed from the right of way within five (5) working days of their removal from the track.

Piles of scrap crossties and other wood products are permitted at locations agreed upon between the Contractor and MCRR. Such staging piles must be removed within thirty (30) days of completion of the crosstie installation phase of this Contract.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Measurement and Payment of the work items included in this contract are defined under the bid items listed in Document B00420 Proposal. All costs associated with the work in accordance with the requirements specified under this Section shall be included in the bid price for the respective bid item.

Item 492.3 will be paid for at the Contract Lump Sum Price for Cleanup, Removal, and disposal of Wood Crossties, Scraps and Six Trees, which price shall include full compensation for all work performed under the task and shall include all labor, tools, equipment, materials, installation, testing, loading, transportation, maintenance, dismantling, removal, approvals, permits, and all incidental work necessary for the completion of the work.

Cleanup And Disposal of Defective Crossties and Wood Material will be measured by the TON and the quantity paid shall be the number of tons of disposed crossties and wood material as determined by the actual amount of defective crossties and wood material disposed from the tickets produced by a MassDOT/Mass DEP certified facility.

Work under this item shall be paid at the contract unit price per TON. No additional payment in excess of the contract price will be made without prior approval from MassDOT.

All other labor and material required to complete work within the ITEM 492.3 CLEANUP AND DISPOSAL OF DEFECTIVE CROSSTIES AND WOOD MATERIAL, including but not necessarily limited to, pickup of materials, disposal of materials, and maintaining the Work Area in a neat and orderly fashion, meeting all of the requirements of the ITEM 492.3 CLEANUP AND DISPOSAL OF DEFECTIVE CROSSTIES AND WOOD MATERIAL, shall be considered incidental to ITEM 492.3 CLEANUP AND DISPOSAL OF DEFECTIVE CROSSTIES AND WOOD MATERIAL.

ITEM 493.1 RISK ALLOWANCE ALLOWANCE
MISCELLANEOUS WORK AS DIRECTED BY THE ENGINEER

GENERAL

This section specifies miscellaneous work to be performed as directed by the Engineer. No work shall be performed that is not within the scope of this Project unless explicitly directed by the Engineer.

SUBMITTALS

Prior to commencement of any directed work, Contractor shall submit a cost proposal for all required labor, equipment, and materials to complete the work. Subsequent technical submittals may be required for proposed methodology, equipment, and materials to be used.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Payment under this item will be made at the contract unit price per ALLOWANCE under ITEM 493.1 MISCELLANEOUS WORK AS DIRECTED BY THE ENGINEER. No additional payment over the Contract Allowance amount will be made for any work that does not meet the requirements of this section.

ITEM 767.122 EROSION AND SEDIMENTATION CONTROL LUMP SUM

GENERAL

This Section specifies installing straw bales or compost filter tubes and silt fences for the control of erosion and sedimentation on site.

Straw bale siltation barrier shall consist of straw bales/silt fence or compost filter tubes as detailed in the Contract Documents.

This Section specifies installing turbidity curtain (staked floating siltation barrier) for the control of erosion and sedimentation on site. The type of turbidity curtain shall be determined by the manufacturer for the body of water the work is being performed in.

PRODUCT DELIVERY, STORAGE, AND HANDLING

The silt fence fabric shall be furnished with suitable wrapping for protection against moisture and extended ultraviolet exposure prior to placement.

Each roll of fabric or erosion control mat shall be labeled or tagged to provide product identification sufficient for field identification, as well as inventory and quality control purposes.

Each roll of fabric shall be stored in a manner that will protect them from the elements. If stored outdoors, they shall be elevated and protected with a waterproof cover.

Straw bales or compost filter tubes shall be stored in a manner that will protect them from the elements. If stored outdoors, they shall be elevated and protected with a waterproof cover.

Turbidity curtains shall be labeled or tagged to provide product identification sufficient for field identification.

MATERIALS AND EQUIPMENT

Compost Filter Tubes

The compost filter tubes shall be a minimum of twelve (12) inch compost filled tube of flexible netting material. It shall be a machine-produced tube containing a long term, wood fiber mulch compost that is certified weed free, by a manufacturer. Outer tube fabric shall be made of 100% biodegradable material (i.e. cotton, hemp, or jute) and shall have a knitted mesh with openings that allow for sufficient water flow and effective sediment capture.

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; no wood chips, bark chips and reprocessed wood products will be acceptable; material shall pass through a 2-inch sieve; and the C:N ratio shall be disregarded.

Tubes shall be tamped, but not trenched with good contract with soil. When reinforcement is necessary, tubes shall be stacked. Tubes shall be individually banded and staked for securing into the ground as shown on the Contract drawings.

Straw Bales

Straw bales shall be used if shown on the plans or when specified by Orders of Condition or other permit requirements.

Straw bales shall consist of straw for outdoor use banded with wire or nylon cord (minimum two bands per bale or equal per compost filter tube) and shall be staked for securing into the ground as shown on the Drawings.

Stakes for straw bales shall be standard steel pickets, 2 inch by 2 inch wood stakes, or approved equal. Straw bales shall be individually banded and staked into the ground.Silt fence shall consist of a self or wire supported geotextile silt fence with support posts

Sedimentation Fence

Materials and Installation shall be per Section 670.40 and 670.60 of the Standard Specifications and the following:

Fibers used in the manufacture of geotextiles, and the threads used in joining geotextiles by sewing, shall consist of long chain synthetic polymers composed of at least 85% by weight polyolefins, or polyesters.

Both the geotextile and threads shall be resistant to chemical attack, mildew, and rot.

Geotextiles shall conform to the following physical requirements in accordance with the acceptance criteria required by ASTM D4759. Values shown are minimum average roll values. Strength values are in the weaker principal direction.

1. Tensile Grab Strength: ASTM D4632; 90 pounds minimum.
2. Elongation at 50% Minimum Tensile Strength: ASTM D4632; 50% maximum for self-supported fences.
3. Permittivity: ASTM D4491; 0.0 10 per second minimum.
4. Apparent Opening Size (AOS): ASTM D4751; 0.84 millimeters maximum.
5. Ultraviolet Degradation: ASTM D4759; at 500 hours exposure, 70% strength retained for all cases.

Posts for Silt Fence: Wood, steel, or synthetic posts may be used. Posts shall have a minimum length of 30” plus burial depth, be of sufficient strength to resist damage during installation, and support applied loads.

Wire Support: 12-gauge wire supports at 6-inch maximum spacing each way shall be used when geotextile fabric is not strong enough to support applied loads as specified. Provide hog ring supports as detailed.

Prefabricated fence systems may be used provided they meet all of the above material requirements.

Turbidity Curtain

Barriers should be a bright color (yellow or "international" orange are recommended) that will attract the attention of nearby boaters.

The turbidity curtain fabric shall conform to the following minimum physical property requirements:

1. Thickness: 45 mils minimum
2. Weight
   a. Type I: 18 Oz./SY minimum
   b. Type II: 18 or 22 Oz./SY
   c. Type III: 22 Oz./SY minimum
3. Grab Tensile Strength: 300 lbs. minimum
4. Ultraviolet Inhibitor: must be included

Seams in the fabric shall be either vulcanized welded or sewn, and shall develop the full strength of the fabric.

Floatation devices shall be flexible, buoyant units contained in an individual floatation sleeve or collar attached to the curtain. Buoyancy provided by the floatation units shall be sufficient to support the weight of the curtain and maintain a freeboard of at least 3 inches above the water surface level.

Load lines must be fabricated into the bottom of all floating turbidity curtains. Type II and Type III must have load lines also fabricated into the top of the fabric. The top load line shall consist of woven webbing or vinyl-sheathed steel cable and shall have minimum breaking strength of 9,800 pounds. The supplemental (bottom) load line shall consist of a chain incorporated into the bottom hem of the curtain of sufficient weight to serve as ballast to hold the curtain in a vertical position. Additional anchorage shall be provided as necessary. The load lines shall have suitable connecting devices to maintain full breaking strength in connecting to load lines in adjacent sections.

External anchors may consist of wooden or metal stakes (2 inch x 4 inch or 2 1/2 – inch minimum diameter wood or 1.33 pounds/linear foot steel) when Type I Installation is used; when Type II or Type III installation are used, bottom anchors should be used.

Bottom anchors must be sufficient to hold the curtain in the same position relative to the bottom of the watercourse without interfering with the action of the curtain. The anchor may dig into the bottom (grappling hook, plow or fluke-type) or may be weighted (mushroom type) and should be attached to a floating anchor buoy via an anchor line. The anchor line will then run from the buoy to the top load line of the curtain. When used with Type III installation, these lines must contain enough slack to allow the buoy and curtain to float freely with tidal changes without pulling the buoy or curtain down and must be checked regularly to make sure they do not become entangled with debris. As previously noted, anchor spacing will vary with current velocity and potential

wind and wave action. Manufacture's recommendations should be followed. Follow the manufactures orientation of the external anchors and anchor buoys for tidal installation.

EXECUTION

Temporary Erosion Control

Method of stripping vegetation shall be such as to minimize erosion. Fills shall be placed and compacted in such a manner that soil sliding and erosion is minimized. Grading shall be done in such a manner as not to divert water on to the property adjoining the construction site without expressed written permission of the landowner and the local Conservation Commission. If Contractor fails to employ adequate and acceptable erosion control techniques during construction, Engineer may order a suspension of the work until implementation of satisfactory techniques are agreed upon and demonstrated, and Contractor shall have no claim for damages or time extension resulting from such delays.

Staked straw bales/silt fences and/or compost filter tubes shall be installed at the following locations:

1. Toe of embankment construction.
2. Toe of abutments and retaining walls.
3. Across construction ditches prior to entry into any drainage system or waterway.
4. Toe of temporary earthwork stockpiles.
5. Other locations shown on the Contract Drawings or designated by Engineer.

Abut straw bales or overlap compost filter tubes to form a continuous barrier. Silt Fence shall be entrenched 4" minimum as shown in the Drawings. Secure straw bales or compost filter tubes in place with two stakes per bale.

Silt fence construction shall be adequate to handle the stress from sediment loading. Geotextile at the bottom of the fence shall be buried a minimum of six (6) inches deep in a trench as shown on the drawings so that no flow can pass under the barrier. Trench shall be backfilled and the soil compacted over the geotextile. Fence height shall be as shown on the drawings, but in no case shall exceed thirty (30) inches above ground surface. Geotextile shall be spliced together only at a support post with a minimum six (6) inch overlap. Posts shall be spaced as indicated on the Contract Drawings. Where a twelve (12) inch depth is not possible, the post shall be adequately secured to prevent overturning of the fence due to sediment or wind loading.

Sediment controls shall be in place prior to any soil disturbing activities including, but not limited to clearing and grubbing, earthwork, dewatering, and excavation.

Any disturbed soils shall be stabilized, either permanently or temporarily, within two (2) weeks of disturbance.

Staked straw bales or compost filter tubes shall be placed at the toe of ballast in all excavation areas adjacent to existing track. Straw bales or compost filter tubes in these areas shall be inspected daily for any defects and repaired immediately.

Turbidity Curtain Installation

In the calm water of lakes or ponds (Type I installation) it is usually sufficient to merely set the curtain end stakes or anchor points (using anchor buoys if bottom anchors are employed), then tow the curtain in the furled condition out and attach it to these stakes or anchor points. Following this, any additional stakes or

buoyed anchors required to maintain the desired location of the curtain may be set and these anchor points made fast to the curtain. Only then, the furling lines should be cut to the curtain skirt drop.

In rivers or in other moving water (Type II or Type III installations) it is important to set all the curtain anchor points. Care must be taken to ensure that anchor points are of sufficient holding power to retain the curtain under the existing current conditions, prior to putting the furled curtain into the water. Again, anchor buoys should be employed on all anchors to prevent the current from submerging the flotation at the anchor points. If the moving water into which the curtain is being installed is tidal and will subject the curtain to currents in both directions as the tide changes, it is important to provide anchors on both sides of the curtain for two reasons:

1. Curtain movement will be minimized during tidal current reversals.
2. The curtain will not overrun the anchors and pull them out when the tide reverses.

When the anchors are secure, the furled curtain should be secured to the upstream anchor point and then sequentially attached to each next downstream anchor point until the entire curtain is in position. At this point, and before unfurling, the "lay" of the curtain should be assessed and any necessary adjustments made to the anchors. Finally, when the location is ascertained to be as desired, the furling lines should be cut to allow the skirt to drop.

Always attach anchor lines to the floatation device, not to the bottom of the curtain. The anchoring line attached to the floatation device on the downstream side will provide support for the curtain. Attaching the anchors to the bottom of the curtain could cause premature failure of the curtain due to the stresses imparted on the middle section of the curtain.

There is an exception to the rule that turbidity curtains should not be installed across channel flows; it occurs when there is a danger of creating a silt build-up in the middle of a watercourse, thereby blocking access or creating a sand bar. Curtains have been used effectively in large areas of moving water by forming a very long-sided, sharp "V" to deflect clean water around a work site, confine a large part of the silt-laden water to the work area inside the "V" and direct much of the silt towards the shoreline. Care must be taken, however, not to install the curtain perpendicular to the water current.

Contractor shall follow the manufacture's typical installation layout for the type of curtain.

MAINTENANCE AND CLEANUP

Maintenance of the sediment control barrier shall be per section 670.60 of the Standard Specifications.

Maintain the integrity of staked straw bale/silt fence barriers and compost filter tubes as long as they are necessary to contain sediment runoff. Promptly repair or replace ineffective straw bale/silt fence barriers and compost filter tubes while the barrier is still necessary.

Inspect all temporary straw bale/silt fence barriers and compost filter tubes immediately after each rainfall and at least daily during prolonged rainfall. Any deficiencies shall be immediately corrected. Make a daily review of the location of straw bale/silt fence barriers and compost filter tubes in areas where construction activities have changed the natural contour and drainage runoff to ensure that the straw bale/silt fence barriers and compost filter tubes are properly located for effectiveness. Where deficiencies exist, additional straw bale/silt fence barriers or compost filter tubes and erosion control measures shall be installed as directed by Engineer.

Sediment deposits shall either be removed when the deposit reaches approximately one-half of the height of the straw bale/silt fence barrier or compost filter tube, or a second straw bale/silt fence barrier or compost filter tube shall be installed as directed by Engineer. Sediment shall be removed and disposed of periodically from behind straw bale/silt fence barriers and compost filter tubes. In no case shall the accumulated sediment be allowed to rise above the mid height of the straw bale or compost filter tube. All sediment shall be disposed of in an approved manner.

Turbidity curtain maintenance:

1. Contractor shall be responsible for maintenance of the turbidity curtain for the duration of the project in order to ensure the continuous protection of the watercourse.
2. Should repairs to the geotextile fabric become necessary, there are normally repair kits available from the manufacturers; manufacture's instruction must be followed to ensure the adequacy of the repair.

DISMANTLING AND REMOVAL

Barriers shall be dismantled and/or removed, as required, when construction has been completed and upslope areas have been permanently stabilized and after receiving permission to do so from Engineer.

Upon removal, remove and dispose of any excess silt accumulations, dress the area to give a pleasing appearance, and vegetate all bare areas with approved seed mix.

Straw bales, compost filter tubes, silt fences, and stakes will remain the property of Contractor, may be re-used at other locations provided the materials meet the requirements, and shall be removed and disposed of upon acceptance of the respective work unless directed otherwise by Engineer.

Turbidity curtain removal:

1. Care should be taken to protect the skirt from damage as the turbidity curtain is dragged from the water.
2. The site selected to bring the curtain ashore should be free of sharp rocks, broken concrete, debris, etc. so as to minimize damage when hauling the curtain over the area.
3. If the curtain has a deep skirt, it can be further protected by running a small boat along its length with a crew installing furling lines before attempting to remove the curtain from the water.
4. When the curtain is no longer required as determined by the inspector, the curtain and related components shall be removed is such a manner as to minimize turbidity. Remaining sediment shall be sufficiently settled before removing the curtain. Sediment may be removed and the original depth (or plan elevation) restored. Any spoils must be taken to upland area and be stabilized.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

The work described for Erosion and Sedimentation Control under this section shall be paid under Item 767.122 at the Contract Lump Sum price and shall include all labor, tools, equipment, materials, testing, loading, transportation, maintenance, dismantling, removal, restoration of soil, approvals, permits, and all incidental work necessary for the completion of the work.

Barriers that have been driven over or otherwise damaged by construction activities shall be repaired or replaced as directed by Engineer at Contractor's expense.

ITEM 983.11 MODIFIED RIPRAP – ARMORED STONE TON

GENERAL

The work to be performed under Item 983.11 of this section shall conform to the relevant provisions of Subsection 150 of the Standard Specifications and the following:

This work shall consist of the placement of armored riprap stone revetment along embankment slope and rip rap stone at culvert pipe ends to form splash pads and shall consist of a protective covering of angular shaped stones laid on slopes in front of and around pipe ends to ensure protection of the pipe ends, in accordance with these Special Provisions and in close conformity with the lines and grades shown on the Contract Plans. Same stone shall be used to install temporary sump splash pads for dewatering in accordance with the Contract Plans.

For the stone revetment, Contractor shall install stone revetment protection along the restored embankment toe of slope line; during low tide conditions only, per Contract Documents to the limits indicated by the revetment limits indicated on the Contract Plans and as directed by the Engineer and per acceptance of the on-site Professional Wetland Scientist.

MATERIALS

Riprap shall conform to MassDOT Material Specification M2.02.0. Riprap stone sizes to be installed are to exactly match those sizes; by location, as shown and labelled on the Contract Plan drawings and in the permit documents.

Stone for pipe ends shall be sound, durable rock which is angular in shape. Rounded stones, boulders, sandstone or similar stone or relatively thin slabs will not be acceptable. Each stone shall weigh not less than 50 pounds and not more than 125 pounds and at least 75% of the volume shall consist of stones weighing not less than 75 pounds each. The remainder of the stones shall be so graded that when placed with the larger stones the entire mass will be compact.

EXECUTION - CONSTRUCTION METHODS

The stone shall be placed upon a properly prepared subgrade in a manner which will produce a reasonably well graded mass of stone with a minimum practicable percentage of voids, to the lines and grades shown on the plans and as directed by Engineer.

Each stone shall be carefully placed by hand, normal to the slope and firmly bedded thereon. The larger stones shall be placed directly at the drainage end to prevent erosion and displacement. The remainder of the stones shall be so graded that when placed with the larger stones, the entire mass will be compact with a minimum percentage of voids and minimum thickness of 6 inches

It is the intent of this specification to produce a fairly compact stone splash pad protection in which all sizes of material are placed in their proper proportions. Hand placing or rearranging of individual stones by mechanical equipment may be required to the extent necessary to secure the results specified.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 983.11. Modified Riprap – Armored Stone revetment for slope embankment and at culvert pipe ends and splash pads shall be paid under Item 983.11 at the Contract Unit Price per TON up to 2555 TON of armored stone Riprap. The work described under this section shall include all labor, tools, equipment, materials, testing, loading, transportation, access, approvals, permits and incidental work necessary for the completion of the work.

ITEM 991.1 CONTROL OF WATER – MP 63.22 LUMP SUM

GENERAL

The work to be performed under Item 991.1 of this section shall conform to the relevant provisions of Subsection 140 of the standard Specifications and the following:

The work shall consist of the installation of a temporary dewatering system as needed to maintain a work area that will accommodate the specified construction in a dry condition, isolating construction activities from contact with water flow and to prevent impacts on water quality from the construction work, as well as properly treating and discharging sediment-laden water.

The scope of work shall include dewatering activities for the construction area, as needed to perform all proposed work as specified.

DEWATERING PERFORMANCE

Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of ground water and permit stream restoration work and excavation and construction of culverts to proceed on stable subgrades. Contractor shall coordinate dewatering activities with project phasing plans provided as part of the construction documents.

1. Design dewatering system, including comprehensive engineering analysis by a qualified Professional Engineer registered in the Commonwealth of Massachusetts. Contractor shall submit a Water Control/Management Plan to describe the methods, equipment, and operation to collect, store and discharge water from distributed work areas during construction. The plan shall include specific provisions for the prevention of silt discharged beyond the limits of the work area during normal and storm flows.
2. Continuously monitor and maintain dewatering operations to ensure erosion control, stability of excavations and constructed slopes, that excavation does not flood, and that damage to subgrades and permanent structures is prevented.
3. Prevent surface water from entering excavations by grading, dikes, or other means.
4. Accomplish dewatering without damaging site improvements adjacent to excavation.
5. Remove dewatering system when no longer required for construction.

DESIGN SUBMITTAL

Delegated-Design Submittal: For dewatering system indicated to comply with performance requirements and design criteria, include in the Water Control/Management Plan analysis data signed and sealed by the qualified Professional Engineer responsible for their preparation.

Contractor shall submit a detailed plan of temporary culvert flow dewatering, and erosion/sedimentation controls for approval prior to the start of any work.

INSTALLATION

Protect structures, utilities, track, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards sometimes created by dewatering operations.

1. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding site and surrounding area.
2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.
3. Provide temporary grading to facilitate dewatering and control of surface water.
4. Monitor dewatering systems continuously.
5. Promptly repair damages to adjacent facilities caused by dewatering.

Install coffer dams on the inlet and outlet ends of the existing culvert in accordance with the contract plans and approved contractor submitted dewatering work plan.

Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.

1. Space well points or wells at intervals required to provide sufficient dewatering.
2. Use filters or other means to prevent pumping of fine sands or silts from the subsurface.
3. Before excavating below ground-water level, place system into operation to lower water to one foot below the excavation unless otherwise specified. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed or until dewatering is no longer required.
4. Provide an adequate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom of foundation excavation.
5. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.
6. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water and sediment in a manner that avoids inconvenience to others. Provide sumps, sedimentation tanks or filter bags, and other flow-control devices as required by authorities having jurisdiction.
7. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore the site, damaged structures and foundation soils at no additional expense to Owner.

EROSION AND POLLUTION CONTROL

Contractor shall install erosion and sediment control devices, per the plans and specifications, prior to installation of water diverting measures. The Water Control/Management Plan submitted by Contractor shall include erosion and sedimentation control provisions to control diverted or collected water to minimize impacts outside the work area. Measures shall be taken to divert runoff from entering the project area. At the discretion of Engineer, Contractor shall install a

turbidity curtain at the upstream and downstream end of the project stream segment in order to contain sediment that may result from construction operations.

All erosion and sediment control devices shall be properly maintained and repaired or replaced, as necessary. Removal of water from the construction site shall be accomplished in accordance with local and state regulations and in such a manner that erosion and the transmission of sediment and other pollutants are minimized. To avoid contamination and compaction, equipment shall not enter the natural stream bed. Diverted water shall be drained through a sediment filtering bag device located such that water drains back into the channel below the downstream cofferdam.

REMOVAL OF TEMPORARY WORKS

After the temporary works have served their purposes, Contractor shall remove them or level and grade them to the extent required to present a slight appearance and to prevent any obstruction of the flow of water or any other interference with the operation of or access to the permanent works. The downstream diversion shall be removed prior to accepting flows.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 991.1 will be paid for at the Contract Lump Sum Price for Control of Water, which price shall include full compensation for and shall include all labor, tools, equipment, materials, installation, testing, loading, transportation, maintenance, dismantling, removal, restoration of soil, approvals, permits, for any temporary water barriers, including cofferdams and/or sandbagging, or other diverting systems or material, filter fences, sedimentation/retention basins, and all incidental work necessary for the completion of the work.

DOCUMENT A00803

DRAWINGS AND SKETCHES

Document A00803 Drawings and Sketches Posted Separately on COMMBUYS

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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: _____

Project File Number: 614254

Contract Number: 132590

Project Description: Cape Main Culvert Replacement at MP 63.22

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This signed form shall be emailed to the Project Manager at the MassDOT -Rail and Transit Division at the following email address:

Kevin McGrath
Kevin.Mcgrath@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 A00830

PERMIT APPLICATIONS

SECTION 401 MASSDEP WATER QUALITY CERTIFICATION (WQC) – Page 3

SECTION 404 USACE PRE-CONSTRUCTION NOTIFICATION (PCN) – Page 85

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Enter your transmittal number → X289061 (Transmittal Number)

Your unique Transmittal Number can be accessed online:
http://www.mass.gov/eea/agencies/massdep/service/approvals/transmittal-form-for-payment.html

Massachusetts Department of Environmental Protection

Transmittal Form for Permit Application and Payment

1. Please type or print. A separate Transmittal Form must be completed for each permit application.

2. Make your check payable to the Commonwealth of Massachusetts and mail it with a copy of this form to: MassDEP, P.O. Box 4062, Boston, MA 02211.

3. Three copies of this form will be needed.

Copy 1 - the original must accompany your permit application. **Copy 2** must accompany your fee payment. **Copy 3** should be retained for your records

4. Both fee-paying and exempt applicants must mail a copy of this transmittal form to:

MassDEP
P.O. Box 4062
Boston, MA
02211

*** Note:**
For BWSC Permits, enter the LSP.

A. Permit Information

BRP WW 10	Major Project Certification
1. Permit Code: 4 to 7 character code from permit instructions	2. Name of Permit Category

Culvert Replacement Project
3. Type of Project or Activity

B. Applicant Information – Firm or Individual

Massachusetts Coastal Railroad
1. Name of Firm - Or, if party needing this approval is an individual enter name below:

Podgurski	Christopher	
2. **Last Name** of Individual	3. **First Name** of Individual	4. MI

12 Harding Street, Unit 202
5. Street Address

Lakeville	MA	02347	781.828.0576	
6. City/Town	7. State	8. Zip Code	9. Telephone #	10. Ext. #

Christopher Podgurski	cpodgurski@masscoastal.com
11. Contact Person	12. e-mail address

C. Facility, Site or Individual Requiring Approval

Cape Main Railroad Line MP 63.22
1. Name of Facility, Site Or Individual

N/A
2. Street Address

Sandwich	MA	02537	N/A	
3. City/Town	4. State	5. Zip Code	6. Telephone #	7. Ext. #

8. DEP Facility Number (if Known)	9. Federal I.D. Number (if Known)	10. BWSC Tracking # (if Known)

D. Application Prepared by (if different from Section B)*

GZA GeoEnvironmental Inc
1. Name of Firm Or Individual

249 Vanderbilt Ave
2. Address

Norwood	MA	02062	781.278.5852	
3. City/Town	4. State	5. Zip Code	6. Telephone #	7. Ext. #

Kimberly Degutis	
8. Contact Person	9. LSP Number (BWSC Permits only)

E. Permit - Project Coordination

1. Is this project subject to MEPA review? ☐ yes ☒ no
   If yes, enter the project's EOEA file number - assigned when an Environmental Notification Form is submitted to the MEPA unit:

EOEA File Number

F. Amount Due

DEP Use Only

Permit No:

Rec'd Date:

Reviewer:

Special Provisions:

1. ☒ **Fee** Exempt (city, town or municipal housing authority)(state agency if fee is $100 or less).
   There are no fee exemptions for BWSC permits, regardless of applicant status.
2. ☐ Hardship Request - payment extensions according to 310 CMR 4.04(3)(c).
3. ☐ Alternative Schedule Project (according to 310 CMR 4.05 and 4.10).
4. ☐ Homeowner (according to 310 CMR 4.02).

	Exempt	
Check Number	Dollar Amount	Date



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F: 781.278.5702
www.gza.com

SECTION 401 WATER QUALITY CERTIFICATION APPLICATION

CULVERT REPLACMENT PROJECT AT CAPE MAIN MILE POST 63.22 Sandwich, Massachusetts

June 2022
File No. 01.0174521.05



PREPARED FOR:
Massachusetts Coastal Railroad

GZA GeoEnvironmental, Inc.
249 Vanderbilt Avenue | Norwood, MA 02062
781-278-5700

Offices Nationwide
www.gza.com

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Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wetlands and Waterways

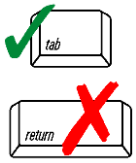
BRP WW 10 Major Project Certification
BRP WW 11 Minor Project Certification

401 water Quality Certification for Fill and excavation Projects in waters and Wetlands

X289061
Transmittal Number #

A. Applicant Information

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



1. Which permit category are you applying for?

☒ BRP WW 10 ☐ BRP WW 11

2. Applicant/Owner:

Massachusetts Coastal Railroad
Name

12 Harding Street, Unit 202
Address

Lakeville | MA | 02347
City/Town | State | Zip Code

Chrisopher Podgurski
Contact Person

	781.828.0576
Telephone (home)	(work)

3. Authorized Agent

GZA GeoEnvironmental Inc
Name

249 Vanderbilt Ave
Address

Norwood | MA | 02062
City/Town | State | Zip Code

Kimberly Degutis
Contact Person

	781.278.5852
Telephone (home)	(work)

BRP WW 10 Major Project Certification
BRP WW 11 Minor Project Certification

401 water Quality Certification for Fill and excavation Projects in waters and Wetlands

X289061
Transmittal Number #

B. Project Information

1. Project Location:

Cape Main Line MP 63.22
Address

Sandwich | MA | 02537
City/Town | State | Zip Code

Unnamed Tributary to Old Harbor Creek
Nearest or Adjacent Waterbody

2. Project Name (if any):

Culvert Replacement at Cape Main Line MP 63.22

3. a. Describe project purpose:

The purpose of the Project is to replace the existing, partially- failed 24 x 30-inch stone box culvert with a new 48-inch reinforced concrete pipe to provide safe passage for trains across the culvert area. The replacement of the existing culvert is necessary to avoid a serious and immediate threat to the health and safety of the citizens of the Commonwealth, significant loss of railroad property, and severe, deleterious impacts to the environment.

b. Is the project

☒ water-dependent ☐ non water-dependent

B. Project Information (cont.)

4. a. provide a brief description of the proposed project (See Application Instructions and include a copy of the Notice of intent, if any.):

The Cape Main MP 63.22 Culvert Replacement Project involves the replacement of an existing 24 x 30-inch stone box culvert with a 48-inch reinforced concrete pipe with precast concrete wingwalls and riprap velocity dissipation pads on the MassDOT Rail owned property in the Town of Sandwich. Armor stone is proposed on the railroad embankment within the immediate vicinity of the culvert location to provide slope stability and protection during extreme high tide, coastal storm and other wave generating events.

b. Notice of Intent File number (if any): N/A

5. Identify the loss in square feet of each type of resource area (see Application Instructions for additional information.):

a. Bordering vegetated wetland: 0 square feet

b. Isolated vegetated wetland: 0 square feet

c. Land under water: 234 square feet

d. Total cumulative loss of a. + b. + c.: 234 square feet

e. Salt marsh: 17 square feet

6. a. Will the proposed project occur in any wetlands or waters designated as "Outstanding Resource Waters"?

☐ Yes ☒ No

If yes has public notice been published in the Environmental Monitor?

☒ Yes ☐ No 6/15/2022 Date of Publication

b. Is this project a subdivision or any part of a subdivision? ☐ Yes ☒ No

c. Is the project categorically subject to MEPA? ☐ Yes ☒ No

If yes, has final action been taken? ☐ Yes ☐ No

If yes, please include copy of MEPA certificate.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wetlands and Waterways

BRP WW 10 Major Project Certification
BRP WW 11 Minor Project Certification

401 water Quality Certification for Fill and excavation Projects in waters and Wetlands

X289061
Transmittal Number #

B. Project information (cont.)

7. Alternatives Analysis:

   As related to the project purpose, attach a detailed description of alternatives to the proposed project that were considered and why none are available that avoid adverse impacts to wetlands and waters.

   If no alternatives are available, describe how the activity will minimize or mitigate the adverse impacts to wetlands and waters.

   See application instructions for information required. Attach required documentation.

C. Additional Information

1. Is any of your proposed work exempt from the Massachusetts Wetlands Protection Act or taking place in a federal non-state wetland?

   ☐ Yes ☒ No

   If yes, see Application Instructions for additional information needed.

2. Public notice to a newspaper of general circulation within the area of the proposed activity must be published within 10 days of the date of this application. Is proof of public notice submitted?

   ☒ Yes ☐ No

   (See Application Instructions for additional information)

D. Certification

Application is hereby made for water quality certification.

"I certify that I am familiar with the work proposed and that to the best of my knowledge and belief the information contained in this application is true, complete, and accurate"

Applicant's Signature

Print name

Agent's Signature

Kimberly Degutis
Print Name

Date

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1.0 INTRODUCTION

On behalf of the Massachusetts Coastal Railroad (MCRR), GZA GeoEnvironmental Inc. (GZA) is requesting a permit authorization to impact Waters of the United States. The Cape Main Mile Post (MP) 63.22 Culvert Replacement Project (Project) involves the replacement of an existing 24 x 30-inch box culvert with a 48-inch reinforced concrete pipe with precast concrete wingwalls on the Massachusetts Department of Rail and Transit (MassDOT) owned Cape Main Line in the Town of Sandwich (see **Figure 1 – Site Locus**). Armor stone is proposed on the railroad embankment within the immediate vicinity of the culvert location to provide slope stability and protection during extreme high tides, coastal storm and other wave generating events. Replacement work will consist of the establishment of a support of excavation and water bypass, removal of the embankment overburden, removal of the existing culvert, preparation of the substrate, placement of the proposed 48-inch culvert, installation of precast concrete wingwalls, placement of 5-foot by 5-foot riprap pads on the inlet and outlet sides, re-establishment of the embankment and overburden, restoration of the track and ties in the Project area.

Allowing the culvert replacement project offers tangible public benefit in providing a safe, reliable train crossing through sensitive resource areas. In addition, MCRR proposes to provide salt marsh restoration above and beyond what is required for proposed impacts due to replacement of the culvert. As part of this restoration work, MCRR will address an existing erosion issue that currently occurs on the upstream side of the culvert.

The following narrative provides a detailed description of the existing conditions and the proposed Project, as well as a description of the resource areas and potential impacts to those resources that may result from this Project. Please note that the project is being completed on land owned by MassDOT and, as an Agency of the Commonwealth, MassDOT is exempt from the abutter notification requirements of the Wetlands Protection Act, filing fees, peer review fees and local bylaws.

The Right of Way and bridge is owned by MassDOT Rail & Transit. As a MassDOT-owned bridge, the replacement of said structure qualifies as a bridge exempt project under the Transportation Bond Bill. Therefore, this project is exempt from the Wetlands Protection Act (WPA), Chapter 91, and the Massachusetts Environmental Policy Act (MEPA).

1.1 PROJECT PURPOSE

The purpose of the Project is to replace the existing, partially-failed 24- by 30-inch stone box culvert with a new 48-inch reinforced concrete pipe to provide safe passage for trains across the culvert area. The swift replacement of the existing culvert is necessary to avoid a serious and immediate threat to the health and safety of the citizens of the Commonwealth, significant loss of railroad property, and severe, deleterious impacts to the environment. In addition, replacement of the culvert crossing maintains the hydraulic capacity of the existing crossing and continues to support anadromous fish passage of American Eel (*Anguilla rostrate*).

2.0 REGULATORY COMPLIANCE SUMMARY

Except as otherwise provided in 314 CMR 9.06(3), no discharge of dredged or fill material shall be permitted to certain waters and wetlands designated in the Massachusetts Surface Water Quality Standards (314 CMR 4.00) as Outstanding Resource Waters (ORWs), The exceptions are granted without a variance for certain eligible activities as listed in

314 CMR9.06 (3)(a) through (k) if MassDEP determines that the discharge of dredged or fill material may be permitted. The proposed project is an eligible activity as defined in 314 CMR 9.06 (3)(c), as follows:

(c) Maintenance, repair, replacement or reconstruction but not substantial enlargement of existing and lawfully located structures or facilities including buildings, roads, railways, utilities, dams, and coastal engineering structures;

The proposed project is also an eligible activity as defined in 314 CMR 9.06 (3)(k), as follows:

(k) Maintenance, repair, replacement, or reconstruction of structures or facilities for water dependent uses. In addition, the enlargement of structures or facilities for water-dependent uses is allowed only in following limited circumstances:

1. *in an Outstanding Resource Water that is designated for purposes other than a public water supply; or*

   The project is designed to facilitate tidally influenced flow equalization between two wetland areas under an existing railroad embankment and is not affiliated with a public water supply.

2. *in an Outstanding Resource Water that is located within an Area of Critical Environmental Concern provided that if there is a resource management plan for the ACEC that has been adopted by the municipality and approved by the Secretary, the Department determines that: the enlargement of structures or facilities is consistent with said plan and the fill or structure associated with the enlargement activity is located entirely within an area of previously filled tidelands.*

   The culvert replacement project at Cape Main MP 63.22 is not located within an Area of Critical Environmental Concern (ACEC).

The project was determined to be subject to federal, state and local environmental regulations. Below is a list of permits or approvals that MCRR is in the process of receiving.

2.1 MASSACHUSETTS WETLANDS PROTECTION ACT – FOOTPRINT BRIDGE EXEMPTION

According to c. 79 § 24 of the (Massachusetts) Acts of 2014, the project qualifies for using the Footprint Bridge Exemption. As stated in the cited regulation, the ""bridge" shall include any structure spanning and providing passage over water, railroad right-of-way, public or private way, other vehicular facility or other area." As the culvert meets the definition of a bridge, the exemption is applicable and eliminates the need for the review under Massachusetts Environmental Policy Act, Wetlands Protection Act and Waterways Regulations (Chapter 91).

2.2 CLEAN WATER ACT SECTION 404

A request for a Massachusetts General Permit Pre-Construction Notice for Activity #10 (Linear Transportation Projects Including Stream Crossings) and Activity #14 (Temporary Construction, Access and Dewatering) is being applied for by MCRR for the proposed project. Authorization by the U.S. Army Corps of Engineers is anticipated in July 2022.

2.3 SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT

In accordance with this request for Section 404 authorization, MCRR is coordinating with the State Historic Preservation Officer (SHPO), the Board of Underwater Archeological Resources (BUAR), and appropriate Tribal Historic Preservation Officers (THPO).

2.4 ENDANGERED SPECIES ACT OF 1973

The proposed culvert replacement project is not located within mapped Natural Heritage & Endangered Species Program (NHESP) Estimated or Priority Habitat. Priority Habitat is the extent of habitat for state-listed rare species, both plants and animals. Estimated Habitat is a sub-set of the Priority Habitat and is the geographical extent of habitat of state-listed rare wetlands wildlife. Mapped Priority habitat exists to the northwest of the project location, however the limit of work for this project will be outside of the mapped habitat area. The project area and NHESP data layers are depicted within **Appendix A - Existing Conditions Figures.**

In addition, a search conducted of the U.S. Fish and Wildlife (USFWS) Information for Planning and Conservation (IPaC) database on April 28, 2022 listed two birds, two plants and 20 migratory birds as potentially present within the project limits[1]. A copy of the IPaC report is included under **Appendix D**. The listed species identified in the IPaC report are summarized below in Table 1.

Table 1 – Potential Federally-Listed Protected Species within the Project Area

Scientific Name	Common Name	Status
Myotis septentrionalis	Northern Long-Eared Bat	Federally Threatened
Calidris canutus rufa	Red Knot	Federally Threatened
Schwalbea americana	American Chaffseed	Federally Endangered
Agalinis acuta	Sandplain Gerardia	Federally Endangered

Northern long-eared bat (NLEB) is a federally listed species (threatened) that is known to occur within the project limits. While Designated Critical Habitat for the NLEB has been defined, specific habitat that may be used by the bats are protected under the 4(d) rule of the Endangered Species Act if tree removal is required. Specifically:

> ***"Incidental take resulting from tree removal is prohibited if: 1) Occurs within 0.25-mile radius of known northern long-eared bat hibernacula or 2) cuts or destroys known occupied maternity roost trees, or any other trees within a 150-foot radius from the known maternity tree during the pup season (June 1 through July 31)."***

For the NLEB, potential habitat includes known hibernacula (e.g. caves or mines) and maternity or roost trees that include hardwood specimens greater than 3-inch diameter breast height (DBH) with crevices or shaggy bark capable of providing shelter for the bats. Large dead snags are also considered resting habitat.

A review of the Massachusetts Division of Fisheries and Wildlife's NLEB page[2] with interactive habitat map indicated no mapped hibernacula are located within 0.25 miles of the project location and no mapped maternity roost trees are mapped within 150-feet of the project location. In addition, a limited habitat assessment was conducted within the project limits. No trees >3" DBH were identified within the project limits that may be permanently impacted by project construction.

[1] Information for Planning and Consultation." IPaC, U.S. Fish and Wildlife Service, 28 April 2022, ecos.fws.gov/ipac/project/GORHKJ2CYJHJVDDQLDJMYGHDRE/resources.

[2] MassWildlife's Northern Long Eared Bat information page with interactive habitat identification map, accessed 28 April 2022: https://www.mass.gov/service-details/the-northern-long-eared-bat

Given the limited nature of required, selective tree and shrub clearing to access the project work zone, project activities are not anticipated to affect neither the NLEB nor any migratory birds protected under the Migratory Bird Treaty Act or identified on the USFWS Birds of Conservation Concern (BCC) list (see **Appendix D – USFWS IPaC Report**).

American chaffseed (*Schwalbea americana*) is a Federally listed (endangered) hemiparasitic plant species that is known to potentially occur on the Cape Cod peninsula. The American chaffseed requires frequent fire or understory removal to persist. According to the USFWS species account page[3], historically this species occurred along the coast from Massachusetts to Louisiana in open grass-sedge systems in moist acidic sandy loams or sandy peat loams. USFWS further states that American chaffseed likely "existed on savannas and pinelands throughout the coastal plain and on sandstone knobs and plains inland where frequent, naturally occurring fires maintained these sub-climax communities". The project site does not contain habitat likely to support American chaffseed, therefore the species is unlikely to occur within the project limits.

Sandplain gerardia (*Agalinis acuta*) is a Federally listed (endangered) hemiparasitic plant that requires exposed mineral soil in close proximity to little bluestem (*Schizachyrium scoparium*) and other native grasses. It inhabits dry, sandy, poor-nutrient soils in sandplain and serpentine sites within 10-miles of the coast[4]. The project site does not contain habitat likely to support Sandplain gerardia, therefore the species is unlikely to occur within the project limits.

An informal consultation using the IPaC determination key for the revised February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO). The USFWS issued a "no effect" determination for project actions and the project does not require further consultation with the USFWS. See **Appendix D - USFWS IPaC Report and Consistency Determination** for the species list and consistency letter.

Necessary clearing, grubbing and/or selective removal of trees will be conducted by hand at the direction of the Engineer. Removal of vegetation will be limited to areas of construction access and areas required for safe excavation of embankment soils to access the existing culvert and work area.

2.5 COASTAL ZONE MANAGEMENT CONSISTENCY DETERMINATION

The Project is located within the areas under the jurisdiction of the Federal Coastal Zone Management Act. The Project will require a federal consistency review.

2.6 OTHER FEDERAL JURISDICTIONAL REQUIREMENTS

The Project will not impact federal lands or wetlands and waterbodies associated with or designated as a National Wild and Scenic River.

A portion of the project limits are located within the John H. Chafee Coastal Barrier Resources System, within the Town Neck Otherwise Protected Area (MA-14P). The project is not Federally funded and therefore does not require consultation with the USFWS.

[3] USFWS Species Account for American chaffseed, located at: https://www.fws.gov/southeast/wildlife/plants/american-chaffseed/

[4] https://www.biologicaldiversity.org/campaigns/esa_works/profile_pages/SandplainGerardia.html

3.0 EXISTING CONDITIONS

A field inspection was performed in Sandwich Massachusetts on April 2021 to observe an embankment issue reported by MassCoastal Railroad (MCRR) and to document the conditions and recommendation for addressing the existing 24-inch square drainage stone box culvert crossing under the track at MP 63.22 on the Cape Main Line. According to MCRR, this location has repeatedly exhibited a cone-shaped sinkhole which is a reoccurring condition being filled with stone ballast when needed. It is suspected to be caused by the loss of embankment soil fines settling down through void cracks in the culvert stones below it during combinations of extremely high moon tides with storm events resulting in high stage tidal surge at this location.

A record video scan as well as a physical crawl through inspection of the entire length of this culvert was performed by Bass Ready Inc in July 2021. These efforts verified that there is a drop down in roof stone and also that the numerous joint gaps between the supporting sidewall stone blocks and this and other roof stones are allowing the pumping and drawdown of soil fines within the embankment just above the culvert wall and roof stones likely with every extreme rise and fall of the tidal storm surge of a high intensity or greater. At this milepost 63.22 stone box culvert, it was further observed that at the east bayside end of this culvert, the end of this culvert is exposed to surge impacts with rising tidal waters swirling across the opening as evidenced by the flattened eel grass patterns in front of the culvert opening. Also observed was embankment stone ballast washed out and stacking in the inland side of the culvert due to high force tidal surge action.

This culvert itself; based on visual observation, is open and clear without any large blockages and is capable of passing tidal storm water volumes in both flow directions as an equalizer structure for the length of this stone box culvert. Despite this fact, it is jeopardizing the integrity of the railroad embankment. This culvert at MP 63.22 is prone to the same problematic issues as was the culvert that was ultimately replaced at MP 66.14 in April of 2020. Given the similar vulnerable conditions, it is therefore recommended that replacement of this culvert is prioritized. The ongoing, critical structural failings of this culvert at MP 63.22 as evidenced by the dropped ceiling stone and gap ridden walls which continue to be vulnerable to the detrimental effects of long-term tidal rise action are resulting in embankment and track settlement and it needs to be removed and replaced

Although passenger services are only seasonally scheduled for the railroad, the Cape Main Line supports regular daily freight train traffic and equipment moves. The failure of the embankment and railroad track due to the culvert could result in a catastrophic event, such as a train derailment, potentially resulting in the loss of lives (train operators, neighbors); loss of property; and loss of important commercial services to the communities of Cape Cod and southeastern Massachusetts. In the event of an accident, adjacent sensitive resource areas would also be negatively impacted by the release of hazardous and non-hazardous materials associated with the train and its cargo.

The Cape Main Line operates both daily freight service and seasonal passenger trains. In addition, it offers the CapeFlyer service on weekends and holidays from Memorial Day to Labor Day. If not repaired, the current conditions will continue to deteriorate to the point of disrupting service.

3.1 WETLANDS PROTECTION ACT RESOURCE AREAS

Wetlands Protection Act Resource Areas identified within the project limits include:

- Salt Marsh
- Land Under Water Bodies and Waterways (LUW)

3.1.1 Salt Marshes

Wetlands Protection Act Regulations (310 CMR 10.32) define Salt Marshes as "a coastal wetland that extends landward up to the highest high tide line, that is, the highest spring tide of the year, and is characterized by plants that are well adapted to or prefer living in, saline soils. Dominant plants within salt marshes typically include salt meadow cordgrass (*Spartina patens*) and/or salt marsh cordgrass (*Spartina alterniflora*), but may also include, without limitation, spike grass (*Distichlis spicata*), high-tide bush (*Iva frutescens*), blackgrass (*Juncus gerardii*), and common reedgrass (*Phragmites*).".

GZA assessed resource areas within the project limits and observed Salt Marsh. Permanent impacts to salt marsh have been limited to less than 20 square feet, and temporary impacts have been limited to less than 270 sf^2. MCRR is proposing to restore approximately 207 sf^2 of eroded salt marsh, to the southeast of the culvert, as mitigation for permanent impacts due to project construction. The wetland delineation report has been included under **Appendix B – Wetland Delineation Report**. Salt marsh limits are included in the permit plans under **Appendix C – Permit Plans.**

3.1.2 Land Under Water Bodies and Waterways

Wetlands Protection Act Regulations (310 CMR 10.56) define Land Under Water Bodies and Waterways (LUW) as "the land beneath any creek, river, stream, pond or lake". The boundary of LUW is the mean annual low water level. LUW for areas within the proposed support of excavation is limited to the inlet and outlet areas of the existing equalization culvert and a stream channel with a defined topographic break.

Areas of LUW were identified in the field. Limited impacts to the LUW would occur due to addition of riprap at the proposed culvert inlet and outlet areas to prevent scour conditions during storm events and extremes in tidal change associated with spring high and low tidal cycles. The proposed improvements will not affect the water carrying capacity of the adjacent marsh as the improvements will not create a dam or blockage to downstream receiving waters. The proposed improvements will not affect the ground or surface water quality of the marsh. No additional impervious surface runoff will be added to the marsh from the railroad embankment or from the culvert replacement. The existing capacity of the immediately adjacent marsh provides limited capacity to provide breeding habitat, escape cover or food availability for resident fish; the proposed riprap would, under higher volume storm and tidal conditions, provide escape cover and areas for potential vegetation establishment within the marsh where currently none exists due to velocity of the water. The existing condition provides poor wildlife habitat and is in a degraded state. The proposed improvements are proposing to permanently alter 234 ft^2 of LUW.

The proposed improvements incorporate stormwater BMPs through the installation of riprap that is intended to reduce the velocity of the water flowing into and out of the culvert and reduce scour conditions within the downstream marsh. The existing conditions near the proposed riprap pad include a denuded marsh bottom with no cover and no vegetation. Construction methods to minimize impacts to LUW, including a limited footprint of disturbance and access using the adjacent railroad embankment, will be used to further avoid impacts to LUW and adjacent salt marsh.

4.0 ALTERNATIVES ANALYSIS

Several alternatives were assessed during the planning and design of the proposed culvert replacement project, including the No Build; Rehabilitation of the Existing Stone Box Culvert, and Full Culvert Replacement. However, it was determined that there are no safe practicable alternatives that do not involve an additional discharge of fill material to jurisdictional wetlands and waterways.

All alternatives considered involve the installation of temporary dewatering/water diversion structures and appropriate erosion and sedimentation controls. The selected alternative includes appropriate and practicable steps to minimize potential adverse impacts to resources delineated in the field as Waters of the United States.

4.1 NO BUILD

The No Build Alternative assumes no repair or replacement of the existing culvert will occur and the existing condition will remain. Structural deficiencies of the stone culvert will not be addressed. Therefore, the No Build Alternative is not practicable because if no action is taken, the culvert will deteriorate and eventually undermine the embankment soils, leading to potentially catastrophic failure of the track. The resulting condition will lead to downstream impacts to wetlands and waterbodies including potential channel deformation, restriction of tidal flow and the addition of sediment to sensitive resource areas, which ultimately cause unacceptable adverse environmental impacts.

4.2 REHABILITATION OF THE EXISTING STONE BOX CULVERT

The Rehabilitation Alternative assumes repair of the existing culvert will occur using high-pressure injection grout to stabilize the existing soils and the failed sections of the culvert. In addition, the existing stone culvert will remain in place, however, the structurally deficient section will be stabilized using bracing bars. This alternative is considered a temporary repair as it does not address the nearly failed culvert conditions. The embankment soils may also be temporarily stabilized, however the creation of sinkholes due to weakened embankment soils may occur.

4.3 FULL CULVERT REPLACEMENT

The Full Culvert Replacement Alternative includes the replacement of an existing 24- by 30-inch stone box culvert that passes the under the Cape Main Line railroad embankment at MP 63.22 in Sandwich, Massachusetts. The proposed replacement structure includes a 48-inch reinforced concrete pipe with precast concrete wingwall and riprap splash pads within a similar skew alignment of the existing stone culvert structure. Armor stone is proposed on the railroad embankment within the immediate vicinity of the culvert location to provide slope stability and protection during extreme high tide, coastal storm and other wave generating events.

The 48-inch culvert will be embedded sufficiently to maintain the existing invert flowline and the intake capacity as compared to the existing stone box culvert. In addition, full replacement of the culvert crossing will continue to support anadromous fish passage of American Eel (*Anguilla rostrate*).

5.0 CONSTRUCTION SEQUENCE

Construction will include establishment and installation of erosion control BMPs around the work zone prior to ground disturbance. Construction equipment will access the Project site by using the existing railroad embankment and will not cross through adjacent wetland resource areas. Proposed impacts, both temporary and permanent, will be located within limited sections of adjacent wetland resource areas. No additional impervious surface is proposed, no additional fill material is proposed. The proposed work consists of the following activities:

- Establishment of soil erosion and sediment control BMPs around areas of proposed ground disturbance;
- Limited vegetation clearing and grubbing to allow for access within the work zone;

- Removal and off-site stockpiling of existing track, tie and embankment soil materials for reuse upon embankment reconstruction;
- Construction of limited area of benching within the project work zone for safe access by equipment;
- Establishment of temporary diversion structure, water bypass and dewatering areas
- Installation of support of excavation using machine driven steel sheet piles or steel plates;
- Removal of overburden, removal of existing stone box culvert elements;
- Preparation of excavation area subbase and support materials; installation of proposed 48-inch culvert and precast concrete wingwalls; installation of riprap splash pads;
- Reconstruction of the railroad embankment, ties and track using stockpiled materials to the extent practicable;
- Adding ballast where required;
- Tamping and raising the track structure to match the existing approach track sections;
- Cutting the sheet piles to match existing grade; armor stone will be added to both the north and south sides of the existing embankment to provide for additional slope stability and storm protection; and
- Removal of soil erosion and sediment controls.

The existing ballast and soil in the embankment will be excavated and benched to allow for a work pad and then stockpiled within the upland railroad right-of-way nearby for reuse after the work is completed. Existing culvert elements and adjacent areas (e.g. wingwalls and side-slope stone armor) found to be in good condition may be reused, if feasible. The remaining material will be transported down the railroad right-of-way to pre-identified upland disposal locations within MassDOT owned railroad property.

The proposed culvert prism excavation will be larger than the existing culvert footprint to prepare the area for installation of the proposed pipe sections (refer to **Appendix C – Permit Plans**). The bottom elevation of the culvert will be approximately 1-feet lower than the existing bottom culvert elevation. Approximately 6 to 8 inches of restoration stone, approximate ½ to 1-inch in diameter, will be added to the bottom of the proposed culvert to create a natural substrate floor. The bottom elevation of the restored streambed within the replacement pipe is anticipated to provide for low-flow fish passage and increase viability of the passage of American eel during spawning runs in the spring and fall.

Upon project completion, disturbed upland areas will be stabilized with ballast. The temporary water bypass will be removed, and natural flow restored. Soil erosion and sediment control BMPs will remain in place until exposed soils are permanently stabilized. Disturbed areas that will not be armored with ballast or stone will be stabilized with a fast-germinating erosion control native seed mix, covered with a biodegradable erosion control blanket and properly staked.

Proposed conditions plans and standard specifications for installation of soil erosion and sediment controls are located under **Appendix C – Permit Plans.**

6.0 IMPACTS TO WETLANDS PROTECTION ACT RESOURCE AREAS

The proposed project will impact wetlands and other Waters of the U.S., both permanent and temporary, and are quantified in Table 2. The nature and extent of impacts to these resources are limited to the area immediately adjacent to the inlet and/or outlet ends of the culvert where work is anticipated. Temporary impacts to resources will occur due to installation of the support of excavation, construction access, removal of the existing stone culvert, grading, installation and maintenance of erosion and sedimentation controls, and installation and maintenance of dewatering/diversion structures. Permanent impacts to resources will result from the installation of new pipe sections, precast concrete wingwalls, riprap splash pads, installation of armor stone on the embankment and clean fill for final grading.

Table 2 – Summary of Estimate Impacts to Wetlands and Waterbodies

	Salt Marsh			**Land under Waters of the U.S.**		
	Temporary Impacts (ft^2)	Permanent Impacts (ft^2)	Total Estimated Impacts (ft^2)	Temporary Impacts (ft^2)	Permanent Impacts (ft^2)	Total Estimated Impacts (ft^2)
North Side	268	17	285	87	34	121
South Side	0	0	0	300	200	500

Avoidance of impacts to wetlands and waterbodies is not feasible given the project location, existing and proposed facilities. Impacts to wetlands and water bodies will be limited to the extent practicable by reducing the total area of required grading for the support of excavation, limiting vegetation removal required for access, siting of riprap scour pads and placement of armor stone. Areas of temporary impact will be restored with a native seed mix where appropriate, or approved equal, and stabilized with a coconut blanket or other similar biodegradable option upon project completion. More detail on impact minimization and mitigation is provided in the following section.

7.0 IMPACT MINIMIZATION AND MITIGATION MEASURES

Measures to limit impacts to the resource areas noted above include the following: temporary barriers, fencing and signage will be placed at the work site during construction; the contractor will have a spill kit/absorbent pads on each piece of equipment; each vehicle shall be inspected daily for leaks and leaking equipment shall be removed from the Project Site immediately and shall not return to service until repaired; the work area will be left in a condition such that precipitation and/or adverse weather will not cause damage to the work area or adjacent areas; site preparation work will include limited vegetation clearing and/or removal of select trees by hand, if necessary; sedimentation and erosion control measures will installed prior to the start of work and will remain in place during construction activities; proposed work shall comply with Federal, State, and Local Codes and Regulations.

Access for the project will be established from uplands and buffer zone areas adjacent to the proposed work zone. Access through wetlands will be limited to allow for safe passage of personnel and equipment; where available, access routes will make use of the existing railroad right-of-way through uplands.

Mitigation for impacts to salt marsh will be provided at a greater than 10:1 within a single, aggregate wetland replication area on the southeast side of the railroad embankment. Grading of the wetland replication area will be maintained at an

elevation similar to the adjacent wetland and will have a minimum of 12 inches of wetland topsoil. The wetland mitigation area will be stabilized with coir logs and salt marsh plantings, as indicated on the Proposed Conditions Plans under **Appendix C – Permit Plans**. The soil within the limits of the coir logs will be seeded with a native wetland seed mix, or approved equal, and stabilized with biodegradable coconut mesh fabric.

7.1 EROSION AND SEDIMENTATION CONTROL

During removal and construction activities, erosion controls such as compost filter tubes or similar, will be utilized. Sedimentation and erosion control measures will be removed following completion of the work. The Contractor will be required to inspect the project site and remove demolition debris or other construction related materials upon completion.

Work will be conducted within the railroad embankment and adjacent wetlands or waters. A temporary diversion structure to provide water bypass around the work area will be required. The temporary diversion structure consists of a two-stage dewatering pump screening process; the primary screen will incorporate a seine net with 1/4-inch mesh set approximately 5-feet in front of the intake pipe and a hard screen with a mesh size of 1/4-inch to 3/8-inch opening will be set directly against the intake pipe to further refuse aquatic fauna. The seine net will have a lead line and float system to provide vertical stability and will be staked into the substrate to ensure the intake of the pump remains submerged in a non-turbid area.

7.2 STORMWATER MANAGEMENT

The existing conditions within the project location incorporate country flow style drainage from the top of the railroad embankment and into the existing ballast. The project does not propose to add new impervious surface, new point source outfalls or additional drainage facilities. The project is proposing to increase the hydraulic capacity of the existing culvert to provide better equalizing flow conditions during extreme storm events.

7.3 DEWATERING

Work associated with the emergency culvert replacement will require establish of a support of excavation, establishment of flow bypass for waters outside of the support of excavation and dewatering within the excavation area. Dewatering within the support of excavation will use a sump area and pump system to redirect water into a dirt bag to be located within adjacent uplands. Contract documents will require the submission of a specific dewatering and turbidity control plan for review and approval by the drainage engineer and by MassDEP if required.

7.4 INVASIVE SPECIES CONTROL

Field observations conducted by GZA indicated the presence of Common reed (*Phragmites australis*) within adjacent wetland resource areas. The colony of common reed on the north side of the railroad embankment appears to be well established and comprises a small part of the existing wetland ecosystem. Monitoring of the proposed wetland mitigation area will incorporate reporting requirements and control methods to treat for invasive species.

Control of invasive plants, including common reed, will be conducted in accordance with MassDOT standard specifications for this practice and will be in compliance with local, state and federal requirements for such practices.

7.5 DIVISION OF MARINE FISHERIES

Coordination with the Massachusetts Division of Marine Fisheries has confirmed that there is no diadromous fish present in this location and that a Time of Year restriction will not be required.

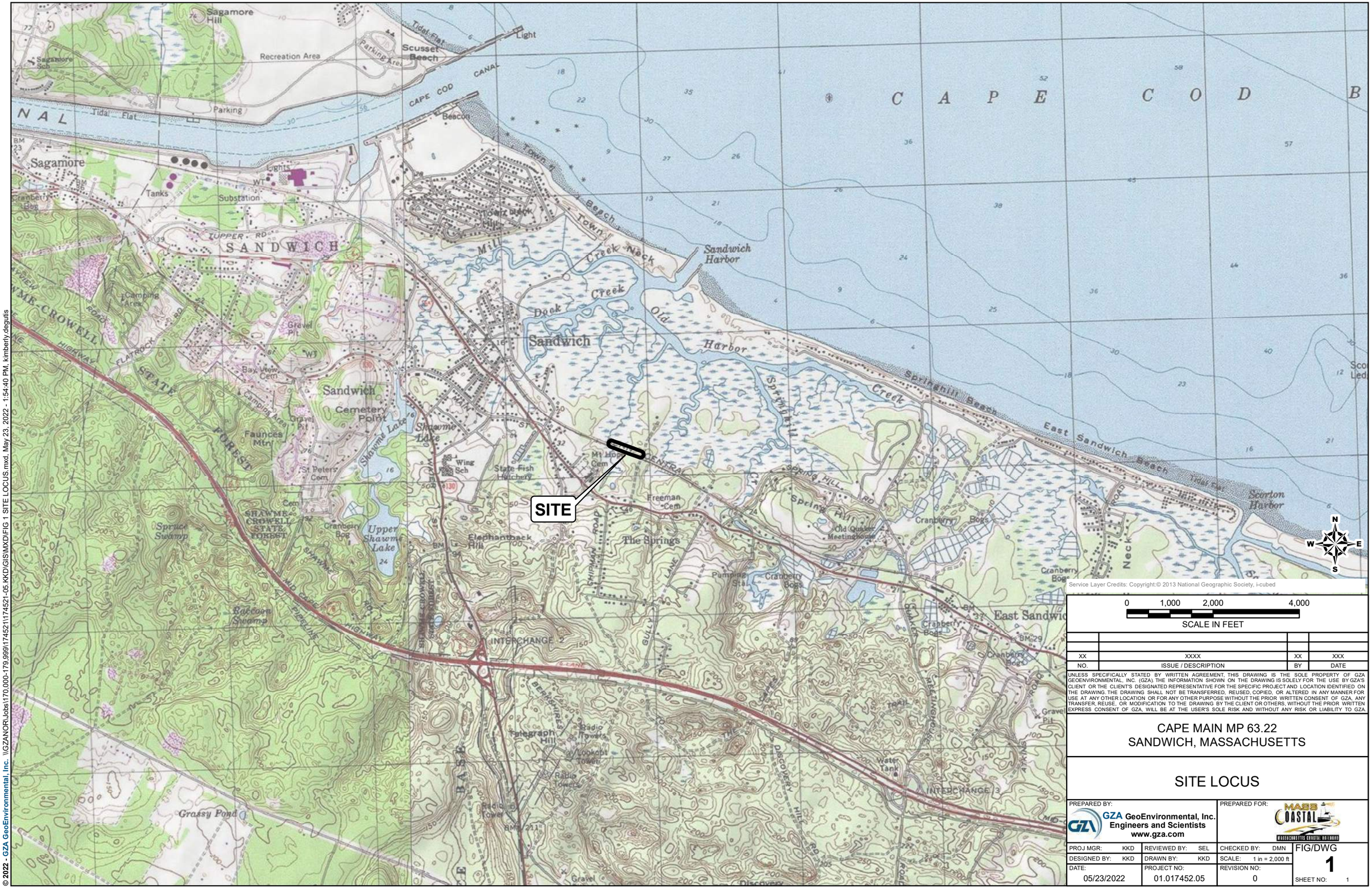
8.0 CONCLUSIONS

MCRR is requesting the timely acknowledgement and expedited approval by the DEP for the proposed culvert replacement project. The existing condition poses a threat to the public health and safety of the citizens of the Commonwealth of Massachusetts, as described herein. Work is expected to commence as soon as possible. Anticipated impacts to wetland resources presumed to be under the jurisdiction of the USACE and MassDEP will be avoided and limited through the implementation of environmental controls meant to meet the performance standards outlined in federal and state resource protection regulations. Work will be observed by a GZA Wetland Scientist, Environmental Monitor, and Site Engineer to adhere to applicable environmental protection laws.

As designed, total impacts are limited to the extent practicable. The design approach taken was to avoid wetland impacts where feasible, and where unavoidable, and limit impacts to the extent practical through an extensive and thoughtful review and design process.

Figures

© 2022 - GZA GeoEnvironmental, Inc. \\GZANOR\Jobs\170,000-179,999\174521\174521-05.KKD\GIS\MXD\FIG 1 SITE LOCUS.mxd, May 23, 2022 - 1:54:40 PM, kimberly.degutis



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CAPE MAIN MP 63.22
SANDWICH, MASSACHUSETTS

SITE LOCUS

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
MASS COASTAL RAILROAD

PROJ MGR: KKD	REVIEWED BY: SEL	CHECKED BY: DMN	FIG/DWG 1
DESIGNED BY: KKD	DRAWN BY: KKD	SCALE: 1 in = 2,000 ft	
DATE: 05/23/2022	PROJECT NO: 01.017452.05	REVISION NO: 0	SHEET NO: 1

Appendix A - Existing Conditions Figures

© 2022 - GZA GeoEnvironmental, Inc. \\GZANOR\Jobs\170,000-179,999\174521\174521-05.KKD\GIS\MXD\FIG 2 EXISTING CONDITIONS.mxd, May 23, 2022 - 2:34:44 PM, kimberly.degutis

LEGEND

- LIMIT OF WORK
- GZA DELINEATED LAND UNDER WATERWAYS
- GZA DELINEATED SALT MARSH
- MADEP MAPPED SALT MARSH
- FEMA FLOOD ZONE AE
- FEMA FLOOD ZONE VE
- MADEP MAPPED ESTIMATED HABITAT

CULVERT AT MP 63.22

GREAT ISLAND ROAD



NOTES:

1. BASE MAP MASSGIS AERIAL IMAGERY 2021.

2. LOCATION OF EXISTING FEATURES ARE MAPPED BY MADEP. LOCATION OF CULVERT CROSSING IS APPROXIMATED.

3. LOCATION OF WETLAND AND LAND UNDER WATER BOUNDARIES WERE APPROXIMATELY DETERMINED BY GZA GEOENVIRONMENTAL IN MARCH 2022. WETLAND BOUNDARIES WERE LOCATED BY TRADITIONAL SURVEY. THIS DRAWING IS NOT CONSIDERED A LAND SURVEY. THE LOCATIONS SHOWN SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

4. VERTICAL DATUM IS NAD83.

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CAPE MAIN MP 63.22
SANDWICH, MASSACHUSETTS

EXISTING CONDITIONS

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
MASS COASTAL RAILWAY

PROJ MGR: KKD	REVIEWED BY: SEL	CHECKED BY: DMN	FIG/DWG 2
DESIGNED BY: KKD	DRAWN BY: KKD	SCALE: 1 in = 67 ft	
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Appendix B - Wetland Delineation Report



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May 25, 2022
File No. 01.0174521.05.00

Mr. Christopher Podgurski
Massachusetts Coastal Railroad
12 Harding Street, Unit 202
Lakeville, Massachusetts 02347

Re: Wetland Assessment and Delineation Report
Cape Main MP 63.22
Sandwich, Massachusetts 02537

Dear Mr. Podgurski:

GZA GeoEnvironmental, Inc. (GZA) has prepared this report describing wetland assessment and delineation services for the Massachusetts Coastal Railroad (MCRR) for the proposed culvert replacement project on the Cape Main Railroad at Milepost 63.22 in Sandwich, Massachusetts (the Project Area, see Figure 1). The wetland delineation included an approximately 3-acre area around the proposed limit of construction and site access route. Resource areas observed within the limit of work included salt marsh and land under water associated with an unnamed tributary to Old Harbor Creek. The wetland delineation was performed by GZA Environmental Scientist, Anthony Damiano, WPIT, on March 16, 2022. This report is subject to the Limitations attached as **Appendix A**.

PROJECT BACKGROUND

The purpose of the wetland assessment work was to assess and mark the limits of wetland boundaries within the Project Area. GZA understands that this report may be used in the design and permitting for the replacement of an existing stone box culvert.

SITE LOCATION AND DESCRIPTION

The Project Area encompasses the railroad corridor along the Cape Main, beginning with the at-grade railroad crossing at Great Island Road and extending approximately 900-feet west into salt marsh in Sandwich, Massachusetts. The limit of the study area extends approximately 75-feet to the north and south of the top of the railroad embankment. The project area is bounded to the north, west, and south by undeveloped salt marsh and forested uplands, and Great Island Road (a residential street) to the west. The predominant wetland type is a salt marsh. No houses or other structures were observed during the assessment of the parcel.

RESOURCE AREA BOUNDARY DELINEATION AND METHODOLOGY

The wetland assessment was conducted in a manner that is consistent with the 1995 Massachusetts Department of Environmental Protection (MassDEP) handbook titled *Delineating Bordering Vegetated Wetlands under the Massachusetts Wetlands Protection Act*[1] and the MADEP "Coastal Manual"[2], in accordance with the 1987 Corps of Engineers *Corps of Engineers*

[1] 310 CMR: Department of Environmental Protection; Wetlands Protection Act.
[2] MADEP. 2017, rev 2020. *Applying the Massachusetts Coastal Wetlands Regulations: A Practical Manual for Conservation Commissions to Protect the Storm Damage Prevention and Flood Control Functions of Coastal Resource Areas*

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Wetlands Delineation Manual[3]*,* using the *Routine Determination Method;* in conjunction with the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual*[4] (Regional Supplement). Observed wetlands were classified in accordance with the *Classification of Wetlands and Deepwater Habitats of the United States – Second Edition*[5]*.*

Publicly available environmental data including the USDA Natural Resources Conservation Service Soil Survey for Barnstable County, Massachusetts; Massachusetts MassMapper[6]; and FEMA Flood Insurance Rate Maps were used to prepare the field data forms, and this wetland delineation report. Descriptions of wetlands delineated within the Project Area are provided in the following sections, and representative photographs are provided in **Appendix B.**

Wetland resource boundaries were demarcated in the field with pink flagging tied on vegetation. The wetland boundary flags were established by examining the dominant vegetation, soils, and evidence of hydrology and spring high tide indications at several locations within the Project Area. Sample plots were conducted, and data were collected to characterize the wetland and upland conditions. Standard Wetland Determination Data Forms sourced from the Regional Supplement; these forms are provided in **Appendix C**. Additionally, several undocumented soil pits were examined throughout the Project Area to observe hydric soil and hydrology indicators that were used to help determine wetland boundaries.

DESKTOP ANALYSIS

A desktop analysis using MassGIS's MassMapper database preceded the field investigation to identify critical areas on or within 200 feet of the Project Area.

Table 1 - Critical Environmental Areas as Mapped by MassGIS

Mapped Resources on or Within 200 Feet of the Project Area	Yes	No
NHESP Certified Vernal Pool		X
NHESP Potential Vernal Pool		X
Outstanding Resource Water		X
FEMA 100-Year Flood Zones	X	

There are two state-identified MassDEP wetland polygons mapped within the Project Area. The Project Area is located within mapped FEMA Flood Zones VE (north/ocean side) and AE (south/inland side). Based on the Massachusetts Natural Heritage Atlas 15th Edition (2019), the Project Area does not contain mapped NHESP Estimated or Priority Habitats of Rare Species or Wildlife. There are no certified or potential vernal pool habitats mapped within the Project Area limits.

According to the U.S. Department of Agriculture National Resource Conservation Service (NRCS) Web Soil Survey[7] and the NRCS SSURGO soils data[8], there are two soil units mapped within the Project Area (*Custom Soil Resource Report for*

[3] U.S. Army Corps of Engineers, Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*, Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi

[4] U.S. Army Corps of Engineers, 2012. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (Version 2.0), ed. J.S. Wakeley, R.W. Lichvar, C.V. Noble and J.F. Berkowitz. ERDC/EL TR-12-1. Vicksburg, Mississippi; U.S. Army Engineer Research and Development Center

[5] Federal Geographic Data Committee. 2013. *Classification of Wetlands and Deepwater Habitats of the United States*. FGDT-STD-004-2013, 2nd edition. Wetlands Subcommittee, Federal Geographic Data Committee and U.S. Fish and Wildlife Service, Washington, DC

[6] MassGIS (Bureau of Geographic Information), Commonwealth of Massachusetts EOTSS. MassMapper Interactive Mapping Application. Accessed online at: https://maps.massgis.digital.mass.gov/MassMapper/MassMapper.html. Accessed 3/14/2022.

[7] Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at the following link: https://websoilsurvey.sc.egov.usda.gov/. Accessed 3/14/2022.

[8] USDA. 1989. Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Soil Survey Geographic (SSURGO) Database for Hampden and Hampshire Counties, Massachusetts, Western Part. Available online. Accessed 3/14/2022.

Barnstable, Massachusetts). However, the majority of the Project Area consists of Eastchop loamy fine sand, 3 to 8 percent slopes, a non-hydric soil. Table 2 identifies NRCS soil series that are mapped within the Project Area.

Table 2 - NRCS Mapped Soils Series within the Project Area

Soil Unit Name	Hydric Rating	Acres / Percent Area of Project Area
Ipswich - Pawcatuck - Matunuck complex, 0 to 2 percent slopes, very frequently flooded	90	0.3 / 28.2
Eastchop loamy fine sand, 3 to 8 percent slopes	0	0.8 / 71.8
Total Project Acres		94 / 100

FINDINGS

Within the Project Area, GZA observed four regulated resource areas (two salt marsh and two areas of land under water) (refer to **Figure 2 – Wetland Delineation Site Plan**).

RESOURCE AREA DESCRIPTIONS

WETLAND A – SALT MARSH

Wetland A is a salt marsh (SM) located along the north side of the railroad embankment. The east boundary of the SM is identified by an abrupt change in topography and vegetation; the SM extends out of the project area to the west. Wetland A is dominated by salt meadow cordgrass (*Spartina patens*,). Other plant species observed included high tide bush (*Iva frutescens*) and cattails (*Typha latifolia*).

WETLAND B – SALT MARSH

Wetland B is a SM located along the south side of the railroad embankment. The east boundary of the SM is identified by an abrupt change in topography and vegetation; the SM extends out of the project area to the west. Wetland B is dominated by salt meadow cordgrass (Spartina patens,).

LAND UNDER WATER BODIES AND WATERWAYS

An unnamed tributary to Oak Harbor Creek, a tidal stream, traverses the project area through the existing culvert. The stream has eroded a significant portion of the SM on the south side of the railroad embankment, east of the culvert opening. The stream is identified by an abrupt change in topography and an obvious vegetation break.

JURISDICTIONAL WETLAND RESOURCE AREAS – FEDERAL CLEAN WATER ACT (SECTION 404)

Wetland systems A and B are likely "Waters of the United States," and would be subject to protection under the federal Clean Water Act, 33 U.S.C. §1251 et seq (1972). According to 33 CFR §328.3(c)(4), vegetated wetlands are defined as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions." The wetland boundaries previously described in this report were delineated in accordance with this definition.

United States Army Corps Wetland Determination Data Forms are attached in **Appendix C**, documenting GZA's observations including evidence of hydrology, soils, and hydrophytic vegetation at specific sample plots. It is GZA's opinion that work conducted within an SM is subject to jurisdiction under Section 404 of the Clean Water Act.

JURISDICTIONAL WETLAND RESOURCE AREAS – MASSACHUSETTS WETLANDS PROTECTION ACT

Wetland resource area boundaries were also assessed and delineated in accordance with methods developed by the 1995 Massachusetts Department of Environmental Protection's handbook for *Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act*[9] (the Act), as well as definitions set forth in the Wetland Regulations, 310 CMR 10.00. The Project Area contains regulated resources subject to protection under the Act.

SALT MARSH – 310 CMR 10.32

Two (2) salt marsh boundaries were observed within the Project Area. According to 310 CMR 10.32(2), the definition of a salt marsh is "coastal wetland that extends landward up to the highest high tide line, that is, the highest spring tide of the year, and is characterized by plants that are well adapted to or prefer living in, saline soils."

It is GZA's opinion that work conducted within or within the 100-foot buffer zone of a SM is subject to jurisdiction under the Massachusetts Wetlands Protection Act.

Wetland resource areas are summarized in Table 3.

Table 3 - Resource Area Summary Table

Wetland ID	Anticipated Federal Jurisdiction (USACE)	Anticipated State Jurisdiction (WPA)
A	Likely – contains a direct connection to a WOTUS	Salt marsh is likely jurisdictional
B	Likely – contains a direct connection to a WOTUS	Salt marsh is likely jurisdictional

CONCLUSIONS AND RECOMMENDATIONS

GZA has identified two resource areas that would be subject to protection and/or jurisdiction under the Massachusetts Wetlands Protection Act and the federal Clean Water Act on or within 200 feet of the Project Area and has delineated the boundaries of these areas. GZA has assessed the likely jurisdiction of each wetland area based upon a review of USGS topographic maps, aerial photographs, and previously mapped wetland resource areas in conjunction with definitions of regulated resource areas as provided by the USACE and the MassDEP.

[9] 310 CMR: Department of Environmental Protection; Wetlands Protection Act

Should you have any questions or comments regarding this submittal, or if you require additional information, please contact the undersigned at (781) 278-3700.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

Kimberly Degutis, PWS, CESCL
Senior Project Manager

Daniel M. Nitzsche CPESC, CESSWI, SE
Consultant/Reviewer

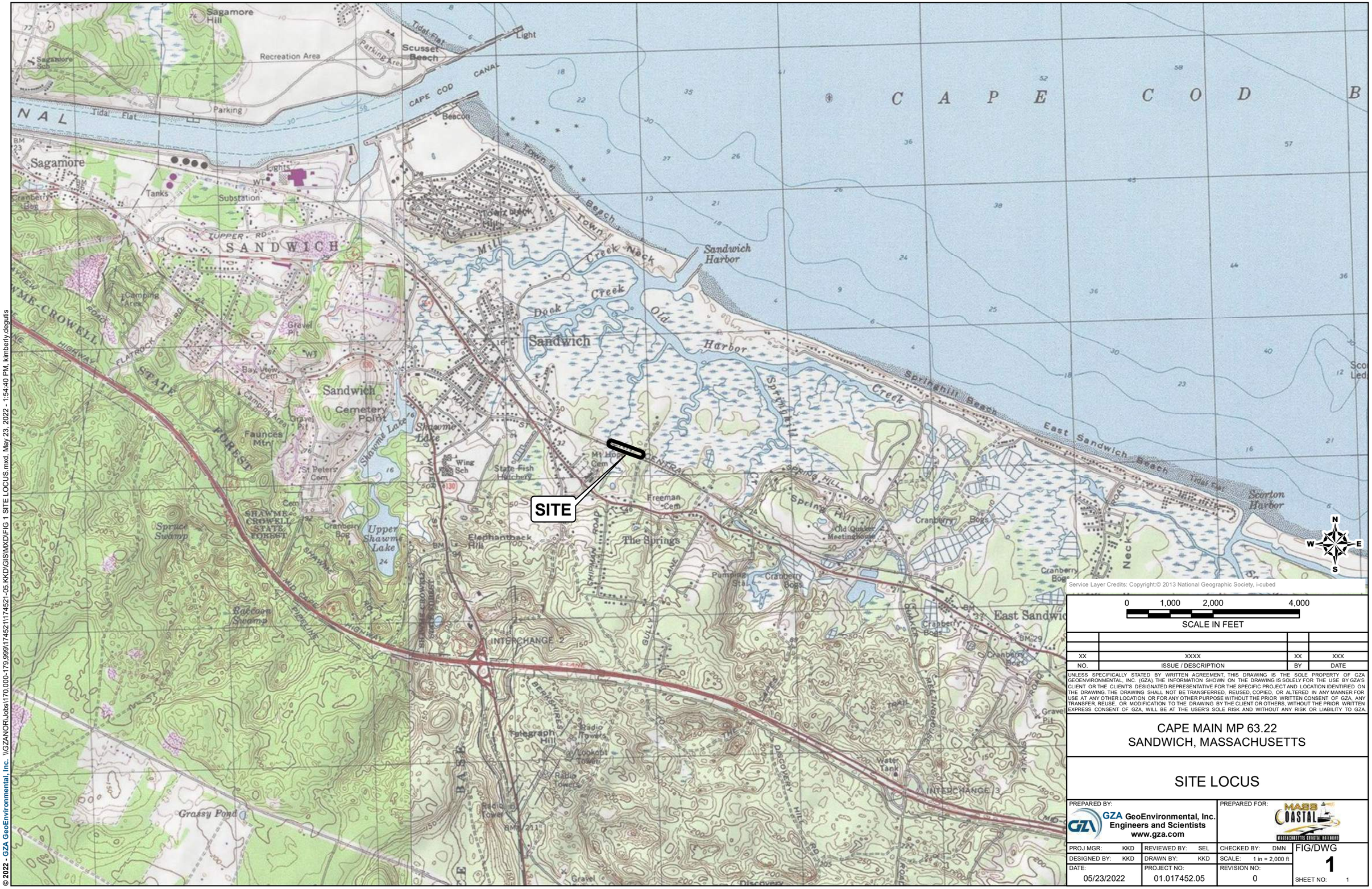
Stephen L. Lecco, A.I.C.P., C.E.P.
Principal

Attachments: Figure 1 – Site Locus
Figure 2 – Existing Conditions Plan
Appendix A – Limitations
Appendix B - Representative Site Photographs
Appendix C – Wetland Data Sheets

\\GZANOR\Jobs\170,000-179,999\174521\174521-05.KKD\401 FBE LETTER\DRAFT\APP B - WETLAND DELIN\FINAL_Cape Main MP 63.22 Delineation.docx

Figures

© 2022 - GZA GeoEnvironmental, Inc. \\GZANOR\Jobs\170,000-179,999\174521\174521-05.KKD\GIS\MXD\FIG 1 SITE LOCUS.mxd, May 23, 2022 - 1:54:40 PM, kimberly.degutis



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SCALE IN FEET

NO.	ISSUE / DESCRIPTION	BY	DATE
XX	XXXX	XX	XXX

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CAPE MAIN MP 63.22
SANDWICH, MASSACHUSETTS

SITE LOCUS

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
MASS COASTAL RAILROAD

PROJ MGR: KKD	REVIEWED BY: SEL	CHECKED BY: DMN	FIG/DWG 1
DESIGNED BY: KKD	DRAWN BY: KKD	SCALE: 1 in = 2,000 ft	
DATE: 05/23/2022	PROJECT NO: 01.017452.05	REVISION NO: 0	SHEET NO: 1

© 2022 - GZA GeoEnvironmental, Inc. \\GZANOR\Jobs\170,000-179,999\174521\174521-05.KKD\GIS\MXD\FIG 2 EXISTING CONDITIONS.mxd, May 23, 2022 - 2:34:44 PM, kimberly.degutis

LEGEND

- LIMIT OF WORK
- GZA DELINEATED LAND UNDER WATERWAYS
- GZA DELINEATED SALT MARSH
- MADEP MAPPED SALT MARSH
- FEMA FLOOD ZONE AE
- FEMA FLOOD ZONE VE
- MADEP MAPPED ESTIMATED HABITAT

CULVERT AT MP 63.22

GREAT ISLAND ROAD



NOTES:

1. BASE MAP MASSGIS AERIAL IMAGERY 2021.

2. LOCATION OF EXISTING FEATURES ARE MAPPED BY MADEP. LOCATION OF CULVERT CROSSING IS APPROXIMATED.

3. LOCATION OF WETLAND AND LAND UNDER WATER BOUNDARIES WERE APPROXIMATELY DETERMINED BY GZA GEOENVIRONMENTAL IN MARCH 2022. WETLAND BOUNDARIES WERE LOCATED BY TRADITIONAL SURVEY. THIS DRAWING IS NOT CONSIDERED A LAND SURVEY. THE LOCATIONS SHOWN SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

4. VERTICAL DATUM IS NAD83.

Service Layer Credits:

0 30 60 120

SCALE IN FEET

NO.	ISSUE / DESCRIPTION	BY	DATE
XX	XXXX	XX	XXX

UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEOENVIRONMENTAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR THE USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.

CAPE MAIN MP 63.22
SANDWICH, MASSACHUSETTS

EXISTING CONDITIONS

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
MASS COASTAL RAILWAY

PROJ MGR: KKD	REVIEWED BY: SEL	CHECKED BY: DMN	FIG/DWG 2
DESIGNED BY: KKD	DRAWN BY: KKD	SCALE: 1 in = 67 ft	
DATE: 05/23/2022	PROJECT NO: 01.017452.05	REVISION NO: 0	SHEET NO: 1

Appendix A – Limitations

USE OF REPORT

1. GZA GeoEnvironmental, Inc. (GZA) has prepared this report on behalf of, and for the exclusive use of Massachusetts Coastal Railroad ("Client") for the stated purpose(s) and location(s) identified in the report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not identified in the agreement, for any use, without our prior written permission, shall be at that party's risk, and without any liability to GZA.

STANDARD OF CARE

2. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in the Report and/or proposal and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the data gathered and observations made during the course of our work. Conditions other than described in this report may be found at the subject location(s).

3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made.

LIMITS TO OBSERVATIONS

4. Natural resource characteristics are inherently variable. Biological community composition and diversity can be affected by seasonal, annual or anthropogenic influences. In addition, soil conditions are reflective of subsurface geologic materials, the composition and distribution of which vary spatially.

5. The observations described in this report were made on the dates referenced and under the conditions stated therein. Conditions observed and reported by GZA reflect the conditions that could be reasonably observed based upon the visual observations of surface conditions and/or a limited observation of subsurface conditions at the specific time of observation. Such conditions are subject to environmental and circumstantial alteration and may not reflect conditions observable at another time.

6. The conclusions and recommendations contained in this report are based upon the data obtained from a limited number of surveys performed during the course of our work on the site, as described in the Report. There may be variations between these surveys and other past or future surveys due to inherent environmental and circumstantial variability.

RELIANCE ON INFORMATION FROM OTHERS

7. Preparation of this Report may have relied upon information made available by Federal, state and local authorities; and/or work products prepared by other professionals as specified in the report. Unless specifically stated, GZA did not attempt to independently verify the accuracy or completeness of that information.

COMPLIANCE WITH REGULATIONS AND CODES

8. GZA's services were performed to render an opinion on the presence and/or condition of natural resources as described in the Report. Standards used to identify or assess these resources as well as regulatory jurisdiction, if any, are stated in the Report. Standards for identification of jurisdictional resources and regulatory control over them may vary between governmental agencies at Federal, state and local levels and are subject to change over time which may affect the conclusions and findings of this report.

NEW INFORMATION

9. In the event that the Client or others authorized to use this report obtain information on environmental regulatory compliance issues at the site not contained in this report, such information shall be brought to GZA's attention forthwith. GZA will evaluate such information and, on the basis of this work, may modify the conclusions stated in this report.

ADDITIONAL SERVICES

10. GZA recommends that we be retained to provide further investigation, if necessary, which would allow GZA to (1) observe compliance with the concepts and recommendations contained herein; (2) evaluate whether the manner of implementation creates a potential new finding; and (3) evaluate whether the manner of implementation affects or changes the conditions on which our opinions were made.

Appendix B – Representative Site Photographs

Photographic Log

Client Name:	Site Location:	Project No.
MassCoastal Railroad	Cape Main MP 63.22 Sandwich, Massachusetts	01.0174521.05

Photo No.	Date:
1	3/16/22

Direction Photo Taken:
Northwest

Description:
View looking at the ocean side of the stone culvert ooutlet at low tide. Note stream channel within salt marsh.



Photo No.	Date:
2	3/16/22

Direction Photo Taken:
Southeast

Description:
View looking towards stone culvert opening on north/ocean side.



Photographic Log

Client Name:	Site Location:	Project No.
MassCoastal Railroad	Cape Main MP 63.22 Sandwich, Massachusetts	01.0174521.05

Photo No.	Date:
3	3/16/22

Direction Photo Taken:
Northwest

Description:
View looking across south/upstream side of stone culvert area at high tide. Note pooling of tidal floodwaters.



Photo No.	Date:
4	3/16/22

Direction Photo Taken:
Southeast

Description:
View of stone culvert at low tide. Note existing eroded bank on south side (right side of photo).



Photographic Log

Client Name: MassCoastal Railroad	**Site Location:** Cape Main MP 63.22 Sandwich, Massachusetts	**Project No.** 01.0174521.05

Photo No.	**Date:**
5	3/16/22

Direction Photo Taken:
Southeast

Description:
View looking across area of proposed mitigation; rock gabion proposed to be installed along this photo alignment, backfilled with wetland soil and planted with salt meadow cordgrass to stabilize eroded bank and restore salt marsh.



Appendix C – Wetland Data Sheets

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Cape Main MP 63.22 City/County: Sandwich / Barnstable Sampling Date: 3/16/22

Applicant/Owner: MassCoastal Railroad State: MA Sampling Point: SP1

Investigator(s): GZA GeoEnvironmental: A Damiano, WPIT Section, Township, Range: N/A

Landform (hillside, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope %: 1

Subregion (LRR or MLRA): LRR S, MLRA 149B Lat: 41.751666 Long: -70.476842 Datum: NAD83

Soil Map Unit Name: Ipswich - Pawcatuck - Matunuck complex, 0 to 2 percent slopes, very frequently flooded NWI classification: E2EM1Pd

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
Plot associated with flag A11. Sample plot associated with tidally influenced area; observations made during low tide / slack conditions.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- X Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes X	No ____	Depth (inches): 12
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 6

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
Northeast Regional Climate Center, 3-month average precipitation; aerial photo review

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: SP1

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	15	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	15	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Iva frutescens*	10	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	10	=Total Cover	
Herb Stratum (Plot size: 5)			
1. *Spartina patens*	75	Yes	FACW
2. *Typha latifolia*	20	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	95	=Total Cover	
Woody Vine Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20
FACW species	85	x 2 =	170
FAC species	15	x 3 =	45
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	120 (A)		235 (B)

Prevalence Index = B/A = 1.96

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: SP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-22	10YR 4/1	100					Mucky Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- X Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- X Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: N/A

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Cape Main MP 63.22 City/County: Sandwich / Barnstable Sampling Date: 3/16/22

Applicant/Owner: MassCoastal Railroad State: MA Sampling Point: SP2

Investigator(s): GZA GeoEnvironmental: A Damiano, WPIT Section, Township, Range: N/A

Landform (hillside, terrace, etc.): slope Local relief (concave, convex, none): convex Slope %: 3

Subregion (LRR or MLRA): LRR S, MLRA 149B Lat: 41.751519 Long: -70.476478 Datum: NAD83

Soil Map Unit Name: Ipswich - Pawcatuck - Matunuck complex, 0 to 2 percent slopes, very frequently flooded NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)
Plot is located east of flag A3. Plot located adjacent to railroad embankment.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
Northeast Regional Climate Center, 3-month average precipitation; aerial photo review

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: SP2

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus rubra*	25	Yes	FACU
2. *Pinus strobus*	10	Yes	FACU
3. *Fagus grandifolia*	5	No	FACU
4.			
5.			
6.			
7.			
	40	=Total Cover	

Sapling/Shrub Stratum (Plot size: 15)			
1. *Quercus rubra*	10	Yes	FACU
2. *Acer rubrum*	10	Yes	FAC
3. *Clethra alnifolia*	5	Yes	FAC
4.			
5.			
6.			
7.			
	25	=Total Cover	

Herb Stratum (Plot size: 5)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		=Total Cover	

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 40.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	15	x 3 =	45
FACU species	50	x 4 =	200
UPL species	0	x 5 =	0
Column Totals:	65 (A)		245 (B)

Prevalence Index = B/A = 3.77

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: SP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/3	100					Sandy	
3-20	2.5Y 6/6	100					Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: N/A

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Soil materials appear to be non-native and associated with historic fill used for railroad embankment.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Cape Main MP 63.22 City/County: Sandwich / Barnstable Sampling Date: 3/16/22

Applicant/Owner: MassCoastal Railroad State: MA Sampling Point: SP3

Investigator(s): GZA GeoEnvironmental: A Damiano, WPIT Section, Township, Range: N/A

Landform (hillside, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope %: 1

Subregion (LRR or MLRA): LRR S, MLRA 149B Lat: 41.751523 Long: -70.476836 Datum: NAD83

Soil Map Unit Name: Ipswich - Pawcatuck - Matunuck complex, 0 to 2 percent slopes, very frequently flooded NWI classification: E2EM1P

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
Plot associated with flag B5.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- X Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches): 8
Water Table Present?	Yes X	No ____	Depth (inches): 8
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 12

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
Northeast Regional Climate Center, 3-month average precipitation for Barnstable Co, MA; aerial photo review

Remarks:
Wetland boundary is consistent with spring high tide line.

VEGETATION – Use scientific names of plants.

Sampling Point: SP3

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus rubra*	10	Yes	FACU
2. *Juniperus communis*	10	Yes	FACU
3.			
4.			
5.			
6.			
7.			
	20	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Acer rubrum*	15	Yes	FAC
2. *Alnus incana*	10	Yes	FACW
3. *Iva frutescens*	10	Yes	FACW
4.			
5.			
6.			
7.			
	35	=Total Cover	
Herb Stratum (Plot size: 5)			
1. *Spartina patens*	75	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	75	=Total Cover	
Woody Vine Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	95	x 2 =	190
FAC species	15	x 3 =	45
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals:	130 (A)		315 (B)

Prevalence Index = B/A = 2.42

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: SP3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-24	10YR 3/1	100					Mucky Sand	Mucky sand with hydrogen sulfide odor

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- X Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- X Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: N/A

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Cape Main MP 63.22 City/County: Sandwich / Barnstable Sampling Date: 3/16/22

Applicant/Owner: MassCoastal Railroad State: MA Sampling Point: SP4

Investigator(s): GZA GeoEnvironmental: A Damiano, WPIT Section, Township, Range: N/A

Landform (hillside, terrace, etc.): Slope Local relief (concave, convex, none): convex Slope %: 3

Subregion (LRR or MLRA): LRR S, MLRA 149B Lat: 41.751523 Long: -70.476836 Datum: NAD83

Soil Map Unit Name: Ipswich - Pawcatuck - Matunuck complex, 0 to 2 percent slopes, very frequently flooded NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)
Plot is located east of flag B7 along railroad embankment.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
Northeast Regional Climate Center, 3-month average precipitation; aerial photo review

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: SP4

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus rubra*	25	Yes	FACU
2. *Pinus strobus*	15	Yes	FACU
3.			
4.			
5.			
6.			
7.			
	40	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Quercus rubra*	10	Yes	FACU
2. *Clethra alnifolia*	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	20	=Total Cover	
Herb Stratum (Plot size: 5)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		=Total Cover	
Woody Vine Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	10	x 3 =	30
FACU species	50	x 4 =	200
UPL species	0	x 5 =	0
Column Totals:	60 (A)		230 (B)

Prevalence Index = B/A = 3.83

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: SP4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-4	10YR 3/3	100					Sandy	
4-18	2.5Y 6/6	100					Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: N/A

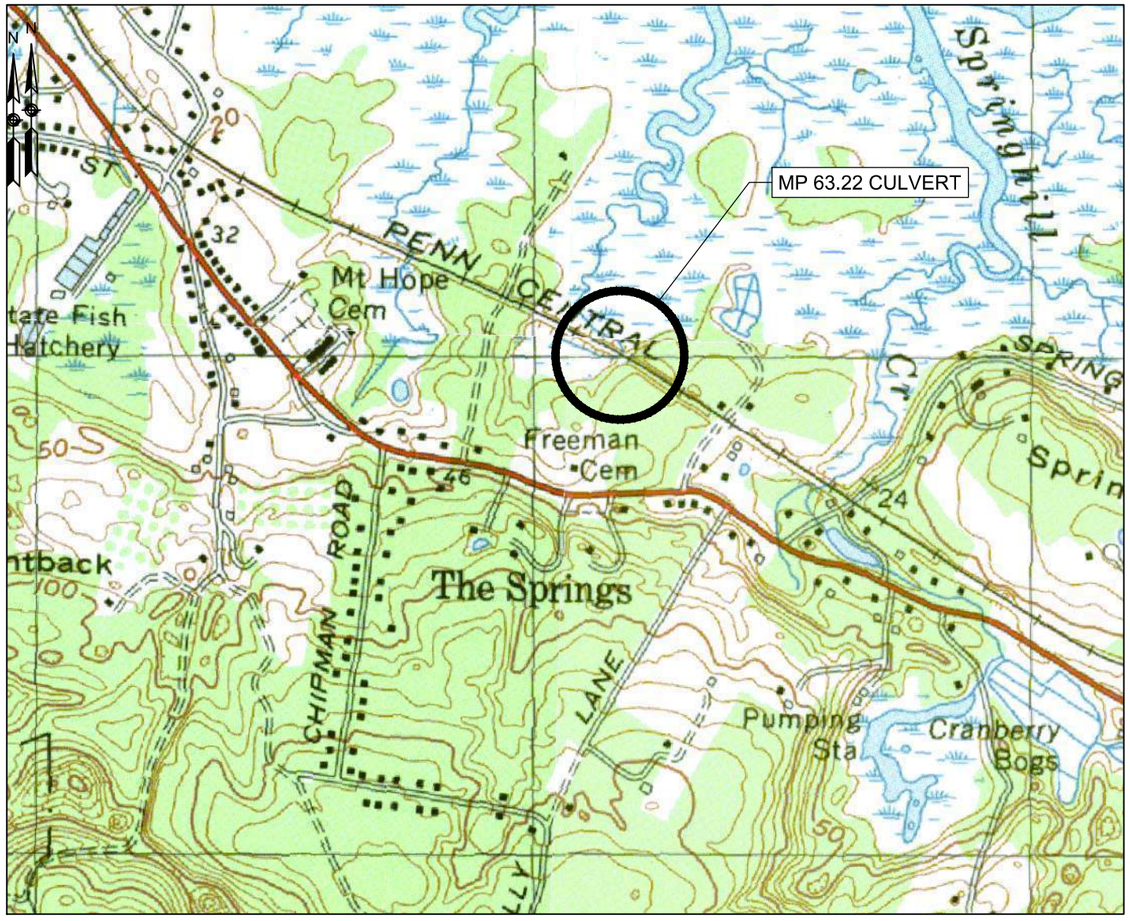
Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Soils consistent with historic fill associated with railroad embankment. Ballast and cobbles encountered to 12-inches.

Appendix C - Permit Plans



CULVERT REPLACEMENT PROJECT AT CAPE MAIN MP 63.22 SANDWICH, MA

401 WATER QUALITY CERTIFICATE PERMITTING PLANS

MASSCOASTAL RAILROAD JUNE 2022

PERMIT PLANS - NOT FOR CONSTRUCTION

Jacobs

MASS COASTAL RAILROAD

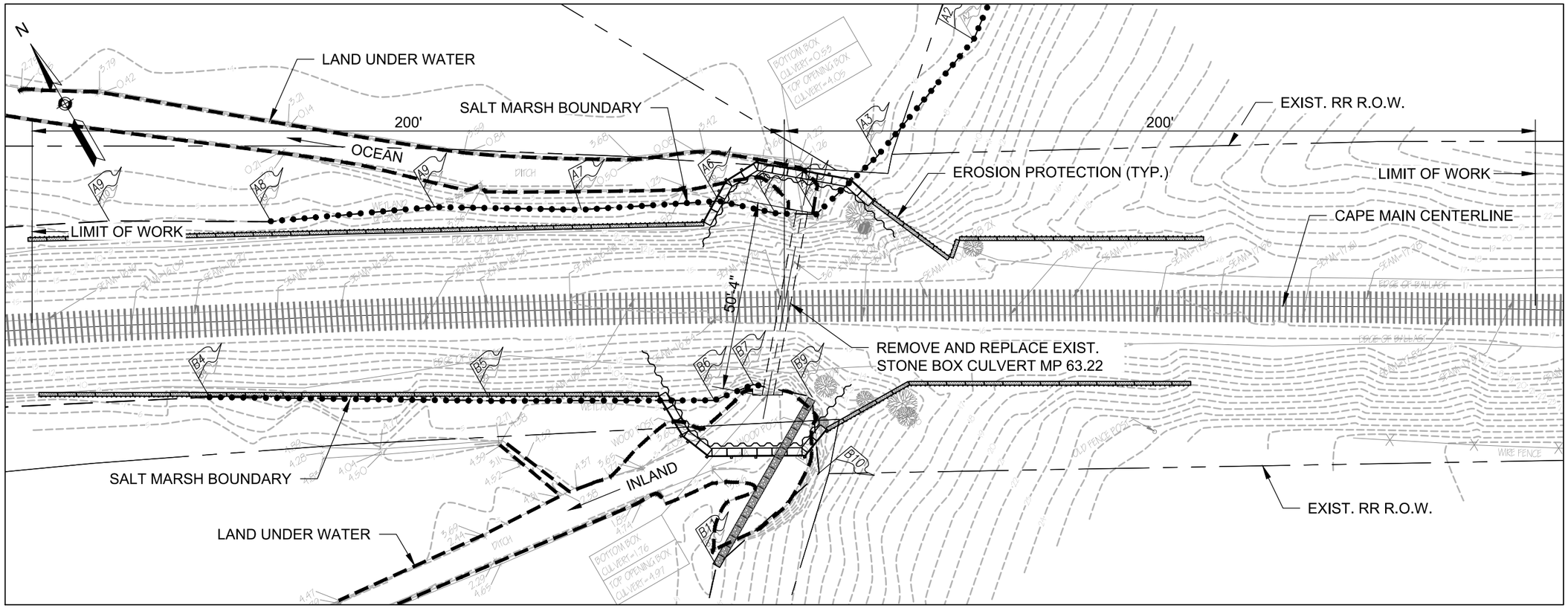
DRAWN BY: CWB
CHECKED BY: EP
APPROVED BY: BEM
DATE: June 1, 2022

CAPE MAIN
SANDWICH, MASSACHUSETTS

COVER SHEET

SHEET
1 OF 9

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June 1, 2022



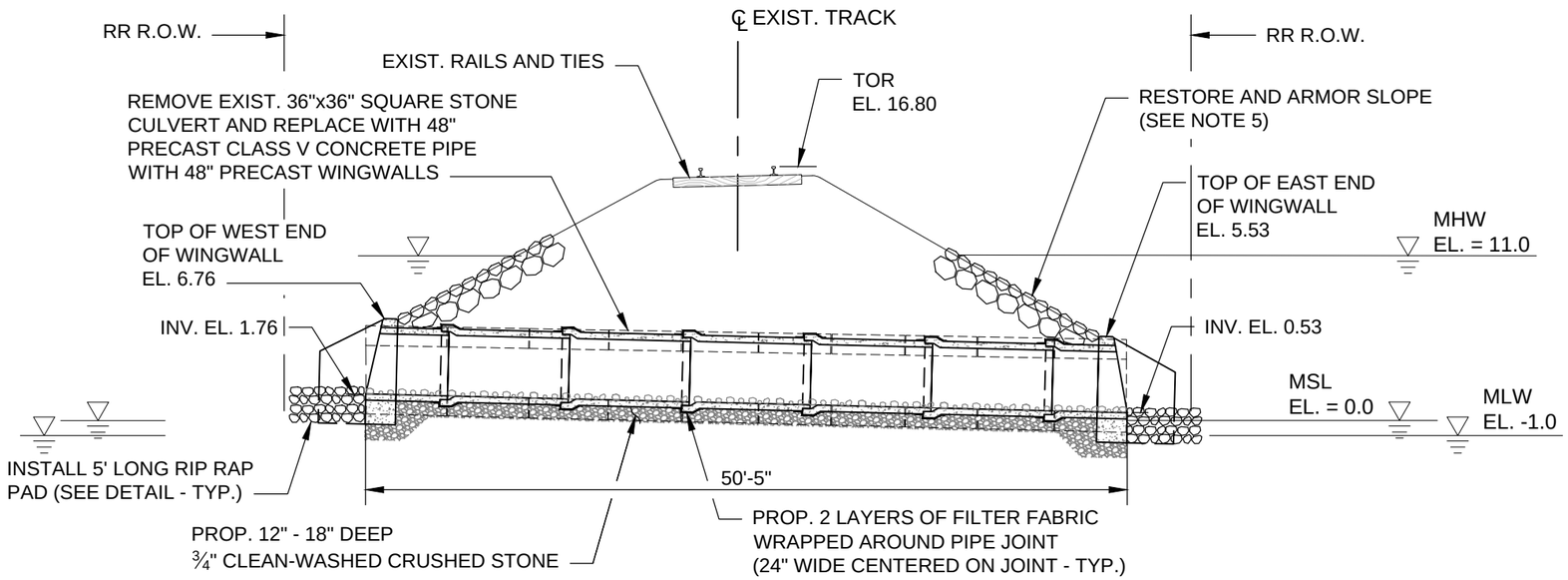




PERMIT PLANS - NOT FOR CONSTRUCTION

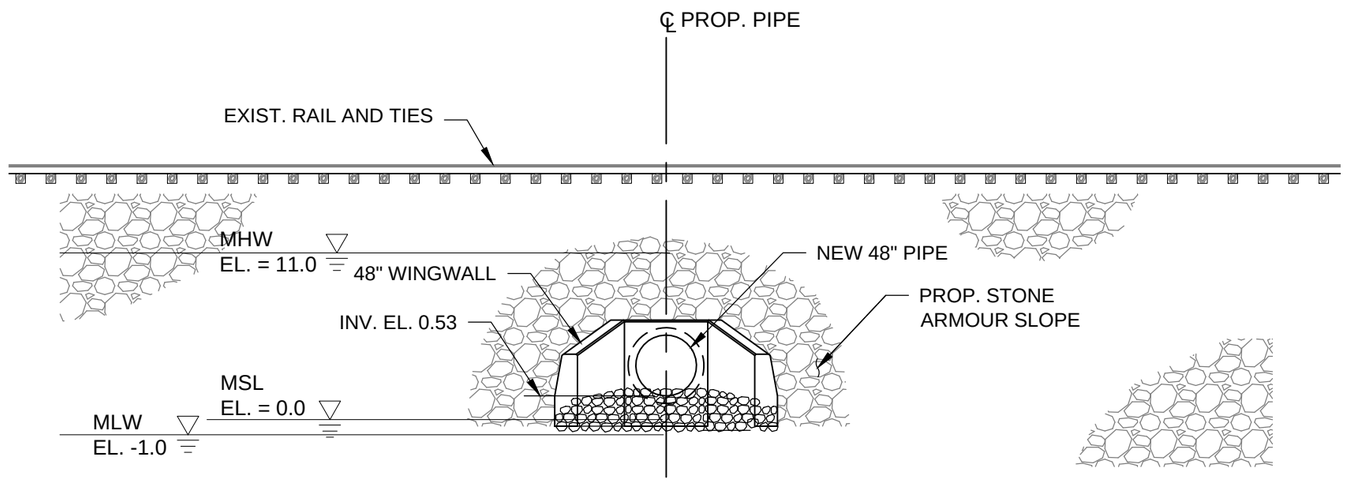
Jacobs	MASS COASTAL RAILROAD	DRAWN BY: CWB CHECKED BY: EP APPROVED BY: BEM DATE: June 1, 2022	CAPE MAIN SANDWICH, MASSACHUSETTS	EXISITING CONDITIONS	SHEET 2 OF 9

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June 1, 2022



PROPOSED LONGITUDINAL SECTION

NOT TO SCALE



INLET ELEVATION

NOT TO SCALE

NOTES:

1. ALL CULVERT AND WINGWALL INSTALLATION WORK SHALL BE PERFORMED IN THE DRY WITH TEMPORARY COFFERDAMS, DEWATERING PUMPING, AND ALL EROSION CONTROL MEASURES IN PLACE AND MAINTAINED FOR THE DURATION OF THE WORK.
2. CONTRACTOR SHALL MINIMIZE ENCROACHMENT INTO THE ADJACENT WATER AND NATURAL VEGETATION TO THE GREATEST EXTENT POSSIBLE TO LIMIT SOIL AND WATER DISTURBANCE.
3. CONTRACTOR SHALL REMOVE AND TEMPORARILY STOCKPILE EMBANKMENT SLOPE SOILS AND SURFACE BALLAST TO BE RESET TO MATCH EXISTING CONDITION FOLLOWING CULVERT INSTALLATION WORK AT THE DIRECTION OF THE ENGINEER ONLY.
4. ANY ADDITIONAL PROCESSED GRAVEL, CRUSHED STONE, AND STONE BALLAST DETERMINED TO BE NEEDED BY THE CONTRACTOR SHALL BE APPROVED BY MASSDOT'S ENGINEER PRIOR TO ORDERING FOR DELIVERY TO THE SITE.
5. CONTRACTOR SHALL PLACE AND EMBED STONE ARMOR RIP RAP ON BOTH SIDES OF THE CULVERT TO LIMITS SHOWN. STONES SHALL BE CHINKED IN TO ELIMINATE ANY DISLODGING OR SLIP-FAILING OF THE RECONSTRUCTED SLOPE.
6. PLACE 7" OF RECLAIMED MUD AND STONE MATERIAL INSIDE NEW PIPE SO THAT FLOW VOLUME IS EQUAL TO THAT OF EXISTING 30" STONE BOX.
7. ALL EMBANKMENT FILL SHALL BE PLACED IN HORIZONTAL LAYERS NOT TO EXCEED TWELVE (12) INCHES IN LAYERED DEPTH FOLLOWING COMPACTION. SUBSEQUENT LAYERS SHALL ONLY THEN PLACED AND COMPACTED AFTER THE PREVIOUS LOWER FILL LAYER IS FULLY COMPACTED IN PLACE.

PERMIT PLANS - NOT FOR CONSTRUCTION

Jacobs

MASS COASTAL — MASSACHUSETTS COASTAL RAILROAD

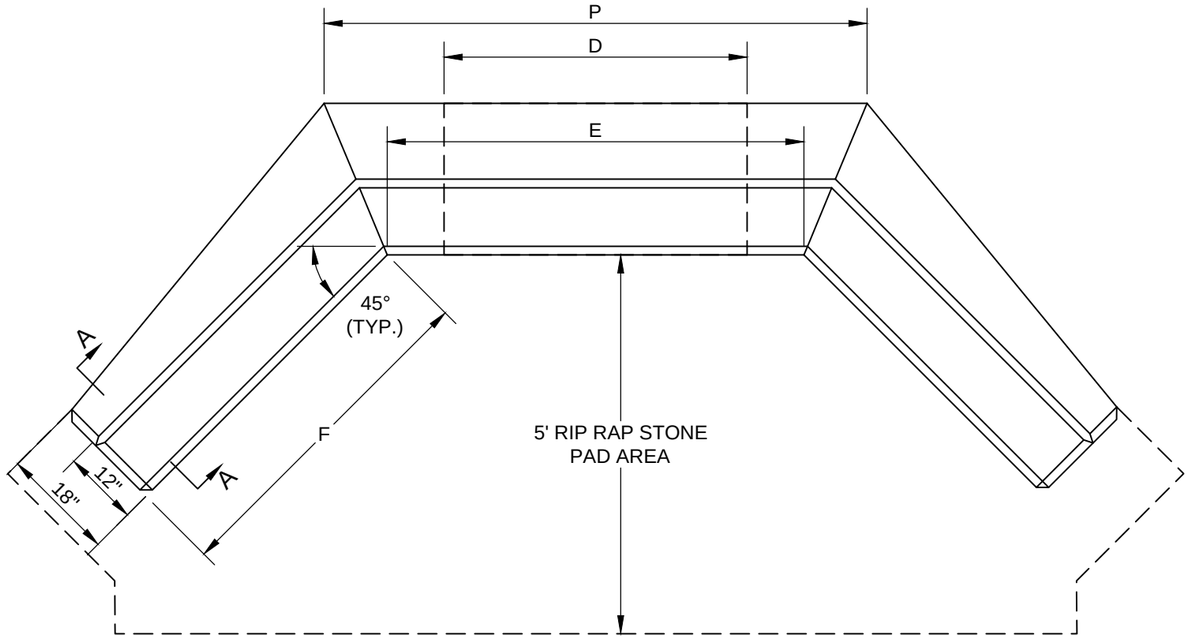
DRAWN BY: CWB
CHECKED BY: EP
APPROVED BY: BEM
DATE: June 1, 2022

CAPE MAIN
SANDWICH, MASSACHUSETTS

PROPOSED PRECAST PIPE CULVERT REPLACEMENT

SHEET 3 OF 9

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June 1, 2022

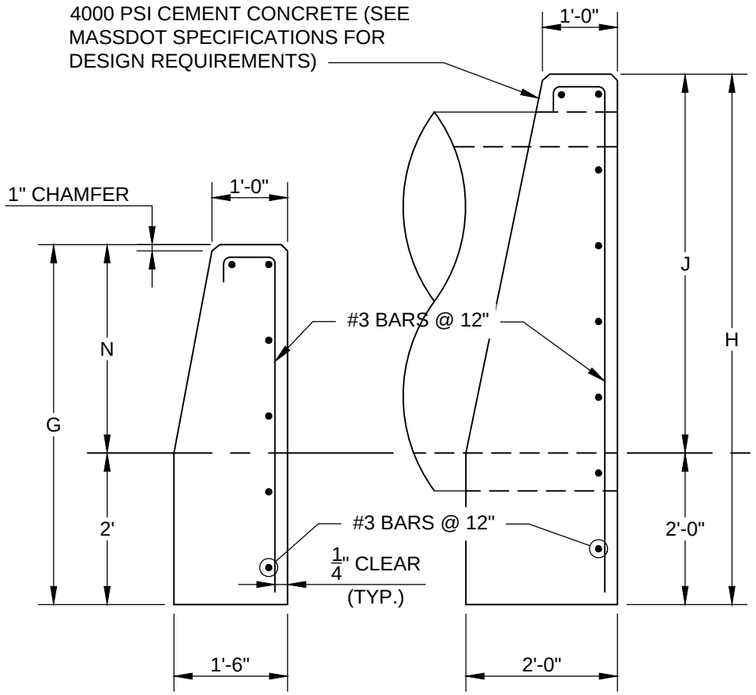


PLAN

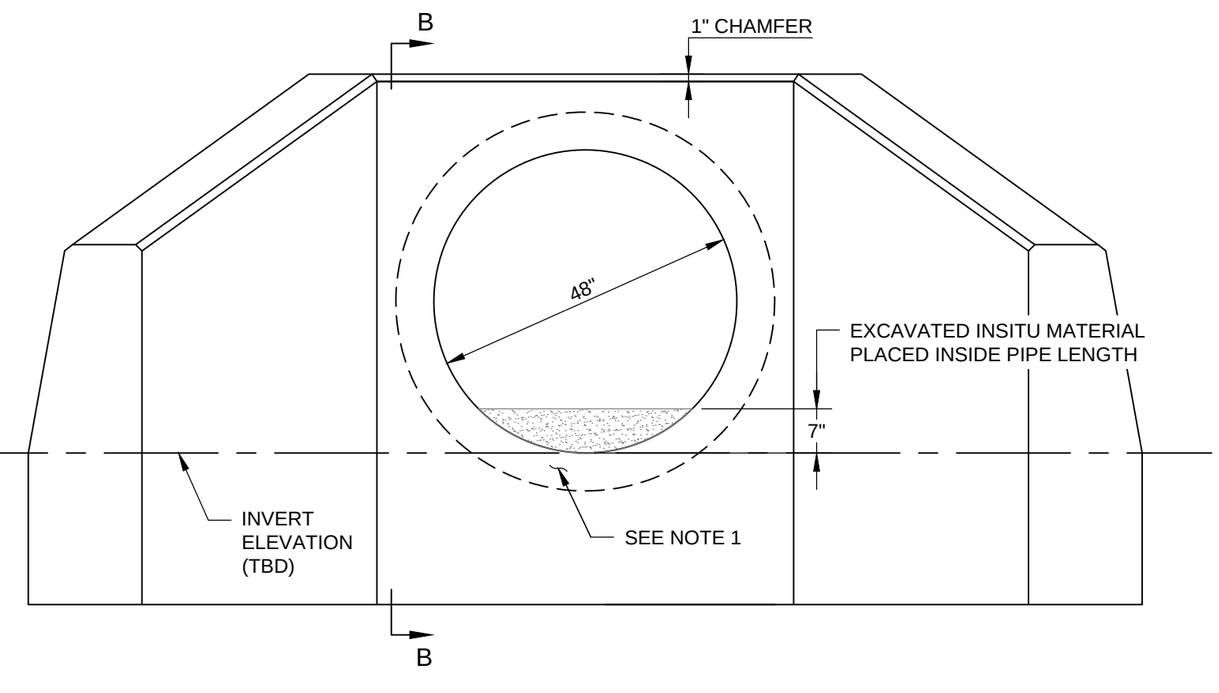
PERMIT PLANS - NOT FOR CONSTRUCTION

NOTE:

1. CONTRACTOR SHALL INSTALL REPLACEMENT, PRECAST WINGWALL AND SEAL CONCRETE CULVERT END WITH WATERTIGHT GROUT SEALANT PRIOR TO REMOVAL OF COFFERDAM.



ELEVATION A-A ELEVATION B-B



FRONT ELEVATION

Jacobs

MASS COASTAL
MASSACHUSETTS COASTAL RAILROAD

DRAWN BY: CWB
CHECKED BY: EP
APPROVED BY: BEM
DATE: June 1, 2022

CAPE MAIN
SANDWICH, MASSACHUSETTS

PROPOSED REPLACEMENT
WINGWALL DETAILS

SHEET
4 OF 9

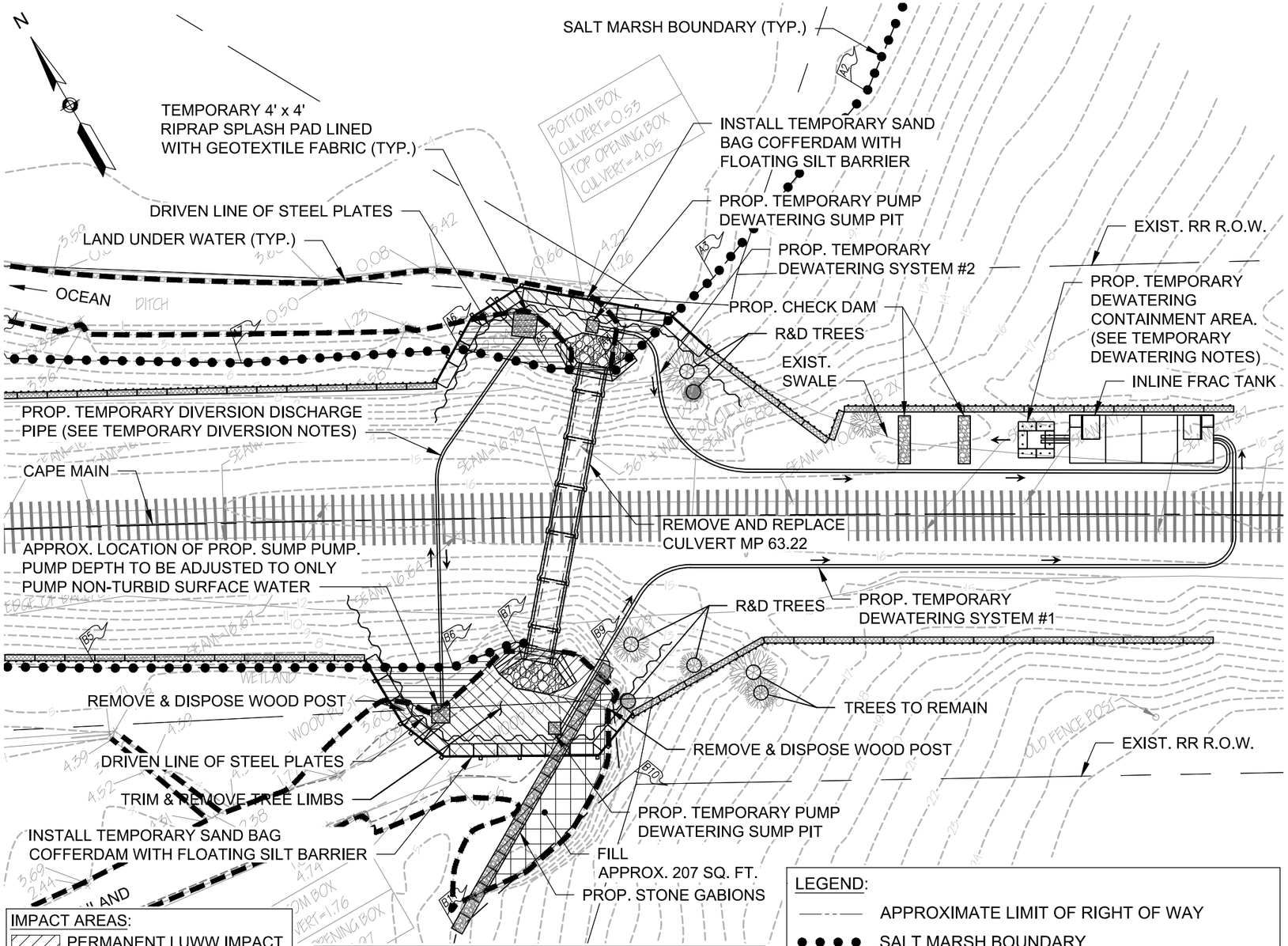
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June 1, 2022



PERMIT PLANS - NOT FOR CONSTRUCTION

Jacobs	MASS COASTAL RAILROAD	DRAWN BY: CWB CHECKED BY: EP APPROVED BY: BEM DATE: June 1, 2022	CAPE MAIN SANDWICH, MASSACHUSETTS	SITE ACCESS AND STAGING AREA	SHEET 5 OF 9

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June 1, 2022



PROPOSED IMPACTS			
RESOURCE AREA	IMPACT TYPE	SQUARE FEET	ACRES
LAND UNDER WATER BODIES AND WATERWAYS (LUWW)	TEMPORARY	387	0.0090
	PERMANENT	234	0.0050
SALT MARSH	TEMPORARY	268	0.0060
	PERMANENT	17	0.0004

PLAN
SCALE: 1" = 20'-0"

TEMPORARY DIVERSION NOTES:

1. THE CONTRACTOR SHALL DESIGN AND SUBMIT FOR APPROVAL A TEMPORARY PUMP DIVERSION SYSTEM TO DIVERT WATER FLOW AROUND CULVERT CONSTRUCTION AREA, INCLUDING REQUIRED SIZE/LOCATION OF DIVERSION PUMP, DISCHARGE PIPE SIZE, AS WELL AS CONTINGENCY PLANS IN THE EVENT OF PUMP FAILURE.
2. WATER LEVELS ARE SUBJECT TO CHANGE, THE CONTRACTOR IS RESPONSIBLE FOR MAKING DETERMINATION OF WATER LEVELS THAT WILL EXIST DURING CONSTRUCTION AND INSTALL AND REFORTIFY COFFER DAMS AS APPLICABLE.
3. UPON INSTALLATION OF ALL SEDIMENT CONTROL MEASURES THE CONTRACTOR SHALL BEGIN IMPLEMENTING THE DIVERSION AND DEWATERING PLAN FOLLOWING INSPECTION.
4. THE CONTRACTOR SHALL INSTALL THE TEMPORARY DISCHARGE PIPES, SUMP-HOLE, DIVERSION PUMPS AND RIP-RAP DISCHARGE SPLASH PAD PRIOR TO PLACING PIPE PLUGS, DRIVEN STEEL PLATES AND SAND BAG COFFERDAMS.
5. THE TEMPORARY DISCHARGE PIPE SHALL BE CONSTRUCTED OF DURABLE MATERIAL ABLE TO WITHSTAND ANTICIPATED SITE CONDITIONS.
6. WATER FROM THE WORK AREA SHALL BE PUMPED TO A DEWATERING CONTAINMENT AREA THE AREA SHALL BE LOCATED SUCH THAT THE WATER DRAINS BACK INTO THE MARSHLAND BELOW THE DOWNGRADIENT COFFERDAM.
7. AFTER THE CULVERT HAS BEEN REPLACED AND READY TO RECEIVE FLOW AND THE DISTURBED AREA HAS BEEN STABILIZED, THE DRIVEN STEEL SHEETS SHALL BE PULLED OUT AND "COFFERDAMS" SHALL BE REMOVED STARTING ON THE NORTHERN END. THEN THE TEMPORARY DIVERSION SHALL BE REMOVED.

TEMPORARY DEWATERING NOTES:

1. THE PROP. TEMPORARY DEWATERING CONTAINMENT AREA. SIZE AND LOCATION OUTSIDE THE WETLAND AREA TO BE DETERMINED BY THE CONTRACTOR AND PRE-APPROVED BY THE ENGINEER'S DRAINAGE ENGINEER AND WETLAND SCIENTIST.
2. CONTRACTOR SHALL EXCAVATE BACK THIS EMBANKMENT AREA AS REQUIRED TO INSTALL DEWATERING CONTAINMENT AREA AND RESTORE SLOPE UPON ITS REMOVAL.

PERMIT PLANS - NOT FOR CONSTRUCTION

Jacobs

MASS COASTAL
MASSACHUSETTS COASTAL RAILROAD

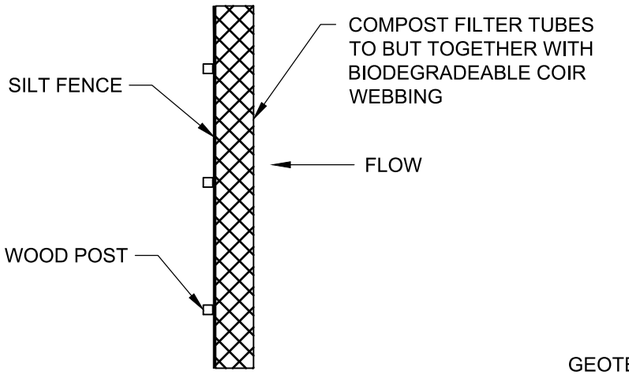
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APPROVED BY: BEM
DATE: June 1, 2022

CAPE MAIN
SANDWICH, MASSACHUSETTS

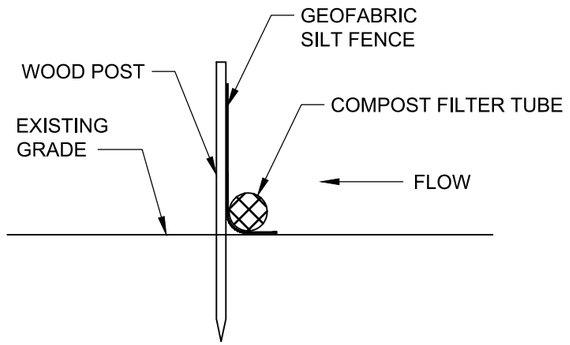
EROSION PROTECTION PLAN

SHEET
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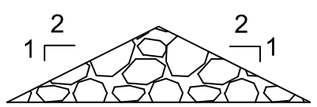


PLAN

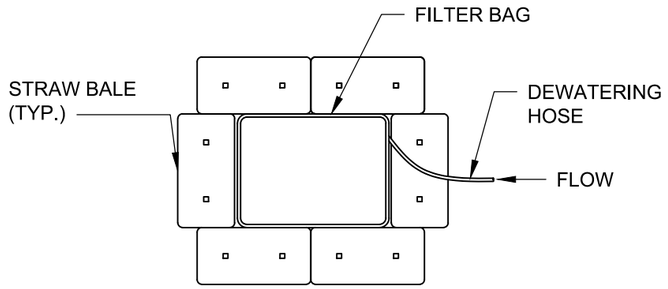


SECTION

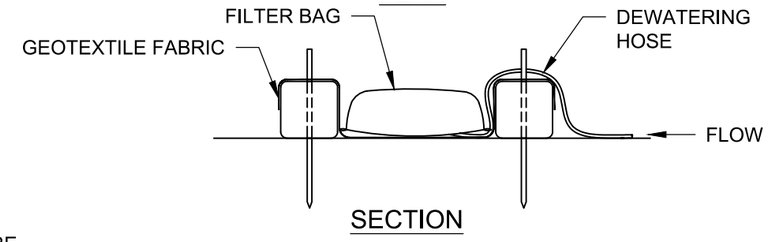
SILT FENCE / COMPOST FILTER TUBE EROSION CONTROL BARRIER



STONE CHECK DAM DETAIL

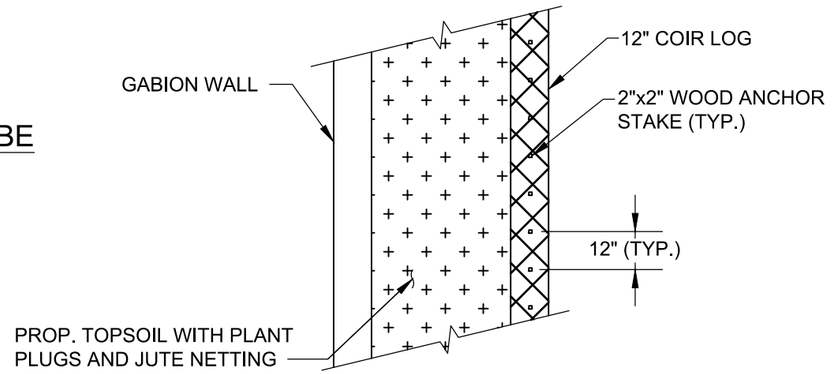


PLAN

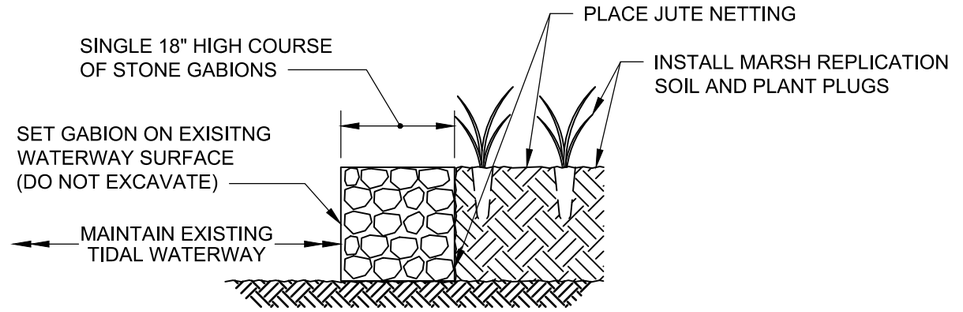


SECTION

DEWATERING CONTAINMENT AREA DETAIL



WETLAND MITIGATION DETAIL



GABION INSTALLATION SECTION DETAIL

GABION INSTALLITION NOTES

1. INSTALLATION OF THIS GABION WALL DURING LOW TIDE ONLY SHALL BE SET UPON EXISTING WATERWAY BOTTOM SURFACE GROUND ALONG THE LOCATION SHOWN IN PLAN VIEW WITH NO PERMITTED EXCAVATION, NOR PLACEMENT OF A SUPPORTING STONE LAYER NOR OTHER IMPACTS INFLICTED TO THE EXISTING WATERWAY.
2. THE TOP ELEVATION OF THIS SINGLE COURSE GABION WALL RUN SHALL BE SET NEARLY EQUIVALENT TO THAT OF THE ADJACENT TOP OF MARSHLAND SURFACE GRADE.
3. A CONTINUOUS BIODEGRADABLE JUTE MESH FOLDED OVER ALONG THE BACKSIDE OF THE GABION CAGES AND LAPPED ATOP OF THE INFILLED MARSHLAND REPLICATION PLANTINGS AREA SHALL CONTAIN THE INFILLED SOIL MATERIAL AS SHOWN IN DETAIL ABOVE AND IN ACCORDANCE WITH APPROVAL BY THE ENGINEER.

PERMIT PLANS - NOT FOR CONSTRUCTION

Jacobs

MASS COASTAL RAILROAD

DRAWN BY: CWB
CHECKED BY: EP
APPROVED BY: BEM
DATE: June 1, 2022

CAPE MAIN
SANDWICH, MASSACHUSETTS

EROSION PROTECTION & GABION INSTALLATION DETAILS

SHEET
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June 1, 2022

EROSION CONTROL NOTES:

1. PRIOR TO BEGINNING CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT FOR ACCEPTANCE A GENERAL WORK SCHEDULE, CONSTRUCTION SEQUENCE AND PLAN WHICH INDICATES PLANNED IMPLEMENTATION OF TEMPORARY AND PERMANENT EROSION CONTROL MEASURES. THIS PLAN SHALL INCLUDE PROPOSED METHODS OF SOILS MANAGEMENT AND LEGAL OFFSITE DISPOSAL OF WASTE MATERIALS.

2. FOR EROSION CONTROL INSTALLATION REQUIREMENTS, REFER TO SHEET 6.

3. THE TOE OF ANY SLOPE IS TO REMAIN AT LEAST ONE FOOT INSIDE OF ALL EROSION CONTROLS. UNDER NO CIRCUMSTANCE SHALL THE CONTRACTOR COVER ANY PORTION OF THE EROSION CONTROLS WITH MATERIAL. ANY MATERIAL THAT IS PLACED ON ANY EROSION CONTROLS BY THE CONTRACTOR, OR ANY AGENT OF THE CONTRACTOR, SHALL BE IMMEDIATELY REMOVED BY THE CONTRACTOR, AND ANY NECESSARY REPAIRS TO THE EROSION CONTROLS ACCOMPLISHED, AT NO COST TO THE OWNER.

4. ADDITIONAL AND/OR REPLACEMENT EROSION CONTROLS SHALL BE INSTALLED AS CONDITIONS WARRANT, OR AS DIRECTED BY THE ENGINEER'S WETLAND SCIENTIST.

5. DURING CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EROSION CONTROL MAINTENANCE AND SHALL INSPECT AND/OR REPLACE ALL CONTROLS AS NEEDED. MAINTENANCE WILL BE CARRIED OUT IN ACCORDANCE WITH THE SPECIFICATIONS AND PERMIT CONDITIONS. THE CONTRACTOR IS RESPONSIBLE FOR CARRYING OUT NECESSARY MAINTENANCE DURING ALL PHASES OF PROJECT CONSTRUCTION AND SHALL BE SUBJECT TO THE INSPECTION AND ACCEPTANCE OF THE ENGINEER.

6. DURING CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING RUNOFF FLOW DURING STORMS AND PERIODS OF RAINFALL, THROUGHOUT THE WORK AREA.

7. SEDIMENTATION CONTROL DEVICES SHALL BE INSPECTED CLOSELY AND MAINTAINED PROMPTLY AS DESCRIBED IN THE SPECIFICATIONS OR AS DIRECTED BY THE ENGINEER'S WETLAND SCIENTIST.

8. DISTURBED SLOPES ALONG THE ROW EMBANKMENT WITHIN THE WORK ZONE WILL BE STABILIZED WITH LOAM AND SEED OR BALLAST AS DIRECTED BY THE ENGINEER.

SALT MARSH REPLICATION NOTES:

1. THE SALT MARSH REPLICATION SITE WILL BE CLEARED AND THE SUBGRADE ELEVATION BROUGHT TO AN EVEN LEVEL. THE SUPERVISING WETLAND SCIENTIST WILL INSPECT THE SUB-GRADE OF THE SALT MARSH REPLICATION SITE TO ENSURE THAT THE AREA IS AT A UNIFORM GRADE.

2. COIR LOGS WILL BE INSTALLED AND STACKED ON THE UPSLOPE SIDE OF THE ROCK GABION WALL UNTIL ADJACENT SALT MARSH ELEVATIONS ARE ACHIEVED.

SALT MARSH REPLICATION NOTES (CONT.):

3. MANUFACTURED HYDRIC SOIL SHALL BE PLACED WITHIN THE SALT MARSH REPLICATION SITE AFTER GRADING THE SUBGRADE HAS BEEN APPROVED. SOILS USED FOR SALT MARSH REPLICATION WILL BE CREATED WITH SOIL AMENDMENTS. MANUFACTURED HYDRIC SOILS ARE CREATED FROM A MIXTURE OF ORGANIC AND MINERAL MATERIALS, WITH THE FINAL PRODUCT CONTAINING AT LEAST 12 PERCENT ORGANIC MATTER CONTENT BY WEIGHT. THE CONTRACTOR MUST PROVIDE AN ANALYSIS OF THE PREPARED TOPSOIL TO THE WETLAND SCIENTIST FOR APPROVAL PRIOR TO INSTALLATION. SOIL MUST BE FREE OF SEEDS OR RHIZOMES OF INVASIVE PLANT SPECIES.

4. NO SOIL USED FOR THE CREATION OF SALT MARSH WILL BE TAKEN FROM ANY AREA SUPPORTING INVASIVE SPECIES, THE PROJECT WILL NOT TRANSLOCATE OR REUSE POTENTIALLY CONTAMINATED SALT MARSH OR WETLAND SOILS FROM AREAS ADJACENT TO THE EXISTING RAILROAD. MANUFACTURED WETLAND SOIL WILL BE GRADED TO ACHIEVE A TOPOGRAPHY TO MATCH THE EXISTING ADJACENT SALT MARSH, OR TO ACHIEVE TOPOGRAPHY OF THE TARGET SALT MARSH COVER TYPE. CONTRACTOR IS RESPONSIBLE FOR PROVIDING SPOT GRADES TO CONFIRM THE FINAL ELEVATION OF THE SALT MARSH REPLICATION AREA.

5. THE SUPERVISING WETLAND SCIENTIST WILL INSPECT THE FILLED SALT MARSH REPLICATION AREA TO ENSURE THAT FINAL ELEVATIONS HAVE BEEN MET. IN RESPONSE TO LOCAL HYDROLOGIC CONDITIONS, THE SUPERVISING WETLAND SCIENTIST MAY MAKE MINOR MODIFICATIONS TO THE FINAL ELEVATIONS IN THE FIELD.

6. THE SALT MARSH REPLICATION SITE WILL BE COVERED WITH A 100% BIODEGRADABLE EROSION CONTROL BLANKET AND SECURED IN PLACE USING 100% BIODEGRADABLE STAKES OR OTHER FASTENERS.

7. THE EROSION CONTROL BARRIERS WILL BE DISASSEMBLED AND PROPERLY DISPOSED OF BEFORE NOVEMBER 1 OF THE THIRD FULL GROWING SEASON AFTER PLANTING OF THE SALT MARSH REPLICATION SITE. SEDIMENT COLLECTED BY THE BARRIERS WILL BE REMOVED AND DISPOSED OF IN A MANNER THAT PREVENTS EROSION AND TRANSPORT TO A WETLAND OR WATERWAY. IF MINOR GRADING IS REQUIRED IN THE IMMEDIATE ZONE AROUND THE EROSION CONTROL BARRIER TO PROVIDE SURFACE HYDROLOGIC CONNECTION BETWEEN THE SALT MARSH REPLICATION SITE AND THE EXISTING SALT MARSH AREA, IT WILL BE DONE BY HAND AND STABILIZED BY MULCH.

8. CONTRACTOR SHALL SUBMIT AN AS-BUILT GRADING PLAN PRIOR TO PLANTINGS.

9. CONTRACTOR SHALL NOT FOUL EXISTING FREIGHT AND SIDING TRACKS, THE CONTRACTOR IS RESPONSIBLE FOR TEMPORARY CROSSING MEANS AND METHODS AND PROTECTING THE TRACK AT ALL TIMES.

PLANTING NOTES:

1. PLANTING WITHIN THE SALT MARSH REPLICATION SITE WILL CONFORM TO THE PLANS OR WILL BE COMPLETED IN ACCORDANCE WITH DIRECTIONS PROVIDED IN THE FIELD. ONLY PLANT MATERIALS NATIVE AND INDIGENOUS TO THE REGION WILL BE USED. USE OF CULTIVARS WILL BE PROHIBITED. SPECIES NOT SPECIFIED IN THE FINAL PLANTING PLAN WILL NOT BE USED WITHOUT WRITTEN APPROVAL FROM THE PERMITTING AGENCY.

2. ALL PLUGS WILL BE SPACED APPROXIMATELY 6-INCHES ON-CENTER, AT THE DIRECTION OF THE SUPERVISING WETLAND SCIENTIST TO SIMULATE NATURAL GROWTH PATTERNS.

3. TRANSPLANTS AND PLANT MATERIAL COLLECTED FROM THE WILD ARE PROHIBITED UNLESS APPROVED IN WRITING BY THE WETLAND SCIENTIST. ALL PLANT MATERIAL USED SHALL BE NURSERY-GROWN AND HEALTHY, SOUND AND FREE OF DISEASE, INSECT PESTS, EGGS OR LARVAE, DISCOLORATIONS, LEAF WILTING OR CURLING AND WEEDS.

4. CONTAINER GROWN STOCK SHALL HAVE BEEN GROWN IN A CONTAINER LONG ENOUGH FOR THE ROOT SYSTEM TO HAVE DEVELOPED SUFFICIENTLY TO HOLD ITS SOIL AFTER REMOVAL FROM THE CONTAINER. ROOTS SHALL VISIBLY EXTEND TO THE INSIDE FACE OF THE GROWING CONTAINER BUT SHALL NOT BE ROOT-BOUND OR GIRDLING.

5. ALL PLANTS SHALL BE DELIVERED TO THE SITE AS LIVE, ACTIVELY GROWING, OR JUST BREAKING DORMANCY, AND ARRIVE TO THE PROJECT SITE READY FOR PLANTING. THE WETLAND SCIENTIST MAY REJECT PLANTS DAMAGED IN HANDLING OR TRANSPORT. PLANT MATERIAL SHALL BE INSTALLED AS SOON AS POSSIBLE AFTER IT HAS BEEN DELIVERED TO THE SITE.

6. SOIL AND ROOTMASS SHALL BE WATERED AND MOIST ON DELIVERY TO THE JOB SITE. PLANTS WITH DRY SOIL AND ROOTS SHALL NOT BE ACCEPTABLE. ALL PLANT MATERIALS TEMPORARILY STORED AT THE SITE PRIOR TO PLANTING SHALL BE STORED OUT OF DIRECT EXPOSURE TO SUN AND WIND, SHALL BE MAINTAINED BY CAREFUL WATERING, AND SHALL BE PROTECTED FROM DAMAGE DUE TO CONSTRUCTION ACTIVITIES AND ADVERSE WEATHER.

7. PLANTING TO OCCUR BETWEEN MAY 1 AND SEPTEMBER 15. ALL PLANT MATERIALS SHALL BE GUARANTEED FOR ONE YEAR FOLLOWING DATE OF FINAL ACCEPTANCE.

PERMIT PLANS - NOT FOR CONSTRUCTION

Jacobs

MASS COASTAL RAILROAD

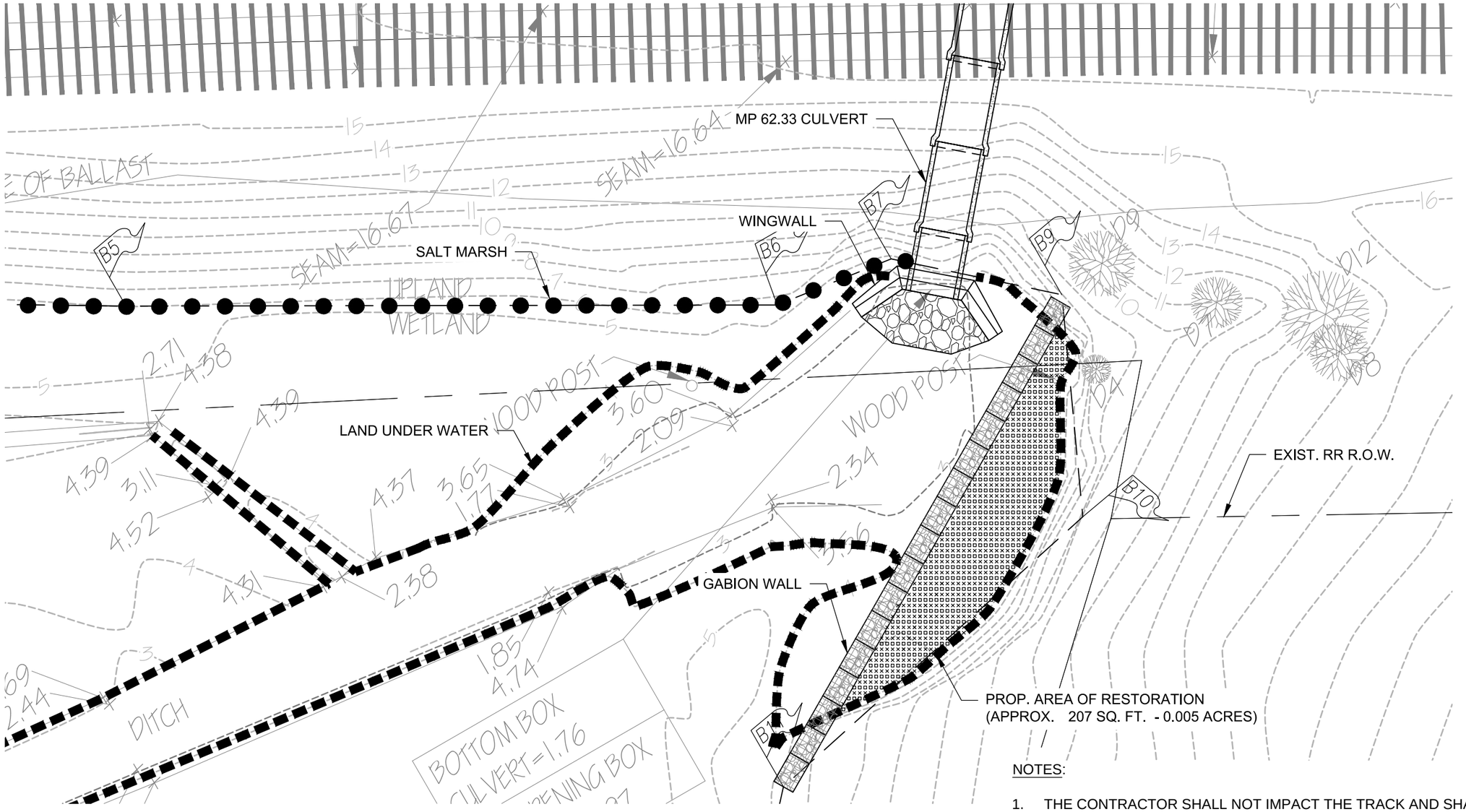
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APPROVED BY: BEM
DATE: June 1, 2022

CAPE MAIN
SANDWICH, MASSACHUSETTS

EROSION CONTROL,SALT MARSH MITIGATION AND PLANTING NOTES

SHEET
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June 1, 2022



PLANTING SCHEDULE						
PLANTING AREA	COMMON NAME	SCIENTIFIC NAME	SYMBOL	SIZE	QTY	ON CENTER SPACING
SALT MARSH REPLICATION AREA	SALT MEADOW CORDGRASS	SPARTINA PATENS	×	2" PLUG	420	6-IN
	SALTGRASS	DISTICHLIS SPICATA	□	2" PLUG	420	6-IN

NOTES:

1. THE CONTRACTOR SHALL NOT IMPACT THE TRACK AND SHALL GUARD AGAINST INTRODUCING ANY GROUND SLOPE DISTURBANCE TO THE BALLAST ON THE NEW EMBANKMENT AND THE SURROUNDING GREEN AREAS WHEN MOBILIZING TO PERFORM THIS RESTORATION WORK AS SHOWN.
2. THE CONTACTOR SHALL REMOVE ALL LITTER, TOOLS AND SURPLUS MATERIALS AS PART OF THE COMPLETION OF THE WORK UPON FINAL SITE INSPECTION AND ACCEPTANCE.

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SCALE IN FEET

PERMIT PLANS - NOT FOR CONSTRUCTION

Jacobs

MASS COASTAL
MASSACHUSETTS COASTAL RAILROAD

DRAWN BY: CWB
CHECKED BY: EP
APPROVED BY: BEM
DATE: June 1, 2022

CAPE MAIN
SANDWICH, MASSACHUSETTS

SALT MARSH RESTORATION PLAN

SHEET
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June 1, 2022

Appendix D – USFWS IPaC Report and Consistency Determination

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
http://www.fws.gov/newengland

In Reply Refer To: May 19, 2022
Project code: 2022-0044757
Project Name: Cape Main MP 63.22 Culvert Replacement

Subject: Consistency letter for the 'Cape Main MP 63.22 Culvert Replacement' project under the revised February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat.

To whom it may concern:

The U.S. Fish and Wildlife Service (Service) has received your request dated May 19, 2022 to verify that the **Cape Main MP 63.22 Culvert Replacement** (Proposed Action) may rely on the revised February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO) to satisfy requirements under Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 *et seq.*).

Based on the information you provided (Project Description shown below), you have determined that the Proposed Action will have no effect on the endangered Indiana bat (*Myotis sodalis*) or the threatened Northern long-eared bat (*Myotis septentrionalis*). If the Proposed Action is not modified, **no consultation is required for these two species.** If the Proposed Action is modified, or new information reveals that it may affect the Indiana bat and/or Northern long-eared bat in a manner or to an extent not considered in the PBO, further review to conclude the requirements of ESA Section 7(a)(2) may be required.

For Proposed Actions that include bridge/culvert or structure removal, replacement, and/or maintenance activities: If your initial bridge/culvert or structure assessments failed to detect Indiana bats, but you later detect bats prior to, or during construction, please submit the Post Assessment Discovery of Bats at Bridge/Culvert or Structure Form (User Guide Appendix E) to this Service Office within 2 working days of the incident. In these instances, potential incidental take of Indiana bats may be exempted provided that the take is reported to the Service.

If the Proposed Action may affect any other federally-listed or proposed species and/or designated critical habitat, additional consultation between the lead Federal action agency and this Service Office is required. If the proposed action has the potential to take bald or golden eagles, additional coordination with the Service under the Bald and Golden Eagle Protection Act may also be required. In either of these circumstances, please advise the lead Federal action agency accordingly.

The following species may occur in your project area and **are not** covered by this determination:

- American Chaffseed *Schwalbea americana* Endangered
- Monarch Butterfly *Danaus plexippus* Candidate
- Red Knot *Calidris canutus rufa* Threatened
- Sandplain Gerardia *Agalinis acuta* Endangered

Project Description

The following project name and description was collected in IPaC as part of the endangered species review process.

Name

Cape Main MP 63.22 Culvert Replacement

Description

Culvert replacement project under RR embankment through salt marsh

Determination Key Result

Based on the information you provided, you have determined that the Proposed Action will have no effect on the endangered Indiana bat and/or the threatened Northern long-eared bat. Therefore, no consultation with the U.S. Fish and Wildlife Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended 16 U.S.C. 1531 *et seq.*) is required for these two species.

Qualification Interview

1. Is the project within the range of the Indiana bat[1]?

   [1] See Indiana bat species profile

   Automatically answered
   No

2. Is the project within the range of the Northern long-eared bat[1]?

   [1] See Northern long-eared bat species profile

   Automatically answered
   Yes

3. Which Federal Agency is the lead for the action?

   B) Federal Railroad Administration (FRA)

4. Are *all* project activities limited to non-construction[1] activities only? (examples of non-construction activities include: bridge/abandoned structure assessments, surveys, planning and technical studies, property inspections, and property sales)

   [1] Construction refers to activities involving ground disturbance, percussive noise, and/or lighting.

   No

5. Does the project include *any* activities that are **greater than** 300 feet from existing road/rail surfaces[1]?

   [1] Road surface is defined as the actively used [e.g. motorized vehicles] driving surface and shoulders [may be pavement, gravel, etc.] and rail surface is defined as the edge of the actively used rail ballast.

   No

6. Does the project include *any* activities **within** 0.5 miles of a known Indiana bat and/or NLEB hibernaculum[1]?

   [1] For the purpose of this consultation, a hibernaculum is a site, most often a cave or mine, where bats hibernate during the winter (see suitable habitat), but could also include bridges and structures if bats are found to be hibernating there during the winter.

   No

7. Is the project located **within** a karst area?

   No

8. Is there *any* suitable[1] summer habitat for Indiana Bat or NLEB **within** the project action area[2]? (includes any trees suitable for maternity, roosting, foraging, or travelling habitat)

   [1] See the Service's summer survey guidance for our current definitions of suitable habitat.

   [2] The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR Section 402.02). Further clarification is provided by the User's Guide for the Range-wide Programmatic Consultation for Indiana Bat and Northern Long-eared Bat.

   No

9. Does the project include wetland or stream protection activities associated with compensatory wetland mitigation?

   Yes

10. Does the project include slash pile burning?

    No

11. Does the project include *any* bridge removal, replacement, and/or maintenance activities (e.g., any bridge repair, retrofit, maintenance, and/or rehabilitation work)?

    Yes

12. Is there *any* suitable habitat[1] for Indiana bat or NLEB **within** 1,000 feet of the bridge? (includes any trees suitable for maternity, roosting, foraging, or travelling habitat)

    [1] See the Service's current summer survey guidance for our current definitions of suitable habitat.

    No

13. Does the project include the removal, replacement, and/or maintenance of *any* structure other than a bridge? (e.g., rest areas, offices, sheds, outbuildings, barns, parking garages, etc.)

    No

14. Will the project involve the use of **temporary** lighting *during* the active season?

    Yes

15. Is there *any* suitable habitat **within** 1,000 feet of the location(s) where **temporary** lighting will be used?

    No

16. Will the project install new or replace existing **permanent** lighting?

    No

17. Does the project include percussives or other activities (**not including tree removal/ trimming or bridge/structure work**) that will increase noise levels above existing traffic/ background levels?

    No

18. Are *all* project activities that are **not associated with** habitat removal, tree removal/ trimming, bridge and/or structure activities, temporary or permanent lighting, or use of percussives, limited to actions that DO NOT cause any additional stressors to the bat species?

    Examples: lining roadways, unlighted signage , rail road crossing signals, signal lighting, and minor road repair such as asphalt fill of potholes, etc.

    Yes

19. Will the project raise the road profile **above the tree canopy**?

    No

20. Is the location of this project consistent with a No Effect determination in this key?

    Automatically answered
    Yes, because the project action area is not within suitable Indiana bat and/or NLEB summer habitat and is outside of 0.5 miles of a hibernaculum.

21. Is the bridge removal, replacement, or maintenance activities portion of this project consistent with a No Effect determination in this key?

    Automatically answered
    Yes, because the bridge is more than 1,000 feet from the nearest suitable habitat and is therefore considered unsuitable for use by bats

22. Is the temporary lighting portion of this project consistent with a No Effect determination in this key?

    Automatically answered
    Yes, because the lighting will be more than 1,000 feet from the nearest suitable habitat

Determination Key Description: FHWA, FRA, FTA Programmatic Consultation For Transportation Projects Affecting NLEB Or Indiana Bat

This key was last updated in IPaC on April 28, 2022. Keys are subject to periodic revision.

This decision key is intended for projects/activities funded or authorized by the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), and/or Federal Transit Administration (FTA), which may require consultation with the U.S. Fish and Wildlife Service (Service) under Section 7 of the Endangered Species Act (ESA) for the endangered **Indiana bat** (*Myotis sodalis*) and the threatened **Northern long-eared bat** (NLEB) (*Myotis septentrionalis*).

This decision key should only be used to verify project applicability with the Service's February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects. The programmatic biological opinion covers limited transportation activities that may affect either bat species, and addresses situations that are both likely and not likely to adversely affect either bat species. This decision key will assist in identifying the effect of a specific project/activity and applicability of the programmatic consultation. The programmatic biological opinion is not intended to cover all types of transportation actions. Activities outside the scope of the programmatic biological opinion, or that may affect ESA-listed species other than the Indiana bat or NLEB, or any designated critical habitat, may require additional ESA Section 7 consultation.

IPaC User Contact Information

Agency: GZA GeoEnvironmental Inc
Name: kimberly degutis
Address: 249 Vanderbilt Ave
City: Norwood
State: MA
Zip: 02062
Email kimberly.degutis@gza.com
Phone: 7812785852

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
http://www.fws.gov/newengland

In Reply Refer To: May 19, 2022
Project Code: 2022-0044757
Project Name: Cape Main MP 63.22 Culvert Replacement

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 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
- Coastal Barriers

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: 2022-0044757
Event Code: None
Project Name: Cape Main MP 63.22 Culvert Replacement
Project Type: Railroad - Maintenance/Modification
Project Description: Culvert replacement project under RR embankment through salt marsh
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@41.7511203,-70.47575132702619,14z



Counties: Barnstable County, Massachusetts

Endangered Species Act Species

There is a total of 5 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.

---

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.

Mammals

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Birds

NAME	STATUS
Red Knot *Calidris canutus rufa* There is **proposed** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/1864	Threatened

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

Flowering Plants

NAME	STATUS
American Chaffseed *Schwalbea americana* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1286	Endangered
Sandplain Gerardia *Agalinis acuta* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8128	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

Coastal Barriers

Projects within the John H. Chafee Coastal Barrier Resources System (CBRS) may be subject to the restrictions on federal expenditures and financial assistance and the consultation requirements of the Coastal Barrier Resources Act (CBRA) (16 U.S.C. 3501 et seq.). For more information, please contact the local Ecological Services Field Office or visit the CBRA Consultations website. The CBRA website provides tools such as a flow chart to help determine whether consultation is required and a template to facilitate the consultation process.

UNIT	NAME	TYPE	ESTABLISHMENT DATE	FLOOD INSURANCE DATE
MA-14P	Town Neck	Otherwise Protected Area	N/A	11/16/1991

IPaC User Contact Information

Agency: GZA GeoEnvironmental Inc
Name: kimberly degutis
Address: 249 Vanderbilt Ave
City: Norwood
State: MA
Zip: 02062
Email kimberly.degutis@gza.com
Phone: 7812785852



GZA GeoEnvironmental, Inc.

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WATER
CONSTRUCTION MANAGEMENT

249 Vanderbilt Avenue
Norwood, MA 02062
T: 781.278.3700
F: 781.278.5701
F: 781.278.5702
www.gza.com

SECTION 404 CLEAN WATER ACT PRE-CONSTRUCTION NOTIFICATION

CULVERT REPLACEMENT PROJECT AT CAPE MAIN MILE POST 63.22 Sandwich, Massachusetts

SEPTEMBER 2023
File No. 01.0174521.05



PREPARED FOR:
Massachusetts Coastal Railroad

GZA GeoEnvironmental, Inc.
249 Vanderbilt Avenue | Norwood, MA 02062
781-278-5700

Offices Nationwide
www.gza.com

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U.S. Army Corps of Engineers (USACE), New England District (NAE)

PRE-CONSTRUCTION NOTIFICATION (PCN)

DATA REQUIRED BY THE PRIVACY ACT OF 1974

Authority Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332.

Principal Purpose The information provided will be used in evaluating activities under Pre-Construction Notification procedures within New England.

Routine Uses This information may be shared with other federal, state, and local government agencies during the application review process. Submission

Disclosure of requested information is voluntary. However, if information is not provided the PCN application cannot be fully evaluated nor can USACE render a permit decision.

Instructions The applicant must complete ALL required sections of this document before their submission to USACE. The PCN submission to USACE shall include one set of drawings which show the location and character of the proposed activity, statements that address each required field below, and documentation that supports each field (e.g., emails, letters, description/narrative, phone calls, surveys, reports, etc.). Electronic submissions to the following address are strongly preferred: cenae-r-ma@usace.army.mil. The email subject line shall contain the following: General Permit #, PCN, City/Town, and date submitted. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY USACE)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME
First - Christopher Middle - Last - Podgurski
Company - MassCoastal Railroad
E-mail Address - cpodgurski@masscoastal.com

8. AUTHORIZED AGENT'S NAME AND TITLE (*agent is not required*)
First - Kimberly Middle - Last - Degutis
Company - GZA GeoEnvironmental Inc
E-mail Address - kimberly.degutis@gza.com

6. APPLICANT'S ADDRESS:
Address- 200 Myles Standish Blvd, Ste 3
City - Taunton State - MA Zip - 02780 Country - USA

9. AGENT'S ADDRESS:
Address- 249 Vanderbilt Ave
City - Norwood State - MA Zip - 02062 Country - USA

7. APPLICANT'S PHONE NOs. with AREA CODE
a. Residence b. Business c. Fax d. Mobile
781.828.0576

10. AGENT'S PHONE NOs. with AREA CODE
a. Residence b. Business c. Fax d. Mobile
781.278.585

STATEMENT OF AUTHORIZATION

11. I hereby authorize, Kimberly Degutis to act on my behalf as my agent in the processing of this general permit PCN application and to furnish, upon request, supplemental information in support of this general permit PCN application.

P. Christopher Podgurski 11/22/23
SIGNATURE OF APPLICANT DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME or TITLE (*see instructions*)
Culvert Replacement at Cape Main MP 63.22

13. NAME OF WATERBODY, IF KNOWN (*if applicable*)
Unnamed Trib to Old Harbor Creek

14. PROPOSED ACTIVITY STREET ADDRESS (*if applicable*)
N/A
City: Sandwich State: MA Zip: 02537

15. LOCATION OF PROPOSED ACTIVITY (*see instructions*)
Latitude: 41°45'5.38"N °N Longitude: 70°28'35.87"W °W

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (*see instructions*)

State Tax Parcel ID: N/A Municipality: East Sandwich

Section: N/A Township: N/A Range: N/A

17. DIRECTIONS TO THE SITE.

From Sagamore Bridge: Route 6 E to exit 59 / MA-130 N in Sandwich. Follow Route 130 N 1 mile to Beale Ave. R onto Beale Ave for 0.3 miles. R onto Main Street for 0.2 miles. R onto MA-6A East for 0.9 miles. L onto Great Island Road, 0.1 mile to RR crossing. L along RR tracks approximately 800 feet to culvert crossing.

18. IDENTIFY THE SPECIFIC GENERAL PERMIT(S) YOU PROPOSE TO USE:

GP 23 - Linear Transportation Projects

GP 24 - Temporary construct, access and dewatering

19. DESCRIPTION OF PROPOSED GENERAL PERMIT ACTIVITY (*see instructions*)

Culvert replacement project: temporary support of excavation including dewatering, pumped bypass and temporary occupancy of salt marsh. Restoration of salt marsh and land under water to salt marsh upon project completion. See attached narrative for additional information.

20. DESCRIPTION OF PROPOSED MITIGATION MEASURES (*see instructions*)

Limit of work confined to railroad embankment and right-of-way. Approximately 207 SF/0.005 Ac of restoration proposed for approx. 17 SF of salt marsh impact. See attached narrative for additional information.

21. PURPOSE OF GENERAL PERMIT ACTIVITY (*Describe the reason or purpose of the project, see instructions*)

The purpose of the Project is to replace the existing, partially- failed 24 x 30-inch stone box culvert with a new 48-inch reinforced concrete pipe to provide safe passage for trains across the culvert area. The replacement of the existing culvert is necessary to avoid a serious and immediate threat to the health and safety of the citizens of the Commonwealth, significant loss of railroad property, and severe, deleterious impacts to the environment. See attached narrative for additional information.

22. Quantity of Wetlands, Streams, or Other Types of Waters Directly Affected by Proposed General Permit Activity (*see instructions*)

Area (square feet)	Length (linear feet)	Volume (cubic yards)	Duration	Purpose
0.006		5CY (stone)	Perm	culvert wingwalls, velocity dissipation devices
		10CY (wetland sc		

Each PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site.

23. List any other GP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project on any related activity (*see instructions*)

N/A

24. If the proposed activity will result in the loss of aquatic resources that exceed those identified in the New England District Compensatory Mitigation Thresholds, explain how the compensatory mitigation requirement will be satisfied. (*see instructions*)

N/A

25. Is Any Portion of the General Permit Activity Already Complete? [ ] Yes [X] No If Yes, describe the completed work:

26. List the name(s) of any species listed as endangered or threatened under the Endangered Species Act that might be affected by the proposed GP activity or utilize the designated critical habitat that might be affected by the proposed GP activity. (*see instructions*)

No effect determination by USFWS for Northern Long Eared Bad, Rufa Red Knot and American Chaffseed. See attached narrative for additional information.

27. List any historic properties that have the potential to be affected by the proposed GP activity or include a vicinity map indicating the location of the historic property or properties. Attach relevant project information, along with any responses received from project notifications to this submittal. (*see instructions*)

No responses to PNF issued. No resources affected.

28. For a proposed GP activity that will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, identify the Wild and Scenic River or the "study river":

N/A

29. If the proposed GP activity also requires permission from the USACE pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers federally authorized civil works project, have you submitted a written request for section 408 permission from the USACE district having jurisdiction over that project? [ ] Yes [X] No

If "yes", please provide the date your request was submitted to the USACE District:

30. Does the activity require a 401 Water Quality Certification (WQC)? If so, specify the type of 401 WQC that is required (general or individual). In cases where an individual 401 WQC is required, provide the date the 401 WQC certification request was submitted to the certifying authority and their contact information.

MADEP X289061 issued 2022-06-30. See attachted narrative for additional information.

31. If the terms of the GP(s) you want to use require additional information to be included in the PCN (i.e. sampling and analysis plan), please include that information in this space or provide it on an additional sheet of paper marked Block 30. (*see instructions*)

See attached narrative for additional information.

32. I certify that the information in this pre-construction notification is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

P. Christopher Podgurski	11/22/23		11/22/23
SIGNATURE OF APPLICANT	DATE	SIGNATURE OF AGENT	DATE

The Pre-Construction Notification must be signed by the person who desires to undertake the proposed activity (applicant) and, if the statement in block 11 has been filled out and signed, the authorized agent.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

1.0 INTRODUCTION

On behalf of the Massachusetts Coastal Railroad (MCRR), GZA GeoEnvironmental Inc. (GZA) is requesting a permit authorization to impact Waters of the United States. The Cape Main Mile Post (MP) 63.22 Culvert Replacement Project (Project) involves the replacement of an existing 24 x 30-inch box culvert with a 48-inch reinforced concrete pipe with precast concrete wingwalls on the Massachusetts Department of Rail and Transit (MassDOT) owned Cape Main Line in the Town of Sandwich (see **Figure 1 – Site Locus**). Armor stone is proposed on the railroad embankment within the immediate vicinity of the culvert location to provide slope stability and protection during extreme high tides, coastal storm and other wave generating events. Replacement work will consist of the establishment of a support of excavation and water bypass, removal of the embankment overburden, removal of the existing culvert, preparation of the substrate, placement of the proposed 48-inch culvert, installation of precast concrete wingwalls, placement of 5-foot by 5-foot riprap pads on the inlet and outlet sides, re-establishment of the embankment and overburden, restoration of the track and ties in the Project area.

Allowing the culvert replacement project offers tangible public benefit in providing a safe, reliable train crossing through sensitive resource areas. In addition, MCRR proposes to provide salt marsh restoration above and beyond what is required for proposed impacts due to replacement of the culvert. As part of this restoration work, MCRR will address an existing erosion issue that currently occurs on the upstream side of the culvert.

The following narrative provides a detailed description of the existing conditions and the proposed Project, as well as a description of the resource areas and potential impacts to those resources that may result from this Project. Please note that the project is being completed on land owned by MassDOT and, as an Agency of the Commonwealth, MassDOT is exempt from the abutter notification requirements of the Wetlands Protection Act, filing fees, peer review fees and local bylaws.

Please note that a PCN for this project was issued by the USACE (NAE-2022-02055, dated April 3, 2023) and has been included under **Appendix F – Prior Approvals**. Also included is the CWA 401 WQC issued by MassDEP (X289061, dated November 2, 2022). We have also included the two prior Requests for Information issued by the USACE under **Appendix F** for reference.

The Right of Way and bridge is owned by MassDOT Rail & Transit. As a MassDOT-owned bridge, the replacement of said structure qualifies as a bridge exempt project under the Transportation Bond Bill. Therefore, this project is exempt from the Wetlands Protection Act (WPA), Chapter 91, and the Massachusetts Environmental Policy Act (MEPA).

1.1 PROJECT PURPOSE

The purpose of the Project is to replace the existing, partially-failed 24- by 30-inch stone box culvert with a new 48-inch reinforced concrete pipe to provide safe passage for trains across the culvert area. The swift replacement of the existing culvert is necessary to avoid a serious and immediate threat to the health and safety of the citizens of the Commonwealth, significant loss of railroad property, and severe, deleterious impacts to the environment. In addition, replacement of the culvert crossing maintains the hydraulic capacity of the existing crossing and continues to support anadromous fish passage of American Eel (*Anguilla rostrate*).

2.0 REGULATORY COMPLIANCE SUMMARY

Except as otherwise provided in 314 CMR 9.06(3), no discharge of dredged or fill material shall be permitted to certain waters and wetlands designated in the Massachusetts Surface Water Quality Standards (314 CMR 4.00) as Outstanding Resource Waters (ORWs), The exceptions are granted without a variance for certain eligible activities as listed in 314 CMR9.06 (3)(a) through (k) if MassDEP determines that the discharge of dredged or fill material may be permitted. The proposed project is an eligible activity as defined in 314 CMR 9.06 (3)(c), as follows:

(c) Maintenance, repair, replacement or reconstruction but not substantial enlargement of existing and lawfully located structures or facilities including buildings, roads, railways, utilities, dams, and coastal engineering structures;

The proposed project is also an eligible activity as defined in 314 CMR 9.06 (3)(k), as follows:

(k) Maintenance, repair, replacement, or reconstruction of structures or facilities for water dependent uses. In addition, the enlargement of structures or facilities for water-dependent uses is allowed only in following limited circumstances:

1. *in an Outstanding Resource Water that is designated for purposes other than a public water supply; or*

   The project is designed to facilitate tidally influenced flow equalization between two wetland areas under an existing railroad embankment and is not affiliated with a public water supply.

2. *in an Outstanding Resource Water that is located within an Area of Critical Environmental Concern provided that if there is a resource management plan for the ACEC that has been adopted by the municipality and approved by the Secretary, the Department determines that: the enlargement of structures or facilities is consistent with said plan and the fill or structure associated with the enlargement activity is located entirely within an area of previously filled tidelands.*

   The culvert replacement project at Cape Main MP 63.22 is not located within an Area of Critical Environmental Concern (ACEC).

The project was determined to be subject to federal, state and local environmental regulations. Below is a list of permits or approvals that MCRR is in the process of receiving.

2.1 MASSACHUSETTS WETLANDS PROTECTION ACT – FOOTPRINT BRIDGE EXEMPTION

According to c. 79 § 24 of the (Massachusetts) Acts of 2014, the project qualifies for using the Footprint Bridge Exemption. As stated in the cited regulation, the ""bridge" shall include any structure spanning and providing passage over water, railroad right-of-way, public or private way, other vehicular facility or other area." As the culvert meets the definition of a bridge, the exemption is applicable and eliminates the need for the review under Massachusetts Environmental Policy Act, Wetlands Protection Act and Waterways Regulations (Chapter 91).

2.2 CLEAN WATER ACT SECTION 401

A request for certification under Section 401 - Water Quality Certificate is being applied for by MassCoastal for the proposed project. Authorization by the Massachusetts Department of Environmental Protection is anticipated in early-July 2022.

2.3 SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT

In accordance with this request for Section 404 authorization, MCRR is coordinating with the State Historic Preservation Officer (SHPO), the Board of Underwater Archeological Resources (BUAR), and appropriate Tribal Historic Preservation Officers (THPO).

2.4 ENDANGERED SPECIES ACT OF 1973

The proposed culvert replacement project is not located within mapped Natural Heritage & Endangered Species Program (NHESP) Estimated or Priority Habitat. Priority Habitat is the extent of habitat for state-listed rare species, both plants and animals. Estimated Habitat is a sub-set of the Priority Habitat and is the geographical extent of habitat of state-listed rare wetlands wildlife. Mapped Priority habitat exists to the northwest of the project location, however the limit of work for this project will be outside of the mapped habitat area. The project area and NHESP data layers are depicted within **Appendix A - Existing Conditions Figures.**

In addition, a search conducted of the U.S. Fish and Wildlife (USFWS) Information for Planning and Conservation (IPaC) database on April 28, 2022 listed two birds, two plants and 20 migratory birds as potentially present within the project limits[1]. A copy of the IPaC report is included under **Appendix D**. The listed species identified in the IPaC report are summarized below in Table 1.

Table 1 – Potential Federally-Listed Protected Species within the Project Area

Scientific Name	Common Name	Status
Myotis septentrionalis	Northern Long-Eared Bat	Federally Threatened
Calidris canutus rufa	Red Knot	Federally Threatened
Schwalbea americana	American Chaffseed	Federally Endangered
Agalinis acuta	Sandplain Gerardia	Federally Endangered

Northern long-eared bat (NLEB) is a federally listed species (threatened) that is known to occur within the project limits. While Designated Critical Habitat for the NLEB has been defined, specific habitat that may be used by the bats are protected under the 4(d) rule of the Endangered Species Act if tree removal is required. Specifically:

> ***"Incidental take resulting from tree removal is prohibited if: 1) Occurs within 0.25-mile radius of known northern long-eared bat hibernacula or 2) cuts or destroys known occupied maternity roost trees, or any other trees within a 150-foot radius from the known maternity tree during the pup season (June 1 through July 31)."***

For the NLEB, potential habitat includes known hibernacula (e.g. caves or mines) and maternity or roost trees that include hardwood specimens greater than 3-inch diameter breast height (DBH) with crevices or shaggy bark capable of providing shelter for the bats. Large dead snags are also considered resting habitat.

A review of the Massachusetts Division of Fisheries and Wildlife's NLEB page[2] with interactive habitat map indicated no mapped hibernacula are located within 0.25 miles of the project location and no mapped maternity roost trees are

[1] Information for Planning and Consultation." IPaC, U.S. Fish and Wildlife Service, 28 April 2022, ecos.fws.gov/ipac/project/GORHKJ2CYJHJVDDQLDJMYGHDRE/resources.

[2] MassWildlife's Northern Long Eared Bat information page with interactive habitat identification map, accessed 28 April 2022: https://www.mass.gov/service-details/the-northern-long-eared-bat

mapped within 150-feet of the project location. In addition, a limited habitat assessment was conducted within the project limits. No trees >3" DBH were identified within the project limits that may be permanently impacted by project construction.

Given the limited nature of required, selective tree and shrub clearing to access the project work zone, project activities are not anticipated to affect neither the NLEB nor any migratory birds protected under the Migratory Bird Treaty Act or identified on the USFWS Birds of Conservation Concern (BCC) list (see **Appendix D – USFWS IPaC Report**).

American chaffseed (*Schwalbea americana*) is a Federally listed (endangered) hemiparasitic plant species that is known to potentially occur on the Cape Cod peninsula. The American chaffseed requires frequent fire or understory removal to persist. According to the USFWS species account page[3], historically this species occurred along the coast from Massachusetts to Louisiana in open grass-sedge systems in moist acidic sandy loams or sandy peat loams. USFWS further states that American chaffseed likely "existed on savannas and pinelands throughout the coastal plain and on sandstone knobs and plains inland where frequent, naturally occurring fires maintained these sub-climax communities". The project site does not contain habitat likely to support American chaffseed, therefore the species is unlikely to occur within the project limits.

Sandplain gerardia (*Agalinis acuta*) is a Federally listed (endangered) hemiparasitic plant that requires exposed mineral soil in close proximity to little bluestem (*Schizachyrium scoparium*) and other native grasses. It inhabits dry, sandy, poor-nutrient soils in sandplain and serpentine sites within 10-miles of the coast[4]. The project site does not contain habitat likely to support Sandplain gerardia, therefore the species is unlikely to occur within the project limits.

An informal consultation using the IPaC determination key for the revised February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO). The USFWS issued a "no effect" determination for project actions and the project does not require further consultation with the USFWS. See **Appendix D - USFWS IPaC Report and Consistency Determination** for the species list and consistency letter.

Necessary clearing, grubbing and/or selective removal of trees will be conducted by hand at the direction of the Engineer. Removal of vegetation will be limited to areas of construction access and areas required for safe excavation of embankment soils to access the existing culvert and work area.

2.5 COASTAL ZONE MANAGEMENT CONSISTENCY DETERMINATION

The Project is located within the areas under the jurisdiction of the Federal Coastal Zone Management Act. The Project will require a federal consistency review.

2.6 OTHER FEDERAL JURISDICTIONAL REQUIREMENTS

The Project will not impact federal lands or wetlands and waterbodies associated with or designated as a National Wild and Scenic River.

[3] USFWS Species Account for American chaffseed, located at: https://www.fws.gov/southeast/wildlife/plants/american-chaffseed/

[4] https://www.biologicaldiversity.org/campaigns/esa_works/profile_pages/SandplainGerardia.html

A portion of the project limits are located within the John H. Chafee Coastal Barrier Resources System, within the Town Neck Otherwise Protected Area (MA-14P). The project is not Federally funded and therefore does not require consultation with the USFWS.

3.0 EXISTING CONDITIONS

A field inspection was performed in Sandwich Massachusetts on April 2021 to observe an embankment issue reported by MassCoastal Railroad (MCRR) and to document the conditions and recommendation for addressing the existing 24-inch square drainage stone box culvert crossing under the track at MP 63.22 on the Cape Main Line. According to MCRR, this location has repeatedly exhibited a cone-shaped sinkhole which is a reoccurring condition being filled with stone ballast when needed. It is suspected to be caused by the loss of embankment soil fines settling down through void cracks in the culvert stones below it during combinations of extremely high moon tides with storm events resulting in high stage tidal surge at this location.

A record video scan as well as a physical crawl through inspection of the entire length of this culvert was performed by Bass Ready Inc in July 2021. These efforts verified that there is a drop down in roof stone and also that the numerous joint gaps between the supporting sidewall stone blocks and this and other roof stones are allowing the pumping and drawdown of soil fines within the embankment just above the culvert wall and roof stones likely with every extreme rise and fall of the tidal storm surge of a high intensity or greater. At this milepost 63.22 stone box culvert, it was further observed that at the east bayside end of this culvert, the end of this culvert is exposed to surge impacts with rising tidal waters swirling across the opening as evidenced by the flattened eel grass patterns in front of the culvert opening. Also observed was embankment stone ballast washed out and stacking in the inland side of the culvert due to high force tidal surge action.

This culvert itself; based on visual observation, is open and clear without any large blockages and is capable of passing tidal storm water volumes in both flow directions as an equalizer structure for the length of this stone box culvert. Despite this fact, it is jeopardizing the integrity of the railroad embankment. This culvert at MP 63.22 is prone to the same problematic issues as was the culvert that was ultimately replaced at MP 66.14 in April of 2020. Given the similar vulnerable conditions, it is therefore recommended that replacement of this culvert is prioritized. The ongoing, critical structural failings of this culvert at MP 63.22 as evidenced by the dropped ceiling stone and gap ridden walls which continue to be vulnerable to the detrimental effects of long-term tidal rise action are resulting in embankment and track settlement and it needs to be removed and replaced

Although passenger services are only seasonally scheduled for the railroad, the Cape Main Line supports regular daily freight train traffic and equipment moves. The failure of the embankment and railroad track due to the culvert could result in a catastrophic event, such as a train derailment, potentially resulting in the loss of lives (train operators, neighbors); loss of property; and loss of important commercial services to the communities of Cape Cod and southeastern Massachusetts. In the event of an accident, adjacent sensitive resource areas would also be negatively impacted by the release of hazardous and non-hazardous materials associated with the train and its cargo.

The Cape Main Line operates both daily freight service and seasonal passenger trains. In addition, it offers the CapeFlyer service on weekends and holidays from Memorial Day to Labor Day. If not repaired, the current conditions will continue to deteriorate to the point of disrupting service.

3.1 WETLANDS PROTECTION ACT RESOURCE AREAS

Wetlands Protection Act Resource Areas identified within the project limits include:

- Salt Marsh
- Land Under Water Bodies and Waterways (LUW)

3.1.1 Salt Marsh

Wetlands Protection Act Regulations (310 CMR 10.32) define Salt Marshes as "a coastal wetland that extends landward up to the highest high tide line, that is, the highest spring tide of the year, and is characterized by plants that are well adapted to or prefer living in, saline soils. Dominant plants within salt marshes typically include salt meadow cordgrass (*Spartina patens*) and/or salt marsh cordgrass (*Spartina alterniflora*), but may also include, without limitation, spike grass (*Distichlis spicata*), high-tide bush (*Iva frutescens*), blackgrass (*Juncus gerardii*), and common reedgrass (*Phragmites*).".

GZA assessed resource areas within the project limits and observed Salt Marsh. Permanent impacts to salt marsh have been limited to less than 20 square feet, and temporary impacts have been limited to less than 270 sf^2. MCRR is proposing to restore approximately 207 sf^2 of eroded salt marsh, to the southeast of the culvert, as mitigation for permanent impacts due to project construction. The wetland delineation report has been included under **Appendix B – Wetland Delineation Report**. Salt marsh limits are included in the permit plans under **Appendix C – Permit Plans.**

3.1.2 Land Under Water Bodies and Waterways

Wetlands Protection Act Regulations (310 CMR 10.56) define Land Under Water Bodies and Waterways (LUW) as "the land beneath any creek, river, stream, pond or lake". The boundary of LUW is the mean annual low water level. LUW for areas within the proposed support of excavation is limited to the inlet and outlet areas of the existing equalization culvert and a stream channel with a defined topographic break.

Areas of LUW were identified in the field. Limited impacts to the LUW would occur due to addition of riprap at the proposed culvert inlet and outlet areas to prevent scour conditions during storm events and extremes in tidal change associated with spring high and low tidal cycles. The proposed improvements will not affect the water carrying capacity of the adjacent marsh as the improvements will not create a dam or blockage to downstream receiving waters. The proposed improvements will not affect the ground or surface water quality of the marsh. No additional impervious surface runoff will be added to the marsh from the railroad embankment or from the culvert replacement. The existing capacity of the immediately adjacent marsh provides limited capacity to provide breeding habitat, escape cover or food availability for resident fish; the proposed riprap would, under higher volume storm and tidal conditions, provide escape cover and areas for potential vegetation establishment within the marsh where currently none exists due to velocity of the water. The existing condition provides poor wildlife habitat and is in a degraded state. The proposed improvements are proposing to permanently alter 234 ft^2 of LUW.

The proposed improvements incorporate stormwater BMPs through the installation of riprap that is intended to reduce the velocity of the water flowing into and out of the culvert and reduce scour conditions within the downstream marsh. The existing conditions near the proposed riprap pad include a denuded marsh bottom with no cover and no vegetation. Construction methods to minimize impacts to LUW, including a limited footprint of disturbance and access using the adjacent railroad embankment, will be used to further avoid impacts to LUW and adjacent salt marsh.

4.0 ALTERNATIVES ANALYSIS

Several alternatives were assessed during the planning and design of the proposed culvert replacement project, including the No Build; Rehabilitation of the Existing Stone Box Culvert, and Full Culvert Replacement. However, it was determined that there are no safe practicable alternatives that do not involve an additional discharge of fill material to jurisdictional wetlands and waterways.

All alternatives considered involve the installation of temporary dewatering/water diversion structures and appropriate erosion and sedimentation controls. The selected alternative includes appropriate and practicable steps to minimize potential adverse impacts to resources delineated in the field as Waters of the United States.

4.1 NO BUILD

The No Build Alternative assumes no repair or replacement of the existing culvert will occur and the existing condition will remain. Structural deficiencies of the stone culvert will not be addressed. Therefore, the No Build Alternative is not practicable because if no action is taken, the culvert will deteriorate and eventually undermine the embankment soils, leading to potentially catastrophic failure of the track. The resulting condition will lead to downstream impacts to wetlands and waterbodies including potential channel deformation, restriction of tidal flow and the addition of sediment to sensitive resource areas, which ultimately cause unacceptable adverse environmental impacts.

4.2 REHABILITATION OF THE EXISTING STONE BOX CULVERT

The Rehabilitation Alternative assumes repair of the existing culvert will occur using high-pressure injection grout to stabilize the existing soils and the failed sections of the culvert. In addition, the existing stone culvert will remain in place, however, the structurally deficient section will be stabilized using bracing bars. This alternative is considered a temporary repair as it does not address the nearly failed culvert conditions. The embankment soils may also be temporarily stabilized, however the creation of sinkholes due to weakened embankment soils may occur.

4.3 FULL CULVERT REPLACEMENT

The Full Culvert Replacement Alternative includes the replacement of an existing 24- by 30-inch stone box culvert that passes the under the Cape Main Line railroad embankment at MP 63.22 in Sandwich, Massachusetts. The proposed replacement structure includes a 48-inch reinforced concrete pipe with precast concrete wingwall and riprap splash pads within a similar skew alignment of the existing stone culvert structure. Armor stone is proposed on the railroad embankment within the immediate vicinity of the culvert location to provide slope stability and protection during extreme high tide, coastal storm and other wave generating events.

The 48-inch culvert will be embedded sufficiently to maintain the existing invert flowline and the intake capacity as compared to the existing stone box culvert. In addition, full replacement of the culvert crossing will continue to support anadromous fish passage of American Eel (*Anguilla rostrate*).

5.0 CONSTRUCTION SEQUENCE

Construction will include establishment and installation of erosion control BMPs around the work zone prior to ground disturbance. Construction equipment will access the Project site by using the existing railroad embankment and will not cross through adjacent wetland resource areas. Proposed impacts, both temporary and permanent, will be located within

limited sections of adjacent wetland resource areas. No additional impervious surface is proposed, no additional fill material is proposed. The proposed work consists of the following activities:

- Establishment of soil erosion and sediment control BMPs around areas of proposed ground disturbance;
- Limited vegetation clearing and grubbing to allow for access within the work zone;
- Removal and off-site stockpiling of existing track, tie and embankment soil materials for reuse upon embankment reconstruction;
- Construction of limited area of benching within the project work zone for safe access by equipment;
- Establishment of temporary diversion structure, water bypass and dewatering areas
- Installation of support of excavation using machine driven steel sheet piles or steel plates;
- Removal of overburden, removal of existing stone box culvert elements;
- Preparation of excavation area subbase and support materials; installation of proposed 48-inch culvert and precast concrete wingwalls; installation of riprap splash pads;
- Reconstruction of the railroad embankment, ties and track using stockpiled materials to the extent practicable;
- Adding ballast where required;
- Tamping and raising the track structure to match the existing approach track sections;
- Cutting the sheet piles to match existing grade; armor stone will be added to both the north and south sides of the existing embankment to provide for additional slope stability and storm protection; and
- Removal of soil erosion and sediment controls.

The existing ballast and soil in the embankment will be excavated and benched to allow for a work pad and then stockpiled within the upland railroad right-of-way nearby for reuse after the work is completed. Existing culvert elements and adjacent areas (e.g. wingwalls and side-slope stone armor) found to be in good condition may be reused, if feasible. The remaining material will be transported down the railroad right-of-way to pre-identified upland disposal locations within MassDOT owned railroad property.

The proposed culvert prism excavation will be larger than the existing culvert footprint to prepare the area for installation of the proposed pipe sections (refer to **Appendix C – Permit Plans**). The bottom elevation of the culvert will be approximately 1-feet lower than the existing bottom culvert elevation. Approximately 6 to 8 inches of restoration stone, approximate ½ to 1-inch in diameter, will be added to the bottom of the proposed culvert to create a natural substrate floor. The bottom elevation of the restored streambed within the replacement pipe is anticipated to provide for low-flow fish passage and increase viability of the passage of American eel during spawning runs in the spring and fall.

Upon project completion, disturbed upland areas will be stabilized with ballast. The temporary water bypass will be removed, and natural flow restored. Soil erosion and sediment control BMPs will remain in place until exposed soils are permanently stabilized. Disturbed areas that will not be armored with ballast or stone will be stabilized with a fast-germinating erosion control native seed mix, covered with a biodegradable erosion control blanket and properly staked.

Proposed conditions plans and standard specifications for installation of soil erosion and sediment controls are located under **Appendix C – Permit Plans.**

6.0 IMPACTS TO WETLANDS PROTECTION ACT RESOURCE AREAS

The proposed project will impact wetlands and other Waters of the U.S., both permanent and temporary, and are quantified in Table 2. The nature and extent of impacts to these resources are limited to the area immediately adjacent to the inlet and/or outlet ends of the culvert where work is anticipated. Temporary impacts to resources will occur due to installation of the support of excavation, construction access, removal of the existing stone culvert, grading, installation and maintenance of erosion and sedimentation controls, and installation and maintenance of dewatering/diversion structures. Permanent impacts to resources will result from the installation of new pipe sections, precast concrete wingwalls, riprap splash pads, installation of armor stone on the embankment and clean fill for final grading.

Table 2 – Summary of Estimate Impacts to Wetlands and Waterbodies

	Salt Marsh			**Land under Waters of the U.S.**		
	Temporary Impacts (ft^2)	Permanent Impacts (ft^2)	Total Estimated Impacts (ft^2)	Temporary Impacts (ft^2)	Permanent Impacts (ft^2)	Total Estimated Impacts (ft^2)
North Side	268	17	285	87	34	121
South Side	0	0	0	300	200	500

Avoidance of impacts to wetlands and waterbodies is not feasible given the project location, existing and proposed facilities. Impacts to wetlands and water bodies will be limited to the extent practicable by reducing the total area of required grading for the support of excavation, limiting vegetation removal required for access, siting of riprap scour pads and placement of armor stone. Areas of temporary impact will be restored with a native seed mix where appropriate, or approved equal, and stabilized with a coconut blanket or other similar biodegradable option upon project completion. More detail on impact minimization and mitigation is provided in the following section.

7.0 IMPACT MINIMIZATION AND MITIGATION MEASURES

Measures to limit impacts to the resource areas noted above include the following: temporary barriers, fencing and signage will be placed at the work site during construction; the contractor will have a spill kit/absorbent pads on each piece of equipment; each vehicle shall be inspected daily for leaks and leaking equipment shall be removed from the Project Site immediately and shall not return to service until repaired; the work area will be left in a condition such that precipitation and/or adverse weather will not cause damage to the work area or adjacent areas; site preparation work will include limited vegetation clearing and/or removal of select trees by hand, if necessary; sedimentation and erosion control measures will installed prior to the start of work and will remain in place during construction activities; proposed work shall comply with Federal, State, and Local Codes and Regulations.

Access for the project will be established from uplands and buffer zone areas adjacent to the proposed work zone. Access through wetlands will be limited to allow for safe passage of personnel and equipment; where available, access routes will make use of the existing railroad right-of-way through uplands.

Mitigation for impacts to salt marsh will be provided at a greater than 10:1 within a single, aggregate wetland replication area on the southeast side of the railroad embankment. Grading of the wetland replication area will be maintained at an elevation similar to the adjacent wetland and will have a minimum of 12 inches of wetland topsoil. The wetland mitigation area will be stabilized with coir logs and salt marsh plantings, as indicated on the Proposed Conditions Plans under **Appendix C – Permit Plans**. The soil within the limits of the coir logs will be seeded with a native wetland seed mix, or approved equal, and stabilized with biodegradable coconut mesh fabric.

7.1 EROSION AND SEDIMENTATION CONTROL

During removal and construction activities, erosion controls such as compost filter tubes or similar, will be utilized. Sedimentation and erosion control measures will be removed following completion of the work. The Contractor will be required to inspect the project site and remove demolition debris or other construction related materials upon completion.

Work will be conducted within the railroad embankment and adjacent wetlands or waters. A temporary diversion structure to provide water bypass around the work area will be required. The temporary diversion structure consists of a two-stage dewatering pump screening process; the primary screen will incorporate a seine net with 1/4-inch mesh set approximately 5-feet in front of the intake pipe and a hard screen with a mesh size of 1/4-inch to 3/8-inch opening will be set directly against the intake pipe to further refuse aquatic fauna. The seine net will have a lead line and float system to provide vertical stability and will be staked into the substrate to ensure the intake of the pump remains submerged in a non-turbid area.

7.2 STORMWATER MANAGEMENT

The existing conditions within the project location incorporate country flow style drainage from the top of the railroad embankment and into the existing ballast. The project does not propose to add new impervious surface, new point source outfalls or additional drainage facilities. The project is proposing to increase the hydraulic capacity of the existing culvert to provide better equalizing flow conditions during extreme storm events.

7.3 DEWATERING

Work associated with the emergency culvert replacement will require establish of a support of excavation, the establishment of flow bypass for waters outside of the support of excavation and dewatering within the excavation area. Dewatering within the support of excavation may use a sump area and pump system to redirect sediment-laden water into and through a temporary, mobile frac settling tank to provide additional treatment prior to release into a dirt bag to be located within adjacent uplands Contract documents will require the submission of specific dewatering and turbidity control plan for review and approval by the drainage engineer and by MassDEP if required.

7.4 INVASIVE SPECIES CONTROL

Field observations conducted by GZA indicated the presence of Common reed (*Phragmites australis*) within adjacent wetland resource areas. The colony of common reed on the north side of the railroad embankment appears to be well established and comprises a small part of the existing wetland ecosystem. Monitoring of the proposed wetland mitigation area will incorporate reporting requirements and control methods to treat for invasive species.

Control of invasive plants, including common reed, will be conducted in accordance with MassDOT standard specifications for this practice and will be in compliance with local, state and federal requirements for such practices.

7.5 DIVISION OF MARINE FISHERIES

Coordination with the Massachusetts Division of Marine Fisheries has confirmed that there is no diadromous fish present in this location and that a Time of Year restriction will not be required.

8.0 CONCLUSIONS

MCRR is requesting the timely acknowledgement and expedited approval by the DEP for the proposed culvert replacement project. The existing condition poses a threat to the public health and safety of the citizens of the Commonwealth of Massachusetts, as described herein. Work is expected to commence as soon as possible. Anticipated impacts to wetland resources presumed to be under the jurisdiction of the USACE and MassDEP will be avoided and limited through the implementation of environmental controls meant to meet the performance standards outlined in federal and state resource protection regulations. Work will be observed by a GZA Wetland Scientist, Environmental Monitor, and Site Engineer to adhere to applicable environmental protection laws.

As designed, total impacts are limited to the extent practicable. The design approach taken was to avoid wetland impacts where feasible, and where unavoidable, and limit impacts to the extent practical through an extensive and thoughtful review and design process.

Figures

Appendix A - Existing Conditions Figures



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SCALE IN FEET

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CAPE MAIN MP 63.22
SANDWICH, MASSACHUSETTS

SITE LOCUS

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
MASS COASTAL RAILROAD

PROJ MGR: KKD	REVIEWED BY: SEL	CHECKED BY: DMN	FIG/DWG 1
DESIGNED BY: KKD	DRAWN BY: KKD	SCALE: 1 in = 2,000 ft	
DATE: 05/23/2022	PROJECT NO: 01.017452.05	REVISION NO: 0	SHEET NO: 1

© 2022 - GZA GeoEnvironmental, Inc. \\GZANORJobs\170,000-179,999\174521\174521-05.KKD\GIS\MXD\FIG 1 SITE LOCUS.mxd, May 23, 2022 - 1:54:40 PM, kimberly.degulis

© 2023 - GZA GeoEnvironmental, Inc. \\GZANORJobs\170,000-179,999\174521\174521-05.KKD\GIS\MXD\FIG 2 EXISTING CONDITIONS.mxd, November 15, 2023 - 5:04:13 PM, kimberly.degutis

CULVERT AT MP 63.22

GREAT ISLAND ROAD



LEGEND

- LIMIT OF WORK
- GZA DELINEATED LAND UNDER WATERWAYS
- GZA DELINEATED SALT MARSH
- MADEP MAPPED SALT MARSH
- FEMA FLOOD ZONE AE
- FEMA FLOOD ZONE VE
- MADEP MAPPED ESTIMATED HABITAT

NOTES:

1. BASE MAP MASSGIS AERIAL IMAGERY 2021.

2. LOCATION OF EXISTING FEATURES ARE MAPPED BY MADEP. LOCATION OF CULVERT CROSSING IS APPROXIMATED.

3. LOCATION OF WETLAND AND LAND UNDER WATER BOUNDARIES WERE APPROXIMATELY DETERMINED BY GZA GEOENVIRONMENTAL IN MARCH 2022. WETLAND BOUNDARIES WERE LOCATED BY TRADITIONAL SURVEY. THIS DRAWING IS NOT CONSIDERED A LAND SURVEY. THE LOCATIONS SHOWN SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

4. VERTICAL DATUM IS NAD83.

Service Layer Credits:

0 30 60 120

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CAPE MAIN MP 63.22
SANDWICH, MASSACHUSETTS

EXISTING CONDITIONS

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
MASS COASTAL

PROJ MGR: KKD	REVIEWED BY: SEL	CHECKED BY: DMN	FIG/DWG 2A
DESIGNED BY: KKD	DRAWN BY: KKD	SCALE: 1 in = 67 ft	
DATE: 8/15/2023	PROJECT NO: 01.017452.05	REVISION NO: 0	SHEET NO: 1

© 2023 - GZA GeoEnvironmental, Inc. P:\2024\01.P000598.24\GIS\MXD\FIG 2 EXISTING CONDITIONS_B.mxd, November 15, 2023 - 4:56:15 PM, kimberly.degutis

LEGEND

- LIMIT OF WORK
- GZA DELINEATED LAND UNDER WATERWAYS
- GZA DELINEATED SALT MARSH
- NOAA MHW Elev +11.0
- NOAA MTL Elev. +4.6
- NOAA MLW Elev. -1.0

CULVERT AT MP 63.22

GREAT ISLAND ROAD

N E S W

Service Layer Credits:

0 30 60 120

SCALE IN FEET

NOTES:

1. BASE MAP MASSGIS AERIAL IMAGERY 2021.
2. LOCATION OF EXISTING FEATURES ARE MAPPED BY MADEP. LOCATION OF CULVERT CROSSING IS APPROXIMATED.
3. LOCATION OF WETLAND AND LAND UNDER WATER BOUNDARIES WERE APPROXIMATELY DETERMINED BY GZA GEOENVIRONMENTAL IN MARCH 2022. WETLAND BOUNDARIES WERE LOCATED BY TRADITIONAL SURVEY. THIS DRAWING IS NOT CONSIDERED A LAND SURVEY. THE LOCATIONS SHOWN SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
4. VERTICAL DATUM IS NAD83.
5. ELEVATION DATA FROM MASSGIS LATEST AND BEST QUALITY LIDAR TERRAIN DATA, CENTRAL-EASTERN MA 2021.
6. NOAA TIDAL DATUM FROM SANDWICH REPORTING STATION.

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CAPE MAIN MP 63.22
SANDWICH, MASSACHUSETTS

EXISTING CONDITIONS

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
MASS COASTAL

PROJ MGR: KKD	REVIEWED BY: SEL	CHECKED BY: DMN	FIG/DWG 2B
DESIGNED BY: KKD	DRAWN BY: KKD	SCALE: 1 in = 67 ft	
DATE: 10/20/2023	PROJECT NO: 01.017452.05	REVISION NO: 0	SHEET NO: 1

Appendix B - Wetland Delineation Report



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May 25, 2022
File No. 01.0174521.05.00

Mr. Christopher Podgurski
Massachusetts Coastal Railroad
12 Harding Street, Unit 202
Lakeville, Massachusetts 02347

Re: Wetland Assessment and Delineation Report
Cape Main MP 63.22
Sandwich, Massachusetts 02537

Dear Mr. Podgurski:

GZA GeoEnvironmental, Inc. (GZA) has prepared this report describing wetland assessment and delineation services for the Massachusetts Coastal Railroad (MCRR) for the proposed culvert replacement project on the Cape Main Railroad at Milepost 63.22 in Sandwich, Massachusetts (the Project Area, see Figure 1). The wetland delineation included an approximately 3-acre area around the proposed limit of construction and site access route. Resource areas observed within the limit of work included salt marsh and land under water associated with an unnamed tributary to Old Harbor Creek. The wetland delineation was performed by GZA Environmental Scientist, Anthony Damiano, WPIT, on March 16, 2022. This report is subject to the Limitations attached as **Appendix A**.

PROJECT BACKGROUND

The purpose of the wetland assessment work was to assess and mark the limits of wetland boundaries within the Project Area. GZA understands that this report may be used in the design and permitting for the replacement of an existing stone box culvert.

SITE LOCATION AND DESCRIPTION

The Project Area encompasses the railroad corridor along the Cape Main, beginning with the at-grade railroad crossing at Great Island Road and extending approximately 900-feet west into salt marsh in Sandwich, Massachusetts. The limit of the study area extends approximately 75-feet to the north and south of the top of the railroad embankment. The project area is bounded to the north, west, and south by undeveloped salt marsh and forested uplands, and Great Island Road (a residential street) to the west. The predominant wetland type is a salt marsh. No houses or other structures were observed during the assessment of the parcel.

RESOURCE AREA BOUNDARY DELINEATION AND METHODOLOGY

The wetland assessment was conducted in a manner that is consistent with the 1995 Massachusetts Department of Environmental Protection (MassDEP) handbook titled *Delineating Bordering Vegetated Wetlands under the Massachusetts Wetlands Protection Act*[1] and the MADEP "Coastal Manual"[2], in accordance with the 1987 Corps of Engineers *Corps of Engineers*

[1] 310 CMR: Department of Environmental Protection; Wetlands Protection Act.
[2] MADEP. 2017, rev 2020. *Applying the Massachusetts Coastal Wetlands Regulations: A Practical Manual for Conservation Commissions to Protect the Storm Damage Prevention and Flood Control Functions of Coastal Resource Areas*

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Wetlands Delineation Manual[3]*,* using the *Routine Determination Method;* in conjunction with the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual*[4] (Regional Supplement). Observed wetlands were classified in accordance with the *Classification of Wetlands and Deepwater Habitats of the United States – Second Edition*[5]*.*

Publicly available environmental data including the USDA Natural Resources Conservation Service Soil Survey for Barnstable County, Massachusetts; Massachusetts MassMapper[6]; and FEMA Flood Insurance Rate Maps were used to prepare the field data forms, and this wetland delineation report. Descriptions of wetlands delineated within the Project Area are provided in the following sections, and representative photographs are provided in **Appendix B.**

Wetland resource boundaries were demarcated in the field with pink flagging tied on vegetation. The wetland boundary flags were established by examining the dominant vegetation, soils, and evidence of hydrology and spring high tide indications at several locations within the Project Area. Sample plots were conducted, and data were collected to characterize the wetland and upland conditions. Standard Wetland Determination Data Forms sourced from the Regional Supplement; these forms are provided in **Appendix C**. Additionally, several undocumented soil pits were examined throughout the Project Area to observe hydric soil and hydrology indicators that were used to help determine wetland boundaries.

DESKTOP ANALYSIS

A desktop analysis using MassGIS's MassMapper database preceded the field investigation to identify critical areas on or within 200 feet of the Project Area.

Table 1 - Critical Environmental Areas as Mapped by MassGIS

Mapped Resources on or Within 200 Feet of the Project Area	Yes	No
NHESP Certified Vernal Pool		X
NHESP Potential Vernal Pool		X
Outstanding Resource Water		X
FEMA 100-Year Flood Zones	X	

There are two state-identified MassDEP wetland polygons mapped within the Project Area. The Project Area is located within mapped FEMA Flood Zones VE (north/ocean side) and AE (south/inland side). Based on the Massachusetts Natural Heritage Atlas 15th Edition (2019), the Project Area does not contain mapped NHESP Estimated or Priority Habitats of Rare Species or Wildlife. There are no certified or potential vernal pool habitats mapped within the Project Area limits.

According to the U.S. Department of Agriculture National Resource Conservation Service (NRCS) Web Soil Survey[7] and the NRCS SSURGO soils data[8], there are two soil units mapped within the Project Area (*Custom Soil Resource Report for*

[3] U.S. Army Corps of Engineers, Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*, Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi

[4] U.S. Army Corps of Engineers, 2012. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (Version 2.0), ed. J.S. Wakeley, R.W. Lichvar, C.V. Noble and J.F. Berkowitz. ERDC/EL TR-12-1. Vicksburg, Mississippi; U.S. Army Engineer Research and Development Center

[5] Federal Geographic Data Committee. 2013. *Classification of Wetlands and Deepwater Habitats of the United States*. FGDT-STD-004-2013, 2nd edition. Wetlands Subcommittee, Federal Geographic Data Committee and U.S. Fish and Wildlife Service, Washington, DC

[6] MassGIS (Bureau of Geographic Information), Commonwealth of Massachusetts EOTSS. MassMapper Interactive Mapping Application. Accessed online at: https://maps.massgis.digital.mass.gov/MassMapper/MassMapper.html. Accessed 3/14/2022.

[7] Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at the following link: https://websoilsurvey.sc.egov.usda.gov/. Accessed 3/14/2022.

[8] USDA. 1989. Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Soil Survey Geographic (SSURGO) Database for Hampden and Hampshire Counties, Massachusetts, Western Part. Available online. Accessed 3/14/2022.

Barnstable, Massachusetts). However, the majority of the Project Area consists of Eastchop loamy fine sand, 3 to 8 percent slopes, a non-hydric soil. Table 2 identifies NRCS soil series that are mapped within the Project Area.

Table 2 - NRCS Mapped Soils Series within the Project Area

Soil Unit Name	Hydric Rating	Acres / Percent Area of Project Area
Ipswich - Pawcatuck - Matunuck complex, 0 to 2 percent slopes, very frequently flooded	90	0.3 / 28.2
Eastchop loamy fine sand, 3 to 8 percent slopes	0	0.8 / 71.8
Total Project Acres		94 / 100

FINDINGS

Within the Project Area, GZA observed four regulated resource areas (two salt marsh and two areas of land under water) (refer to **Figure 2 – Wetland Delineation Site Plan**).

RESOURCE AREA DESCRIPTIONS

WETLAND A – SALT MARSH

Wetland A is a salt marsh (SM) located along the north side of the railroad embankment. The east boundary of the SM is identified by an abrupt change in topography and vegetation; the SM extends out of the project area to the west. Wetland A is dominated by salt meadow cordgrass (*Spartina patens*,). Other plant species observed included high tide bush (*Iva frutescens*) and cattails (*Typha latifolia*).

WETLAND B – SALT MARSH

Wetland B is a SM located along the south side of the railroad embankment. The east boundary of the SM is identified by an abrupt change in topography and vegetation; the SM extends out of the project area to the west. Wetland B is dominated by salt meadow cordgrass (Spartina patens,).

LAND UNDER WATER BODIES AND WATERWAYS

An unnamed tributary to Oak Harbor Creek, a tidal stream, traverses the project area through the existing culvert. The stream has eroded a significant portion of the SM on the south side of the railroad embankment, east of the culvert opening. The stream is identified by an abrupt change in topography and an obvious vegetation break.

JURISDICTIONAL WETLAND RESOURCE AREAS – FEDERAL CLEAN WATER ACT (SECTION 404)

Wetland systems A and B are likely "Waters of the United States," and would be subject to protection under the federal Clean Water Act, 33 U.S.C. §1251 et seq (1972). According to 33 CFR §328.3(c)(4), vegetated wetlands are defined as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions." The wetland boundaries previously described in this report were delineated in accordance with this definition.

United States Army Corps Wetland Determination Data Forms are attached in **Appendix C**, documenting GZA's observations including evidence of hydrology, soils, and hydrophytic vegetation at specific sample plots. It is GZA's opinion that work conducted within an SM is subject to jurisdiction under Section 404 of the Clean Water Act.

JURISDICTIONAL WETLAND RESOURCE AREAS – MASSACHUSETTS WETLANDS PROTECTION ACT

Wetland resource area boundaries were also assessed and delineated in accordance with methods developed by the 1995 Massachusetts Department of Environmental Protection's handbook for *Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act*[9] (the Act), as well as definitions set forth in the Wetland Regulations, 310 CMR 10.00. The Project Area contains regulated resources subject to protection under the Act.

SALT MARSH – 310 CMR 10.32

Two (2) salt marsh boundaries were observed within the Project Area. According to 310 CMR 10.32(2), the definition of a salt marsh is "coastal wetland that extends landward up to the highest high tide line, that is, the highest spring tide of the year, and is characterized by plants that are well adapted to or prefer living in, saline soils."

It is GZA's opinion that work conducted within or within the 100-foot buffer zone of a SM is subject to jurisdiction under the Massachusetts Wetlands Protection Act.

Wetland resource areas are summarized in Table 3.

Table 3 - Resource Area Summary Table

Wetland ID	Anticipated Federal Jurisdiction (USACE)	Anticipated State Jurisdiction (WPA)
A	Likely – contains a direct connection to a WOTUS	Salt marsh is likely jurisdictional
B	Likely – contains a direct connection to a WOTUS	Salt marsh is likely jurisdictional

CONCLUSIONS AND RECOMMENDATIONS

GZA has identified two resource areas that would be subject to protection and/or jurisdiction under the Massachusetts Wetlands Protection Act and the federal Clean Water Act on or within 200 feet of the Project Area and has delineated the boundaries of these areas. GZA has assessed the likely jurisdiction of each wetland area based upon a review of USGS topographic maps, aerial photographs, and previously mapped wetland resource areas in conjunction with definitions of regulated resource areas as provided by the USACE and the MassDEP.

[9] 310 CMR: Department of Environmental Protection; Wetlands Protection Act

Should you have any questions or comments regarding this submittal, or if you require additional information, please contact the undersigned at (781) 278-3700.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

Kimberly Degutis, PWS, CESCL
Senior Project Manager

Daniel M. Nitzsche CPESC, CESSWI, SE
Consultant/Reviewer

Stephen L. Lecco, A.I.C.P., C.E.P.
Principal

Attachments: Figure 1 – Site Locus
Figure 2 – Existing Conditions Plan
Appendix A – Limitations
Appendix B - Representative Site Photographs
Appendix C – Wetland Data Sheets

\\GZANOR\Jobs\170,000-179,999\174521\174521-05.KKD\401 FBE LETTER\DRAFT\APP B - WETLAND DELIN\FINAL_Cape Main MP 63.22 Delineation.docx

Figures



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CAPE MAIN MP 63.22
SANDWICH, MASSACHUSETTS

SITE LOCUS

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
MASS COASTAL RAILROAD

PROJ MGR: KKD	REVIEWED BY: SEL	CHECKED BY: DMN	FIG/DWG 1
DESIGNED BY: KKD	DRAWN BY: KKD	SCALE: 1 in = 2,000 ft	
DATE: 05/23/2022	PROJECT NO: 01.017452.05	REVISION NO: 0	SHEET NO: 1

© 2022 - GZA GeoEnvironmental, Inc. \\GZANORJobs\170,000-179,999\174521\174521-05.KKD\GIS\MXD\FIG 1 SITE LOCUS.mxd, May 23, 2022 - 1:54:40 PM, kimberly.degulis

© 2023 - GZA GeoEnvironmental, Inc. \\GZANORJobs\170,000-179,999\174521\174521-05.KKD\GIS\MXD\FIG 2 EXISTING CONDITIONS.mxd, November 15, 2023 - 5:04:13 PM, kimberly.degutis

CULVERT AT MP 63.22

GREAT ISLAND ROAD



LEGEND

- LIMIT OF WORK
- GZA DELINEATED LAND UNDER WATERWAYS
- GZA DELINEATED SALT MARSH
- MADEP MAPPED SALT MARSH
- FEMA FLOOD ZONE AE
- FEMA FLOOD ZONE VE
- MADEP MAPPED ESTIMATED HABITAT

NOTES:

1. BASE MAP MASSGIS AERIAL IMAGERY 2021.

2. LOCATION OF EXISTING FEATURES ARE MAPPED BY MADEP. LOCATION OF CULVERT CROSSING IS APPROXIMATED.

3. LOCATION OF WETLAND AND LAND UNDER WATER BOUNDARIES WERE APPROXIMATELY DETERMINED BY GZA GEOENVIRONMENTAL IN MARCH 2022. WETLAND BOUNDARIES WERE LOCATED BY TRADITIONAL SURVEY. THIS DRAWING IS NOT CONSIDERED A LAND SURVEY. THE LOCATIONS SHOWN SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

4. VERTICAL DATUM IS NAD83.

Service Layer Credits:

0 30 60 120

SCALE IN FEET

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CAPE MAIN MP 63.22
SANDWICH, MASSACHUSETTS

EXISTING CONDITIONS

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
MASS COASTAL

PROJ MGR: KKD	REVIEWED BY: SEL	CHECKED BY: DMN	FIG/DWG 2A
DESIGNED BY: KKD	DRAWN BY: KKD	SCALE: 1 in = 67 ft	
DATE: 8/15/2023	PROJECT NO: 01.017452.05	REVISION NO: 0	SHEET NO: 1

© 2023 - GZA GeoEnvironmental, Inc. P:\2024\01.P000598.24\GIS\MXD\FIG 2 EXISTING CONDITIONS_B.mxd, November 15, 2023 - 4:56:15 PM, kimberly.degutis

LEGEND

- LIMIT OF WORK
- GZA DELINEATED LAND UNDER WATERWAYS
- GZA DELINEATED SALT MARSH
- NOAA MHW Elev +11.0
- NOAA MTL Elev. +4.6
- NOAA MLW Elev. -1.0

CULVERT AT MP 63.22

GREAT ISLAND ROAD

N E S W

Service Layer Credits:

0 30 60 120

SCALE IN FEET

NOTES:

1. BASE MAP MASSGIS AERIAL IMAGERY 2021.
2. LOCATION OF EXISTING FEATURES ARE MAPPED BY MADEP. LOCATION OF CULVERT CROSSING IS APPROXIMATED.
3. LOCATION OF WETLAND AND LAND UNDER WATER BOUNDARIES WERE APPROXIMATELY DETERMINED BY GZA GEOENVIRONMENTAL IN MARCH 2022. WETLAND BOUNDARIES WERE LOCATED BY TRADITIONAL SURVEY. THIS DRAWING IS NOT CONSIDERED A LAND SURVEY. THE LOCATIONS SHOWN SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
4. VERTICAL DATUM IS NAD83.
5. ELEVATION DATA FROM MASSGIS LATEST AND BEST QUALITY LIDAR TERRAIN DATA, CENTRAL-EASTERN MA 2021.
6. NOAA TIDAL DATUM FROM SANDWICH REPORTING STATION.

NO.	ISSUE / DESCRIPTION	BY	DATE
XX	XXXX	XX	XXX

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CAPE MAIN MP 63.22
SANDWICH, MASSACHUSETTS

EXISTING CONDITIONS

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
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PREPARED FOR:
MASS COASTAL

PROJ MGR: KKD	REVIEWED BY: SEL	CHECKED BY: DMN	FIG/DWG 2B
DESIGNED BY: KKD	DRAWN BY: KKD	SCALE: 1 in = 67 ft	
DATE: 10/20/2023	PROJECT NO: 01.017452.05	REVISION NO: 0	SHEET NO: 1

Appendix A – Limitations

USE OF REPORT

1. GZA GeoEnvironmental, Inc. (GZA) has prepared this report on behalf of, and for the exclusive use of Massachusetts Coastal Railroad ("Client") for the stated purpose(s) and location(s) identified in the report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not identified in the agreement, for any use, without our prior written permission, shall be at that party's risk, and without any liability to GZA.

STANDARD OF CARE

2. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in the Report and/or proposal and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the data gathered and observations made during the course of our work. Conditions other than described in this report may be found at the subject location(s).

3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made.

LIMITS TO OBSERVATIONS

4. Natural resource characteristics are inherently variable. Biological community composition and diversity can be affected by seasonal, annual or anthropogenic influences. In addition, soil conditions are reflective of subsurface geologic materials, the composition and distribution of which vary spatially.

5. The observations described in this report were made on the dates referenced and under the conditions stated therein. Conditions observed and reported by GZA reflect the conditions that could be reasonably observed based upon the visual observations of surface conditions and/or a limited observation of subsurface conditions at the specific time of observation. Such conditions are subject to environmental and circumstantial alteration and may not reflect conditions observable at another time.

6. The conclusions and recommendations contained in this report are based upon the data obtained from a limited number of surveys performed during the course of our work on the site, as described in the Report. There may be variations between these surveys and other past or future surveys due to inherent environmental and circumstantial variability.

RELIANCE ON INFORMATION FROM OTHERS

7. Preparation of this Report may have relied upon information made available by Federal, state and local authorities; and/or work products prepared by other professionals as specified in the report. Unless specifically stated, GZA did not attempt to independently verify the accuracy or completeness of that information.

COMPLIANCE WITH REGULATIONS AND CODES

8. GZA's services were performed to render an opinion on the presence and/or condition of natural resources as described in the Report. Standards used to identify or assess these resources as well as regulatory jurisdiction, if any, are stated in the Report. Standards for identification of jurisdictional resources and regulatory control over them may vary between governmental agencies at Federal, state and local levels and are subject to change over time which may affect the conclusions and findings of this report.

NEW INFORMATION

9. In the event that the Client or others authorized to use this report obtain information on environmental regulatory compliance issues at the site not contained in this report, such information shall be brought to GZA's attention forthwith. GZA will evaluate such information and, on the basis of this work, may modify the conclusions stated in this report.

ADDITIONAL SERVICES

10. GZA recommends that we be retained to provide further investigation, if necessary, which would allow GZA to (1) observe compliance with the concepts and recommendations contained herein; (2) evaluate whether the manner of implementation creates a potential new finding; and (3) evaluate whether the manner of implementation affects or changes the conditions on which our opinions were made.

Appendix B – Representative Site Photographs

Photographic Log

Client Name:	Site Location:	Project No.
MassCoastal Railroad	Cape Main MP 63.22 Sandwich, Massachusetts	01.0174521.05

Photo No.	Date:
1	3/16/22

Direction Photo Taken:
Northwest

Description:
View looking at the ocean side of the stone culvert ooutlet at low tide. Note stream channel within salt marsh.



Photo No.	Date:
2	3/16/22

Direction Photo Taken:
Southeast

Description:
View looking towards stone culvert opening on north/ocean side.



Photographic Log

Client Name:	Site Location:	Project No.
MassCoastal Railroad	Cape Main MP 63.22 Sandwich, Massachusetts	01.0174521.05

Photo No.	Date:
3	3/16/22

Direction Photo Taken:
Northwest

Description:
View looking across south/upstream side of stone culvert area at high tide. Note pooling of tidal floodwaters.



Photo No.	Date:
4	3/16/22

Direction Photo Taken:
Southeast

Description:
View of stone culvert at low tide. Note existing eroded bank on south side (right side of photo).



Photographic Log

Client Name: MassCoastal Railroad	**Site Location:** Cape Main MP 63.22 Sandwich, Massachusetts	**Project No.** 01.0174521.05

Photo No.	**Date:**
5	3/16/22

Direction Photo Taken:
Southeast

Description:
View looking across area of proposed mitigation; rock gabion proposed to be installed along this photo alignment, backfilled with wetland soil and planted with salt meadow cordgrass to stabilize eroded bank and restore salt marsh.



Appendix C – Wetland Data Sheets

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Cape Main MP 63.22 City/County: Sandwich / Barnstable Sampling Date: 3/16/22

Applicant/Owner: MassCoastal Railroad State: MA Sampling Point: SP1

Investigator(s): GZA GeoEnvironmental: A Damiano, WPIT Section, Township, Range: N/A

Landform (hillside, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope %: 1

Subregion (LRR or MLRA): LRR S, MLRA 149B Lat: 41.751666 Long: -70.476842 Datum: NAD83

Soil Map Unit Name: Ipswich - Pawcatuck - Matunuck complex, 0 to 2 percent slopes, very frequently flooded NWI classification: E2EM1Pd

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
Plot associated with flag A11. Sample plot associated with tidally influenced area; observations made during low tide / slack conditions.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- X Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes X	No ____	Depth (inches): 12
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 6

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
Northeast Regional Climate Center, 3-month average precipitation; aerial photo review

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: SP1

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	15	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	15	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Iva frutescens*	10	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	10	=Total Cover	
Herb Stratum (Plot size: 5)			
1. *Spartina patens*	75	Yes	FACW
2. *Typha latifolia*	20	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	95	=Total Cover	
Woody Vine Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20
FACW species	85	x 2 =	170
FAC species	15	x 3 =	45
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	120 (A)		235 (B)

Prevalence Index = B/A = 1.96

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: SP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-22	10YR 4/1	100					Mucky Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- X Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- X Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: N/A

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Cape Main MP 63.22 City/County: Sandwich / Barnstable Sampling Date: 3/16/22

Applicant/Owner: MassCoastal Railroad State: MA Sampling Point: SP2

Investigator(s): GZA GeoEnvironmental: A Damiano, WPIT Section, Township, Range: N/A

Landform (hillside, terrace, etc.): slope Local relief (concave, convex, none): convex Slope %: 3

Subregion (LRR or MLRA): LRR S, MLRA 149B Lat: 41.751519 Long: -70.476478 Datum: NAD83

Soil Map Unit Name: Ipswich - Pawcatuck - Matunuck complex, 0 to 2 percent slopes, very frequently flooded NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)
Plot is located east of flag A3. Plot located adjacent to railroad embankment.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
Northeast Regional Climate Center, 3-month average precipitation; aerial photo review

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: SP2

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus rubra*	25	Yes	FACU
2. *Pinus strobus*	10	Yes	FACU
3. *Fagus grandifolia*	5	No	FACU
4.			
5.			
6.			
7.			
	40	=Total Cover	

Sapling/Shrub Stratum (Plot size: 15)			
1. *Quercus rubra*	10	Yes	FACU
2. *Acer rubrum*	10	Yes	FAC
3. *Clethra alnifolia*	5	Yes	FAC
4.			
5.			
6.			
7.			
	25	=Total Cover	

Herb Stratum (Plot size: 5)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		=Total Cover	

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 40.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	15	x 3 =	45
FACU species	50	x 4 =	200
UPL species	0	x 5 =	0
Column Totals:	65 (A)		245 (B)

Prevalence Index = B/A = 3.77

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: SP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/3	100					Sandy	
3-20	2.5Y 6/6	100					Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: N/A

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Soil materials appear to be non-native and associated with historic fill used for railroad embankment.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Cape Main MP 63.22 City/County: Sandwich / Barnstable Sampling Date: 3/16/22

Applicant/Owner: MassCoastal Railroad State: MA Sampling Point: SP3

Investigator(s): GZA GeoEnvironmental: A Damiano, WPIT Section, Township, Range: N/A

Landform (hillside, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope %: 1

Subregion (LRR or MLRA): LRR S, MLRA 149B Lat: 41.751523 Long: -70.476836 Datum: NAD83

Soil Map Unit Name: Ipswich - Pawcatuck - Matunuck complex, 0 to 2 percent slopes, very frequently flooded NWI classification: E2EM1P

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
Plot associated with flag B5.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- X Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches): 8
Water Table Present?	Yes X	No ____	Depth (inches): 8
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 12

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
Northeast Regional Climate Center, 3-month average precipitation for Barnstable Co, MA; aerial photo review

Remarks:
Wetland boundary is consistent with spring high tide line.

VEGETATION – Use scientific names of plants.

Sampling Point: SP3

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus rubra*	10	Yes	FACU
2. *Juniperus communis*	10	Yes	FACU
3.			
4.			
5.			
6.			
7.			
	20	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Acer rubrum*	15	Yes	FAC
2. *Alnus incana*	10	Yes	FACW
3. *Iva frutescens*	10	Yes	FACW
4.			
5.			
6.			
7.			
	35	=Total Cover	
Herb Stratum (Plot size: 5)			
1. *Spartina patens*	75	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	75	=Total Cover	
Woody Vine Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	95	x 2 =	190
FAC species	15	x 3 =	45
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals:	130 (A)		315 (B)

Prevalence Index = B/A = 2.42

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: SP3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-24	10YR 3/1	100					Mucky Sand	Mucky sand with hydrogen sulfide odor

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- X Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- X Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: N/A

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Cape Main MP 63.22 City/County: Sandwich / Barnstable Sampling Date: 3/16/22

Applicant/Owner: MassCoastal Railroad State: MA Sampling Point: SP4

Investigator(s): GZA GeoEnvironmental: A Damiano, WPIT Section, Township, Range: N/A

Landform (hillside, terrace, etc.): Slope Local relief (concave, convex, none): convex Slope %: 3

Subregion (LRR or MLRA): LRR S, MLRA 149B Lat: 41.751523 Long: -70.476836 Datum: NAD83

Soil Map Unit Name: Ipswich - Pawcatuck - Matunuck complex, 0 to 2 percent slopes, very frequently flooded NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)
Plot is located east of flag B7 along railroad embankment.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
Northeast Regional Climate Center, 3-month average precipitation; aerial photo review

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: SP4

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus rubra*	25	Yes	FACU
2. *Pinus strobus*	15	Yes	FACU
3.			
4.			
5.			
6.			
7.			
	40	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Quercus rubra*	10	Yes	FACU
2. *Clethra alnifolia*	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	20	=Total Cover	
Herb Stratum (Plot size: 5)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		=Total Cover	
Woody Vine Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	10	x 3 =	30
FACU species	50	x 4 =	200
UPL species	0	x 5 =	0
Column Totals:	60 (A)		230 (B)

Prevalence Index = B/A = 3.83

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: SP4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-4	10YR 3/3	100					Sandy	
4-18	2.5Y 6/6	100					Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: N/A

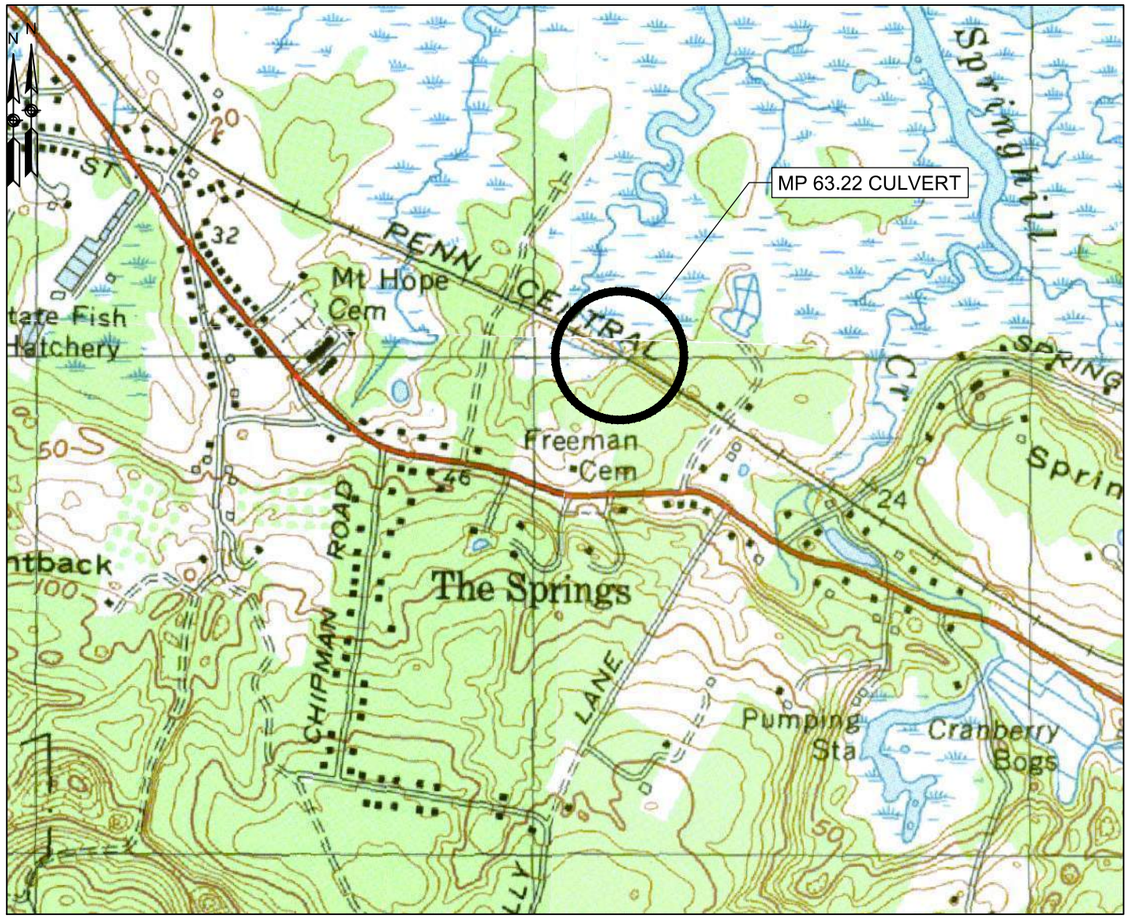
Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Soils consistent with historic fill associated with railroad embankment. Ballast and cobbles encountered to 12-inches.

Appendix C - Permit Plans



CULVERT REPLACEMENT PROJECT
AT CAPE MAIN MP 63.22
SANDWICH, MA

401 WATER QUALITY CERTIFICATE PERMITTING PLANS

MASSCOASTAL RAILROAD JUNE 2022

PERMIT PLANS - NOT FOR CONSTRUCTION

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MASS COASTAL RAILROAD

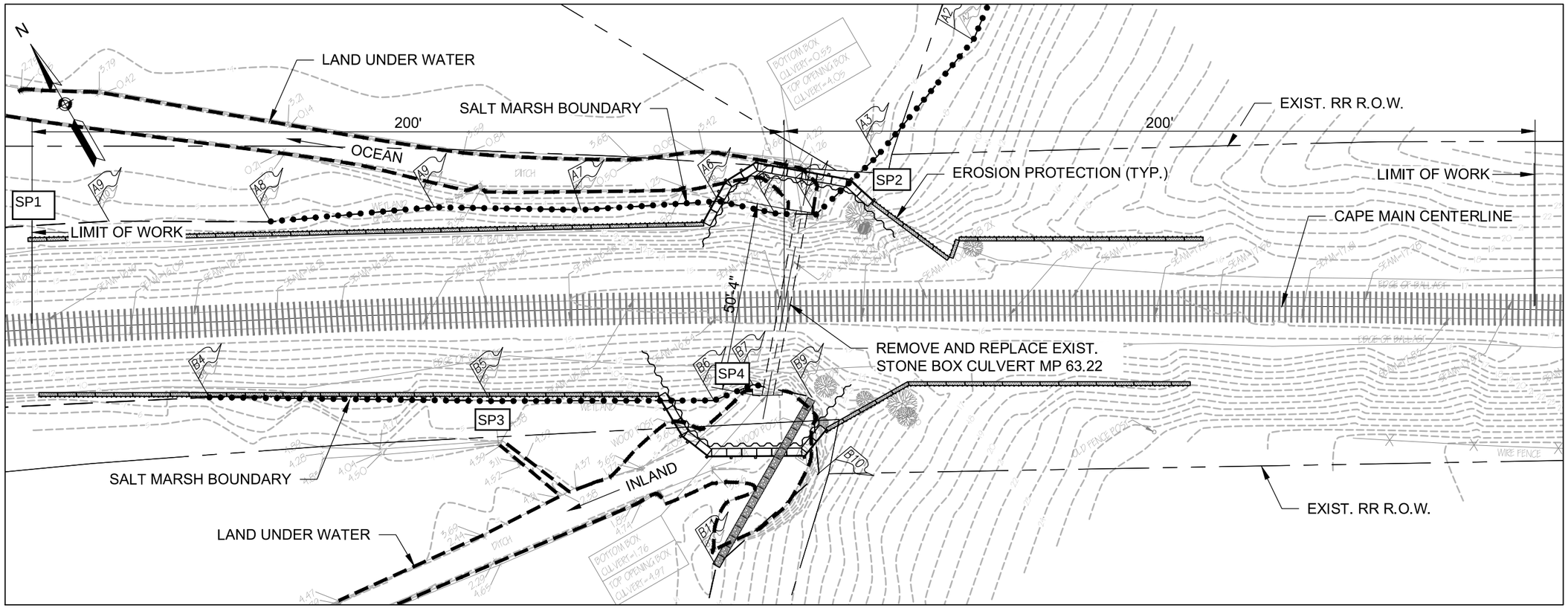
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CAPE MAIN
SANDWICH, MASSACHUSETTS

COVER SHEET

SHEET
1 OF 9

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MASS COASTAL RAILROAD

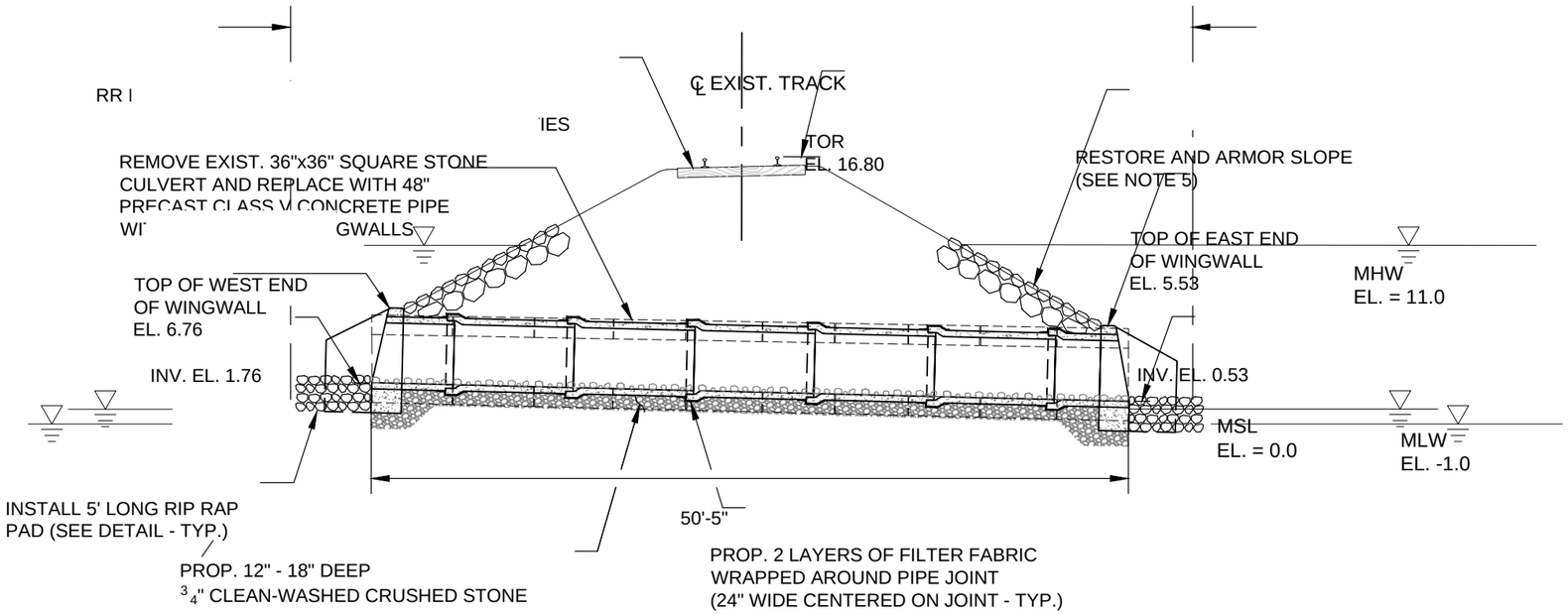
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CAPE MAIN
SANDWICH, MASSACHUSETTS

EXISITING CONDITIONS

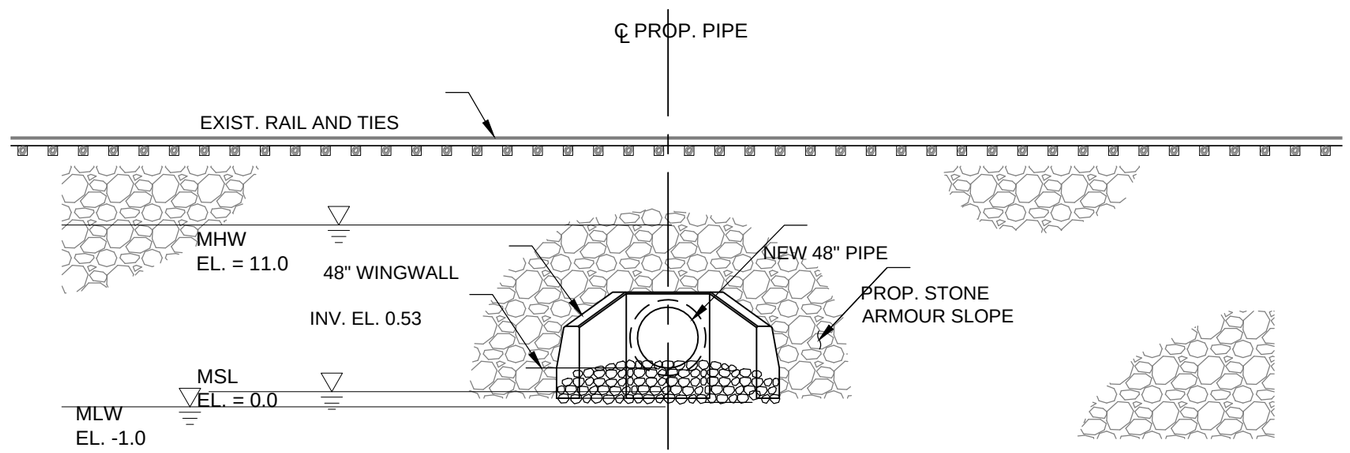
SHEET
2 OF 9

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June 1, 2022



PROPOSED LONGITUDINAL SECTION

NOT TO SCALE



INLET ELEVATION

NOT TO SCALE

NOTES:

1. ALL CULVERT AND WINGWALL INSTALLATION WORK SHALL BE PERFORMED IN THE DRY WITH TEMPORARY COFFERDAMS, DEWATERING PUMPING, AND ALL EROSION CONTROL MEASURES IN PLACE AND MAINTAINED FOR THE DURATION OF THE WORK.
2. CONTRACTOR SHALL MINIMIZE ENCROACHMENT INTO THE ADJACENT WATER AND NATURAL VEGETATION TO THE GREATEST EXTENT POSSIBLE TO LIMIT SOIL AND WATER DISTURBANCE.
3. CONTRACTOR SHALL REMOVE AND TEMPORARILY STOCKPILE EMBANKMENT SLOPE SOILS AND SURFACE BALLAST TO BE RESET TO MATCH EXISTING CONDITION FOLLOWING CULVERT INSTALLATION WORK AT THE DIRECTION OF THE ENGINEER ONLY.
4. ANY ADDITIONAL PROCESSED GRAVEL, CRUSHED STONE, AND STONE BALLAST DETERMINED TO BE NEEDED BY THE CONTRACTOR SHALL BE APPROVED BY MASSDOT'S ENGINEER PRIOR TO ORDERING FOR DELIVERY TO THE SITE.
5. CONTRACTOR SHALL PLACE AND EMBED STONE ARMOR RIP RAP ON BOTH SIDES OF THE CULVERT TO LIMITS SHOWN. STONES SHALL BE CHINKED IN TO ELIMINATE ANY DISLODGING OR SLIP-FAILING OF THE RECONSTRUCTED SLOPE.
6. PLACE 7" OF RECLAIMED MUD AND STONE MATERIAL INSIDE NEW PIPE SO THAT FLOW VOLUME IS EQUAL TO THAT OF EXISTING 30" STONE BOX.
7. ALL EMBANKMENT FILL SHALL BE PLACED IN HORIZONTAL LAYERS NOT TO EXCEED TWELVE (12) INCHES IN LAYERED DEPTH FOLLOWING COMPACTION. SUBSEQUENT LAYERS SHALL ONLY THEN PLACED AND COMPACTED AFTER THE PREVIOUS LOWER FILL LAYER IS FULLY COMPACTED IN PLACE.

PERMIT PLANS - NOT FOR CONSTRUCTION

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MASS COASTAL RAILROAD

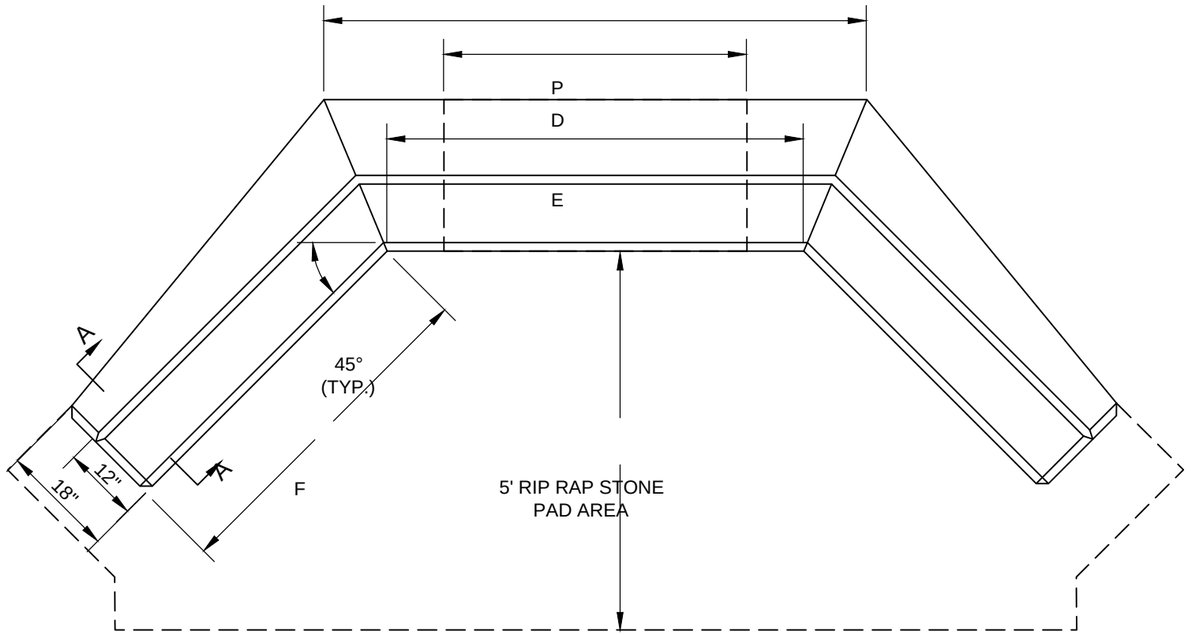
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CAPE MAIN
SANDWICH, MASSACHUSETTS

PROPOSED PRECAST PIPE CULVERT REPLACEMENT

SHEET
3 OF 9

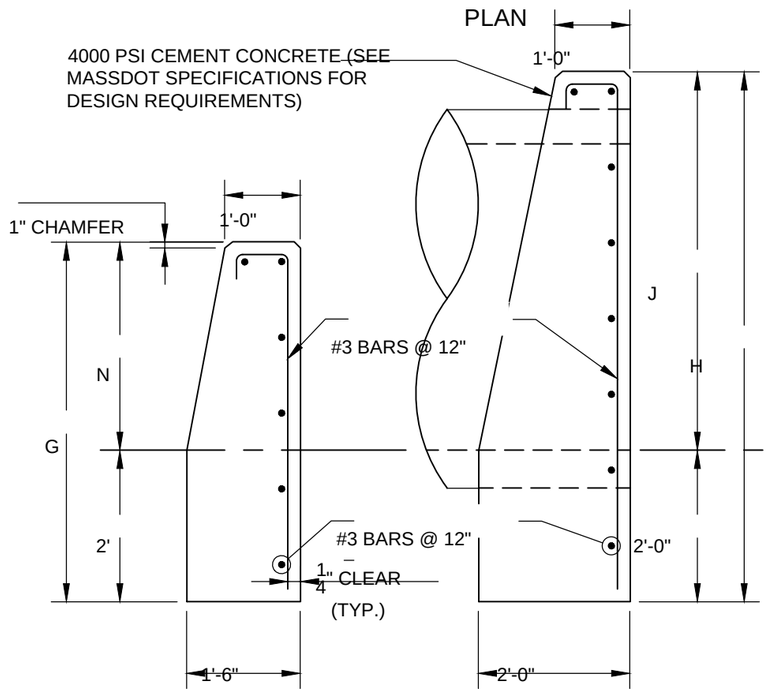
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June 1, 2022



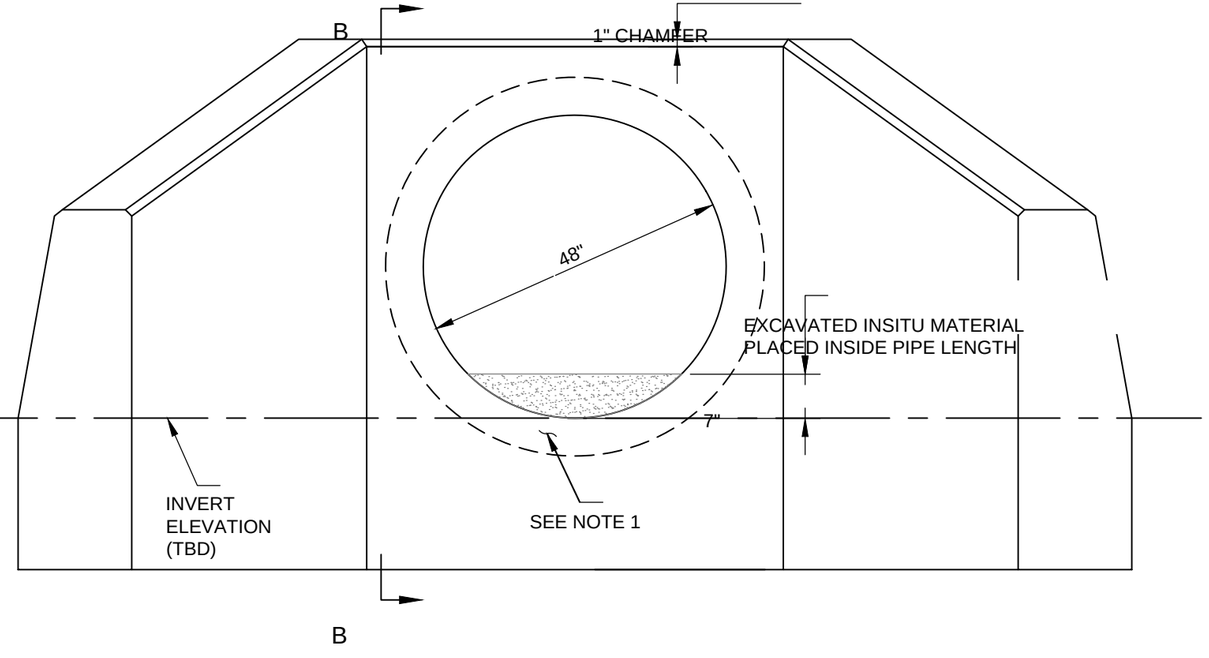
PERMIT PLANS - NOT FOR CONSTRUCTION

NOTE:

1. CONTRACTOR SHALL INSTALL REPLACEMENT, PRECAST WINGWALL AND SEAL CONCRETE CULVERT END WITH WATERTIGHT GROUT SEALANT PRIOR TO REMOVAL OF COFFERDAM.



ELEVATION A-A ELEVATION B-B



FRONT ELEVATION

Jacobs

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CAPE MAIN
SANDWICH, MASSACHUSETTS

PROPOSED REPLACEMENT
WINGWALL DETAILS

SHEET
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MASS COASTAL RAILROAD

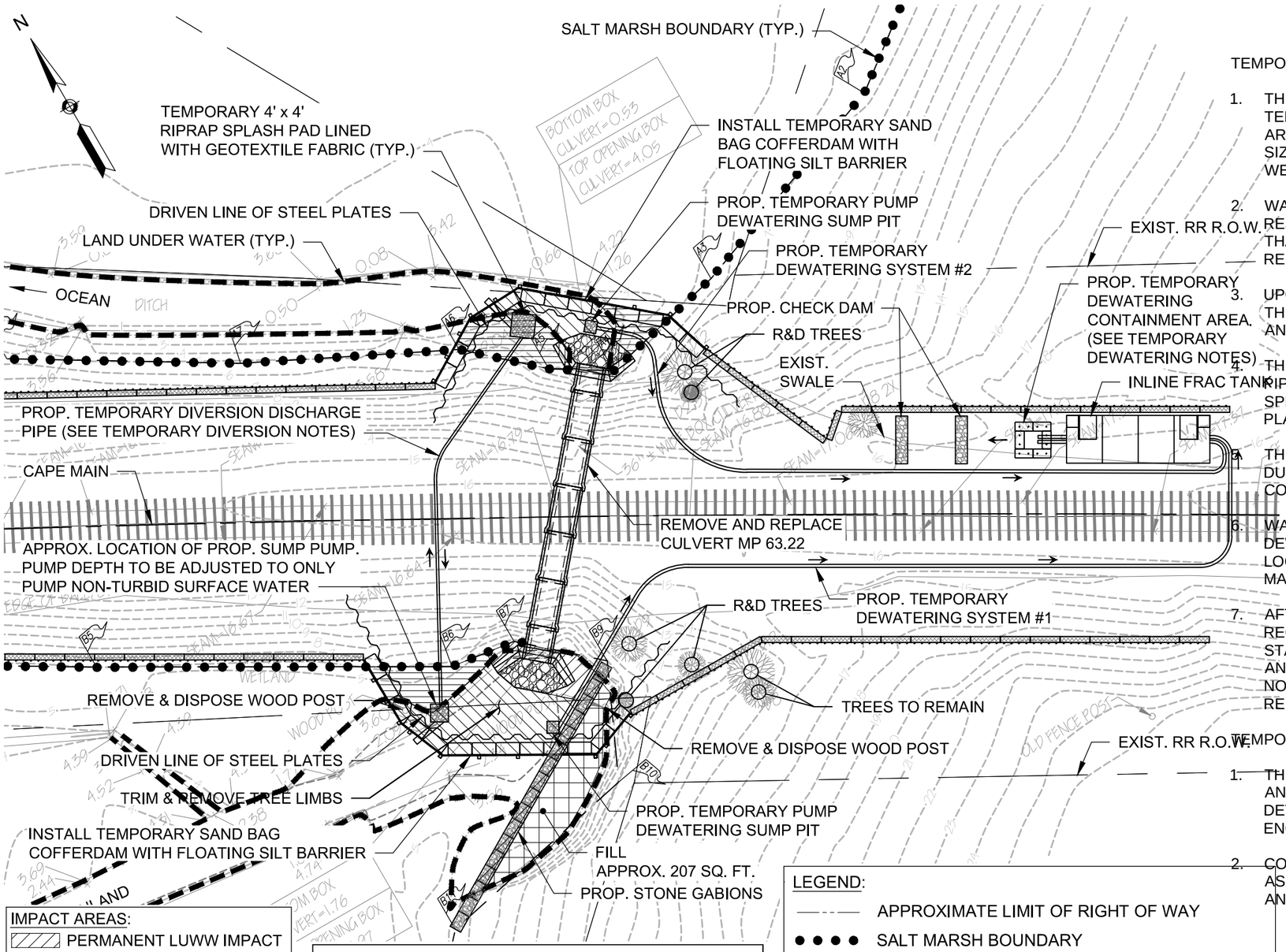
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CAPE MAIN
SANDWICH, MASSACHUSETTS

SITE ACCESS AND STAGING AREA

SHEET
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June 1, 2022



PROPOSED IMPACTS

RESOURCE AREA	IMPACT TYPE	SQUARE FEET	ACRES
LAND UNDER WATER BODIES AND WATERWAYS (LUWW)	TEMPORARY	387	0.0090
	PERMANENT	234	0.0050
SALT MARSH	TEMPORARY	268	0.0060
	PERMANENT	17	0.0004

PLAN
SCALE: 1" = 20'-0"

TEMPORARY DIVERSION NOTES:

1. THE CONTRACTOR SHALL DESIGN AND SUBMIT FOR APPROVAL A TEMPORARY PUMP DIVERSION SYSTEM TO DIVERT WATER FLOW AROUND CULVERT CONSTRUCTION AREA, INCLUDING REQUIRED SIZE/LOCATION OF DIVERSION PUMP, DISCHARGE PIPE SIZE, AS WELL AS CONTINGENCY PLANS IN THE EVENT OF PUMP FAILURE.
2. WATER LEVELS ARE SUBJECT TO CHANGE, THE CONTRACTOR IS RESPONSIBLE FOR MAKING DETERMINATION OF WATER LEVELS THAT WILL EXIST DURING CONSTRUCTION AND INSTALL AND REFORTIFY COFFER DAMS AS APPLICABLE.
3. UPON INSTALLATION OF ALL SEDIMENT CONTROL MEASURES THE CONTRACTOR SHALL BEGIN IMPLEMENTING THE DIVERSION AND DEWATERING PLAN FOLLOWING INSPECTION.
4. THE CONTRACTOR SHALL INSTALL THE TEMPORARY DISCHARGE PIPES, SUMP-HOLE, DIVERSION PUMPS AND RIP-RAP DISCHARGE SPLASH PAD PRIOR TO PLACING PIPE PLUGS, DRIVEN STEEL PLATES AND SAND BAG COFFERDAMS.
5. THE TEMPORARY DISCHARGE PIPE SHALL BE CONSTRUCTED OF DURABLE MATERIAL ABLE TO WITHSTAND ANTICIPATED SITE CONDITIONS.
6. WATER FROM THE WORK AREA SHALL BE PUMPED TO A DEWATERING CONTAINMENT AREA THE AREA SHALL BE LOCATED SUCH THAT THE WATER DRAINS BACK INTO THE MARSHLAND BELOW THE DOWNGRADIENT COFFERDAM.
7. AFTER THE CULVERT HAS BEEN REPLACED AND READY TO RECEIVE FLOW AND THE DISTURBED AREA HAS BEEN STABILIZED, THE DRIVEN STEEL SHEETS SHALL BE PULLED OUT AND "COFFERDAMS" SHALL BE REMOVED STARTING ON THE NORTHERN END. THEN THE TEMPORARY DIVERSION SHALL BE REMOVED.

TEMPORARY DEWATERING NOTES:

1. THE PROP. TEMPORARY DEWATERING CONTAINMENT AREA. SIZE AND LOCATION OUTSIDE THE WETLAND AREA TO BE DETERMINED BY THE CONTRACTOR AND PRE-APPROVED BY THE ENGINEER'S DRAINAGE ENGINEER AND WETLAND SCIENTIST.
2. CONTRACTOR SHALL EXCAVATE BACK THIS EMBANKMENT AREA AS REQUIRED TO INSTALL DEWATERING CONTAINMENT AREA AND RESTORE SLOPE UPON ITS REMOVAL.

PERMIT PLANS - NOT FOR CONSTRUCTION

Jacobs

MASS COASTAL RAILROAD

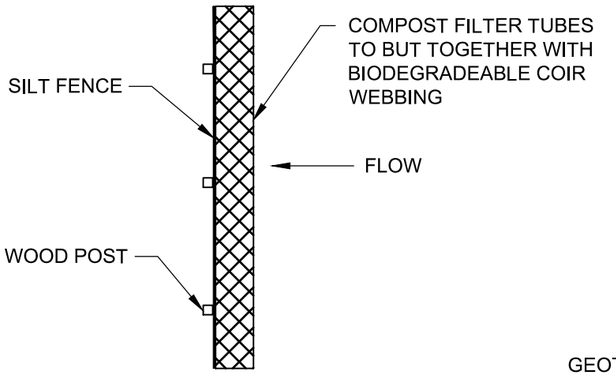
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CAPE MAIN
SANDWICH, MASSACHUSETTS

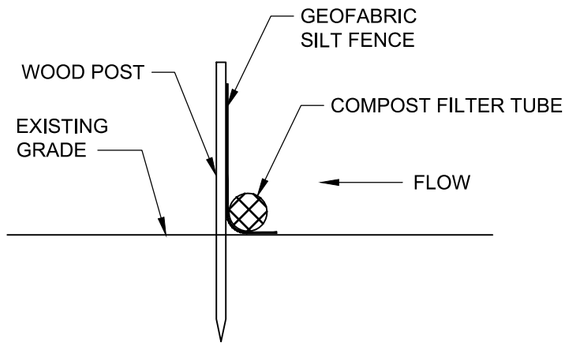
EROSION PROTECTION PLAN

SHEET
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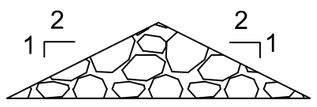


PLAN

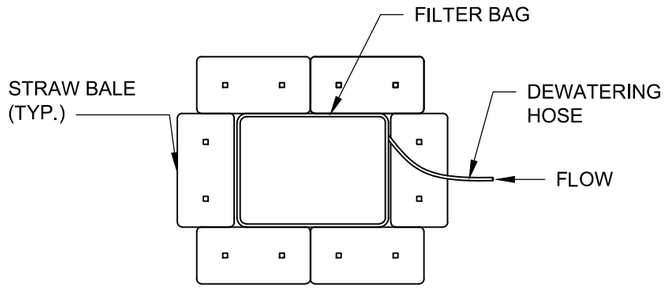


SECTION

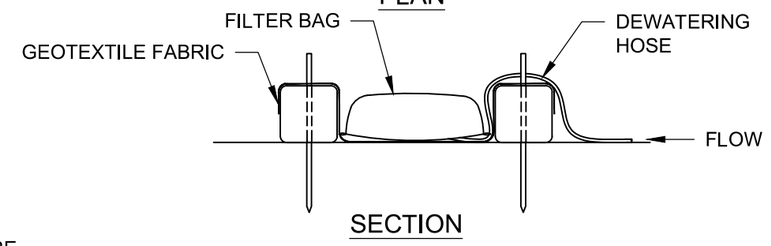
SILT FENCE / COMPOST FILTER TUBE EROSION CONTROL BARRIER



STONE CHECK DAM DETAIL

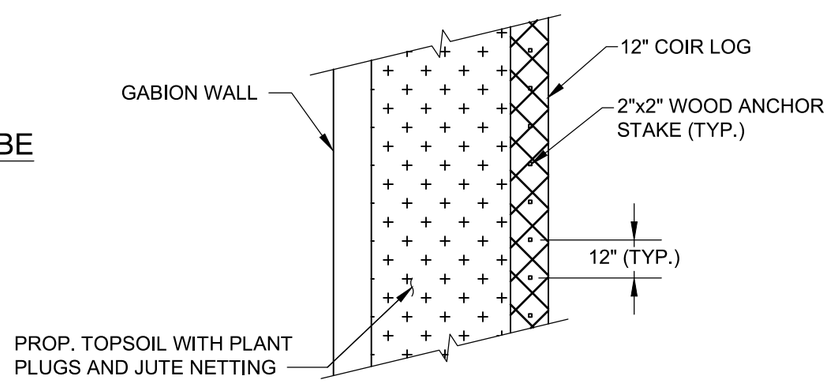


PLAN

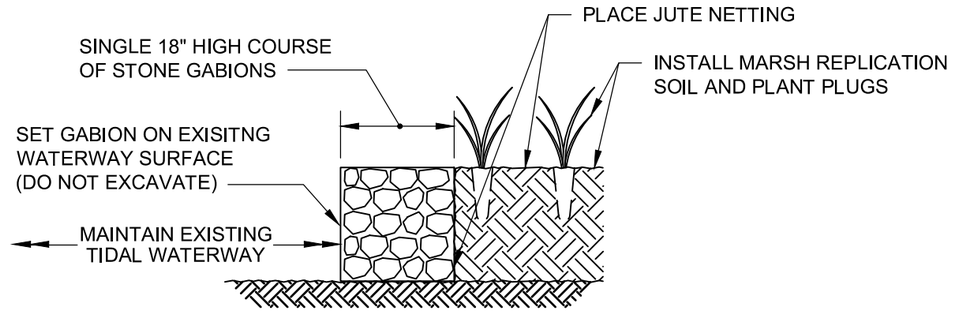


SECTION

DEWATERING CONTAINMENT AREA DETAIL



WETLAND MITIGATION DETAIL



GABION INSTALLATION SECTION DETAIL

GABION INSTALLITION NOTES

1. INSTALLATION OF THIS GABION WALL DURING LOW TIDE ONLY SHALL BE SET UPON EXISTING WATERWAY BOTTOM SURFACE GROUND ALONG THE LOCATION SHOWN IN PLAN VIEW WITH NO PERMITTED EXCAVATION, NOR PLACEMENT OF A SUPPORTING STONE LAYER NOR OTHER IMPACTS INFLICTED TO THE EXISTING WATERWAY.
2. THE TOP ELEVATION OF THIS SINGLE COURSE GABION WALL RUN SHALL BE SET NEARLY EQUIVALENT TO THAT OF THE ADJACENT TOP OF MARSHLAND SURFACE GRADE.
3. A CONTINUOUS BIODEGRADABLE JUTE MESH FOLDED OVER ALONG THE BACKSIDE OF THE GABION CAGES AND LAPPED ATOP OF THE INFILLED MARSHLAND REPLICATION PLANTINGS AREA SHALL CONTAIN THE INFILLED SOIL MATERIAL AS SHOWN IN DETAIL ABOVE AND IN ACCORDANCE WITH APPROVAL BY THE ENGINEER.

PERMIT PLANS - NOT FOR CONSTRUCTION

Jacobs

MASS COASTAL RAILROAD

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CAPE MAIN
SANDWICH, MASSACHUSETTS

EROSION PROTECTION & GABION INSTALLATION DETAILS

SHEET 7 OF 9

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June 1, 2022

EROSION CONTROL NOTES:

1. PRIOR TO BEGINNING CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT FOR ACCEPTANCE A GENERAL WORK SCHEDULE, CONSTRUCTION SEQUENCE AND PLAN WHICH INDICATES PLANNED IMPLEMENTATION OF TEMPORARY AND PERMANENT EROSION CONTROL MEASURES. THIS PLAN SHALL INCLUDE PROPOSED METHODS OF SOILS MANAGEMENT AND LEGAL OFFSITE DISPOSAL OF WASTE MATERIALS.

2. FOR EROSION CONTROL INSTALLATION REQUIREMENTS, REFER TO SHEET 6.

3. THE TOE OF ANY SLOPE IS TO REMAIN AT LEAST ONE FOOT INSIDE OF ALL EROSION CONTROLS. UNDER NO CIRCUMSTANCE SHALL THE CONTRACTOR COVER ANY PORTION OF THE EROSION CONTROLS WITH MATERIAL. ANY MATERIAL THAT IS PLACED ON ANY EROSION CONTROLS BY THE CONTRACTOR, OR ANY AGENT OF THE CONTRACTOR, SHALL BE IMMEDIATELY REMOVED BY THE CONTRACTOR, AND ANY NECESSARY REPAIRS TO THE EROSION CONTROLS ACCOMPLISHED, AT NO COST TO THE OWNER.

4. ADDITIONAL AND/OR REPLACEMENT EROSION CONTROLS SHALL BE INSTALLED AS CONDITIONS WARRANT, OR AS DIRECTED BY THE ENGINEER'S WETLAND SCIENTIST.

5. DURING CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EROSION CONTROL MAINTENANCE AND SHALL INSPECT AND/OR REPLACE ALL CONTROLS AS NEEDED. MAINTENANCE WILL BE CARRIED OUT IN ACCORDANCE WITH THE SPECIFICATIONS AND PERMIT CONDITIONS. THE CONTRACTOR IS RESPONSIBLE FOR CARRYING OUT NECESSARY MAINTENANCE DURING ALL PHASES OF PROJECT CONSTRUCTION AND SHALL BE SUBJECT TO THE INSPECTION AND ACCEPTANCE OF THE ENGINEER.

6. DURING CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING RUNOFF FLOW DURING STORMS AND PERIODS OF RAINFALL, THROUGHOUT THE WORK AREA.

7. SEDIMENTATION CONTROL DEVICES SHALL BE INSPECTED CLOSELY AND MAINTAINED PROMPTLY AS DESCRIBED IN THE SPECIFICATIONS OR AS DIRECTED BY THE ENGINEER'S WETLAND SCIENTIST.

8. DISTURBED SLOPES ALONG THE ROW EMBANKMENT WITHIN THE WORK ZONE WILL BE STABILIZED WITH LOAM AND SEED OR BALLAST AS DIRECTED BY THE ENGINEER.

SALT MARSH REPLICATION NOTES:

1. THE SALT MARSH REPLICATION SITE WILL BE CLEARED AND THE SUBGRADE ELEVATION BROUGHT TO AN EVEN LEVEL. THE SUPERVISING WETLAND SCIENTIST WILL INSPECT THE SUB-GRADE OF THE SALT MARSH REPLICATION SITE TO ENSURE THAT THE AREA IS AT A UNIFORM GRADE.

2. COIR LOGS WILL BE INSTALLED AND STACKED ON THE UPSLOPE SIDE OF THE ROCK GABION WALL UNTIL ADJACENT SALT MARSH ELEVATIONS ARE ACHIEVED.

SALT MARSH REPLICATION NOTES (CONT.):

3. MANUFACTURED HYDRIC SOIL SHALL BE PLACED WITHIN THE SALT MARSH REPLICATION SITE AFTER GRADING THE SUBGRADE HAS BEEN APPROVED. SOILS USED FOR SALT MARSH REPLICATION WILL BE CREATED WITH SOIL AMENDMENTS. MANUFACTURED HYDRIC SOILS ARE CREATED FROM A MIXTURE OF ORGANIC AND MINERAL MATERIALS, WITH THE FINAL PRODUCT CONTAINING AT LEAST 12 PERCENT ORGANIC MATTER CONTENT BY WEIGHT. THE CONTRACTOR MUST PROVIDE AN ANALYSIS OF THE PREPARED TOPSOIL TO THE WETLAND SCIENTIST FOR APPROVAL PRIOR TO INSTALLATION. SOIL MUST BE FREE OF SEEDS OR RHIZOMES OF INVASIVE PLANT SPECIES.

4. NO SOIL USED FOR THE CREATION OF SALT MARSH WILL BE TAKEN FROM ANY AREA SUPPORTING INVASIVE SPECIES, THE PROJECT WILL NOT TRANSLOCATE OR REUSE POTENTIALLY CONTAMINATED SALT MARSH OR WETLAND SOILS FROM AREAS ADJACENT TO THE EXISTING RAILROAD. MANUFACTURED WETLAND SOIL WILL BE GRADED TO ACHIEVE A TOPOGRAPHY TO MATCH THE EXISTING ADJACENT SALT MARSH, OR TO ACHIEVE TOPOGRAPHY OF THE TARGET SALT MARSH COVER TYPE. CONTRACTOR IS RESPONSIBLE FOR PROVIDING SPOT GRADES TO CONFIRM THE FINAL ELEVATION OF THE SALT MARSH REPLICATION AREA.

5. THE SUPERVISING WETLAND SCIENTIST WILL INSPECT THE FILLED SALT MARSH REPLICATION AREA TO ENSURE THAT FINAL ELEVATIONS HAVE BEEN MET. IN RESPONSE TO LOCAL HYDROLOGIC CONDITIONS, THE SUPERVISING WETLAND SCIENTIST MAY MAKE MINOR MODIFICATIONS TO THE FINAL ELEVATIONS IN THE FIELD.

6. THE SALT MARSH REPLICATION SITE WILL BE COVERED WITH A 100% BIODEGRADABLE EROSION CONTROL BLANKET AND SECURED IN PLACE USING 100% BIODEGRADABLE STAKES OR OTHER FASTENERS.

7. THE EROSION CONTROL BARRIERS WILL BE DISASSEMBLED AND PROPERLY DISPOSED OF BEFORE NOVEMBER 1 OF THE THIRD FULL GROWING SEASON AFTER PLANTING OF THE SALT MARSH REPLICATION SITE. SEDIMENT COLLECTED BY THE BARRIERS WILL BE REMOVED AND DISPOSED OF IN A MANNER THAT PREVENTS EROSION AND TRANSPORT TO A WETLAND OR WATERWAY. IF MINOR GRADING IS REQUIRED IN THE IMMEDIATE ZONE AROUND THE EROSION CONTROL BARRIER TO PROVIDE SURFACE HYDROLOGIC CONNECTION BETWEEN THE SALT MARSH REPLICATION SITE AND THE EXISTING SALT MARSH AREA, IT WILL BE DONE BY HAND AND STABILIZED BY MULCH.

8. CONTRACTOR SHALL SUBMIT AN AS-BUILT GRADING PLAN PRIOR TO PLANTINGS.

9. CONTRACTOR SHALL NOT FOUL EXISTING FREIGHT AND SIDING TRACKS, THE CONTRACTOR IS RESPONSIBLE FOR TEMPORARY CROSSING MEANS AND METHODS AND PROTECTING THE TRACK AT ALL TIMES.

PLANTING NOTES:

1. PLANTING WITHIN THE SALT MARSH REPLICATION SITE WILL CONFORM TO THE PLANS OR WILL BE COMPLETED IN ACCORDANCE WITH DIRECTIONS PROVIDED IN THE FIELD. ONLY PLANT MATERIALS NATIVE AND INDIGENOUS TO THE REGION WILL BE USED. USE OF CULTIVARS WILL BE PROHIBITED. SPECIES NOT SPECIFIED IN THE FINAL PLANTING PLAN WILL NOT BE USED WITHOUT WRITTEN APPROVAL FROM THE PERMITTING AGENCY.

2. ALL PLUGS WILL BE SPACED APPROXIMATELY 6-INCHES ON-CENTER, AT THE DIRECTION OF THE SUPERVISING WETLAND SCIENTIST TO SIMULATE NATURAL GROWTH PATTERNS.

3. TRANSPLANTS AND PLANT MATERIAL COLLECTED FROM THE WILD ARE PROHIBITED UNLESS APPROVED IN WRITING BY THE WETLAND SCIENTIST. ALL PLANT MATERIAL USED SHALL BE NURSERY-GROWN AND HEALTHY, SOUND AND FREE OF DISEASE, INSECT PESTS, EGGS OR LARVAE, DISCOLORATIONS, LEAF WILTING OR CURLING AND WEEDS.

4. CONTAINER GROWN STOCK SHALL HAVE BEEN GROWN IN A CONTAINER LONG ENOUGH FOR THE ROOT SYSTEM TO HAVE DEVELOPED SUFFICIENTLY TO HOLD ITS SOIL AFTER REMOVAL FROM THE CONTAINER. ROOTS SHALL VISIBLY EXTEND TO THE INSIDE FACE OF THE GROWING CONTAINER BUT SHALL NOT BE ROOT-BOUND OR GIRDLING.

5. ALL PLANTS SHALL BE DELIVERED TO THE SITE AS LIVE, ACTIVELY GROWING, OR JUST BREAKING DORMANCY, AND ARRIVE TO THE PROJECT SITE READY FOR PLANTING. THE WETLAND SCIENTIST MAY REJECT PLANTS DAMAGED IN HANDLING OR TRANSPORT. PLANT MATERIAL SHALL BE INSTALLED AS SOON AS POSSIBLE AFTER IT HAS BEEN DELIVERED TO THE SITE.

6. SOIL AND ROOTMASS SHALL BE WATERED AND MOIST ON DELIVERY TO THE JOB SITE. PLANTS WITH DRY SOIL AND ROOTS SHALL NOT BE ACCEPTABLE. ALL PLANT MATERIALS TEMPORARILY STORED AT THE SITE PRIOR TO PLANTING SHALL BE STORED OUT OF DIRECT EXPOSURE TO SUN AND WIND, SHALL BE MAINTAINED BY CAREFUL WATERING, AND SHALL BE PROTECTED FROM DAMAGE DUE TO CONSTRUCTION ACTIVITIES AND ADVERSE WEATHER.

7. PLANTING TO OCCUR BETWEEN MAY 1 AND SEPTEMBER 15. ALL PLANT MATERIALS SHALL BE GUARANTEED FOR ONE YEAR FOLLOWING DATE OF FINAL ACCEPTANCE.

PERMIT PLANS - NOT FOR CONSTRUCTION

Jacobs

MASS COASTAL RAILROAD

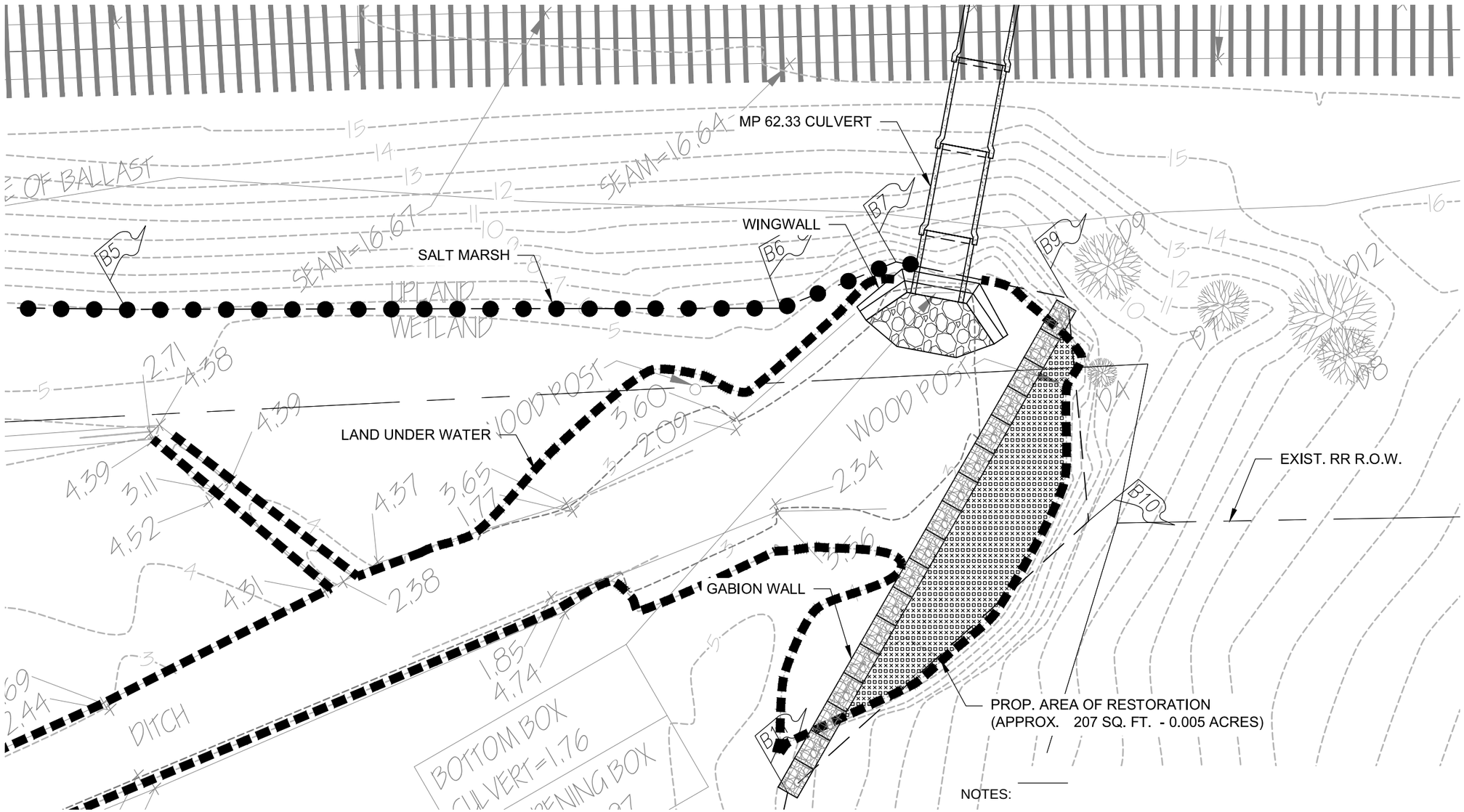
DRAWN BY: CWB
CHECKED BY: EP
APPROVED BY: BEM
DATE: June 1, 2022

CAPE MAIN
SANDWICH, MASSACHUSETTS

EROSION CONTROL,SALT MARSH MITIGATION AND PLANTING NOTES

SHEET
8 OF 9

P:\MASSDOT\2021\E2X88271 - MassDOT Rail MSA Contract\Cape Main MP 63.22 Replacement\700 CADD\DEP and ACOE\MP 63.22 Culvert DEP Erosion Protection.dwg
June 1, 2022



PLANTING SCHEDULE

PLANTING AREA	COMMON NAME	SCIENTIFIC NAME	SYMBOL	SIZE	QTY	ON CENTER SPACING
SALT MARSH REPLICATION AREA	SALT MEADOW CORDGRASS	SPARTINA PATENS	×	2" PLUG	420	6-IN
	SALTGRASS	DISTICHLIS SPICATA	□	2" PLUG	420	6-IN

NOTES:

1. THE CONTRACTOR SHALL NOT IMPACT THE TRACK AND SHALL GUARD AGAINST INTRODUCING ANY GROUND SLOPE DISTURBANCE TO THE BALLAST ON THE NEW EMBANKMENT AND THE SURROUNDING GREEN AREAS WHEN MOBILIZING TO PERFORM THIS RESTORATION WORK AS SHOWN.
2. THE CONTACTOR SHALL REMOVE ALL LITTER, TOOLS AND SURPLUS MATERIALS AS PART OF THE COMPLETION OF THE WORK UPON FINAL SITE INSPECTION AND ACCEPTANCE.

0 10 20

SCALE IN FEET

PERMIT PLANS - NOT FOR CONSTRUCTION

Jacobs

MASS COASTAL RAILROAD

DRAWN BY: CWB
CHECKED BY: EP
APPROVED BY: BEM
DATE: June 1, 2022

CAPE MAIN
SANDWICH, MASSACHUSETTS

SALT MARSH RESTORATION PLAN

SHEET 9 OF 9

P:\MASSDOT\2021\E2X88271 - MassDOT Rail MSA Contract\Cape Main MP 63.22 Replacement\700 CADD\DEP and ACOE\MP 63.22 Culvert DEP Erosion Protection.dwg
June 1, 2022

Appendix D – USFWS IPaC Report and Consistency Determination

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:
Project Code: 2023-0044253
Project Name: Cape Main MP 63.22

November 15, 2023

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:

Updated 4/12/2023 - 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 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 - (**Updated 4/12/2023**) The Service published a final rule to reclassify the northern long-eared bat (NLEB) as endangered on November 30, 2022. The final rule went into effect on March 31, 2023. You may utilize the **Northern Long-eared Bat Rangewide Determination Key** available in IPaC. More information about this Determination Key and the Interim Consultation Framework are available on the northern long-eared bat species page:

https://www.fws.gov/species/northern-long-eared-bat-myotis-septentrionalis

For projects that previously utilized the 4(d) Determination Key, 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. If your project was not completed by March 31, 2023, and may result in incidental take of NLEB, please reach out to our office at newengland@fws.gov to see if reinitiation is necessary.

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
- Coastal Barriers

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".

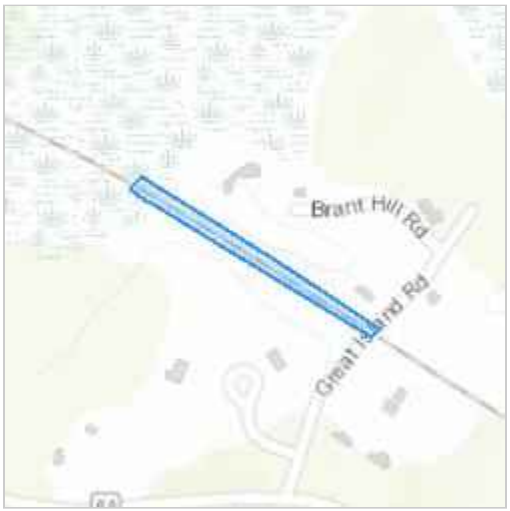
This species list is provided by:

New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

PROJECT SUMMARY

Project Code: 2023-0044253
Project Name: Cape Main MP 63.22
Project Type: Culvert Repair/Replacement/Maintenance
Project Description: Culvert replacement project through tidal salt marsh
Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@41.750972250000004,-70.47547596755382,14z



Counties: Barnstable County, Massachusetts

ENDANGERED SPECIES ACT SPECIES

There is a total of 5 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.

---

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.

MAMMALS

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered

BIRDS

NAME	STATUS
Rufa Red Knot *Calidris canutus rufa* There is **proposed** critical habitat for this species. Species profile: https://ecos.fws.gov/ecp/species/1864	Threatened

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

FLOWERING PLANTS

NAME	STATUS
American Chaffseed *Schwalbea americana* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1286	Endangered
Sandplain Gerardia *Agalinis acuta* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8128	Endangered

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

COASTAL BARRIERS

Projects within the John H. Chafee Coastal Barrier Resources System (CBRS) may be subject to the restrictions on Federal expenditures and financial assistance and the consultation requirements of the Coastal Barrier Resources Act (CBRA) (16 U.S.C. 3501 et seq.). For more information, please contact the local Ecological Services Field Office or visit the CBRA Consultations website. The CBRA website provides tools such as a flow chart to help determine whether consultation is required and a template to facilitate the consultation process.

UNIT	NAME	TYPE	SYSTEM UNIT ESTABLISHMENT DATE	FLOOD INSURANCE PROHIBITION DATE
MA-14P	Town Neck	UNKNOWN	N/A	11/16/1991

IPAC USER CONTACT INFORMATION

Agency: GZA GeoEnvironmental Inc
Name: kimberly degutis
Address: 249 Vanderbilt Ave
City: Norwood
State: MA
Zip: 02062
Email kimberly.degutis@gza.com
Phone: 7812785852

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: November 15, 2023
Project code: 2023-0044253
Project Name: Cape Main MP 63.22

Federal Nexus: no
Federal Action Agency (if applicable): Massachusetts Department of Transportation

Subject: Federal agency coordination under the Endangered Species Act, Section 7 for 'Cape Main MP 63.22'

Dear kimberly degutis:

This letter records your determination using the Information for Planning and Consultation (IPaC) system provided to the U.S. Fish and Wildlife Service (Service) on November 15, 2023, for “Cape Main MP 63.22” (here forward, Project). This project has been assigned Project Code 2023-0044253 and all future correspondence should clearly reference this number.

The Service developed the IPaC system and associated species’ determination keys in accordance with the Endangered Species Act of 1973 (ESA; 87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) and based on a standing analysis. All information submitted by the Project proponent into the IPaC must accurately represent the full scope and details of the Project. Failure to accurately represent or implement the Project as detailed in IPaC or the Northeast Determination Key (DKey), invalidates this letter. ***Answers to certain questions in the DKey commit the project proponent to implementation of conservation measures that must be followed for the ESA determination to remain valid.***

To make a no effect determination, the full scope of the proposed project implementation (action) should not have any effects (either positive or negative effect(s)), to a federally listed species or designated critical habitat. Effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action. (See § 402.17). Under Section 7 of the ESA, if a federal action agency makes a no effect determination, no further consultation with, or concurrence from, the Service is required (ESA §7). If a proposed Federal action may affect a listed species or designated critical

habitat, formal consultation is required (except when the Service concurs, in writing, that a proposed action "is not likely to adversely affect" listed species or designated critical habitat [50 CFR §402.02, 50 CFR§402.13]).

The IPaC results indicated the following species is (are) potentially present in your project area and, based on your responses to the Service's Northeast DKey, you determined the proposed Project will have the following effect determinations:

Species	**Listing Status**	**Determination**
American Chaffseed (*Schwalbea americana*)	Endangered	No effect
Rufa Red Knot (*Calidris canutus rufa*)	Threatened	No effect

Conclusion If there are no updates on listed species, no further consultation/coordination for this project is required for the species identified above. However, the Service recommends that project proponents re-evaluate the Project in IPaC if: 1) the scope, timing, duration, or location of the Project changes (includes any project changes or amendments); 2) new information reveals the Project may impact (positively or negatively) federally listed species or designated critical habitat; or 3) a new species is listed, or critical habitat designated. If any of the above conditions occurs, additional consultation with the Service should take place before project implements any changes which are final or commits additional resources.

In addition to the species listed above, the following species and/or critical habitats may also occur in your project area and are not covered by this conclusion:

- Monarch Butterfly *Danaus plexippus* Candidate
- Northern Long-eared Bat *Myotis septentrionalis* Endangered
- Sandplain Gerardia *Agalinis acuta* Endangered

To complete consultation for species that have reached a "May Affect" determination and/or species may occur in your project area and are not covered by this conclusion, 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 these listed species and/or critical habitats, avoid and minimize potential adverse effects, and prepare and submit a project review package if necessary: https://www.fws.gov/office/new-england-ecological-services/endangered-species-project-review

Please Note: If the Action may impact bald or golden eagles, additional coordination with the Service under the Bald and Golden Eagle Protection Act (BGEPA) (54 Stat. 250, as amended, 16 U.S.C. 668a-d) by the prospective permittee may be required. Please contact the Migratory Birds Permit Office, (413) 253-8643, or PermitsR5MB@fws.gov, with any questions regarding potential impacts to Eagles.

If you have any questions regarding this letter or need further assistance, please contact the New England Ecological Services Field Office and reference the Project Code associated with this Project.

Action Description
You provided to IPaC the following name and description for the subject Action.

1. Name

Cape Main MP 63.22

2. Description

The following description was provided for the project 'Cape Main MP 63.22':

> Culvert replacement project through tidal salt marsh

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@41.750972250000004,-70.47547597516498,14z



QUALIFICATION INTERVIEW

1. As a representative of this project, do you agree that all items submitted represent the complete scope of the project details and you will answer questions truthfully?

   Yes

2. Does the proposed project include, or is it reasonably certain to cause, intentional take of listed species?

   Note: This question could refer to research, direct species management, surveys, and/or studies that include intentional handling/encountering, harassment, collection, or capturing of any individual of a federally listed threatened, endangered, or proposed species.

   No

3. Is the action authorized, permitted, licensed, funded, or being carried out by a Federal agency in whole or in part?

   No

4. Will the proposed project involve the use of herbicide where listed species are present?

   No

5. Are there any caves or anthropogenic features suitable for hibernating or roosting bats within the area expected to be impacted by the project?

   Yes

6. Does any component of the project associated with this action include structures that may pose a collision risk to **birds** (e.g., land-based or offshore wind turbines, communication towers, high voltage transmission lines, any type of towers with or without guy wires)?

   Note: For federal actions, answer ‘yes’ if the construction or operation of wind power facilities is either (1) part of the federal action or (2) would not occur but for a federal agency action (federal permit, funding, etc.).

   No

7. Does any component of the project associated with this action include structures that may pose a collision risk to **bats** (e.g., land-based wind turbines)?

   Note: For federal actions, answer ‘yes’ if the construction or operation of wind power facilities is either (1) part of the federal action or (2) would not occur but for a federal agency action (federal permit, funding, etc.).

   No

8. Will the proposed project result in permanent changes to water quantity in a stream or temporary changes that would be sufficient to result in impacts to listed species?

   For example, will the proposed project include any activities that would alter stream flow, such as water withdrawal, hydropower energy production, impoundments, intake structures, diversion structures, and/or turbines? Projects that include temporary and limited water reductions that will not displace listed species or appreciably change water availability for listed species (e.g. listed species will experience no changes to feeding, breeding or sheltering) can answer "No". Note: This question refers only to the amount of water present in a stream, other water quality factors, including sedimentation and turbidity, will be addressed in following questions.

   No

9. Will the proposed project affect wetlands where listed species are present?

   This includes, for example, project activities within wetlands, project activities within 300 feet of wetlands that may have impacts on wetlands, water withdrawals and/or discharge of contaminants (even with a NPDES).

   No

10. Will the proposed project activities (including upland project activities) occur within 0.5 miles of the water's edge of a stream or tributary of a stream where listed species may be present?

    Yes

11. Will the proposed project directly affect a streambed (below ordinary high water mark (OHWM)) of the stream or tributary where listed species may be present?

    No

12. Will the proposed project bore underneath (directional bore or horizontal directional drill) a stream where listed species may be present?

    No

13. Will the proposed project involve a new point source discharge into a stream or change an existing point source discharge (e.g., outfalls; leachate ponds) where listed species may be present?

    No

14. Will the proposed project involve the removal of excess sediment or debris, dredging or in-stream gravel mining where listed species may be present?

    No

15. Will the proposed project involve the creation of a new water-borne contaminant source where listed species may be present?

    Note New water-borne contaminant sources occur through improper storage, usage, or creation of chemicals. For example: leachate ponds and pits containing chemicals that are not NSF/ANSI 60 compliant have contaminated waterways. Sedimentation will be addressed in a separate question.

    No

16. Will the proposed project involve perennial stream loss, in a stream of tributary of a stream where listed species may be present, that would require an individual permit under 404 of the Clean Water Act?

    No

17. Will the proposed project involve blasting where listed species may be present?

    No

18. Will the proposed project include activities that could negatively affect fish movement temporarily or permanently (including fish stocking, harvesting, or creation of barriers to fish passage).

    Yes

19. Will the proposed project involve earth moving that could cause erosion and sedimentation, and/or contamination along a stream or tributary of a stream where listed species may be present?

    Note: Answer "Yes" to this question if erosion and sediment control measures will be used to protect the stream.

    Yes

20. Will earth moving activities result in sediment being introduced to streams or tributaries of streams where listed species may be present through activities such as, but not limited to, valley fills, large-scale vegetation removal, and/or change in site topography?

    No

21. Will the proposed project involve vegetation removal within 200 feet of a perennial stream bank where aquatic listed species may be present?

    No

22. Will erosion and sedimentation control Best Management Practices (BMPs) associated with applicable state and/or Federal permits, be applied to the project? If BMPs have been provided by and/or coordinated with and approved by the appropriate Ecological Services Field Office, answer "Yes" to this question.

    Yes

23. Is the project being funded, lead, or managed in whole or in part by U.S Fish and Wildlife Restoration and Recovery Program (e.g., Partners, Coastal, Fisheries, Wildlife and Sport Fish Restoration, Refuges)?

    No

24. Will the proposed project result in changes to beach dynamics that may modify formation of habitat over time?

    Note: Examples of projects that result in changes to beach dynamics include 1) construction of offshore breakwaters and groins; 2) mining of sand from an updrift ebb tidal delta; 3) removing or adding beach sands; and 4) projects that stabilize dunes (including placement of sand fences or planting vegetation).

    No

25. [Hidden Semantic] Is the project area located within the red knot AOI?

    Automatically answered
    Yes

26. If you have determined that the red knot is unlikely to occur within your project's action area or that your project is unlikely to have any potential effects on the red knot, you may wish to make a "no effect" determination for the red knot. Additional guidance on how to make this decision can be found in the project review section of your local Ecological Services Field Office's website. CBFO: https://www.fws.gov/office/chesapeake-bay-ecological-services/project-review ; MEFO: https://www.fws.gov/office/maine-ecological-services ; NJFO: https://www.fws.gov/office/new-jersey-ecological-services/new-jersey-field-office-project-review-guide ; NEFO: https://www.fws.gov/office/new-england-ecological-services/endangered-species-project-review#Step5 ; WVFO: https://www.fws.gov/office/west-virginia-ecological-services/project-planning. If you are unsure, answer "No" and continue through the key.

    Would you like to make a no effect determination for the red knot?

    Yes

27. [Semantic] Does the project intersect the Virginia big-eared bat critical habitat?

    Automatically answered
    No

28. [Semantic] Does the project intersect the Indiana bat critical habitat?

    Automatically answered
    No

29. Will all activities occur within an area that is paved, graveled, routinely maintained, and/or inside a structure?

    No

30. Will the proposed project involve temporary or permanent modification to hydrology, including groundwater recharge, that could result in changes to water quality, water quantity, or timing of water availability in proximity to listed plants?

    No

31. Will the proposed project involve herbaceous native vegetation removal (including prescribed fire that would result in the burning of plants) or mowing?

    No

32. Will the proposed project involve ground disturbance?

    Yes

33. [Hidden Semantic] Does the project intersect the American Chaffseed AOI?

    Automatically answered
    Yes

34. Does the project occur within suitable habitat for American chaffseed? American chaffseed occurs in sandy (sandy peat, sandy loam), acidic, seasonally moint to dry soils. The species is generally found in habitats described as pine flatwoods, fire-maintained savannas, ecotonal areas between peaty wetlands and xeric sandy soils, and other open grass-sedge systems.

    No

35. [Semantic] Does the project intersect the candy darter critical habitat?

    Automatically answered
    No

36. [Semantic] Does the project intersect the diamond darter critical habitat?

    Automatically answered
    No

37. [Semantic] Does the project intersect the Big Sandy crayfish critical habitat?

    Automatically answered
    No

38. [Hidden Semantic] Does the project intersect the Guyandotte River crayfish critical habitat?

    Automatically answered
    No

39. Do you have any other documents that you want to include with this submission?

    No

PROJECT QUESTIONNAIRE

1. Approximately how many acres of trees would the proposed project remove?

   0.1

2. Approximately how many total acres of disturbance are within the disturbance/ construction limits of the proposed project?

   1.0

3. Briefly describe the habitat within the construction/disturbance limits of the project site.

   railroad embankment (ballast, scrub shrub) over high salt marsh

IPAC USER CONTACT INFORMATION

Agency: GZA GeoEnvironmental Inc
Name: kimberly degutis
Address: 249 Vanderbilt Ave
City: Norwood
State: MA
Zip: 02062
Email kimberly.degutis@gza.com
Phone: 7812785852

Appendix E – Section 106 Documentation



Known for excellence.
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GEOTECHNICAL
ENVIRONMENTAL
ECOLOGICAL
WATER
CONSTRUCTION MANAGEMENT

249 Vanderbilt Avenue
Norwood, MA 02062
T: 781.278.3700
F: 781.278.5701
F: 781.278.5702
www.gza.com

September 15, 2023
File No. 01.0174521.05

via electronic mail
david.s.robinson@mass.gov

Mr. David Robinson
Massachusetts Board of Underwater Archaeological Resources
251 Causeway Street, Suite 800
Boston, Massachusetts 02114

Re: Massachusetts Coastal Railroad (MassCoastal)
Application for Department of the Army General Permit for Massachusetts
Pre-Construction Notification for the Cape Main MM 63.22 Culvert Replacement Project

Dear Mr. Robinson:

On behalf of MassCoastal, GZA GeoEnvironmental, Inc. (GZA) is submitting to the United States Army Corps of Engineers (USACE) a Pre-Construction Notification (PCN) Permit Application for proposed work related to the replacement of an existing, nearly-failed culvert with a 48-inch reinforced concrete pipe culvert under the Cape Main Line Railroad at Milepost (MP) 63.22 in Sandwich, Massachusetts.

The proposed project includes the replacement of an existing 24 x 30-inch box culvert will be replaced with a 48-inch reinforced concrete pipe culvert with precast concrete wingwalls within the same alignment. Armoring stone on the embankment in the culvert area will be added to protect against anticipated future storm surge events and riprap splash pads will also be installed.

As part of the permit process, we are submitting project information to your office to be reviewed for the presence of historical or archeological resources that may be impacted by the project.

Should you have any questions or comments regarding this submittal, or if you require additional information, please contact our office at (781) 278-3700.

Sincerely,

GZA GEOENVIRONMENTAL, INC.

Kimberly K. Degutis, PWS, CESCL
Senior Project Manager

Daniel M. Nitzsche CPESC, CESSWI
Consultant/Reviewer

Stephen L. Lecco, A.I.C.P., C.E.P.
Associate Principal

Attached: Project Notification Form, USGS Locus Map, Permit Drawings

An Equal Opportunity Employer M/F/V/H

© 2022 - GZA GeoEnvironmental, Inc. \\GZANORJobs\170,000-179,999\174521\174521-05.KKD\GIS\MXD\FIG 1 SITE LOCUS.mxd, May 23, 2022 - 1:54:40 PM, kimberly.degulis

SITE

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SCALE IN FEET

NO.	ISSUE / DESCRIPTION	BY	DATE
XX	XXXX	XX	XXX

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CAPE MAIN MP 63.22
SANDWICH, MASSACHUSETTS

SITE LOCUS

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
MASS COASTAL RAILROAD

PROJ MGR: KKD	REVIEWED BY: SEL	CHECKED BY: DMN	FIG/DWG 1
DESIGNED BY: KKD	DRAWN BY: KKD	SCALE: 1 in = 2,000 ft	
DATE: 05/23/2022	PROJECT NO: 01.017452.05	REVISION NO: 0	SHEET NO: 1

US Army Corps of Engineers ®
New England District

IX: HISTORIC PROPERTY NOTIFICATION FORM

In accordance with General Condition 7, proponents must ensure and document that all potential historic properties within the permit area have been identified. To assist with this effort, proponents may send this form for self-verification activities, but must send this form for PCN activities, to the SHPO, BUAR and applicable THPO(s). You must include any Corps or state waterway agency application forms, plans and a copy of the USGS quadrangle map section that clearly marks the project location. It is recommended that you complete **all** fields (write "none" or "see attached application form" if applicable). The PCN sent to the Corps must include proof of having sent this form, e.g. the email or certified mail receipt that was used to send it, to the SHPO (does not accept email), BUAR and applicable THPOs. Please include any comments or requests received from these agencies with your PCN.

Project Name: Culvert Replacement at Cape Main MP 63.22
Address, City, State & Zip: near Great Island Road, Sandwich, MA
Project Proponent Name: Massachusetts Coastal Railroad
Address: 12 Harding Street, Unit 202, Lakeville, MA 02347
Phone(s) and Email: 781.828.0576 cpodgurski@masscoastal.com
Project Location (provide detailed description if necessary) Address, City, State & Zip:
Cape Main Railroad MilePost 63.22, 800-feet west of Great Island Road in Sandwich, MA

Latitude/Longitude Coordinates (if address doesn't exist): Lat: N 41.7515853 Long: W -70.4768418
Waterway Name: unnamed tributary to Old Harbor Creek

Agency license or funding for the project (list all licenses, permits, approvals, grants or other entitlements being sought from state and federal agencies).

Agency Name	**Type of License or Funding (specify)**
MADEP	401 Water Quality Certificate

Project Description: Culvert replacement

Does the project include demolition? If so, specify nature of demolition and describe the building(s) which are proposed for demolition: Yes. Removal of existing 24 x 30 inch stone box culvert under railroad embankment; temporary removal of existing overburden and some excavation beneath culvert to install proposed round concrete pipe; installation of riprap pads, headwalls; reconstruction of eroded salt marsh.

Does the project include rehabilitation of any existing buildings? If so, specify nature of rehabilitation and describe the building(s) which are proposed for rehabilitation: No

Does the project include new construction? If so, describe (attach plans and elevations if necessary): Yes - restoration of eroded stream bank and eroded salt marsh

To the best of your knowledge, are any historic or archaeological properties known to exist within the project's area of potential impact? If so, specify: No

What is the total acreage of the project area?

Woodland 0 acres
Wetland 0.006 acres
Floodplain 0.006 acres
Underwater and/or bottomlands 0.001 acres
Open space 0.5 acres
Developed 0 acres

Productive Resources:
Agriculture 0 acres
Forestry 0 acres
Mining/Extraction 0 acres
Total Project Acreage 1.0 acres

What is the acreage of the proposed new construction? 0.001 acres

What is the present land use of the project area? railroad embankment, salt marsh and upland forested / scrub shrub woodland

Signature of person submitting this form: _____ Date: 9/15/2023

Name: Kimbelry Degutis, PWS - GZA GeoEnvironmental Inc.
Address: 249 Vanderbilt Avenue
City/Town/Zip: Norwood, MA 02062
Telephone: 781.278.5852



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www.gza.com

September 15, 2023
File No. 01.0174521.05

Ms. Brona Simon
State Historic Preservation Officer & Executive Director
Massachusetts Historical Commission
Mass. Archives Bldg.
220 Morrissey Blvd.
Boston MA 02125

Re: Massachusetts Coastal Railroad (MassCoastal)
Application for Department of the Army General Permit for Massachusetts
Pre-Construction Notification for the Cape Main MM 63.22 Culvert Replacement Project

Dear Ms. Simon:

On behalf of MassCoastal, GZA GeoEnvironmental, Inc. (GZA) is submitting to the United States Army Corps of Engineers (USACE) a Pre-Construction Notification (PCN) Permit Application for proposed work related to the replacement of an existing, nearly-failed culvert with a 48-inch reinforced concrete pipe culvert under the Cape Main Line Railroad at Milepost (MP) 63.22 in Sandwich, Massachusetts.

The proposed project includes the replacement of an existing 24 x 30-inch box culvert will be replaced with a 48-inch reinforced concrete pipe culvert with precast concrete wingwalls within the same alignment. Armoring stone on the embankment in the culvert area will be added to protect against anticipated future storm surge events and riprap splash pads will be installed.

As part of the permit process, we are submitting project information to your office to be reviewed for the presence of historical or archeological resources that may be impacted by the project.

Should you have any questions or comments regarding this submittal, or if you require additional information, please contact our office at (781) 278-3700.

Sincerely,

GZA GEOENVIRONMENTAL, INC.

Kimberly K. Degutis, PWS, CESCL
Senior Project Manager

Daniel M. Nitzsche CPESC, CESSWI
Consultant/Reviewer

Stephen L. Lecco, A.I.C.P., C.E.P.
Associate Principal

Attached: Project Notification Form, USGS Locus Map, Permit Drawings

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CAPE MAIN MP 63.22
SANDWICH, MASSACHUSETTS

SITE LOCUS

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
MASS COASTAL RAILROAD

PROJ MGR: KKD	REVIEWED BY: SEL	CHECKED BY: DMN	FIG/DWG 1
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Agency Name	**Type of License or Funding (specify)**
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Project Description: Culvert replacement

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Total Project Acreage 1.0 acres

What is the acreage of the proposed new construction? 0.001 acres

What is the present land use of the project area? railroad embankment, salt marsh and upland forested / scrub shrub woodland

Signature of person submitting this form: _____ Date: 9/15/2023

Name: Kimbelry Degutis, PWS - GZA GeoEnvironmental Inc.
Address: 249 Vanderbilt Avenue
City/Town/Zip: Norwood, MA 02062
Telephone: 781.278.5852



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www.gza.com

September 15, 2023
File No. 01.0174521.05

via electronic mail
David.Weeden@mwtribe-NSN.gov

Mr. David Weeden
Tribal Historic Preservation Officer
Mashpee Wampanoag Tribe
483 Great Neck Road South
Mashpee, Massachusetts 02649

Re: Massachusetts Coastal Railroad (MassCoastal)
Application for Department of the Army General Permit for Massachusetts
Pre-Construction Notification for the Cape Main MM 63.22 Culvert Replacement Project

Dear Mr. Weeden:

On behalf of MassCoastal, GZA GeoEnvironmental, Inc. (GZA) is submitting to the United States Army Corps of Engineers (USACE) a Pre-Construction Notification (PCN) Permit Application for proposed work related to the replacement of an existing, nearly-failed culvert with a 48-inch reinforced concrete pipe culvert under the Cape Main Line Railroad at Milepost (MP) 63.22 in Sandwich, Massachusetts.

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Should you have any questions or comments regarding this submittal, or if you require additional information, please contact our office at (781) 278-3700.

Sincerely,

GZA GEOENVIRONMENTAL, INC.

Kimberly K. Degutis, PWS, CESCL
Senior Project Manager

Daniel M. Nitzsche CPESC, CESSWI
Consultant/Reviewer

Stephen L. Lecco, A.I.C.P., C.E.P.
Associate Principal

Attached: Project Notification Form, USGS Locus Map, Permit Drawings

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CAPE MAIN MP 63.22
SANDWICH, MASSACHUSETTS

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PREPARED FOR:
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PROJ MGR: KKD	REVIEWED BY: SEL	CHECKED BY: DMN	FIG/DWG 1
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Total Project Acreage 1.0 acres

What is the acreage of the proposed new construction? 0.001 acres

What is the present land use of the project area? railroad embankment, salt marsh and upland forested / scrub shrub woodland

Signature of person submitting this form: _____ Date: 9/15/2023

Name: Kimbelry Degutis, PWS - GZA GeoEnvironmental Inc.
Address: 249 Vanderbilt Avenue
City/Town/Zip: Norwood, MA 02062
Telephone: 781.278.5852



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F: 781.278.5702
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September 15, 2023
File No. 01.0174521.05

via electronic mail
tashtesook@aol.com

Mr. John Brown
Tribal Historic Preservation Officer
Narragansett Indian Longhouse
4425 South County Trail
Charlestown, Rhode Island 02813

Re: Massachusetts Coastal Railroad (MassCoastal)
Application for Department of the Army General Permit for Massachusetts
Pre-Construction Notification for the Cape Main MM 63.22 Culvert Replacement Project

Dear Mr. Brown:

On behalf of MassCoastal, GZA GeoEnvironmental, Inc. (GZA) is submitting to the United States Army Corps of Engineers (USACE) a Pre-Construction Notification (PCN) Permit Application for proposed work related to the replacement of an existing, nearly-failed culvert with a 48-inch reinforced concrete pipe culvert under the Cape Main Line Railroad at Milepost (MP) 63.22 in Sandwich, Massachusetts.

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GZA GEOENVIRONMENTAL, INC.

Kimberly K. Degutis, PWS, CESCL
Senior Project Manager

Daniel M. Nitzsche CPESC, CESSWI
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Stephen L. Lecco, A.I.C.P., C.E.P.
Associate Principal

Attached: Project Notification Form, USGS Locus Map, Permit Drawings

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CAPE MAIN MP 63.22
SANDWICH, MASSACHUSETTS

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September 15, 2023
File No. 01.0174521.05

via electronic mail
bettina@wampanoagtribe.net

Ms. Bettina Washington
Tribal Historic Preservation Officer
Wampanoag Tribe of Gay Head (Aquinnah)
20 Black Brook Road
Aquinnah, Massachusetts 02535

Re: Massachusetts Coastal Railroad (MassCoastal)
Application for Department of the Army General Permit for Massachusetts
Pre-Construction Notification for the Cape Main MM 63.22 Culvert Replacement Project

Dear Ms. Washington:

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Consultant/Reviewer

Stephen L. Lecco, A.I.C.P., C.E.P.
Associate Principal

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CAPE MAIN MP 63.22
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PREPARED FOR:
MASS COASTAL RAILROAD

PROJ MGR: KKD	REVIEWED BY: SEL	CHECKED BY: DMN	FIG/DWG 1
DESIGNED BY: KKD	DRAWN BY: KKD	SCALE: 1 in = 2,000 ft	
DATE: 05/23/2022	PROJECT NO: 01.017452.05	REVISION NO: 0	SHEET NO: 1

US Army Corps of Engineers ®
New England District

IX: HISTORIC PROPERTY NOTIFICATION FORM

In accordance with General Condition 7, proponents must ensure and document that all potential historic properties within the permit area have been identified. To assist with this effort, proponents may send this form for self-verification activities, but must send this form for PCN activities, to the SHPO, BUAR and applicable THPO(s). You must include any Corps or state waterway agency application forms, plans and a copy of the USGS quadrangle map section that clearly marks the project location. It is recommended that you complete **all** fields (write "none" or "see attached application form" if applicable). The PCN sent to the Corps must include proof of having sent this form, e.g. the email or certified mail receipt that was used to send it, to the SHPO (does not accept email), BUAR and applicable THPOs. Please include any comments or requests received from these agencies with your PCN.

Project Name: Culvert Replacement at Cape Main MP 63.22
Address, City, State & Zip: near Great Island Road, Sandwich, MA
Project Proponent Name: Massachusetts Coastal Railroad
Address: 12 Harding Street, Unit 202, Lakeville, MA 02347
Phone(s) and Email: 781.828.0576 cpodgurski@masscoastal.com
Project Location (provide detailed description if necessary) Address, City, State & Zip:
Cape Main Railroad MilePost 63.22, 800-feet west of Great Island Road in Sandwich, MA

Latitude/Longitude Coordinates (if address doesn't exist): Lat: N 41.7515853 Long: W -70.4768418
Waterway Name: unnamed tributary to Old Harbor Creek

Agency license or funding for the project (list all licenses, permits, approvals, grants or other entitlements being sought from state and federal agencies).

Agency Name	**Type of License or Funding (specify)**
MADEP	401 Water Quality Certificate

Project Description: Culvert replacement

Does the project include demolition? If so, specify nature of demolition and describe the building(s) which are proposed for demolition: Yes. Removal of existing 24 x 30 inch stone box culvert under railroad embankment; temporary removal of existing overburden and some excavation beneath culvert to install proposed round concrete pipe; installation of riprap pads, headwalls; reconstruction of eroded salt marsh.

Does the project include rehabilitation of any existing buildings? If so, specify nature of rehabilitation and describe the building(s) which are proposed for rehabilitation: No

Does the project include new construction? If so, describe (attach plans and elevations if necessary): Yes - restoration of eroded stream bank and eroded salt marsh

To the best of your knowledge, are any historic or archaeological properties known to exist within the project's area of potential impact? If so, specify: No

What is the total acreage of the project area?

Woodland 0 acres
Wetland 0.006 acres
Floodplain 0.006 acres
Underwater and/or bottomlands 0.001 acres
Open space 0.5 acres
Developed 0 acres

Productive Resources:
Agriculture 0 acres
Forestry 0 acres
Mining/Extraction 0 acres
Total Project Acreage 1.0 acres

What is the acreage of the proposed new construction? 0.001 acres

What is the present land use of the project area? railroad embankment, salt marsh and upland forested / scrub shrub woodland

Signature of person submitting this form: _____ Date: 9/15/2023

Name: Kimbelry Degutis, PWS - GZA GeoEnvironmental Inc.
Address: 249 Vanderbilt Avenue
City/Town/Zip: Norwood, MA 02062
Telephone: 781.278.5852

Appendix F – Prior Approvals

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
696 VIRGINIA ROAD
CONCORD MA 01742-2751

April 3, 2023

Regulatory Division
File Number: NAE-2022-02055

Christopher Podgurski
MassCoastal Railroad
12 Harding Street, Unit 202
Lakeville, MA 02347
Sent by email to consultant: Kimberly.Degutis@gza.com

Dear Christopher Podgurski:

The U.S. Army Corps of Engineers (USACE) has reviewed your application to replace the failing 24x30 inch stone box culvert at Cape Main MP 63.22 with a new 48-inch reinforced concrete pipe with precast concrete wingwalls, including temporary dewatering, pumped bypass, installation of riprap, and includes 207 square feet of salt marsh restoration, located 800 feet from the intersection of the railroad and Great Island Road in an unnamed tributary to Old Harbor Creek in Sandwich, Massachusetts. The project would include impacts to 285 square feet of tidal saltmarsh and 621 square feet of tidal waters waterward of the high tide line (HTL). The work is shown on the enclosed plans titled “Culvert Replacement Project at Cape Maine MP 63.22 Sandwich, MA” on sheets #2-9, and dated “June 2022”.

Based on the information that you have provided, we verify that the activity is authorized under General Permit # 10 Linear Transportation Projects and Stream Crossings of the enclosed April 16, 2018, federal permit known as the Massachusetts General Permits (GPs). The GPs are also available at https://www.nae.usace.army.mil/Missions/Regulatory/State-General-Permits/Massachusetts-General-Permit.

Please review the enclosed GPs carefully, in particular the general conditions beginning on page 19, and ensure that you and all personnel performing work authorized by the GPs are fully aware of and comply with its terms and conditions. A copy of the GPs and this verification letter shall be available at the work site as required by General Condition 32. You must perform this work in compliance with the following special condition:

> *You must maintain the activity authorized herein in good condition and in conformance with the terms and conditions of this authorization. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 37 on page 32 of the GPs. Should you wish to cease to maintain the*

authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this authorization from this office, which may require restoration of the area.

This authorization expires on April 5, 2023. You must commence or have under contract to commence the work authorized herein by April 5, 2023, and complete the work by April 5, 2024. If not, you must contact this office to determine the need for further authorization and we recommend you contact us *before* the work authorized herein expires. Please contact us immediately if you change the plans or construction methods for work within our jurisdiction as we must approve any changes before you undertake them. Performing work within our jurisdiction that is not specifically authorized by this determination or failing to comply with the special condition(s) provided above or all the terms and conditions of the GPs may subject you to the enforcement provisions of our regulations.

This authorization does not obviate the need to obtain other federal, state, or local authorizations required by law. Applicants are responsible for applying for and obtaining any other approvals.

Your project is located within, or may affect resources within, the coastal zone. The Massachusetts Office of Coastal Zone Management (CZM) has already determined that no further Federal Consistency Review is required.

We continually strive to improve our customer service. To better serve you, we would appreciate your completing our Customer Service Survey located at https://regulatory.ops.usace.army.mil/customer-service-survey.

Please contact [PM] of my staff at (443) 310-4567 or meghan.e.fullam@usace.army.mil if you have any questions.

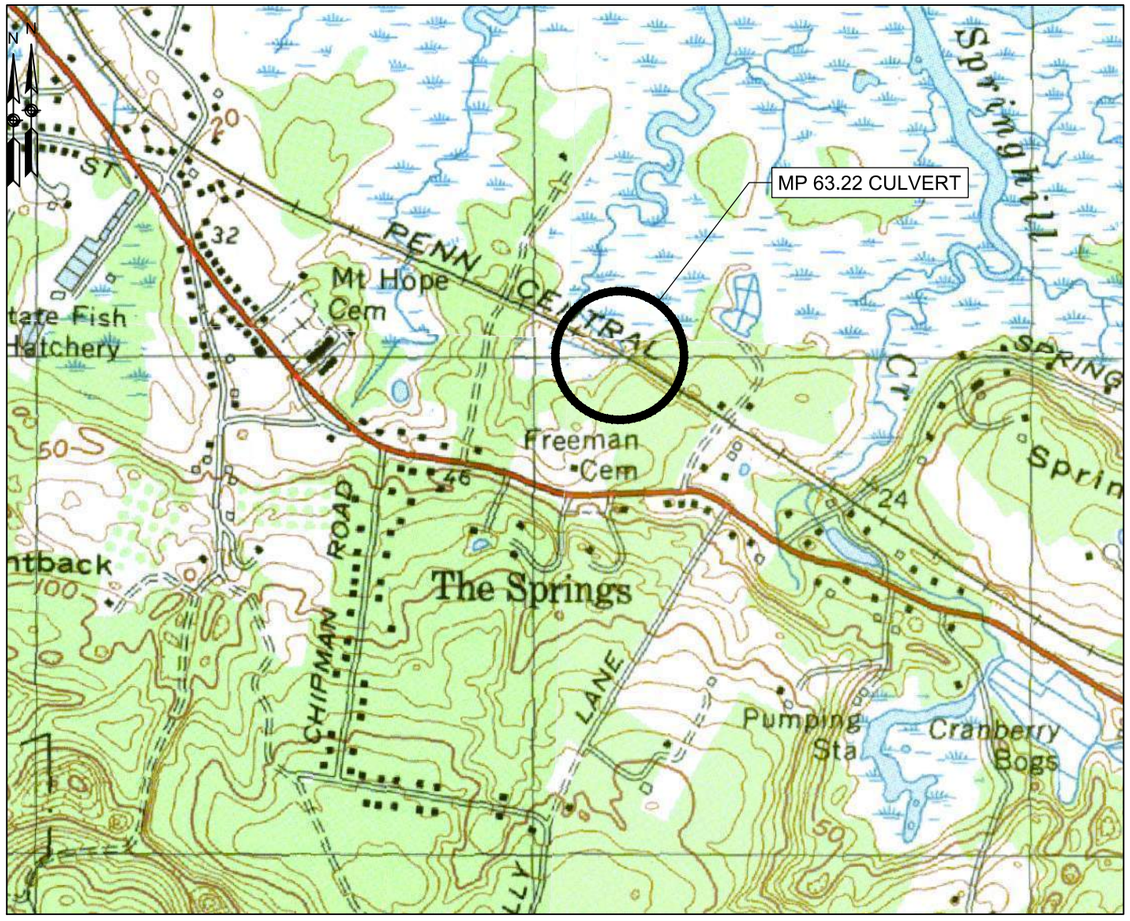
Sincerely,

Paul Maniccia

Paul M. Maniccia
Chief, Permits & Enforcement Branch
Regulatory Division

Enclosures
Final Approved Plans

cc:
Kimberly Degutis, Project Agent (GZA), Kimberly.Degutis@gza.com
Ed Reiner: U.S. EPA, Region 1, Boston, MA, reiner.ed@epa.gov
Rachel Croy: U.S. EPA, Region 1, Boston, MA, croy.rachel@epa.gov
Robert Boeri: Coastal Zone Management, Boston, MA, robert.boeri@mass.gov
Daniel Gilmore, Chief, DEP SERO, Wetlands and Waterways, Lakeville, MA;
daniel.gilmore@mass.gov (DEP File No. X289061)



CULVERT REPLACEMENT PROJECT
AT CAPE MAIN MP 63.22
SANDWICH, MA

401 WATER QUALITY CERTIFICATE PERMITTING PLANS

MASSCOASTAL RAILROAD JUNE 2022

PERMIT PLANS - NOT FOR CONSTRUCTION

Jacobs

MASS COASTAL RAILROAD

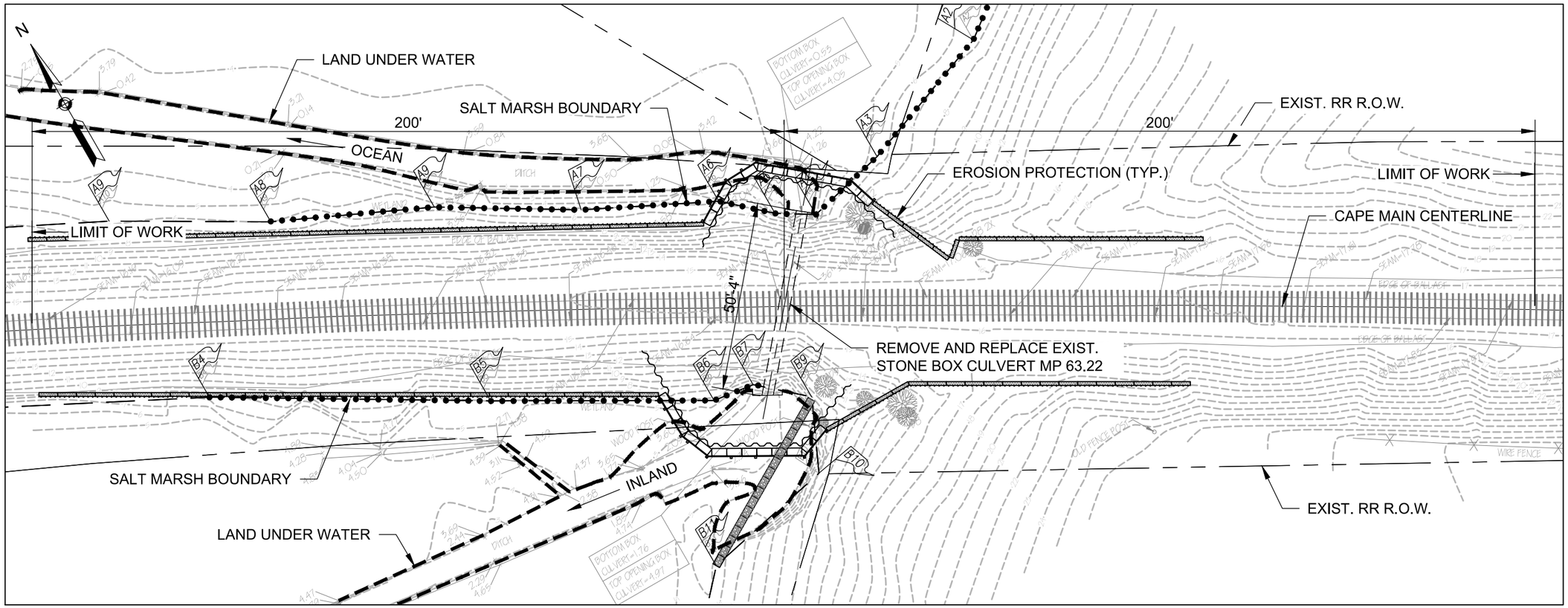
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CHECKED BY: EP
APPROVED BY: BEM
DATE: June 1, 2022

CAPE MAIN
SANDWICH, MASSACHUSETTS

COVER SHEET

SHEET
1 OF 9

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June 1, 2022







PERMIT PLANS - NOT FOR CONSTRUCTION

Jacobs

MASS COASTAL RAILROAD

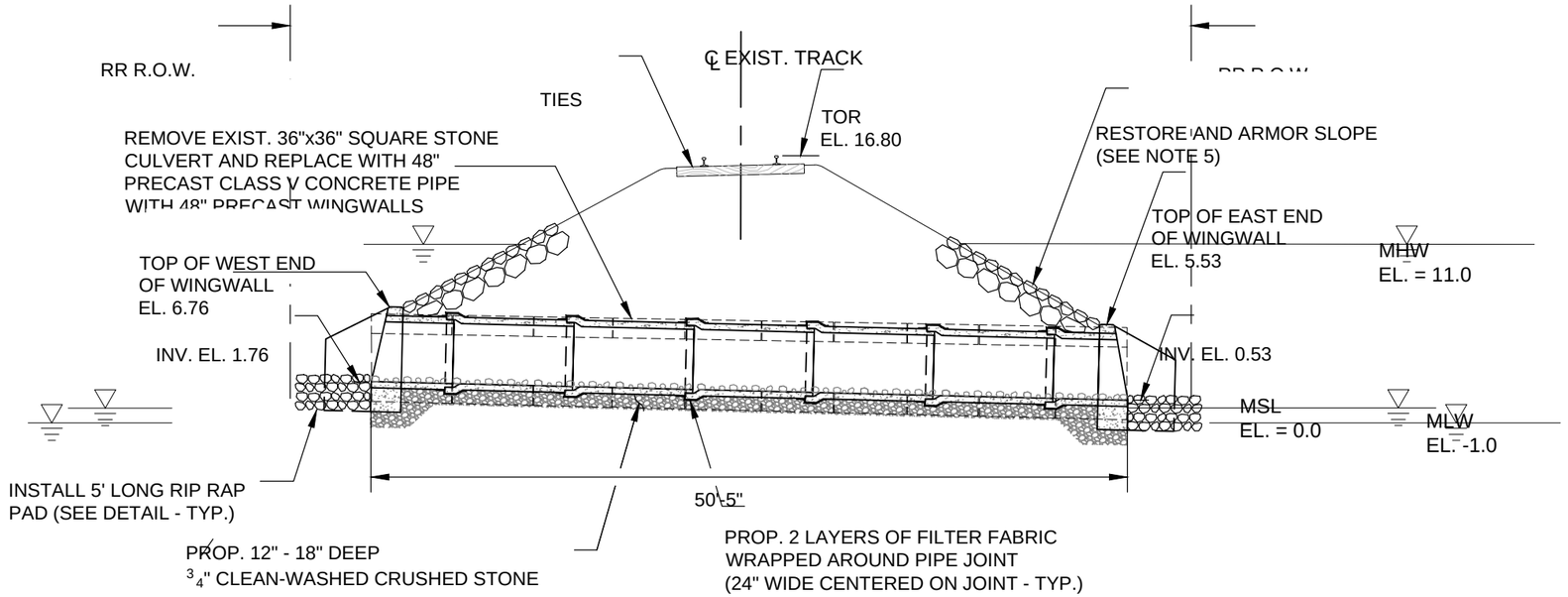
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APPROVED BY: BEM
DATE: June 1, 2022

CAPE MAIN
SANDWICH, MASSACHUSETTS

EXISITING CONDITIONS

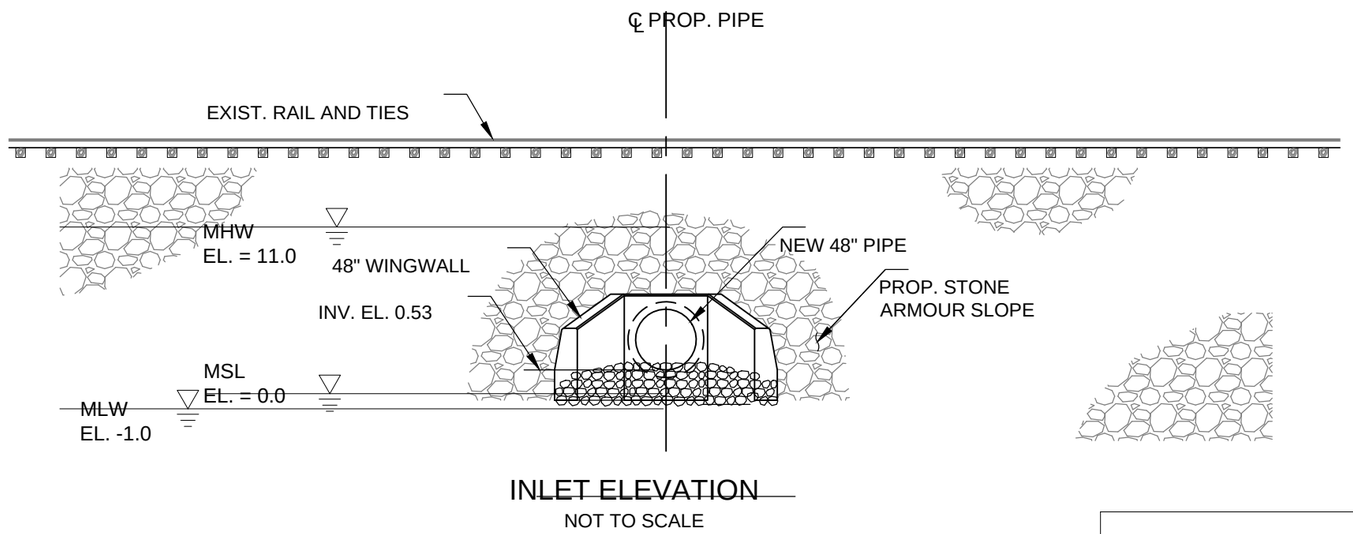
SHEET
2 OF 9

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June 1, 2022



PROPOSED LONGITUDINAL SECTION

NOT TO SCALE



INLET ELEVATION

NOT TO SCALE

NOTES:

1. ALL CULVERT AND WINGWALL INSTALLATION WORK SHALL BE PERFORMED IN THE DRY WITH TEMPORARY COFFERDAMS, DEWATERING PUMPING, AND ALL EROSION CONTROL MEASURES IN PLACE AND MAINTAINED FOR THE DURATION OF THE WORK.
2. CONTRACTOR SHALL MINIMIZE ENCROACHMENT INTO THE ADJACENT WATER AND NATURAL VEGETATION TO THE GREATEST EXTENT POSSIBLE TO LIMIT SOIL AND WATER DISTURBANCE.
3. CONTRACTOR SHALL REMOVE AND TEMPORARILY STOCKPILE EMBANKMENT SLOPE SOILS AND SURFACE BALLAST TO BE RESET TO MATCH EXISTING CONDITION FOLLOWING CULVERT INSTALLATION WORK AT THE DIRECTION OF THE ENGINEER ONLY.
4. ANY ADDITIONAL PROCESSED GRAVEL, CRUSHED STONE, AND STONE BALLAST DETERMINED TO BE NEEDED BY THE CONTRACTOR SHALL BE APPROVED BY MASSDOT'S ENGINEER PRIOR TO ORDERING FOR DELIVERY TO THE SITE.
5. CONTRACTOR SHALL PLACE AND EMBED STONE ARMOR RIP RAP ON BOTH SIDES OF THE CULVERT TO LIMITS SHOWN. STONES SHALL BE CHINKED IN TO ELIMINATE ANY DISLODGING OR SLIP-FAILING OF THE RECONSTRUCTED SLOPE.
6. PLACE 7" OF RECLAIMED MUD AND STONE MATERIAL INSIDE NEW PIPE SO THAT FLOW VOLUME IS EQUAL TO THAT OF EXISTING 30" STONE BOX.
7. ALL EMBANKMENT FILL SHALL BE PLACED IN HORIZONTAL LAYERS NOT TO EXCEED TWELVE (12) INCHES IN LAYERED DEPTH FOLLOWING COMPACTION. SUBSEQUENT LAYERS SHALL ONLY THEN PLACED AND COMPACTED AFTER THE PREVIOUS LOWER FILL LAYER IS FULLY COMPACTED IN PLACE.

PERMIT PLANS - NOT FOR CONSTRUCTION

Jacobs

MASS COASTAL — MASSACHUSETTS COASTAL RAILROAD

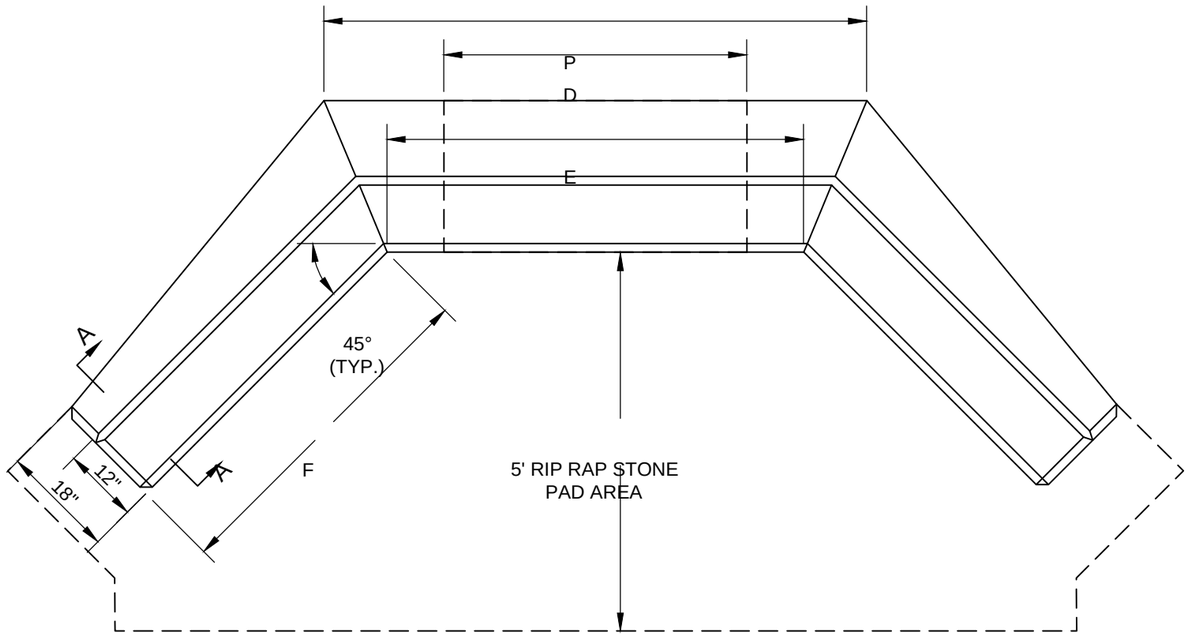
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DATE: June 1, 2022

CAPE MAIN
SANDWICH, MASSACHUSETTS

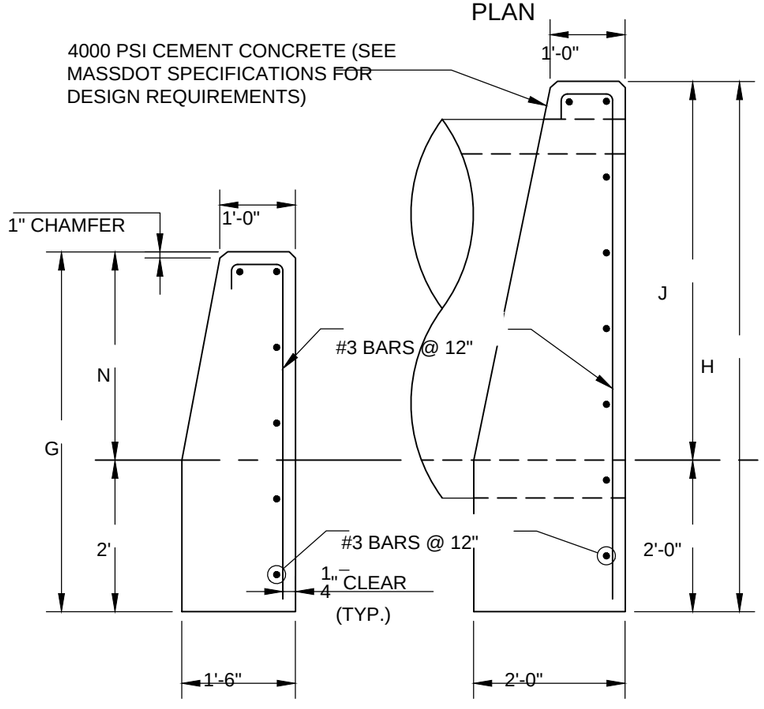
PROPOSED PRECAST PIPE CULVERT REPLACEMENT

SHEET 3 OF 9

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June 1, 2022

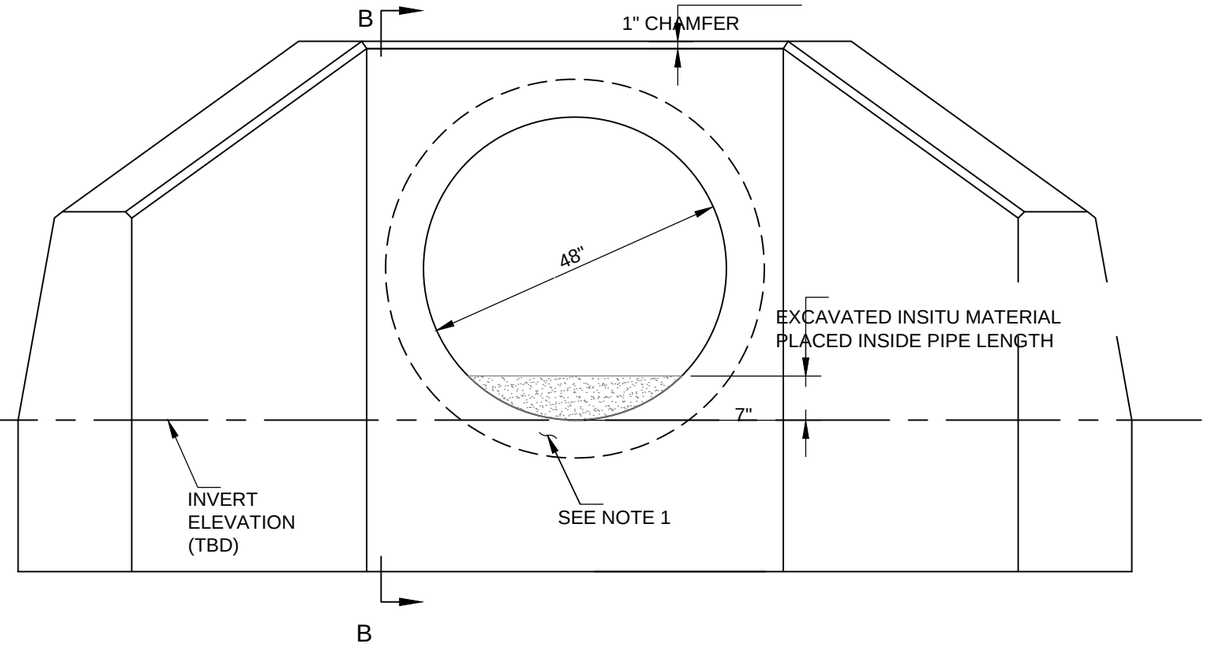


PLAN



ELEVATION A-A

ELEVATION B-B



FRONT ELEVATION

PERMIT PLANS - NOT FOR CONSTRUCTION

NOTE:

1. CONTRACTOR SHALL INSTALL REPLACEMENT, PRECAST WINGWALL AND SEAL CONCRETE CULVERT END WITH WATERTIGHT GROUT SEALANT PRIOR TO REMOVAL OF COFFERDAM.

Jacobs

MASS COASTAL RAILROAD

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APPROVED BY: BEM
DATE: June 1, 2022

CAPE MAIN
SANDWICH, MASSACHUSETTS

PROPOSED REPLACEMENT
WINGWALL DETAILS

SHEET
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June 1, 2022



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Jacobs

MASS COASTAL RAILROAD
MASSACHUSETTS COASTAL RAILROAD

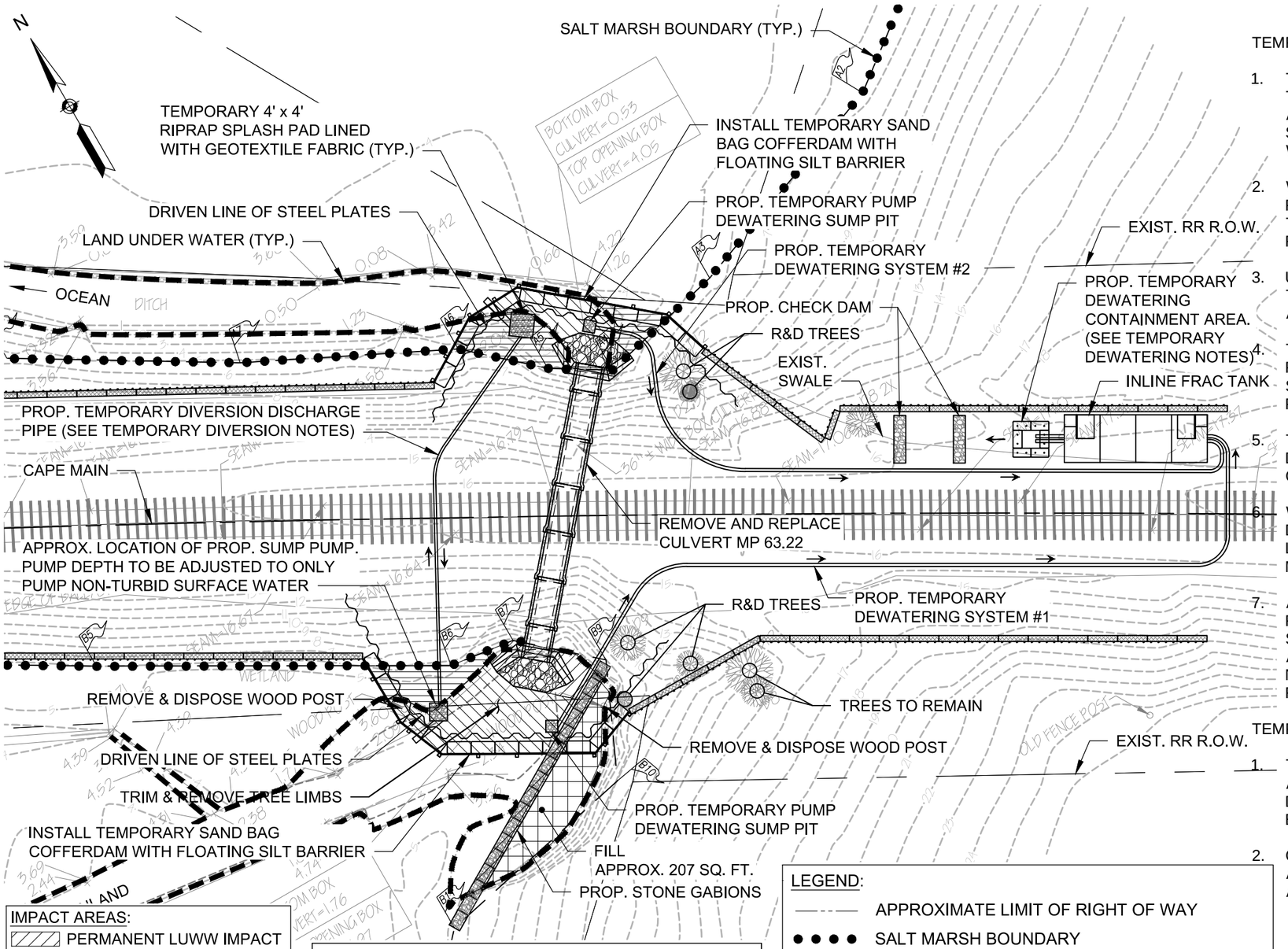
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CAPE MAIN
SANDWICH, MASSACHUSETTS

SITE ACCESS AND STAGING AREA

SHEET
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June 1, 2022



PROPOSED IMPACTS

RESOURCE AREA	IMPACT TYPE	SQUARE FEET	ACRES
LAND UNDER WATER BODIES AND WATERWAYS (LUWW)	TEMPORARY	387	0.0090
	PERMANENT	234	0.0050
SALT MARSH	TEMPORARY	268	0.0060
	PERMANENT	17	0.0004

PLAN
SCALE: 1" = 20'-0"

TEMPORARY DIVERSION NOTES:

1. THE CONTRACTOR SHALL DESIGN AND SUBMIT FOR APPROVAL A TEMPORARY PUMP DIVERSION SYSTEM TO DIVERT WATER FLOW AROUND CULVERT CONSTRUCTION AREA, INCLUDING REQUIRED SIZE/LOCATION OF DIVERSION PUMP, DISCHARGE PIPE SIZE, AS WELL AS CONTINGENCY PLANS IN THE EVENT OF PUMP FAILURE.
2. WATER LEVELS ARE SUBJECT TO CHANGE, THE CONTRACTOR IS RESPONSIBLE FOR MAKING DETERMINATION OF WATER LEVELS THAT WILL EXIST DURING CONSTRUCTION AND INSTALL AND REFORTIFY COFFER DAMS AS APPLICABLE.
3. UPON INSTALLATION OF ALL SEDIMENT CONTROL MEASURES THE CONTRACTOR SHALL BEGIN IMPLEMENTING THE DIVERSION AND DEWATERING PLAN FOLLOWING INSPECTION.
4. THE CONTRACTOR SHALL INSTALL THE TEMPORARY DISCHARGE PIPES, SUMP-HOLE, DIVERSION PUMPS AND RIP-RAP DISCHARGE SPLASH PAD PRIOR TO PLACING PIPE PLUGS, DRIVEN STEEL PLATES AND SAND BAG COFFERDAMS.
5. THE TEMPORARY DISCHARGE PIPE SHALL BE CONSTRUCTED OF DURABLE MATERIAL ABLE TO WITHSTAND ANTICIPATED SITE CONDITIONS.
6. WATER FROM THE WORK AREA SHALL BE PUMPED TO A DEWATERING CONTAINMENT AREA THE AREA SHALL BE LOCATED SUCH THAT THE WATER DRAINS BACK INTO THE MARSHLAND BELOW THE DOWNGRADIENT COFFERDAM.
7. AFTER THE CULVERT HAS BEEN REPLACED AND READY TO RECEIVE FLOW AND THE DISTURBED AREA HAS BEEN STABILIZED, THE DRIVEN STEEL SHEETS SHALL BE PULLED OUT AND "COFFERDAMS" SHALL BE REMOVED STARTING ON THE NORTHERN END. THEN THE TEMPORARY DIVERSION SHALL BE REMOVED.

TEMPORARY DEWATERING NOTES:

1. THE PROP. TEMPORARY DEWATERING CONTAINMENT AREA. SIZE AND LOCATION OUTSIDE THE WETLAND AREA TO BE DETERMINED BY THE CONTRACTOR AND PRE-APPROVED BY THE ENGINEER'S DRAINAGE ENGINEER AND WETLAND SCIENTIST.
2. CONTRACTOR SHALL EXCAVATE BACK THIS EMBANKMENT AREA AS REQUIRED TO INSTALL DEWATERING CONTAINMENT AREA AND RESTORE SLOPE UPON ITS REMOVAL.

PERMIT PLANS - NOT FOR CONSTRUCTION

Jacobs

MASS COASTAL RAILROAD

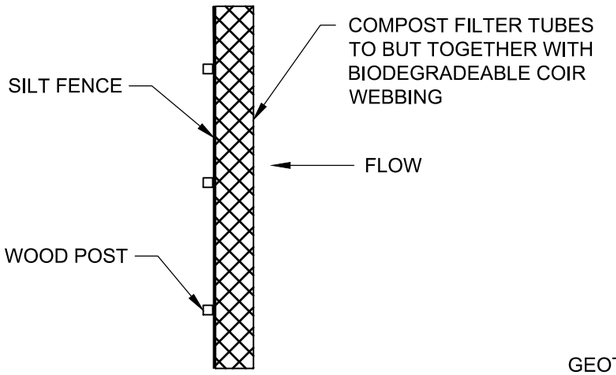
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DATE: June 1, 2022

CAPE MAIN
SANDWICH, MASSACHUSETTS

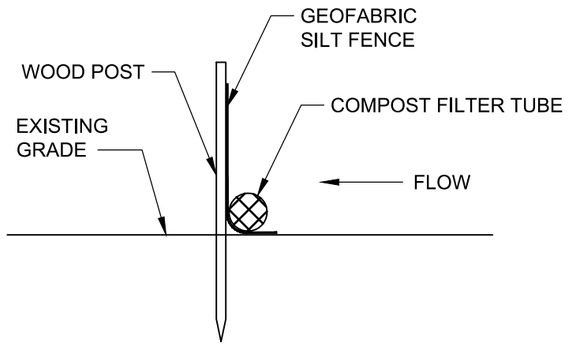
EROSION PROTECTION PLAN

SHEET
6 OF 9

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June 1, 2022

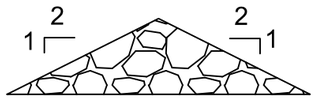


PLAN

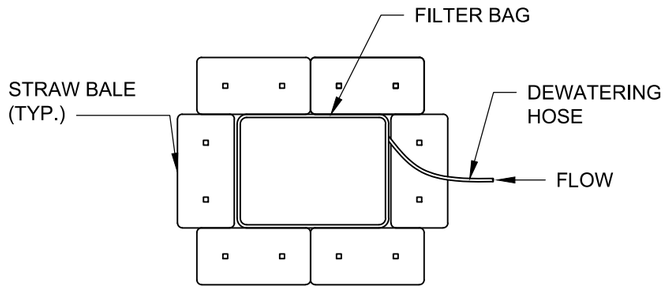


SECTION

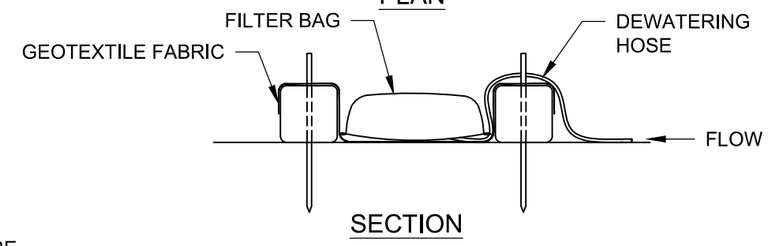
SILT FENCE / COMPOST FILTER TUBE EROSION CONTROL BARRIER



STONE CHECK DAM DETAIL

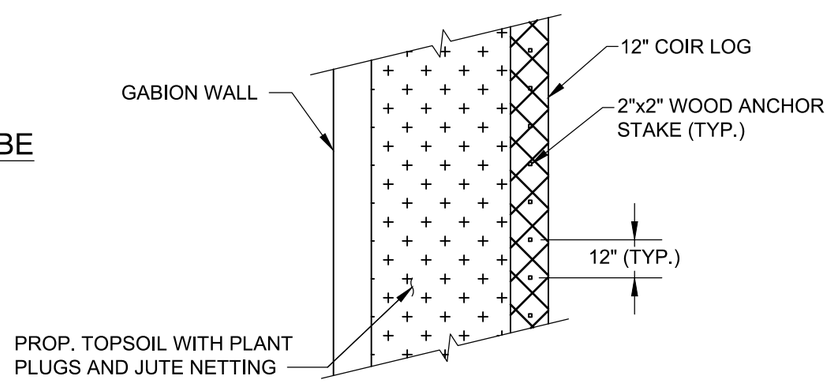


PLAN

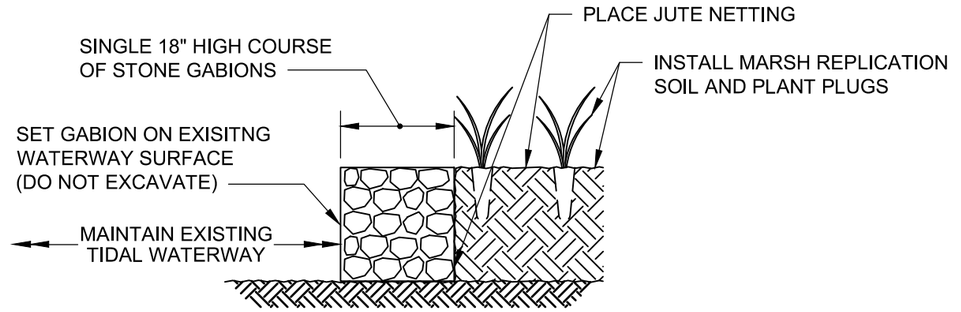


SECTION

DEWATERING CONTAINMENT AREA DETAIL



WETLAND MITIGATION DETAIL



GABION INSTALLATION SECTION DETAIL

GABION INSTALLITION NOTES

1. INSTALLATION OF THIS GABION WALL DURING LOW TIDE ONLY SHALL BE SET UPON EXISTING WATERWAY BOTTOM SURFACE GROUND ALONG THE LOCATION SHOWN IN PLAN VIEW WITH NO PERMITTED EXCAVATION, NOR PLACEMENT OF A SUPPORTING STONE LAYER NOR OTHER IMPACTS INFLICTED TO THE EXISTING WATERWAY.
2. THE TOP ELEVATION OF THIS SINGLE COURSE GABION WALL RUN SHALL BE SET NEARLY EQUIVALENT TO THAT OF THE ADJACENT TOP OF MARSHLAND SURFACE GRADE.
3. A CONTINUOUS BIODEGRADABLE JUTE MESH FOLDED OVER ALONG THE BACKSIDE OF THE GABION CAGES AND LAPPED ATOP OF THE INFILLED MARSHLAND REPLICATION PLANTINGS AREA SHALL CONTAIN THE INFILLED SOIL MATERIAL AS SHOWN IN DETAIL ABOVE AND IN ACCORDANCE WITH APPROVAL BY THE ENGINEER.

PERMIT PLANS - NOT FOR CONSTRUCTION

Jacobs

MASS COASTAL RAILROAD

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CHECKED BY: EP
APPROVED BY: BEM
DATE: June 1, 2022

CAPE MAIN
SANDWICH, MASSACHUSETTS

EROSION PROTECTION & GABION INSTALLATION DETAILS

SHEET 7 OF 9

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June 1, 2022

EROSION CONTROL NOTES:

1. PRIOR TO BEGINNING CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT FOR ACCEPTANCE A GENERAL WORK SCHEDULE, CONSTRUCTION SEQUENCE AND PLAN WHICH INDICATES PLANNED IMPLEMENTATION OF TEMPORARY AND PERMANENT EROSION CONTROL MEASURES. THIS PLAN SHALL INCLUDE PROPOSED METHODS OF SOILS MANAGEMENT AND LEGAL OFFSITE DISPOSAL OF WASTE MATERIALS.

2. FOR EROSION CONTROL INSTALLATION REQUIREMENTS, REFER TO SHEET 6.

3. THE TOE OF ANY SLOPE IS TO REMAIN AT LEAST ONE FOOT INSIDE OF ALL EROSION CONTROLS. UNDER NO CIRCUMSTANCE SHALL THE CONTRACTOR COVER ANY PORTION OF THE EROSION CONTROLS WITH MATERIAL. ANY MATERIAL THAT IS PLACED ON ANY EROSION CONTROLS BY THE CONTRACTOR, OR ANY AGENT OF THE CONTRACTOR, SHALL BE IMMEDIATELY REMOVED BY THE CONTRACTOR, AND ANY NECESSARY REPAIRS TO THE EROSION CONTROLS ACCOMPLISHED, AT NO COST TO THE OWNER.

4. ADDITIONAL AND/OR REPLACEMENT EROSION CONTROLS SHALL BE INSTALLED AS CONDITIONS WARRANT, OR AS DIRECTED BY THE ENGINEER'S WETLAND SCIENTIST.

5. DURING CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EROSION CONTROL MAINTENANCE AND SHALL INSPECT AND/OR REPLACE ALL CONTROLS AS NEEDED. MAINTENANCE WILL BE CARRIED OUT IN ACCORDANCE WITH THE SPECIFICATIONS AND PERMIT CONDITIONS. THE CONTRACTOR IS RESPONSIBLE FOR CARRYING OUT NECESSARY MAINTENANCE DURING ALL PHASES OF PROJECT CONSTRUCTION AND SHALL BE SUBJECT TO THE INSPECTION AND ACCEPTANCE OF THE ENGINEER.

6. DURING CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING RUNOFF FLOW DURING STORMS AND PERIODS OF RAINFALL, THROUGHOUT THE WORK AREA.

7. SEDIMENTATION CONTROL DEVICES SHALL BE INSPECTED CLOSELY AND MAINTAINED PROMPTLY AS DESCRIBED IN THE SPECIFICATIONS OR AS DIRECTED BY THE ENGINEER'S WETLAND SCIENTIST.

8. DISTURBED SLOPES ALONG THE ROW EMBANKMENT WITHIN THE WORK ZONE WILL BE STABILIZED WITH LOAM AND SEED OR BALLAST AS DIRECTED BY THE ENGINEER.

SALT MARSH REPLICATION NOTES:

1. THE SALT MARSH REPLICATION SITE WILL BE CLEARED AND THE SUBGRADE ELEVATION BROUGHT TO AN EVEN LEVEL. THE SUPERVISING WETLAND SCIENTIST WILL INSPECT THE SUB-GRADE OF THE SALT MARSH REPLICATION SITE TO ENSURE THAT THE AREA IS AT A UNIFORM GRADE.

2. COIR LOGS WILL BE INSTALLED AND STACKED ON THE UPSLOPE SIDE OF THE ROCK GABION WALL UNTIL ADJACENT SALT MARSH ELEVATIONS ARE ACHIEVED.

SALT MARSH REPLICATION NOTES (CONT.):

3. MANUFACTURED HYDRIC SOIL SHALL BE PLACED WITHIN THE SALT MARSH REPLICATION SITE AFTER GRADING THE SUBGRADE HAS BEEN APPROVED. SOILS USED FOR SALT MARSH REPLICATION WILL BE CREATED WITH SOIL AMENDMENTS. MANUFACTURED HYDRIC SOILS ARE CREATED FROM A MIXTURE OF ORGANIC AND MINERAL MATERIALS, WITH THE FINAL PRODUCT CONTAINING AT LEAST 12 PERCENT ORGANIC MATTER CONTENT BY WEIGHT. THE CONTRACTOR MUST PROVIDE AN ANALYSIS OF THE PREPARED TOPSOIL TO THE WETLAND SCIENTIST FOR APPROVAL PRIOR TO INSTALLATION. SOIL MUST BE FREE OF SEEDS OR RHIZOMES OF INVASIVE PLANT SPECIES.

4. NO SOIL USED FOR THE CREATION OF SALT MARSH WILL BE TAKEN FROM ANY AREA SUPPORTING INVASIVE SPECIES, THE PROJECT WILL NOT TRANSLOCATE OR REUSE POTENTIALLY CONTAMINATED SALT MARSH OR WETLAND SOILS FROM AREAS ADJACENT TO THE EXISTING RAILROAD. MANUFACTURED WETLAND SOIL WILL BE GRADED TO ACHIEVE A TOPOGRAPHY TO MATCH THE EXISTING ADJACENT SALT MARSH, OR TO ACHIEVE TOPOGRAPHY OF THE TARGET SALT MARSH COVER TYPE. CONTRACTOR IS RESPONSIBLE FOR PROVIDING SPOT GRADES TO CONFIRM THE FINAL ELEVATION OF THE SALT MARSH REPLICATION AREA.

5. THE SUPERVISING WETLAND SCIENTIST WILL INSPECT THE FILLED SALT MARSH REPLICATION AREA TO ENSURE THAT FINAL ELEVATIONS HAVE BEEN MET. IN RESPONSE TO LOCAL HYDROLOGIC CONDITIONS, THE SUPERVISING WETLAND SCIENTIST MAY MAKE MINOR MODIFICATIONS TO THE FINAL ELEVATIONS IN THE FIELD.

6. THE SALT MARSH REPLICATION SITE WILL BE COVERED WITH A 100% BIODEGRADABLE EROSION CONTROL BLANKET AND SECURED IN PLACE USING 100% BIODEGRADABLE STAKES OR OTHER FASTENERS.

7. THE EROSION CONTROL BARRIERS WILL BE DISASSEMBLED AND PROPERLY DISPOSED OF BEFORE NOVEMBER 1 OF THE THIRD FULL GROWING SEASON AFTER PLANTING OF THE SALT MARSH REPLICATION SITE. SEDIMENT COLLECTED BY THE BARRIERS WILL BE REMOVED AND DISPOSED OF IN A MANNER THAT PREVENTS EROSION AND TRANSPORT TO A WETLAND OR WATERWAY. IF MINOR GRADING IS REQUIRED IN THE IMMEDIATE ZONE AROUND THE EROSION CONTROL BARRIER TO PROVIDE SURFACE HYDROLOGIC CONNECTION BETWEEN THE SALT MARSH REPLICATION SITE AND THE EXISTING SALT MARSH AREA, IT WILL BE DONE BY HAND AND STABILIZED BY MULCH.

8. CONTRACTOR SHALL SUBMIT AN AS-BUILT GRADING PLAN PRIOR TO PLANTINGS.

9. CONTRACTOR SHALL NOT FOUL EXISTING FREIGHT AND SIDING TRACKS, THE CONTRACTOR IS RESPONSIBLE FOR TEMPORARY CROSSING MEANS AND METHODS AND PROTECTING THE TRACK AT ALL TIMES.

PLANTING NOTES:

1. PLANTING WITHIN THE SALT MARSH REPLICATION SITE WILL CONFORM TO THE PLANS OR WILL BE COMPLETED IN ACCORDANCE WITH DIRECTIONS PROVIDED IN THE FIELD. ONLY PLANT MATERIALS NATIVE AND INDIGENOUS TO THE REGION WILL BE USED. USE OF CULTIVARS WILL BE PROHIBITED. SPECIES NOT SPECIFIED IN THE FINAL PLANTING PLAN WILL NOT BE USED WITHOUT WRITTEN APPROVAL FROM THE PERMITTING AGENCY.

2. ALL PLUGS WILL BE SPACED APPROXIMATELY 6-INCHES ON-CENTER, AT THE DIRECTION OF THE SUPERVISING WETLAND SCIENTIST TO SIMULATE NATURAL GROWTH PATTERNS.

3. TRANSPLANTS AND PLANT MATERIAL COLLECTED FROM THE WILD ARE PROHIBITED UNLESS APPROVED IN WRITING BY THE WETLAND SCIENTIST. ALL PLANT MATERIAL USED SHALL BE NURSERY-GROWN AND HEALTHY, SOUND AND FREE OF DISEASE, INSECT PESTS, EGGS OR LARVAE, DISCOLORATIONS, LEAF WILTING OR CURLING AND WEEDS.

4. CONTAINER GROWN STOCK SHALL HAVE BEEN GROWN IN A CONTAINER LONG ENOUGH FOR THE ROOT SYSTEM TO HAVE DEVELOPED SUFFICIENTLY TO HOLD ITS SOIL AFTER REMOVAL FROM THE CONTAINER. ROOTS SHALL VISIBLY EXTEND TO THE INSIDE FACE OF THE GROWING CONTAINER BUT SHALL NOT BE ROOT-BOUND OR GIRDLING.

5. ALL PLANTS SHALL BE DELIVERED TO THE SITE AS LIVE, ACTIVELY GROWING, OR JUST BREAKING DORMANCY, AND ARRIVE TO THE PROJECT SITE READY FOR PLANTING. THE WETLAND SCIENTIST MAY REJECT PLANTS DAMAGED IN HANDLING OR TRANSPORT. PLANT MATERIAL SHALL BE INSTALLED AS SOON AS POSSIBLE AFTER IT HAS BEEN DELIVERED TO THE SITE.

6. SOIL AND ROOTMASS SHALL BE WATERED AND MOIST ON DELIVERY TO THE JOB SITE. PLANTS WITH DRY SOIL AND ROOTS SHALL NOT BE ACCEPTABLE. ALL PLANT MATERIALS TEMPORARILY STORED AT THE SITE PRIOR TO PLANTING SHALL BE STORED OUT OF DIRECT EXPOSURE TO SUN AND WIND, SHALL BE MAINTAINED BY CAREFUL WATERING, AND SHALL BE PROTECTED FROM DAMAGE DUE TO CONSTRUCTION ACTIVITIES AND ADVERSE WEATHER.

7. PLANTING TO OCCUR BETWEEN MAY 1 AND SEPTEMBER 15. ALL PLANT MATERIALS SHALL BE GUARANTEED FOR ONE YEAR FOLLOWING DATE OF FINAL ACCEPTANCE.

PERMIT PLANS - NOT FOR CONSTRUCTION

Jacobs

MASS COASTAL RAILROAD

DRAWN BY: CWB
CHECKED BY: EP
APPROVED BY: BEM
DATE: June 1, 2022

CAPE MAIN
SANDWICH, MASSACHUSETTS

EROSION CONTROL, SALT MARSH MITIGATION AND PLANTING NOTES

SHEET
8 OF 9

P:\MASSDOT\2021\E2X88271 - MassDOT Rail MSA Contract\Cape Main MP 63.22 Replacement\700 CADD\DEP and ACOE\MP 63.22 Culvert DEP Erosion Protection.dwg
June 1, 2022

PLANTING SCHEDULE

PLANTING AREA	COMMON NAME	SCIENTIFIC NAME	SYMBOL	SIZE	QTY	ON CENTER SPACING
SALT MARSH REPLICATION AREA	SALT MEADOW CORDGRASS	SPARTINA PATENS	×	2" PLUG	420	6-IN
	SALTGRASS	DISTICHLIS SPICATA	□	2" PLUG	420	6-IN

NOTES:

1. THE CONTRACTOR SHALL NOT IMPACT THE TRACK AND SHALL GUARD AGAINST INTRODUCING ANY GROUND SLOPE DISTURBANCE TO THE BALLAST ON THE NEW EMBANKMENT AND THE SURROUNDING GREEN AREAS WHEN MOBILIZING TO PERFORM THIS RESTORATION WORK AS SHOWN.
2. THE CONTACTOR SHALL REMOVE ALL LITTER, TOOLS AND SURPLUS MATERIALS AS PART OF THE COMPLETION OF THE WORK UPON FINAL SITE INSPECTION AND ACCEPTANCE.

0 10 20

SCALE IN FEET

PERMIT PLANS - NOT FOR CONSTRUCTION

Jacobs

MASS COASTAL RAILROAD

DRAWN BY: CWB
CHECKED BY: EP
APPROVED BY: BEM
DATE: June 1, 2022

CAPE MAIN
SANDWICH, MASSACHUSETTS

SALT MARSH RESTORATION PLAN

SHEET 9 OF 9

P:\MASSDOT\2021\E2X88271 - MassDOT Rail MSA Contract\Cape Main MP 63.22 Replacement\700 CADD\DEP and ACOE\MP 63.22 Culvert DEP Erosion Protection.dwg
June 1, 2022

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

One Winter Street Boston, MA 02108 • 617-292-5500

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Governor

Karyn E. Polito
Lieutenant Governor

Bethany A. Card
Secretary

Martin Suuberg
Commissioner

NOV 0 2 2022

Massachusetts Coastal Railroad
ATTN: Christopher Podgurski
12 Harding Street, Unit 202
Lakeville, MA 02347

RE: **401 WATER QUALITY CERTIFICATION**
Application for: BRP WW 10
MAJOR FILL AND EXCAVATION PROJECTS

AT: Cape Main Railroad Line MP 63.22
Culvert Replacement
SANDWICH

Transmittal No: X289061

Dear Mr. Podgurski:

The Department of Environmental Protection ("MassDEP") has reviewed your application for a Water Quality Certification, as referenced above. In accordance with the provisions of MGL Ch. 21, §§26-53, Section 401 of the Federal Clean Water Act as amended (33 U.S.C. §1251 et seq.), and 314 CM 9.00, it has been determined there is reasonable assurance the proposed project will be conducted in a manner which will not violate applicable water quality standards at 314 CMR 4.00.

The property is owned by the MassDOT Rail and Transit Division. The culvert replacement qualifies as Footprint Bridge Exempt under Section 24 of the Transportation Bond Bill of 2014. Section 24 of the 2014 Transportation Bond Bill (Chapter 79 Acts) exempts bridge projects of the Massachusetts Department of Transportation from the requirements of MGL Chapter 30, sections 61 - 62A (MEPA), MGL Chapter 91 (Public Waterfront Act), and MGL 131, section 40 (WPA) if the design is substantially the functional equivalent of, and in similar alignment to, the structure to be reconstructed or replaced. As stated in the regulation, a "bridge" shall include any structure spanning and providing passage over water, railroad right-of-way, public or private way, other vehicle facility or other area. As a culvert meets the definition of a bridge, the exemption is applicable and eliminates the need for review under the Massachusetts Environmental Policy Act, Wetlands Protection Act, and Public Waterfront Act (Chapter 91).

The project includes the replacement of a partially failed 24 x 30-inch stone box culvert within a railroad embankment with a 48-inch reinforced concrete pipe with precast concrete wingwalls and riprap velocity dissipation pads. The culvert is approximately 50' long. The work has been demonstrated to be necessary to avoid a track failure and to restore hydraulic capacity to the culvert.

The culvert is located approximately 800 feet west of Great Island Road and connects an unnamed tributary to Old Harbor Creek. The railroad embankment where the culvert is located bisects a salt marsh system. The top of the embankment is approximately 14 feet higher in elevation than the salt marsh. Flow within the tributary and culvert is tidally influenced. On the south side of the culvert, landward of rail bed, the salt marsh transitions to Bordering Vegetated Wetland. On the south side it is anticipated that impacts will be limited to Land Under Water only. On the south side a total of up to 500 square feet of Land Under Water is to be impacted, of which 200 square feet will be permanent. The permanent impacts are mostly attributable to the wingwalls, velocity dissipation pad, and armor stone necessary to support a salt marsh restoration effort. On the north side of the culvert a total of 285 square feet of Salt Marsh will be impacted, of which 17 square feet will be permanent. Additionally, a total of 121 square feet of Land Under Water will be impacted on the north side, of which 34 square feet will be permanent. The impacts to Salt Marsh and Land Under Water on the north side of the culvert are mostly attributable to the wingwalls and velocity dissipation pad. Temporary impacts on both the north and south sides of the culvert are attributed to the installation of dewatering/diversion structures, access necessary for construction activities, and the removal of the existing culvert.

Before construction activities begin, erosion controls will be installed around the work area and will define the limits of work. Access to the work area will be from the existing railroad easement only. A temporary water bypass system will be necessary to move sediment free clean water around the work area from south to north during construction. This pumping system will be initiated before flow is stopped to the culvert. A driven line of sheet piles and sandbags on either side of the culvert will then be used to stop flow through the culvert and define the limits of excavation. Water within the excavation will be pumped to a treatment system located east of excavation in an upland area. Treated water from the dewatering system will then gravity flow through at least two (2) check dams before discharging immediately north of the work area within the existing stream channel. After the culvert has been replaced and the construction zone has been stabilized, the driven sheet piles will be removed starting on the northern end to restore flow. Following removal of the sheet piles the temporary water bypass will be deactivated and removed. It is proposed that the excavation, removal, and installation of the new culvert will be completed within a five (5) day construction period.

Mitigation for the impacts to Salt Marsh will be created on the south side of the culvert outlet in an area of existing scour and is anticipated to be approximately 207 square feet in size. Planting will include the installation of spartina patens and distichlis spicata plugs.

The project site is not located in an Area of Critical Environmental Concern (ACEC), Outstanding Resource Water (ORW), Priority Habitat of Rare Species and Estimated Habitat of Rare Wildlife, and there are no mapped certified or potential vernal pools. Additionally, the Division of Marine Fisheries (DMF) did not identify any Time of Year (TOY) restrictions for the work.

Alternatives were evaluated to minimize impacts. The alternatives included a no build alternative, rehabilitation of the existing stone box culvert, and the full culvert replacement. The no build alternative was quickly dismissed as the structure is in poor condition and is likely to fail causing a serious threat to public health, safety, and the environment. The rehabilitation alternative, which would include injecting grout and stabilizing the structure with bracing bars was also dismissed as it would only provide a short-term repair.

Public notice was provided in the Environmental Monitor on September 23, 2022, and in the Sandwich Enterprise on September 30, 2022. The Department did not receive any public comments during the 21-day public comment periods which ended on October 14, 2022, and October 21, 2022, respectively.

Based on a review of information provided by the applicant, MassDEP finds that this project complies with the standards described under 314 CMR 9.06.

Therefore, based on information currently in the record, the Department grants a 401 Water Quality Certification for this project subject to the following conditions to maintain water quality, to minimize impact on waters and wetlands, and to ensure compliance with appropriate state law.

1. All work shall conform to the plans entitled:

    - Culvert Replacement Project at Cape Main MP 63.22 Sandwich, MA, 401 Water Quality Certification Permitting Plans (Sheets 1 through 9) prepared by Jacobs Engineering Group, dated June 1, 2022.

    - Section 401 Water Quality Certification Application, Culvert Replacement Project at Cape Main Mile Post 63.22 Sandwich, Massachusetts, prepared by GZA GeoEnvironmental, dated June 2022.

2. To the extent that the following conditions modify or differ from the plans, specifications or other proposals referenced in Condition 1, the conditions of this Certification shall control.

3. A copy of this Certification and referenced plans and other documents shall be provided to the contractor prior to the start of construction.

4. Prior to the start of work, the applicant shall provide MassDEP with the name, address, and phone number(s) of the person responsible for ensuring that all work complies with the conditions of this Water Quality Certification.

5. Prior to the start of work and installation of erosion control measures, the applicant shall provide MassDEP with the name, address and phone number(s) of the following individuals:

    - Environmental Monitor(s)
    - Wetland Specialist(s)

6. A minimum of twenty-one (21) days prior to the commencement of construction the applicant or their representative shall contact MassDEP (mark.bartow@mass.gov) to schedule a pre-construction consultation meeting to review the plans, specifications and terms and conditions of this Water Quality Certificate (WQC). In addition to the applicant/representative attendees shall include the Environmental Monitor and Wetland Specialist unless MassDEP deems attendance is not necessary for any individual.

7. Prior to the commencement of construction adequate erosion control measures shall be installed to protect all wetland resource areas.

8. An Environmental Monitor (EM), with experience in wetland science, erosion and sedimentation control, and experience in Railroad/Roadway/Bridge/linear construction, shall be employed for the duration of the project. The EM will be responsible for assuring compliance with the permit conditions, plans, and specifications, maintaining limit of work, proper maintenance of the erosion and sedimentation controls, as well as determining if additional erosion and sedimentation controls are necessary. The EM shall assure that dewatering measures are properly implemented and maintained and that the discharge is adequately filtered prior to discharge to wetlands and waterways. The EM shall conduct daily inspections during construction and provide MassDEP with a Monitoring Report (MR) at the end of construction summarizing work activities, and compliance with the conditions of this permit. The MR shall be supported with photographs representative of work activities.

9. In addition to normal inspections, the EM shall coordinate with the contractor and anyone else responsible for maintaining the erosion control and sedimentation control measures prior to forecasted significant storm events to assure that the erosion and sedimentation control measures will adequately protect resource areas. The EM shall have the authority to direct responsible parties to install additional or alternative erosion and sedimentation control measures.

10. In instances where an EM directs the installation of additional or alternative erosion and sedimentation control measures MassDEP shall be notified via email with photographs and a description of measures.

11. A stockpile of erosion control measures shall be kept on-site for emergency and routine replacement. The materials may include but are not limited to silt fence, hay bales, stone rip rap, filter dikes, compost filter tubes, filter bags, or any other devices planned for use during construction.

12. No more than 500 square feet of Land Under Water (LUW) will be impacted cumulatively with 200 square feet of permanent impact to LUW.

13. No more than 285 square feet of Salt Marsh will be impacted cumulatively with 17 square feet of permanent impact to Salt Marsh.

14. The surface area of the salt marsh mitigation area as shown on the Salt Marsh Restoration Plan (Sheet 9 of 9) and described in the Erosion Control, Salt Marsh Mitigation and Planting Notes (Sheet 8 of 9) shall be at least 75% evenly distributed with indigenous wetland vegetation within two growing seasons. This determination shall be made by the wetland scientist selected by the applicant or his/her designee and approved by MassDEP. Should the mitigation area fail to meet this standard, MassDEP may require additional measures necessary to achieve compliance.

15. At the end of each growing season, a progress report of the relative success or failure of the mitigation effort shall be submitted to this office by the wetland scientist. The report shall include percent of vegetation cover, a list of the type of plants growing in the mitigation area, coverage of wetland plants as a percentage of all plants and relative vigor of the plants. The report shall also include recommendations for improvement of poorly established wetland areas.

16. The progress report shall also document the restoration efforts associated with the areas of LUW and Salt Marsh temporarily impacted during construction. Should the temporary impact areas not be adequately restored, MassDEP may require additional measures to achieve compliance.

17. It shall be the responsibility of the applicant, and/or any successor(s) in title to ensure that within the wetland mitigation and restoration areas, non-native invasive plant species such as *Phragmites australis* do not expand because of the project.

18. Staff of the Department of Environmental Protection shall have the right to enter and inspect the area subject to this Certification at reasonable hours to evaluate compliance with the conditions stated in this Certification and may require the submittal of any data deemed necessary by the Department for that evaluation.

19. No Special Condition set forth herein shall be constructed or operate to prohibit the Department from taking enforcement against the applicant or its contractors for any failure to comply with the terms and requirements of this 401 Water Quality Certification.

20. No activity authorized by this Water Quality Certification may begin prior to expiration of the 21-day appeal period or until a final decision is issued by MassDEP if an appeal is filed.

21. This Certification remains in effect for the same duration as the federal permit that requires it or five years from the date of issuance of this Certification whichever comes first.

22. The applicant may request an amendment or extension of this Certification in accordance with 314 CMR 9.09(2) and (3), respectively.

Failure to comply with this Certification is grounds for enforcement, including civil and criminal penalties, under MGL Ch. 21 §42, MGL Ch. 21A §16, or other possible actions/penalties as authorized by the General Laws of the Commonwealth.

This Certification does not relieve the applicant of the obligation to comply with other appropriate state or federal statutes or regulations.

NOTICE OF APPEAL RIGHTS

A) Appeal Rights and Time Limits

Certain persons shall have a right to request an adjudicatory hearing concerning certifications by MassDEP when an application is required: (a) the applicant or property owner; (b) any person aggrieved by the decision who has submitted written comments during the public comment period; any ten (10) persons of the Commonwealth pursuant to M.G.L. c.30A where a group member has submitted written comments during the public comment period; or (d) any governmental body or private organization with a mandate to protect the environment which has submitted written comments during the public comment period. Any person aggrieved, any ten (10) persons of the Commonwealth, or a governmental body or private organization with a mandate to protect the environment may appeal without having submitted written comments during the public comment period only when the claim is based on new substantive issues arising from material changes to the scope or impact of the activity and not apparent at the time of public notice. To request an adjudicatory hearing pursuant to M.G.L. c.30A, § 10, a Notice of Claim must be made in writing, provided that the request is made by certified mail or hand delivery to MassDEP, with the appropriate filing fee specified within 310 CMR 4.10 along with a DEP Fee Transmittal Form within twenty-one (21) days from the date of issuance of this Certificate, and addressed to:

Case Administrator
Department of Environmental Protection
One Winter Street, 2nd Floor
Boston, MA 02108

A copy of the request shall at the same time be sent by certified mail or hand delivery to the issuing office of the Wetlands and Waterways Program at:

Department of Environmental Protection
Southeast Regional Office
20 Riverside Drive
Lakeville, Massachusetts 02347

B) Contents of Hearing Request

A Notice of Claim for Adjudicatory Hearing shall comply with MassDEP's Rules for Adjudicatory Proceedings, 310 CMR 1.01(6), and shall contain the following information pursuant to 314 CMR 9.10(3):

(a) the 401 Certification Transmittal Number;
(b) the complete name of the applicant and address of the project;
(c) the complete name, address, and fax and telephone numbers of the party filing the request, and, if represented by counsel or other representative, the name, fax and telephone numbers, and address of the attorney;
(d) if claiming to be a party aggrieved, the specific facts that demonstrate that the party satisfies the definition of "aggrieved person" found at 314 CMR 9.02;
(e) a clear and concise statement that an adjudicatory hearing is being requested;
(f) a clear and concise statement of (1) the facts which are grounds for the proceedings, (2) the objections to this Certificate, including specifically the manner in which it is alleged to be inconsistent with the MassDEP's Water Quality Regulations, 314 CMR 9.00, and (3) the relief sought through the adjudicatory hearing, including specifically the changes desired in the final written Certification; and

(g) a statement that a copy of the request has been sent by certified mail or hand delivery to the applicant, the owner (if different from the applicant), the conservation commission of the city or town where the activity will occur, the Department of Environmental Management (when the certificate concerns projects in Areas of Critical Environmental Concern), the public or private water supplier where the project is located (when the certificate concerns projects in Outstanding Resource Waters), and any other entity with responsibility for the resource where the project is located.

C) Filing Fee and Address

The hearing request along with a DEP Fee Transmittal Form and a valid check or money order payable to the Commonwealth of Massachusetts in the amount of one hundred dollars ($100) must be mailed to:

Commonwealth of Massachusetts
Department of Environmental Protection
Commonwealth Master Lockbox
PO Box 4062
Boston, MA 02211

The request will be dismissed if the filing fee is not paid, unless the appellant is exempt or granted a waiver. The filing fee is not required if the appellant is a city or town (or municipal agency), county, or district of the Commonwealth of Massachusetts, or a municipal housing authority. MassDEP may waive the adjudicatory hearing filing fee pursuant to 310 CMR 4.06(2) for a person who shows that paying the fee will create an undue financial hardship. A person seeking a waiver must file an affidavit setting forth the facts believed to support the claim of undue financial hardship together with the hearing request as provided above.

Should you have any questions relative to this permit, please Mark Bartow at mark.bartow@mass.gov or (508) 946-2746.

Sincerely,

Daniel F. Gilmore, Chief
Wetlands & Waterways Program
Bureau of Water Resources

DFG/mnb

cc: Sandwich Conservation Commission

Regulatory Division
The New England District
U.S. Army Corps of Engineers
696 Virginia Road
Concord, MA 01742-275

MassDOT – Rail and Transit Division
ATTN: Ms Chalita Belfield
Director of Railroad Properties
Ten Park Plaza, Suite 4160
Boston, MA 02116

Kimberly Degutis, Environmental Project Manager
GZA GeoEnvironmental Inc
249 Vanderbilt Avenue
Norwood, MA 02062

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

4

DEP File Number:

Provided by DEP

Request for Departmental Action Fee Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

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

Email Address

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

Email Address

4. DEP File Number:

B. Instructions

1. When the Departmental action request is for (check one):

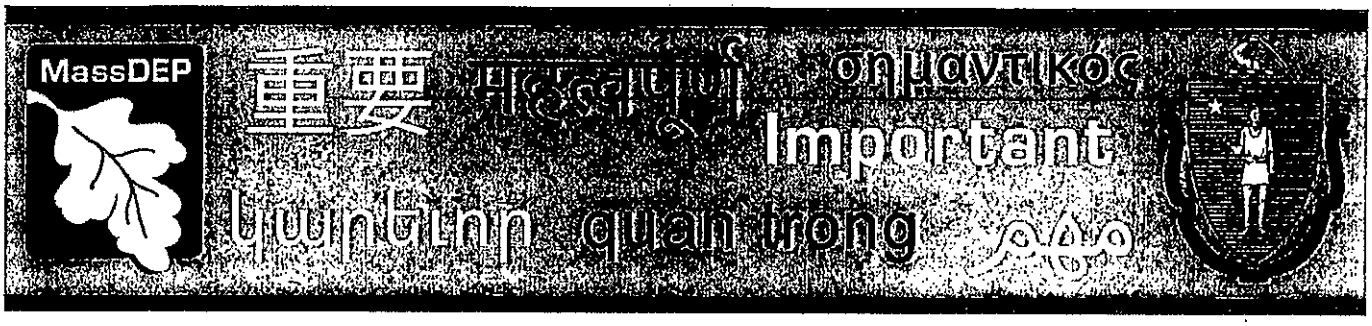
☐ Superseding Order of Conditions – Fee: $120.00 (single family house projects) or $245 (all other projects)

☐ Superseding Determination of Applicability – Fee: $120

☐ Superseding Order of Resource Area Delineation – Fee: $120

Send this form and check or money order, payable to the *Commonwealth of Massachusetts,* to:

Department of Environmental Protection
Box 4062
Boston, MA 02211



Communication for Non-English-Speaking Parties

English
This document is important and should be translated immediately.
If you need this document translated, please contact MassDEP's Diversity Director at the telephone number listed below.

Español Spanish
Este documento es importante y debe ser traducido de inmediato. Si necesita este documento traducido, comuníquese con la Directora de Diversidad de MassDEP al número de teléfono que aparece más abajo.

Português Portuguese
Este é um documento importante e deve ser traduzido imediatamente. Se precisar de uma tradução deste documento, entre em contato com o Diretor de Diversidade da MassDEP nos números de telefone listados abaixo.

繁體中文 Chinese Traditional
本文件非常重要，應立即翻譯。如果您需要翻譯這份文件，請用下面列出的電話號碼聯絡 MassDEP 多元化負責人。

簡体中文 Chinese Simplified
本文件非常重要，应立即翻译。如果您需要翻译这份文件，请用下面列出的电话号码与 MassDEP 的多元化主任联系。

Ayisyen Kreyòl Haitian Creole
Dokiman sa-a se yon bagay enpòtan epi yo ta dwe tradwi l imedyatman. Si ou bezwen dokiman sa a tradwi, tanpri kontakte Direktè Divèsite MassDEP la nan nimewo telefòn endike anba.

Việt Vietnamese
Tài liệu này rất quan trọng và cần được dịch ngay lập tức. Nếu quý vị cần dịch tài liệu này, xin liên lạc với Giám đốc Đa dạng của MassDEP theo các số điện thoại ghi dưới đây.

ប្រទេសកម្ពុជា Khmer/Cambodian
ឯកសារនេះគឺសំខាន់ហើយគួរត្រូវបានបកប្រែភ្លាមៗ។ ប្រសិនបើអ្នកត្រូវការឱ្យគេបកប្រែឯកសារនេះ
សូមទាក់ទងមកនាយកផ្នែកពិពិធកម្មរបស់ MassDEP តាមលេខទូរស័ព្ទខាងក្រោម។

Kriolu Kabuverdianu Cape Verdean
Kel dukumentu li é inpurtánti y debe ser traduzidu imidiatamenti. Se bu meste di kel dukumentu traduzidu, pur favor kontakta Diretor di Diversidádi di MassDEP na numeru abaxu indikadu.

Contact Glynis L. Bugg, Acting Diversity Director/Civil Rights 857-262-0606
Massachusetts Department of Environmental Protection
One Winter Street, Boston MA 02108
TTY# MassRelay Service 1-800-439-2370 • https://www.mass.gov/environmental-justice
(Version revised 7.22.2022) 310 CMR 1.03(5)(a

Русский Russian

Это важный документ, и он должен быть безотлагательно переведен. Если вам нужен перевод данного документа, пожалуйста, свяжитесь с директором по вопросам многообразия (Diversity Director) компании MassDEP по указанному ниже телефону.

العربية Arabic

هذه الوثيقة مهمة ويجب ترجمتها على الفور. اذا كنت بحاجة الى هذه الوثيقة مترجمة، يرجى الاتصال بمدير التنوع PMassDE على أرقام الهواتف المدرجة أدناه.

한국어 Korean

이 문서는 중요하고 즉시 번역해야 합니다. 이 문서의 번역이 필요하시다면, 아래의 전화 번호로 MassDEP 의 다양성 담당 이사에 문의하시기 바랍니다.

հայերեն Armenian

Այս փաստաթուղթը կարևոր է և պետք է անմիջապես թարգմանվի:
Եթե Ձեզ անհրաժեշտ է այս փաստաթուղթը թարգմանել, դիմեք MassDEP-ի բազմազանության տնօրենին ստորև նշված հեռախոսահամարով:

فارسی Farsi Persian

این سند مهم است و باید فورا ترجمه شود.
اگر به ترجمه این سند نیاز دارید، لطفا با مدیر بخش تنوع نژادی MassDEP به شماره تلفن ذکر شده در زیر تماس بگیرید.

Français French

Ce document est important et devrait être traduit immédiatement. Si vous avez besoin de ce document traduit, veuillez communiquer avec le directeur de la diversité MassDEP aux numéros de téléphone indiqués ci-dessous.

Deutsch German

Dieses Dokument ist wichtig und sollte sofort übersetzt werden. Sofern Sie eine Übersetzung dieses Dokuments benötigen, wenden Sie sich bitte an den Diversity Director MassDEP unter der unten aufgeführten Telefonnummer.

Ελληνική Greek

Το παρόν έγγραφο είναι σημαντικό και θα πρέπει να μεταφραστεί αμέσως. Αν χρειάζεστε μετάφραση του παρόντος εγγράφου, παρακαλούμε επικοινωνήστε με τον Διευθυντή Διαφορετικότητας του MassDEP στους αριθμούς τηλεφώνου που αναγράφονται παρακάτω.

Italiano Italian

Comunicazione per parti che non parlano inglese. Questo documento è importante e dovrebbe essere tradotto immediatamente. Se avete bisogno di questo documento tradotto, potete contattare il Direttore di Diversità di MassDEP al numero di telefono elencato di seguito.

Język Polski Polish

Dokument ten jest ważny i powinien zostać natychmiast przetłumaczony. Jeśli potrzebujesz przetłumaczonej wersji dokumentu, prosimy o kontakt z dyrektorem ds. różnorodności MassDEP pod jednym z numerów telefonu wymienionych poniżej.

हिन्दी Hindi

यह दस्तावेज महत्वपूर्ण है और इसका तुरंत अनुवाद किया जाना चाहिए. यदि आपको इस दस्तावेज़ का अनुवाद करने की आवश्यकता है, तो कृपया नीचे सूचीबद्ध टेलीफोन नंबरों पर मासडेप्स डाइवर्सिटी के निदेशक से संपर्क करें.

Contact Glynis L. Bugg, Acting Diversity Director/Civil Rights 857-262-0606
Massachusetts Department of Environmental Protection
One Winter Street, Boston MA 02108
TTY# MassRelay Service 1-800-439-2370 • https://www.mass.gov/environmental-justice
(Version revised 7.22.2022) 310 CMR 1.03(5)(a



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F: 781.278.5702
www.gza.com

November 10, 2022
File No. 01.0174521.05

Max Roseman
Project Manager (Detailee)
New England District, Regulatory Division
U.S. Army Corps of Engineers
696 Virginia Road
Lexington, Massachusetts 01742

Re: Request for Information
NAE-2022-02055: Cape Main MP 63.22 Culvert Replacement Project
Sandwich, Massachusetts

Dear Mr. Roseman:

At your request for additional information via email dated October 17, 2022, for the above-referenced project, GZA GeoEnvironmental, Inc. (GZA) provides the following responses:

1. *An aquatic resources delineation map that includes the following:*

   a. *Showing the location and extent of resources (wetlands and non-wetland waters).*
   The location and extent of resource areas is shown on the attached Permit Plans sheets 2, 6 and 9; wetlands are labeled as "SALT MARSH BOUNDARY" and the tidal channel is labeled as "LAND UNDER WATER".

   b. *Clearly annotate the OHWM.*
   The project is located within a tidal area and has no OHWM.

   c. *If the area is tidal include MHW and HTL (NAVD 88)*
   The MHW is 11.00' per the NOAA record tidal charts. The field identified MTL is consistent with the observed Salt Marsh boundary elevation. The noted tide elevations are graphically shown on the embankment section detail on sheet 3 of 15 in the permit set.

   d. *Show locations of OHWM data and wetland data were taken.*

GZA has updated Sheet 2 of 9 of the permit plan set with the sample plot locations.

- SP1 (wetland) – 15-feet east of flag A11
- SP2 (upland) – 5-feet south of flag A3
- SP3 (wetland) – 5-feet south of flag B5
- SP4 (upland) – 5-feet north of flag B7

2. *There appears to be an open water channel within the survey area. Provide OHWM data sheets for the resource.*

The New England Region (Northcentral/Northeast Regional Supplement) does not contain regional-specific data sheets for OHWM delineations. The channel within the adjacent salt marsh is tidal within the project limits and thus does not fall under the OHWM definition.

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3. *Clarify the project description.*

As stated on ENG FORM 4345, under box 18: Culvert replacement project: temporary support of excavation including dewatering, pumped bypass, and temporary occupancy of salt marsh. Restoration of salt marsh and land under water to salt marsh upon project completion.

a. The types and amounts of materials to be placed into waters of the U.S. (concrete, native soil, etc.)

As stated on ENG FORM 4345, under box 21: stone 5 CY, wetland soil 10 CY.

b. Clarify the approximate acreage that would result from the permanent discharges of fill material.

As stated on ENG FORM 4345, under box 22: 0.006 acres.

Areas of impact are listed on Table 2 within the narrative attached to ENG FORM 4345.

4. *Clarify if the project has another lead federal agency (FHA, Federal Rail, or other).*

The project does not have another lead federal agency as is not Federally funded or sponsored.

This report is subject to the Natural Resource Limitations attached as **Appendix A**.

Should you have any questions or comments regarding this submittal, or if you require additional information, please feel free to contact Kimberly Degutis at (781) 278-5852 or kimberly.degutis@gza.com.

Very truly yours,
GZA GEOENVIRONMENTAL, INC.

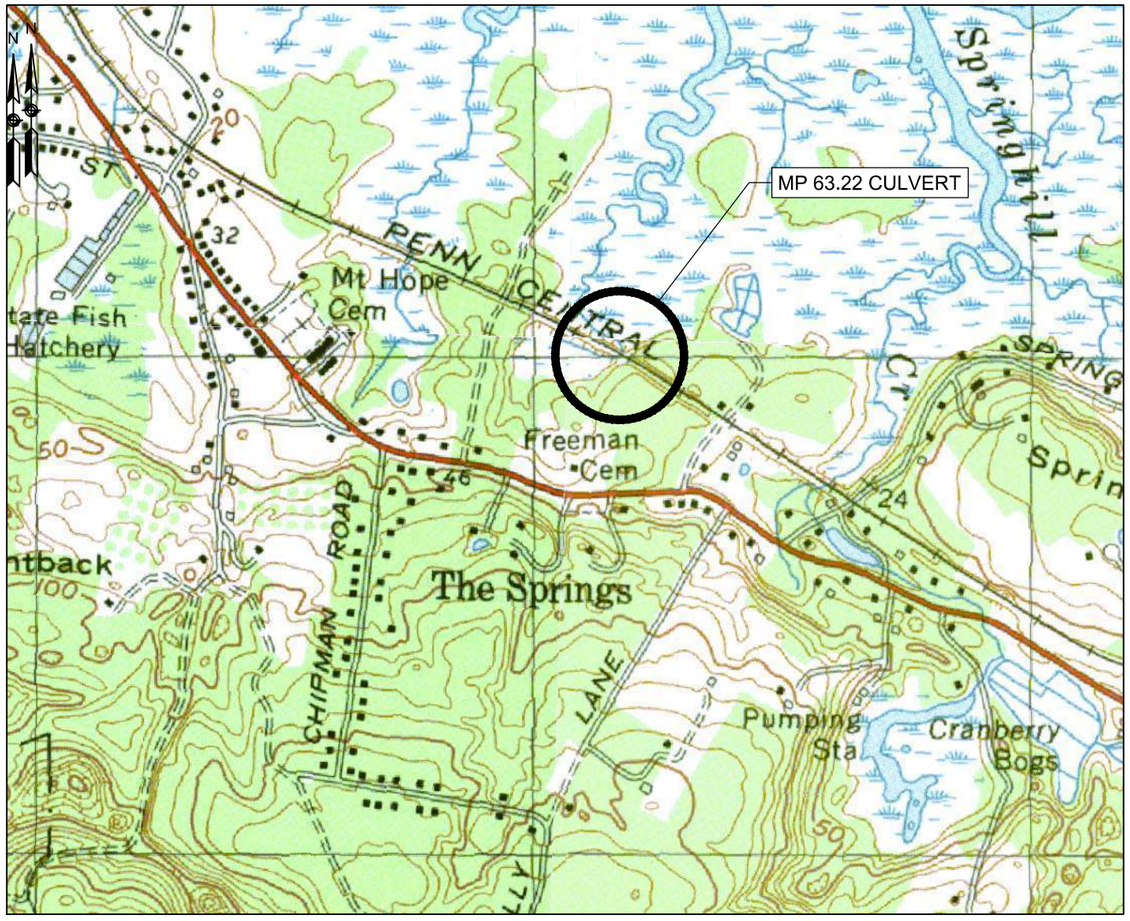
Kimberly Degutis, PWS, CESCL
Senior Project Manager

Daniel M. Nitzsche, CPESC, CESSWI, SE
Consultant/Reviewer

Stephen L Lecco, A.I.C.P., C.E.P.
Associate Principal

Attachments: Permit Plans
Appendix A – Limitations

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CULVERT REPLACEMENT PROJECT
AT CAPE MAIN MP 63.22
SANDWICH, MA

401 WATER QUALITY CERTIFICATE PERMITTING PLANS

MASSCOASTAL RAILROAD JUNE 2022

PERMIT PLANS - NOT FOR CONSTRUCTION

Jacobs

MASS COASTAL RAILROAD

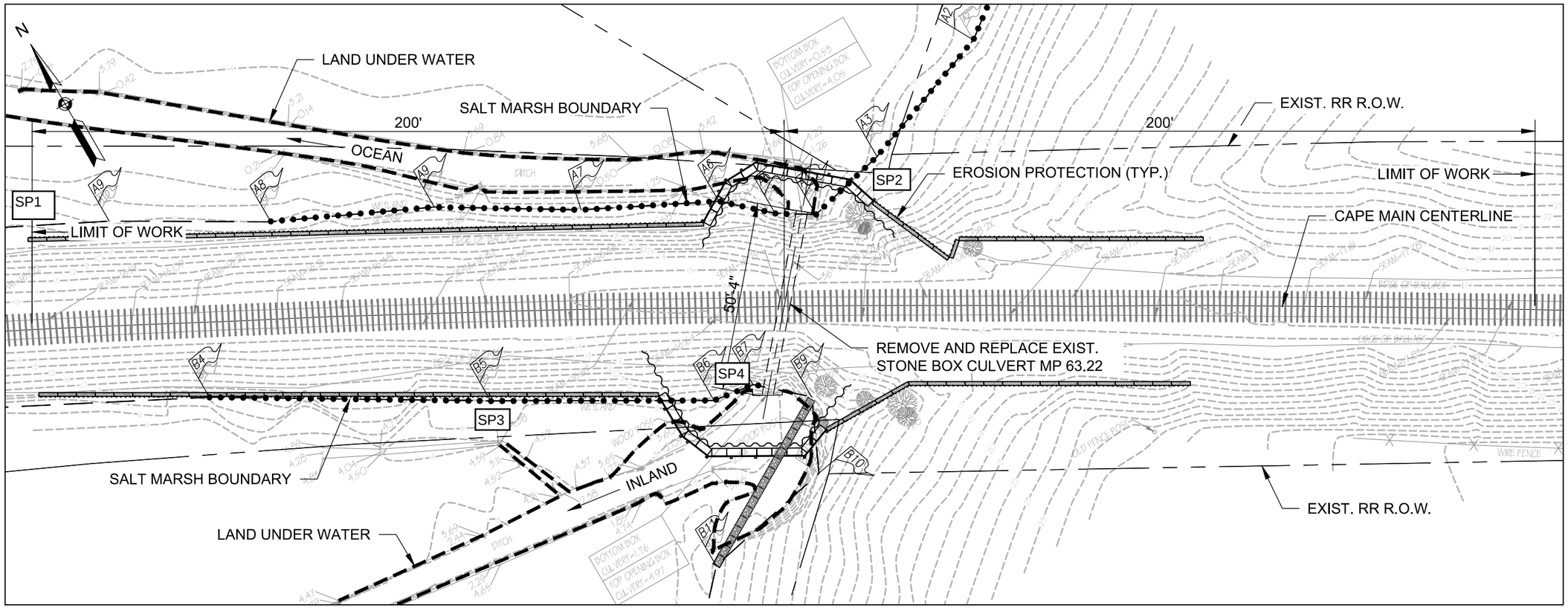
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CAPE MAIN
SANDWICH, MASSACHUSETTS

COVER SHEET

SHEET
1 OF 9

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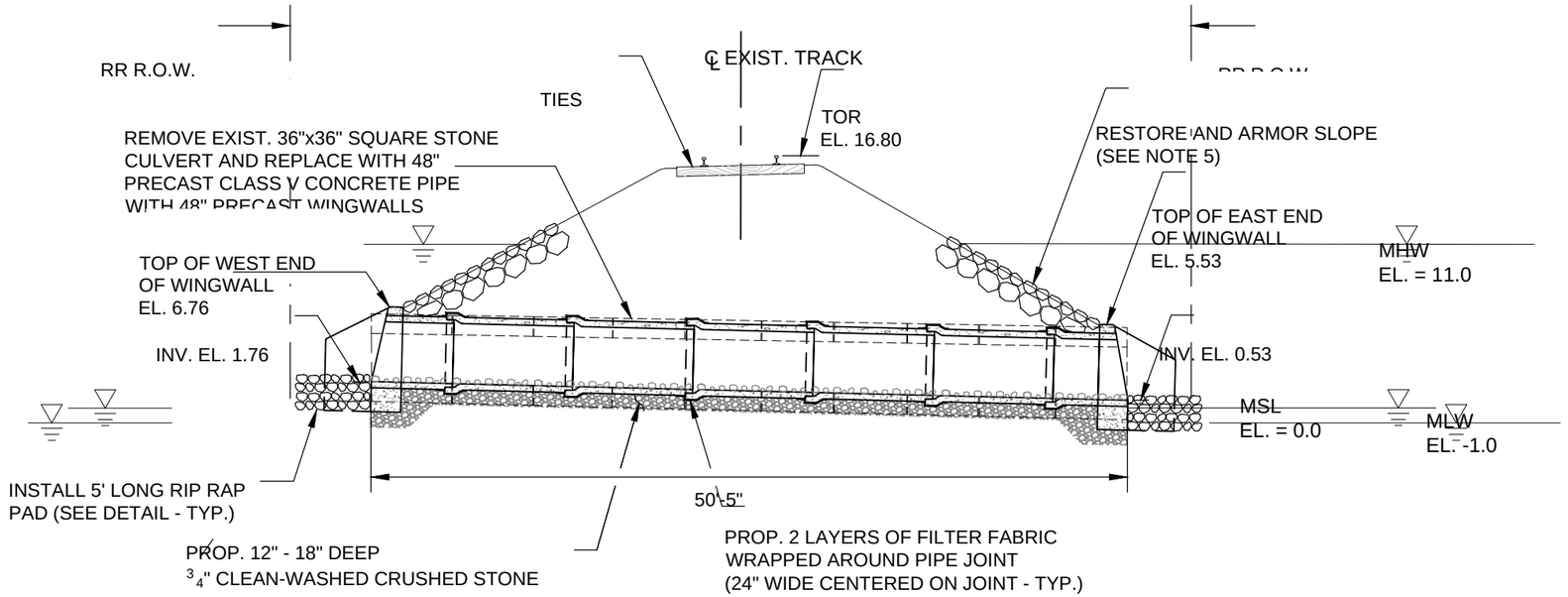
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EXISITING CONDITIONS

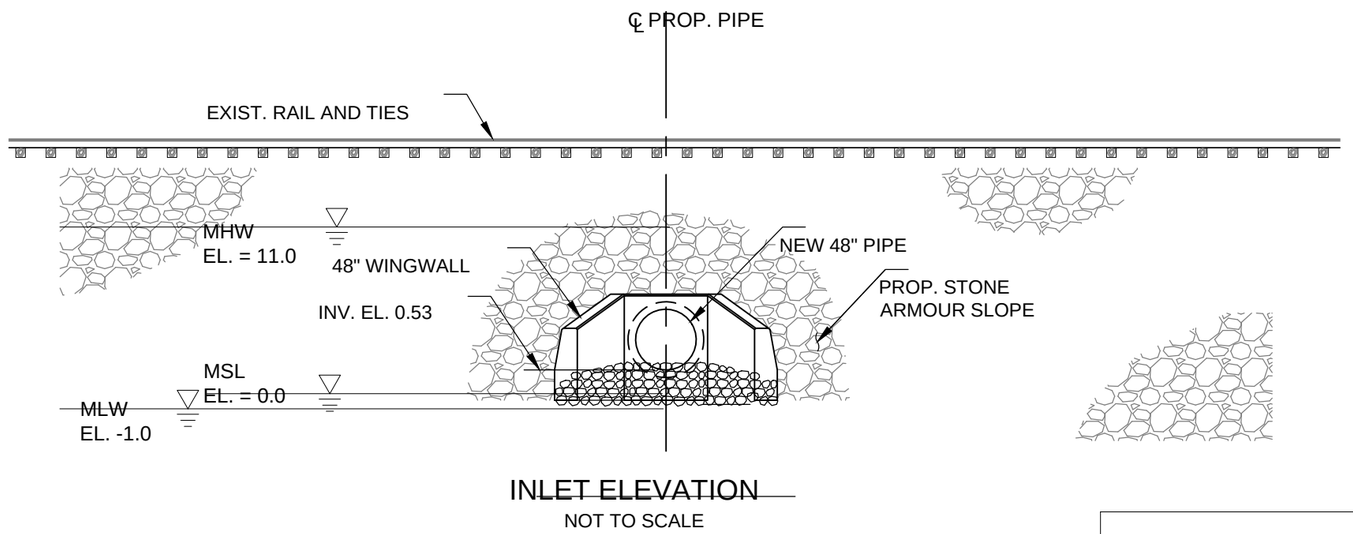
SHEET
2 OF 9

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PROPOSED LONGITUDINAL SECTION

NOT TO SCALE



INLET ELEVATION

NOT TO SCALE

NOTES:

1. ALL CULVERT AND WINGWALL INSTALLATION WORK SHALL BE PERFORMED IN THE DRY WITH TEMPORARY COFFERDAMS, DEWATERING PUMPING, AND ALL EROSION CONTROL MEASURES IN PLACE AND MAINTAINED FOR THE DURATION OF THE WORK.
2. CONTRACTOR SHALL MINIMIZE ENCROACHMENT INTO THE ADJACENT WATER AND NATURAL VEGETATION TO THE GREATEST EXTENT POSSIBLE TO LIMIT SOIL AND WATER DISTURBANCE.
3. CONTRACTOR SHALL REMOVE AND TEMPORARILY STOCKPILE EMBANKMENT SLOPE SOILS AND SURFACE BALLAST TO BE RESET TO MATCH EXISTING CONDITION FOLLOWING CULVERT INSTALLATION WORK AT THE DIRECTION OF THE ENGINEER ONLY.
4. ANY ADDITIONAL PROCESSED GRAVEL, CRUSHED STONE, AND STONE BALLAST DETERMINED TO BE NEEDED BY THE CONTRACTOR SHALL BE APPROVED BY MASSDOT'S ENGINEER PRIOR TO ORDERING FOR DELIVERY TO THE SITE.
5. CONTRACTOR SHALL PLACE AND EMBED STONE ARMOR RIP RAP ON BOTH SIDES OF THE CULVERT TO LIMITS SHOWN. STONES SHALL BE CHINKED IN TO ELIMINATE ANY DISLODGING OR SLIP-FAILING OF THE RECONSTRUCTED SLOPE.
6. PLACE 7" OF RECLAIMED MUD AND STONE MATERIAL INSIDE NEW PIPE SO THAT FLOW VOLUME IS EQUAL TO THAT OF EXISTING 30" STONE BOX.
7. ALL EMBANKMENT FILL SHALL BE PLACED IN HORIZONTAL LAYERS NOT TO EXCEED TWELVE (12) INCHES IN LAYERED DEPTH FOLLOWING COMPACTION. SUBSEQUENT LAYERS SHALL ONLY THEN PLACED AND COMPACTED AFTER THE PREVIOUS LOWER FILL LAYER IS FULLY COMPACTED IN PLACE.

PERMIT PLANS - NOT FOR CONSTRUCTION

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MASS COASTAL — MASSACHUSETTS COASTAL RAILROAD

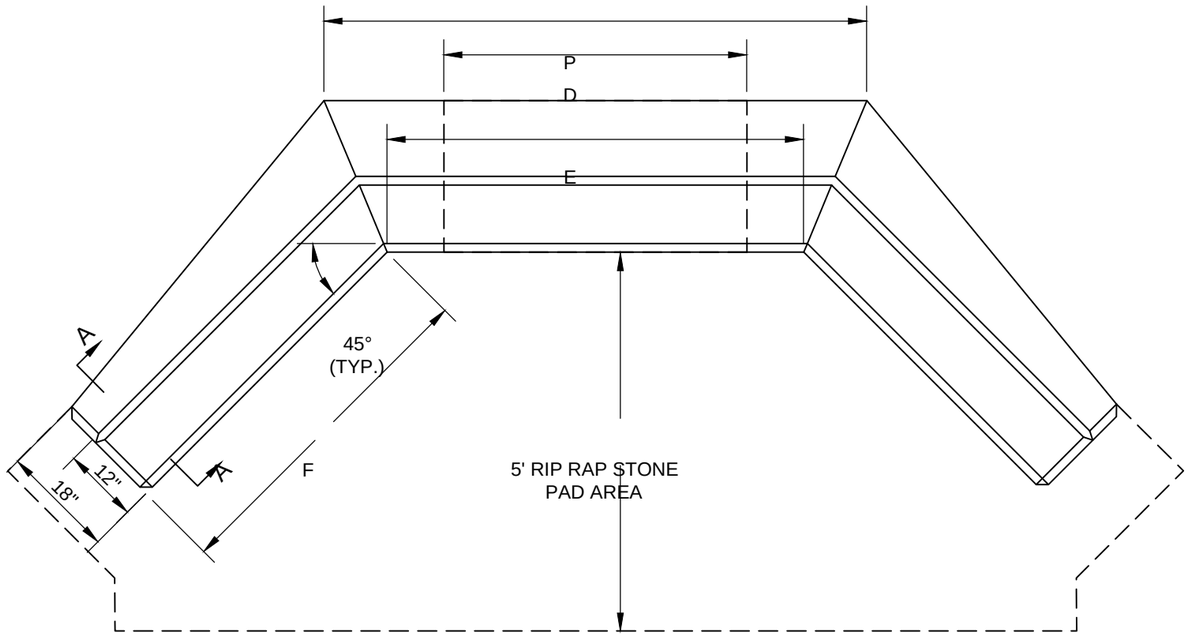
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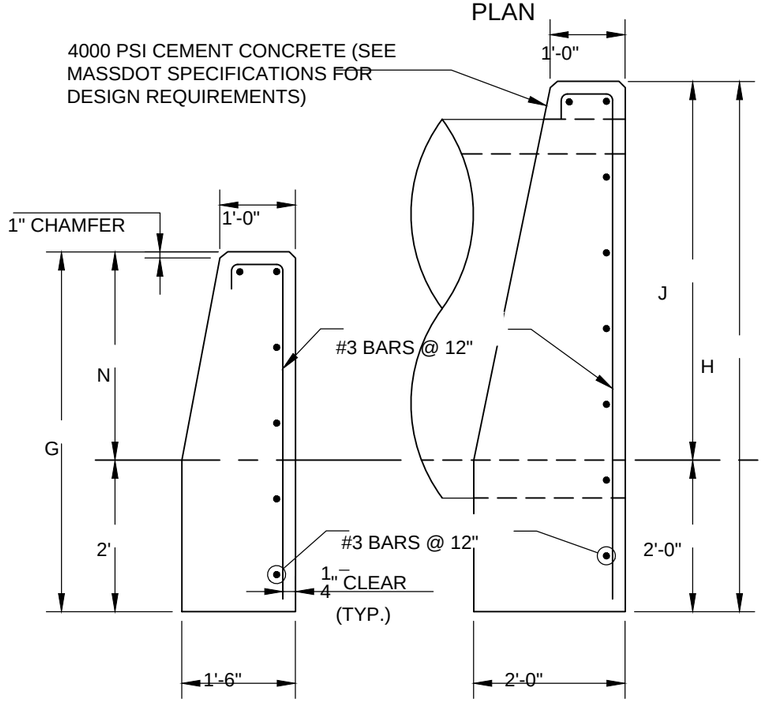
PROPOSED PRECAST PIPE CULVERT REPLACEMENT

SHEET 3 OF 9

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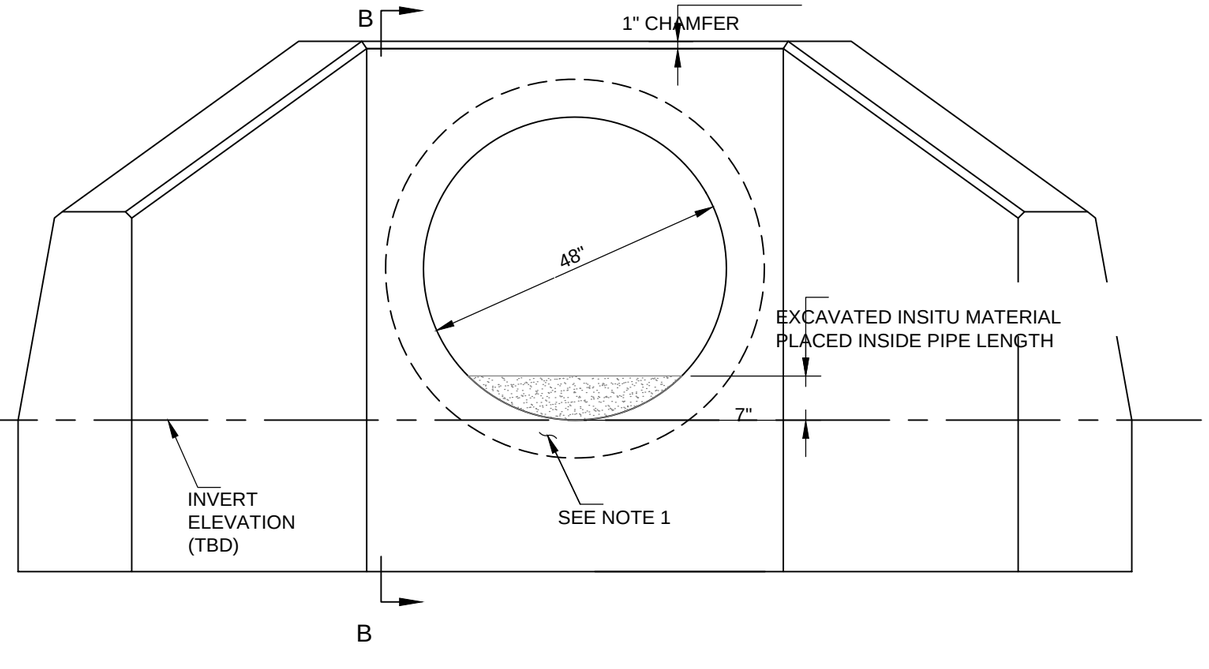


PLAN



ELEVATION A-A

ELEVATION B-B



FRONT ELEVATION

PERMIT PLANS - NOT FOR CONSTRUCTION

NOTE:

1. CONTRACTOR SHALL INSTALL REPLACEMENT, PRECAST WINGWALL AND SEAL CONCRETE CULVERT END WITH WATERTIGHT GROUT SEALANT PRIOR TO REMOVAL OF COFFERDAM.

Jacobs

MASS COASTAL RAILROAD

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SANDWICH, MASSACHUSETTS

PROPOSED REPLACEMENT
WINGWALL DETAILS

SHEET
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MASS COASTAL RAILROAD
MASSACHUSETTS COASTAL RAILROAD

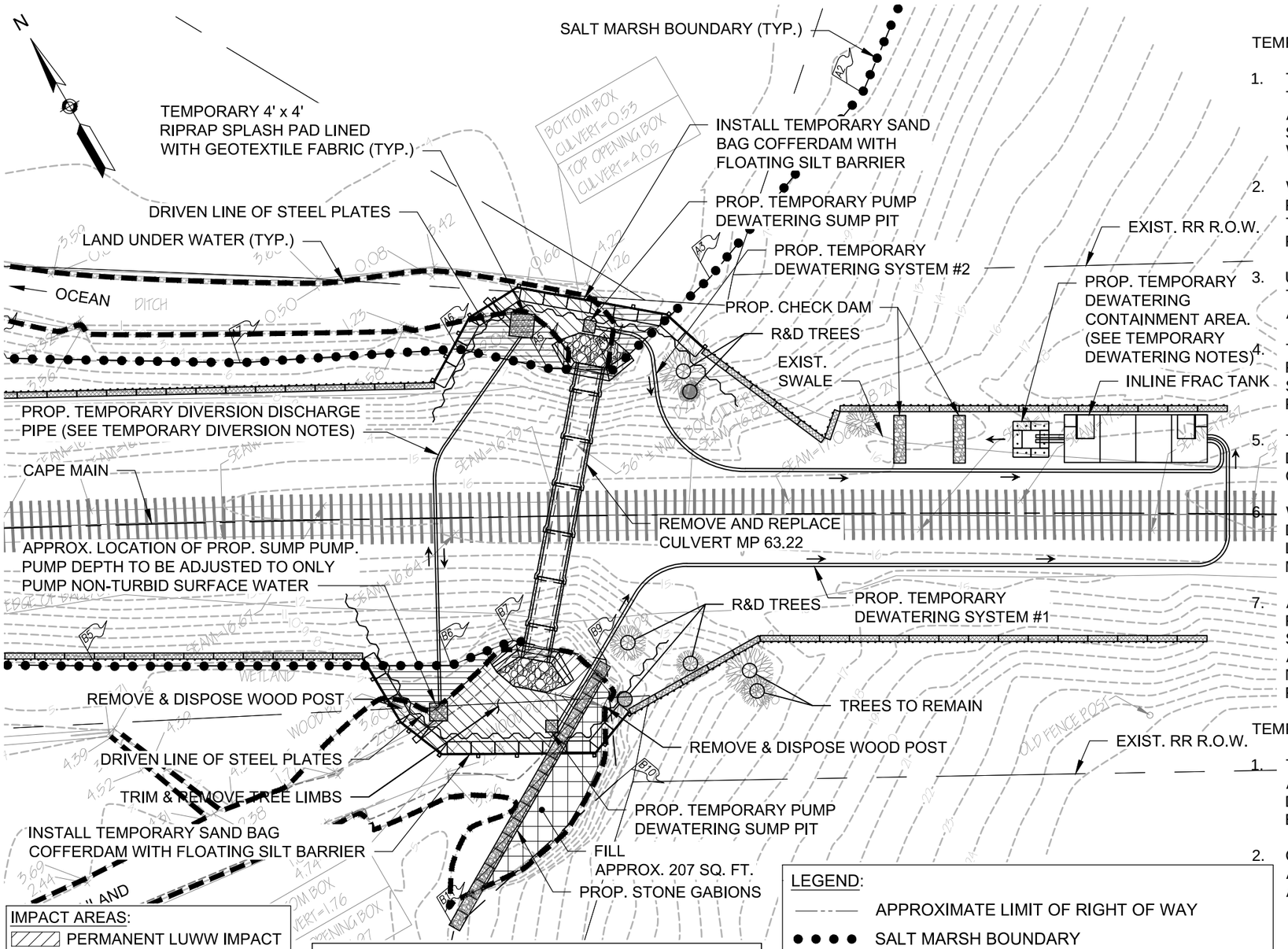
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SITE ACCESS AND STAGING AREA

SHEET
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PROPOSED IMPACTS

RESOURCE AREA	IMPACT TYPE	SQUARE FEET	ACRES
LAND UNDER WATER BODIES AND WATERWAYS (LUWW)	TEMPORARY	387	0.0090
	PERMANENT	234	0.0050
SALT MARSH	TEMPORARY	268	0.0060
	PERMANENT	17	0.0004

PLAN
SCALE: 1" = 20'-0"

TEMPORARY DIVERSION NOTES:

1. THE CONTRACTOR SHALL DESIGN AND SUBMIT FOR APPROVAL A TEMPORARY PUMP DIVERSION SYSTEM TO DIVERT WATER FLOW AROUND CULVERT CONSTRUCTION AREA, INCLUDING REQUIRED SIZE/LOCATION OF DIVERSION PUMP, DISCHARGE PIPE SIZE, AS WELL AS CONTINGENCY PLANS IN THE EVENT OF PUMP FAILURE.
2. WATER LEVELS ARE SUBJECT TO CHANGE, THE CONTRACTOR IS RESPONSIBLE FOR MAKING DETERMINATION OF WATER LEVELS THAT WILL EXIST DURING CONSTRUCTION AND INSTALL AND REFORTIFY COFFER DAMS AS APPLICABLE.
3. UPON INSTALLATION OF ALL SEDIMENT CONTROL MEASURES THE CONTRACTOR SHALL BEGIN IMPLEMENTING THE DIVERSION AND DEWATERING PLAN FOLLOWING INSPECTION.
4. THE CONTRACTOR SHALL INSTALL THE TEMPORARY DISCHARGE PIPES, SUMP-HOLE, DIVERSION PUMPS AND RIP-RAP DISCHARGE SPLASH PAD PRIOR TO PLACING PIPE PLUGS, DRIVEN STEEL PLATES AND SAND BAG COFFERDAMS.
5. THE TEMPORARY DISCHARGE PIPE SHALL BE CONSTRUCTED OF DURABLE MATERIAL ABLE TO WITHSTAND ANTICIPATED SITE CONDITIONS.
6. WATER FROM THE WORK AREA SHALL BE PUMPED TO A DEWATERING CONTAINMENT AREA THE AREA SHALL BE LOCATED SUCH THAT THE WATER DRAINS BACK INTO THE MARSHLAND BELOW THE DOWNGRADIENT COFFERDAM.
7. AFTER THE CULVERT HAS BEEN REPLACED AND READY TO RECEIVE FLOW AND THE DISTURBED AREA HAS BEEN STABILIZED, THE DRIVEN STEEL SHEETS SHALL BE PULLED OUT AND "COFFERDAMS" SHALL BE REMOVED STARTING ON THE NORTHERN END. THEN THE TEMPORARY DIVERSION SHALL BE REMOVED.

TEMPORARY DEWATERING NOTES:

1. THE PROP. TEMPORARY DEWATERING CONTAINMENT AREA. SIZE AND LOCATION OUTSIDE THE WETLAND AREA TO BE DETERMINED BY THE CONTRACTOR AND PRE-APPROVED BY THE ENGINEER'S DRAINAGE ENGINEER AND WETLAND SCIENTIST.
2. CONTRACTOR SHALL EXCAVATE BACK THIS EMBANKMENT AREA AS REQUIRED TO INSTALL DEWATERING CONTAINMENT AREA AND RESTORE SLOPE UPON ITS REMOVAL.

PERMIT PLANS - NOT FOR CONSTRUCTION

Jacobs

MASS COASTAL RAILROAD

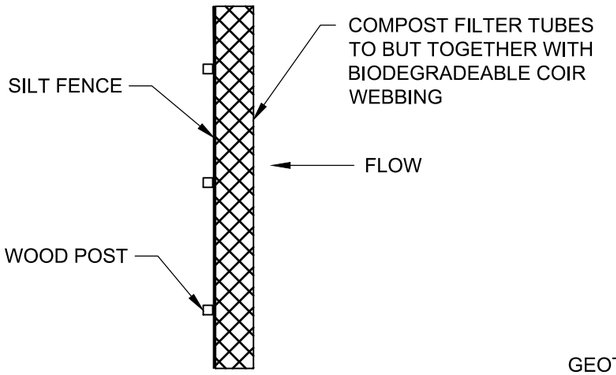
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SANDWICH, MASSACHUSETTS

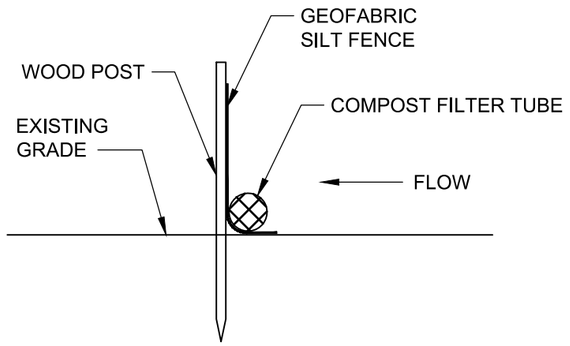
EROSION PROTECTION PLAN

SHEET
6 OF 9

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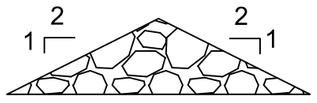


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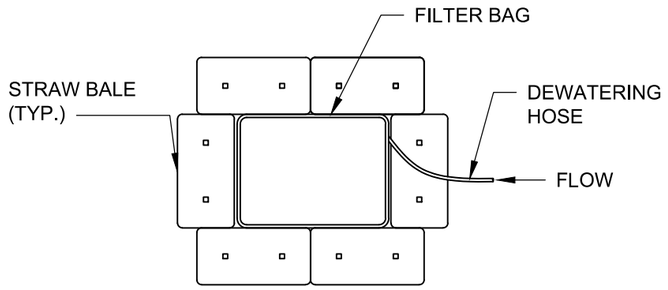


SECTION

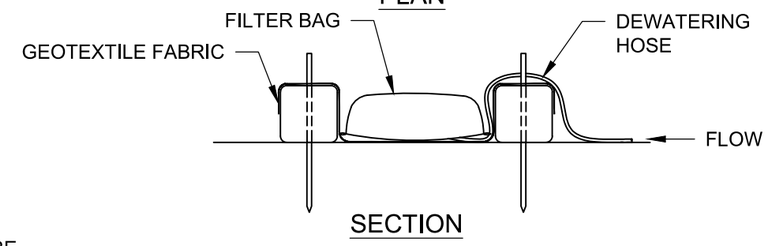
SILT FENCE / COMPOST FILTER TUBE EROSION CONTROL BARRIER



STONE CHECK DAM DETAIL

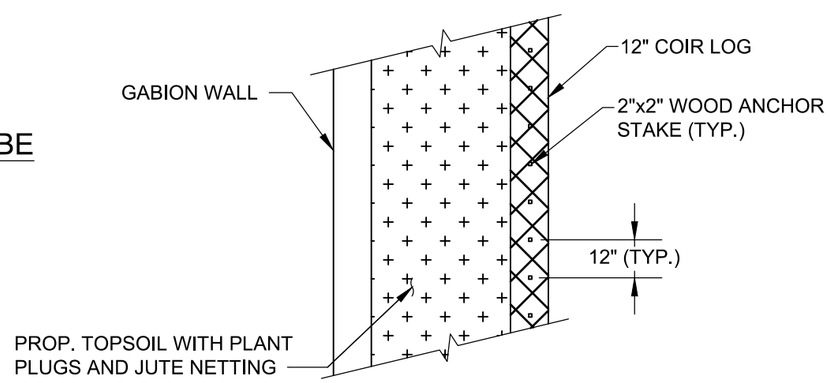


PLAN

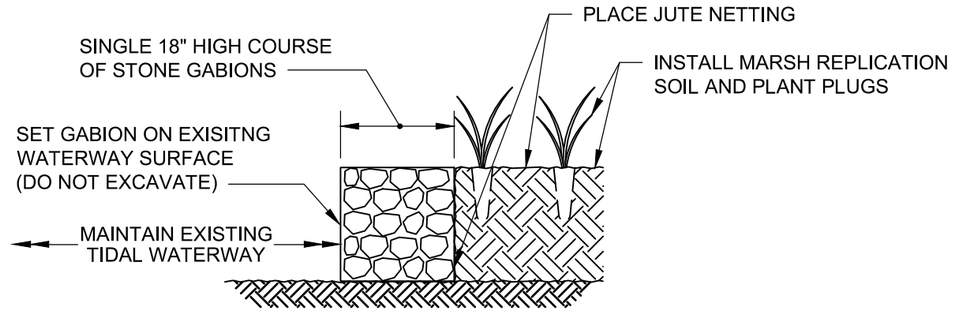


SECTION

DEWATERING CONTAINMENT AREA DETAIL



WETLAND MITIGATION DETAIL



GABION INSTALLATION SECTION DETAIL

GABION INSTALLITION NOTES

1. INSTALLATION OF THIS GABION WALL DURING LOW TIDE ONLY SHALL BE SET UPON EXISTING WATERWAY BOTTOM SURFACE GROUND ALONG THE LOCATION SHOWN IN PLAN VIEW WITH NO PERMITTED EXCAVATION, NOR PLACEMENT OF A SUPPORTING STONE LAYER NOR OTHER IMPACTS INFLICTED TO THE EXISTING WATERWAY.
2. THE TOP ELEVATION OF THIS SINGLE COURSE GABION WALL RUN SHALL BE SET NEARLY EQUIVALENT TO THAT OF THE ADJACENT TOP OF MARSHLAND SURFACE GRADE.
3. A CONTINUOUS BIODEGRADABLE JUTE MESH FOLDED OVER ALONG THE BACKSIDE OF THE GABION CAGES AND LAPPED ATOP OF THE INFILLED MARSHLAND REPLICATION PLANTINGS AREA SHALL CONTAIN THE INFILLED SOIL MATERIAL AS SHOWN IN DETAIL ABOVE AND IN ACCORDANCE WITH APPROVAL BY THE ENGINEER.

PERMIT PLANS - NOT FOR CONSTRUCTION

Jacobs

MASS COASTAL RAILROAD

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CAPE MAIN
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EROSION PROTECTION & GABION INSTALLATION DETAILS

SHEET 7 OF 9

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EROSION CONTROL NOTES:

1. PRIOR TO BEGINNING CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT FOR ACCEPTANCE A GENERAL WORK SCHEDULE, CONSTRUCTION SEQUENCE AND PLAN WHICH INDICATES PLANNED IMPLEMENTATION OF TEMPORARY AND PERMANENT EROSION CONTROL MEASURES. THIS PLAN SHALL INCLUDE PROPOSED METHODS OF SOILS MANAGEMENT AND LEGAL OFFSITE DISPOSAL OF WASTE MATERIALS.

2. FOR EROSION CONTROL INSTALLATION REQUIREMENTS, REFER TO SHEET 6.

3. THE TOE OF ANY SLOPE IS TO REMAIN AT LEAST ONE FOOT INSIDE OF ALL EROSION CONTROLS. UNDER NO CIRCUMSTANCE SHALL THE CONTRACTOR COVER ANY PORTION OF THE EROSION CONTROLS WITH MATERIAL. ANY MATERIAL THAT IS PLACED ON ANY EROSION CONTROLS BY THE CONTRACTOR, OR ANY AGENT OF THE CONTRACTOR, SHALL BE IMMEDIATELY REMOVED BY THE CONTRACTOR, AND ANY NECESSARY REPAIRS TO THE EROSION CONTROLS ACCOMPLISHED, AT NO COST TO THE OWNER.

4. ADDITIONAL AND/OR REPLACEMENT EROSION CONTROLS SHALL BE INSTALLED AS CONDITIONS WARRANT, OR AS DIRECTED BY THE ENGINEER'S WETLAND SCIENTIST.

5. DURING CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EROSION CONTROL MAINTENANCE AND SHALL INSPECT AND/OR REPLACE ALL CONTROLS AS NEEDED. MAINTENANCE WILL BE CARRIED OUT IN ACCORDANCE WITH THE SPECIFICATIONS AND PERMIT CONDITIONS. THE CONTRACTOR IS RESPONSIBLE FOR CARRYING OUT NECESSARY MAINTENANCE DURING ALL PHASES OF PROJECT CONSTRUCTION AND SHALL BE SUBJECT TO THE INSPECTION AND ACCEPTANCE OF THE ENGINEER.

6. DURING CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING RUNOFF FLOW DURING STORMS AND PERIODS OF RAINFALL, THROUGHOUT THE WORK AREA.

7. SEDIMENTATION CONTROL DEVICES SHALL BE INSPECTED CLOSELY AND MAINTAINED PROMPTLY AS DESCRIBED IN THE SPECIFICATIONS OR AS DIRECTED BY THE ENGINEER'S WETLAND SCIENTIST.

8. DISTURBED SLOPES ALONG THE ROW EMBANKMENT WITHIN THE WORK ZONE WILL BE STABILIZED WITH LOAM AND SEED OR BALLAST AS DIRECTED BY THE ENGINEER.

SALT MARSH REPLICATION NOTES:

1. THE SALT MARSH REPLICATION SITE WILL BE CLEARED AND THE SUBGRADE ELEVATION BROUGHT TO AN EVEN LEVEL. THE SUPERVISING WETLAND SCIENTIST WILL INSPECT THE SUB-GRADE OF THE SALT MARSH REPLICATION SITE TO ENSURE THAT THE AREA IS AT A UNIFORM GRADE.

2. COIR LOGS WILL BE INSTALLED AND STACKED ON THE UPSLOPE SIDE OF THE ROCK GABION WALL UNTIL ADJACENT SALT MARSH ELEVATIONS ARE ACHIEVED.

SALT MARSH REPLICATION NOTES (CONT.):

3. MANUFACTURED HYDRIC SOIL SHALL BE PLACED WITHIN THE SALT MARSH REPLICATION SITE AFTER GRADING THE SUBGRADE HAS BEEN APPROVED. SOILS USED FOR SALT MARSH REPLICATION WILL BE CREATED WITH SOIL AMENDMENTS. MANUFACTURED HYDRIC SOILS ARE CREATED FROM A MIXTURE OF ORGANIC AND MINERAL MATERIALS, WITH THE FINAL PRODUCT CONTAINING AT LEAST 12 PERCENT ORGANIC MATTER CONTENT BY WEIGHT. THE CONTRACTOR MUST PROVIDE AN ANALYSIS OF THE PREPARED TOPSOIL TO THE WETLAND SCIENTIST FOR APPROVAL PRIOR TO INSTALLATION. SOIL MUST BE FREE OF SEEDS OR RHIZOMES OF INVASIVE PLANT SPECIES.

4. NO SOIL USED FOR THE CREATION OF SALT MARSH WILL BE TAKEN FROM ANY AREA SUPPORTING INVASIVE SPECIES, THE PROJECT WILL NOT TRANSLOCATE OR REUSE POTENTIALLY CONTAMINATED SALT MARSH OR WETLAND SOILS FROM AREAS ADJACENT TO THE EXISTING RAILROAD. MANUFACTURED WETLAND SOIL WILL BE GRADED TO ACHIEVE A TOPOGRAPHY TO MATCH THE EXISTING ADJACENT SALT MARSH, OR TO ACHIEVE TOPOGRAPHY OF THE TARGET SALT MARSH COVER TYPE. CONTRACTOR IS RESPONSIBLE FOR PROVIDING SPOT GRADES TO CONFIRM THE FINAL ELEVATION OF THE SALT MARSH REPLICATION AREA.

5. THE SUPERVISING WETLAND SCIENTIST WILL INSPECT THE FILLED SALT MARSH REPLICATION AREA TO ENSURE THAT FINAL ELEVATIONS HAVE BEEN MET. IN RESPONSE TO LOCAL HYDROLOGIC CONDITIONS, THE SUPERVISING WETLAND SCIENTIST MAY MAKE MINOR MODIFICATIONS TO THE FINAL ELEVATIONS IN THE FIELD.

6. THE SALT MARSH REPLICATION SITE WILL BE COVERED WITH A 100% BIODEGRADABLE EROSION CONTROL BLANKET AND SECURED IN PLACE USING 100% BIODEGRADABLE STAKES OR OTHER FASTENERS.

7. THE EROSION CONTROL BARRIERS WILL BE DISASSEMBLED AND PROPERLY DISPOSED OF BEFORE NOVEMBER 1 OF THE THIRD FULL GROWING SEASON AFTER PLANTING OF THE SALT MARSH REPLICATION SITE. SEDIMENT COLLECTED BY THE BARRIERS WILL BE REMOVED AND DISPOSED OF IN A MANNER THAT PREVENTS EROSION AND TRANSPORT TO A WETLAND OR WATERWAY. IF MINOR GRADING IS REQUIRED IN THE IMMEDIATE ZONE AROUND THE EROSION CONTROL BARRIER TO PROVIDE SURFACE HYDROLOGIC CONNECTION BETWEEN THE SALT MARSH REPLICATION SITE AND THE EXISTING SALT MARSH AREA, IT WILL BE DONE BY HAND AND STABILIZED BY MULCH.

8. CONTRACTOR SHALL SUBMIT AN AS-BUILT GRADING PLAN PRIOR TO PLANTINGS.

9. CONTRACTOR SHALL NOT FOUL EXISTING FREIGHT AND SIDING TRACKS, THE CONTRACTOR IS RESPONSIBLE FOR TEMPORARY CROSSING MEANS AND METHODS AND PROTECTING THE TRACK AT ALL TIMES.

PLANTING NOTES:

1. PLANTING WITHIN THE SALT MARSH REPLICATION SITE WILL CONFORM TO THE PLANS OR WILL BE COMPLETED IN ACCORDANCE WITH DIRECTIONS PROVIDED IN THE FIELD. ONLY PLANT MATERIALS NATIVE AND INDIGENOUS TO THE REGION WILL BE USED. USE OF CULTIVARS WILL BE PROHIBITED. SPECIES NOT SPECIFIED IN THE FINAL PLANTING PLAN WILL NOT BE USED WITHOUT WRITTEN APPROVAL FROM THE PERMITTING AGENCY.

2. ALL PLUGS WILL BE SPACED APPROXIMATELY 6-INCHES ON-CENTER, AT THE DIRECTION OF THE SUPERVISING WETLAND SCIENTIST TO SIMULATE NATURAL GROWTH PATTERNS.

3. TRANSPLANTS AND PLANT MATERIAL COLLECTED FROM THE WILD ARE PROHIBITED UNLESS APPROVED IN WRITING BY THE WETLAND SCIENTIST. ALL PLANT MATERIAL USED SHALL BE NURSERY-GROWN AND HEALTHY, SOUND AND FREE OF DISEASE, INSECT PESTS, EGGS OR LARVAE, DISCOLORATIONS, LEAF WILTING OR CURLING AND WEEDS.

4. CONTAINER GROWN STOCK SHALL HAVE BEEN GROWN IN A CONTAINER LONG ENOUGH FOR THE ROOT SYSTEM TO HAVE DEVELOPED SUFFICIENTLY TO HOLD ITS SOIL AFTER REMOVAL FROM THE CONTAINER. ROOTS SHALL VISIBLY EXTEND TO THE INSIDE FACE OF THE GROWING CONTAINER BUT SHALL NOT BE ROOT-BOUND OR GIRDLING.

5. ALL PLANTS SHALL BE DELIVERED TO THE SITE AS LIVE, ACTIVELY GROWING, OR JUST BREAKING DORMANCY, AND ARRIVE TO THE PROJECT SITE READY FOR PLANTING. THE WETLAND SCIENTIST MAY REJECT PLANTS DAMAGED IN HANDLING OR TRANSPORT. PLANT MATERIAL SHALL BE INSTALLED AS SOON AS POSSIBLE AFTER IT HAS BEEN DELIVERED TO THE SITE.

6. SOIL AND ROOTMASS SHALL BE WATERED AND MOIST ON DELIVERY TO THE JOB SITE. PLANTS WITH DRY SOIL AND ROOTS SHALL NOT BE ACCEPTABLE. ALL PLANT MATERIALS TEMPORARILY STORED AT THE SITE PRIOR TO PLANTING SHALL BE STORED OUT OF DIRECT EXPOSURE TO SUN AND WIND, SHALL BE MAINTAINED BY CAREFUL WATERING, AND SHALL BE PROTECTED FROM DAMAGE DUE TO CONSTRUCTION ACTIVITIES AND ADVERSE WEATHER.

7. PLANTING TO OCCUR BETWEEN MAY 1 AND SEPTEMBER 15. ALL PLANT MATERIALS SHALL BE GUARANTEED FOR ONE YEAR FOLLOWING DATE OF FINAL ACCEPTANCE.

PERMIT PLANS - NOT FOR CONSTRUCTION

Jacobs

MASS COASTAL RAILROAD

DRAWN BY: CWB
CHECKED BY: EP
APPROVED BY: BEM
DATE: June 1, 2022

CAPE MAIN
SANDWICH, MASSACHUSETTS

EROSION CONTROL, SALT MARSH MITIGATION AND PLANTING NOTES

SHEET
8 OF 9

P:\MASSDOT\2021\E2X88271 - MassDOT Rail MSA Contract\Cape Main MP 63.22 Replacement\700 CADD\DEP and ACOE\MP 63.22 Culvert DEP Erosion Protection.dwg
June 1, 2022

PLANTING SCHEDULE

PLANTING AREA	COMMON NAME	SCIENTIFIC NAME	SYMBOL	SIZE	QTY	ON CENTER SPACING
SALT MARSH REPLICATION AREA	SALT MEADOW CORDGRASS	SPARTINA PATENS	×	2" PLUG	420	6-IN
	SALTGRASS	DISTICHLIS SPICATA	□	2" PLUG	420	6-IN

NOTES:

1. THE CONTRACTOR SHALL NOT IMPACT THE TRACK AND SHALL GUARD AGAINST INTRODUCING ANY GROUND SLOPE DISTURBANCE TO THE BALLAST ON THE NEW EMBANKMENT AND THE SURROUNDING GREEN AREAS WHEN MOBILIZING TO PERFORM THIS RESTORATION WORK AS SHOWN.
2. THE CONTACTOR SHALL REMOVE ALL LITTER, TOOLS AND SURPLUS MATERIALS AS PART OF THE COMPLETION OF THE WORK UPON FINAL SITE INSPECTION AND ACCEPTANCE.

0 10 20

SCALE IN FEET

PERMIT PLANS - NOT FOR CONSTRUCTION

Jacobs

MASS COASTAL RAILROAD

DRAWN BY: CWB
CHECKED BY: EP
APPROVED BY: BEM
DATE: June 1, 2022

CAPE MAIN
SANDWICH, MASSACHUSETTS

SALT MARSH RESTORATION PLAN

SHEET 9 OF 9

P:\MASSDOT\2021\E2X88271 - MassDOT Rail MSA Contract\Cape Main MP 63.22 Replacement\700 CADD\DEP and ACOE\MP 63.22 Culvert DEP Erosion Protection.dwg
June 1, 2022



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F: 781.278.5702
www.gza.com

February 23, 2023
File No. 01.0174521.05

Maria DeLaundreau
Regulatory Project Manager
New England District, Regulatory Division
U.S. Army Corps of Engineers
696 Virginia Road
Lexington, Massachusetts 01742

Re: Request for Information – February 2023
NAE-2022-02055: Cape Main MP 63.22 Culvert Replacement Project
Sandwich, Massachusetts

Dear Ms. DeLaundreau:

At your request for additional information via email dated February 9, 2023, for the above-referenced project, GZA GeoEnvironmental, Inc. (GZA) provides the following responses:

1. *The 401 WQC, if available. If the WQC has not been issued provide the name and contact information for the person conducting 401 WQC review*.

We have attached the approved 401 WQC as issued by MassDEP. You may contact Mark Bartow at MassDEP at (508) 946-2746 or mark.bartow@mass.gov with any questions.

2. *Previous permitting information or historical information regarding structures/fills existing on site (especially documenting if the structure/fill was in place before 1968 and/or 1972).*

As you provided via email to us dated February 10, 2023, historic USGS maps identify the railroad embankment and culvert (project location) as the Old Colony Railroad: Cape Cod Branch since at least 1939. We have provided the image and a direct link to the National Geologic Map Database for review:



https://ngmdb.usgs.gov/topoview/viewer/#15/41.7510/-70.4767

3. *Update the Site Access and Staging Area Figure Sheet 5 of 9 to include the OHWM and wetland boundaries.*

The channel within the adjacent salt marsh is tidal within the project limits and thus does not fall under the OHWM definition. We have updated the figure to indicate the delineated wetland boundary and have included an updated version of the plan sheet per request.

4. *Identify the Lead Federal Agency*

As discussed with you via telephone on Friday, February 10, 2023, the project does not have a lead federal agency as it is not Federally funded or sponsored.

5. *Anticipated Dates of In-Water Work*

Per your email request dated February 10, 2023, MassCoastal Railroad anticipates project construction to begin in the summer of 2023, with a two-week work window to allow for mobilization, the establishment of project erosion controls, installation of support of excavation and bypass controls, and project finalization and demobilization. The anticipated in-water work period is 5 consecutive days during the 2-week window. The work window is predicated on the issuance of a permit from the USACE before the issuance of the PCNs and the successful project bidding process.

6. *Federal Railroad Administration Compliance Documents*

Please find attached email and postal receipts for renotification to the relevant Section 106 organizations. Please note that the project is located within Sandwich, Massachusetts, which is not within an area requiring notification to the Narragansett Indian Longhouse.

7. *Request for Monitoring Plan for Salt Marsh Replication Area*

Per your email request dated February 21, 2022, MassDOT provides the following response:

MassDOT requires the selected contractor to prepare a salt marsh mitigation monitoring plan for wetland replication areas. MassDOT's contractor will be required to conduct required yearly follow-up monitoring for three years using a MassDOT-qualified wetland scientist. The mitigation monitoring plan will include a narrative describing the monitoring protocol being followed to measure the success of the replication area, a qualitative and quantitative description of how the replication area has met the performance standards at 310 CMR 10.32(3)-(6), which adaptive management strategies will be employed to meet the performance standards at 310 CMR 10.32(3)-(6) if necessary, and a yearly photographic log.

This report is subject to the Natural Resource Limitations attached as **Appendix A**.

Should you have any questions or comments regarding this submittal, or if you require additional information, please feel free to contact Kimberly Degutis at (781) 278-5852 or kimberly.degutis@gza.com.

Very truly yours,
GZA GEOENVIRONMENTAL, INC.

Kimberly Degutis, PWS, CESCL
Senior Project Manager

Daniel M. Nitzsche, CPESC, CESSWI, SE
Consultant/Reviewer

Stephen L Lecco, AICP, CEP, PWS
Associate Principal

Attachments: Permit Plan – Updated Sheet 5 of 9 of the permit plan set
Appendix A – Limitations.
Appendix B – Water Quality Certificate
Appendix C – Section 106 Notifications

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Appendix A – Limitations

USE OF REPORT

1. GZA GeoEnvironmental, Inc. (GZA) has prepared this report on behalf of, and for the exclusive use of Jacobs Engineering ("Client") for the stated purpose(s) and location(s) identified in the report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not identified in the agreement, for any use, without our prior written permission, shall be at that party's risk, and without any liability to GZA.

STANDARD OF CARE

2. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in the Report and/or proposal, and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the data gathered and observations made during the course of our work. Conditions other than described in this report may be found at the subject location(s).

3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made.

LIMITS TO OBSERVATIONS

4. Natural resource characteristics are inherently variable. Biological community composition and diversity can be affected by seasonal, annual or anthropogenic influences. In addition, soil conditions are reflective of subsurface geologic materials, the composition and distribution of which vary spatially.

5. The observations described in this report were made on the dates referenced and under the conditions stated therein. Conditions observed and reported by GZA reflect the conditions that could be reasonably observed based upon the visual observations of surface conditions and/or a limited observation of subsurface conditions at the specific time of observation. Such conditions are subject to environmental and circumstantial alteration and may not reflect conditions observable at another time.

6. The conclusions and recommendations contained in this report are based upon the data obtained from a limited number of surveys performed during the course of our work on the site, as described in the Report. There may be variations between these surveys and other past or future surveys due to inherent environmental and circumstantial variability.

RELIANCE ON INFORMATION FROM OTHERS

7. Preparation of this Report may have relied upon information made available by Federal, state and local authorities; and/or work products prepared by other professionals as specified in the report. Unless specifically stated, GZA did not attempt to independently verify the accuracy or completeness of that information.

COMPLIANCE WITH REGULATIONS AND CODES

8. GZA's services were performed to render an opinion on the presence and/or condition of natural resources as described in the Report. Standards used to identify or assess these resources as well as regulatory jurisdiction, if any, are stated in the Report. Standards for identification of jurisdictional resources and regulatory control over them may vary between governmental agencies at Federal, state and local levels and are subject to change over time which may affect the conclusions and findings of this report.

NEW INFORMATION

9. In the event that the Client or others authorized to use this report obtain information on environmental regulatory compliance issues at the site not contained in this report, such information shall be brought to GZA's attention forthwith. GZA will evaluate such information and, on the basis of this work, may modify the conclusions stated in this report.

ADDITIONAL SERVICES

10. GZA recommends that we be retained to provide further investigation, if necessary, which would allow GZA to (1) observe compliance with the concepts and recommendations contained herein; (2) evaluate whether the manner of implementation creates a potential new finding; and (3) evaluate whether the manner of implementation affects or changes the conditions on which our opinions were made.

Appendix B – Water Quality Certificate

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

One Winter Street Boston, MA 02108 • 617-292-5500

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Bethany A. Card
Secretary

Martin Suuberg
Commissioner

NOV 0 2 2022

Massachusetts Coastal Railroad
ATTN: Christopher Podgurski
12 Harding Street, Unit 202
Lakeville, MA 02347

RE: **401 WATER QUALITY CERTIFICATION**
Application for: BRP WW 10
MAJOR FILL AND EXCAVATION PROJECTS

AT: Cape Main Railroad Line MP 63.22
Culvert Replacement
SANDWICH

Transmittal No: X289061

Dear Mr. Podgurski:

The Department of Environmental Protection ("MassDEP") has reviewed your application for a Water Quality Certification, as referenced above. In accordance with the provisions of MGL Ch. 21, §§26-53, Section 401 of the Federal Clean Water Act as amended (33 U.S.C. §1251 et seq.), and 314 CM 9.00, it has been determined there is reasonable assurance the proposed project will be conducted in a manner which will not violate applicable water quality standards at 314 CMR 4.00.

The property is owned by the MassDOT Rail and Transit Division. The culvert replacement qualifies as Footprint Bridge Exempt under Section 24 of the Transportation Bond Bill of 2014. Section 24 of the 2014 Transportation Bond Bill (Chapter 79 Acts) exempts bridge projects of the Massachusetts Department of Transportation from the requirements of MGL Chapter 30, sections 61 - 62A (MEPA), MGL Chapter 91 (Public Waterfront Act), and MGL 131, section 40 (WPA) if the design is substantially the functional equivalent of, and in similar alignment to, the structure to be reconstructed or replaced. As stated in the regulation, a "bridge" shall include any structure spanning and providing passage over water, railroad right-of-way, public or private way, other vehicle facility or other area. As a culvert meets the definition of a bridge, the exemption is applicable and eliminates the need for review under the Massachusetts Environmental Policy Act, Wetlands Protection Act, and Public Waterfront Act (Chapter 91).

The project includes the replacement of a partially failed 24 x 30-inch stone box culvert within a railroad embankment with a 48-inch reinforced concrete pipe with precast concrete wingwalls and riprap velocity dissipation pads. The culvert is approximately 50' long. The work has been demonstrated to be necessary to avoid a track failure and to restore hydraulic capacity to the culvert.

The culvert is located approximately 800 feet west of Great Island Road and connects an unnamed tributary to Old Harbor Creek. The railroad embankment where the culvert is located bisects a salt marsh system. The top of the embankment is approximately 14 feet higher in elevation than the salt marsh. Flow within the tributary and culvert is tidally influenced. On the south side of the culvert, landward of rail bed, the salt marsh transitions to Bordering Vegetated Wetland. On the south side it is anticipated that impacts will be limited to Land Under Water only. On the south side a total of up to 500 square feet of Land Under Water is to be impacted, of which 200 square feet will be permanent. The permanent impacts are mostly attributable to the wingwalls, velocity dissipation pad, and armor stone necessary to support a salt marsh restoration effort. On the north side of the culvert a total of 285 square feet of Salt Marsh will be impacted, of which 17 square feet will be permanent. Additionally, a total of 121 square feet of Land Under Water will be impacted on the north side, of which 34 square feet will be permanent. The impacts to Salt Marsh and Land Under Water on the north side of the culvert are mostly attributable to the wingwalls and velocity dissipation pad. Temporary impacts on both the north and south sides of the culvert are attributed to the installation of dewatering/diversion structures, access necessary for construction activities, and the removal of the existing culvert.

Before construction activities begin, erosion controls will be installed around the work area and will define the limits of work. Access to the work area will be from the existing railroad easement only. A temporary water bypass system will be necessary to move sediment free clean water around the work area from south to north during construction. This pumping system will be initiated before flow is stopped to the culvert. A driven line of sheet piles and sandbags on either side of the culvert will then be used to stop flow through the culvert and define the limits of excavation. Water within the excavation will be pumped to a treatment system located east of excavation in an upland area. Treated water from the dewatering system will then gravity flow through at least two (2) check dams before discharging immediately north of the work area within the existing stream channel. After the culvert has been replaced and the construction zone has been stabilized, the driven sheet piles will be removed starting on the northern end to restore flow. Following removal of the sheet piles the temporary water bypass will be deactivated and removed. It is proposed that the excavation, removal, and installation of the new culvert will be completed within a five (5) day construction period.

Mitigation for the impacts to Salt Marsh will be created on the south side of the culvert outlet in an area of existing scour and is anticipated to be approximately 207 square feet in size. Planting will include the installation of spartina patens and distichlis spicata plugs.

The project site is not located in an Area of Critical Environmental Concern (ACEC), Outstanding Resource Water (ORW), Priority Habitat of Rare Species and Estimated Habitat of Rare Wildlife, and there are no mapped certified or potential vernal pools. Additionally, the Division of Marine Fisheries (DMF) did not identify any Time of Year (TOY) restrictions for the work.

Alternatives were evaluated to minimize impacts. The alternatives included a no build alternative, rehabilitation of the existing stone box culvert, and the full culvert replacement. The no build alternative was quickly dismissed as the structure is in poor condition and is likely to fail causing a serious threat to public health, safety, and the environment. The rehabilitation alternative, which would include injecting grout and stabilizing the structure with bracing bars was also dismissed as it would only provide a short-term repair.

Public notice was provided in the Environmental Monitor on September 23, 2022, and in the Sandwich Enterprise on September 30, 2022. The Department did not receive any public comments during the 21-day public comment periods which ended on October 14, 2022, and October 21, 2022, respectively.

Based on a review of information provided by the applicant, MassDEP finds that this project complies with the standards described under 314 CMR 9.06.

Therefore, based on information currently in the record, the Department grants a 401 Water Quality Certification for this project subject to the following conditions to maintain water quality, to minimize impact on waters and wetlands, and to ensure compliance with appropriate state law.

1. All work shall conform to the plans entitled:

    - Culvert Replacement Project at Cape Main MP 63.22 Sandwich, MA, 401 Water Quality Certification Permitting Plans (Sheets 1 through 9) prepared by Jacobs Engineering Group, dated June 1, 2022.

    - Section 401 Water Quality Certification Application, Culvert Replacement Project at Cape Main Mile Post 63.22 Sandwich, Massachusetts, prepared by GZA GeoEnvironmental, dated June 2022.

2. To the extent that the following conditions modify or differ from the plans, specifications or other proposals referenced in Condition 1, the conditions of this Certification shall control.

3. A copy of this Certification and referenced plans and other documents shall be provided to the contractor prior to the start of construction.

4. Prior to the start of work, the applicant shall provide MassDEP with the name, address, and phone number(s) of the person responsible for ensuring that all work complies with the conditions of this Water Quality Certification.

5. Prior to the start of work and installation of erosion control measures, the applicant shall provide MassDEP with the name, address and phone number(s) of the following individuals:

    - Environmental Monitor(s)
    - Wetland Specialist(s)

6. A minimum of twenty-one (21) days prior to the commencement of construction the applicant or their representative shall contact MassDEP (mark.bartow@mass.gov) to schedule a pre-construction consultation meeting to review the plans, specifications and terms and conditions of this Water Quality Certificate (WQC). In addition to the applicant/representative attendees shall include the Environmental Monitor and Wetland Specialist unless MassDEP deems attendance is not necessary for any individual.

7. Prior to the commencement of construction adequate erosion control measures shall be installed to protect all wetland resource areas.

8. An Environmental Monitor (EM), with experience in wetland science, erosion and sedimentation control, and experience in Railroad/Roadway/Bridge/linear construction, shall be employed for the duration of the project. The EM will be responsible for assuring compliance with the permit conditions, plans, and specifications, maintaining limit of work, proper maintenance of the erosion and sedimentation controls, as well as determining if additional erosion and sedimentation controls are necessary. The EM shall assure that dewatering measures are properly implemented and maintained and that the discharge is adequately filtered prior to discharge to wetlands and waterways. The EM shall conduct daily inspections during construction and provide MassDEP with a Monitoring Report (MR) at the end of construction summarizing work activities, and compliance with the conditions of this permit. The MR shall be supported with photographs representative of work activities.

9. In addition to normal inspections, the EM shall coordinate with the contractor and anyone else responsible for maintaining the erosion control and sedimentation control measures prior to forecasted significant storm events to assure that the erosion and sedimentation control measures will adequately protect resource areas. The EM shall have the authority to direct responsible parties to install additional or alternative erosion and sedimentation control measures.

10. In instances where an EM directs the installation of additional or alternative erosion and sedimentation control measures MassDEP shall be notified via email with photographs and a description of measures.

11. A stockpile of erosion control measures shall be kept on-site for emergency and routine replacement. The materials may include but are not limited to silt fence, hay bales, stone rip rap, filter dikes, compost filter tubes, filter bags, or any other devices planned for use during construction.

12. No more than 500 square feet of Land Under Water (LUW) will be impacted cumulatively with 200 square feet of permanent impact to LUW.

13. No more than 285 square feet of Salt Marsh will be impacted cumulatively with 17 square feet of permanent impact to Salt Marsh.

14. The surface area of the salt marsh mitigation area as shown on the Salt Marsh Restoration Plan (Sheet 9 of 9) and described in the Erosion Control, Salt Marsh Mitigation and Planting Notes (Sheet 8 of 9) shall be at least 75% evenly distributed with indigenous wetland vegetation within two growing seasons. This determination shall be made by the wetland scientist selected by the applicant or his/her designee and approved by MassDEP. Should the mitigation area fail to meet this standard, MassDEP may require additional measures necessary to achieve compliance.

15. At the end of each growing season, a progress report of the relative success or failure of the mitigation effort shall be submitted to this office by the wetland scientist. The report shall include percent of vegetation cover, a list of the type of plants growing in the mitigation area, coverage of wetland plants as a percentage of all plants and relative vigor of the plants. The report shall also include recommendations for improvement of poorly established wetland areas.

16. The progress report shall also document the restoration efforts associated with the areas of LUW and Salt Marsh temporarily impacted during construction. Should the temporary impact areas not be adequately restored, MassDEP may require additional measures to achieve compliance.

17. It shall be the responsibility of the applicant, and/or any successor(s) in title to ensure that within the wetland mitigation and restoration areas, non-native invasive plant species such as *Phragmites australis* do not expand because of the project.

18. Staff of the Department of Environmental Protection shall have the right to enter and inspect the area subject to this Certification at reasonable hours to evaluate compliance with the conditions stated in this Certification and may require the submittal of any data deemed necessary by the Department for that evaluation.

19. No Special Condition set forth herein shall be constructed or operate to prohibit the Department from taking enforcement against the applicant or its contractors for any failure to comply with the terms and requirements of this 401 Water Quality Certification.

20. No activity authorized by this Water Quality Certification may begin prior to expiration of the 21-day appeal period or until a final decision is issued by MassDEP if an appeal is filed.

21. This Certification remains in effect for the same duration as the federal permit that requires it or five years from the date of issuance of this Certification whichever comes first.

22. The applicant may request an amendment or extension of this Certification in accordance with 314 CMR 9.09(2) and (3), respectively.

Failure to comply with this Certification is grounds for enforcement, including civil and criminal penalties, under MGL Ch. 21 §42, MGL Ch. 21A §16, or other possible actions/penalties as authorized by the General Laws of the Commonwealth.

This Certification does not relieve the applicant of the obligation to comply with other appropriate state or federal statutes or regulations.

NOTICE OF APPEAL RIGHTS

A) Appeal Rights and Time Limits

Certain persons shall have a right to request an adjudicatory hearing concerning certifications by MassDEP when an application is required: (a) the applicant or property owner; (b) any person aggrieved by the decision who has submitted written comments during the public comment period; any ten (10) persons of the Commonwealth pursuant to M.G.L. c.30A where a group member has submitted written comments during the public comment period; or (d) any governmental body or private organization with a mandate to protect the environment which has submitted written comments during the public comment period. Any person aggrieved, any ten (10) persons of the Commonwealth, or a governmental body or private organization with a mandate to protect the environment may appeal without having submitted written comments during the public comment period only when the claim is based on new substantive issues arising from material changes to the scope or impact of the activity and not apparent at the time of public notice. To request an adjudicatory hearing pursuant to M.G.L. c.30A, § 10, a Notice of Claim must be made in writing, provided that the request is made by certified mail or hand delivery to MassDEP, with the appropriate filing fee specified within 310 CMR 4.10 along with a DEP Fee Transmittal Form within twenty-one (21) days from the date of issuance of this Certificate, and addressed to:

Case Administrator
Department of Environmental Protection
One Winter Street, 2nd Floor
Boston, MA 02108

A copy of the request shall at the same time be sent by certified mail or hand delivery to the issuing office of the Wetlands and Waterways Program at:

Department of Environmental Protection
Southeast Regional Office
20 Riverside Drive
Lakeville, Massachusetts 02347

B) Contents of Hearing Request

A Notice of Claim for Adjudicatory Hearing shall comply with MassDEP's Rules for Adjudicatory Proceedings, 310 CMR 1.01(6), and shall contain the following information pursuant to 314 CMR 9.10(3):

(a) the 401 Certification Transmittal Number;
(b) the complete name of the applicant and address of the project;
(c) the complete name, address, and fax and telephone numbers of the party filing the request, and, if represented by counsel or other representative, the name, fax and telephone numbers, and address of the attorney;
(d) if claiming to be a party aggrieved, the specific facts that demonstrate that the party satisfies the definition of "aggrieved person" found at 314 CMR 9.02;
(e) a clear and concise statement that an adjudicatory hearing is being requested;
(f) a clear and concise statement of (1) the facts which are grounds for the proceedings, (2) the objections to this Certificate, including specifically the manner in which it is alleged to be inconsistent with the MassDEP's Water Quality Regulations, 314 CMR 9.00, and (3) the relief sought through the adjudicatory hearing, including specifically the changes desired in the final written Certification; and

(g) a statement that a copy of the request has been sent by certified mail or hand delivery to the applicant, the owner (if different from the applicant), the conservation commission of the city or town where the activity will occur, the Department of Environmental Management (when the certificate concerns projects in Areas of Critical Environmental Concern), the public or private water supplier where the project is located (when the certificate concerns projects in Outstanding Resource Waters), and any other entity with responsibility for the resource where the project is located.

C) Filing Fee and Address

The hearing request along with a DEP Fee Transmittal Form and a valid check or money order payable to the Commonwealth of Massachusetts in the amount of one hundred dollars ($100) must be mailed to:

Commonwealth of Massachusetts
Department of Environmental Protection
Commonwealth Master Lockbox
PO Box 4062
Boston, MA 02211

The request will be dismissed if the filing fee is not paid, unless the appellant is exempt or granted a waiver. The filing fee is not required if the appellant is a city or town (or municipal agency), county, or district of the Commonwealth of Massachusetts, or a municipal housing authority. MassDEP may waive the adjudicatory hearing filing fee pursuant to 310 CMR 4.06(2) for a person who shows that paying the fee will create an undue financial hardship. A person seeking a waiver must file an affidavit setting forth the facts believed to support the claim of undue financial hardship together with the hearing request as provided above.

Should you have any questions relative to this permit, please Mark Bartow at mark.bartow@mass.gov or (508) 946-2746.

Sincerely,

Daniel F. Gilmore, Chief
Wetlands & Waterways Program
Bureau of Water Resources

DFG/mnb

cc: Sandwich Conservation Commission

Regulatory Division
The New England District
U.S. Army Corps of Engineers
696 Virginia Road
Concord, MA 01742-275

MassDOT – Rail and Transit Division
ATTN: Ms Chalita Belfield
Director of Railroad Properties
Ten Park Plaza, Suite 4160
Boston, MA 02116

Kimberly Degutis, Environmental Project Manager
GZA GeoEnvironmental Inc
249 Vanderbilt Avenue
Norwood, MA 02062

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

4

DEP File Number:

Provided by DEP

Request for Departmental Action Fee Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

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

Email Address

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

Email Address

4. DEP File Number:

B. Instructions

1. When the Departmental action request is for (check one):

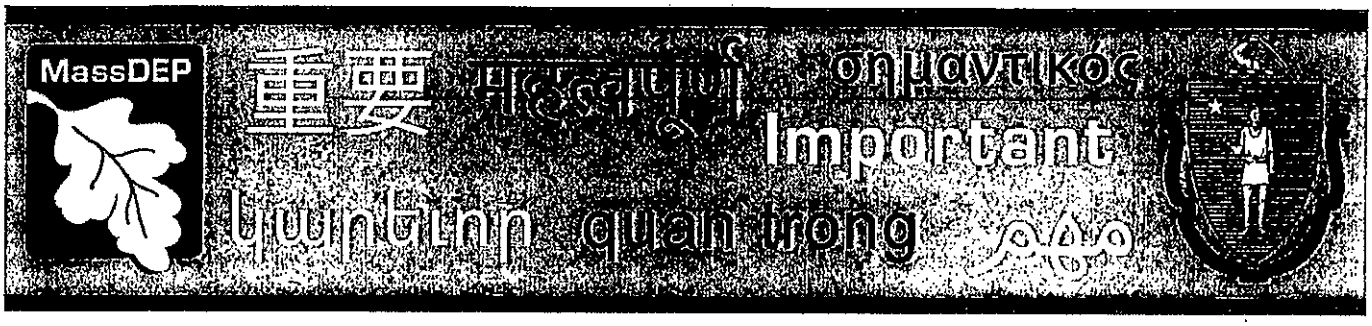
☐ Superseding Order of Conditions – Fee: $120.00 (single family house projects) or $245 (all other projects)

☐ Superseding Determination of Applicability – Fee: $120

☐ Superseding Order of Resource Area Delineation – Fee: $120

Send this form and check or money order, payable to the *Commonwealth of Massachusetts,* to:

Department of Environmental Protection
Box 4062
Boston, MA 02211



Communication for Non-English-Speaking Parties

English
This document is important and should be translated immediately.
If you need this document translated, please contact MassDEP's Diversity Director at the telephone number listed below.

Español Spanish
Este documento es importante y debe ser traducido de inmediato. Si necesita este documento traducido, comuníquese con la Directora de Diversidad de MassDEP al número de teléfono que aparece más abajo.

Português Portuguese
Este é um documento importante e deve ser traduzido imediatamente. Se precisar de uma tradução deste documento, entre em contato com o Diretor de Diversidade da MassDEP nos números de telefone listados abaixo.

繁體中文 Chinese Traditional
本文件非常重要，應立即翻譯。如果您需要翻譯這份文件，請用下面列出的電話號碼聯絡 MassDEP 多元化負責人。

簡体中文 Chinese Simplified
本文件非常重要，应立即翻译。如果您需要翻译这份文件，请用下面列出的电话号码与 MassDEP 的多元化主任联系。

Ayisyen Kreyòl Haitian Creole
Dokiman sa-a se yon bagay enpòtan epi yo ta dwe tradwi l imedyatman. Si ou bezwen dokiman sa a tradwi, tanpri kontakte Direktè Divèsite MassDEP la nan nimewo telefòn endike anba.

Việt Vietnamese
Tài liệu này rất quan trọng và cần được dịch ngay lập tức. Nếu quý vị cần dịch tài liệu này, xin liên lạc với Giám đốc Đa dạng của MassDEP theo các số điện thoại ghi dưới đây.

ប្រទេសកម្ពុជា Khmer/Cambodian
ឯកសារនេះគឺសំខាន់ហើយគួរត្រូវបានបកប្រែភ្លាមៗ។ ប្រសិនបើអ្នកត្រូវការឱ្យគេបកប្រែឯកសារនេះ
សូមទាក់ទងមកនាយកផ្នែកពិពិធកម្មរបស់ MassDEP តាមលេខទូរស័ព្ទខាងក្រោម។

Kriolu Kabuverdianu Cape Verdean
Kel dukumentu li é inpurtánti y debe ser traduzidu imidiatamenti. Se bu meste di kel dukumentu traduzidu, pur favor kontakta Diretor di Diversidádi di MassDEP na numeru abaxu indikadu.

Contact Glynis L. Bugg, Acting Diversity Director/Civil Rights 857-262-0606
Massachusetts Department of Environmental Protection
One Winter Street, Boston MA 02108
TTY# MassRelay Service 1-800-439-2370 • https://www.mass.gov/environmental-justice
(Version revised 7.22.2022) 310 CMR 1.03(5)(a

Русский Russian

Это важный документ, и он должен быть безотлагательно переведен. Если вам нужен перевод данного документа, пожалуйста, свяжитесь с директором по вопросам многообразия (Diversity Director) компании MassDEP по указанному ниже телефону.

العربية Arabic

هذه الوثيقة مهمة ويجب ترجمتها على الفور. اذا كنت بحاجة الى هذه الوثيقة مترجمة، يرجى الاتصال بمدير التنوع PMassDE على أرقام الهواتف المدرجة أدناه.

한국어 Korean

이 문서는 중요하고 즉시 번역해야 합니다. 이 문서의 번역이 필요하시다면, 아래의 전화 번호로 MassDEP 의 다양성 담당 이사에 문의하시기 바랍니다.

հայերեն Armenian

Այս փաստաթուղթը կարևոր է և պետք է անմիջապես թարգմանվի:
Եթե Ձեզ անհրաժեշտ է այս փաստաթուղթը թարգմանել, դիմեք MassDEP-ի բազմազանության տնօրենին ստորև նշված հեռախոսահամարով:

فارسی Farsi Persian

این سند مهم است و باید فورا ترجمه شود.
اگر به ترجمه این سند نیاز دارید، لطفا با مدیر بخش تنوع نژادی MassDEP به شماره تلفن ذکر شده در زیر تماس بگیرید.

Français French

Ce document est important et devrait être traduit immédiatement. Si vous avez besoin de ce document traduit, veuillez communiquer avec le directeur de la diversité MassDEP aux numéros de téléphone indiqués ci-dessous.

Deutsch German

Dieses Dokument ist wichtig und sollte sofort übersetzt werden. Sofern Sie eine Übersetzung dieses Dokuments benötigen, wenden Sie sich bitte an den Diversity Director MassDEP unter der unten aufgeführten Telefonnummer.

Ελληνική Greek

Το παρόν έγγραφο είναι σημαντικό και θα πρέπει να μεταφραστεί αμέσως. Αν χρειάζεστε μετάφραση του παρόντος εγγράφου, παρακαλούμε επικοινωνήστε με τον Διευθυντή Διαφορετικότητας του MassDEP στους αριθμούς τηλεφώνου που αναγράφονται παρακάτω.

Italiano Italian

Comunicazione per parti che non parlano inglese. Questo documento è importante e dovrebbe essere tradotto immediatamente. Se avete bisogno di questo documento tradotto, potete contattare il Direttore di Diversità di MassDEP al numero di telefono elencato di seguito.

Język Polski Polish

Dokument ten jest ważny i powinien zostać natychmiast przetłumaczony. Jeśli potrzebujesz przetłumaczonej wersji dokumentu, prosimy o kontakt z dyrektorem ds. różnorodności MassDEP pod jednym z numerów telefonu wymienionych poniżej.

हिन्दी Hindi

यह दस्तावेज महत्वपूर्ण है और इसका तुरंत अनुवाद किया जाना चाहिए. यदि आपको इस दस्तावेज़ का अनुवाद करने की आवश्यकता है, तो कृपया नीचे सूचीबद्ध टेलीफोन नंबरों पर मासडेप्स डाइवर्सिटी के निदेशक से संपर्क करें.

Contact Glynis L. Bugg, Acting Diversity Director/Civil Rights 857-262-0606
Massachusetts Department of Environmental Protection
One Winter Street, Boston MA 02108
TTY# MassRelay Service 1-800-439-2370 • https://www.mass.gov/environmental-justice
(Version revised 7.22.2022) 310 CMR 1.03(5)(a

Appendix C – Section 106 Notifications

Kimberly Degutis

From: Kimberly Degutis
Sent: Monday, February 13, 2023 3:34 PM
To: bettina@wampanoagtribe.net
Subject: USACE Application: NAE-2022-02055; Cape Main MP 63.22 Culvert Replacement Project
Attachments: Cover Letter THPO Wompanoag - Cape Main 63.22.pdf

Good afternoon Ms. Washington -

Please find attached the required Section 106 coordination communication in support of a Pre-Construction Notification for the US Army Corps of Engineers.

The project involves the replacement of an existing 3' x 3' stone box culvert with a reinforced concrete pipe within an existing railroad embankment (please see attached project locus).

Please let me know if you have any questions.

Kim

Kimberly K. Degutis, PWS, CESCL
Senior Project Manager
GZA | 249 Vanderbilt Avenue | Norwood, MA 02062
o: 781.278.5852 | c: 973.294.6875 | kimberly.degutis@gza.com | www.gza.com | LinkedIn

GEOTECHNICAL | ENVIRONMENTAL | ECOLOGICAL | WATER | CONSTRUCTION MANAGEMENT
Known for excellence. Built on trust.
Please consider the environment before printing this e-mail.

Kimberly Degutis

From: Kimberly Degutis
Sent: Monday, February 13, 2023 3:34 PM
To: 'victor.mastone@state.ma.us'
Cc: David.s.robinson@mass.gov
Subject: USACE Application: NAE-2022-02055; Cape Main MP 63.22 Culvert Replacement Project
Attachments: Cover Letter BUAR - Cape Main 63.22.pdf

Good afternoon Mr. Mastone and Mr. Robinson -

Please find attached the required Section 106 coordination communication in support of a Pre-Construction Notification for the US Army Corps of Engineers.

The project involves the replacement of an existing 3' x 3' stone box culvert with a reinforced concrete pipe within an existing railroad embankment (please see attached project locus).

Please let me know if you have any questions.

Kim

Kimberly K. Degutis, PWS, CESCL
Senior Project Manager
GZA | 249 Vanderbilt Avenue | Norwood, MA 02062
o: 781.278.5852 | c: 973.294.6875 | kimberly.degutis@gza.com | www.gza.com | LinkedIn

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Kimberly Degutis

From: Kimberly Degutis
Sent: Monday, February 13, 2023 3:34 PM
To: 'rpeters@mwtribe.com'
Cc: 'David Weeden'
Subject: USACE Application: NAE-2022-02055; Cape Main MP 63.22 Culvert Replacement Project
Attachments: Cover Letter THPO Mashpee - Cape Main 63.22.pdf

Good afternoon Mr Peters and Mr Weeden -

Please find attached the required Section 106 coordination communication in support of a Pre-Construction Notification for the US Army Corps of Engineers.

The project involves the replacement of an existing 3' x 3' stone box culvert with a reinforced concrete pipe within an existing railroad embankment (please see attached project locus).

Please let me know if you have any questions.

Kim

Kimberly K. Degutis, PWS, CESCL
Senior Project Manager
GZA | 249 Vanderbilt Avenue | Norwood, MA 02062
o: 781.278.5852 | c: 973.294.6875 | kimberly.degutis@gza.com | www.gza.com | LinkedIn

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Dorchester MA 02125

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☐ Adult Signature Required $0.00
☐ Adult Signature Restricted Delivery $
Postage $1.98
Total Postage and Fees $9.48

0462
20
FEB 1 2023
Postmark Here
USPS
02/15/2023

Sent To
Ms. Brona Simon
Street and Apt. No., or F
Massachusetts Historical Commision
220 Morrissey Boulevard
City, State, ZIP+4®
Boston, Massachusetts 02125

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

7021 1970 0001 5744 5975

Appendix A – Limitations

USE OF REPORT

1. GZA GeoEnvironmental, Inc. (GZA) has prepared this report on behalf of, and for the exclusive use of Massachusetts Coastal Railroad ("Client") for the stated purpose(s) and location(s) identified in the report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not identified in the agreement, for any use, without our prior written permission, shall be at that party's risk, and without any liability to GZA.

STANDARD OF CARE

2. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in the Report and/or proposal, and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the data gathered and observations made during the course of our work. Conditions other than described in this report may be found at the subject location(s).

3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made.

LIMITS TO OBSERVATIONS

4. Natural resource characteristics are inherently variable. Biological community composition and diversity can be affected by seasonal, annual or anthropogenic influences. In addition, soil conditions are reflective of subsurface geologic materials, the composition and distribution of which vary spatially.

5. The observations described in this report were made on the dates referenced and under the conditions stated therein. Conditions observed and reported by GZA reflect the conditions that could be reasonably observed based upon the visual observations of surface conditions and/or a limited observation of subsurface conditions at the specific time of observation. Such conditions are subject to environmental and circumstantial alteration and may not reflect conditions observable at another time.

6. The conclusions and recommendations contained in this report are based upon the data obtained from a limited number of surveys performed during the course of our work on the site, as described in the Report. There may be variations between these surveys and other past or future surveys due to inherent environmental and circumstantial variability.

RELIANCE ON INFORMATION FROM OTHERS

7. Preparation of this Report may have relied upon information made available by Federal, state and local authorities; and/or work products prepared by other professionals as specified in the report. Unless specifically stated, GZA did not attempt to independently verify the accuracy or completeness of that information.

COMPLIANCE WITH REGULATIONS AND CODES

8. GZA's services were performed to render an opinion on the presence and/or condition of natural resources as described in the Report. Standards used to identify or assess these resources as well as regulatory jurisdiction, if any, are stated in the Report. Standards for identification of jurisdictional resources and regulatory control over them may vary between

governmental agencies at Federal, state and local levels and are subject to change over time which may affect the conclusions and findings of this report.

NEW INFORMATION

9. In the event that the Client or others authorized to use this report obtain information on environmental regulatory compliance issues at the site not contained in this report, such information shall be brought to GZA's attention forthwith. GZA will evaluate such information and, on the basis of this work, may modify the conclusions stated in this report.

ADDITIONAL SERVICES

10. GZA recommends that we be retained to provide further investigation, if necessary, which would allow GZA to (1) observe compliance with the concepts and recommendations contained herein; (2) evaluate whether the manner of implementation creates a potential new finding; and (3) evaluate whether the manner of implementation affects or changes the conditions on which our opinions were made.



GZA GeoEnvironmental, Inc.

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DOCUMENT A00831

US ARMY CORPS OF ENGINEERS (USACE)

VERIFICATION AND GENERAL PERMIT No. 10

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DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
696 VIRGINIA ROAD
CONCORD MA 01742-2751

April 3, 2023

Regulatory Division
File Number: NAE-2022-02055

Christopher Podgurski
MassCoastal Railroad
12 Harding Street, Unit 202
Lakeville, MA 02347
Sent by email to consultant: Kimberly.Degutis@gza.com

Dear Christopher Podgurski:

The U.S. Army Corps of Engineers (USACE) has reviewed your application to replace the failing 24x30 inch stone box culvert at Cape Main MP 63.22 with a new 48-inch reinforced concrete pipe with precast concrete wingwalls, including temporary dewatering, pumped bypass, installation of riprap, and includes 207 square feet of salt marsh restoration, located 800 feet from the intersection of the railroad and Great Island Road in an unnamed tributary to Old Harbor Creek in Sandwich, Massachusetts. The project would include impacts to 285 square feet of tidal saltmarsh and 621 square feet of tidal waters waterward of the high tide line (HTL). The work is shown on the enclosed plans titled “Culvert Replacement Project at Cape Maine MP 63.22 Sandwich, MA” on sheets #2-9, and dated “June 2022”.

Based on the information that you have provided, we verify that the activity is authorized under General Permit # 10 Linear Transportation Projects and Stream Crossings of the enclosed April 16, 2018, federal permit known as the Massachusetts General Permits (GPs). The GPs are also available at https://www.nae.usace.army.mil/Missions/Regulatory/State-General-Permits/Massachusetts-General-Permit.

Please review the enclosed GPs carefully, in particular the general conditions beginning on page 19, and ensure that you and all personnel performing work authorized by the GPs are fully aware of and comply with its terms and conditions. A copy of the GPs and this verification letter shall be available at the work site as required by General Condition 32. You must perform this work in compliance with the following special condition:

> *You must maintain the activity authorized herein in good condition and in conformance with the terms and conditions of this authorization. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 37 on page 32 of the GPs. Should you wish to cease to maintain the*

authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this authorization from this office, which may require restoration of the area.

This authorization expires on April 5, 2023. You must commence or have under contract to commence the work authorized herein by April 5, 2023, and complete the work by April 5, 2024. If not, you must contact this office to determine the need for further authorization and we recommend you contact us *before* the work authorized herein expires. Please contact us immediately if you change the plans or construction methods for work within our jurisdiction as we must approve any changes before you undertake them. Performing work within our jurisdiction that is not specifically authorized by this determination or failing to comply with the special condition(s) provided above or all the terms and conditions of the GPs may subject you to the enforcement provisions of our regulations.

This authorization does not obviate the need to obtain other federal, state, or local authorizations required by law. Applicants are responsible for applying for and obtaining any other approvals.

Your project is located within, or may affect resources within, the coastal zone. The Massachusetts Office of Coastal Zone Management (CZM) has already determined that no further Federal Consistency Review is required.

We continually strive to improve our customer service. To better serve you, we would appreciate your completing our Customer Service Survey located at https://regulatory.ops.usace.army.mil/customer-service-survey.

Please contact [PM] of my staff at (443) 310-4567 or meghan.e.fullam@usace.army.mil if you have any questions.

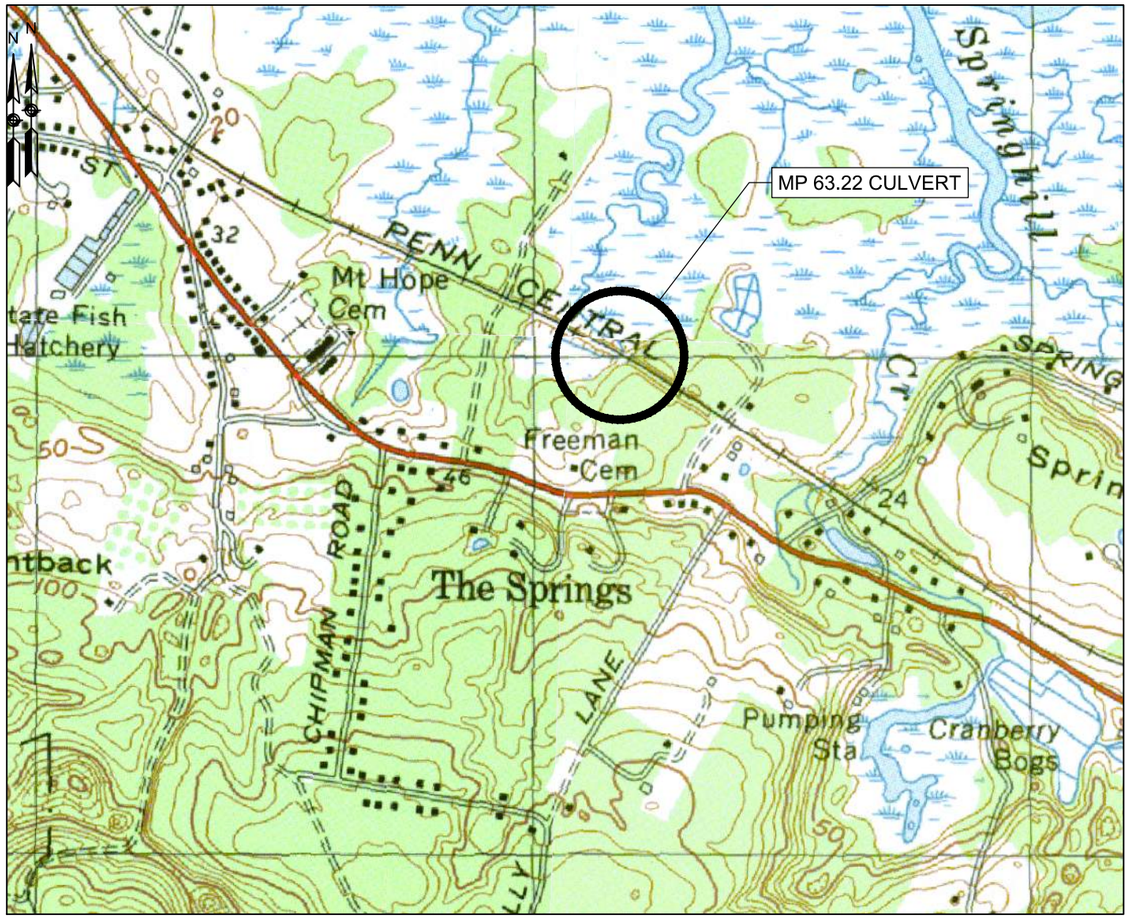
Sincerely,

Paul Maniccia

Paul M. Maniccia
Chief, Permits & Enforcement Branch
Regulatory Division

Enclosures
Final Approved Plans

cc:
Kimberly Degutis, Project Agent (GZA), Kimberly.Degutis@gza.com
Ed Reiner: U.S. EPA, Region 1, Boston, MA, reiner.ed@epa.gov
Rachel Croy: U.S. EPA, Region 1, Boston, MA, croy.rachel@epa.gov
Robert Boeri: Coastal Zone Management, Boston, MA, robert.boeri@mass.gov
Daniel Gilmore, Chief, DEP SERO, Wetlands and Waterways, Lakeville, MA;
daniel.gilmore@mass.gov (DEP File No. X289061)



CULVERT REPLACEMENT PROJECT AT CAPE MAIN MP 63.22 SANDWICH, MA

401 WATER QUALITY CERTIFICATE PERMITTING PLANS

MASSCOASTAL RAILROAD JUNE 2022

PERMIT PLANS - NOT FOR CONSTRUCTION

Jacobs

MASS COASTAL RAILROAD

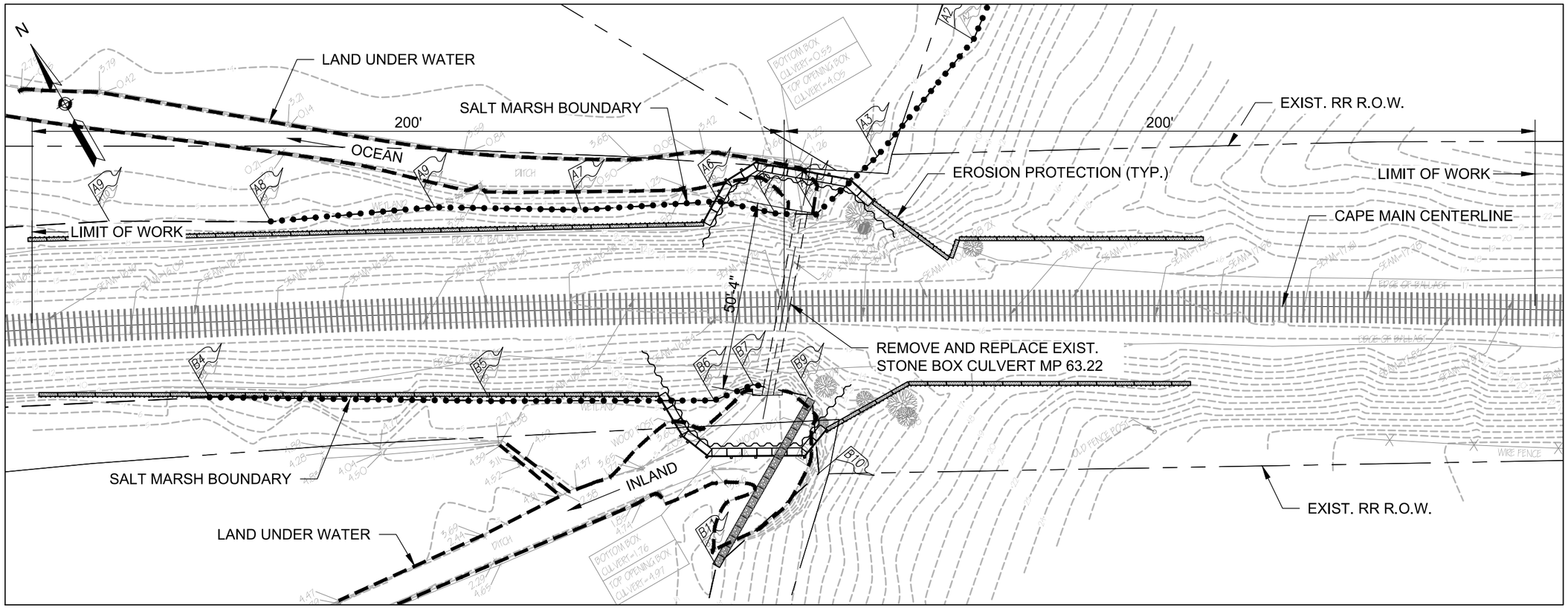
DRAWN BY: CWB
CHECKED BY: EP
APPROVED BY: BEM
DATE: June 1, 2022

CAPE MAIN
SANDWICH, MASSACHUSETTS

COVER SHEET

SHEET
1 OF 9

P:\MASSDOT\2021\E2X88271 – MassDOT Rail MSA Contract\Cape Main MP 63.22 Replacement\700 CADD\DEP and ACOE\MP 63.22 Culvert DEP.dwg
June 1, 2022







PERMIT PLANS - NOT FOR CONSTRUCTION

Jacobs

MASS COASTAL RAILROAD

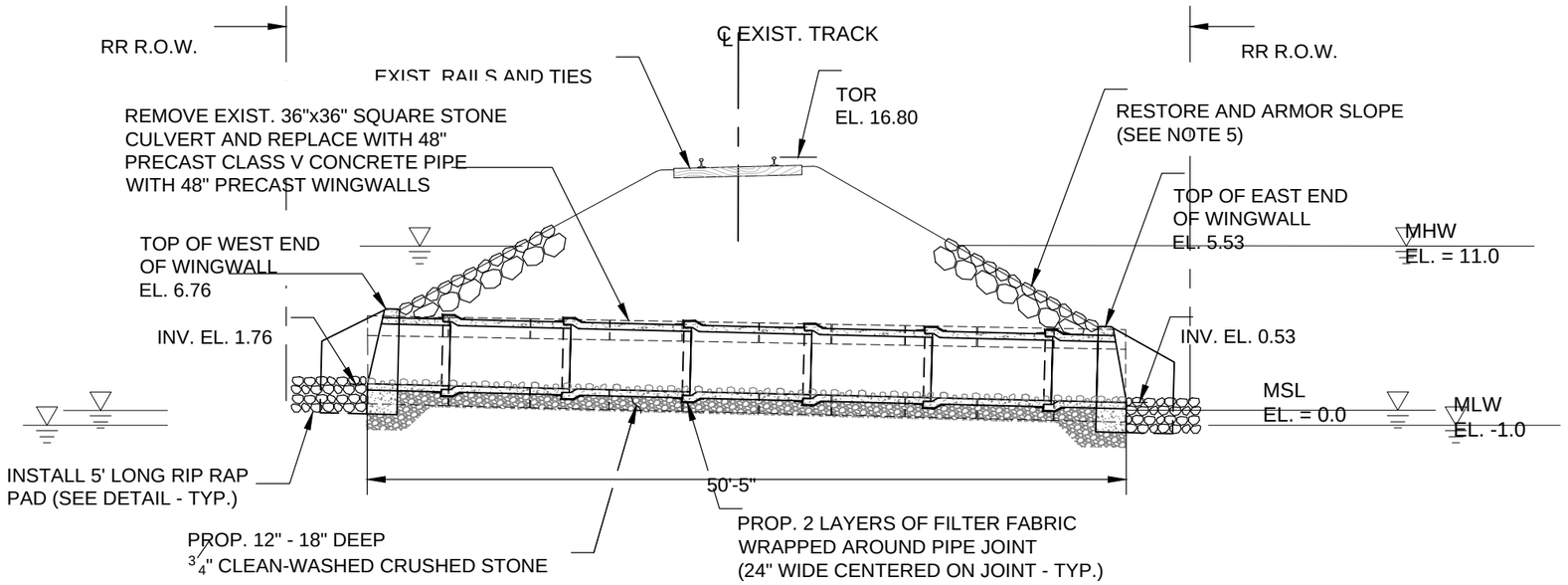
DRAWN BY: CWB
CHECKED BY: EP
APPROVED BY: BEM
DATE: June 1, 2022

CAPE MAIN
SANDWICH, MASSACHUSETTS

EXISITING CONDITIONS

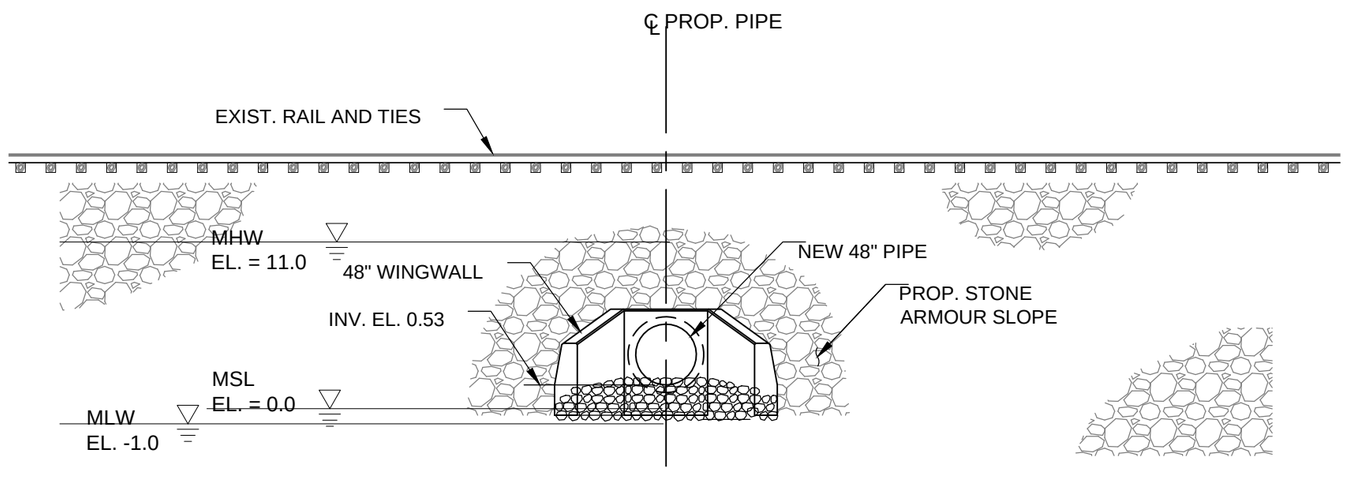
SHEET
2 OF 9

P:\MASSDOT\2021\E2X88271 – MassDOT Rail MSA Contract\Cape Main MP 63.22 Replacement\700 CADD\DEP and ACOE\MP 63.22 Culvert DEP.dwg
June 1, 2022



PROPOSED LONGITUDINAL SECTION

NOT TO SCALE



INLET ELEVATION

NOT TO SCALE

NOTES:

1. ALL CULVERT AND WINGWALL INSTALLATION WORK SHALL BE PERFORMED IN THE DRY WITH TEMPORARY COFFERDAMS, DEWATERING PUMPING, AND ALL EROSION CONTROL MEASURES IN PLACE AND MAINTAINED FOR THE DURATION OF THE WORK.
2. CONTRACTOR SHALL MINIMIZE ENCROACHMENT INTO THE ADJACENT WATER AND NATURAL VEGETATION TO THE GREATEST EXTENT POSSIBLE TO LIMIT SOIL AND WATER DISTURBANCE.
3. CONTRACTOR SHALL REMOVE AND TEMPORARILY STOCKPILE EMBANKMENT SLOPE SOILS AND SURFACE BALLAST TO BE RESET TO MATCH EXISTING CONDITION FOLLOWING CULVERT INSTALLATION WORK AT THE DIRECTION OF THE ENGINEER ONLY.
4. ANY ADDITIONAL PROCESSED GRAVEL, CRUSHED STONE, AND STONE BALLAST DETERMINED TO BE NEEDED BY THE CONTRACTOR SHALL BE APPROVED BY MASSDOT'S ENGINEER PRIOR TO ORDERING FOR DELIVERY TO THE SITE.
5. CONTRACTOR SHALL PLACE AND EMBED STONE ARMOR RIP RAP ON BOTH SIDES OF THE CULVERT TO LIMITS SHOWN. STONES SHALL BE CHINKED IN TO ELIMINATE ANY DISLODGING OR SLIP-FAILING OF THE RECONSTRUCTED SLOPE.
6. PLACE 7" OF RECLAIMED MUD AND STONE MATERIAL INSIDE NEW PIPE SO THAT FLOW VOLUME IS EQUAL TO THAT OF EXISTING 30" STONE BOX.
7. ALL EMBANKMENT FILL SHALL BE PLACED IN HORIZONTAL LAYERS NOT TO EXCEED TWELVE (12) INCHES IN LAYERED DEPTH FOLLOWING COMPACTION. SUBSEQUENT LAYERS SHALL ONLY THEN PLACED AND COMPACTED AFTER THE PREVIOUS LOWER FILL LAYER IS FULLY COMPACTED IN PLACE.

PERMIT PLANS - NOT FOR CONSTRUCTION

Jacobs

MASS COASTAL RAILROAD

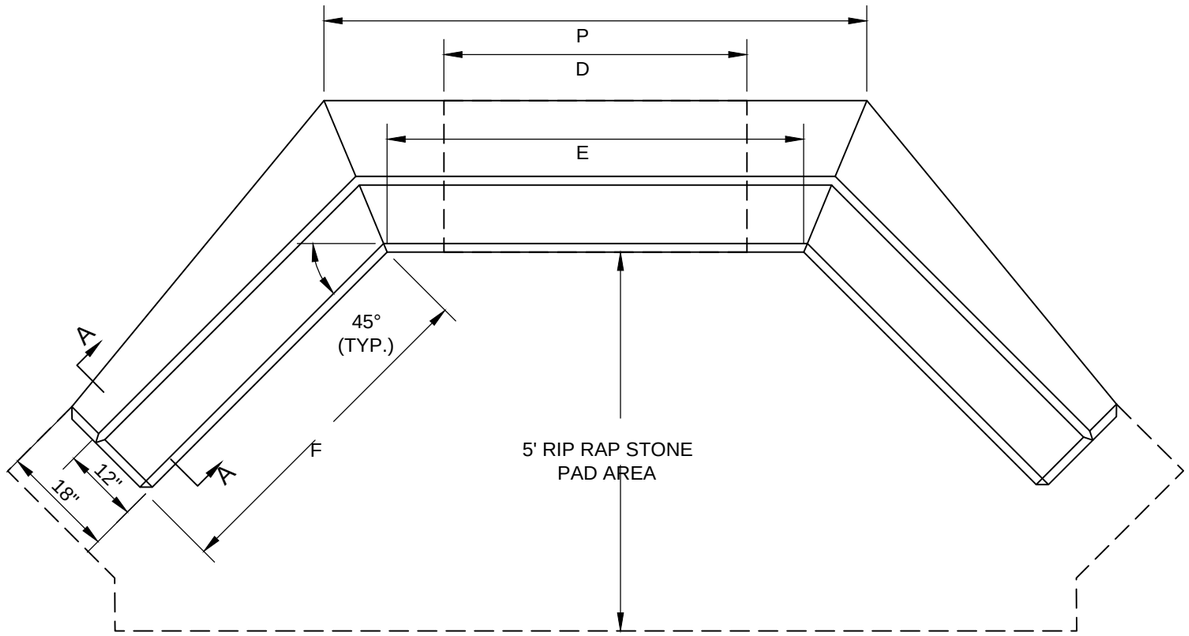
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CAPE MAIN
SANDWICH, MASSACHUSETTS

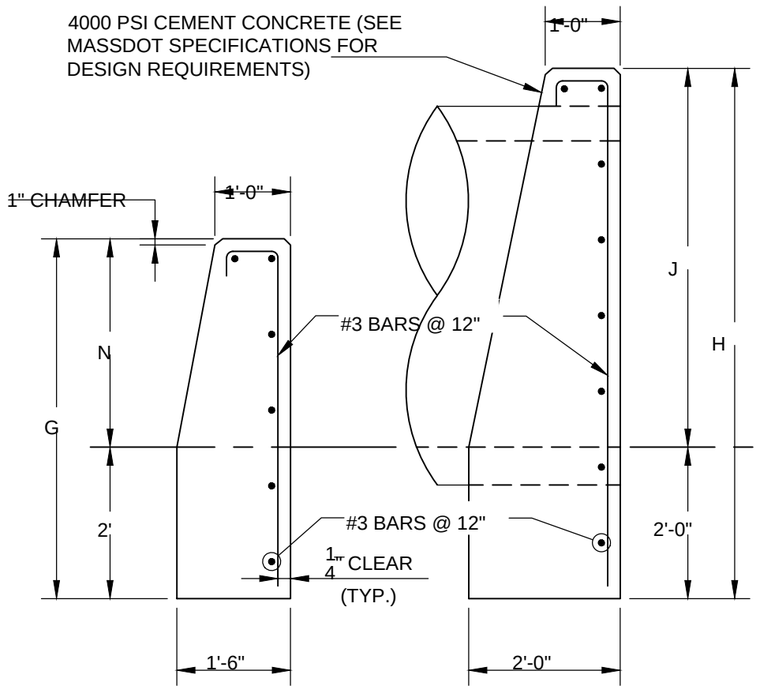
PROPOSED PRECAST PIPE CULVERT REPLACEMENT

SHEET 3 OF 9

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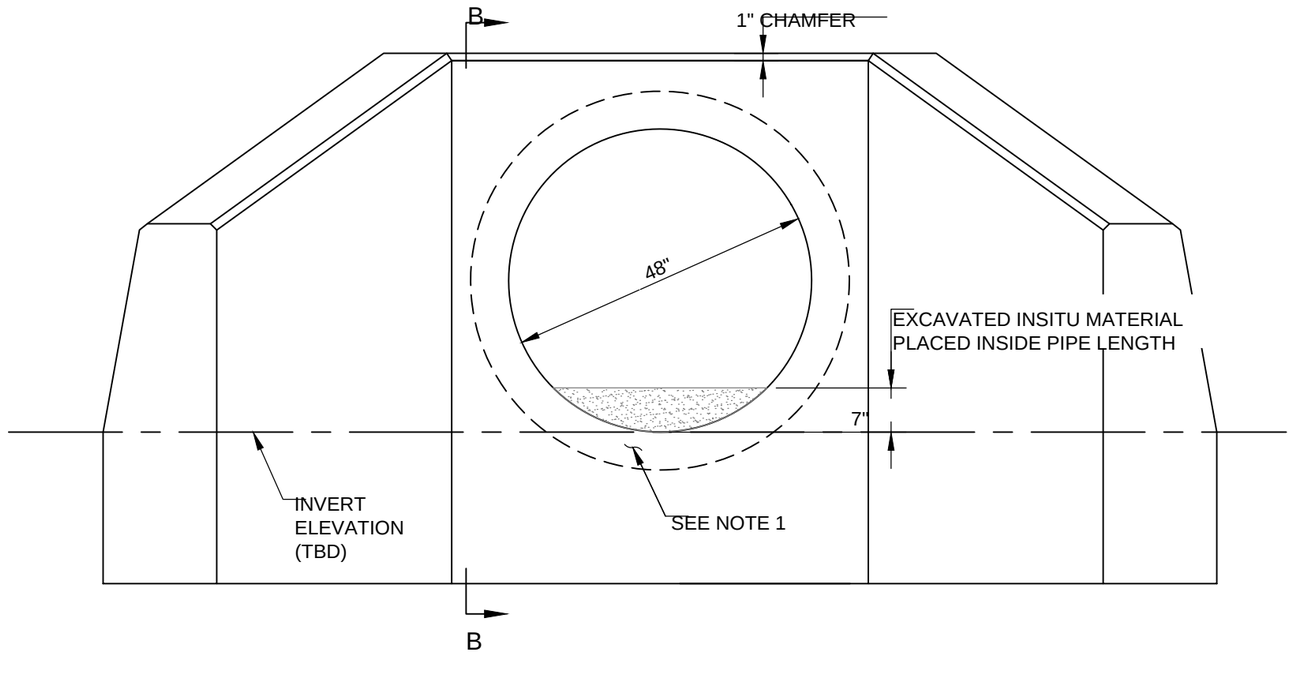


PLAN



ELEVATION A-A

ELEVATION B-B



FRONT ELEVATION

PERMIT PLANS - NOT FOR CONSTRUCTION

NOTE:

1. CONTRACTOR SHALL INSTALL REPLACEMENT, PRECAST WINGWALL AND SEAL CONCRETE CULVERT END WITH WATERTIGHT GROUT SEALANT PRIOR TO REMOVAL OF COFFERDAM.

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MASS COASTAL RAILROAD

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PROPOSED REPLACEMENT
WINGWALL DETAILS

SHEET
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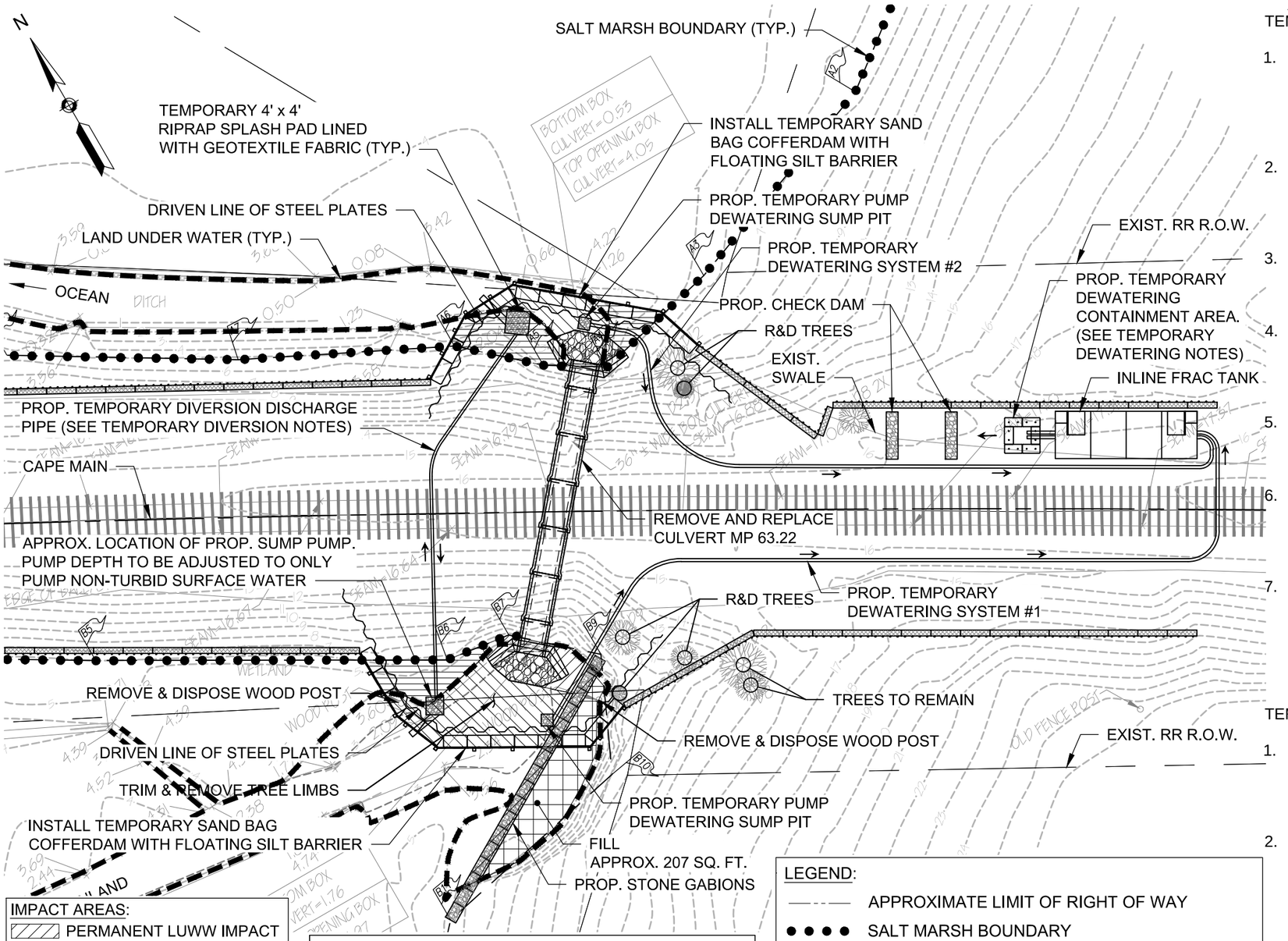
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Jacobs	MASS COASTAL RAILROAD	DRAWN BY: CWB CHECKED BY: EP APPROVED BY: BEM DATE: June 1, 2022	CAPE MAIN SANDWICH, MASSACHUSETTS	SITE ACCESS AND STAGING AREA	SHEET 5 OF 9

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PROPOSED IMPACTS

RESOURCE AREA	IMPACT TYPE	SQUARE FEET	ACRES
LAND UNDER WATER BODIES AND WATERWAYS (LUWW)	TEMPORARY	387	0.0090
	PERMANENT	234	0.0050
SALT MARSH	TEMPORARY	268	0.0060
	PERMANENT	17	0.0004

PLAN
SCALE: 1" = 20'-0"

TEMPORARY DIVERSION NOTES:

1. THE CONTRACTOR SHALL DESIGN AND SUBMIT FOR APPROVAL A TEMPORARY PUMP DIVERSION SYSTEM TO DIVERT WATER FLOW AROUND CULVERT CONSTRUCTION AREA, INCLUDING REQUIRED SIZE/LOCATION OF DIVERSION PUMP, DISCHARGE PIPE SIZE, AS WELL AS CONTINGENCY PLANS IN THE EVENT OF PUMP FAILURE.
2. WATER LEVELS ARE SUBJECT TO CHANGE, THE CONTRACTOR IS RESPONSIBLE FOR MAKING DETERMINATION OF WATER LEVELS THAT WILL EXIST DURING CONSTRUCTION AND INSTALL AND REFORTIFY COFFER DAMS AS APPLICABLE.
3. UPON INSTALLATION OF ALL SEDIMENT CONTROL MEASURES THE CONTRACTOR SHALL BEGIN IMPLEMENTING THE DIVERSION AND DEWATERING PLAN FOLLOWING INSPECTION.
4. THE CONTRACTOR SHALL INSTALL THE TEMPORARY DISCHARGE PIPES, SUMP-HOLE, DIVERSION PUMPS AND RIP-RAP DISCHARGE SPLASH PAD PRIOR TO PLACING PIPE PLUGS, DRIVEN STEEL PLATES AND SAND BAG COFFERDAMS.
5. THE TEMPORARY DISCHARGE PIPE SHALL BE CONSTRUCTED OF DURABLE MATERIAL ABLE TO WITHSTAND ANTICIPATED SITE CONDITIONS.
6. WATER FROM THE WORK AREA SHALL BE PUMPED TO A DEWATERING CONTAINMENT AREA THE AREA SHALL BE LOCATED SUCH THAT THE WATER DRAINS BACK INTO THE MARSHLAND BELOW THE DOWNGRADIENT COFFERDAM.
7. AFTER THE CULVERT HAS BEEN REPLACED AND READY TO RECEIVE FLOW AND THE DISTURBED AREA HAS BEEN STABILIZED, THE DRIVEN STEEL SHEETS SHALL BE PULLED OUT AND "COFFERDAMS" SHALL BE REMOVED STARTING ON THE NORTHERN END. THEN THE TEMPORARY DIVERSION SHALL BE REMOVED.

TEMPORARY DEWATERING NOTES:

1. THE PROP. TEMPORARY DEWATERING CONTAINMENT AREA. SIZE AND LOCATION OUTSIDE THE WETLAND AREA TO BE DETERMINED BY THE CONTRACTOR AND PRE-APPROVED BY THE ENGINEER'S DRAINAGE ENGINEER AND WETLAND SCIENTIST.
2. CONTRACTOR SHALL EXCAVATE BACK THIS EMBANKMENT AREA AS REQUIRED TO INSTALL DEWATERING CONTAINMENT AREA AND RESTORE SLOPE UPON ITS REMOVAL.

PERMIT PLANS - NOT FOR CONSTRUCTION

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MASS COASTAL RAILROAD

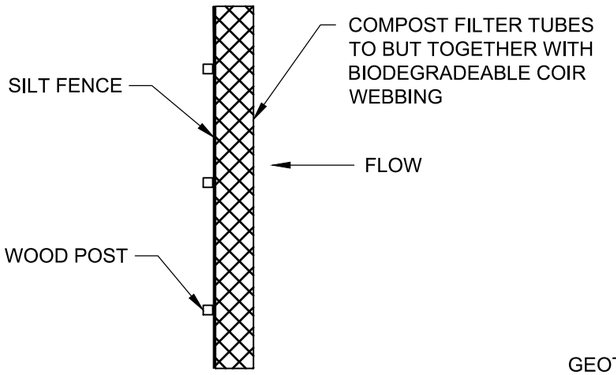
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CAPE MAIN
SANDWICH, MASSACHUSETTS

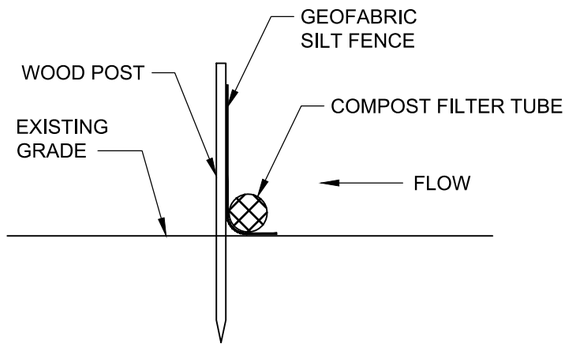
EROSION PROTECTION PLAN

SHEET
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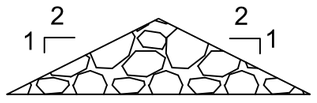


PLAN

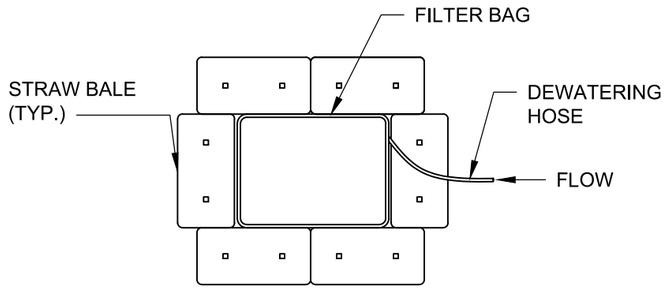


SECTION

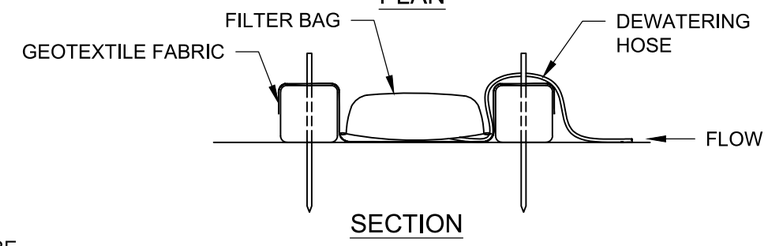
SILT FENCE / COMPOST FILTER TUBE EROSION CONTROL BARRIER



STONE CHECK DAM DETAIL

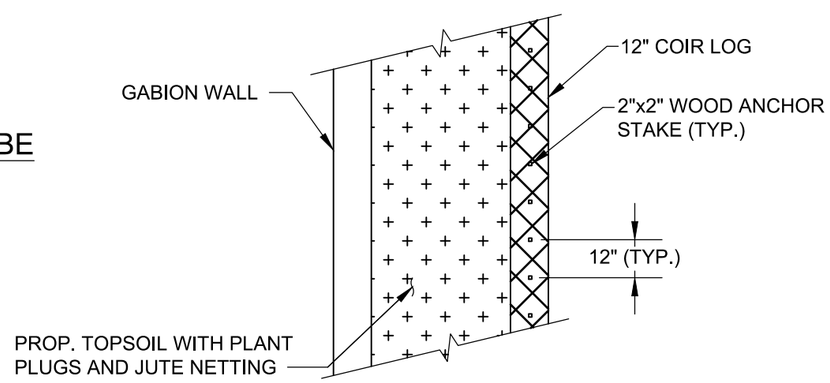


PLAN

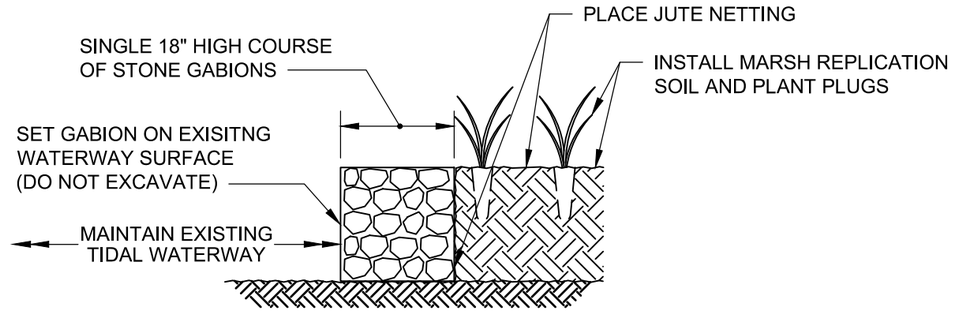


SECTION

DEWATERING CONTAINMENT AREA DETAIL



WETLAND MITIGATION DETAIL



GABION INSTALLATION SECTION DETAIL

GABION INSTALLITION NOTES

1. INSTALLATION OF THIS GABION WALL DURING LOW TIDE ONLY SHALL BE SET UPON EXISTING WATERWAY BOTTOM SURFACE GROUND ALONG THE LOCATION SHOWN IN PLAN VIEW WITH NO PERMITTED EXCAVATION, NOR PLACEMENT OF A SUPPORTING STONE LAYER NOR OTHER IMPACTS INFLICTED TO THE EXISTING WATERWAY.
2. THE TOP ELEVATION OF THIS SINGLE COURSE GABION WALL RUN SHALL BE SET NEARLY EQUIVALENT TO THAT OF THE ADJACENT TOP OF MARSHLAND SURFACE GRADE.
3. A CONTINUOUS BIODEGRADABLE JUTE MESH FOLDED OVER ALONG THE BACKSIDE OF THE GABION CAGES AND LAPPED ATOP OF THE INFILLED MARSHLAND REPLICATION PLANTINGS AREA SHALL CONTAIN THE INFILLED SOIL MATERIAL AS SHOWN IN DETAIL ABOVE AND IN ACCORDANCE WITH APPROVAL BY THE ENGINEER.

PERMIT PLANS - NOT FOR CONSTRUCTION

Jacobs

MASS COASTAL RAILROAD

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EROSION PROTECTION & GABION INSTALLATION DETAILS

SHEET 7 OF 9

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EROSION CONTROL NOTES:

1. PRIOR TO BEGINNING CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT FOR ACCEPTANCE A GENERAL WORK SCHEDULE, CONSTRUCTION SEQUENCE AND PLAN WHICH INDICATES PLANNED IMPLEMENTATION OF TEMPORARY AND PERMANENT EROSION CONTROL MEASURES. THIS PLAN SHALL INCLUDE PROPOSED METHODS OF SOILS MANAGEMENT AND LEGAL OFFSITE DISPOSAL OF WASTE MATERIALS.

2. FOR EROSION CONTROL INSTALLATION REQUIREMENTS, REFER TO SHEET 6.

3. THE TOE OF ANY SLOPE IS TO REMAIN AT LEAST ONE FOOT INSIDE OF ALL EROSION CONTROLS. UNDER NO CIRCUMSTANCE SHALL THE CONTRACTOR COVER ANY PORTION OF THE EROSION CONTROLS WITH MATERIAL. ANY MATERIAL THAT IS PLACED ON ANY EROSION CONTROLS BY THE CONTRACTOR, OR ANY AGENT OF THE CONTRACTOR, SHALL BE IMMEDIATELY REMOVED BY THE CONTRACTOR, AND ANY NECESSARY REPAIRS TO THE EROSION CONTROLS ACCOMPLISHED, AT NO COST TO THE OWNER.

4. ADDITIONAL AND/OR REPLACEMENT EROSION CONTROLS SHALL BE INSTALLED AS CONDITIONS WARRANT, OR AS DIRECTED BY THE ENGINEER'S WETLAND SCIENTIST.

5. DURING CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EROSION CONTROL MAINTENANCE AND SHALL INSPECT AND/OR REPLACE ALL CONTROLS AS NEEDED. MAINTENANCE WILL BE CARRIED OUT IN ACCORDANCE WITH THE SPECIFICATIONS AND PERMIT CONDITIONS. THE CONTRACTOR IS RESPONSIBLE FOR CARRYING OUT NECESSARY MAINTENANCE DURING ALL PHASES OF PROJECT CONSTRUCTION AND SHALL BE SUBJECT TO THE INSPECTION AND ACCEPTANCE OF THE ENGINEER.

6. DURING CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING RUNOFF FLOW DURING STORMS AND PERIODS OF RAINFALL, THROUGHOUT THE WORK AREA.

7. SEDIMENTATION CONTROL DEVICES SHALL BE INSPECTED CLOSELY AND MAINTAINED PROMPTLY AS DESCRIBED IN THE SPECIFICATIONS OR AS DIRECTED BY THE ENGINEER'S WETLAND SCIENTIST.

8. DISTURBED SLOPES ALONG THE ROW EMBANKMENT WITHIN THE WORK ZONE WILL BE STABILIZED WITH LOAM AND SEED OR BALLAST AS DIRECTED BY THE ENGINEER.

SALT MARSH REPLICATION NOTES:

1. THE SALT MARSH REPLICATION SITE WILL BE CLEARED AND THE SUBGRADE ELEVATION BROUGHT TO AN EVEN LEVEL. THE SUPERVISING WETLAND SCIENTIST WILL INSPECT THE SUB-GRADE OF THE SALT MARSH REPLICATION SITE TO ENSURE THAT THE AREA IS AT A UNIFORM GRADE.

2. COIR LOGS WILL BE INSTALLED AND STACKED ON THE UPSLOPE SIDE OF THE ROCK GABION WALL UNTIL ADJACENT SALT MARSH ELEVATIONS ARE ACHIEVED.

SALT MARSH REPLICATION NOTES (CONT.):

3. MANUFACTURED HYDRIC SOIL SHALL BE PLACED WITHIN THE SALT MARSH REPLICATION SITE AFTER GRADING THE SUBGRADE HAS BEEN APPROVED. SOILS USED FOR SALT MARSH REPLICATION WILL BE CREATED WITH SOIL AMENDMENTS. MANUFACTURED HYDRIC SOILS ARE CREATED FROM A MIXTURE OF ORGANIC AND MINERAL MATERIALS, WITH THE FINAL PRODUCT CONTAINING AT LEAST 12 PERCENT ORGANIC MATTER CONTENT BY WEIGHT. THE CONTRACTOR MUST PROVIDE AN ANALYSIS OF THE PREPARED TOPSOIL TO THE WETLAND SCIENTIST FOR APPROVAL PRIOR TO INSTALLATION. SOIL MUST BE FREE OF SEEDS OR RHIZOMES OF INVASIVE PLANT SPECIES.

4. NO SOIL USED FOR THE CREATION OF SALT MARSH WILL BE TAKEN FROM ANY AREA SUPPORTING INVASIVE SPECIES, THE PROJECT WILL NOT TRANSLOCATE OR REUSE POTENTIALLY CONTAMINATED SALT MARSH OR WETLAND SOILS FROM AREAS ADJACENT TO THE EXISTING RAILROAD. MANUFACTURED WETLAND SOIL WILL BE GRADED TO ACHIEVE A TOPOGRAPHY TO MATCH THE EXISTING ADJACENT SALT MARSH, OR TO ACHIEVE TOPOGRAPHY OF THE TARGET SALT MARSH COVER TYPE. CONTRACTOR IS RESPONSIBLE FOR PROVIDING SPOT GRADES TO CONFIRM THE FINAL ELEVATION OF THE SALT MARSH REPLICATION AREA.

5. THE SUPERVISING WETLAND SCIENTIST WILL INSPECT THE FILLED SALT MARSH REPLICATION AREA TO ENSURE THAT FINAL ELEVATIONS HAVE BEEN MET. IN RESPONSE TO LOCAL HYDROLOGIC CONDITIONS, THE SUPERVISING WETLAND SCIENTIST MAY MAKE MINOR MODIFICATIONS TO THE FINAL ELEVATIONS IN THE FIELD.

6. THE SALT MARSH REPLICATION SITE WILL BE COVERED WITH A 100% BIODEGRADABLE EROSION CONTROL BLANKET AND SECURED IN PLACE USING 100% BIODEGRADABLE STAKES OR OTHER FASTENERS.

7. THE EROSION CONTROL BARRIERS WILL BE DISASSEMBLED AND PROPERLY DISPOSED OF BEFORE NOVEMBER 1 OF THE THIRD FULL GROWING SEASON AFTER PLANTING OF THE SALT MARSH REPLICATION SITE. SEDIMENT COLLECTED BY THE BARRIERS WILL BE REMOVED AND DISPOSED OF IN A MANNER THAT PREVENTS EROSION AND TRANSPORT TO A WETLAND OR WATERWAY. IF MINOR GRADING IS REQUIRED IN THE IMMEDIATE ZONE AROUND THE EROSION CONTROL BARRIER TO PROVIDE SURFACE HYDROLOGIC CONNECTION BETWEEN THE SALT MARSH REPLICATION SITE AND THE EXISTING SALT MARSH AREA, IT WILL BE DONE BY HAND AND STABILIZED BY MULCH.

8. CONTRACTOR SHALL SUBMIT AN AS-BUILT GRADING PLAN PRIOR TO PLANTINGS.

9. CONTRACTOR SHALL NOT FOUL EXISTING FREIGHT AND SIDING TRACKS, THE CONTRACTOR IS RESPONSIBLE FOR TEMPORARY CROSSING MEANS AND METHODS AND PROTECTING THE TRACK AT ALL TIMES.

PLANTING NOTES:

1. PLANTING WITHIN THE SALT MARSH REPLICATION SITE WILL CONFORM TO THE PLANS OR WILL BE COMPLETED IN ACCORDANCE WITH DIRECTIONS PROVIDED IN THE FIELD. ONLY PLANT MATERIALS NATIVE AND INDIGENOUS TO THE REGION WILL BE USED. USE OF CULTIVARS WILL BE PROHIBITED. SPECIES NOT SPECIFIED IN THE FINAL PLANTING PLAN WILL NOT BE USED WITHOUT WRITTEN APPROVAL FROM THE PERMITTING AGENCY.

2. ALL PLUGS WILL BE SPACED APPROXIMATELY 6-INCHES ON-CENTER, AT THE DIRECTION OF THE SUPERVISING WETLAND SCIENTIST TO SIMULATE NATURAL GROWTH PATTERNS.

3. TRANSPLANTS AND PLANT MATERIAL COLLECTED FROM THE WILD ARE PROHIBITED UNLESS APPROVED IN WRITING BY THE WETLAND SCIENTIST. ALL PLANT MATERIAL USED SHALL BE NURSERY-GROWN AND HEALTHY, SOUND AND FREE OF DISEASE, INSECT PESTS, EGGS OR LARVAE, DISCOLORATIONS, LEAF WILTING OR CURLING AND WEEDS.

4. CONTAINER GROWN STOCK SHALL HAVE BEEN GROWN IN A CONTAINER LONG ENOUGH FOR THE ROOT SYSTEM TO HAVE DEVELOPED SUFFICIENTLY TO HOLD ITS SOIL AFTER REMOVAL FROM THE CONTAINER. ROOTS SHALL VISIBLY EXTEND TO THE INSIDE FACE OF THE GROWING CONTAINER BUT SHALL NOT BE ROOT-BOUND OR GIRDLING.

5. ALL PLANTS SHALL BE DELIVERED TO THE SITE AS LIVE, ACTIVELY GROWING, OR JUST BREAKING DORMANCY, AND ARRIVE TO THE PROJECT SITE READY FOR PLANTING. THE WETLAND SCIENTIST MAY REJECT PLANTS DAMAGED IN HANDLING OR TRANSPORT. PLANT MATERIAL SHALL BE INSTALLED AS SOON AS POSSIBLE AFTER IT HAS BEEN DELIVERED TO THE SITE.

6. SOIL AND ROOTMASS SHALL BE WATERED AND MOIST ON DELIVERY TO THE JOB SITE. PLANTS WITH DRY SOIL AND ROOTS SHALL NOT BE ACCEPTABLE. ALL PLANT MATERIALS TEMPORARILY STORED AT THE SITE PRIOR TO PLANTING SHALL BE STORED OUT OF DIRECT EXPOSURE TO SUN AND WIND, SHALL BE MAINTAINED BY CAREFUL WATERING, AND SHALL BE PROTECTED FROM DAMAGE DUE TO CONSTRUCTION ACTIVITIES AND ADVERSE WEATHER.

7. PLANTING TO OCCUR BETWEEN MAY 1 AND SEPTEMBER 15. ALL PLANT MATERIALS SHALL BE GUARANTEED FOR ONE YEAR FOLLOWING DATE OF FINAL ACCEPTANCE.

PERMIT PLANS - NOT FOR CONSTRUCTION

Jacobs

MASS COASTAL RAILROAD

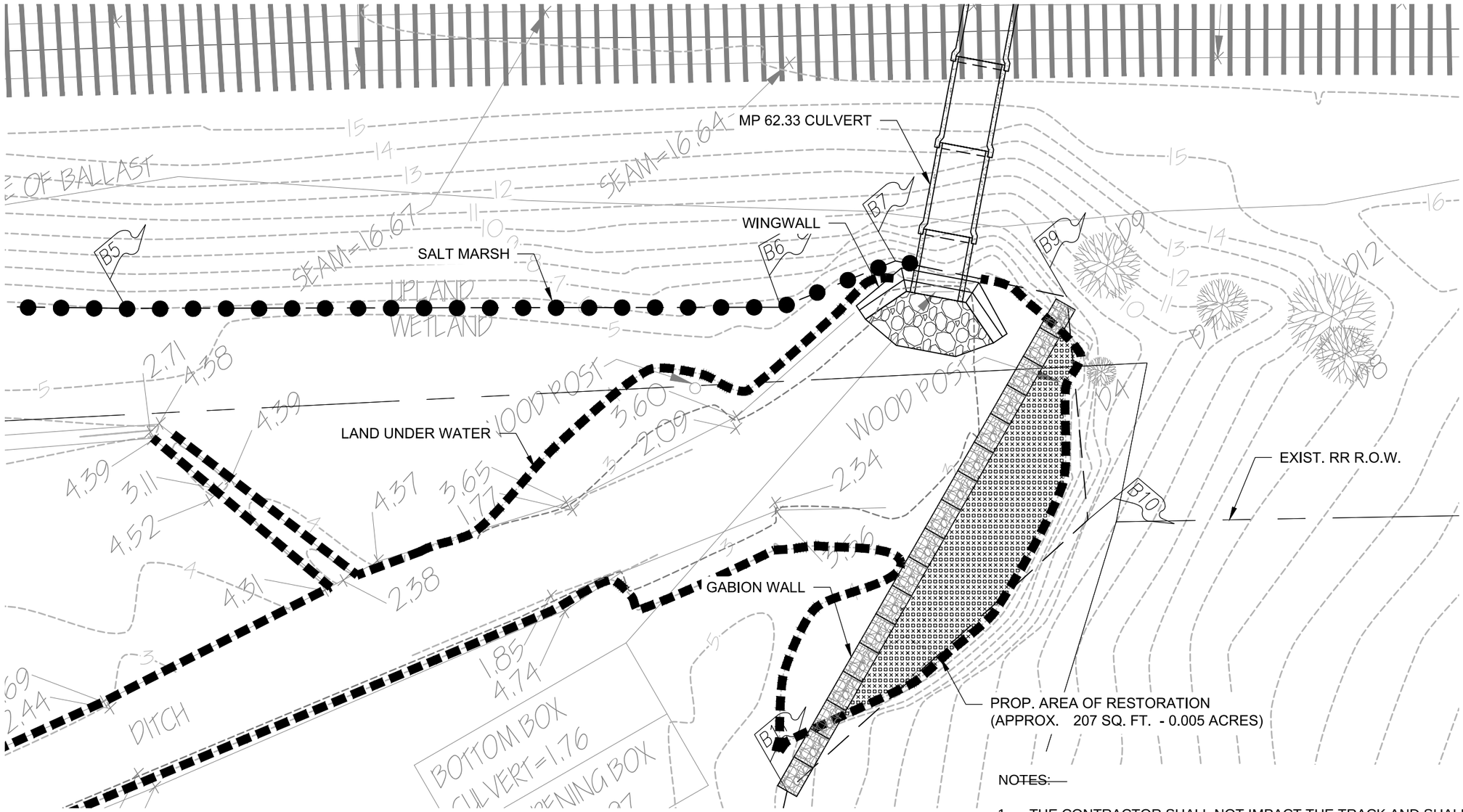
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EROSION CONTROL, SALT MARSH MITIGATION AND PLANTING NOTES

SHEET
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PLANTING SCHEDULE

PLANTING AREA	COMMON NAME	SCIENTIFIC NAME	SYMBOL	SIZE	QTY	ON CENTER SPACING
SALT MARSH REPLICATION AREA	SALT MEADOW CORDGRASS	SPARTINA PATENS	×	2" PLUG	420	6-IN
	SALTGRASS	DISTICHLIS SPICATA	□	2" PLUG	420	6-IN

0 10 20

SCALE IN FEET

NOTES:

1. THE CONTRACTOR SHALL NOT IMPACT THE TRACK AND SHALL GUARD AGAINST INTRODUCING ANY GROUND SLOPE DISTURBANCE TO THE BALLAST ON THE NEW EMBANKMENT AND THE SURROUNDING GREEN AREAS WHEN MOBILIZING TO PERFORM THIS RESTORATION WORK AS SHOWN.
2. THE CONTACTOR SHALL REMOVE ALL LITTER, TOOLS AND SURPLUS MATERIALS AS PART OF THE COMPLETION OF THE WORK UPON FINAL SITE INSPECTION AND ACCEPTANCE.

PERMIT PLANS - NOT FOR CONSTRUCTION

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SALT MARSH RESTORATION PLAN

SHEET 9 OF 9

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DOCUMENT A00832

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION (MASSDEP) SECTION 401 WATER QUALITY CERTIFICATION (WQC)

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Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

One Winter Street Boston, MA 02108 • 617-292-5500

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Bethany A. Card
Secretary

Martin Suuberg
Commissioner

NOV 0 2 2022

Massachusetts Coastal Railroad
ATTN: Christopher Podgurski
12 Harding Street, Unit 202
Lakeville, MA 02347

RE: **401 WATER QUALITY CERTIFICATION**
Application for: BRP WW 10
MAJOR FILL AND EXCAVATION PROJECTS

AT: Cape Main Railroad Line MP 63.22
Culvert Replacement
SANDWICH

Transmittal No: X289061

Dear Mr. Podgurski:

The Department of Environmental Protection ("MassDEP") has reviewed your application for a Water Quality Certification, as referenced above. In accordance with the provisions of MGL Ch. 21, §§26-53, Section 401 of the Federal Clean Water Act as amended (33 U.S.C. §1251 et seq.), and 314 CM 9.00, it has been determined there is reasonable assurance the proposed project will be conducted in a manner which will not violate applicable water quality standards at 314 CMR 4.00.

The property is owned by the MassDOT Rail and Transit Division. The culvert replacement qualifies as Footprint Bridge Exempt under Section 24 of the Transportation Bond Bill of 2014. Section 24 of the 2014 Transportation Bond Bill (Chapter 79 Acts) exempts bridge projects of the Massachusetts Department of Transportation from the requirements of MGL Chapter 30, sections 61 - 62A (MEPA), MGL Chapter 91 (Public Waterfront Act), and MGL 131, section 40 (WPA) if the design is substantially the functional equivalent of, and in similar alignment to, the structure to be reconstructed or replaced. As stated in the regulation, a "bridge" shall include any structure spanning and providing passage over water, railroad right-of-way, public or private way, other vehicle facility or other area. As a culvert meets the definition of a bridge, the exemption is applicable and eliminates the need for review under the Massachusetts Environmental Policy Act, Wetlands Protection Act, and Public Waterfront Act (Chapter 91).

The project includes the replacement of a partially failed 24 x 30-inch stone box culvert within a railroad embankment with a 48-inch reinforced concrete pipe with precast concrete wingwalls and riprap velocity dissipation pads. The culvert is approximately 50' long. The work has been demonstrated to be necessary to avoid a track failure and to restore hydraulic capacity to the culvert.

The culvert is located approximately 800 feet west of Great Island Road and connects an unnamed tributary to Old Harbor Creek. The railroad embankment where the culvert is located bisects a salt marsh system. The top of the embankment is approximately 14 feet higher in elevation than the salt marsh. Flow within the tributary and culvert is tidally influenced. On the south side of the culvert, landward of rail bed, the salt marsh transitions to Bordering Vegetated Wetland. On the south side it is anticipated that impacts will be limited to Land Under Water only. On the south side a total of up to 500 square feet of Land Under Water is to be impacted, of which 200 square feet will be permanent. The permanent impacts are mostly attributable to the wingwalls, velocity dissipation pad, and armor stone necessary to support a salt marsh restoration effort. On the north side of the culvert a total of 285 square feet of Salt Marsh will be impacted, of which 17 square feet will be permanent. Additionally, a total of 121 square feet of Land Under Water will be impacted on the north side, of which 34 square feet will be permanent. The impacts to Salt Marsh and Land Under Water on the north side of the culvert are mostly attributable to the wingwalls and velocity dissipation pad. Temporary impacts on both the north and south sides of the culvert are attributed to the installation of dewatering/diversion structures, access necessary for construction activities, and the removal of the existing culvert.

Before construction activities begin, erosion controls will be installed around the work area and will define the limits of work. Access to the work area will be from the existing railroad easement only. A temporary water bypass system will be necessary to move sediment free clean water around the work area from south to north during construction. This pumping system will be initiated before flow is stopped to the culvert. A driven line of sheet piles and sandbags on either side of the culvert will then be used to stop flow through the culvert and define the limits of excavation. Water within the excavation will be pumped to a treatment system located east of excavation in an upland area. Treated water from the dewatering system will then gravity flow through at least two (2) check dams before discharging immediately north of the work area within the existing stream channel. After the culvert has been replaced and the construction zone has been stabilized, the driven sheet piles will be removed starting on the northern end to restore flow. Following removal of the sheet piles the temporary water bypass will be deactivated and removed. It is proposed that the excavation, removal, and installation of the new culvert will be completed within a five (5) day construction period.

Mitigation for the impacts to Salt Marsh will be created on the south side of the culvert outlet in an area of existing scour and is anticipated to be approximately 207 square feet in size. Planting will include the installation of spartina patens and distichlis spicata plugs.

The project site is not located in an Area of Critical Environmental Concern (ACEC), Outstanding Resource Water (ORW), Priority Habitat of Rare Species and Estimated Habitat of Rare Wildlife, and there are no mapped certified or potential vernal pools. Additionally, the Division of Marine Fisheries (DMF) did not identify any Time of Year (TOY) restrictions for the work.

Alternatives were evaluated to minimize impacts. The alternatives included a no build alternative, rehabilitation of the existing stone box culvert, and the full culvert replacement. The no build alternative was quickly dismissed as the structure is in poor condition and is likely to fail causing a serious threat to public health, safety, and the environment. The rehabilitation alternative, which would include injecting grout and stabilizing the structure with bracing bars was also dismissed as it would only provide a short-term repair.

Public notice was provided in the Environmental Monitor on September 23, 2022, and in the Sandwich Enterprise on September 30, 2022. The Department did not receive any public comments during the 21-day public comment periods which ended on October 14, 2022, and October 21, 2022, respectively.

Based on a review of information provided by the applicant, MassDEP finds that this project complies with the standards described under 314 CMR 9.06.

Therefore, based on information currently in the record, the Department grants a 401 Water Quality Certification for this project subject to the following conditions to maintain water quality, to minimize impact on waters and wetlands, and to ensure compliance with appropriate state law.

1. All work shall conform to the plans entitled:

    - Culvert Replacement Project at Cape Main MP 63.22 Sandwich, MA, 401 Water Quality Certification Permitting Plans (Sheets 1 through 9) prepared by Jacobs Engineering Group, dated June 1, 2022.

    - Section 401 Water Quality Certification Application, Culvert Replacement Project at Cape Main Mile Post 63.22 Sandwich, Massachusetts, prepared by GZA GeoEnvironmental, dated June 2022.

2. To the extent that the following conditions modify or differ from the plans, specifications or other proposals referenced in Condition 1, the conditions of this Certification shall control.

3. A copy of this Certification and referenced plans and other documents shall be provided to the contractor prior to the start of construction.

4. Prior to the start of work, the applicant shall provide MassDEP with the name, address, and phone number(s) of the person responsible for ensuring that all work complies with the conditions of this Water Quality Certification.

5. Prior to the start of work and installation of erosion control measures, the applicant shall provide MassDEP with the name, address and phone number(s) of the following individuals:

    - Environmental Monitor(s)
    - Wetland Specialist(s)

6. A minimum of twenty-one (21) days prior to the commencement of construction the applicant or their representative shall contact MassDEP (mark.bartow@mass.gov) to schedule a pre-construction consultation meeting to review the plans, specifications and terms and conditions of this Water Quality Certificate (WQC). In addition to the applicant/representative attendees shall include the Environmental Monitor and Wetland Specialist unless MassDEP deems attendance is not necessary for any individual.

7. Prior to the commencement of construction adequate erosion control measures shall be installed to protect all wetland resource areas.

8. An Environmental Monitor (EM), with experience in wetland science, erosion and sedimentation control, and experience in Railroad/Roadway/Bridge/linear construction, shall be employed for the duration of the project. The EM will be responsible for assuring compliance with the permit conditions, plans, and specifications, maintaining limit of work, proper maintenance of the erosion and sedimentation controls, as well as determining if additional erosion and sedimentation controls are necessary. The EM shall assure that dewatering measures are properly implemented and maintained and that the discharge is adequately filtered prior to discharge to wetlands and waterways. The EM shall conduct daily inspections during construction and provide MassDEP with a Monitoring Report (MR) at the end of construction summarizing work activities, and compliance with the conditions of this permit. The MR shall be supported with photographs representative of work activities.

9. In addition to normal inspections, the EM shall coordinate with the contractor and anyone else responsible for maintaining the erosion control and sedimentation control measures prior to forecasted significant storm events to assure that the erosion and sedimentation control measures will adequately protect resource areas. The EM shall have the authority to direct responsible parties to install additional or alternative erosion and sedimentation control measures.

10. In instances where an EM directs the installation of additional or alternative erosion and sedimentation control measures MassDEP shall be notified via email with photographs and a description of measures.

11. A stockpile of erosion control measures shall be kept on-site for emergency and routine replacement. The materials may include but are not limited to silt fence, hay bales, stone rip rap, filter dikes, compost filter tubes, filter bags, or any other devices planned for use during construction.

12. No more than 500 square feet of Land Under Water (LUW) will be impacted cumulatively with 200 square feet of permanent impact to LUW.

13. No more than 285 square feet of Salt Marsh will be impacted cumulatively with 17 square feet of permanent impact to Salt Marsh.

14. The surface area of the salt marsh mitigation area as shown on the Salt Marsh Restoration Plan (Sheet 9 of 9) and described in the Erosion Control, Salt Marsh Mitigation and Planting Notes (Sheet 8 of 9) shall be at least 75% evenly distributed with indigenous wetland vegetation within two growing seasons. This determination shall be made by the wetland scientist selected by the applicant or his/her designee and approved by MassDEP. Should the mitigation area fail to meet this standard, MassDEP may require additional measures necessary to achieve compliance.

15. At the end of each growing season, a progress report of the relative success or failure of the mitigation effort shall be submitted to this office by the wetland scientist. The report shall include percent of vegetation cover, a list of the type of plants growing in the mitigation area, coverage of wetland plants as a percentage of all plants and relative vigor of the plants. The report shall also include recommendations for improvement of poorly established wetland areas.

16. The progress report shall also document the restoration efforts associated with the areas of LUW and Salt Marsh temporarily impacted during construction. Should the temporary impact areas not be adequately restored, MassDEP may require additional measures to achieve compliance.

17. It shall be the responsibility of the applicant, and/or any successor(s) in title to ensure that within the wetland mitigation and restoration areas, non-native invasive plant species such as *Phragmites australis* do not expand because of the project.

18. Staff of the Department of Environmental Protection shall have the right to enter and inspect the area subject to this Certification at reasonable hours to evaluate compliance with the conditions stated in this Certification and may require the submittal of any data deemed necessary by the Department for that evaluation.

19. No Special Condition set forth herein shall be constructed or operate to prohibit the Department from taking enforcement against the applicant or its contractors for any failure to comply with the terms and requirements of this 401 Water Quality Certification.

20. No activity authorized by this Water Quality Certification may begin prior to expiration of the 21-day appeal period or until a final decision is issued by MassDEP if an appeal is filed.

21. This Certification remains in effect for the same duration as the federal permit that requires it or five years from the date of issuance of this Certification whichever comes first.

22. The applicant may request an amendment or extension of this Certification in accordance with 314 CMR 9.09(2) and (3), respectively.

Failure to comply with this Certification is grounds for enforcement, including civil and criminal penalties, under MGL Ch. 21 §42, MGL Ch. 21A §16, or other possible actions/penalties as authorized by the General Laws of the Commonwealth.

This Certification does not relieve the applicant of the obligation to comply with other appropriate state or federal statutes or regulations.

NOTICE OF APPEAL RIGHTS

A) Appeal Rights and Time Limits

Certain persons shall have a right to request an adjudicatory hearing concerning certifications by MassDEP when an application is required: (a) the applicant or property owner; (b) any person aggrieved by the decision who has submitted written comments during the public comment period; any ten (10) persons of the Commonwealth pursuant to M.G.L. c.30A where a group member has submitted written comments during the public comment period; or (d) any governmental body or private organization with a mandate to protect the environment which has submitted written comments during the public comment period. Any person aggrieved, any ten (10) persons of the Commonwealth, or a governmental body or private organization with a mandate to protect the environment may appeal without having submitted written comments during the public comment period only when the claim is based on new substantive issues arising from material changes to the scope or impact of the activity and not apparent at the time of public notice. To request an adjudicatory hearing pursuant to M.G.L. c.30A, § 10, a Notice of Claim must be made in writing, provided that the request is made by certified mail or hand delivery to MassDEP, with the appropriate filing fee specified within 310 CMR 4.10 along with a DEP Fee Transmittal Form within twenty-one (21) days from the date of issuance of this Certificate, and addressed to:

Case Administrator
Department of Environmental Protection
One Winter Street, 2nd Floor
Boston, MA 02108

A copy of the request shall at the same time be sent by certified mail or hand delivery to the issuing office of the Wetlands and Waterways Program at:

Department of Environmental Protection
Southeast Regional Office
20 Riverside Drive
Lakeville, Massachusetts 02347

B) Contents of Hearing Request

A Notice of Claim for Adjudicatory Hearing shall comply with MassDEP's Rules for Adjudicatory Proceedings, 310 CMR 1.01(6), and shall contain the following information pursuant to 314 CMR 9.10(3):

(a) the 401 Certification Transmittal Number;
(b) the complete name of the applicant and address of the project;
(c) the complete name, address, and fax and telephone numbers of the party filing the request, and, if represented by counsel or other representative, the name, fax and telephone numbers, and address of the attorney;
(d) if claiming to be a party aggrieved, the specific facts that demonstrate that the party satisfies the definition of "aggrieved person" found at 314 CMR 9.02;
(e) a clear and concise statement that an adjudicatory hearing is being requested;
(f) a clear and concise statement of (1) the facts which are grounds for the proceedings, (2) the objections to this Certificate, including specifically the manner in which it is alleged to be inconsistent with the MassDEP's Water Quality Regulations, 314 CMR 9.00, and (3) the relief sought through the adjudicatory hearing, including specifically the changes desired in the final written Certification; and

(g) a statement that a copy of the request has been sent by certified mail or hand delivery to the applicant, the owner (if different from the applicant), the conservation commission of the city or town where the activity will occur, the Department of Environmental Management (when the certificate concerns projects in Areas of Critical Environmental Concern), the public or private water supplier where the project is located (when the certificate concerns projects in Outstanding Resource Waters), and any other entity with responsibility for the resource where the project is located.

C) Filing Fee and Address

The hearing request along with a DEP Fee Transmittal Form and a valid check or money order payable to the Commonwealth of Massachusetts in the amount of one hundred dollars ($100) must be mailed to:

Commonwealth of Massachusetts
Department of Environmental Protection
Commonwealth Master Lockbox
PO Box 4062
Boston, MA 02211

The request will be dismissed if the filing fee is not paid, unless the appellant is exempt or granted a waiver. The filing fee is not required if the appellant is a city or town (or municipal agency), county, or district of the Commonwealth of Massachusetts, or a municipal housing authority. MassDEP may waive the adjudicatory hearing filing fee pursuant to 310 CMR 4.06(2) for a person who shows that paying the fee will create an undue financial hardship. A person seeking a waiver must file an affidavit setting forth the facts believed to support the claim of undue financial hardship together with the hearing request as provided above.

Should you have any questions relative to this permit, please Mark Bartow at mark.bartow@mass.gov or (508) 946-2746.

Sincerely,

Daniel F. Gilmore, Chief
Wetlands & Waterways Program
Bureau of Water Resources

DFG/mnb

cc: Sandwich Conservation Commission

Regulatory Division
The New England District
U.S. Army Corps of Engineers
696 Virginia Road
Concord, MA 01742-275

MassDOT – Rail and Transit Division
ATTN: Ms Chalita Belfield
Director of Railroad Properties
Ten Park Plaza, Suite 4160
Boston, MA 02116

Kimberly Degutis, Environmental Project Manager
GZA GeoEnvironmental Inc
249 Vanderbilt Avenue
Norwood, MA 02062

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

4

DEP File Number:

Provided by DEP

Request for Departmental Action Fee Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

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

Email Address

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

Email Address

4. DEP File Number:

B. Instructions

1. When the Departmental action request is for (check one):

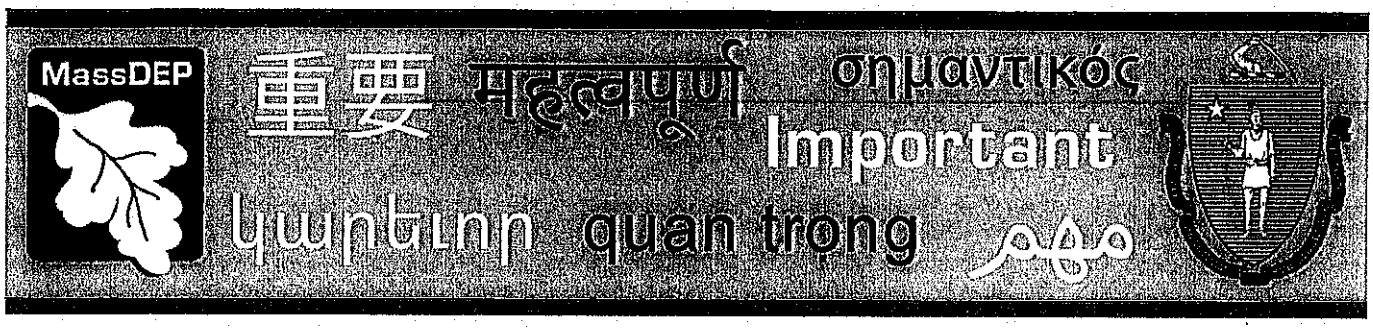
☐ Superseding Order of Conditions – Fee: $120.00 (single family house projects) or $245 (all other projects)

☐ Superseding Determination of Applicability – Fee: $120

☐ Superseding Order of Resource Area Delineation – Fee: $120

Send this form and check or money order, payable to the *Commonwealth of Massachusetts*, to:

Department of Environmental Protection
Box 4062
Boston, MA 02211



Communication for Non-English-Speaking Parties

English
This document is important and should be translated immediately.
If you need this document translated, please contact MassDEP's Diversity Director at the telephone number listed below.

Español Spanish
Este documento es importante y debe ser traducido de inmediato. Si necesita este documento traducido, comuníquese con la Directora de Diversidad de MassDEP al número de teléfono que aparece más abajo.

Português Portuguese
Este é um documento importante e deve ser traduzido imediatamente. Se precisar de uma tradução deste documento, entre em contato com o Diretor de Diversidade da MassDEP nos números de telefone listados abaixo.

繁體中文 Chinese Traditional
本文件非常重要，應立即翻譯。如果您需要翻譯這份文件，請用下面列出的電話號碼聯絡 MassDEP 多元化負責人。

簡体中文 Chinese Simplified
本文件非常重要，应立即翻译。如果您需要翻译这份文件，请用下面列出的电话号码与 MassDEP 的多元化主任联系。

Ayisyen Kreyòl Haitian Creole
Dokiman sa-a se yon bagay enpòtan epi yo ta dwe tradwi l imedyatman. Si ou bezwen dokiman sa a tradwi, tanpri kontakte Direktè Divèsite MassDEP la nan nimewo telefòn endike anba.

Việt Vietnamese
Tài liệu này rất quan trọng và cần được dịch ngay lập tức. Nếu quý vị cần dịch tài liệu này, xin liên lạc với Giám đốc Đa dạng của MassDEP theo các số điện thoại ghi dưới đây.

ប្រទេសកម្ពុជា Khmer/Cambodian
ឯកសារនេះគឺសំខាន់ហើយគួរត្រូវបានបកប្រែភ្លាមៗ។ ប្រសិនបើអ្នកត្រូវការឱ្យគេបកប្រែឯកសារនេះ
សូមទាក់ទងមកនាយកផ្នែកពិពិធកម្មរបស់ MassDEP តាមលេខទូរស័ព្ទខាងក្រោម។

Kriolu Kabuverdianu Cape Verdean
Kel dukumentu li é inpurtánti y debe ser traduzidu imidiatamenti. Se bu meste di kel dukumentu traduzidu, pur favor kontakta Diretor di Diversidádi di MassDEP na numeru abaxu indikadu.

Contact Glynis L. Bugg, Acting Diversity Director/Civil Rights 857-262-0606
Massachusetts Department of Environmental Protection
One Winter Street, Boston MA 02108
TTY# MassRelay Service 1-800-439-2370 • https://www.mass.gov/environmental-justice
(Version revised 7.22.2022) 310 CMR 1.03(5)(a

Русский Russian

Это важный документ, и он должен быть безотлагательно переведен. Если вам нужен перевод данного документа, пожалуйста, свяжитесь с директором по вопросам многообразия (Diversity Director) компании MassDEP по указанному ниже телефону.

العربية Arabic

هذه الوثيقة مهمة ويجب ترجمتها على الفور. اذا كنت بحاجة الى هذه الوثيقة مترجمة، يرجى الاتصال بمدير التنوع PMassDE على أرقام الهواتف المدرجة أدناه.

한국어 Korean

이 문서는 중요하고 즉시 번역해야 합니다. 이 문서의 번역이 필요하시다면, 아래의 전화 번호로 MassDEP 의 다양성 담당 이사에 문의하시기 바랍니다.

հայերեն Armenian

Այս փաստաթուղթը կարևոր է և պետք է անմիջապես թարգմանվի:
Եթե Ձեզ անհրաժեշտ է այս փաստաթուղթը թարգմանել, դիմեք MassDEP-ի բազմազանության տնօրենին ստորև նշված հեռախոսահամարով:

فارسی Farsi Persian

این سند مهم است و باید فورا ترجمه شود.
اگر به ترجمه این سند نیاز دارید، لطفا با مدیر بخش تنوع نژادی MassDEP به شماره تلفن ذکر شده در زیر تماس بگیرید.

Français French

Ce document est important et devrait être traduit immédiatement. Si vous avez besoin de ce document traduit, veuillez communiquer avec le directeur de la diversité MassDEP aux numéros de téléphone indiqués ci-dessous.

Deutsch German

Dieses Dokument ist wichtig und sollte sofort übersetzt werden. Sofern Sie eine Übersetzung dieses Dokuments benötigen, wenden Sie sich bitte an den Diversity Director MassDEP unter der unten aufgeführten Telefonnummer.

Ελληνική Greek

Το παρόν έγγραφο είναι σημαντικό και θα πρέπει να μεταφραστεί αμέσως. Αν χρειάζεστε μετάφραση του παρόντος εγγράφου, παρακαλούμε επικοινωνήστε με τον Διευθυντή Διαφορετικότητας του MassDEP στους αριθμούς τηλεφώνου που αναγράφονται παρακάτω.

Italiano Italian

Comunicazione per parti che non parlano inglese. Questo documento è importante e dovrebbe essere tradotto immediatamente. Se avete bisogno di questo documento tradotto, potete contattare il Direttore di Diversità di MassDEP al numero di telefono elencato di seguito.

Język Polski Polish

Dokument ten jest ważny i powinien zostać natychmiast przetłumaczony. Jeśli potrzebujesz przetłumaczonej wersji dokumentu, prosimy o kontakt z dyrektorem ds. różnorodności MassDEP pod jednym z numerów telefonu wymienionych poniżej.

हिन्दी Hindi

यह दस्तावेज महत्वपूर्ण है और इसका तुरंत अनुवाद किया जाना चाहिए. यदि आपको इस दस्तावेज़ का अनुवाद करने की आवश्यकता है, तो कृपया नीचे सूचीबद्ध टेलीफोन नंबरों पर मासडेप्स डाइवर्सिटी के निदेशक से संपर्क करें.

Contact Glynis L. Bugg, Acting Diversity Director/Civil Rights 857-262-0606
Massachusetts Department of Environmental Protection
One Winter Street, Boston MA 02108
TTY# MassRelay Service 1-800-439-2370 • https://www.mass.gov/environmental-justice
(Version revised 7.22.2022) 310 CMR 1.03(5)(a

DOCUMENT A00896

MASSDOT MW - 1

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MassDOT MW-1

RECOMMENDED PRACTICE

FOR THE

MAINTENANCE OF TRACK AND SPECIAL TRACKWORK

Massachusetts Department of Transportation
10 Park Plaza, Suite 4160
Boston, MA 02116

Rev. 1 - July 2018

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MassDOT MW-1

RECOMMENDED PRACTICE

FOR THE

MAINTENANCE OF TRACK AND SPECIAL TRACKWORK



Document No. _____

Massachusetts Department of Transportation
10 Park Plaza, Suite 4160
Boston, MA 02116

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MassDOT MW-1

RECOMMENDED PRACTICE

FOR THE

MAINTENANCE OF TRACK AND SPECIAL TRACKWORK

Director of Railroad Properties
Massachusetts Department of Transportation
10 Park Plaza, Suite 4160
Boston, MA 02116

Effective July 1, 2018

Chalita Belfield

Chalita Belfield
Director of Railroad Properties

Date: July 1, 2018

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RECOMMENDED PRACTICE

FOR THE

MAINTENANCE OF TRACK AND SPECIAL TRACKWORK

This Manual belongs to:

Name: _____

Employee #: _____

Address: _____

_____

_____

Phone:_____

If this Manual is found,
please return it to the address below:

Director of Railroad Properties
Massachusetts Department of Transportation
10 Park Plaza, Suite 4160
Boston, MA 02116

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MassDOT MW-1

MANUAL REVISIONS

We welcome your comments on the MassDOT Manual. Please send all suggestions to:

Director of Railroad Properties
Massachusetts Department of Transportation
10 Park Plaza, Suite 4160
Boston, MA 02116

Suggested revisions to this Manual should be submitted in writing in accordance with the following format.

Section/Paragraph Number _____

Page Number _____

Recommended Changes, Corrections, or Questions:

_____

_____

_____

Submitted by:

Name _____

Operating Railroad Company _____

Address _____

_____

_____

Phone _____

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MassDOT MW-1

RECOMMENDED PRACTICE

The Massachusetts Department of Transportation (MassDOT) is committed to providing the safest and most efficient rail service to our customers by maintaining and upgrading the Commonwealth's track infrastructure and assets using best industry recommended practice.

MassDOT has sought to contract with Operating Railroad Companies that will work cooperatively with MassDOT, and that will maintain the Commonwealth's track system at the required standards with competent and dedicated employees.

MassDOT requires their designated Operating Railroad Companies to perform diligent inspections, prepare maintenance and repair programs, and ensure the proper maintenance of track in accordance with the governing operating agreements.

Recommended Practice is based on the best practice developed by and in current use on the United States and Canadian passenger and freight railroads. They allow for a common language amongst railroad administrators, maintenance personnel, contractors, material and equipment suppliers and all others concerned with railroad safety.

Each of the Operating Railroad Companies are currently under agreement with MassDOT. The information found in this Manual contains tables, instructions, and references designed for track and special trackwork as a guide for maintenance personnel in their everyday efforts to maintain a safe and efficient plant.

The MassDOT Manual is a manual of recommended practice. We recognize that best practice of maintenance of way (MOW) continues to change due to the location, environment, operation, and geographic conditions of individual railroads.

The MassDOT Recommended Practice Manual is meant to aid and assist the Operating Railroad Companies to maintain MassDOT-owned tracks in a safe and efficient manner at a reasonable cost. Performing maintenance in accordance with the recommended practice in the MW-1 will meet the expectations of the Commonwealth and provide uniform practice between the different properties of the Operating Railroad Companies.

As of July 2018, the Operating Railroad Companies operate rail freight service and maintain the MassDOT-owned track infrastructure pursuant to License and Operating Agreements with MassDOT on the following line segments:

- Adams Industrial Track: MP 0.0 to MP 5.2
- Conn River Main Line: MP 0.38 to MP 49.7
- Housatonic Railroad: MP 50.0 to MP 85.9
- Massachusetts Central Railroad: MP 1.6 to MP 25.0
- Framingham Secondary: MP 0.0 to MP 21.05
- Middleboro Subdivision:
    - Attleboro Secondary: MP 0.0 to MP 8.6
    - New Bedford Secondary: MP 8.6 to MP 13.3
    - Middleboro Branch: MP 13.3 to MP 21.1
- New Bedford Secondary: MP 13.3 to MP 31.8
- Fall River Secondary: MP 0.0 to MP 12.0
- Cape Main Line:
    - Buzzards Bay Secondary: MP 36.3 to MP 54.7
    - Hyannis Secondary: MP 55.0 to 78.5
- Falmouth Secondary: MP 0.0 to MP 6.8
- South Dennis Secondary: MP 0.0 to MP 2.8
- Dean Street Industrial Track: MP 0.0 to MP 1.5
- Watuppa Branch: MP 6.0 to MP 8.0

MassDOT MW-1

PURPOSE AND USE

The MassDOT MW-1 was developed for MassDOT Rail and Transit Division and selected Operating Railroad Companies who have contracted with MassDOT Rail and Transit Division to operate and maintain lines of track owned by the Commonwealth, as a manual of best practice for the maintenance of track and associated trackwork components. Materials presented in this handbook establish and define MassDOT Rail and Transit Division recommended practice for maintenance of track owned by MassDOT Rail and Transit Division and operated by Operating Railroad Companies under contractual agreements with MassDOT Rail and Transit Division. These practices have been developed to meet the needs of the MassDOT Rail and Transit Division and may be used exactly as presented or modified as is necessary and desirable to meet the present and future needs of the Railroads operating and maintaining MassDOT Rail and Transit Division rail lines, in accordance with the terms of the governing License and Operating Agreements.

In all cases, inspection and restoration of track must be performed in accordance with Federal Railroad Administration (FRA) Part 213, Track Safety Standards.

The intent of the recommended practice is not to establish artificially rigid procedures governing track maintenance but rather to serve as guidelines for prudent track maintenance practice. These guidelines must be used in concert with proper exercise of judgment based upon experience and knowledge of service requirements.

The maintenance limits in the MassDOT MW-1 are unique and are intended to supersede the inspection and restoration limits given in FRA Part 213, provided that the more restrictive practices should be followed. For example, the track gage limits given in the MassDOT MW-1 (53.0(M)) are more restrictive than the track gage limits found in FRA Part 213 (§213.53).

Track maintenance limits and recommended practice in the MassDOT MW-1 are to be used for everyday maintenance activities. The limits act as a trigger to prompt the maintenance or reconstruction of track. The track and related rail infrastructure must be maintained in accordance with the requirements of the relevant License and Operating Agreement between MassDOT Rail and Transit Division and the Operating Railroad

Company. The Commonwealth expects that wherever possible, track shall be maintained so that the track structure does not fall below track maintenance limits established in the MassDOT MW-1.

In all cases, MassDOT Operating Railroad Companies will strive to restore track, make track repairs, and maintain track at or above the respective maintenance limits given in the MassDOT MW-1.

The development of the MassDOT MW-1 involved many hours of input from railroad professionals, and represents the latest recommended practice approved by the MassDOT Director of Railroad Properties. It is understood that these practices are subject to revisions as new technology and improved techniques are established. Other practices may be found to be equally acceptable and, as a result, the materials contained in the MassDOT MW-1 may be modified from time to time to promote the understanding of and efficiency and economy of maintenance of MassDOT-owned rail lines.

The MW-1 is an interactive document. It is expected that every individual that has reason to use this document will constantly strive to offer suggestions and constructive criticism to improve the overall understanding, use, and quality of this Manual.

Modifications to these recommended practice materials must be made in writing, and incorporated into the Manual following approval by MassDOT Rail and Transit Division.

MassDOT MW-1

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MassDOT MW-1

RECOMMENDED PRACTICE

FOR THE

MAINTENANCE OF TRACK AND SPECIAL TRACKWORK



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SUBPARTS A-E

RECOMMENDED PRACTICE
FOR THE
MAINTENANCE OF TRACK

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RECOMMENDED PRACTICE FOR THE MAINTENANCE OF TRACK SUBPARTS A-E

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Subpart A - General

§1.0(M) SCOPE

(a) Maintenance is both spot and out-of-face replacement of components of the track structure such as laying new or relay rail or installing ties so as to maintain the infrastructure in a state-of-good repair.

(1) Maintenance limits are to be used as a triggering mechanism that prompts maintenance or reconstruction.

(2) It is MassDOT's policy to have a track structure that stays between new construction and maintenance limits.

(3) As the track structure wears, maintenance should be programmed before the track reaches the MassDOT maintenance limits.

(4) Should these maintenance limits be exceeded, maintenance must be completed prior to reaching the limits found in FRA Part 213.

(5) Whenever possible, track should be repaired or reconstructed to new track tolerances.

(b) This subpart provides practices that will be used for the maintenance of track. It is for the guidance of Operating Railroad Companies that maintain and repair track.

(c) This subpart contains "maintenance limits" that are to be used when maintaining track and are not to be confused with the minimum limits found in FRA Part 213 or with new track tolerances.

§3.0(M) APPLICATION

The MW-1 applies to all operating railroads that have maintenance and compliance responsibility on MassDOT-owned railroad property.

§5.0(M) MAINTENANCE

(a) The responsible personnel in charge of performing the maintenance work for the Operating Railroad Companies shall be qualified to maintain, restore, or renew trackwork in accordance with FRA §213.7(a), (b), (c) and (d).

(b) The person responsible for the work shall coordinate and report all maintenance work on the appropriate form to the Operating Railroad Company and MassDOT Rail and Transit Division.

(c) A record of all maintenance performed and all required inspection reports shall be maintained by the Operating Railroad Company for the duration of their operating contract. Reports to be provided are as follows:

(1) Track Inspection Reports (planned and special)

(2) Switch Inspection Reports (planned and special)

(3) Rail Defect Inspection Reports:

- Detector Car Report (car to be ridden by Operating Railroad Company Official)
- Rail Failure Report

(4) Reports included in CWR procedures section (see Appendix A, "Continuous Welded Rail (CWR) Procedures").

§7.0(M) DESIGNATION OF QUALIFIED PERSONS TO SUPERVISE CERTAIN RENEWALS AND INSPECT TRACK

(a) Each Operating Railroad Company to which this Part applies shall designate qualified persons to supervise restorations and renewals of track under traffic conditions. Each person designated shall have:

(1) At least:

(i) 1 year of supervisory experience in railroad track maintenance; or

(ii) A combination of supervisory experience in track maintenance and training from a course in track maintenance or from a college level educational program related to track maintenance;

(2) Demonstrated to the owner that he or she:

(i) Knows and understands the requirements of this Part that apply to the restoration and renewal of the track for which he or she is responsible;

(ii) Can detect deviations from those requirements; and

(iii) Can prescribe appropriate remedial action to correct or safely compensate for those deviations; and

(3) Written authorization from the track owner to prescribe remedial actions to correct or safely compensate for deviations from the requirements in this Part.

(b) Each Operating Railroad Company to which this Part applies shall designate qualified persons to inspect track for defects. Each person designated shall have:

(1) At least:

(i) 1 year of supervisory experience in railroad track maintenance; or

(ii) A combination of supervisory experience in track maintenance and training from a course in track maintenance or from a college level educational program related to track maintenance;

(2) Demonstrated to the owner that he or she:

(i) Knows and understands the requirements of this Part that apply to the inspection of track for which he or she is responsible; and

(ii) Can detect deviations from those requirements; and

(iii) Can prescribe appropriate remedial action to correct or safely compensate for those deviations; and

(3) Written authorization from the track owner to prescribe remedial actions to correct or safely compensate for deviations from the requirements in this Part, pending review by a qualified person designated under Paragraph (a) of this section.

(c) Individuals designated under Paragraphs (a) or (b) of this section that inspect continuous welded rail (CWR) track or supervise the installation, adjustment, and maintenance of CWR track in accordance with the written procedures of the track owner shall have:

(1) Current qualifications under either Paragraphs (a) or (b) of this section;

(2) Successfully completed a comprehensive training course specifically developed for the application of written CWR procedure issued by the track owner;

(3) Demonstrated to the Operating Railroad Company that the individual:

(i) Knows and understands the requirements of those written CWR procedures; and

(ii) Can detect deviations from those requirements; and

(iii) Can prescribe appropriate remedial action to correct or safely compensate for those deviations; and

(4) Written authorization from the Operating Railroad Company to prescribe remedial actions to correct or safely compensate for deviations from the requirements in those procedures and successfully completed a recorded examination on those procedures as part of the qualified process.

(d) Persons not fully qualified to supervise certain renewals and inspect track as required in Paragraphs (a) through (c) of this section, but with at least one year of maintenance of way (MOW) or signal experience, may pass trains over broken rails and pull-aparts provided that:

(1) The Operating Railroad Company determines the person to be qualified and, as part of doing so, trains, examines, and re-examines the person periodically within two years after each prior examination on the following topics as they relate to the safe passage of trains over broken rails or pull-aparts: rail defect identification, crosstie condition, track surface and alignment, gage restraint, rail end mismatch, joint bars, and maximum distance between rail ends over which trains may be allowed to pass. The sole purpose of the examination is to ascertain the person's ability to effectively apply these requirements and the examination may not be used to disqualify the person from other duties. A minimum of four hours training is required for initial training;

(2) The person deems it safe and train speeds are limited to a maximum of 10 MPH over the broken rail or pull apart;

(3) The person shall watch all movements over the broken rail or pull apart and be prepared to stop the train if necessary; and

(4) Person(s) fully qualified under FRA §213.7 are notified and dispatched to the location promptly for the purpose of authorizing movements and effecting temporary or permanent repairs.

§8.0(M) QUALITY CONTROL

(a) The person in charge of performing the maintenance activity or repair shall be responsible for the overall quality of the work performed.

(b) All maintenance work shall be performed in accordance with this Part.

(c) The Operating Railroad Company shall review the work performed for quality, consistency, and compliance to this Part.

(d) Trackwork repairs that are deficient:

(1) Shall be brought to the attention of the Operating Railroad Company.

(2) May be cause for remedial action.

(e) The Operating Railroad Company shall see that any additional work necessary is performed to bring the repair into compliance with this Part.

(f) The Operating Railroad Company shall be responsible to re-inspect the corrected work to ensure that it is in compliance with this Part.

(g) The Operating Railroad Company is encouraged to make recommendations to the MassDOT Rail and Transit Division as to required modifications to methods, procedures, and practice to improve the overall quality of the work.

§10.0(M) SIDINGS

Maintenance of Way (MOW) forces maintain up to the derail and/or property line on industrial siding tracks.

Subpart B - Roadbed and Right-of-Way

§31.0(M) SEASONAL PREPARATION AND MAINTENANCE

(a) Fall/Winter

(1) Dig out switch (gas, electric) rods

(2) Check heaters

(3) Before winter, clean sand out of flange ways at all highway grade crossings

(4) Keep crossing ends and flanges clear of snow and ice

(5) Ensure adequate supplies of materials/tools and snow equipment

(6) Order frost spikes/shims

(7) Order rope and drift pins from approved supplier and prepare for usage (to heat rail)

(8) Clean snow from switches at switch points, frog points and guard rails

(9) Obtain cleaner and lubricate Sargeant and Greenleaf switch locks

(b) Spring/Summer (Special Inspections after Acts of Nature)

(1) Verify proper neutral temperature of rail installed at less than the desired neutral temperature range and adjust as required (see Appendix A, "Continuous Welded Rail (CWR) Procedures").

(2) Plan vegetation control.

(3) Remove temporary shims/spikes.

(4) Bring winter equipment back to central headquarters.

(5) Perform heat patrol (kinks).

(6) Perform rain storm patrols – inspection and cleaning of culverts.

(7) Check and cross-cut joints in track.

(8) Lubricate main line hand throw and yard switches.

§33.0(M) DRAINAGE

(a) Drainage is of prime importance for the maintenance of track. Water mixing with materials in the roadbed tends to make the entire track structure unstable.

(b) Water seeping or flowing toward the track should be carried across and off the roadbed or be intercepted and diverted before it reaches the roadbed.

(c) Water falling upon the roadbed should be quickly drained off to side ditches or drainage structures.

(d) Every effort should be made to see that water from adjacent property does not drain on the MassDOT right-of-way. In areas where this condition is observed the MassDOT Rail and Transit Division shall be notified.

(e) Cross drains should be installed and maintained, particularly where bridges, road crossings, and sags interfere with longitudinal drainage.

(f) Maintenance of drainage systems must satisfy the requirements of FRA §213.33.

(g) Distribution of track or construction materials, and the disposal of fouled ballast and ditch materials, should be handled in such a manner that they no longer interfere with track drainage.

(h) Operating Railroad Company shall notify the MassDOT Rail and Transit Division any time debris is dumped on MassDOT property by abutters.

§33.1(M) Culverts

(a) Culverts require regular inspection and maintenance as do other railroad structures. When making inspections of track and roadway, MassDOT' s Operating Railroad Companies should:

(1) Railroad shall have and maintain an updated list of all culvert locations within the right-of-way. Inspectors should be aware of the location of culverts within the right-of-way.

(2) The tie over the culvert should be painted white and web of rail shall be marked with mile post location.

(3) Be aware that culverts must not only support the live load of trains but the dead load of the track structure.

(4) Report the backup of water near culverts or any abnormal conditions around the ends of culverts (e.g., water seeping through ballast structure).

(5) Report any abnormal conditions found in the track structure at a culvert (e.g., loss of ballast). Operating Railroad Company shall then notify the MassDOT Rail and Transit Division.

(6) If unusual conditions are found at culvert locations, take appropriate remedial action. Appropriate remedial action shall be taken by a Operating Railroad Company qualified individual.

(7) For additional information on culverts, see American Railway Engineering and Maintenance Association (AREMA), Chapter I, Part 4, "Culverts."

§35.0(M) CROSS SECTION (ROADWAY)

Wherever possible, roadbeds, embankments, and excavations should be maintained in accordance with the Massachusetts Bay Transportation Authority (MBTA) Book of Standard Plans. Deviation from approved cross sections should not be made without authorization from the MassDOT Rail and Transit Division.

§37.0(M) VEGETATION

(a) Growth of vegetation should be encouraged on slopes of embankments, cuts, and deep ditches to prevent erosion and to maintain stability.

(b) Vegetation growth must be controlled in accordance with the requirements of FRA §213.37.

(c) The goal of MassDOT is to have the right-of-way cleared of both brush and vegetation in the track and to within 25' of the track centerline. This should be accomplished using a combination of brush cutting and weed spraying.

(d) Vegetation on railroad property, which is on or immediately adjacent to roadbed, must be controlled so that it does not:

(1) Become a fire hazard to track-carrying structures;

(2) Obstruct visibility of railroad signs and signals;

(i) Along the right-of-way

(ii) At highway-rail crossings

(3) Interfere with railroad employees performing normal trackside duties;

(4) Prevent proper functioning of signal and communication lines; or

(5) Prevent railroad employees from visually inspecting moving equipment from their normal duty stations.

(e) The Operating Railroad Companies shall develop and carry out vegetation management programs as required by MassDOT.

(f) The Operating Railroad Companies shall provide copies of their approved management programs to the MassDOT Rail and Transit Division.

§39.0(M) SIGNS

(a) Track signs and posts must be placed and maintained in accordance with either the MBTA Book of Standard Plans and/or AREMA Chapter 1, Part 7 Roadway Signs and operating special instructions. They should not be installed so as to interfere with signals or safety appliances.

(b) The following is a list of the common signs, which are maintained by the Operating Railroad's Maintenance of Way Department:

(1) Whistle Posts (see Paragraph (c) for placement)

(2) Permanent Speed Restriction Signs (see Operating Railroad Company Time Table Special Instructions) (MBTA Standard Plan No. 3304)

(3) Temporary Speed Signs (see Appendix D)

(4) Mile Posts (see appropriate Track Charts) (MBTA Standard Plan No. 3302)

(5) Station Markers (see Operating Railroad Company Time Table Special Instructions)

(6) End of Block (see Operating Railroad Company Time Table)

(7) Stop Boards (see Operating Railroad Company Time Table)

(8) Clearance Marker (fouling point) painted rail or ties in yellow

(9) Close Clearance Markers (MBTA Standard Plan No. 3312)

(10) Yard Limit Signs (see Operating Railroad Company Time Table) (MBTA Standard Plan No. 3304)

(11) Switch Targets (MBTA Standard Plan No. 3030)

(12) Spring Switch Markers (SS) (MBTA Standard Plan No. 3304)

(13) No Trespassing/No Dumping Signs (MBTA Standard Plan No. 3208)

(14) Cross Bucks (Passive) (MBTA Standard Plan No. 3388)

(15) Crossing Approach Circuit Signage (XC) at Highway Grade Crossing

(16) Emergency Notification Sign at all Public and Private Grade Crossings (as per FRA Requirements) (Manual on Uniform Traffic Control Devices (MUTCD) Figure 8B-5)

(17) Bridge Markers (undergrade and overhead bridges)

(18) Culvert Markers (mark on web of rail and paint ties white)

(19) Track Lubricator Signage

(20) Buried Cable Signs (MBTA Standard Plan No. 3344)

(21) Low Ground Clearance at Grade Crossings (MUTCD Figure W10-5 and W10-5P)

(22) Snow Flanger Sign (MBTA Standard Plan No. 3304)

(23) Will Not Clear Man on Side of Car (MBTA Standard Plan No. 3314)

(c) Whistle post placement:

(1) Whistle posts are placed 1,320' in advance of a public grade crossing so as to comply with Massachusetts General Law (MGL), Chapter 160 "Railroads," Section 138 "Warning to Public."

§41.0(M) HIGHWAY GRADE CROSSINGS

(a) Typical grade crossing surfaces found on the MassDOT are as follows (see also MBTA Standard Plan Nos. 3100, 3106, 3108, 3120):

(1) Timber

(2) Timber and asphalt

(3) Asphalt with cut flangeways

(4) Asphalt with rubber rail seal

(5) Full depth rubber

(6) Full depth concrete

(7) Full depth rubber on the gage and rail seal and asphalt on the field side

(8) Special products as approved by the MassDOT Rail and Transit Division at grade crossings or at pedestrian crossings

§41.1(M) Placement of Devices at Grade Crossings

(a) Whistle signs shall be installed in accordance with Commonwealth of Massachusetts requirements (see §39.0(M)(c)).

(b) The design and placement of grade crossing signage, roadway signage, and appliances at both public and private grade crossings are governed by the Manual on Uniform Traffic Control Devices (MUTCD, see Part 8).

(c) Low ground clearance at grade crossings (see the MUTCD).

§41.2(M) Highway Grade Crossing Maintenance

(a) All roadway signs, highway traffic signal systems, and pavement markings are maintained by the municipality and/or Commonwealth.

(b) The railroad warning devices whether passive or active are maintained by the Operating Railroad Companies.

(c) At private grade crossings, any paving markings or highway signage is the responsibility of the roadway owner. The Emergency Notification Sign is the responsibility of the Operating Railroad Companies.

(d) Crossings should be kept clean and attention given to the following:

(1) Drainage: sloping the surface, if necessary, and constructing underground drains, as required.

(2) Surface water flowing along the highway toward the railroad should be diverted before it reaches the tracks.

(3) The ends of the crossing shall extend at least 2' beyond the width of the highway. Crossing surface installed in a gated pedestrian walkway area should be restricted to the width of the sidewalk gate.

(4) It is recommended that the ends of the crossing surfaces be protected by either end deflector plate/ballast or asphalt to prevent against dragging equipment.

(5) Flangeways shall be 2-1/2" wide and not less than 2" deep. They must be kept clean at all times and free of debris, ice, and snow.

(6) Crossing surface materials and components should be inspected, aligned, and properly secured to the track structure so that the materials cannot damage rolling stock and/or motor vehicles. Crossing surface material that cannot be properly secured and/or repaired shall be removed and temporarily replaced with cold patch or asphalt.

(7) The four quadrant site distances for vehicles approaching the highway grade crossing shall be kept as clear as practicable.

(8) When installing or making general repairs to crossings, track alignment should be established by transit and/or mechanical lining devices.

(9) The condition of crossing approaches is vital to the performance of a grade crossing. Special attention should be paid to the surface and alignment on the crossing approaches so that the ties are tamped and there is a smooth transition into the crossing area.

(10) Special attention should be paid to the maintenance of joints and welds at crossing ends. This includes insulated and conventional track joints, as well as field and plant welds. When performing maintenance, track joints should be eliminated as soon as possible.

(11) Joints must be avoided within the area of the crossing panel.

(12) When working at a crossing, rail should be observed under load to determine if there is excessive rail movement. As track deflects under load, cut spikes tend to loosen. Loose and worn fastening systems should be repaired and/or replaced as necessary to minimize all track and crossing surface movement.

(13) In an emergency (broken weld or rail), when welding joints within the limits of the crossing panel, closure welds may be made by the thermite process.

(14) When changing a broken rail in a crossing, ensure that all clips, spikes, plates, and excessively worn components are replaced and secured. Galvanized clips should be installed. Ties should be tamped. Rails temporarily joined with joint bars should be field welded as soon as practicable. If the broken rail is replaced in CWR territory refer to Appendix A, “Continuous Welded Rail (CWR) Procedures” for proper rail adjustment procedures.

(15) Use of gage rods in crossings is prohibited.

(16) Fastening and clipping devices shall be used that do not interfere with the installation of the crossing surface materials.

(17) Galvanized clips should be used in crossings with an elastic fastening system.

(18) Seasonal clearing of silt and other debris from both crossing approaches.

(19) Clean out flangeways in the Fall (e.g., sand and dirt).

(e) All new crossings must be complaint with the Americans with Disabilities Act (ADA).

(f) MassDOT has a number of different types of highway grade crossings types. Pictures of the more common types are shown below:

(1) Asphalt With Cut Flangeway (not recommended for mainline track except overnight during crossing renewals or for emergency repairs).



(2) Timber and Asphalt



(3) Timber



(4a) Full Depth Rubber with Rail Seal



(4b) Full Depth Rubber with Rail Seal



(5) Full Depth Concrete on Wood or Concrete Ties



(6) Rubber Flangeway and Asphalt



Subpart C - Track Geometry

§53.0(M) GAGE

§53.1(M) Standard for Gage

(a) The standard gage for track, measured between the running rails at right angles to the track, 5/8" below the top of rail, is 56-1/2".

(b) Gage will be 56-1/2" unless specified by the MassDOT Rail and Transit Division.

(c) When gaging is required, care should be taken to not adversely affect the alignment of the track. Changes in prescribed gage should be made in uniform increments as given in §53.2(M).

(d) Gage shall be changed by adjustment of the rail opposite the line rail (preferred method).

(e) In some cases, gage may be adjusted on the line rail only if the adjustment will improve line and ride quality (e.g., joint elbowed out on the line rail).

(f) In cases where the line rail is re-aligned, re-spike line high rail and then re-gage the low rail.

§53.2(M) Maintenance of Gage

(a) Gage shall be measured with a standard track gauge or other authorized devices. These devices must be checked daily prior to use for accuracy.

(b) Maintenance shall be performed when gage reaches the following limits:

Gage Maintenance Limits			
Class of Track	**Minimum (Inches)**	**Maximum (Inches)**	**Maximum Rate of Change in Gage per 31' (Inches)**
1	56-1/8	57-1/2	1
2	56-1/8	57-1/4	3/4
3	56-1/4	57-1/4	3/4
4	56-1/4	57	1/2
5	56-1/4	57	1/2

(c) Gage rods shall be applied only in emergency situations for temporary repair. Permanent repairs to gage should be completed as soon as possible. On main line tracks, gage rods shall only be installed in an emergency and removed as soon as possible.

(d) When using gage rods in signal territory, insulated rods are to be tested by the Signal Maintainer prior to installation. When permanent repairs are completed, gage rods are to be completely removed.

§55.0(M) ALIGNMENT

Alignment is the horizontal location of a railroad as described by curves, spirals, and tangents.

§55.1(M) Maintenance of Alignment

(a) Outer rails of curves and field side rails on tangents should be selected as the line rails. On single tangent track, either rail may be used as the line rail, however, the north or east rail is the preferred line rail. The same line rail shall be used for the full length of the track tangent.

(b) In general, alignment information may be obtained using the following:

(1) The stringline method.

(2) Surveying equipment or a rail-mounted laser.

(3) The automatic geometry system on an approved tamper.

(4) Track geometry car.

(c) Maintenance shall be performed when alignment values reach the limits given in the table below.

(1) Alignment deviation in curves, as defined in this table, is the difference in mid-ordinate value between adjacent stations and not the average of multiple stations (uniformity) as defined in FRA §213.55.

(2) The definition of alignment deviation used in this paragraph, allows the maintainer to achieve alignment tolerances that are more restrictive than those defined in FRA §213.55.

Alignment Maintenance Limits			
	Tangent Track	**Curved Track**	
Class of Track	**The deviation of the mid-offset from a 62' chord[(1)] may not be more than (Inches):**	**The deviation of the mid-ordinate from a 31' chord[(2)] may not be more than (Inches):**	**The deviation of the mid-ordinate from a 62' chord[(2)] may not be more than (Inches):**
1	3-3/4	N/A[(3)]	3-3/4
2	2-1/4	N/A[(3)]	2-1/4
3	1-1/4	7/8	1-1/4
4	1	3/4	1
5	1/2	3/8	1/2

Notes:

[(1)] The ends of the line shall be at points on the gage side of the line rail, 5/8" below the top of the railhead. Either rail may be used as the line rail; however, the same rail shall be used for the full length of that tangential segment of track.

[(2)] The ends of the line or chord must be at points on the gage side of the line rail, 5/8" below the top of the rail head. Use line rail in accordance with §55.1(M).

[(3)] N/A – Not Applicable.

(d) Designation of line rail:

(1) On tangent track in single track either rail or rail on the mile post side.

(2) On tangent track and multiple tracks the field side rail.

(3) In single or multiple tracks in curves on the high/outer rail.

(e) Curve realignment changes in CWR territory must be made in accordance with Appendix A, "Continuous Welded Rail (CWR) Procedures."

(f) Alignments must be maintained within the prescribed limits given above. Roadway clearances are prescribed in AREMA, Chapter 28 (see Table 28-3-3, "Legal Clearance Requirements by State" (in English Units)).

§55.2(M) Stringlining Curves

(a) Stringlining of curves is a method for determining the most advantageous alignment that can be obtained with reasonable amounts of throw.

(b) Any of the established numerical or mathematical methods, such as the automated geometry system on tampers, the "Bartlett Method" or "Bracket Method," may be used to calculate the throws of curves.

(c) The practical relationship between station and chord length, mid-ordinate value, and degree of curvature for station lengths most commonly used is shown below:

Degree of Curve	Mid-Ordinate	Station Length	Chord Length
1°	1"	31'	62'
1°	1/4"	15'-6"	31'

(d) In higher degree curves, shorter station lengths and chords are to be used. It may be desirable to use longer station lengths and chords for curves less than 30 minutes.

(e) Basic stringlining principles:

(1) The mid-ordinates of a curve are indicative of its degree of curvature.

(2) The mid-ordinates of a uniform circular curve are equal when measuring offsets using chords of equal length.

(3) The mid-ordinate varies directly with the degree of curvature.

(4) Where track is thrown in or out at any single station on the curve, the mid-ordinate of the curve at the station is affected by the amount of the throw and the mid-ordinates at the adjacent stations are affected by half the throw amount, but in the opposite direction.

(5) All calculations should be checked to ascertain that the calculated throws will actually produce the required changes in mid-ordinates.

§55.2.1(M) Stringline Procedures: Road Worker Protection (RWP) and Personal Protection Equipment (PPE)

(a) Ensure area to be stringlined has the proper RWP Procedures in effect.

(b) A minimum of three people is required when using conventional stringline equipment.

(c) Many curves have grease on the rails with residual amounts on the ties and ballast so caution needs to be taken when walking in areas to be stringlined.

(d) Wear Operating Railroad Company's designated PPE, to include gloves that protect hands from getting dirty.

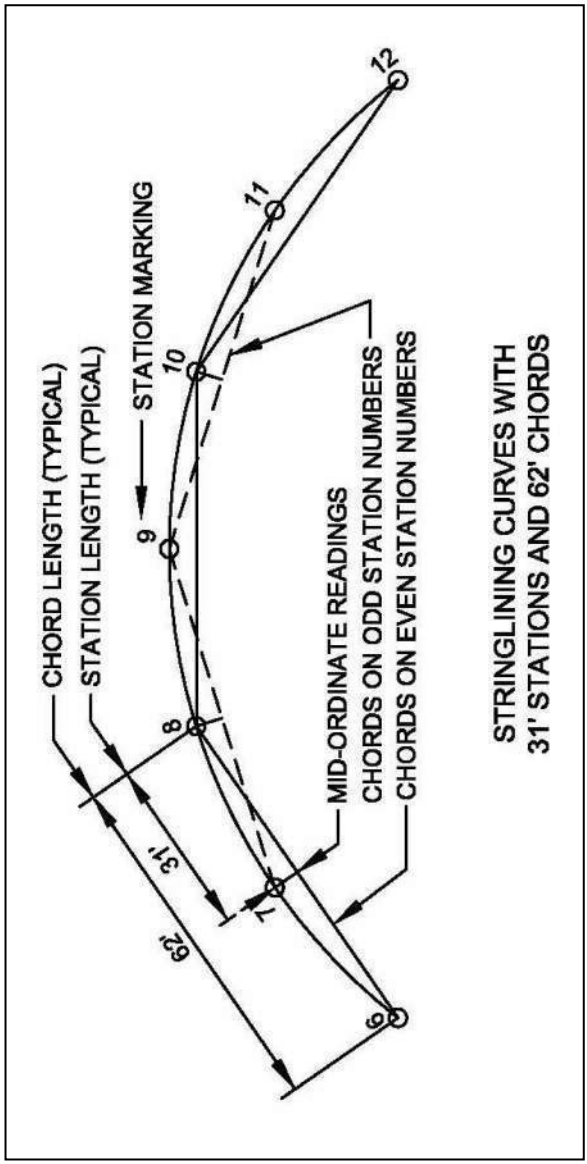
(e) Ensure that all stringline equipment is cleaned after use.

§55.2.2(M) Stringline Procedures: Items/Tools Required:

(a) Keel or crayon marker
(b) Writing instrument
(c) Stringline data sheet (as given below) with clip board
(d) 100' cloth tape with 6' folding wood ruler
(e) Stringline paddles with string
(f) Ordinate ruler
(g) Level board

§55.2.3(M) Stationing Curves and Obtaining Stringline Data

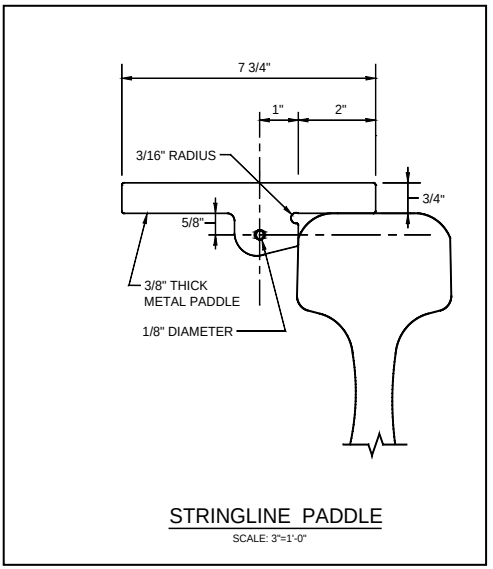
(a) The figure below shows a typical curve with stationing marked out in keel and the chords in place for measurement of mid-ordinates.
(b) Ordinate readings are taken at odd and even stations.
(c) A chord length of 62' is the chord used for this stationing.



Stringlining of Curves

(d) Stationing shall begin at a point on the tangent far enough ahead of the curve to permit the measurement of any reverse curvature or “dog-leg.” Stationing shall continue throughout the curve to a point on the tangent five stations beyond the tangent point to permit measurement of any reverse curvature. Mark stations on rail web with keel.

(e) When obtaining mid-ordinate date, stringline paddles should be used to position the string a distance of 1" away from the gage line of the rail, so as to locate and permit measurement of any local deviations in the curve. A typical stringline paddle is shown below.



Note: In curved track, measurements are taken on the gage side of the high rail (line rail) if possible. If not, field side of low rail may be used.

(f) The Stringline Data Form should be used to record field measurements and for making mathematical calculation (see §55.2.4(M)).

(g) When a conventional ruler is used to measure the mid-ordinate, the actual scale reading should be recorded and a correction made to the mid-ordinate value to compensate for any offset of the stringline from the rail. Conventional stringline paddles require that 1" be subtracted from the readings taken to give the correct mid-ordinate value.

(h) Mid-ordinate measurements should be taken (with an accuracy of 1/16"+/-) with the stringline pulled taut, not affected by the wind, and with the stringline paddles and the scale held horizontal and perpendicular to the gage face of the rail.

(i) Track center lines should be measured and recorded at every station in a two or more track territory. The distance from centerline of track to any obstruction that might interfere with the lining of the curve should be measured and recorded so that limiting throws for these tight spots may be determined.

(j) The apparent location of the curve points Tangent to Spiral (TS), Spiral to Curve (SC), Curve to Spiral (CS) and Spiral to Tangent (ST) should be noted when stationing the curve as appropriate so that the relationship between alignment and required superelevation can be determined.

(k) At all station locations record:

(1) Crosslevel as read by a level board.

(2) Gage as read from the 6' ruler (or calibrated level board).

(3) Track centers if in multiple track territory.

(4) Physical features in the field such as crossings, turnouts, field or plant welds, joints, curve tags, bridge girders, grease pots, impedance boxes, etc., that may affect the ability to throw a curve.

55.2.4(M) Stringline Data Form

(a) Below is an example of a Stringline Data Form to be filled out when stringlining a curve.

CURVE ID. _____

MassDOT RAILROAD STRINGLINE DATA FORM

BRANCH _____ MP_____ TRACK _____ CHORD (Ft.) _____ STATION (Ft.) _____ ORDINATE _____

DEGREE: _____ **PRES. ELEV: _____** **PROP. ELEV: _____**	**DATE MEASURED: _____** **DATE LINED: _____**	**DATE TAGGED: _____** **COMPUTED BY: _____**	**APPROVED BY: _____** **DATE: _____** **STATION 0 AT _____ END**

STA. NO.	TRACK CENTERS	EXIST. GAGE	EXIST. ELEV.	EXIST. ORD.	NOTES	CLEARANCE TO FIXED OBJECT	FINAL ORD.	PROP. ELEV.	THROW	STA.

§57.0(M) CURVES: ELEVATION AND SPEED LIMITATIONS

§57.1(M) General

(a) Elevation, or superelevation, is the vertical distance of the outer rail of a curve above the inner rail. It is provided to overcome or partially overcome the effects of curvature and speed.

(b) Passenger railroads primarily elevate curves to provide adequate ride quality.

(c) Freight railroads primarily elevate curves to provide ride quality and reduce rail wear.

(d) Maximum authorized speed (MAS) for a curve is that specified in the current Operating Railroad Company's Employee Timetable.

§57.2(M) Superelevation

(a) The MassDOT Rail and Transit Division shall establish the amount of superelevation and underbalance to be placed and maintained on each curve.

(b) The superelevation should not exceed values given in Appendix C, "Underbalance Table - Maximum Allowable Operating Speed On Curves."

(c) MAS shall be determined using 3" of unbalance (E_u).

§57.3(M) Superelevation Tags

(a) Curves should be tagged in the field. Points to be marked or tagged on the curves are: TS, SC, CS, and ST.

(b) Information on curve tags shall include the maximum design superelevation and the date the curve is elevated.

(c) Superelevation tags are placed as follows:

(1) The TS and the ST tags are placed 1" off the tie plate and/or elastic fastener perpendicular to the high rail.

(2) The SC and CS tags are placed 1" off the tie plate and/or elastic fastener parallel to the high rail.

§59.0(M) Elevation of Curved Track; Runoff

(a) If a curve or segment of a compound curve is elevated, the full elevation must be provided between points of full curvature throughout the curve, unless physical conditions do not permit. If the elevation does not extend throughout the curve, or segment of a compound curve, the minimum elevation must be used in determining the maximum allowable operating speed under FRA §213.57(b).

(b) Elevation runoff must be at a uniform rate, within the limits of track surface deviation prescribed in FRA §213.63 and it must extend at least the full length of the spiral. If physical conditions do not permit a spiral long enough to accommodate the minimum length of runoff, a maximum of 1" elevation may be run off in tangent track.

Maximum Authorized Speed (MAS)	Maximum Rate of Change in 31'
Up to 59 MPH	1/2"
60 to 90 MPH	3/8"

(3) At least 100' of tangent track, with zero crosslevel, shall be provided between the zero superelevation points in adjacent curves of opposite direction, or facing same hand turnouts, where practicable.

§61.0(M) CLEARANCES AND TRACK CENTERS

§61.1(M) Track Centers

(a) In maintaining alignment, the existing track centers, including equivalent centers on curves, must not be reduced below the minimum established for the territory.

(b) When surfacing track, any changes in track centers must be immediately reported to the Operating Railroad Company and the MassDOT Rail and Transit Division.

(c) In maintaining alignment, existing track center distances, including equivalent distances on curves, should not be decreased without the authority of the MassDOT Rail and Transit Division.

(d) If the measured track center in tangent track is less than 12'-6" notify the MassDOT Rail and Transit Division for guidance.

(e) On curves, the tangent track center must be increased as follows (see MassDOT MBTA Plan 1018):

(1) Where the amount of superelevation is the same on adjacent tracks or the superelevation of the inner track is greater than the superelevation of the outer track, increase the tangent track center distance at a rate of 2" per degree of curve (CRDS(6)(D)(2)).[1]

(2) Where the amount of the superelevation of the outer track is greater than the superelevation of the inner track:

(i) Increase the tangent track center distance at a rate of 2" per degree of curve and 3-1/2" for each 1" difference in elevation between the outer and inner tracks (and/or tracks under consideration) (CRDS(6)(D)(4)).[1]

(3) When aligning and super-elevating curves, the required increase in track centers should be as given in Paragraphs (e) (1) and (2) of this Part.

(4) Track centers that do not meet the requirements of the MBTA Plan 1018 should be reported to the MassDOT Rail and Transit Division.

(f) Standard Tangent Track Center Dimensions:

(1) The standard track center for tangent main line tracks is 14'-0".

(2) Track centers of 13'-0" are permissible where 14'-0" centers are not possible as approved by the MassDOT Rail and Transit Division (CRDS (6)(D)(1)).[1]

(g) Track clearance information is given in the MBTA Book of Standard Plans. See:

(1) Dwg. No. 1012: "Standard Clearances General Roadway Obstructions – Tangent Track"

(2) Dwg. No. 1013: "Standard Clearances at Stations – Tangent Track"

(3) Dwg. No. 1014: "Standard Clearances Tangent Track Signal Equipment & Utility Crossings"

(4) Dwg. No. 1015: "Clearances for New Overhead Bridges"

(5) Dwg. No. 1017: "Standard Clearances Tangent Track Bridges"

(6) Dwg. No. 1018: "Standard Track Centers & Side Clearance Increases for Curved Track"

(7) Dwg. No. 1019: "Clearances at Passenger Platforms"

[1] MBTA Commuter Rail Design Standards Manuals, Vol. I, Revision 1, April 19, 1996.

§61.2(M) Horizontal Clearances

(a) Side Clearance Increase Because of Curvature:

(1) Side clearances must be increased on both the inside and outside of curves. This is to maintain equivalent tangent clearance on curves which is decreased due to:

(i) End overhang of equipment on the outside of curves, and;

(ii) Mid-ordinate swing-in on the inside or curves.

(2) Required side clearances increase on both inside and outside of curves:

(i) 1.5" per degree of curve (AREMA Chapter 28, Section 1.1).

(3) On curved track, side clearances shall be increased 1" per degree of curve. As recommended by AREMA Chapter 28, Section 1.1., Special Notes (1984), clearances to fixed obstructions should be increased within 80' of the curve (from TS and/or ST):

(i) Clearances to fixed objects within 80' of a curve should be increased at least as given in the table below:

Distance from Fixed Obstruction to Curve (TS and/or ST) (Feet)	**Increase in Clearance Per Degree of Curve (Inches)**
20	1-1/2
40	1-1/8
60	3/4
80	3/8

(4) Also see MBTA Standard Plan No. 1018.

(b) Side Clearance Increase Because of Superelevation:

(1) Side clearances on the inside or low side of the curve must be increased to compensate for the inward lean of the equipment when a curve has superelevation.

(2) The increased side clearance amount required to clear an object and/or obstruction is:

(i) Increased side clearances required in inches

$$= h/5 \times E_A,$$

Where:

h = height of obstruction/object in feet above top of rail.

E_A = actual elevation in curve at point in question in inches.

(3) See MBTA Standard Plan No. 1018.

§61.3(M) Vertical Clearances

(a) The minimum preferred vertical clearance required by the Commonwealth of Massachusetts is 22'-6" above top of rail.

(1) See AREMA, Section 3.6, “Legal Clearance Requirements by State.”

(2) See Table 28-33, for Massachusetts for both horizontal and vertical clearances.

(b) Compensation for Superelevation:

(1) If tracks are superelevated under an overhead (OH) structure:

(i) Vertical clearance must be increased to accommodate the required vertical clearance out to a point 7'-0" from the centerline of track on a plane parallel to the top of rail of the superelevated track (CRDS (6)(B)(3)).[2]

(2) Relative to the low rail and/or grade rail, the required vertical clearance in superelevated curves is increased by the amount (inches) calculated below:

(i) Increase in Vertical Clearance Required = 143 E_A

Where:

E_A = Superelevation in curve at point of interest

(c) Compensation in Vertical Clearance for Vertical Curves:

(1) When a vertical curve exists under an overhead structure and/or obstruction, additional clearance is required to:

(i) Accommodate the vertical mid-ordinate of railway equipment (cars and locomotives)

(2) For railway equipment up to 90' in length, the required increase in vertical clearance can be calculated as follows (CRDS(6)(B)(4)).[2]

(i) Increase in Vertical Clearance Required = $\frac{0.90 \times G_1 - G_2}{8}$

Where:

G_1 = Grade at point on vertical curve (PVC) in percent

G_2 = Grade at point on vertical tangent (PVT) in percent

§61.4(M) Clearance Limiting Objects

(a) For clearance limiting objects, see AREMA, Chapter 28, Table 28-3-3 "Legal Clearance Requirements by State" and the MBTA Book of Standard Plans.

(b) The clearance from the center line of track to objects within the right-of-way such as: signal appliances, signal bridge foundations, bridge abutments and platforms shall not be reduced without ascertaining that the final clearance to the object is no less than given in AREMA, Chapter 28, Table 28-3-3, "Legal Clearance Requirements by State" and the MBTA Book of Standard Plans.

§62.0(M) GRADES

§62.1(M) Grade Limitations

(a) The maximum design gradient shall be 1-1/2% and may be exceeded only with the approval of the MassDOT Rail and Transit Division.

(b) Storage and/or yard track grades shall be level where existing grades and obstructions permit.

(c) When reconstructing track, the existing profile must be retained except where it is possible to reduce the severity, length or the number of grades.

(d) Frequent changes in gradient shall be avoided as this introduces more vertical curves into the geometry and may degrade ride quality and increase train resistance.

(e) The preferred minimum length of vertical tangent is 300'**.**

(f) However, an absolute minimum length of 100' is required (unless approved by the MassDOT Rail and Transit Division).

[2] MBTA Commuter Rail Design Standards Manuals, Vol. I, Revision 1, April 19, 1996.

§62.3(M) Horizontal Curves/Minimum Tangent Lengths

(a) For spiraled compound or reverse curves, the above minimum tangent length between spirals and/or curves is as follows:

(1) A minimum tangent length of 100' on main tracks.

(2) A minimum tangent length of 85' on secondary tracks.

(3) An absolute minimum tangent length of 65', if approved by the MassDOT Rail and Transit Division.

§63.0(M) TRACK SURFACE

§63.1(M) General

(a) Track surface is the relationship of opposite rails to each other in profile and crosslevel.

(b) Track profile is the running surface along the top of the grade rail.

(c) Crosslevel is the difference in elevation across opposite rail heads measured at right angles to the track alignment.

(d) The ideal surface is a uniform profile consisting of constant grades connected by vertical curves, with zero crosslevel on tangents and predetermined crosslevel on curves.

(e) The profile of track being surfaced should not be raised above established grades, except as approved by the MassDOT Rail and Transit Division, who will give consideration to the required elevations and clearances:

(1) In tunnels; and

(2) Under overhead bridges/structures; and

(3) At interlocking plants; and

(4) Highway grade crossings.

(f) Any encroachment upon the published minimum overhead or side clearances from a track will not be permitted.

(1) See AREMA, Chapter 28, Table 28-3-3, “Legal Clearance Requirements by State.”

§63.2(M) Maintenance of Track Surface

(a) The following criteria will serve as a practical guide for maintaining smooth riding conditions on existing tracks.

(b) The basic tools for determining correct track surface are the standard track level and stringline. The track level should be checked by the employee inspecting the track prior to use. If found to be incorrect, it must be accurately adjusted or replaced. Other approved devices may be used for determining crosslevel, but their accuracy should be determined by comparison with a standard track level in correct adjustment.

(c) When surfacing or raising track, one rail, which shall be the low rail on curves and usually the line rail on tangents, shall be selected as the grade rail. The other rail must be brought to surface by adjusting the crosslevel as required.

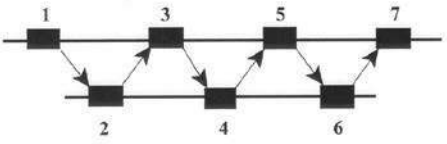
(d) For Track Classes 1-5 track, surface may not deviate more than the amount prescribed in the following table.

Surface Maintenance Limits					
Track Surface	**Class of Track**				
	1	**2**	**3**	**4**	**5**
The runoff in any 31' of rail at the end of a raise may not be more than (inches):	2-5/8	2-1/4	1-1/2	1-1/8	3/4
The deviation from uniform profile on either rail at the mid-ordinate of a 62' chord may not be more than (inches):	2-1/4	2	1-5/8	1-1/2	1
The deviation from zero crosslevel at any point on a tangent or the reverse elevation on curves may not be more than (inches):	2-1/4	1-1/2	1-1/4	1	3/4
The difference in crosslevel between any two points less than 62' apart may not be more than (inches):*(1, 2)	2-1/4	1-1/2	1-1/4	1	3/4
*Where determined by engineering decision prior to June 22, 1998 due to physical restrictions on spiral length and operating practices and experience, the variation in crosslevel on spirals per 31' may not be more than (inches):	2	1-3/4	1-1/4	1	

Notes:

(1) Except as limited by Part I, FRA §213.57(a), where the elevation at any point in a curve equals or exceeds 6", the difference in crosslevel within 62' between that point and a point with greater elevation may not be more than 1-1/2".

(2) However, to control harmonics on Track Classes 2-5 jointed track with staggered joints, the crosslevel differences shall not exceed 1-1/4" in all of six consecutive pairs of joints, as created by seven low joints (see diagram below). Track with joints staggered less than 10' shall not be considered as having staggered joints. Joints within the seven low joints outside of the regular joint spacing shall not be considered as joints for purposes of this footnote.



§63.3(M) Surfacing Areas That Require Special Attention

(a) Special attention must be given to the surface and line of track at the ends and approaches of bridges, crossings, and platforms.

(b) When surfacing, installing or tamping ties, particularly in interlocking plants, care must be taken to avoid breaking or damaging bond wires, pipes, cables or wire connections to the tracks. The Signal Maintainer must be notified prior to any work and all signal appliances are to be marked with high-visibility paint. Notify the Signal Maintainer immediately if damage occurs. Care shall be exercised to avoid the dropping or laying of metal tools or objects across the rails and causing a shunt of the signal circuits.

(c) In hot weather when surfacing track, the requirements of FRA §213.119 and Appendix A, “Continuous Welded Rail (CWR) Procedures” must be followed.

(d) During freezing and thawing weather, attention must be given to the surface of track likely to be affected by heaving due to frost action. Surface irregularities due to frost action that cannot be corrected by usual procedures may be temporarily corrected by use of track shims or by de-icing the ballast. Shimming must be performed in compliance with FRA Part 213 and §129.0(M).

(e) Undercutting, out-of-face track surfacing, and out-of-face tie renewal shall be performed in accordance with Appendix A, “Continuous Welded Rail (CWR) Procedures.”

§63.4(M) Surfacing Track

(a) When track is given a general raise, both rails should be raised at the same time. When track jacks are used, they should be placed opposite each other on the field side of the rail and must not be placed between the rails, except when absolutely necessary.

(b) Surfacing track with automated tamping equipment causes ballast breakdown and, therefore, should only be performed where it is determined to be an effective solution to correct track geometry defects or to raise the track to a required profile. Surfacing work shall be executed in a manner that assures maximum durability of the track raise and the ballast materials.

(c) When track is given a general raise, it is important to consider the relationship between the amount of lift and durability of results. In general, average lifts between 1" to 2" are desirable. Higher raises may be performed, with multiple passes, under the authority of the MassDOT Rail and Transit Division.

(d) Adequate ballast for dressing to the required ballast cross section should be distributed in advance of surfacing and aligning track.

(e) CWR track that has been surfaced and aligned and is being returned to service will be inspected by a qualified person before releasing and in accordance with Appendix A, “Continuous Welded Rail (CWR) Procedures.”

(f) Track should not be raised in interlockings or in signal territory until advance notice has been given to the Signal Maintainer so that switches, or other appliances, can be protected and then re-inspected when the work is completed.

Subpart D - Track Structure and Materials

§100.0(M) MATERIALS

"Track structure" materials include: sub-ballast, ballast, ties, rails, rail fastenings, and other track materials (OTM).

§100.1(M) Handling and Care of Materials

(a) Moving materials from place to place and caring for materials on hand is costly and requires careful planning. Therefore, the amount of material on hand and the number of handlings should be kept to a minimum.

(b) Threaded and/or insulated materials and parts should be kept under cover and protected from the weather.

(c) Materials should be distributed in such a manner so as not to become a tripping hazard or be lost prior to installation in track.

(d) Whenever possible, CWR distributed for installation should be distributed clear of the track.

  (1) When necessary to be placed in the center line of the track, the rail ends should be protected by bending them towards the center line of track (proper nosing).

  (2) When unloaded, CWR should be secured and insulated in such a manner as to prevent shunting of the signal system.

  (3) The top of the CWR, when distributed in the center line of track, should not exceed the height of the running rails.

§100.2(M) Classification of Materials

(a) Materials are classified as follows:

  (1) New: Unused, as manufactured.

  (2) Rehabilitated: Worn materials removed from track and repaired to a relay condition for reuse (e.g., rebuilt frogs).

  (3) Relay: Usable (second-hand) material removed from track to be reused with no required work to be performed before re-installation into track, such as:

    - relay ties,
    - relay rail,
    - relay frogs,
    - relay joints,
    - relay fasteners,
    - relay turnouts, and
    - other special trackwork.

  (4) Scrap: Materials removed from tracks that are not suitable for reuse.

§100.3(M) Removal and Disposition of Materials

(a) Materials removed from track shall be classified as relay or scrap (see §100.2(M)).

(b) Relay materials shall be sorted and stored properly and safely at the Operating Railroad Company's designated MOW materials area for reuse.

(c) Scrap materials shall be disposed of by the Operating Railroad Company in accordance with MassDOT, local, State, and Federal regulations.

(d) Reroller materials are used to fabricate other steel products (see §113.4.1(M)).

(e) Materials shall be removed from the work area as quickly as practicable so as to provide for a clean, safe, right-of-way, and stored securely.

§103.0(M) BALLAST; GENERAL

§103.1(M) Ballast Characteristics

(a) Unless supported by a structure, all track must be supported on a material that will:

(1) Transmit and distribute the load of the track and railroad rolling equipment to the sub-ballast and then to sub-grade.

(2) Provide lateral, longitudinal, and vertical restraint for the track.

(3) Provide drainage for the track structure.

(4) Facilitate the maintenance of track elevation, crosslevel, surface, and alignment.

(b) Ballast shall conform to the AREMA recommended practice Chapter 1 and Part 2, Section 2.4 to include Tables 2-1 and 2-2. Ballast may be obtained only from MassDOT Rail and Transit Division approved quarries.

(c) When ballast received is of inferior quality, has improper grading, or contains quantities of screenings, dirt, or foreign matter, it shall be rejected and shall be reported to the Track Supervisor, so that corrective action may be taken.

§103.2(M) Ballast Unloading

(a) To the extent practicable, ballast should be unloaded in position for use with a minimum of rehandling and dressing.

(b) Ballast must be distributed and immediately dressed so that adequate clearance below top of rail is provided for the movement of rolling stock and track equipment. Switches are not to be fouled and guard rails are not to be obstructed.

(c) When unloading ballast cars, caution should be used to ensure that both sides of the car are unloaded equally to maintain the stability of the car while unloading.

(d) Use the table given below to determine typical ballast quantities for track panels and special trackwork renewals.

Renewal Type	Number of Ballast Cars
Track Panels (3 each)	1
Crossing Frogs	1
No. 7, 8, 9, 10 Turnouts	2
No. 15 Turnouts	3
No. 20 and 24 Turnouts	4

§103.3(M) Ballast Section

(a) Ballast and sub-ballast cross sections should conform to AREMA, Chapter 1, Section 2.1, “Design,” Figures 1-2-1 through 1-2-4.

(b) Minimum ballast shoulder widths are:

Jointed Rail 12" shoulder	2:1 slope
CWR Rail 12" shoulder	2:1 slope
CWR on curves 16" shoulder	2:1 slope

(c) On CWR track, take remedial action where there is insufficient ballast (see Appendix A, "Continuous Welded Rail Procedures").

§103.4(M) Fouled Ballast

(a) Ballast may consist of crushed slag, crushed stone, screened gravel, pit-run gravel, chat, cinders, scoria, pumice, sand, mine waste, or other native material, and is an integral part of the track structure.

(b) Ballast, regardless of the material, must satisfy all four of the requirements stated in the FRA Track Safety Standards.

(c) The sole appearance of fouled ballast (ballast contaminated with broken down ballast particles, mud, coal dust, or any foreign particles), does not warrant a defect or violation to be written, if the ballast section is properly transmitting the load, restraining the track, providing adequate drainage, and maintaining proper geometry.

(d) However, fouled ballast that is unable to provide adequate drainage is of particular concern because it compromises the ability of ballast to meet its other three functions (i.e., to distribute load, restrain track, and maintain proper geometry).

(e) When fouled ballast with inadequate drainage is present, wheel loads are likely to be concentrated, rather than distributed, causing deterioration of components and instability in the area of the defective ballast.

(f) This deterioration of components and instability increases the risk of track shift (such as a track buckle), and also increases the rate of degradation of geometry, and may result in a derailment.

(g) Factors that affect the rate of degradation of components and geometry include the tonnage, traffic density, and operating speeds, as higher tonnage, traffic density, and operating speeds increase the amount and/or frequency the forces exerted on the components

(h) Operating Railroad MOW personnel should look for indicators that the ballast is not performing its four functions, such as the existence of a crosstie and/or geometry condition.

(1) The term "geometry condition" used here means a track surface, gage, or alignment irregularity that does not exceed the allowable threshold for the designated track class in the Track Safety Standards.

(2) Operating Railroad MOW personnel are encouraged to use their technical knowledge and professional experience in recognizing fouled ballast, and should take into account the severity of a geometry condition along with the following factors when considering the action and/or remedial action required:

- Track class and operating speed
- Traffic density and wheel loads
- Adequacy of shoulder ballast and crib ballast
- Track type: route for passenger and/or hazardous materials
- Potential that the track may deteriorate very rapidly following heavy rains
- Center-bound cross ties, if observable
- Rail and fastener conditions
- Sub-grade condition, if observable
- Surrounding track structure (embankment or cut, obvious/observable variation of track stiffness of the left from right side of the track, and from the adjacent areas along the track)

- Proximity of the defective ballast locations to switches (special work), joints, bridges, or grade crossings
- Existence of standing water or indications that water had been standing (as water sometimes get trapped beneath the ties and may not be visible on the surface)

§103.5(M) Ballast Cleaning

(a) When ballast in track becomes fouled, it should be mechanically cleaned, or removed, and then replaced to restore performance and proper drainage.

(b) The type of cleaning procedure employed should depend on the nature and extent of the fouling.

(c) Types of ballast cleaning and/or removal activities are described below:

(1) Shoulder ballast cleaning promotes lateral drainage of the track structure. A proper cycle of shoulder cleaning can aid in extending the cycle between undercutting operations.

(2) Undercutting cleans the ballast under the track to include the ties, cribs, and shoulders.

(3) A portion of the ballast removed may be returned to the track for reuse if approved by the MassDOT Rail and Transit Division.

(4) See Appendix A, "Continuous Welded Rail (CWR) Procedures," for the proper procedures for shoulder cleaning and undercutting of track with CWR.

§103.6(M) Ballast Gradation

(a) The nominal size of crushed stone used for ballast in maintenance and new construction shall be as follows (unless otherwise directed by the MassDOT Rail and Transit Division):

All tracks:

Ballast Size AREMA No. 4 3-4" to 1-1/2"

§109.0(M) CROSSTIES

(a) Crossties shall be made of a material for which rail can be securely fastened. A crosstie must have effective rail fasteners on both the gage and field side of both rails to be considered an effective tie.

(b) Each 39' segment shall have:

(1) A sufficient number of cross ties which in combination provide effective support that will:

(i) Hold gage within limits prescribed in FRA §213.53(b);

(ii) Maintain service within the surface limits prescribed in FRA §213.63; and

(iii) Maintain alignment within the limits prescribed in FRA §213.55.

(2) The minimum number and type of crossties specified in this section must be effectively distributed to support the entire segment; and

(3) At least one non-defective crosstie of the type specified in this section that is located at a joint.

(4) The minimum number of effective crossties as listed in the table below:

Minimum Number of Effective Crossties			Maximum Distance Between Effective Ties (Center to Center) (Inches)	Maximum Number of Successive Defective Ties (Normal Spacing)
Class of Track	**Tangent Track and Curves ≤ 2°**	**Turnouts and Curve Track > 2°**		
1	5	6	100	3
2	8	9	74	2
3	8	10	74	2
4 and 5	12	14	50	1

§109.1(M) Dimensions of Crossties

(a) Wood crossties are 7" in depth, 9" in width and 8'-6" in length (unless otherwise authorized by the MassDOT Rail and Transit Division).

(b) Timber crossties shall be of the following sizes:

Type of Track	Size
Main Line Track	7" grade (7"x9" x 8'-6")
Other Than Main Track and Yard Tracks	6" grade (6"x8" x 8'x6")
Grade Crossings	7" x 9" x 9', 7" x 9" x 10'(1)
Note: (1) Or as recommended by manufacturer.	

(c) The specifications for wood crossties shall be in accordance with AREMA, Chapter 2.

(d) Wooden transition ties may be used at open deck bridge approaches. Transition tie layout is to be approved by the MassDOT Rail and Transit Division.

(e) Concrete and steel ties may be used with the approval of MassDOT Rail and Transit Division.

(1) Concrete ties shall be sized according to MBTA Standard Plan 1120.

§109.2(M) Use of Crossties

(a) The use of crossties, other than those described in §109.1(M), shall be approved by the MassDOT Rail and Transit Division.

(b) The type and spacing of ties for each line and class of track shall be designated by MassDOT.

(c) The number of ties and tie spacing for each line and class of track shall be designated by the MassDOT Rail and Transit Division in accordance with the service requirements. Center to center tie spacings are given in the table below:

Type of Track	Distance (Inches)
Main Tracks	19-1/2"
Within Grade Crossing[(1)]	18"
Other Tracks	22"
Concrete Ties	24"
Steel Ties[(1)]	20"-24"
Note: [(1)] Or as recommended by the manufacturer.	

(d) It is recognized that ties will not normally be re-spaced except during reconstruction.

(e) However, when ties are installed out-of-face, ties should be re-spaced wherever practicable.

§109.3(M) Placement of Crossties

(a) Wood Crossties

(1) Ties should be placed in track with the wider heart wood face down and square to the line of the rail.

(2) The ends of standard 8'-6" ties should be brought to a uniform line 18" from the edge of the base of rail on the line side as follows:

(i) On single tangent track, line the ties to the mile post side of the track.

(ii) On roads with two or more main tracks, line the field ends of ties.

(iii) On all curved track, ties shall be lined to the high rail.

(iv) When necessary to install non-standard length ties, they shall be centered in the track.

(b) Any Crossties

(1) Ties shall be kept sufficiently spaced and square to the line of rail to permit proper tamping and distribution of load.

(2) When necessary, ties should be re-set to standard spacing.

(3) Ties shall be square to the line of rail so that fastening systems are not subjected to a torsional load because of tie skewing.

(4) When installed, crossties shall be properly tamped 12" on both sides of the base of rail.

§109.4(M) Preventing Crosstie Damage

(a) General:

(1) When handling or spacing ties, care shall be taken not to damage them with MOW equipment, picks, and spiking hammers.

(2) Tie tongs, lining bars and other suitable tools or tie spacing equipment shall be used, so as to prevent tie damage.

(3) For additional information on fastener application see §127.0(M).

(b) Wood Crossties:

(1) Adze ties as required to obtain a sound and true bearing to support the tie plate.

(2) If a tie will be reused, cedar tie plugs or an approved hole filler must be used to fill holes where spikes, pins and lag screws have been removed. The tie shall be installed with hole side up.

(3) Square tie plugs (5/8") are used with spikes and pins, round tie plugs (3/4" diameter) are used with lag screws.

§110.0(M) Switch Timber

(a) Timber switch ties shall be 7" grade (7" x 9"), except for power switch machine timbers, which shall be a cross section of 9" x 10", with lengths as shown on the standards plans.

(b) Use of switch timbers of other material must be approved by the MassDOT Rail and Transit Division.

§111.0(M) Bridge Timber

(a) Oak or Southern Yellow Pine Timber, or approved equal by the MassDOT Rail and Transit Division, shall be used on all open deck bridges.

(b) Bridge ties shall be adzed, framed, and sized according to framing plans prior to treatment. Suitable holes must be bored for drive spikes that fasten tie spacing bars on timbers.

(c) Where ties are bored or adzed in the field, they shall be treated with an appropriate preservative.

(d) Bridge ties shall be fastened to the structure with galvanized hook bolts as follows:

- On tangent track every 4th tie shall have two hook bolts to connect the tie to the deck, or
- On curved track every 3rd tie shall have two hook bolts to connect the tie to the deck; or
- The MassDOT Rail and Transit Division shall specify how many ties shall have hook bolts that connect ties to the deck on any and all spans.

(e) Lag screws shall be used in holes bored to size to fasten galvanized tie spacing bars on timber (see MBTA "Standard Book of Plans").

(f) Tie spacing bar, spacer block, and hook bolt details are given on MBTA Standard Plan No. 1236 "Bridge Timber Anchoring Detail."

(g) All open deck bridges shall have spacer blocks between all timber (see MBTA "Standard Book of Plans").

§113.0(M) RAIL

§113.1(M) Branding and Stamping

(a) Branding shall be rolled in raised characters on the side of the web of each rail at a minimum of every 16' in accordance with the following requirements:

(1) The data and order of arrangement of the branding shall be as shown in the following typical brand:

136	RE	Manufacturer	2003	III or 3
(Weight)	(Section)	(Mill Brand)	(Year Rolled)	(Month Rolled)

(2) The method of hydrogen elimination shall be located in the brand when a hydrogen elimination method other than Vacuum Treated (VT) is used.

(b) The web of each rail shall be hot stamped a minimum of three times per rail (short rails must contain a minimum of one full stamp) on the side opposite the brand, and shall not occur within 2' of either end of rails, and in accordance with the following requirements:

(1) The data shall be shown in the following typical stamping. The height of the letters and numerals shall be 5/8".

SS, HH, LA, IH or LH	297165	PSTU	12	BC
(Rail Type)	(Heat Number)	(Rail Letter)	(Strand and Bloom Number)	(Method of Hydrogen Elimination, if indicated in stamping)
Notes: SS = Standard Strength HH = Head-Hardened LA = Low Alley Standard Strength IH = Low Alloy Intermediate LH = Low Alloy Head-Hardened				

(2) Rails from continuous cast blooms shall be identified by a designation for heat number, strand number, and bloom number. The rail shall be identified by an alphabetical designation beginning with “P”, and succeeding “S”, “T”, “U”, etc., consecutively, or any other identification of the position of the rail within the cast, as agreed between the purchaser and manufacturer.

(c) Markings:

(1) High-strength rails shall be marked by either a metal plate permanently attached to the neutral axis, hot stamped, or in the brand which gives the manufacturer, type, and/or method of treatment. Heat-treated rail shall be paint-marked orange. Alloy rail shall be paint-marked aluminum color.

(2) Non-AREMA (Industrial Quality) rails shall be paint-marked yellow.

(3) Short rails (less than 80') shall be paint-marked green.

(4) Trackwork rails shall be paint-marked white.

(5) Rail length shall be painted on the end faces or in a manner acceptable to the purchaser or manufacturer.

(6) Individual rails shall be paint-marked only one color, according to the order listed above.

(7) Industrial Quality (IQ) rails shall be permanently identified by grinding diagonally through every “RE” or other designation within the rails’ branding. Each designation brand shall be ground or milled diagonally from the top right hand corner to the bottom left hand corner, a minimum of 1/4" in width and to within 0.010" of the parent rail web surface.

(d) For further information on this subject see AREMA 2.1.6.

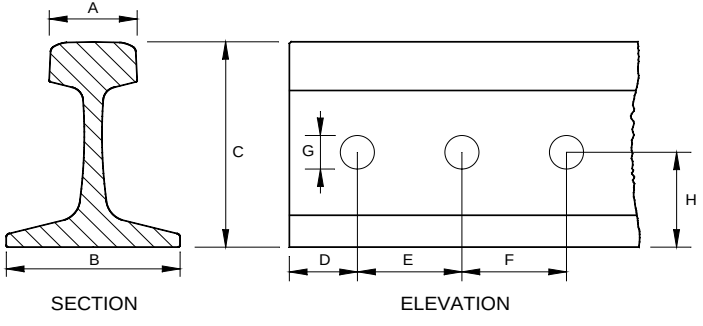
§113.2(M) Rail End Drilling and Bolt Hole Sizes

(a) Jointed rails consist of conventional length rails of 400' or less which are bolted together.

(b) CWR is continuous welded rail in strings of greater than 400' where the rails are welded by the flash butt process or by other methods as approved by MassDOT.

(c) Rail size dimensions and bolt hole drilling for typical rail sections are given in the following table.

(d) A rail and joint dimension table with some typical MassDOT rail sections is contained below.



RAIL DATA

Rail Data (Inches)														
Rail Section Dimensions In Inches	**80# A.S.**	**85# A.S.**	**100# NH**	**105# DY**	**107# NH**	**112# R.E.**	**115# R.E.**	**119# R.E.**	**130# R.E.**	**131# R.E.**	**132# R.E.**	**136# R.E.**	**140# R.E.**	**141# R.E.**
A - Head Width	2-1/2	2-9/16	2-3/4	3	2-3/4	2-23/32	2-23/32	2-21/32	2-15/16	3	3	2-15/16	3	3-1/16
B - Base Width	5	5-3/16	5-1/2	5-1/2	5-1/2	5-1/2	5-1/2	5-1/2	6	7	6	6	6	6
C - Height	5	5-3/16	6	6	6-1/8	6-5/8	6-5/8	6-13/16	6-3/4	7-1/8	7-1/8	7-5/16	7-5/16	7-7/16
D - Drilling (1st Hole)	1-15/16	1-15/16	2-1/2	2-3/4	2-1/2	2-7/16	3-1/2	3-1/2	2-3/8	2-1/2	3-1/2	3-1/2	3-12	3-1/2
E - Drilling (2nd Hole)	7	7	7	5-5/8	7	7	6	6	7	6-1/2	6	6	6	6
F - Drilling (3rd Hole)	-	-	-	5-5/8	-	6	6	6	NA	6-1/2	6	6	6	6
G - Diameter of Bolt Hole	1	1	1	1-1/16	1	1-1/8	1-1/8	1-1/8	1-11/32	1-1/8	1-1/4	1-1/4	1-1/4	1-1/4
H - Base to Center of Hole	2-3/16	2-9/32	2-39/64	2-5/8	2-39/64	2-7/8	2-7/8	2-7/8	2-3/4	3-3/32	3-3/32	3-3/32	3	3-3/32
I - Diam. of Bolt	7/8	7/8	7/8	15/16	7/8	1	1	1	1-1/8	1	1-1/8	1-1/8	1-1/8	1-1/8

Note:
[1] Source: AREMA Plan Nos. 4-1-6, 4-1-7, 4-3-13

§113.3(M) Recommended Maintenance Wear Limits for Rail

§113.3.1(M) Maximum Head and Gage Face Wear for Rail (In and Out of Track)

(a) With traffic, the rail head wears vertically and horizontally. As this wear increases, the cross section of the rail decreases. This decrease in rail section may overstress the rail causing rail failure.

(b) The following table contains the maintenance wear limits for maximum vertical wear and maximum gage face wear (both gage and field) for rail sections commonly found on MassDOT rail lines.

(c) Rail that has head and gage face wear, as given in the table below, shall be immediately removed from track and scrapped as soon as practicable.

(d) Rail replacement should be programmed prior to reaching the given maintenance rail wear limits.

§113.3.2(M) Railway Limits for the Welding of Relay Rail

(a) The table below gives the maximum head wear and gage face wear values recommended by AREMA for the welding of relay rail.

(b) Relay rail that has greater amounts of either head wear and/or gage face wear should not be welded.

(c) Maximum wear values are given for both mainlines and for other tracks to include light density mainlines, sidings, and other tracks.

Recommended Maintenance Maximum Rail Wear Limits [1]							
Rail Section	New Rail Height (Inches)	Allowable Head Wear (Inches)			Allowable Gage Face Wear (Inches)		
		Mainlines	Other Tracks	New Rail Head Width [2] (Inches)	Mainlines	Other Tracks	Total Head Width Wear [3] for Mainlines and Other Tracks
80 AS	5	5/16	3/8	2-1/2	5/16	3/8	1/2
85 AS	6	3/8	7/16	2-9/16	5/16	3/8	1/2
100 NH	6	1/2	5/8	2-3/4	3/8	1/2	1/2
105 DY	6	1/2	5/8	3	3/8	5/8	1/2
107 NH	6-1/8	1/2	5/8	2-3/4	3/8	1/2	1/2
112 RE	6-5/8	1/2	5/8	2-23/32	3/8	1/2	1/2
115 RE	6-5/8	1/2	5/8	2-23/32	3/8	1/2	1/2
119 RE	6-13/16	1/2	5/8	2-21/32	3/8	5/8	1/2
130 RE	6-3/4	1/2	5/8	2-15/16	3/8	3/4	3/4
131 RE	7-1/8	5/8	1/2	3	1/2	3/4	3/4
132 RE	7-1/8	5/8	1/2	3	1/2	3/4	3/4
136 RE	7-5/16	5/8	3/4	2-15/16	1/2	3/4	3/4
140 RE	7-5/16	5/8	3/4	3	1/2	3/4	3/4
141 RE	7-7/16	5/8	3/4	3-1/16	1/2	3/4	3/4

Notes:

(1) Rail that has maximum wear as given in this table shall be removed from track immediately and scrapped as soon as practicable.
(2) Measure gage face wear at 5/8" below top of crown of railhead.
(3) Combine field and gage side wear 5/8" below top of crown of railhead. This wear column only applies to rail that has been transposed.

Rail Wear Limits for the Welding of Relay Rail[5]

Rail Section	New Rail Height (Inches)	Maximum Allowable Head Wear (Inches)			Maximum Allowable Gage Face Wear[1] (Inches)		
		Mainlines/ AREMA Class 2	Other Tracks/ AREMA Class 3	New Rail Head Width[2] (Inches)	Mainlines/ AREMA One Side Class 2	Other Tracks/ AREMA One Side Class 3	Total Head Width Wear[3]/ AREMA Both Sides Classes 2 and 3
80 AS	5	N/A	N/A	2-1/2	N/A	N/A	N/A
85 AS	6	N/A	N/A	2-9/16	N/A	N/A	N/A
100 NH	6	1/8[4]	N/A	2-3/4	3/16[4]	N/A	3/16[4]
105 DY	6	1/8[4]	N/A	3	3/16[4]	N/A	3/16[4]
107 NH	6-1/8	1/8[4]	N/A	2-3/4	3/16[4]	N/A	3/16[4]
112 RE	6-5/8	1/4[4]	3/8[4]	2-23/32	3/16[4]	5/16[4]	3/16[4]
115 RE	6-5/8	1/4[4]	3/8[4]	2-23/32	3/16[4]	5/16[4]	3/16[4]
119 RE	6-13/16	1/4[4]	3/8[4]	2-21/32	3/16[4]	5/16[4]	3/16[4]
130 RE	6-3/4	N/A	N/A	2-15/16	N/A	N/A	N/A
131 RE	7-1/8	1/4[4]	1/2[4]	3	1/4[4]	3/8[4]	3/16[4]
132 RE	7-1/8	5/16[4]	9/16[4]	3	1/4[4]	3/8[4]	3/16[4]
136 RE	7-5/16	5/16[4]	9/16[4]	2-15/16	1/4[4]	3/8[4]	3/16[4]
140 RE	7-5/16[4]	5/16[4]	9/16[4]	3[4]	1/4[4]	3/8[4]	3/16[4]
141 RE	7-7/16[4]	3/8[4]	5/8[4]	3-1/16[4]	1/4[4]	3/8[4]	3/16[4]

Notes:

(1) Measure gage face wear at 5/8" below top of crown of railhead.
(2) Combine field and gage side wear 5/8" below top of crown of railhead. This wear column only applies to rail that has been transposed.
(3) Rail classified as AREMA Class 1 or 2 may be used in any track without restriction.
(4) Rail classified as AREMA Class 3 may be used in light density mainlines, sidings, and all other tracks.
(5) AREMA values from "Rail Grading Classification by Wear Table 4-3-17."

§113.3.3(M) Classification and Identification of Rail for Reuse (In and Out of Track)

(a) By mill inspection, rails are to be classified and identified by paint marking as follows:

Type of Rail	Marking
Standard Carbon Rails	None
Head-Hardened Rails	Orange
Rails not 39 ft. or 80 ft. in length	Green
Relay Rail Pre-Tested	Green
Relay Rail Not Tested	Yellow
Industrial Quality Rail	Per Mill

(1) High-strength rails shall be marked by either a metal plate permanently attached to the neutral axis, hot stamped, or in the brand. The information will include the manufacturer and type and/or method of treatment. (Fully heat-treated rails are no longer available and are not to be used unless approved by MassDOT Rail and Transit Division.)

(2) Individual rails shall be paint-marked only one color according to the above, or as agreed to by MassDOT Rail and Transit Division and the manufacturer.

(3) Paint marking will appear on the top of the head of one end of the rail only, at least 3' from the end.

(4) All short length rails produced shall have the length identified in a manner acceptable to MassDOT Rail and Transit Division and the manufacturer on top of the head of the rail approximately 1' from each end.

(b) Failed Rails:

(1) Rails removed from track on account of any defects listed in FRA §213.113(a), except end defects described in Paragraph (2) below, must have the top of the head noticeably damaged at the defect using a cutting torch or abrasive saw, so that they will not be mistakenly returned to service in track, or be butt welded in fabricating strings of fit CWR. These rails will also be marked with red paint on the running surface near the ends of the rail. Such failed rails, damaged as above, are to be classified for scrap in its proper category.

(2) Rails removed from track on account of end defects only, such as a bolt hole crack or head-web separation where a portion of the rail end is not physically broken out, must have the top of the rail head noticeably damaged at the location of the defect using a cutting torch or abrasive saw to insure that a rail of this type is not returned to service in track without cropping the defective end.

(3) Any rail containing longitudinal or transverse defects must be removed in its entirety (all rail between joints in bolted rail, and all rail between plant welds, between plant and field welds, or between field welds in CWR). These rails will also be marked with red paint on the running surface near the ends of the rail. The entire rail is then to be considered as scrap rail. Rails removed from track on account of any defects listed in FRA §213.113(a), except end defects described in Paragraph (2) above, must have the top of the head noticeably damaged at the defect using a cutting torch or abrasive saw, so that they will not be mistakenly returned to service in track, or be butt welded in fabricating strings of fit CWR.

§113.3.4(M) Transposing and Turning Rail on Curves

(a) To obtain the maximum service life of rails on curves, the high and low sides should be transposed before horizontal wear, vertical wear or flow of metal in the head makes this impractical because of undesirable rail head stresses that may be produced leading to possible failure of the rail itself.

(b) In general, high and low sides should be transposed when the horizontal wear on the high rail is between 3/8" and 5/8" in the full body of the curve, and before the metal in the low rail flows excessively.

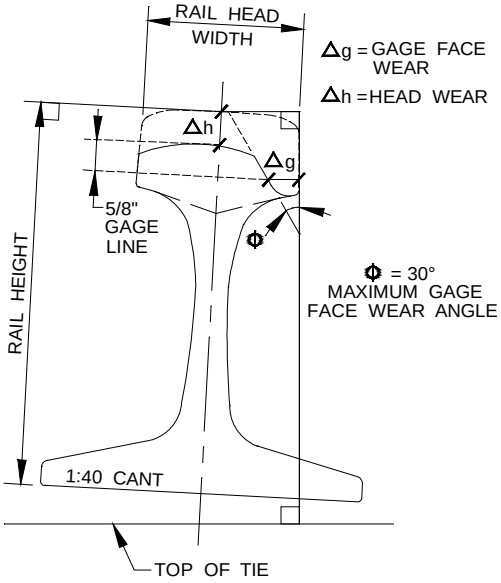
(c) In general, high side rails may be turned when horizontal wear does not exceed 1/2".

(d) 112 lb. and 131 lb. rail must not be turned or transposed without the permission of the MassDOT Rail and Transit Division.

§113.3.5(M) Gage Face Angle (Worn Rail)

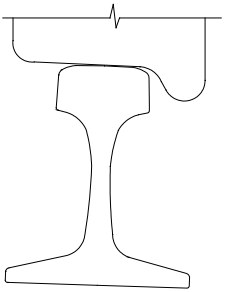
(a) When a rail is placed in track, under traffic, the gage face wears at an angle (ϕ). As this angle increases, the possibility for a wheel to climb the gage face of a rail and derail increases.

(b) As shown on the following diagram, rail replacement shall be accomplished when the gage face angle (ϕ) exceeds 30°. As the rail wear readings approach 30°, the Operating Railroad Company should make necessary plans to change out the rail.



RAIL WEAR CRITERIA

(c) For an example of new wheel and new rail interface, see the following diagram.



§113.4(M) Rail Classifications

§113.4.1(M) Defective Rails

(a) Rails removed from track on account of any defects listed in FRA §213.113(a), except end defects described in Paragraph (c) below, must be marked "NG" (no good) and a torch mark made in the head of the rail.

(b) Rails removed from track with end defects, such as bolt hole cracks or head-web separations where a portion of the rail end is not physically broken out, must have the top of the rail head noticeably damaged at the location of the defect, using a cutting torch or power saw to insure that a rail of this type is not returned to service without cropping off the defective end.

(c) "Reroller Rails/Rail Steel No. 1" are rail steel materials that are recycled as used to fabricate other steel products to include bars and shapes. Reroller rail generally has a higher value than rail scrap. Reroller rail includes:

- Standard section tee rails with a weight of 50 lbs/yard or greater which are free of all attachments;
- Rails that have no excessive pitting;
- Rails that are free of all debris (e.g., concrete, mud, asphalt, etc.);
- Rails that are not bent and twisted;
- Ferrous materials that do not contain frogs, switches and guard rails;
- Rails that do not have split heads and broken flanges;
- Pieces of CWR, provided no weld is over 9" from the end of the rail; or
- As specified by the Institute of Scrap Recycling Industries.

(d) Defective rails should be immediately removed from the right-of-way to the approved MassDOT secured scrap material storage area.

§113.4.2(M) New Rails

Class of Rail	Use
Medium-Hard Rail* Standard Rail (HB310)	In all tracks.
Head-Hardened Rail	For curves 3º and over, mainline turnouts, grade crossings, special trackwork, tunnels, and other locations as specified by the MassDOT Rail and Transit Division.

Notes:

* Standard Rail - standard rail that conforms to latest AREMA Specifications.
* Head-Hardened Rail - prime rail that is fully quenched and tempered in the head area only to increase hardness and strength. Head-hardened rail rolled by PST (Bethlehem Steel Company) will be marked "HH" to the right of the heat number. Head-hardened rail rolled by Rocky Mountain Steel Mill (CF&I Company) will be marked "DH" to the right of the heat number.
* Head-hardened markings furnished by any other manufacturers shall be approved by the MassDOT Rail and Transit Division.

§113.4.3(M) Cropped or Relay Rails

(a) Rails removed from track having only end defects, such as bolt hole cracks or head-web separations within joint bar areas, may be used without restrictions after defects have been eliminated by cropping (see §113.11(M)).

(b) Relay rail should be checked against the rail wear table given in §113.2.1(M) prior to installation.

(c) Any relay rail installed in main track that carries passenger trains, or is a hazardous material route, shall be inspected for internal rail defects if the operating speed is Class 3 or higher.

(d) If a valid search for internal defects cannot be conducted before expiration of time or tonnage limits given in FRA §213.237(a) or (c), reduce operating speed to a maximum 25 MPH until such time as the valid search can be made.

§113.5(M) Disposition and Shipment of Rails

(a) Rails released from renewals and retirements must be disposed of as authorized by MassDOT.

(b) Other track materials (OTM) must be removed from the individual rails before loading rail onto railcars or trucks (see §100.3(M)).

(c) For shipment, relay rails may be loaded head up with wood stripping between layers.

§113.6(M) Distributing Rail

(a) Rails and OTMs should be unloaded in a position as close as possible for laying to minimize further handling.

(b) Rails should be placed parallel with the track on their base to avoid excessive bending or damage. Care should be taken to avoid placing rails on manhole covers, on signal cables and conduits, or close to air lines.

(c) Rail is not to be stored between the running rails unless conditions do not allow rail placement outside the track off the ends of the ties. Rail heads should not be above the running rail.

(d) CWR ends must be offset and blocked to allow for thermal expansion.

(e) In yards and at locations where employees must walk close to the track, rail should be placed as near to the ends of ties as possible to avoid obstructing walkways.

(f) Any time rail and OTM is distributed along the right-of-way, the Transportation Department must be notified so as to include in a Division Notice.

§113.7(M) Preparation and Care

(a) As far as practicable, track should be placed in good line and surface prior to rail renewals. Programmed tie renewal shall be accomplished before laying rail. Track to be laid with CWR should be fully ballasted, and preferably, programmed tie renewals should be completed in advance of rail laying.

(b) Rails should be examined prior to laying in track to detect any sharp bends, damage, or surface conditions that will make them unserviceable.

(c) Care of rail should be taken the day on which it is laid, so that no damage to rail or fastenings will result from continued use under normal traffic. Loose ties should be tamped to a good bearing under the rail immediately behind rail laying operations.

§113.8(M) Laying Jointed Rails

(a) Jointed rails should be laid, one at a time, with space allowance for expansion being provided between rail ends in accordance with the following table:

Jointed Rail Expansion Tables	
39' Rails	
Rail Temperature (°F)	**Rail End Space (Inches)**
Below 6	5/16
6 to 25	1/4
26 to 45	3/16
46 to 65	1/8
66 to 85	1/16
Over 85	None

78' or 80' Rails	
Rail Temperature (°F)	**Rail End Space (Inches)**
Below 30	5/16
31 to 45	1/4
46 to 60	3/16
61 to 72	1/8
73 to 85	1/16
Over 85	None

(b) Rails greater than 80' and less than 400' in length, must be expanded and anchored as CWR.

(c) To insure the required space allowance, rail ends should be brought squarely together against approved expansion shims of proper thickness and the rail joints applied before spiking and anchoring.

(d) Space between rail ends for insulating joints (paper and poly types) should only be sufficient to permit insertion of standard end posts.

(e) An approved rail thermometer shall be used. The person in charge shall see that rail temperature is checked frequently and that proper rail expansion shims are used.

(f) Jointed rails should be laid, one at a time, with space allowance for expansion being provided between rail ends.

(g) To insure the space allowance required, rail ends should be brought squarely together against approved expansion shims of proper thickness and the rail joints bolted before spiking.

(h) An exception to the requirement of laying one rail at a time is to expedite rail installation no more than 180' of rail (5 @ 39' rails) may be bolted together prior to being installed in track, provided that the proper rail end spaces are maintained according to §113.9(a) above.

(i) Space between rail ends in insulated joints should only be sufficient to permit installation of standard end posts.

(j) An approved magnetic rail thermometer shall be used to determine the rail temperature. The thermometer is to be attached to the web of the rail that is shaded from the sun's rays for a minimum of 5 minutes until an accurate temperature reading can be achieved. Rail thermometer should be placed on the smooth surface of the web and not on any raised brand.

(k) Rail should be laid with joints staggered 13' to 15'. Permissible variations are as follows:

  (1) Through turnouts and at insulated joints;

  (2) Rails laid with the joints of one line of rail opposite the middle of rails in the other line in accordance with former standards need not be relocated until out-of-face rail renewals are made; and

  (3) At other locations as directed by the MassDOT Rail and Transit Division.

(l) Rails less than 18' in length should not be used in main tracks, except that rails not less than 14' may be used for:

  (1) Connections within turnouts and crossovers;

  (2) Temporary closures;

  (3) Temporary replacement of broken rails. Rails not less than 14' in length used in accordance with previous standard practice need not be removed until rails are changed or re-laid.

(m) Placing bolted joints in or closer than 30' from the edges of road crossings, within the limits of switch rails, frog guard rails, or the ends of open deck bridges, trestles, or viaducts is prohibited (unless approved by MassDOT Rail and Transit Division).

(n) Rails of the same section should be used on open deck bridges, through road crossings, through paved track areas of station platforms, through areas of direct fixation track, and to the greatest extent possible in turnouts and crossovers.

(o) Rails of unequal wear and different sections must be brought to an even surface at joints on the tread and gage side of the rail by welding. When shimming is required to run off the difference in height of rails, the requirements of §129.0(M) must be met.

(p) The use of shims or spring washers between the web and the joint bar to align the gage sides of rail heads, or the use of acetylene torches, or grinding to manufacture, or change the dimensions of compromise joints, is prohibited. Adjustments to the tread and gage side of the rail head must be accomplished by:

(1) Compromise joints of approved design.

(2) By welding the rail head.

(q) When necessary to make a temporary connection for the passage of a train at normal speed, the connection must be made with a piece of rail not less than 14' long. Use compromise or standard joints with the full number of bolts and with all rail holding spikes driven. Use of switch points to make temporary connections when laying rail is prohibited.

§113.9(M) Rail End Bolt Holes

(a) Holes must be drilled in accordance with AREMA recommended standard practice and the following:

(1) Bolt holes shall be drilled with the joint bars removed by marking the location of the center of the hole with a proper size template block or by drilling through an approved template.

(2) When bolt holes are drilled, a uniform feeding pressure should be maintained as per manufacturer's instructions.

(3) An environmentally sensitive lubricant should be used throughout the drilling process.

(4) Bolt hole sizes and drillings are found in the rail end drilling table given in §113.1(M).

(5) After drilling is completed, bolt holes should be brushed out and inspected. Any burrs or chipped edges should be removed by chamfering or filing to a smooth edge around the entire circumference of the bolt hole.

(6) If jointed rail is to be welded, rail ends should be drilled in such a manner as to provide for closure by field welding (no edge of hole closer than 6" to the joint).

(7) In those instances where the joint will not be welded, all holes in the joint bar will be drilled and fully bolted.

§113.10(M) Cutting and Electric Arc Welding of Rail

(a) For cutting of tight rails in CWR see Appendix A, "Continuous Welded Rail (CWR) Procedures."

(b) The tools which may be used for cutting rails are listed below:

(1) Power saws with approved guide attachments and proper PPE.

(2) Gas cutting torches, in emergency only in accordance with FRA §213.122.

(c) Electric arc welding is prohibited on any portion of the rail, except as listed below:

(1) Welding of engine burns. Engine burns deeper than 3/8" should not be welded. If there are more than four engine burns within a 39' rail, the rail should be changed out.

(2) Application of welded bonds.

(3) Top of rail within limits of joint bars (batter and rail ends).

(4) Gas welding of rail is prohibited.

(d) Any rail damaged by torches must be promptly removed from track.

(e) Except for the welding of engine burns in accordance with approved methods, and except for application of welded bonds, gas or electric arc welding is permitted only on the top of the rail within the limits of the joint bars.

§113.11(M) Bonding Rails for Track Circuits

(a) Except in an emergency where rails are bonded for track circuits, no rail bonds shall be broken or rails removed unless a Signal Maintainer is notified or present.

(b) Signal bonds shall not be applied to the rail web or base; only on the rail head.

(c) In an emergency, a broken rail, switch point, or frog may be renewed without waiting for the Signal Maintainer. In such cases, the joints shall be tightened to make as good contact as possible with the rails and the Signal Maintainer notified that the rail bonds have been broken.

(d) If a broken rail is replaced within the starting circuit of automatic highway crossing protection, the track shall not be restored to service until all trains approaching the crossing have been:

  (1) Instructed to be prepared to stop prior to passing over the crossing involved; or

  (2) Until a qualified person under FRA §213.7(d)(1) is provided to move train traffic at the crossing; or

  (3) The Signal Maintainer has applied all rail bonds and verified the continuity of the circuit.

§113.12(M) Maintenance of Rail by Grinding

(a) Rail grinding must be accomplished with profile grinders or production grinding units.

  (1) Hand grinding should be limited to small areas where the use of profile grinders is not practical.

  (2) Out-of-face grinding must be performed with production grinding units.

(b) Production grinding is required to remove surface anomalies such as scale, flakes, checks, shells, and corrugations on the rail head and to re-profile the rail head.

(c) In special trackwork a combination of production grinding and hand grinding may be required.

(d) Grinding of rail should be performed at regular intervals based on the condition of the rail, location (such as grades and curves), the number, and type of trains, and the accumulated tonnage at a particular location.

(e) All grinding on wooden open deck bridges shall be approved by MassDOT Rail and Transit Division before any work begins. Rail grinding on bridges (ballast deck) is permitted provided that proper precaution is taken against fire as given below:

  (1) Grinding shall only be performed when there is no highway or river traffic directly under the area to be ground.

  (2) The rail grinding crew has a supply of water and other fire suppressants to protect against fire.

  (3) After grinding, the entire structure is re-inspected for possible “hot spots” or fire.

  (4) Production grinding of rail on timber trestles is prohibited.

(f) High rail truck with water tank shall follow rail grinder to inspect for hot spots and slag.

(g) MassDOT Rail and Transit Division shall approve lubricants and/or friction modifiers to be used after grinding curves on:

  (1) Gage face on the high rail

  (2) Top of rail (TOR) on the low rail.

§113.13(M) Repair of Welds and Rail Head Depressions by Welding or Grinding

(a) Field and shop welds shall be inspected for batter. Maintenance welding and grinding shall be performed as required.

(b) The depth of low spots and depressions around welds shall be measured with a 36" straight edge and taper gauge. Maintenance welding and grinding shall be performed as required.

(c) The preferred method of removing low spots, low areas, and engine burns (but NOT engine burn fractures), in the rail head profile is by building up the rail head by welding.

(d) Any engine burn should be repaired as soon as practicable before rail and tie damage occur. Engine burns 3/8" or greater require removal and replacement of the rail.

§113.13.1(M) Cross Cutting (Slotting) of Bolted Joints

(a) Permanent bolted joints shall be inspected and rail ends slotted as required to remove metal flow and prevent end chipping.

(b) When rails are replaced at the location of a permanently bolted joint, the rail ends should be slotted.

(c) The frequency of grinding or slotting rail ends at permanently bolted joint locations may increase due to traffic and as other local conditions require.

§113.14(M) Passing Trains Over Broken Rails and/or Pull-Aparts

(a) When passing trains and/or locomotives over broken rails and/or pull-aparts, the Operating Railroad Company MOW personnel shall comply with the following information.

(b) Persons not fully qualified to supervise certain renewals and inspect track as required in Paragraph (a) of this section, but with at least one year of MOW or signal experience, may pass trains over broken rails and pull-aparts provided that:

  (1) The track owner determines the person to be qualified and, as part of doing so, trains, examines, and re-examines the person periodically within two years after each prior examination on the following topics as they relate to the safe passage of trains over broken rails or pull-aparts: rail defect identification, crosstie condition, track surface and alignment, gage restraint, rail end mismatch, joint bars, and maximum distance between rail ends over which trains may be allowed to pass. The sole purpose of the examination is to ascertain the person's ability to effectively apply these requirements and the examination may not be used to disqualify the person from other duties. A minimum of four hours training is required for initial training;

  (2) The person deems it safe and train speeds are limited to a maximum of 10 MPH over the broken rail or pull apart;

  (3) The person shall watch all movements over the broken rail or pull apart and be prepared to stop the train if necessary; and

  (4) Person(s) fully qualified under FRA §213.7 are notified and dispatched to the location promptly for the purpose of authorizing movements and effecting temporary or permanent repairs.

§115.0(M) RAIL END MISMATCH

Rail shall be maintained so that the mismatch of rails at joints may not be more than that prescribed in the following table:

Rail End Mismatch Maintenance Limits		
Class of Track	Any mismatch of rails at joints may not be more than the following:	
	On the head of the rail ends (Inches)	On the gage side of the rail ends (Inches)
1 – 5	1/8	1/8



Rail End Mismatch

§117.0(M) RAIL END BATTER/BEVELING OF RAIL ENDS

(a) Rail end batter is the depth of depression in the rail head near the end of the rail. It is measured by placing an 18" straight edge on the head of the rail at the rail end, without bridging the joint and measuring with a taper gauge the maximum distance between the bottom of the straight edge and the top of the rail head.

(b) When rail end batter is detected, it should be monitored and corrected when reaching the limits given below:

(1) See the following table:

Rail End Batter Maintenance Limits		
Class of Track	Rail End Batter May Not Be More Than (Inches):	Crop Bolt Holes and Rail Ends to Remove Batter if Batter Exceeds Values Below (Inches):
1 - 2	1/4	3/8
3 – 5	1/8	1/4

(2) Rail end batter should be repaired by a qualified welder using an electric arc welder.

(3) In Classes 3-5, rail ends that have 3/8" or more rail batter shall not be welded and shall be cut out and scrapped.

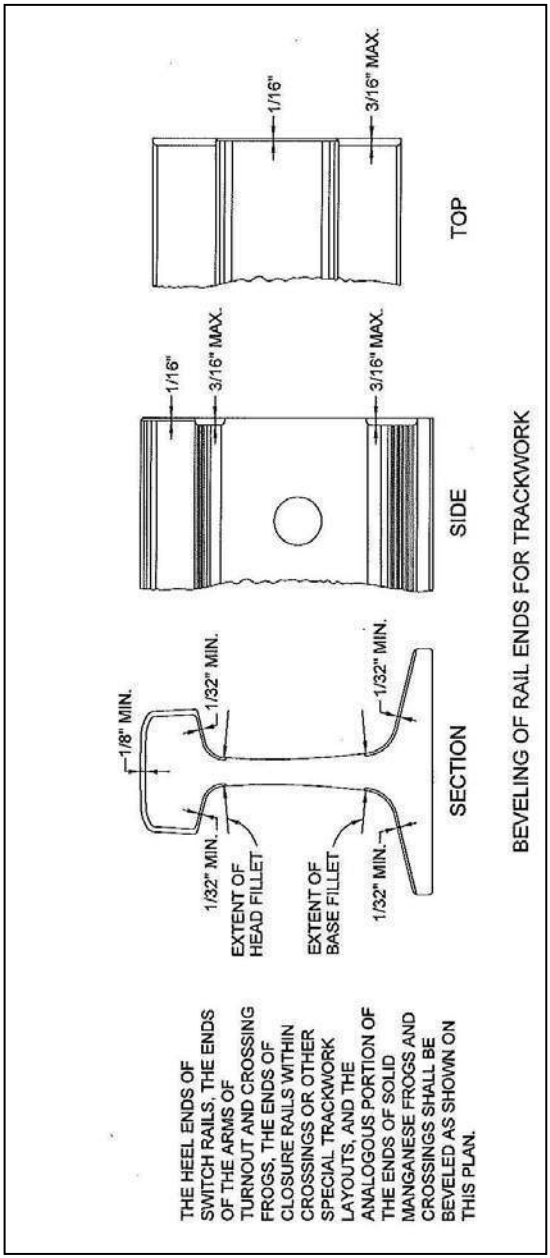
(4) After welding, rail ends shall be ground and slotted as shown in Paragraph (c).

(c) To reduce chipping or spalling due to overflow of steel under traffic, the rail end faces should be cross-cut by grinding with a 1/8" beveled slotting wheel to a depth of not less than 3/16" below the surface of the head.

(1) The maximum cut should not be wider than 1/8".

(2) If the rails are not in contact, the overflowed metal should be removed from both end faces by grinding 1/16" from the ends of both rails.

(3) See following figure as developed by AREMA.



BEVELING OF RAIL ENDS FOR TRACKWORK

§118.0(M) RAIL LUBRICATION

(a) The gage face of the running rail in track or in special trackwork must be lubricated as follows:

(1) Running rail in curve locations where there is significant gage face wear on the high rail, or significant flow on the low rail, shall be lubricated with a wayside lubricator or as specified by the MassDOT Rail and Transit Division.

(i) Lubricate high rail gage face

(ii) Lubricate low rail top of rail

(2) When changing switch points, stock rails, and frogs in heavily used routes in interlockings, regardless of turnout size or type, lubricate new components by hand.

(3) After grinding or welding repairs to switch points and/or frogs, lubricate components by hand.

(4) When production grinding, ensure that in curves both rails are lubricated on the last grinding pass.

(b) When lubricating rail, care should be taken to control the amount of lubricant being used to avoid migration to the running surface of the rail.

(c) At wayside lubricator locations, install geotech fabric to prevent fouling of ballast. Dispose of fabric in accordance with local, State, and Federal regulations.

(d) Locate lubricators no closer than 500' from grade crossings with active warning devices.

(e) When installing lubricators, care should be taken not to install steel-mesh hoses in signal territory.

(f) Both rails should be lubricated as excessive lubrication of the high rail and poor lubrication of the low rail can produce high lateral forces and low rail rollover resulting in derailment.

(g) Use only approved environmentally-friendly lubricants per manufacturer's recommendations.

§119.0(M) CONTINUOUS WELDED RAIL PROCEDURES

See Appendix A, "Continuous Welded Rail (CWR) Procedures."

§121.0(M) RAIL JOINTS

§121.1(M) Field Welding of Rail Joints

(a) When performing rail maintenance, reduce the quantity of joints in track by laying CWR and field welding joints wherever possible.

(b) Thermite and flash butt are acceptable methods for in-track field welding.

(c) Thermite and flash butt welding shall be performed in accordance with the supplier's recommended procedure.

(d) When it is necessary to install plug rails, the plug rails should be at least 13' in length.

(e) Bonded insulated joint rail assemblies shall be field welded.

(f) Whenever possible it is desirable to field weld all turnouts and special trackwork.

(g) If it becomes necessary to apply temporary joint bars in CWR, the end bolt hole in each rail must not be drilled, as this would prevent subsequent field welding. Additional rail anchors must be applied to this joint in accordance with §125.0(M).

(h) Field welding on open deck bridges is permitted provided that proper precaution against fire is taken and only allowed with the prior approval of MassDOT Rail and Transit Division.

§121.1.1(M) Thermite Field Welding

(a) When using the thermite field welding process:

(1) Ensure that rail ends are secured against movement from thermal expansion or contraction, or from other causes. Use a hydraulic expander to maintain the rail end gap and rail alignment.

(2) Saw cut rail ends to be welded. If a torch cut rail is to be welded at least 2" of rail behind the torch cut must be cut off with a saw before the weld is made.

(3) No thermite weld shall be made:

(i) If the air temperature is below 32°F.

(ii) In inclement weather (rain or snow).

(4) Required location of field welds:

(i) Within 14' of a field weld in the same rail.

(ii) Within 4' of a plant weld in the same rail.

(iii) Within 10' of the centerline of any joint (except bonded insulated joints where no weld shall be made within 7' of the centerline of the joint).

(iv) Within 6" of a bolt hole.

(v) Within 6" of a weld that has been cut out.

(vi) On or within 4-1/2" of a tie plate or concrete tie rail seat.

(vii) Within a grade crossing without the permission of MassDOT Rail and Transit Division.

(5) General welding procedures are as follows:

(i) Prior to installing the molds, make a visual inspection of the two rail ends to ensure there are no bent rails or other defects such as cracks, splits, pipes, etc., which could cause, or later be interpreted as a defective weld.

(ii) Check the gap to ensure that it meets the specification of the weld kit manufacturer.

(iii) Align the rail ends.

(iv) Remove foreign matter, luting compound, and/or moisture from the molds or crucible.

(v) If a hydraulic expander has been used, do not release it until the weld has cooled to 500°F or less. The expander shall be released gradually.

(vi) No train traffic shall be allowed to pass over the weld, nor shall there be any disturbance of the track or rail in the area of the weld, until the weld has cooled to 500°F or less.

(6) The grinding and finishing of the weldment are as follows:

(i) The top and sides of the head of the rail at the weld shall be ground flush with the parent metal.

(ii) The weld in the web and base should be ground ***only*** to remove notches created by offset conditions, sharp protrusions, and gouges. These should be blended into the contour of the weld collar to eliminate stress risers.

(iii) In the case of continuously supported rail, the bottom and sides of the base must be ground flush with the parent metal.

(iv) Overheating the rail when grinding must be avoided. If a weld has cooled to below 500°F it must be ground so as to not increase the temperature back above 500°F.

(v) Finish grinding shall be conducted when the weld temperature is less than 200°F.

(7) Welds shall be identified on the rail with a unique number and the date using a highly visible paint or paint stick to allow identification of a particular weld.

(8) Welds shall be inspected once completed and ground.

(i) A visual inspection shall be conducted immediately. This inspection shall look for voids, nicks, gouges, sharp protrusions, or other obvious surface defects.

(ii) An inspection of the alignment of the weld shall be conducted using a 36" straight edge centered on the weld. The weld will meet the following criteria:

1. There shall be no dip.
2. The crown shall not measure more than 3/50" at a point 18" from the weld.
3. The horizontal misalignment (measured by placing the straight edge on the running side of the head) shall not measure more than 3/50" at a point 18" from the weld or at the weld if the misalignment causes a gap at the weld.

(9) An ultrasonic inspection of the weld shall be conducted within 24 hours of the completion of the weld.

(b) Field welding on open deck bridges is permitted provided that all the following conditions are met:

(1) A qualified contractor and/or Operating Railroad Company individual using a 17 lb. dry chemical ABC extinguisher is available to protect against fires.

(2) A qualified contractor and/or Operating Railroad Company individual must be present for a period of at least one hour after the last field weld is finished and ground.

(3) An extra 17 lb. ABC extinguisher must also be readily accessible as a backup.

(4) While extinguishing any fires, the qualified contractor and/or Operating Railroad Company individual must stand upwind and aim the chemical at the base of the fire.

(5) A qualified contractor and/or Operating Railroad Company individual must be present during the entire welding operation from beginning of welding process to at least one hour after the last field is finished and ground.

(6) Flash butt welding, shearing and grinding shall only be performed when there is no highway or river traffic directly under the area of the welding.

(7) Bridge timber spacing may be more restrictive than that of ballasted track. Welding shall not be performed if the tie crib is less than 5-1/2" in width or as approved by MassDOT Rail and Transit Division.

(8) Welds on open deck bridges must be made as close to the center of the crib as possible. The minimum distance between center of weld and edge of tie shall be 2-3/4".

(9) After welding, the entire structure should be inspected for possible “hot spots” or fire.

§121.1.2(M) Electric Flash Butt Welding

(a) In general, thermite field requirements apply to this process along with the following additions:

(1) All electric flash butt welding consumes rail (1-1/4" – 1-1/2" at each weld location).

(2) The weld must be at least 400' from grade crossings, turnouts or other fixed objects in the track.

(3) Anchors or resilient fasteners must be removed from at least 200' of rail on both sides of the weld before the weld is made.

(4) Care must be taken to avoid skewing ties by binding the rail against the shoulder of the tie plates when the rails are pulled together.

(5) Care must be taken to avoid damaging elastomeric tie pads by sliding the rail through the tie seat area of concrete ties when the rails are pulled together.

(6) If new rail is to be welded by the electric flash butt welding method, this decision should be made before the rail is laid and distressed so that the right amount of expansion can be calculated.

(7) When CWR strings in track are laid in track and expanded to reach a preferred rail neutral temperature (PRNT), the actual required expansion shall be reduced if the CWR strings are to be electric flash butt field welded. The amount of expansion required for a particular CWR string shall be calculated using Appendix A, “Continuous Welded Rail (CWR) Procedures.” The amount of rail to be consumed when making the two electric flash butt field welds at each end of the string shall be subtracted from the amount calculated in Appendix A, “Continuous Welded Rail (CWR) Procedures.” The resulting “net” rail expansion shall be achieved in the field when distressing and/or laying the string before welding.

§121.2(M) Bolted Rail Joints

(a) Rail ends shall be fastened together by bolted standard, compromise, or insulated joints.

(b) The use of shims or spring washers between the web of the rail and the joint bar to align the gage sides of rail heads is prohibited.

(c) The use of acetylene torches or grinding to reconfigure or change the dimensions of standard and/or compromise joint bars is prohibited.

(d) Compromise joint bars of an approved design shall only be used to join rails of the respective sections.

(e) If rail end mismatch exists after applying approved joint bars, the rail head and gage face surfaces may be adjusted by electric arc welding the smaller rail and grinding to finish the weld. Do not grind the larger rail section.

(f) Each rail joint, insulated joint, and compromise joint must be of a structurally sound design and dimensions for the rail on which it is applied.

(g) If a joint bar is cracked, broken, or because of wear allows excessive vertical movement of either rail when all bolts are tight, the joint bar shall be changed.

(h) Each joint bar must be held in position by track bolts tightened sufficiently to provide firm support for abutting rail ends and to allow longitudinal movement of rails in the joint to accommodate expansion and contraction due to temperature variations.

(i) In track with conventional jointed rail, each rail shall be bolted with all joint bar bolt holes filled.

(j) If a permanent joint connection is made between CWR and bolted rail, all joint bar holes must be filled.

(k) No rail or joint bar having a torch cut or burned bolt hole may be used in track.

(l) When a bolt is changed in a joint in Track Classes 1-5, or a frog bolt is changed, then all bolts in the connections shall be checked and retightened as required.

(m) Whenever possible, new bolts, nuts, and spring washers should be used when new or relay joint bars are applied.

(n) Lubricate joint bars with environmentally-approved lubricate. Tighten all bolts, working from center of joint bars outward. During this final tightening, tap the toes of the bars inward with a sledgehammer.

(o) In locations of elastic fasteners, the appropriate clip will be used to properly fasten the ties through the joint area.

(p) Description of joint bars:

(1) Standard bolted rail joints consist of either head free or head contact standard bars or compromise joint bars held in position by track bolts having sufficient tension to firmly support abutting rail ends, but not too tight to prevent longitudinal movement in joints to accommodate expansion and contraction due to variation in rail temperature.

(2) Head free bars must have the inner surface of the head of the bar held tightly against the rail head fillet with the heel of the bar standing out the proper distance from the base fillet, where all of the “draw-in” for wear is concentrated.

(3) Head contact bars must have the top surface of the bar held tightly against the fishing surface under the rail head outside of the rail head fillet area. Bars must be secured in a vertical position without “cocking.”

(q) Application of standard bolted joint bars will be as follows:

(1) Joint bars shall be applied with their full number of bolts, nuts, and spring washers according to the standard plans and specifications.

(2) New bolts, nuts, and spring washers should be used when new or reformed joint bars are applied or renewed out-of-face.

(3) Grease shall be applied to the fishing area of the rails, for the full length of the joint bars.

(4) When initially applying joint bars, the bolt tension should be brought in the range of 20,000 to 25,000 lbs. and for subsequent retightening from 15,000 to 20,000 lbs. This may be approximated by an average individual with a 36" track wrench.

(r) Application of head free joint bars will be as follows:

(1) Set bars in position, insert all bolts, and apply spring washers and nuts by hand.

(2) Tighten up the two center nuts with a power track wrench in high gear without fully tightening to avoid locking bars in an improper position.

(3) Strike the bead of the heads of both inside and outside bars at both ends with a hammer to force the inside faces of the bars tightly against rail head fillets. Do not strike the toe of the bar, as this tends to force the toe of the bar outward.

(4) Tighten remainder of bolts from center of joint bars outward in high gear.

(5) Tighten all bolts in low gear, working from center of joint bars outward. During this final tightening drive the toes of the bars inward by tapping with a spike maul or sledge.

(6) By following the above procedure, proper contact will be obtained between the inner face of the bar and the rail head fillet. Also, the heel of the bar will stand out the proper distance from the rail base fillet.

(s) Application of head contact joint bars will be as follows:

(1) Set bars in position on rail; insert all the bolts, nuts, and spring washers by hand.

(2) See that the bars are in a vertical (uncocked) position as one of the center bolts is tightened by:

(i) Inserting a bar or drift pin in a bolt hole (necessary only when applying a 131 lb. bar).

(ii) Tapping toes of joint bars as bolt is tightened.

(3) Tighten all bolts, working from center of joint bars outward. During this final tightening drive the toes of the bars inward by tapping with a spike maul or sledge so that their vertical position is maintained.

(t) Maintenance of joints:

(1) Drilled ends of new rails are to be ground to remove burrs at the mills.

(2) To avoid chipping or spalling under service due to overflow of steel, the rail end faces should be cross-cut by grinding with 1/8" wheel to a depth of not less than 3/16" below the surface of the head. If the rails are not in contact, the overflowed metal should be removed from the end face of each rail. If the rails are in contact, only one pass should be made removing approximately 1/16" from each rail.

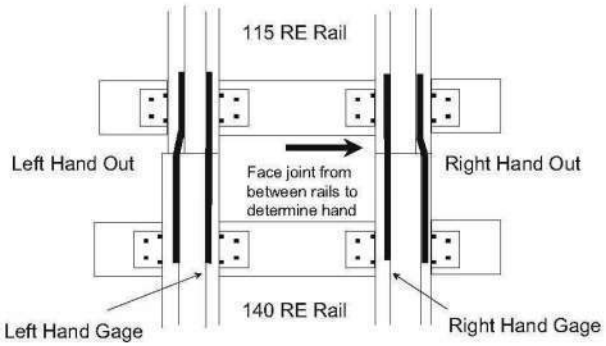
(3) When bolted joints are applied, other than insulated joints, the bolts should be tightened at the time they are applied, retightened within a week and again within a month after application.

(4) Bolts should be retightened periodically at intervals of not more than 1 year and in all cases following program track raising or surfacing.

(5) To prevent undue rail stress on account of expansion or contraction at the changes of seasons and wide temperature changes, sufficient joint bars should be loosened to permit the rail to adjust itself, immediately after which bolts should be retightened. Where necessary, a piece of rail should be cut out to avoid heat kinks or buckling of track.

(6) Wear in fishing spaces of rail should be compensated for by the application of oversized joint bars.

(u) Compromise joints are specified as left or right hand as shown in the following diagram. To determine where a left hand (“LH”) or right hand (“RH”) lays, stand in the center of the track and face the joint to be compromised.



Compromise Joint Example

§121.3(M) Insulated Rail Joints

(a) For new work or rail renewals in track circuit territory, insulated joints shall be located as follows:

(1) Insulated joints shall be staggered not more than 60" nor less than 24".

(2) Insulated rail joints at highway grade crossings shall be located in accordance with the material supplier's standard plans.

(b) For the application of Bonded Insulated Joints (Glued Insulated Joints), see the following:

(1) Glued plug insulated joints are required on all concrete tie tracks.

(2) When utilizing insulated plug rails, install the shortest plug rail available so as to minimize the number of joints and/or wells added.

(3) Conventional rail joints adjacent to bonded insulated joint rails should be field welded.

(4) All bonded insulated joints are to be installed as suspended joints. If it is absolutely necessary to install the insulated joint as a supported joint on a wood crosstie, an approved type rubber tie plate must be used under the joint. The end posts should not project above or beyond rail heads and should be trimmed with a hack saw.

(5) Double shoulder tie plates or elastic fastener tie plates should be used on the two wood crossties supporting suspended bonded insulating joints.

(6) Rail holding spike heads must be in reverse position and must be carefully driven to ensure that spike head is not in contact with the bar, which could result in the joint's being short circuited. All bonded insulating joints will have plate holding spikes installed.

(7) Joints installed with elastic fasteners shall have the correct clips (modified "e" clip) applied to prevent possible damage to the joint.

(8) No attempt should be made to tighten bolts in bonded insulated joints. In the event the bolts in the joint become loose, the joint should be replaced.

(9) Any rail head overflow at a bonded insulated joint is to be removed by grinding. Extreme care must be exercised to ensure that the end post is not damaged. The overflow should be ground only to the rail end, so that the joint gap will not be greater than the original gap. A cross grinder/slotter should not be used to remove the overflow.

(10) Bonded insulated joints will be considered as welded rail for purposes of compliance with the anchoring requirements of §125.1(M).

(11) Glued plug insulated joints shall be used in CWR (unless approved by MassDOT Rail and Transit Division).

(c) For the application of Polyurethane Coated Steel Insulated Joints (Poly Joints) see the following:

(1) Polyurethane coated (poly) steel insulated joints may be used permanently in track where the use of a bonded insulated jointed rail is not practical.

(2) Whenever possible, poly insulated joints are to be installed as suspended joints.

(3) The top of the poly joint must be set first into the fillet area of the rail. Bolts should be applied and tightened from the center out to the end of the bar.

(4) Rail holding spikes shall be reversed and not driven up against the poly joint.

§123.0(M) TIE PLATES

(a) Tie plates shall be installed and centered under running rails on all wood crossties, switch timber, and bridge timber.

(b) The preferred tie plate is a 14" double shoulder canted (1:40) plate (DSC).

(c) Tie plates with different cants and flat plates shall not be mixed.

(d) Canted tie plates shall be installed so that the rail cants towards the centerline of track.

(e) Tie plates must be placed square and tight to the base of the rail and no portion or part of the shoulder can be under the base of the rail.

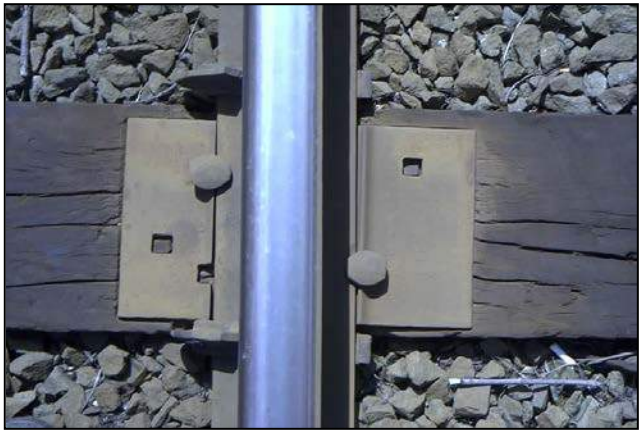
(f) No metal object that causes a concentrated load by solely supporting a rail shall be allowed between the base of the rail and the bearing surface of the tie plate (e.g., tie plate shoulders, spikes, ballast, etc.).



Tie Plate with Anchors Applied Correctly



Tie Plate with Anchors Overdriven



Box Anchored Ties with Anchors Applied Correctly

§124.0(M) TIE PADS

The use of tie pads, under the tie plates on open deck bridges, may be used only with the approval of the MassDOT Rail and Transit Division.

§125.0(M) RAIL ANCHORS/ELASTIC FASTENERS

§125.1(M) Anchor Placement

(a) Rail anchors shall be applied as follows:

(1) Anchors shall be applied on both rails and on the same side of the tie. Where special applications may be necessary, other arrangements may be used with permission of the MassDOT Rail and Transit Division.

(2) Wherever practicable, rail anchors shall be applied from the gage side of the rail.

(i) In turnouts, drive on type anchors shall be applied to switch stock rails from the field side of the track. Care must be taken in application of anchors so as not to foul switch rods.

(3) When adjusting or laying rail, the necessary anchor pattern shall be applied immediately as the rail is adjusted.

(4) Anchors should be fit tightly against sound ties.

(5) When ties at a joint cannot be anchored because of interference with a joint bar, there shall be no anchors applied to the affected joint.

§125.2(M) Fasteners Required

(a) Rail anchors should be driven just far enough so that the locking lip or groove of the anchor snaps into place on the base of the rail.

(b) A sufficient number of anchors must be applied in a pattern to effectively control longitudinal rail movement. See next pictures for typical fastening and anchoring systems.



Elastic Fastener: Pandrol Fast Clip



Elastic Fastener: Pandrol E-Clip

(c) Insufficient anchors may result in longitudinal rail movement and allow changes in rail neutral temperature (RNT) in CWR.

(d) The movement of rail can result in changes in line and surface, which may create a hazardous condition.

(e) Additional anchors must be applied if there is a standard anchor pattern and there is evidence that rails are still moving longitudinally under traffic.

(f) It should be recognized that when track is raised out-of-face, the resistance to longitudinal movement is reduced and additional anchors may be required to avoid undue rail and tie movement.

(g) Basic anchor requirements in CWR track:

(1) Every other tie shall be box anchored in all CWR tracks.

(2) Box anchor every tie in curves 3° and over.

(3) Additional anchors may be added at designated locations in anchored track or elastic fastener territory as required if longitudinal movement of the rail is detected.

(h) On main tracks the number of anchors to be applied when CWR is laid and maintained is as follows:

(1) When using rail anchors, box anchor every wood tie 200' in each direction from:

(i) Ends of CWR strings.

(ii) All joints to include glued plug insulated joints.

(iii) Turnouts, crossovers, and other special trackwork.

(iv) Rail track crossings.

(v) Public and private highway grade crossings.

(vi) Transitions to locations with elastic fasteners.

(vii) Transitions to locations of tie type change (e.g., wood to concrete or wood to steel).

(viii) Open decks on bridges, where the timbers are hooked and blocked in accordance with §119.1(M).

(2) To the extent practical, fully box anchor all ties in CWR within switch, turnout, and crossover areas.

(i) Rail anchoring systems shall be used on open deck bridges, trestles, and viaducts as determined by the MassDOT Rail and Transit Division.

(j) All jointed rail tracks require:

(1) A minimum of 40 anchors for a 78' rail and be boxed on 20 ties.

(2) A minimum of 16 anchors per 39' rail and be boxed on 8 ties.

(3) A minimum of 10 anchors per 33' rail and be boxed on 5 ties.

(4) No anchors will be placed in grade crossing panels (unless approved by MassDOT Rail and Transit Division).

(k) A fully clipped wood tie, bridge timber, or fully clipped and insulated concrete tie with an elastic fastener, is considered equivalent to a box anchored wood tie.

§125.3(M) Anchor Maintenance

(a) Ineffective anchors shall be removed and replaced when installing railing.

(b) Rail anchors must have full bearing against the tie, or tie plate, when applied.

(c) In order to avoid damage, only proper tools or machines should be used in applying and removing rail anchors.

(d) Anchors should never be applied with a spiking hammer.

(e) Anchors should not be driven along the base of the rail with a hammer.

(f) Care should be taken not to strike the rail.

(g) When the bearing of rail anchors against the tie is disturbed by renewing or re-spacing ties or replacing rail, or the anchor was not properly applied, the anchors must be taken off and then re-applied in proper position. All anchors removed must be re-applied, and defective or broken anchors must be replaced as necessary.

(h) Proper opening between rail ends in jointed rail is maintained by the use of rail anchors.

§125.4(M) Anchor Use

New or relay rail anchors may be used at any location on the MassDOT system as long as they are designed for the rail section to which they are applied and perform as intended.

§127.0(M) RAIL FASTENING SYSTEMS

§127.1(M) Number Required

(a) Track shall be fastened by a combination of components which effectively maintains gage to the prescribed limits.

(b) Additional fasteners may be used where they are needed to hold gage and/or restrain the movement of rail (both longitudinal and lateral).

§127.2(M) Installation of Fasteners

§127.2.1(M) Elastic Fasteners/Clips

(a) All elastic fasteners shall be inserted or removed from the specially designed tie plate with an approved device such as an 8 lb. sledgehammer. ***The use of a spike maul is prohibited.***

(b) Elastic fasteners shall not be overdriven as overdriving will cause premature relaxation of the fastener.



Overdriven Pandrol E-Clip



Correctly Driven Pandrol E-Clip as End of Clip Lines Up with Edge of Tie Plate

(c) If a fastener has been overdriven or is not performing its intended function of limiting the vertical and longitudinal movement of the rail, it shall be replaced.

(d) In the case of an “e” clip, a distance of 3/8" (approximate width of a wooden pencil) between the shoulder and the face of the clip should be maintained. This clearance will prevent overdriving.

(e) When applying clips with a sledgehammer, the clip must be gently tapped to ensure proper insertion before the clip is fully seated. When removing clips with a sledgehammer, secure clip with foot and gently tap clip to remove the toe load to ensure safe removal of the clip.

(f) When installing clips, the tie must be tamped up flush with the base of the rail before driving the clip so as not to damage the clip. The clip is not to be used to pull the tie up to the base of the rail.

§127.2.2(M) Screw Spikes

(a) A 15/16" diameter lag screw shall be used to secure elastic fastener plates with 1" diameter holes to wood ties and timber. Lag screws must be screwed into a 11/16" diameter pre-drilled hole that is 6" deep. Driving of lag screws with a sledgehammer or spike maul is prohibited.

(b) As shown in the MBTA Standard Plan Book 1225, in turnouts, gage, slide, heel, frog and standard tie plates, all round holes will be filled with a screw spike except:

(1) Self-aligning frog tie plates shall have one screw spike installed on each end of each plate.

(c) Holes for screw spikes shall be pre-drilled 11/16" in diameter and 6" deep.

§127.2.3(M) Cut Track Spikes

(a) All spikes (cut spikes) shall be driven with the head pointed toward the rail, except that spikes driven against the sides of insulated joints shall be driven with the head pointing away from the rail and not be in contact with the joint bars.

(b) Spikes should not be driven at ends of insulated joints as rail movement may cause the insulated joint bar to become electrically connected to the rail.

(c) Spikes must be started vertically and squarely and driven straight. The shank of rail holding spikes must have full bearing against the base of rail. Spikes should be driven

in accordance with the AREMA Manual, Chapter 5, leaving 1/8" clearance between the spike head and the base of the rail. Do not overdrive spikes.

(d) The use of lock spikes (hair pins) are prohibited. When existing lock spikes are removed they shall be replaced with cut spikes.

(e) Care must be taken not to strike the rail, its fastenings, or signal appliances when driving spikes.

(f) Spikes in main tracks, that have a cut throat, or are deteriorated due to rust, should be replaced.

(g) All old spikes, when pulled, shall be picked up and scrapped.

(h) Track spikes shall not be driven into round plate holes.

(i) When the head of the track spike is broken off, the replacement spike should be inserted in a new location, leaving the spike stub in the tie.

(j) All spike holes shall be plugged with cedar wood plugs, or with an approved plugging material, prior to re-spiking.

§127.3(M) Rail Fasteners Required

(a) Track shall be fastened by a system of components that effectively maintains gage within the limits prescribed.

(b) When spikes or elastic fasteners are used (unless otherwise ordered by the MassDOT Rail and Transit Division), each rail shall be fastened to every tie in the following manner:

Track	**Rail Holding Spikes**	**Plate Holding Spikes or Lag Screws**
Conventional Tie Plates		
Tangent and curves up to 1°	3 (1 field side rail holding; 2 gage side rail holding)	0
Curves between 1° and up to 4°	3 (1 field side rail holding; 2 gage side rail holding)	1 (1 field side)
Curves 4° and over and curved leads on all turnouts and crossovers	3 (1 field side rail holding; 2 gage side rail holding)	2 (1 field side; 1 gage side)[(1)]
Elastic Fastener Tie Plates	**Elastic Fasteners (Clips)**	**Lag Screws**
Tangent	2 clips	2 (1 field side; 1 gage side)[(1)] (2 cut spikes – 1 in each square hole field and gage)
All Curves	2 clips	4 (2 field side; 2 gage side) (2 cut spikes – 1 in each square hole field and gage)
All track with pre-plated ties	2 clips	4 (2 field side; 2 gage side)
Note: [(1)] Apply diagonally on opposite side of clip.		

§129.0(M) TRACK SHIMS

(a) If track does not meet the geometric limits (e.g., crosslevel or profile), track shims may be installed to temporarily correct the track surface.

(b) Shimmed track must be watched carefully to ensure that shims are in place and tight, and that proper gage and crosslevel is being maintained.

(c) If shims are used, they must be removed as soon as the weather, or other conditions, permit the track to be surfaced.

(d) Tie plates must not be removed from the ties as a means of adjusting the surface or crosslevel of track.

(e) Track shims must be at least the size of the tie plate and be spiked directly to the tie with spikes which penetrate the tie at least 4-1/2".

(f) Track shims must be bored where spikes are to be driven, and made of a material approved by MassDOT Rail and Transit Division.

(g) Track shims shall be braced if the shim is over 1" in thickness.

(h) Design and materials used in braces shall be approved by MassDOT Rail and Transit Division.

§145.0(M) BRIDGE GUARD RAILS

§145.1(M) Location

(a) A bridge guard rail is a continuous line of rails, connected by bolted joints or welds. The guard rail is fastened to the crossties or bridge ties adjacent to the gage side of the running rail.

  (1) One such rail is designated in these instructions as a “Single” bridge guard rail.

  (2) Two such continuous lines of rail, one adjacent to the gage side of each running rail is designated as a “Full” bridge guard rail.

(b) Guard rails are applied between the running rails of tracks at undergrade bridges which meet the below listed criteria. Full bridge guard rails shall be installed at the following locations:

  (1) Open deck bridges.

  (2) Ballast deck bridges.

  (3) Truss bridges (all).

  (4) Moveable bridges (all).

  (5) Other locations as directed by MassDOT Rail and Transit Division.

(c) Existing bridge guard rails applied in accordance to previous standards or practices need not be changed (unless instructed by MassDOT Rail and Transit Division).

(d) When it is necessary to remove bridge guard rail to perform work, bridge guard rail will be reinstalled only where required by the above instruction.

§145.2(M) Materials

(a) Suitable scrap or relay running rail may be used. The installed rail section will be approximately:

  (1) Level, but not more than 3/4" below the top of the adjacent running rails as per MBTA Standard Plan Nos. 3060 and 3062.

  (2) But in no case higher than the running rail.

(b) Install tie plates under guard rails on every other tie or timber. Tie plates should be installed with reverse cant.

(c) Joints shall be either four or six hole bars with a minimum of four bolts per joint. Joint bars shall not be used within the curved end section of the guard rail.

§145.3(M) Application

(a) Bridge guard rails shall extend a minimum distance of 39' (for speeds up to 60 MPH) and 78' (for speeds over 60 MPH), beyond each end of the bridge abutment, unless increased distances have been prescribed for specific territories or locations.

(b) The end of the bridge guard rails should be curved and brought to the center of the track.

(c) Guard rail ends shall have the rail ends beveled, bent down, or be fitted with a bridge guard rail nose. Each end shall be fastened to the center of the track so as to divert a derailed wheel and not catch dragging equipment.

(d) The guarding face of bridge guard rails on open deck bridges shall be parallel to and 12-5/8" from the gage of the running rail. If plates and clips are used on open deck bridges, see Paragraph (e) below.

(e) The distance of the guarding face will be changed in the following locations:

(1) On ballasted deck bridges the guarding face shall be at 18".

(2) On ballasted approaches to bridges the guarding face shall be at 18".

(f) Guard rail ends shall rest on a sound tie and be securely fastened.

§145.4(M) Inspection and Maintenance

Guard rails shall be inspected periodically to make certain that bolts and joints are tight, spikes are firmly against base of the rail, and castings fastened securely to rail ends, or ends properly beveled or bent down.

Subpart E - Tools

§150.0(M) TOOL REQUIREMENTS

(a) The person who is responsible for performing the track/switch inspection shall plan ahead and coordinate with the Operating Railroad Company to ensure that inspection tools are available when the inspection is made.

(b) The person who is responsible to perform track inspections shall notify the Operating Railroad Company when tools become in disrepair so that a tool can be fixed or replaced.

(c) Specified numerical limits given in this Part are to be confirmed during the track/switch inspection with the appropriate tool.

(1) Values are not to be estimated or approximated.

(2) Only values measured with approved tools are to be recorded on the Track Inspection Form.

(d) The person who is responsible for performing track inspections is encouraged to make periodic recommendations for improvements in existing tools or gauges and changes in tools that are needed to make the required inspection measurements.

§150.1(M) *Inspection Tools*

(a) Marking materials, as noted below, may be used to mark stations, tie lengths, dimensional data, and other information that will be made part of the inspection.

(1) Crayon (keel);

(2) Permanent metal marker.

(b) A mirror to be used to view difficult areas, especially the base or fillet of the rail, or connections to the moveable point frog and switch point area.

(c) A cloth measuring tape or folding wooden ruler may be used to measure track components and ties in the turnouts. The tape or ruler shall be non-conducting. The tape or folding wood ruler can also be used to measure switch point throw, frog guard face, and guard check, stations for alignment measurements, rail flow, tie spacings, offsets, and other key dimensional data.

(d) A standard combination track gauge with level shall be used so that gage, flangeway width, crosslevel, and superelevation measurements can be made.

(1) Level Board:

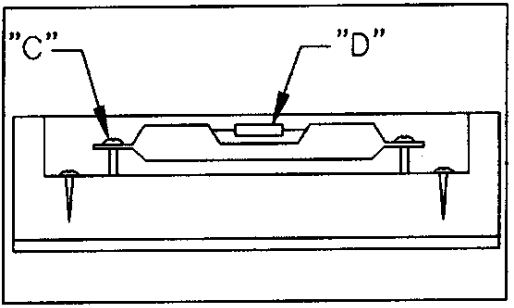
(i) The person who is responsible for performing the track inspection shall ensure that the level board is checked and maintained to measure correct crosslevel readings.

(2) Adjusting a Level Board:

(i) Set the level board on the tangent track where accuracy was checked and the difference in elevation between the two rails is known.

(ii) If required, turn the adjusting screw “C” to return the bubble “D” halfway between the readings for the known elevation. Center the bubble if possible.

- Turning the adjusting screw to the right moves the bubble away from the screw (Memory Aid: “Turn screw right away”).
- Turning the screw to the left moves the bubble toward the screw.



(iii) Turn the level board end for end and place it at the same point on the track.

(iv) See if the bubble is centered or the same. If the bubble rests at the same place, the board is adjusted.

(v) If the bubble readings are not the same, or not centered, continue steps (ii) through (iv). When the bubble is always at the same location (and centered), the level board is adjusted.

(3) Adjusting a level board by bubble positions:

(i) Place level board on the rails.

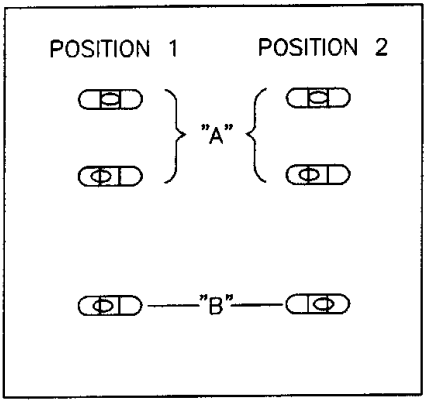
(ii) Note position of the bubble.

(iii) Turn level board end for end and place it at the same point on the track.

(iv) Note position of the bubble again.

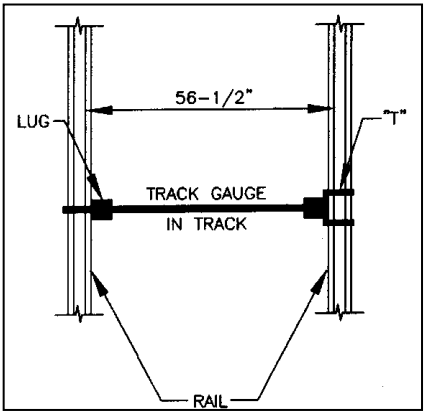
(v) If the bubble comes to rest in the same position both times “A”, the board is in adjustment.

(vi) If the bubble comes to rest in different positions “B”, adjustment of the board is necessary (see “Adjusting a Level Board” (d)(2)).



(4) The Track Inspector shall check and verify daily prior to use that standard track gauges are correctly measuring track gage.

(e) Checking a non-adjustable fixed track gauge.



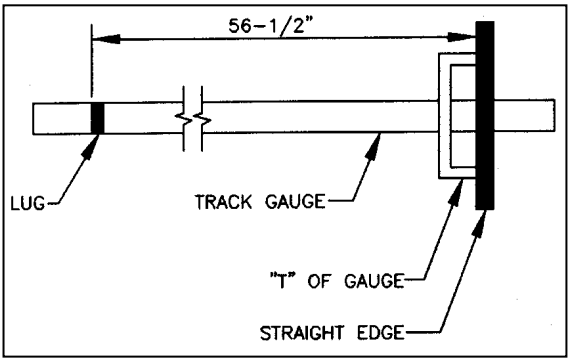
(1) Turn the gauge upside down.

(2) Place a straight edge along the “T” of gage.

(3) Measure the distance between the nearest face of straight edge and the lug.

(i) If the measurement is 56-1/2", the track gage is accurate.

(ii) If the measurement is not 56-1/2", the track gage is inaccurate. DESTROY AND DO NOT USE IT!



Track Gage Check

(f) A machined straight edge (minimum of 18" in length) shall be used to measure batter and chipping of rail ends, wear, flattened rails, mismatches (gage and tread) and engine burns on frogs and rail heads.

(g) A 36" machined straight edge with taper gauge shall be used to measure the straightness of field and plant welds.

(h) A taper gauge shall be used in conjunction with the straight edge to measure the depth of engine burns, flattened rails, and other anomalies in the rail head. In addition, the taper gauge shall be used to measure switch point/stock rail gap, and the gap at the moveable point frog.

(i) Stringline equipment capable of measuring 31' and 62' chords shall be used to check "alignment" spots. A discussion of stringlining curves is given in §55.2(M).

(j) Approved magnetic rail thermometer shall be:

(1) Calibrated in Fahrenheit, with a temperature range of 0°F - 150°F or as approved.

(2) Encased in housing with strong magnet(s) for attaching to web of rail.

(3) Meet AREMA Standard Rail Thermometer Plan 34-71, or approved equal.

(k) The following gauges may be used to check critical dimensions in and around frogs:

(1) Flangeway gauge: the gauge is designed to measure the flangeway in worn frogs so that grinding and welding repairs can be programmed. The gauge to be used by the Track Inspector shall conform to AREMA Plan No. 790-94.

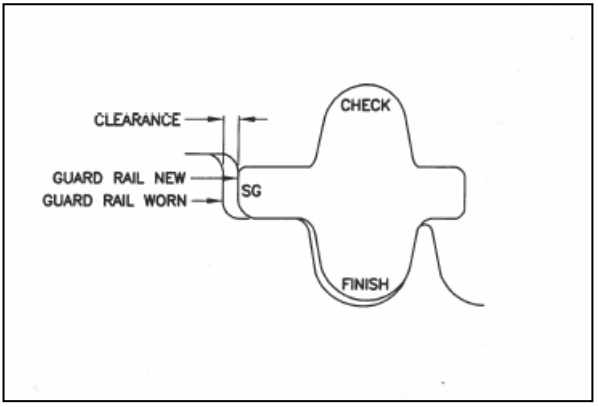
(2) Guard wear gauge: the gauge is designed to measure the wear on the guarding faces on a self-guarded frog.

(i) See AREMA plan for permissible variations in dimensions due to wear of frogs.

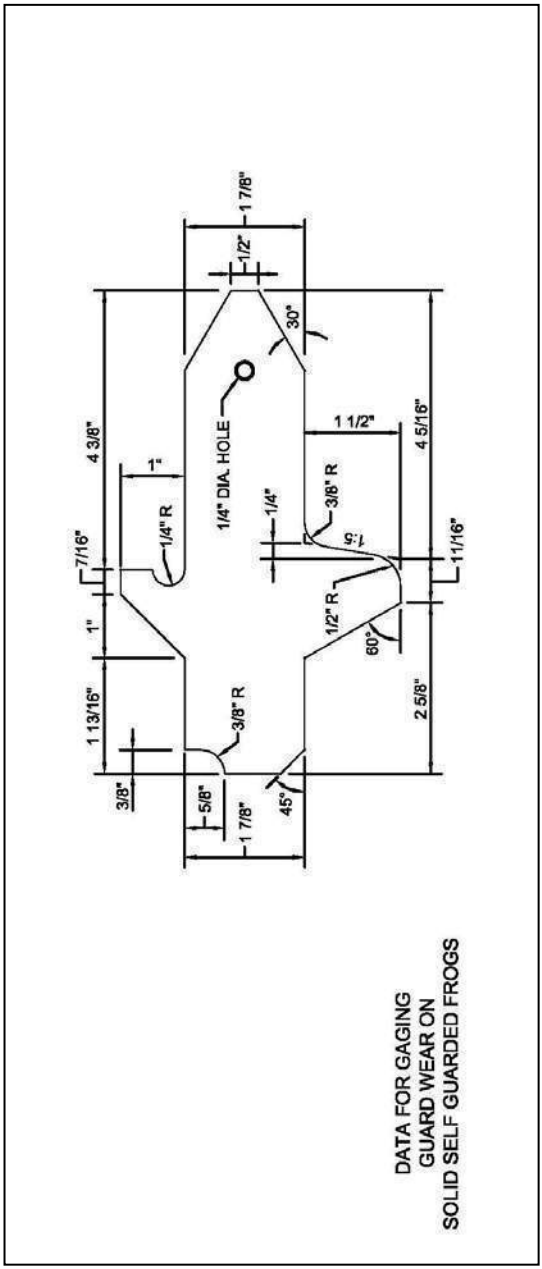
(3) The check gauge is used to test the flangeways in worn frogs and crossings for grinding or for welding repairs when necessary. It is designed for normal 1-7/8" flangeways and proper allowance should be made when used with wider flangeways. Standard contour gauge for self-guarded frogs is shown on the next page.

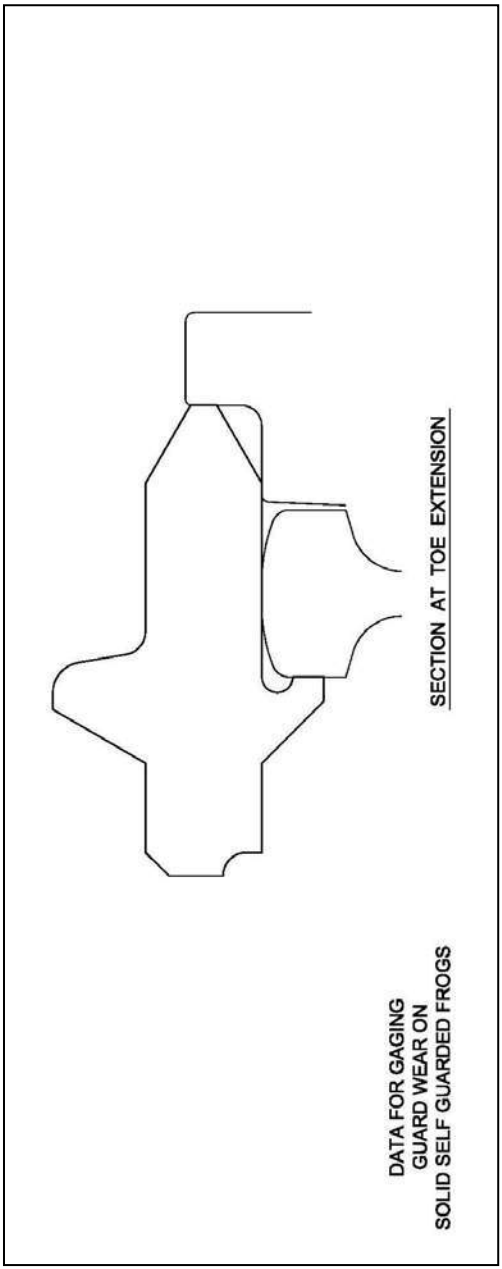
(4) The following check gauge graphic is used to measure flangeway widths in worn frogs and crossings to determine necessary welding and/or grinding repairs:

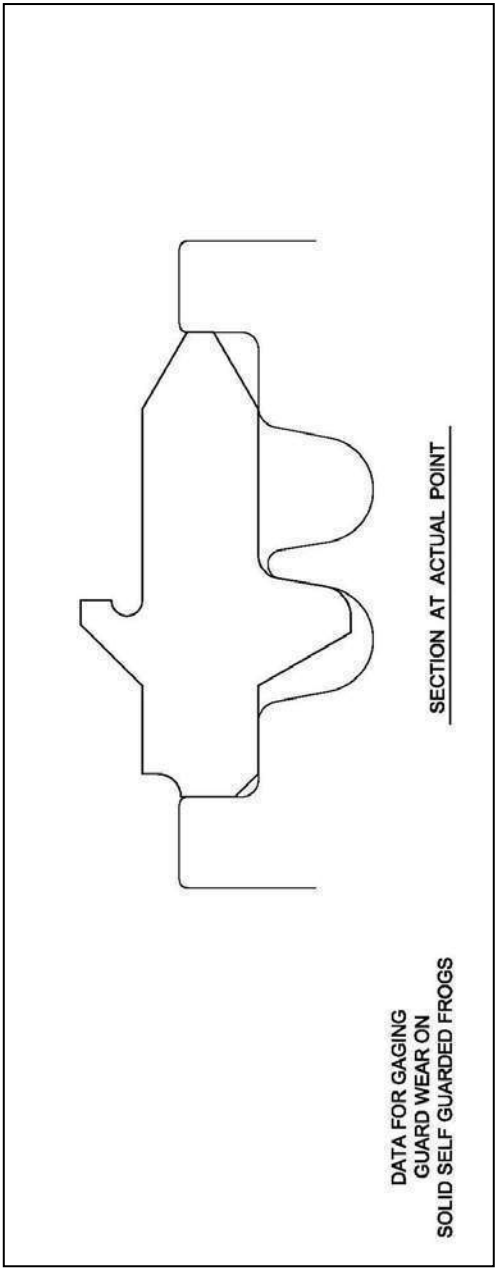
(i) The gage is designed for normal 1-7/8" flangeways.



(5) The gauge to be used by the Track Inspector shall conform to AREMA Plan No. 790-02 as shown on the following pages.


1 7/8"
1/2"
30°
1 1/2"
4 5/16"
4 3/8"
1"
1/4" DIA. HOLE
1/4"
3/8" R
1:6
7/16"
1/4" R
1"
1/2" R
60°
11/16"
1 13/16"
3/8" R
2 5/8"
3/8"
5/8"
1 7/8"
45°
DATA FOR GAGING
GUARD WEAR ON
SOLID SELF GUARDED FROGS


SECTION AT TOE EXTENSION
DATA FOR GAGING
GUARD WEAR ON
SOLID SELF GUARDED FROGS


DATA FOR GAGING
GUARD WEAR ON
SOLID SELF GUARDED FROGS
SECTION AT ACTUAL POINT

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SUBPARTS A-H

RECOMMENDED PRACTICE FOR THE MAINTENANCE OF SPECIAL TRACKWORK

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RECOMMENDED PRACTICE FOR THE MAINTENANCE OF SPECIAL TRACKWORK

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Subpart A – General

§1.0(STM) SCOPE

(a) This subpart will provide guidance as to the types of maintenance and maintenance limits required for special trackwork**.**

(b) This subpart shall be used by the MassDOT' s Operating Railroad Companies to maintain a safe, reliable track structure in the most economical and efficient manner possible.

(c) Forces engaged in the repair of special trackwork and appliances shall be aware that their maintenance goal is to provide a safe and reliable track structure with a superior ride quality.

(d) Ensuring adequate spare material inventory for all trackwork is the responsibility of the Operating Railroad Companies.

§2.0(STM) MAINTENANCE RESPONSIBILITIES

(a) MOW personnel in charge of making repairs and performing maintenance of turnouts and other trackwork shall attend and successfully complete courses prescribed by the Operating Railroad Companies.

(b) For Track Classes 1-5, individuals designated to supervise the maintenance, restoration, and renewal of trackwork shall be designated in accordance with FRA §213.7.

§3.0(STM) SCHEDULED MAINTENANCE ACTIVITIES

(a) Turnouts and other special trackwork must be maintained on a regular basis to:

(1) Provide a safe and reliable track structure;

(2) Provide acceptable ride quality;

(3) Maximize the useful life of the special trackwork.

(b) The maintenance schedule for special trackwork is driven by:

(1) Location of the special trackwork;

(2) Frequency and accumulated tonnage over the special trackwork;

(3) Type and maintenance history of the special trackwork;

(4) Inspection reports of the Operating Railroad Companies.

(c) A summary of scheduled maintenance activities for special trackwork is given in the following table. This table is not intended to be all-inclusive and only identifies the major activities that are usually associated with special trackwork maintenance.

Scheduled Maintenance Activities for Special Trackwork

- Lubrication of switch and spring frog plates
- Maintenance grinding of frog, switch point, and stock rails
- Maintenance grinding of welds, forged areas, and slotting of mechanical joints
- Maintenance welding of worn frogs
- Maintenance welding of engine burns (≤3/8")
- Production grinding of special trackwork and approaches:*
  - 8-12 stone production switch grinder
- Inspection of gage, with attention to the spread of the rail due to defective fasteners, timber, and/or rail wear
  - Inspection of guard face gage, guard check gage and track gage
- Inspection of head block area (switch stand, timbers, and latches)*
  - Check the crank eye bolt under the switch stand to include cotter pin
  - Check the upright bolt and cotter pin at the connection between number 1 rod and the throw rod
  - Inspect all switch locks, circuit controller (CC) box, and unlock box for proper number and placement
  - Throw turnout to observe for loss of motion
  - Observe switch point and stock rail fit
- Maintenance, cleaning, and adjustment of switch targets
- Maintenance and replacement of gage plate and rod insulation*
- Spot tamping of trackwork*
- Out-of-face surfacing and alignment of trackwork*
- Spot replacement of major trackwork components (stock rails, switch points, frogs, etc.)*
- Spot rail replacement to include the replacement of insulated joints and curve worn rail*
- Bolt maintenance: tighten or replace loose and defective bolts and torque to specifications; inspect and install cotter pins as required
- Replacement or adjustment of defective fastener systems
- Maintenance of drainage and waterways
- Vegetation management
- Ballast maintenance
- Out-of-face ballast replacement (undercutting and shoulder ballast cleaning)*

***The Signal Department shall be notified prior to maintenance and inspection as noted above. In addition, the Signal Department must be notified when work is required on the following items:**

- Insulation on bridal plates
- Insulation on switch rods
- Repair/replacement of insulation joints
- Protection of track wires and bond wires

§4.0(STM) UNSCHEDULED MAINTENANCE ACTIVITIES

(a) Unscheduled maintenance activities are maintenance activities that cannot be planned or programmed.

(b) Unscheduled maintenance of special trackwork and components can be due to:

(1) Any signal failure.

(2) Natural events, such as fire, flood, severe storms, and extreme temperatures or extreme variations in temperature, and earthquakes.

(3) A sudden change in the type of traffic, speed of traffic, or frequency of traffic over special trackwork.

(4) A “run through” or derailment within the area of special trackwork or a component of special trackwork.

(5) Failure of a component or components.

Subpart B – Maintenance Program

§5.0(STM) MAINTENANCE

Refer to §5.0(M)

§6.0(STM) PLANNING AND COORDINATION

(a) Refer to §3.0(STM) for the list of maintenance activities that shall be planned and performed by track forces.

(b) Programmed maintenance shall provide for the safety of train operations and shall be carried out in a cost-effective manner to provide maximum life to the trackwork and maximum benefit to the Operating Railroad Company.

(c) The information contained in inspection reports shall be used to plan trackwork maintenance.

(d) Program maintenance and/or capital maintenance and production should be internally coordinated with the Operating, Signal, and Bridge & Building (B&B) Department of the Operating Railroad Company.

(e) Planned maintenance that involves work within private rights-of-way (i.e., grade crossings and utilities), shall be coordinated with fire, police, public safety, and appropriate utilities (call 811 for Dig Safe). Also coordinate with local Department of Public Utilities (DPU) and/or State District.

§7.0(STM) QUALITY CONTROL

(a) The person in charge of performing the maintenance activity or repair shall be responsible for the overall quality of the work performed.

(b) All maintenance work shall be performed in accordance with these practices.

(c) An Operating Railroad Company Official shall periodically review the work performed for quality, consistency, and adherence to (b).

(d) Trackwork repairs that are deficient:

  (1) May be cause for remedial action.

  (2) Shall be brought to the attention of an Operating Railroad Company Official.

(e) An Operating Railroad Company Official shall see that any additional work necessary is performed to bring the repair into compliance with MassDOT recommended practice and shall re-inspect for substandard or deficient work.

(f) Operating Railroad Company personnel are encouraged to make recommendations as to the required modifications to methods, procedures, and practice to improve the overall quality of work.

Subpart C – Scheduled Site Maintenance Activities

§33.0(STM) DRAINAGE AND WATERWAYS

Drainage in and around special trackwork shall be maintained in accordance with §33.0(M).

§37.0(STM) VEGETATION MANAGEMENT

Vegetation in and around special trackwork shall be maintained in accordance with §37.0(M).

Subpart D – Maintenance Limits

§50.0(STM) SCOPE

(a) Maintenance is the repair or replacement of a component of special trackwork which may include switch points, frogs, and fastenings.

(b) Maintenance limits are to be used as a triggering mechanism that prompts maintenance or reconstruction.

  (1) It is MassDOT's goal to have special trackwork that is maintained above FRA minimum standards.

  (2) As special trackwork components wear, maintenance should be programmed before the track reaches the maintenance limits.

  (3) Maintenance must be executed whenever the maintenance limits are exceeded and completed prior to reaching the FRA minimum standards.

  (4) Whenever possible, special trackwork should be repaired or reconstructed to as-new condition.

(c) The maintenance limits and recommended practice for special trackwork and other trackwork are found in this subpart or the applicable maintenance sections.

§53.0(STM) GAGE

Refer to §53.0(M), "Gage."

§55.0(STM) ALIGNMENT

(a) Maintenance shall be performed when alignment values reach the limits given in §55.0(M) Alignment.

(b) The straight stock rail (open point) in a turnout is the line rail. If stations fall within undercut portions of the stock rail, alignment measurements may be taken on the field side of the stock rail.

(c) In special trackwork, alignment deviation in curves is the difference in the mid-ordinate value between adjacent stations and not the average of multiple stations (uniformity) as given in FRA §213.55.

§63.0(STM) TRACK SURFACE

(a) The following criteria:

  (1) Will serve as a practical guide for the maintenance of smooth riding conditions in special trackwork; and

  (2) Will minimize the wear on special trackwork, special trackwork components, and rail vehicles.

(b) For Track Classes 1-5, surface may not deviate more than the amount prescribed in the table in §63.2(M).

Subpart E – General Maintenance Requirements

§133.0(STM) TURNOUTS AND CROSSOVERS

§133.1(STM) Use of Turnouts and Crossovers

(a) Turnouts and crossovers are designated by their frog numbers and should be used as follows:

(1) No. 20: At interlocking plants for crossing over of high speed trains from one main track to another main track (normally used in the same or reverse direction in locations where the normal speed is 50 MPH or more).

(2) No. 15: At interlocking plants for movements to another main track (normally used in the same or reverse direction, where conditions do not justify or afford the distance required for No. 20 frogs). For diverting trains to sidings or other tracks and returning trains to main tracks through power operated or spring switches.

(3) No. 10: For all other turnouts from main tracks and sidings, where practicable, and in yards and terminals.

(4) The use of other turnouts must have the approval of MassDOT Rail and Transit Division.

§133.2(STM) Speeds Through Turnouts

(a) The maximum permissible speeds through turnouts when located in tangent track will be as follows:

Frog No.	Switch Point/ Switch Rail Length (Ft.)	Maximum Authorized Speeds (MAS) (MPH)
20	59'-6"	60*
20	39'	45
20	39'	60*
15	38'	30
15	26'	30
10	27'	15
10	16'-6"	15
8	16'-6"	10
Note: * With equilateral turnouts only.		

(b) When turnouts or crossovers are located in curved tracks, speed must be adjusted in accordance with FRA §213.57.

(c) The maximum authorized speed (MAS) through turnouts shall be designated by the MassDOT Rail and Transit Division.

§135.0(STM) SWITCHES

(a) Switch points and moveable points should be kept in line and surface with all bolts tight and cotter pins in place.

(b) Switch points must fit the stock rails closely and accurately, with a full bearing against the head of the stock rail. If a wear pattern indicates bearing only along the top edge of point, the cause of wear shall be investigated and corrected.

(c) When an open switch point is found of more than 3/16", it must be immediately corrected and/or removed from service.

(d) Each switch stand in connecting rod must be securely fastened and operable without excessive loss of motion.

  (1) Connecting rod bolts must be of the proper size and installed with the bolt facing upwards and the nut on top.

  (2) The upright bolt and nut shall be drilled to accept and installed with a cotter pin.

(e) Switch points and stock rails should have the overflow ground off. Attention should be given to the overflow and fit of the back side of the switch point to the stock rail.

(f) When necessary to replace individual switch points or stock rails, use replacement material of similar kind (i.e., Samson points to Samson stock rails; plain points to plain stock rails).

(g) When replacing or changing a switch point, replace switch points and stock rails as a set:

  (1) Fastenings must be intact and maintained so as to keep the components securely in place.

  (2) Also, each switch, frog, and guard rail must be kept free of obstructions that may interfere with the passage of wheels.

  (3) Classes 3-5 track must be fully box anchored through and on each side of track crossings and turnouts to restrain rail movement affecting the position of switch points and frogs. Elastic fasteners designed to restrict longitudinal rail movement are considered the same as rail anchors.

(h) Adequately fasten switch points and stock rails to prevent lateral and longitudinal rail movement.

(i) Upright bolts used with horizontal switch rods must be placed with nut ends up and nuts secured with cotter pins so they can be visually inspected.

(j) Switch points shall be replaced when worn or chipped so that the top of the switch point, at any place, is more than 7/8" below the plane across the top of the stock rails.

(k) Unusually chipped or worn switch points that are found to have an unprotected flat, vertical service, 5/16" or more in width, at a depth of 3/4" below the top of the stock rail and switch point, must be removed from service and replaced immediately. This type of point wear may contribute to a wheel climb derailment.

(l) Switch points shall be replaced when the raised portion of the switch point (rise) is worn down to the level of the top of the stock rail. The purpose of the rise is to prevent the outer edge of the wheel tread from striking the stock rail and rolling the stock rail out of the switch plates and causing a derailment.

(m) Chipping or wear on any switch point should be investigated, its cause determined and corrective action taken. Wear or chipping produces a sloping surface on the face of the switch point which may tend to lift a wheel having an imperfect flange. The switch rail should be further examined to locate any point of hard contact by the wheel, which might contribute to wheel climb.

(n) Spot grinding of points is allowed to remove chips, minor burns, small imperfections, small cracks, etc., with care being taken to insure that proper profile is restored to the switch point to prevent wheel climb. Grinding is not to exceed 7/8" below top of stock rail.

(o) When changing switch points and curved closure rails, or when grinding switch points, lubricate as follows:

(1) The gage face of the curved point and the curved closure rail.

(2) Spot lubricate top of straight closure rail in vicinity of switch point.

(3) Lubricate gage face of all ground switch points.

(p) Switch points, components, and connections must be examined frequently.

(1) It is important that the stock rails are securely seated and have no movement in the switch plates.

(2) Care should be taken to avoid canting the rail by over-tightening the rail braces.

(3) Switch plates shall have no movement on the ties.

(q) Switch plates and moveable parts should be kept clean and lubricated with an approved graphite dry lubricant.

(r) The heel of each switch point must be secured and the bolts of each heel must be kept tight (e.g., fixed blocks).

(s) In yards when using No. 10 turnouts or smaller, and the maximum authorized speed does not exceed 15 MPH, a switch point guard may be applied to the outside of the stock rail.

(t) Switch point guards shall be used only in yards and installed so that the distance of the guarding face of the guard to the gage face of the switch point is set at 3-15/16". The gage face of the switch point guard shall be restored by welding once the wear exceeds 1/4" (4-3/16").

§137.0(STM) FROGS

(a) See AREMA Standard Track Plan No. 300 for guidance on the use of frogs.

(b) All metal flow from frogs must be ground promptly and the gage and guard edges of castings rounded. The radius shall be ground to match the original radius and contour of the frog. See AREMA Standard Track Plans or manufacturer's shop drawing.

(c) New frogs should be ground 30 days following installation. Subsequent grinding will be required monthly for the first several months depending on frog type and service.

(d) Frog points, frog castings, and wheel relief areas (false flange), should be built up by welding to maintain as-new cross section. Spring rail frogs also have false flange relief areas by design. See AREMA Standard Track Plans or manufacturer's shop drawing.

(e) Worn frogs should be repaired in track by an approved electric welding method and then ground to the correct contour.

(f) Each flangeway in special trackwork must be at least 1-1/2" wide with a 1/8" head radius.

(g) The flangeway depth, measured from a plane across the wheel-bearing area of the frog, may not be less than 1-3/8" in Track Class 1 or less than 1-1/2" in Track Classes 2-5.

(h) If a frog point is chipped, broken, or worn more than 1/2" down and 3" back, the frog should be repaired.

(i) If a frog point is chipped, broken, or worn more than 5/8" down and 6" back, operating speed over that frog may not be more than 10 MPH.

(j) If a riser or insert of a frog is broken out or worn down more than 3/8" below the original contour, operating speed over that frog may not be more than 10 MPH.

(k) Welding repairs on manganese (Mn) steel frogs shall be performed by a welder certified to weld manganese steel.

(l) All frog repairs should be ground to contour. Square corners lead to breakouts into the flangeway.

(m) Frog welding may be prolonged indefinitely by proper grinding practices.

(n) Missing or loose frog bolts shall be retightened or replaced with bolts of correct length and diameter.

(o) All frogs requiring repairs that cannot be made in track shall be removed from track and shipped to the designated repair point.

(p) Frogs shall be supported on effective timber that is fully tamped to minimize wear and damage from train traffic.

§139.0(STM) SPRING RAIL FROGS

(a) Spring frogs have a moveable wing rail that is normally held closed against the body of the frog except when pushed open by a diverging movement. This results in a smoother ride for main line moves.

(b) Spring frogs must be inspected to comply with FRA §213.139.

(c) Recommended practice for the proper installation, inspection, and maintenance:

  (1) Spring frogs must be inspected on foot at least once per week.

  (2) Good surface, line, drainage, and timber condition must be maintained.

  (3) The outer edge of a wheel tread must not be permitted to contact the gage side of the spring wing rail.

  (4) All bolts should be tight:

    (i) Some body bolts are special thin head bolts.

    (ii) Maintenance body bolts (studs) are available for locations where frog must be disassembled to install new bolt.

  (5) Ensure spring wing can move freely.

(d) Spring rail frogs are to be used on industrial tracks that are used infrequently (unless approved by the MassDOT Rail and Transit Division).

(e) The clearance between the hold-down housing and the horn may not be more than 1/8" at the top and 1/8" at the bottom. Other issues to be addressed:

  (1) Wing and point must fit properly. Grind overflow to prevent chipping. Grind gage corner radius to 5/8".

  (2) The spring wing to frog point is designed to have a 3/8" gap at the point. A gap of no more than 3/4" must be maintained.

  (3) Ensure there is sufficient tension on spring:

    (i) The spring nuts should be adjusted to compress the spring 1" (1/4" between spring follower and housing).

    (ii) This results in approximately 600 pounds of force from the spring.

(f) Typically, by design, there is a gap of up to 3/8" between the spring wing rail and frog point within the first 5" of the frog point. It is desirable to maintain contact between the spring wing rail and the remainder of the frog.

  (1) A gap less than 3/4" is to be maintained.

(2) If a gap of 3/4" exists, check the compression of the springs on the wing rail to see if the springs must be adjusted and/or replaced.

(g) Particular attention should be paid to the guard face gage in the point area on the straight side of the turnout. A guard rail protects the straight move through the length of the moveable wing.

(h) The outer edge of a wheel tread must not contact the gage side of a spring wing rail.

(i) When surfacing a spring frog:

(1) Do not jack the frog with production equipment between the toe and heel. This could bend the base plate.

(2) Use hydraulic hand jacks.

(j) Base plate and horns should be lubricated with switch plate lubricant.

(k) The toe of each wing rail must be solidly tamped and fully bolted, or preferably, field welded.

(l) Spring frogs should be ground 30 days after installation. Subsequent grinding may be required monthly for the first several months depending on frog type and service.

(m) Welding of a spring rail frog may only be performed with the permission of the MassDOT Rail and Transit Division.

(1) If a spring rail frog is welded in the field, the first train will operate at Class 1 speeds, freight trains at 10 MPH, and passenger trains at 15 MPH.

(2) The spring rail frog will be re-inspected after the first train before the track will be returned to MAS.

(n) Each spring must have sufficient compression force to hold the spring wing rail against the point rail.

(o) Lubricate spring frog plates with approved lubricant in the Spring, Summer and Fall and “Ice Free Switch” anti-icing agent in the winter (or approved equal).

(p) The opening between the spring wing rail and frog point of spring frog shall be kept free of any debris and snow and ice that may impede the operation of the spring wing rail.

§141.0(STM) SELF-GUARDED FROGS

(a) Self-guarded frogs shall be used in non-main tracks where the speed does not exceed 15 MPH.

(b) If, because of wear, repairs need to be made to the guarding face of a self-guarded frog:

(1) The raised guard face of a self-guarded frog may not be worn horizontally more than 3/8".

(2) Repairs require the use of a contour gauge (see §150.1(M), “Inspection Tools”).

(3) The track should be taken out of service.

(4) When repairing the guard face of a self-guarded frog, the build-up of weld material must be made from the top down to prevent wheel climb

(5) When repairs are made to a self-guarded frog, the guard face must be restored before rebuilding the point. This practice will ensure that the wheel does not strike the rebuilt frog point.

§142.0(STM) GUARD RAILS

§142.1(STM) Guard Rails - General

Guard rails shall be furnished in accordance with MBTA Standard Plan Book, AREMA Standard Plan Book, or as approved by the MassDOT Rail and Transit Division.

§142.2(STM) Guard Rails - Use

(a) Guard rails used with No. 15 spring frogs shall be a minimum of 16'-0" in length. Guard rails used with frogs of lesser number shall be a minimum of 13'-0" in length.

(b) Guard rails used with No. 10 spring frogs shall be a minimum of 16'-0" in length, or as approved by the MassDOT Rail and Transit Division.

(c) Guard rails installed in accordance with previous standard practice may be continued in general use until their replacement becomes necessary.

(d) Relay quality hook flange guard rails must only be reinstalled in other than main tracks.

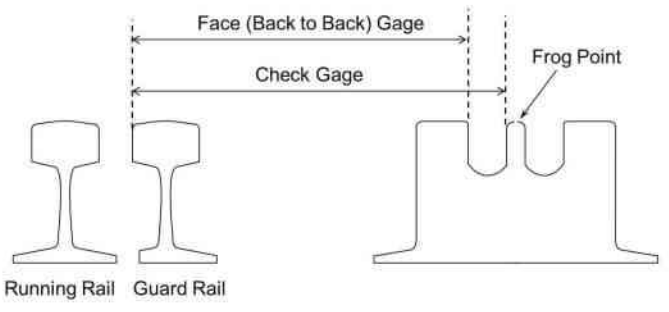
§143.0(STM) FROG GUARD RAIL AND GUARD FACES; GAGE

(a) If possible, when performing trackwork maintenance, repairs shall be made to restore the installation dimensions of guard rails:

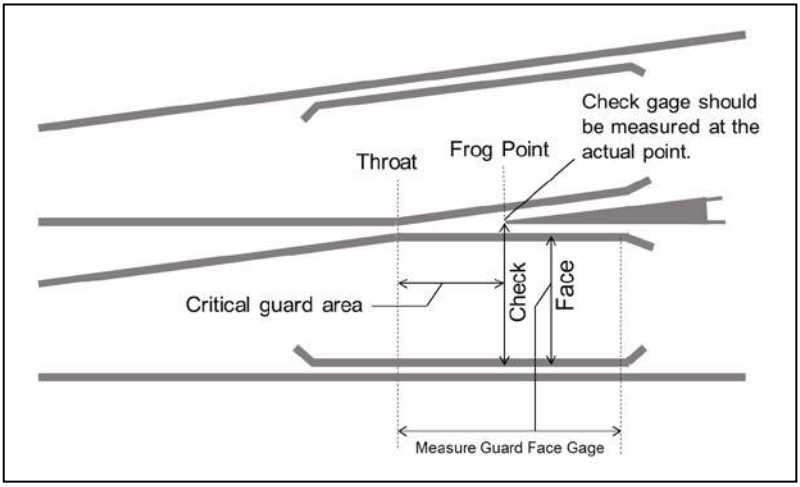
Track gage	56-1/2"
Guard check gage (may not be less than)	54-5/8"
Guard face gage (back to back) (may not be more than)	52-3/4"

(b) Maintenance limits contained in Paragraph (a) are more restrictive than those found in FRA §213.143.

(c) See the following diagrams showing guard check gage and guard face measurement locations.



Guard Check and Guard Face Gage



Guard Check and Guard Face Gage Measurement Locations

§144.0(STM) INSTALLATION OF SPECIAL TRACKWORK GUIDELINES

(a) Trackwork constructed in track, or at the site, shall be built to, and perform to the MBTA Standard Track Plans, AREMA Standard Track Plans, or as approved by the MassDOT Railroad Transit Division.

(b) Turnouts and crossovers shall not be placed in curves or spirals without the approval of the MassDOT Rail and Transit Division.

(c) Pre-plated, pre-assembled switch timber and pre-fabricated switch nose panels (if truckable), are preferred.

(d) Care must be used in unloading and handling all trackwork, timber, and turnouts. This includes handling and unloading from flatbed cars and trucks and assembling and loading onto transport cars.

(e) A minimum 12" bed of clean-bottom compacted ballast shall be provided with good drainage. See MBTA Standard Plan Nos. 1000 and 1002.

  (1) If roadbed materials (sub-ballast and sub-grade) are inadequate, an 8" layer of compacted sub-ballast shall be installed; or

  (2) A 5" layer of compacted hot-mix asphalt under-layment as per MBTA Standard Plan No. 1030; or

  (3) A Geo-Web (or approved equal) sized appropriately for the field conditions (4", 6", or 8") may be used as determined by the MassDOT Rail and Transit Division.

(f) When practicable, special trackwork should be completely installed with switches connected to their operating mechanisms and properly adjusted before trains are permitted to move over the trackwork.

(g) Care must be used when installing trackwork panels to prevent rail bending, tie splitting, or tie cracking, as well as bending and/or breaking fasteners and OTM.

(h) When installing special trackwork panels, bottom ballast should be furnished and installed and compacted level to within 2" to 4" of final bottom of tie grade. The final lift shall be nominal 1-1/2". (Ballast bagging or blocking can be used when undercutting or in emergencies.)

(i) Initial surfacing lifts for special trackwork shall be limited to 2" increments. This size lift helps prevent tie breakage, and the bending of rail and plates in spring and moveable point frogs. The final lift shall be a nominal 1-1/2".

(j) Where only one switch rail (closed point) has been installed in a main track turnout in existing main track, and it is necessary to move trains over the turnout, the following precautions must be taken:

  (1) All switch plates on the turnout side must be in the correct position and clipped and/or fully fastened.

  (2) The switch rail must be securely held against its stock rail by driving a spike in each of the first two ties back of the point and, where possible, spikes must pass through holes in the switch plates.

  (3) The switch point must be secured to the stock rail by standard clamping devices.

  (4) Unconnected ends of lead rails, or the toe of the frog, must be protected by a tapered wedge fastened to the tie to protect against dragging equipment.

  (5) The free end of stock rail must be fastened down to prevent movement and a tapered wedge fastened to prevent against dragging equipment.

  (6) Facing point train movements shall only be made under a 10 MPH temporary speed restriction unless point detection is provided.

(k) If both switch rails have been installed, but not properly connected to the switch operating mechanism, the following must be done before trains are permitted to move over the main track turnout:

  (1) Switch rods must be installed.

  (2) The main track switch rail must be secured against its stock rail, as required above.

  (3) The diverting switch rail (open point) must be blocked by driving a wooden wedge, not less than 18" long, between the switch rail and the stock rail.

  (4) On wood ties, a wedge must be secured in place by means of a lag screw or heavy nail through one clip bolt hole and a piece of wood placed against the end of the wedge and spiked to the first and second ties ahead of the point.

  (5) Unless the curved lead has been installed and spiked or clipped to prevent movement, a connecting rail shall be fastened to the heel of the open switch rail and moved away from the running rail so as to provide at least 5" clearance between rail heads.

  (6) Facing point train movements shall only be made under a 10 MPH temporary speed restriction unless point detection is provided.

(l) The main track guard rail must be correctly placed and clipped or spiked if the frog has been installed.

(m) Unconnected ends of lead rails or the toe of the frog must be protected by a riser wedge fastened to the tie to protect against dragging equipment.

(n) Where track is signaled, a switch circuit controller shall be installed, tested and functioning, by a signal employee of the Operating Railroad Company.

Subpart F – Scheduled Maintenance Activities

§150.0(STM) DESCRIPTION OF SCHEDULED MAINTENANCE ACTIVITIES TO BE PERFORMED

Refer to the table in §3.0(STM) for the list of major trackwork activities to be performed by the Operating Railroad Company.

§151.0(STM) RECORD OF TRACKWORK DISTURBANCE IN CWR TERRITORY

(a) Maintenance activities performed in trackwork installed in CWR track can cause a change in the rail neutral temperature (RNT) of the CWR and cause track instability in and around the special trackwork.

(b) MOW employees in charge of, or responsible for maintenance work performed in and around special trackwork in CWR track, shall be thoroughly familiar with and understand and comply with Appendix A, "Continuous Welded Rail (CWR) Procedures."

§152.0(STM) LUBRICATION OF SWITCHES AND FROGS

(a) Switch and spring frog plates shall be cleaned and lubricated as necessary.

(b) The Signal Maintainer has the overall responsibility to lubricate powered switches and derails in signaled track.

(c) The Track Department has the responsibility to lubricate all other switches, derails, and spring frogs with approved seasonal lubricants.

§152.1(STM) Lubrication of New Switch Points

(a) New switch points shall be greased after installation.

  (1) Special attention should be paid to lubricate the gage face of the diverging point from point of switch to point of frog.

(b) Existing switch points that show indication of wear should be carefully lubricated frequently on the gage face so as to prevent migration to the top of rail, as well as excessive ground and ballast contamination.

§156.0(STM) SURFACING (SPOT TAMPING) - GENERAL

(a) Spot tamping (less than 200') is required to restore the surface and line when deviations approach the alignment and surface maintenance limits given in §§55.0(M) and 63.0(M).

(b) Spot tamping is required to eliminate the excessive deflection and pumping of ties which:

  (1) Overstresses clips causing premature failure or backing out of clips.

  (2) Increases abrasion of the wood ties.

  (3) Fouls the ballast.

  (4) Increases ballast abrasion and wear.

  (5) Changes the load distribution over the length of the tie which, in some cases, may overstress the tie.

(c) Tamping should be performed in such a manner as to prevent the centerbinding of timber and ties.

(d) In wood tie turnouts, head block and movement ties may require tamping by hand to provide full support of the long timber.

(e) When spot surfacing in welded rail territory, see Appendix A, "Continuous Welded Rail (CWR) Procedures."

§157.0(STM) OUT-OF-FACE SURFACING AND ALIGNMENT

(a) Out-of-face surfacing (greater than 200') shall be accomplished by multiple tool switch tampers, ballast stabilizers, and ballast regulators.

(b) Out-of-face surfacing is usually required when there are multiple spots to be surfaced that are greater than 200' in length.

(c) Out-of-face surfacing is required to restore the overall surface and line when deviations approach the alignment and surface maintenance limits given in §§55.0(M) and 63.0(M).

(d) The Operating Railroad Company shall plan any out-of-face surfacing program for trackwork. The Operating Railroad Company MOW personnel shall make use of information on the Track Inspection Report, Special Track Inspection Report, Monthly Switch Inspection Report, track geometry car readings (if available) and train rides when planning the out-of-face surfacing program.

(e) Out-of-face surfacing and aligning of CWR track should be avoided:

(1) When the ambient air temperature is 80°F, or rail temperature is 100°F, or above;

(2) Anytime there is an ambient air temperature of 40°F, or below, for a 24-hour period. To surface and align track below the above temperature requires the approval of MassDOT Rail and Transit Division.

(3) Any other time when questionable track conditions exist that will not safely support surface and alignment of track.

(f) When out-of-face surfacing in welded rail territory, see Appendix A, "Continuous Welded Rail (CWR) Procedures."

§158.0(STM) SPOT REPLACEMENT OF MAJOR COMPONENTS

(a) During the useful life of special trackwork, it may be required to replace major components and systems as part of a programmed maintenance activity. The major components include, but are not limited to:

(1) Switch points, stock rails, and/or point protectors.

(2) Switch plates or tie plates and clips and fasteners.

(3) Frogs and guard rails.

(4) Bolt assemblies.

(5) Closure rails (associated joint and insulated joints).

(6) Switch timber and headblock ties.

(7) Switch stands, switch machines, and/or derails.

(8) Switch targets, handles, rods, and cotter pins.

(b) The replacement of major components is based on:

(1) The physical condition of the component.

(2) The amount of measured wear on the component compared to an established maximum "wear limit" as given in this Part.

(3) The ability of the component to sustain MAS and meet the operational requirements of the railroad.

(4) Lost motion of any moving switch parts.

(c) When changing major components, all work performed shall be reported on the daily Track Inspection Report and be available to the MassDOT Rail and Transit for review.

§159.0(STM) SPOT RAIL REPLACEMENT

(a) Rail replacement shall be performed on an as-needed basis as traffic and local conditions warrant.

(b) The replacement of rail is based on:
   (1) The age and physical condition of the rail.
   (2) The existence of a rail defect as defined in FRA §213.113.
   (3) The amount of measured wear on the rail compared to an established "wear limit" for that rail as given in §113.2(M).
   (4) Switch point to stock rail wear limits as given in this Part take precedence over the maintenance limits given in §113.2(M).

(c) A "Rail Failure in Main Track Report" must be filled out and available for MassDOT Rail and Transit Division to review every time a rail is changed.

§160.0(STM) BOLTS AND LOCK WASHERS

(a) During the useful life of trackwork there may be a requirement to replace broken or defective bolts and/or washers in frogs, heel blocks, and at permanently bolted joints.

(b) When evaluating the performance of bolts:
   (1) Verify that the bolt is of the correct diameter, length, and type.
   (2) Visually inspect the performance of the bolt and washer under load.
   (3) Visually inspect the joint or appliance and look for signs of vertical movement, batter, crushing, excessive flow, or excessive wear in the component affixed with the bolt and washer.
   (4) Visually inspect the condition of crib ballast and general line and surface at that location.
   (5) Visually inspect the condition of ties, plates, and clips at bolted locations.

(c) When changing a bolt in a joint, frog, or in a switch point, tighten all other bolts in the immediate vicinity.

(d) The preferred method of tightening new bolts is with a torque wrench and multiplier that applies the recommended level of torque (foot-pounds) to the bolt. See the following tables.

Recommended Torque Values in ft.-lb. to Produce the Minimum Specified Tension in Society for Automotive Engineers (SAE) Grade 5 Bolts

Bolt Diameter	Min Tension (lb.)	Lubricated Condition(1)	Non-Lubricated Condition(1)
1/2"	12,000	80	105
5/8"	18,000	155	210
3/4"	28,000	275	370
7/8"	39,000	450	600
1"	51,000	670	800
1-1/8"	56,000	825	1,100
1-1/4"	71,000	1,165	1,550
1-3/8"	85,000	1,535	2,040

Note:
(1) Lubricated torque valves shall be achieved by applying a metal-based lubricant to the bolt threads.

Recommended Torque Values in ft.-lb. to Produce the Minimum Specified Tension in SAE Grade 8 Bolts			
Bolt Diameter	**Min Tension (lb.)**	**Lubricated Condition(1)**	**Non-Lubricated Condition(1)**
1/2"	15,000	100	130
5/8"	24,000	195	265
3/4"	35,000	345	460
7/8"	49,000	565	750
1"	64,000	840	1,120
1-1/8"	80,000	1,180	1,575
1-1/4"	102,000	1,675	2,230
1-3/8"	121,000	2,185	2,910
Note: (1) Lubricated torque valves shall be achieved by applying a metal-based lubricant to the bolt threads.			

§161.0(STM) FASTENING SYSTEMS

(a) During the useful life of trackwork, it may be required to change rail fasteners (e.g., clips or spikes or screw spikes) as a normal maintenance activity.

(b) The replacement of fasteners is based on:

(1) The physical condition of the fastener (worn or corroded and/or broken or missing).

(2) The ability of the fastener and the fastening system to minimize the horizontal and vertical movement, as well as the longitudinal movement of the rail or components (e.g., switch points, frogs and guard rail), and to sustain maximum authorized speed.

(c) When evaluating the performance of fasteners, the Foreman shall:

(1) Verify that the correct type of fastener is being used.

(2) Visually inspect the fastener for cracks and breaks.

(3) Visually inspect the fastener to see if they are overdriven.

(4) Visually inspect the components being fastened and look for signs of vertical or horizontal movement or excessive wear.

(d) Clips that have repeatedly backed-out or fallen-out should be replaced with new clips and not reused.

Subpart G – Turnouts in Signalized Track

§170.0(STM) GENERAL PROCEDURES FOR WORK ON TURNOUTS IN SIGNALED TERRITORY

(a) When adjusting or working on a main track turnout in signaled territory:

(1) Notify the Signal Maintainer.

(2) Obtain foul time, track time or other form of Roadway Worker Protection (RWP) from the dispatcher.

(3) Hold a job briefing.

(4) Block the switch point.

(5) Perform the work.

(6) Remove blocking.

(7) Perform obstruction test (by Signal Maintainer).

(8) Make sure hand-thrown turnout is aligned and locked with an approved lock in the normal position before returning to service.

(9) Return track to service.

Subpart H – Mechanisms, Appliances, and Devices

§200.0(STM) SWITCH OPERATING MECHANISMS

§200.1(STM) Use of Mechanisms

(a) Switches shall be operated by approved types of mechanisms as follows:

(1) Power mechanisms as approved by the MassDOT Rail and Transit Division after recommendation by the Signal Department.

(2) Spring switches: Manually operated switch mechanisms, which are supplemented by slow-acting spring devices that permit wheels to trail through switches set for the opposite route, may be used with the approval of the MassDOT Rail and Transit Division.

(3) Approved type of new installation switch stands (unless approved by MassDOT Rail and Transit Division), are: Racor Model 36EH (High Mast) for mainlines and Racor Model 36E for yards.

(4) Manual operated mechanisms shall use the “back saver” and/or “triangular hand level” handles for new installations.

§200.2(STM) Installation of Switch Stands

(a) Manually operated switch stands shall be placed so that the operating rod is in tension when the switch is set in normal position.

(b) Whenever possible, the switch stand handle shall be positioned facing the frog when the switch is in the normal position.

(c) Where crossover switches are protected by signals, a switch locking arrangement shall be provided.

(d) Switch stands for all tracks shall be located to serve the safety and efficiency of employees.

§205.0(STM) SWITCH POINT POSITION INDICATORS (TARGETS)

§205.1(STM) General

(a) Where required, indicators shall be provided on all non-interlocked switches to give a clear and distinct indication of the position of the switch points

(b) Switch point targets shall be reflectorized. The height of the centerline of the target shall not exceed 20" above the track ties. Targets higher than this are called “high targets.”

(c) Generally, high targets with the EH36 high stand are used on all main track.

(d) Generally, low targets are used in yards and at locations on main tracks where clearance precludes the use of a high stand.

§205.2(STM) Installation of Position Indicators

Targets shall be set at right angles to the track and perpendicular to the headblock ties.

§205.3(STM) Maintenance

Switch targets should be kept clean to provide uniform brightness and visibility.

§205.4(STM) Position Indication

(a) In order to give a clear and distinct indication of the position of non-interlocked switch points, colored targets shall be provided, in addition to the switch stands.

(b) Target colors are given in the Northeast Operating Rule Advisory Committee (NORAC) Rule Book (Rule 104H).

(1) Where switch targets are used, a green or white banner indicates normal position of the switch, and a red or yellow banner indicates reverse position.

(2) Green and white banners are used on main tracks, and red and yellow banners are used on other than main tracks and yards.

§205.5(STM) Distance from Rail for Switch Stands and Switch Point Targets

(a) Switch stands, not between tracks, must be placed so that the distance from the gage of the nearest rail to the center of the spindle with a low mast is 4'-1" and with a high mast is 7'-0".

(b) Low target masts placed between tracks must be installed as follows:

Track Center Distance (at least)	**Minimum Distance From Gage of Nearest Rail to Center of Spindle**
12'-2" but less than 13'	3'-8-3/4"
13' or greater	4'-1

(c) All powered switch machines shall be installed as per Signal Department Instructions.

§210.0(STM) SWITCH STAND MAINTENANCE

(a) Switches, switch stands, and operating rods must be examined frequently. Broken, damaged, or missing parts shall be replaced immediately.

(b) Regular inspection shall be in accordance with FRA §213.233, and if necessary, corrective action must be taken immediately.

(c) Worn switch latches must be replaced before the wear is sufficient to permit the switch lever to be thrown without manually releasing the latch (keeper).

(d) Special attention should be taken to ensure that the cotter pin is maintained at the clevis location at the base of the switch stand and at the connection to the No. 1 rod (FRA §213.135).

§220.0(STM) SWITCH LOCKS

(a) At all main track switches, throw levers of switch stands, shall be secured by two latches (for normal and reverse positions), and locked by a standard switch lock. The lock is to be fastened by a chain to the switch stand, or tie, so that the switch can only be locked in the normal position.

(b) The throw levers of switch stands in other than main or secondary track, shall be provided with latches, but shall be provided with padlocks only when required.

(c) The standard switch lock used by the Operating Railroad Company is to be approved by MassDOT Rail and Transit Division.

(d) Recommended operating and cleaning procedures for switch locks are:

(1) Unlock the padlock and open the shackle to soak and wash the lock thoroughly in the recommended cleaner (LPS Instant Super Cleaner/Degreaser) or equivalent. This will remove any oil, grease, and their foreign matter from the

area of the locking balls. If feasible, use of an ultrasonic cleaning tank is advised. This type of device produces superior results.

(2) If cleaning by hand, use a squirt bottle to force the cleaning solution into the locking ball cavities. This will complete the cleaning and flushing of the locking ball area.

(3) Do not oil, grease, or graphite the lock. Lubricate only with a light, non-grease substance, such as LPS #1 Greaseless Lubricant.

§300.0(STM) DERAILS

§300.1(STM) Position of Derails

The "normal" position of a derail shall be to derail wheels of rolling equipment away from the main track or structure. The "reverse" position shall permit the unobstructed movement of equipment.

§300.2(STM) Use of Derails

(a) Derails shall be used on all tracks.

(b) Selection of derail type:

(1) A **double switch point derail** will be used at the following locations:

(i) Where the track on which the derail is to be placed descends towards the main track requiring protection.

(ii) On all tracks, even if descending away from the main track, if any portion of that track is higher in elevation than the track at the derail location.

(iii) Where the industry moves rail cars using on or off track equipment or by gravity or with a car puller.

(iv) On tracks used for loading, unloading, or storage of cars containing hazardous (hazmat) materials as defined in the U.S. Hazardous Material Instructions for Rail.

(v) Where operating conditions demand positive derailing protection.

(2) A **sliding rail** may be used where track on which the derail is to be placed is level or descends away from the main track requiring protection.

(3) A **hinge derail** may be used in yard areas where a derail operating stand would adversely impact the normal walking path.

(4) A **portable derail** is used to provide protection to personnel working on or about a track to make work limits inaccessible (see RWP Rules for Operating Railroad Company), or to protect equipment stored temporarily on a track not normally used for storage.

§300.3(STM) Types of Derails

(a) Derails are generally of three kinds: the "split switch," the "sliding block," and the "hinged block" type.

(b) Where derails are prescribed, the split switch type shall be used on side tracks or industrial tracks as follows:

(1) At all locations where the side track or industrial track is on a descending grade to the main track.

(2) Within interlocking limits, in main tracks, in secondary tracks, and as designated by the MassDOT Rail and Transit Division.

(3) In tracks where it is possible for the speed of rolling equipment to exceed 15 MPH.

(c) Approved sliding block type derails shall be used in other than main tracks with speeds less than 15 MPH at other locations than those given in Paragraph (b) above.

(d) Hinged block derails are usually used in yard limits or in conjunction with Roadway Worker Protection (RWP) practices.

§300.4(STM) Installation of Derails

(a) A derail shall be placed a sufficient distance back of the clearance point, not less than 12', to ensure that derailed rolling equipment will not foul the main or other protected track.

(b) When using single point split switch derails, a deflecting rail must be used.

(c) Where deflecting rails are used:

(1) The minimum length shall be 18'.

(2) The nearest end shall be 10' from the derail.

(3) The flangeway opening at the end nearest to the derail shall be 4".

(4) The end farthest from the derail shall be set to provide a 12" clear opening between running rail opposite the derail and the deflecting rail.

(5) The deflecting rail shall be of a section and weight that is not greater than that of the running rails, and, preferably less.

(6) The deflecting rail should be spiked to every tie with two rail holding spikes, one on each side of the rail base.

(7) Deflecting rails shall be fully anchored or otherwise secured to ensure that they do not move longitudinally.

(8) Derails are to be installed in accordance with manufacturer's recommendations.

(9) Existing installations of derails need not be changed to meet these provisions until renewals are necessary, or unless so ordered by the MassDOT Rail and Transit Division.

§300.5(STM) Operation of Derails

(a) Lever stands of approved types may be used for operating derails. Where practicable, the distance from the center line of the lever stand spindle to the gage of the nearest rail shall be at least 50".

(b) Derails shall be provided with standard switch padlocks fastened to the tie by a chain and staple, so that the lever or derail can be locked only in the normal position.

§300.6(STM) Maintenance of Derails

(a) Sliding block or hinged block derails shall be painted yellow.

(b) Dirt and weeds must be kept away from derails.

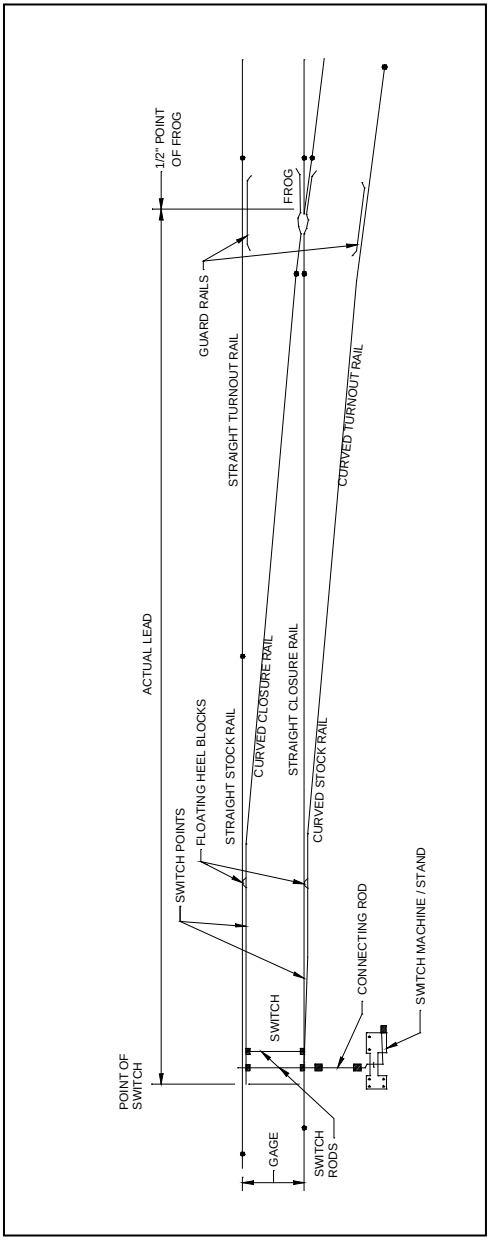
(c) Ballast, snow, and ice must be kept away from derails.

Subpart I – Schematics / Photographs

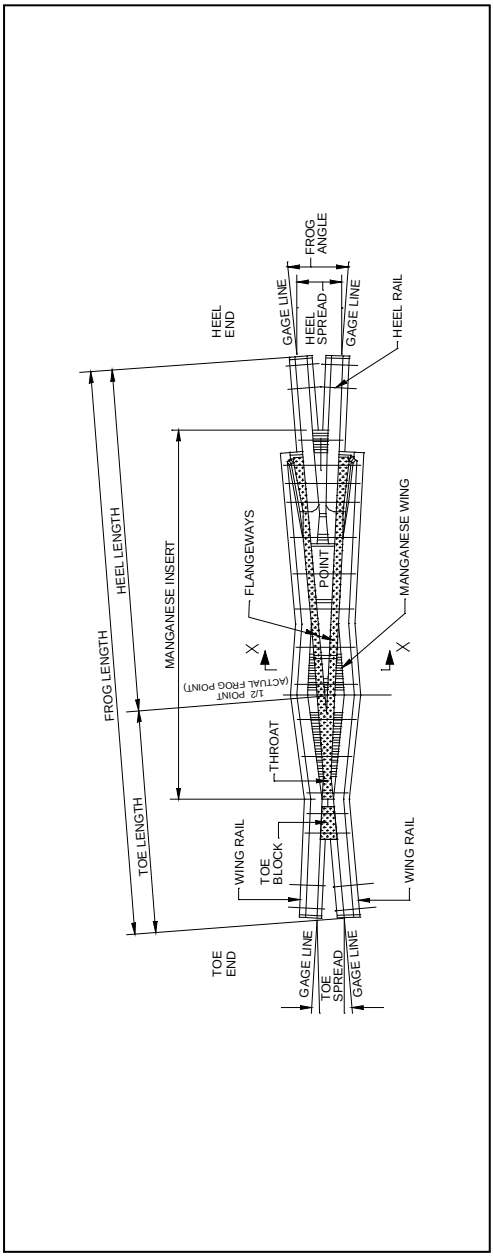
(a) Schematics and photos of trackwork are provided in the MW-1 to illustrate the name, location, and general arrangement of trackwork types and major components.

(b) Trackwork types and components are shown below in photos and drawings and include:

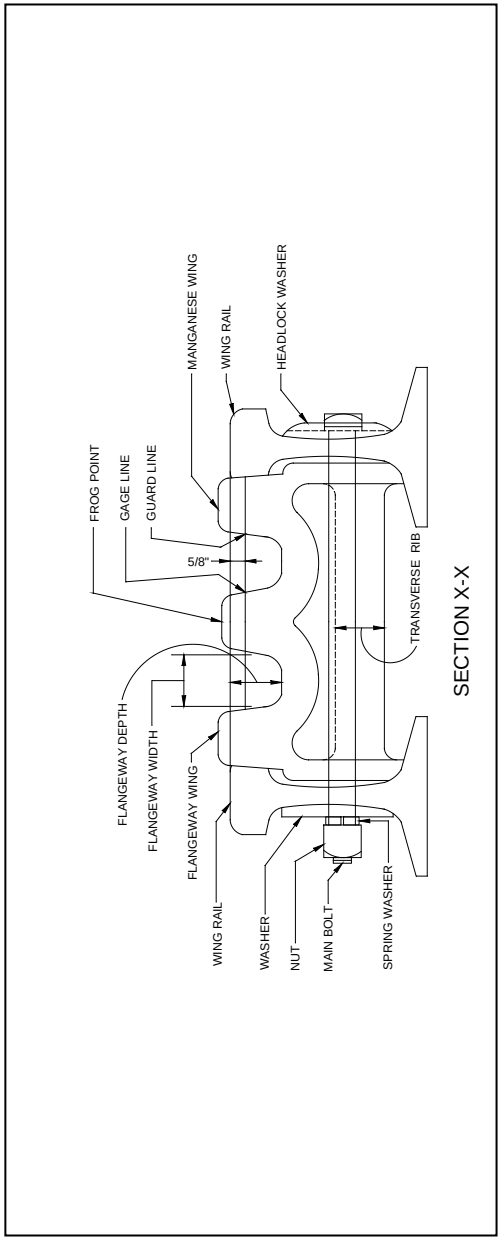
1. Conventional Turnouts
2a. Railbound Manganese Frog (RBM)
2b. Railbound Manganese Frog – Section X-X
3a. Self-Guarded Manganese Frog
3b Self-Guarded Frog – Section Y-Y
4a. Spring Frog Arrangement
4b. Spring Frog Details
5a. Guard Rail - Hook Flange Type
5b. Guard Rail - Hook Flange Type – Section A-A
6a. Hinged Derail
6b. Sliding Block Derail
6c. Double Switch Point Derail
7a. Switch Stand Type 36
7b. Switch Stand Type 36
8a. Western-Cullen Type Bumping Post
8b. High Energy Hydraulic Bumping Post



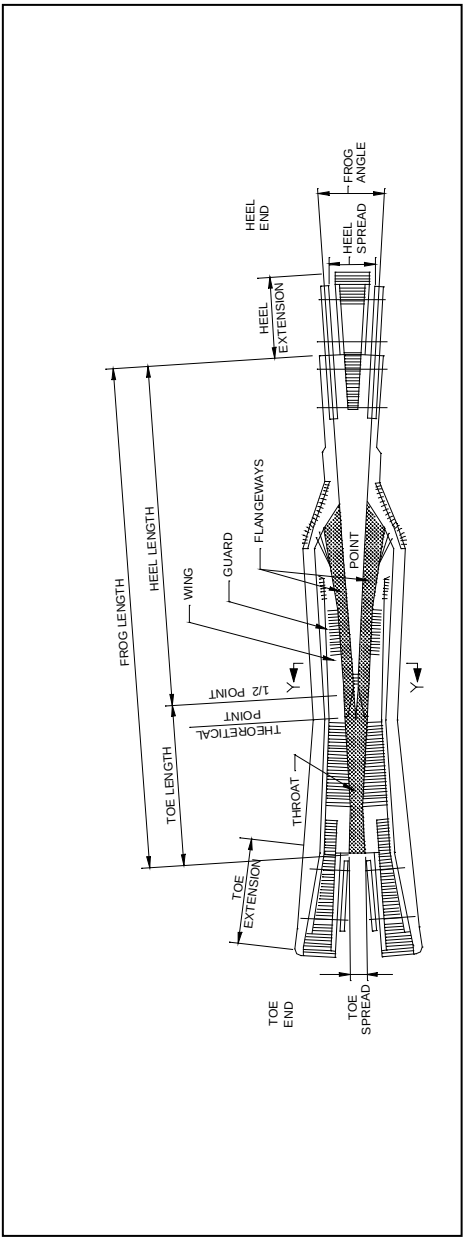
1. Conventional Turnout



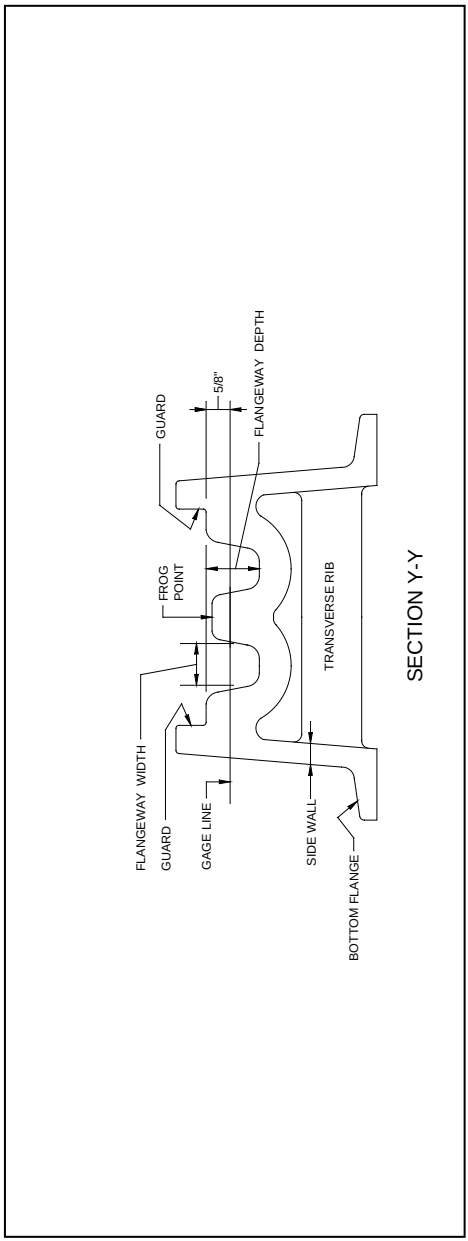
2a. Railbound Manganese Frog (RBM)



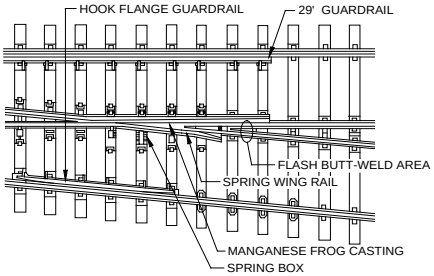
2b. Railbound Manganese Frog – Section X-X



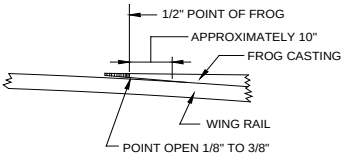
3a. Self-Guarded Manganese Frog



3b. Self-Guarded Frog – Section Y-Y



MANGANESE SPRING FR0G LAYOUT

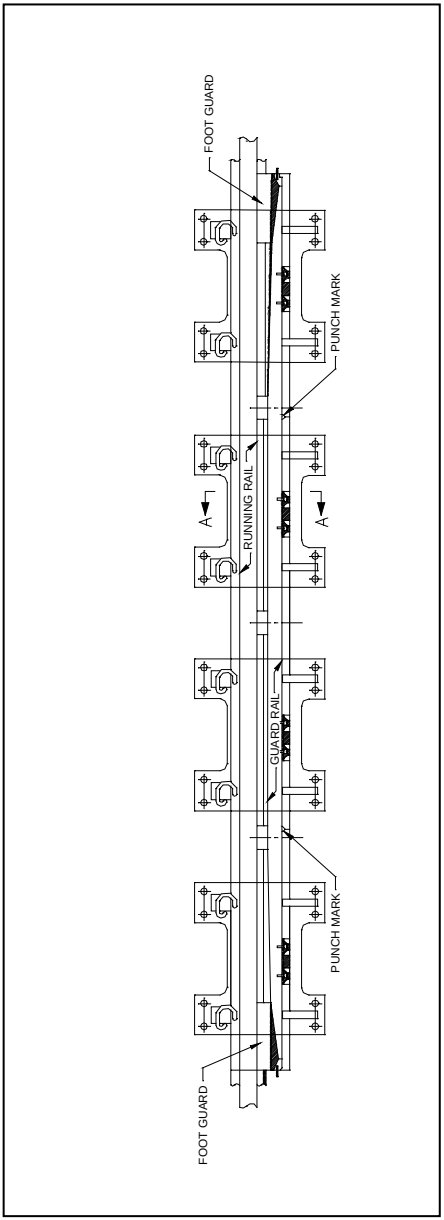


DETAIL OF SPRING FROG POINT AREA

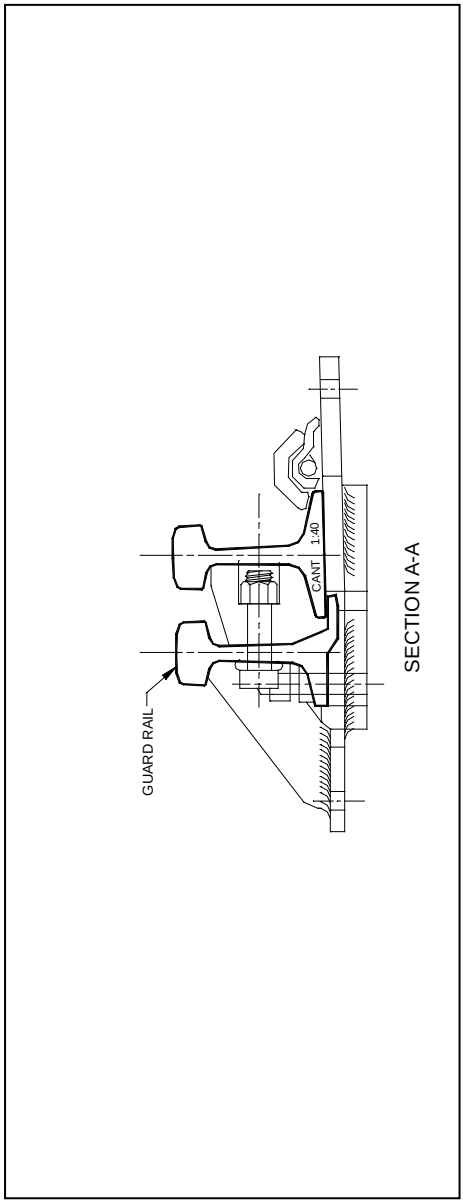
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APPENDIX A

CONTINUOUS WELDED RAIL (CWR) PROCEDURES

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APPENDIX A

MINIMUM RECOMMENDED REQUIREMENTS TO BE INCLUDED IN THE OPERATING RAILROAD'S CWR PLAN CONTENTS AS PER FRA 213.118 & 213.119

1.0 APPLICABILITY

The installation, adjustment, maintenance and inspection of continuous welded rail (CWR) shall be performed in accordance with FRA Part 213, Track Safety Standard's §213.118 and §213.119. As such, the requirements herein are based on the FRA/Rail Safety Advisory Committee (RSAC) Generic Policy document provided to the U.S. railroads as a part of the October 2009 enacted FRA safety rule and are based on current best practice guidelines on CWR in providing minimum requirements on CWR.

These MassDOT procedures are aimed to aid and assist the Railroad Operating Companies to maintain MassDOT-owned tracks in a safe and efficient manner. Performing CWR installation, maintenance, adjustment and inspection in accordance with the provisions and requirements stipulated herein will meet the expectations of the Commonwealth and provide uniform practice between the different properties of the Railroad Operating Companies.

This document details MassDOT's policy on installing, adjusting, maintaining, and inspecting CWR track. Each section details how the individual MassDOT rail operator applies its standards and procedures to comply with FRA standards.

1.1 INTRODUCTION

(a) Continuous Welded Rail (CWR) is defined as any rail that contains no joints in 400' or greater in length. This document will serve as the recommended practice for the installation, adjustment, maintenance, and inspection of CWR. Rail that is installed as CWR and subsequently has additional joints installed within the limits of the rail will still be considered as CWR, and subject to the requirements of this document. Track laid with CWR is referred to as "CWR Track." Any employee who installs, adjusts, maintains and inspects CWR must have a copy of their approved FRA Plan (§213.118 and 213.119).

(b) If the Operating Railroad cannot comply with the minimum recommended requirements found in Appendix A, they shall immediately notify MassDOT Rail and Transit Division.

(c) Preparation and care:

(1) **Programmed tie renewals shall be completed in advance of rail laying.**

(2) **Track shall be surfaced and aligned prior to CWR installation.**

(3) Track to be laid with CWR must have standard ballast section (shoulders and cribs) for welded rail before CWR is installed.

(4) Rails should be examined for defects and damage prior to laying in track.

(5) At the time of installation, care should be taken so that no damage to rail or fastenings will result.

(6) All ties, to include loose ties, should be tamped to full bearing under the rail, with a small tamper, during rail laying operations ahead of the spiker.

2.0 FABRICATION AND DISTRIBUTION

(a) Unloading:

(1) CWR should be unloaded as close as possible to the position where it is to be installed with a minimum of further handling, giving special attention to accurately locating the ends of CWR.

(2) CWR should be placed parallel with the track and base down, avoiding excessive bending or damage, making use of suitable mechanical equipment when available. Care should be taken to avoid placing rails on drainage facilities and other civil structures.

(3) CWR ends must be bypassed.

(b) Use of CWR on MassDOT Rail and Transit Division owned lines:

(1) CWR fabricated by an approved process may be laid without restriction in fully ballasted main and secondary tracks. When welded rail is laid on curves, particularly those sharper than 6 degrees, it must be closely monitored for any indication of movement up out of the plates.

(2) CWR may be laid across open deck bridges where bridge ties are spaced with timber blocks between ties provided that the following conditions are satisfied:

(i) The anchoring of open deck bridges shall be approved by the Operating Railroad's Bridge Engineer.

(ii) Per MBTA Standard Plan, all ties and blocks in a panel are tightly jacked and fastened together with guard timbers or spacing bars secured by lag screws in every tie. See latest MBTA Standard Plan.

(iii) Per MBTA Standard Plan, bridge ties are securely fastened to steel structure by means of a hook bolts, tie anchors, or other approved holding device. See latest MBTA Standard Plan.

(iv) The bridge structure is properly anchored to abutments and piers to prevent any movement other than normal expansion.

(v) CWR is anchored to the bridge ties in both directions in accordance with Section 4.0 of this document.

(3) After application of hook bolts, tie anchors or other approved holding devices, these devices must be checked and retightened weekly until ties have been fully seated on top flanges of built up members.

3.0 INSTALLATION AND ADJUSTMENT OF CWR

(a) Definitions:

(1) Neutral Temperature: The rail neutral temperature (RNT) is the temperature at which a rail is neither in tension or compression (i.e., when it has zero longitudinal force).

(2) The Rail Laying Temperature (RLT): The temperature at which the rail is installed that is sufficiently high so as to provide a high RNT to prevent possible track buckling.

(i) CWR on MassDOT Rail and Transit Division owned lines shall be installed at an RLT of 105°F with an allowable construction tolerance of -10°F to +10°F or 95°F to 115°F. **The target RLT shall be at least 105°F**.

(ii) When laying and/or distressing rail, the required minimum expansion shall be determined by using a target RLT of at least 105°F (see Section 3.0 and Attachment "B").

(iii) When repairing a service failure to include broken joint bars, pulled apart joints, a broken rail, a broken weld (shop or field), the replacement of a plug

rail or a rail cut in the field, the repair shall be made to ensure that the RNT after the repair is made is at or above RLT-10°F (95°F) (see Attachments A and C).

(3) Temperature Differential: The difference between the target rail laying temperature and the actual rail temperature taken at the time of installation is called the temperature differential (TD).

(i) CWR laying and adjusting procedures have been established to take into account these temperature differences.

(ii) If the rail temperature is below desired RNT of 105°F, the rail must be expanded to the target RLT of at least 105°F.

(iii) The rail expansion required is marked at the quarter points in the field on the string to be expanded.

(iv) RNT is achieved when the correct expansion amounts have been realized at the quarter points.

(v) RNT is not achieved when the required rail temperature of 105°F has been reached unless the required expansion has been realized.

(b) Installation of CWR:

(1) Programmed tie renewals shall be completed in advance of rail laying.

(2) Track shall be placed in good line and surface prior to rail renewals.

(3) Track to be laid with CWR must have standard ballast section for welded rail before installation of CWR.

(4) Rails should be examined for defects and damage prior to laying in track.

(5) At the time of installation, care should be taken so that no damage to rail or fastenings will result.

(6) All ties, to include loose ties, should be tamped with a small tamper to full bearing under the rail, during rail laying operations ahead of the spiker.

(7) Any alignment deviation reduces the temperature at which a track will buckle. As an example, an alinement deviation of about 1" may reduce the buckling temperature from 10 – 15 °F°**.** In addition, an alignment deviation from a Class 5 line defect to a Class 3 line defect (1" to 1 1/8") may reduce the buckling potential by 15 - 20°F, depending on track parameters and conditions."

(8) **The target RLT and RNT is at least 105°F unless approved by the MassDOT Rail and Transit Division.**

(9) CWR shall be anchored or have resilient fasteners applied ("clipped") at a rail temperature of between 95°F and 115°F, unless otherwise directed by MassDOT Rail and Transit Division. This is known as the "Desired Rail Installation Temperature Range."

(10) An approved rail thermometer (magnetic) shall be used to measure the rail temperature of all CWR before it is anchored or clipped. The thermometer should be placed on the web of rail just above the bottom fillet, on the side of the rail that is shielded from the direct rays of the sun and left there long enough (5 minutes) to determine the temperature accurately.

(11) When the rail temperature is lower than the target RNT of 105°F an approved rail heating device or a hydraulic rail stretcher must be used for expanding the CWR to make proper adjustment.

(12) A rail puller can be used to hold the required expansion, and/or to help get the required expansion. At least 20 ties on the next string to be distressed shall be

box anchored and/or clipped to provide sufficient holding power for the rail puller to hold or pull the string being expanded.

(13) Where CWR has been anchored and/or clipped at a rail temperature below 105°F- 10°F (RLT -10°F) and not expanded to the target RNT of 105°F during the rail laying operation, the rail shall be inspected by a person qualified on §213.7(a)(b)(c)(d). A TSR shall be placed, if necessary, and then removed when the rail is expanded to a target RNT of 105°F.

(14) If the CWR is anchored and/or clipped at a rail temperature greater than 115°F (RLT +10°F), up to and including 125°F, the rail may remain in track without restriction.

(15) The following information shall be recorded on the field side web of the individual string (with permanent metal marker) as the strings are being laid:

(i) String number

(ii) Date installed or adjusted or distressed

(iii) Length of string in feet

(iv) Existing rail temperature/preferred rail neutral temperature

(v) Total expansion required at end of string (if appropriate)

(16) The person in charge of installing the CWR shall be responsible for recording on the appropriate Form ("CWR Rail Expansion/Heat Record Report") the amount of required expansion and the rail temperature at each CWR string is anchored. Copies of these forms should be forwarded to MassDOT Rail and Transit Division. See Appendix "E", Form "RC".

(17) The "CWR Rail Expansion/Heat Record Report(s)" for any CWR laid in track and or distressed shall be retained by the Railroad Operating Companies until the CWR is readjusted and/or removed from service.

(c) Adjustment/Distressing:

(1) The target RNT is always 105° or greater. When the rail temperature is lower than the target RNT of 105°F an approved rail heating device, a hydraulic rail stretcher or heating by natural means or the ambient temperature shall be used to expand the CWR at its quarter points to achieve proper adjustment.

(2) Adjusting CWR strings to increase RNT by natural means or by using the ambient temperature is allowed only if the unadjusted rail temperature falls in the Desired Rail Installation Temperature Range of RLT -10°F to +10°F or 95°F to 115°F.

(3) All rail anchors and/or resilient fasteners must be removed from strings of CWR requiring adjustment to permit the desired expansion or contraction at the quarter points of the CWR string.

(4) The anchor and/or clip removal should start at the end of the string at the last quarter point to be expanded and move back towards the ¼ point or beginning of the string to be expanded. This is especially important if the rail to be expanded is in compression.

(5) .With conventional cut spikes and plates, an approved mechanical vibratory device may be used to free the rail. Additionally, rail holding spikes shall be pulled if restraining rail movement.

(6) With elastic fasteners and rolled plates, it may be necessary to pick the rail up out of the plates and set on spikes and/or rollers about every 20th tie so as to permit the unrestrained movement of the CWR when being expanded. Again, this process should start from the last quarter point to be expanded and proceed

back towards the ¼ point or beginning of the string to be expanded. This is especially important if the rail to be expanded is in compression.

(7) The rail head must not be struck with a hammer at any time; to include expanding the rail.

(8) CWR should be heated and vibrated so that expansion is introduced from one end of each string to the other end in the direction of rail laying.

(9) All rail anchors or resilient fasteners must be re-applied immediately after the CWR string has achieved proper expansion at the quarter points based upon the target RNT of at least 105°.

(10) The number of inches each CWR string should be expanded during the rail laying operation may be determined by calculation according to the following formula:

$$A = 0.000078 \times (T_D - T_E) \times L$$

where:

A = the amount (inches) of length a CWR string must be increased or decreased to reach the target rail laying or rail neutral temperature

T_E = the existing rail temperature of the CWR before the heating process has begun

T_D = the target neutral temperature or rail laying temperature (105°F) of the CWR at the end of the heating process

L = the length of the CWR in feet

Example: How much expansion is required to adjust the length of a 1,450 ft. CWR string, anchored at a rail temperature of 50°F to the target rail laying/rail neutral temperature of 105°F? Subtract 50°F from 105°F to obtain a difference of 55°F and then multiply as follows:

$$0.000078 \times 1{,}450 \times (105 - 50) = 0.000078 \times 1{,}450 \times 55 = 6.22 \text{ inches.}$$

Say 6.25 inches

Or use "Change In Rail Length Due To Change In Rail Temperature" Table on the back of Form "RC", "Report of Rail Clipping/Anchoring" found in Attachment E.

(11) A space equal to the amount of expansion required for each string of CWR should be provided between the far end of the string being expanded and the near end of the next adjacent string.

(12) The clipping or anchoring operation shall consist of sufficient personnel so that the work will progress closely enough behind the heating and/or pulling process so that the string is held in place, and no loss of expansion occurs.

(13) Quarter points should be marked on the rail and the tie plate, so that the amount of expansion can be accurately determined. The tie plate used for marking as a reference point must be one that is either doweled or has been spiked, or screw lagged; so that it will not move as the rail expands. Particular attention must be

paid to insure that the rail does not bind on tie plates, spikes or other obstructions.

(14) Heating should commence at the beginning of the first CWR string and steadily applied while moving forward until the required expansion has been obtained at the end of the string. Uniformity of expansion is to be controlled by marking each quarter of the string and introducing expansion as follows:

¼ point - ¼ of total expansion
½ point - ½ of total expansion
¾ point - ¾ of total expansion
End of the string – 100% of total expansion

(15) If when heating, the heated CWR string does not have the required expansion at each quarter point, the heater will back over the heated portion, without applying heat, and then reheat the rail until the necessary expansion is obtained.

(16) During and subsequent to heating, resilient fasteners or anchors shall be applied to the patterns specified in Section 4.0 to prevent the rail from losing expansion. If resilient fasteners fail to hold expansion, rail anchors in the pattern of the following paragraph shall be applied.

(17) Rail anchors and/or clips may be used to control and maintain the expansion realized in a string of CWR while the rail string is being anchored and/or clipped in its entirety. A minimum of 20 consecutive ties shall be solid box anchored and/or clipped at the fully expanded end of the string , to hold the expansion while applying all other anchors and or clips as required.

(18) A rail puller can be used to hold the required expansion and/or to help get the required expansion. At least 20 ties on the next string ahead of the string being distressed shall be box anchored and/or clipped to provide sufficient holding power for the rail puller to hold or pull the string being expanded.

(19) The entire CWR string is to be anchored and/or clipped in accordance with Section 4.0 “Anchoring of CWR” before the track is returned to service and trains are permitted to operate.

(20) An approved rail thermometer (magnetic) shall be used to measure the rail temperature of all CWR before it is anchored or clipped. The thermometer should be placed on the web of rail just above the bottom fillet, on the side of the rail that is shielded from the direct rays of the sun and left there long enough (5 minutes) to determine the temperature accurately.

(21) Where CWR has been anchored and/or clipped at a rail temperature below 95°F (RLT -10°F) and not expanded to the target RNT of 105°F during the rail laying operation, the rail shall be inspected by a person qualified on §213.7(a)(b)(c)(d). A TSR shall be placed, if necessary, and the removed when the rail is expanded to at least 95°F (RLT -10°F).

(22) If the CWR is anchored and/or clipped at a temperature greater than 115°F (RLT +10°F), up to and including 125°F, the rail may remain in track without restriction.

(23) If the CWR is anchored and/or clipped at a temperature greater than 125°F, the rail may remain in track without restriction with the permission of the MassDOT Rail and Transit Division.

(24) The following information shall be recorded on the field side web of the individual string (with permanent metal marker) as the strings are being laid:

(i) String number

(ii) Date installed or adjusted or distressed

(iii) Length of string in feet

(iv) Existing rail temperature/preferred RNT

(v) Total expansion required at end of string (if appropriate)

(25) The person in charge of installing the CWR shall be responsible for recording on the appropriate Form ("CWR Rail Expansion/Heat Record Report") the rail temperature for which each CWR string is anchored. Copies of these forms should be forwarded to MassDOT Rail and Transit Division. See Appendix "E", Form "RC".

(26) The "CWR Rail Expansion/Heat Record Report(s)" for any CWR laid in track and or distressed shall be retained by the Railroad Operating Companies until the CWR is readjusted and/or **removed from service.**

4.0 ANCHORING OF CWR

(a) CWR Rail Anchoring Requirements: The following anchoring requirements apply to all CWR tracks.

(1) Existing anchor patterns may remain in place until CWR is installed.

(2) Where the anchoring function is otherwise provided, such as with a resilient fastener, rail anchors may be omitted.

(3) Anchors may not be applied where they will interfere with signal or other track appliances or where they are inaccessible for adjustment or inspection.

(4) Anchoring must effectively restrain the longitudinal rail movement.

(5) Rail must be adjusted and/or anchors must be added to rail that is moving, or where the existing anchors do not have effective holding power to restrain longitudinal movement.

(6) Anchor pattern may be varied, if possible, to avoid placing anchors against deteriorated ties.

(7) When a crosstie has four properly installed resilient fasteners, or four properly installed rail anchors, it will be considered to be fully box anchored tie.

(b) When laying or distressing welded rail, rail anchors are used to maintain the desired expansion and length of CWR strings. Crossties shall be fully box anchored in accordance with the following:

(1) Every Tie:

(i) Curves 3° and over

(ii) Through all rails of turnouts and crossovers, where practicable

(iii) For 195' in each direction from:

a. Main track turnouts and crossovers
b. Track crossings (diamonds)
c. Highway grade crossings
d. On the fixed side of expansion joints
e. On the approaches to open deck bridges
f. On both sides of all insulated joints (bonded and/or non-bonded)
g. On both sides of hot box, dragging equipment and wheel impact load detectors
h. Before bumping posts

(2) Every Other Tie:

(i) Through the remainder of CWR strings where full boxing is not specified above.

(3) Bridge Anchor Patterns:

(i) Ballast deck bridges should be anchored with the same pattern as the rail on each approach to the bridge.

(ii) Open deck bridges should be anchored according to the following table or as approved by the MassDOT Rail and Transit Division:

Length of Continuous Open Deck Portion (ft.)**	**Individual Span Length (ft.)**	**Rail Anchor Requirements**	**Sliding Joint Requirements**
100 ft. or less	All spans	Every 3rd or 4th tie. See §111.0(M) Bridge Timbers*	None required
Greater than 100 ft.	100 ft. or less	Every 3rd or 4th tie. See §111.0(M) Bridge Timbers*	None required
	Greater than 100 ft.	Every 3rd or 4th tie. See §111.0(M) Bridge Timbers*	As per requirements of MassDOT Rail and Transit Division
* Box anchors are to be applied only to ties that are hook bolted to the span. **See MBTA Book of Standard Plans Drawing Nos. 1232 and 1236.			

(4) Other Anchor Patterns:

(a) Under pavement off the ends of grade crossing panels.

(b) Under grade crossing surfaces as per crossing surface manufacturer.

(c) In areas adjacent to the expansion side of expansion joints as authorized and approved by MassDOT Rail and Transit Division.

(c) Anchor Requirements After Making Rail Repairs in CWR and Adding Joints:

(1) When repairs are made to stripped joint or failed bar on CWR that already exists in track, the adjustment or addition of anchors will be as prescribed below:

Condition	Action
Bolted joint in CWR experiencing a service failure (pull-apart) or failed bar(s) with gap* present (FRA §213.119(c)(3)	Weld Joint, **OR** Remediate Joint conditions **and** replace four (4) bolts (new, in-kind or stronger) **and** weld joint within 30 days, **OR** Replace broken bar(s), install 2 additional bolts (6 total) and adjust anchors (ballast permitting), **OR** Replace bars, bolts (if broken or missing) and anchor every tie for 195' in both directions (ballast permitting) **OR** Add rail and make out Form "TD" and make future repairs
* Gap exists if it cannot be closed with a drift pin.	

5.0 MAINTENANCE OF THE DESIRED RAIL NEUTRAL TEMPERATURE IN PREVIOUSLY INSTALLED CWR

(a) **Maintaining Desired Neutral Temperature Range: Broken or Defective Rail, Pull-Apart (Service Failures) And/or Tight Rail or Track Buckle**

(1) This section addresses repairs for broken or defective rail, and corrections made for tight rail, track buckle or pull-apart.

(2) Also see Attachments A, B, and C.

(3) When performing this work, care shall be taken not to add rail to the track.

(4) In general, if a length of rail is installed in CWR, it should have a length less than the rail removed and/or not exceed the length of rail removed (DO NOT ADD RAIL).

(5) Before joint bars are removed and/or a rail is cut, reference marks shall be added at tie plates and on the base of the rail. Reference marks can be used to determine how much the joint opens, or how much rail is cut out (if rail is in compression) or how much rail is added.

(6) The use of reference marks includes:

- Marking the locations where the joint is to be removed or the rail is to be cut
- Marking the rail outside the limits of the joint bars
- Measuring the distance between the reference marks and mark it on the rail
- Installing the rail and re-measure the distance between reference marks
- Recording the difference and documenting the location

(7) If rail is added for any reason, such as repairing a pull-apart, making emergency repairs, fixing a service failure or any other interim repair, measure and record the amount of rail added on Form "TD" so that adjustments can be made before reaching the rail return temperature.

(8) Existing RNT shall be estimated where the rail has pulled apart, broken, or been cut for defect removal by using the appropriate charts in Attachment A.

(9) To determine the pre-break/cut RNT, record the length of the rail end gap, rail temperature, rail base size and existing rail anchorage and use tables in Attachment "A".

(10) The estimated pre-break/cut RNT shall be recorded on Form "TD" so that additional required repairs, if any, can be tracked and done before rail return temperatures are exceeded (see Attachment C).

(11) Work performed by Railroad Operating Companies, such as rail that has pulled apart, broken, or been cut for service failures to make repairs to CWR, shall be readjusted to a preferred RLT or RNT of 105°F +/- 10°F**. The minimum RNT is 95°F** (see Section 3.0).

(12) If rail has not been adjusted before rail return temperatures exceed the values in Attachment C, then a temporary speed restriction (TSR) of 25 MPH shall be placed. A TSR of 40 MPH may be placed if a required daily inspection is made during the heat of the day, every day, **until the adjustment and permanent repair is made.**

(13) For detailed procedures on adjusting pulled apart, broken, or cut rail, refer to Attachment C.

(b) **Adjusting or Distressing Previously Installed CWR**

(1) Rail can be distressed by heating rail and/or pulling rail that has a RNT below the target RLT of 105°F. In a curve, the CWR can be distressed or the curve can be lined out. When distressing or adjusting CWR with an RNT below the target RLT of 105°F, the following is a *general* procedure:

(2) Procedure:

(i) Determine amount of rail to be distressed on either side of a cut and/or joint (up to 800' on either side of the joint and/or cut for a total of 1,600' maximum).

(ii) Cut rail at the end or in center of rail to be distressed (see Attachment B).

(iii) Remove anchors or clips in both directions from either side of the cut back to the distressing limit or to a fixed object or an appliance in the track (turnout or grade crossing) or structure that prevents rail movement.

(iv) Wait until rails stop moving. The rail ends may need to be misaligned to allow for expansion and then trimmed one time (if possible) to fit.

(v) Take the rail temperature.

(vi) Compare the rail temperature to the target RLT=105°F to determine the temperature differential (TD).

(vii) If the actual rail temperature is lower than the RLT of 105°F, use the Rail Expansion Table in Attachment E (Form "RC") to determine the rail length to be removed based on the total distance the anchors or clips that have been removed.

(viii) Expand rail required amount by using ambient temperature, rail heater and/or rail puller.

(ix) Replace the rail anchors or clips.

(x) Weld the joint or apply joint bars:

- When making an orgothermite field weld, cut out required amount of rail plus the weld width allowance as specified by the weld manufacturer. **(**Typically **1"+/-)).**
- When making an electric flash butt field weld, the amount of rail to be cut is the amount determined from the rail expansion table minus the

amount of rail consumed when making the electric flash butt weld. (Typically 3/4" to 1-1/2")**.**

(3) All other provisions of Section 3.0 apply to this process.

(c) **Procedures for Making Repairs to Buckled Track**

(1) In the event of buckled track, the following conditions exist and procedures are to be used as a guideline:

(i) Since both rails are assumed to be in compression, cut both rails with a torch.

(ii) Make these torch cuts out of the displaced track zone where there may be significant compressive stress in the rails.

(iii) Torch cuts shall be at least one rail length (39'+) beyond the end of lateral track displacement.

(iv) If possible, before cutting the rail, line the track at the point of displacement in the direction of the displacement to further reduce the compressive stresses in the rail. If the displaced area is near a joint then the joint bars should be removed after lining the track.

(v) Misalign the cut and/or uncoupled rail ends, allowing the ends to bypass.

(vi) Bring the track back into correct alignment.

(vii) Both rails for some distance on either side of the point of maximum displacement and/or the point where rails were cut or the joint bars were removed are now considered to have lost their adjustment.

(viii) These rails must be readjusted and/or distressed according to this Section.

(ix) Also, see Attachment B: "Recommended Procedures for Distressing Continuous Welded Rail (CWR) Previously Laid In Track": "Reactive or Emergency Distressing".

(x) Track buckle at a fixed object:

- In those cases where the buckle occurs at a fixed object (grade crossing, turnout, etc.) the readjustment/distressing need only take place in the direction away from the fixed object,
- However, a close inspection of the track on the other side of the fixed object is required to determine if there is any evidence of rail or track movement, rail bunching, etc. which may indicate inadequate adjustment in that area and the need for additional distressing.

(xi) If the area cannot be readjusted or repaired before running a train, appropriate remedial action shall be taken:

- A Form "TD" shall be filled out so that necessary distressing work can be accomplished before return rail temperatures are exceeded (see Attachment C).
- Alignment measurements should be taken to ensure that the track meets minimum alignment requirements for the Class of Track at which the track is to be returned to service as is shown in the FRA Track Safety Standards §213.55**.**
- Rails that have been torch cut during the corrective procedure will be either cut back and/or removed from track promptly (see Attachment B).
- On MassDOT Rail and Transit Division owned rail lines, torch cut rails shall be protected by a maximum 10 MPH (F&P) temporary slow order (TSO) until the rail is cut back and/or removed from track.

(xii) New rail adjustment and rail clipping records shall be prepared on the Rail Clipping/Anchoring Form "RC" with the new adjusted temperatures when the rail in the affected area is distressed (see Attachment E).

(xiii) The original Form "TD" that was made out at the time of the incident shall be updated to indicate that all necessary repairs, to include distressing, have been made, when the permanent repairs are made.

(xiv) The Operating Railroad shall retain Form "RC" for the record for the duration of their Operating Contract and/or until the rail is removed from service. A copy of Form "RC" shall be sent to the MassDOT Rail and Transit Division.

(d) **Installing Rail Plugs in Existing CWR Track**

(1) When it is necessary to install rail plugs in existing CWR due to replacement of defective rails, defective field or plant welds, defective joints or insulated joint failures, etc., an approved heating device or hydraulic expander must be used to **assure the amount of rail installed is equal to or less than the length of rail removed. DO NOT ADD RAIL**

(2) If the work cannot be completed and a permanent repair cannot be made before running a train, appropriate remedial action shall be taken:

(i) A Form "TD" shall be filled out to document work done so that the necessary permanent repair can be accomplished before return rail temperatures are exceeded (see Attachment C).

(3) **Where necessary to install a plug rail in CWR, use at least a 14' long plug in tangent and at least a 21' plug in curves wherever possible.**

(4) See FRA §213.119(c)(3): If it becomes necessary to apply joint bars in CWR already laid in track, because of a service failure or a failed bar with a rail gap present:

(i) Weld the joint (The end bolt hole in each rail end must not be drilled to permit field welding);

(ii) Replace broken bar(s), replace broken bolts, adjust anchors and within 30 days, weld the joint;

(iii) Replace the broken bar(s), replace the broken bolts, install one additional bolt per rail end (six hole bar needs six bolts), and adjust anchors;

(iv) Replace the broken bar(s), replace the broken bolts, and anchor every tie 195 feet in both directions from the CWR joint.

(e) **Field Welding of CWR**

(1) When field welding joints with orgothermite welds between CWR strings that have been temperature adjusted, or field welding plugs previously installed in properly adjusted CWR track:

(i) **The necessary gap for welding will not be developed by allowing the rail gap to open up to the correct welding gap.**

(ii) The following welding practices shall be used:

- Remove the joint bar. Remove with an approved rail saw 1"+/- of rail, or as specified by weld manufacturer, to provide the required welding gap. If a "Wide Gap" field weld is to be used, the gap shall be as required by the weld manufacturer. Torch cutting of rail is prohibited. **DO NOT ADD RAIL**
- To maintain the proper weld gap apply a hydraulic expander to return the rail ends to the required gap and while holding this position,

proceed to make the weld in accordance with existing procedures. Let field weld cool to 500°F before removing expander.

- Upon completion of weld reapply anchors and/or clips before removal of the hydraulic expander.

(2) All other provisions contained in §121.1(M), "Field Welding of Rail Joints," of the MW-1 will be followed when field welding is conducted.

6.0 TRACKWORK THAT DISTURBS CWR TRACK AND THE PROTECTION OF DISTURBED TRACK

6.1 General

The following trackwork repairs are considered to disturb CWR track.

6.1.1 Trackwork that Disturbs CWR

(a) Trackwork activities discussed below are repairs and/or production work that are considered to have disturbed CWR track.

(b) **Trackwork activities that disturb CWR track** shall be inspected by a qualified person as designated in FRA §213.7(a)(b)(c).

(c) Before returning the track to service, the above designated person in (b) shall take appropriate remedial action and place a TSR as given in this Section 6.0.

(d) The designated qualified person as given in (b) shall place more restrictive TSRs and additional remedial action as conditions warrant.

6.1.2 Trackwork that Does Not Disturb CWR

(a) **Trackwork activities that do not disturb CWR track** shall be inspected by a qualified person as designated in FRA §213.7(a)(b)(c).

(b) Before returning the track to service, the above designated qualified person in (a) shall take any appropriate remedial action that that person sees fit to protect the safety of train operations.

6.2 Train Definition

(a) For the purposes of this part, a train is defined as:

(1) A locomotive and at least eight loaded ballast cars (80 ton cars each) (1,000 ton +/- consist), or

(2) A commuter train with at least five cars and a locomotive (750 ton +/- consist), or

(3) Some combination of railroad equipment that is 1,000 ton consist (including locomotive), or

(4) A ballast stabilizer that is equivalent to 50 tonnage trains (1,000 tons each) or 50,000 tons, or

(5) As approved by MassDOT Rail and Transit Division.

6.3 Work Activities that Disturbs CWR Track

(a) **Installation of Plugs in CWR that Disturbs CWR Track:**

(1) If, during the installation of a plug rail in CWR, rail has been added or RNT as determined by measurement of rail gap is less than 95°F or (RNT-10°F) see Attachments A and C and the following:

(i) Install the rail anchors reversed on field side of plug rail only until necessary permanent repairs are made; or

(ii) Spray the elastic fasteners on the gage side in orange paint until necessary permanent repairs are made.

(iii) Fill out Track Disturbance Report (Form "TD"). The amount of rail added, as well as the temperature and rail gaps of the rail at the time of the break or

saw cut, **shall** be reported on Form "TD", "Record of Disturbance of Main CWR Track."

(iv) Make temporary and/or permanent repairs as given in Attachment C using tables in Attachment A as required.

(v) The track shall be inspected by a person qualified under FRA §213.7 to ensure that the track is safe for the passage of the first train.

(2) **Protective Slow Order**: See Table in Attachment C for maximum rail temperatures (°F) at which permanent repairs or readjustments shall be made and/or slow orders applied. **When these rail temperatures exceeded a TSR of no more than 25F and 25P MPH shall be placed on the track in question until repairs are made, unless inspected daily in the heat of the day, in which case the TSR can be no more than 40F and 40P MPH**

(3) Repairs shall be accomplished in accordance with Section 5.0 and Attachments C and A.

(4) Following steps (1) and (2), when permanent repairs have been made, the track will be returned to maximum authorized speed (MAS) unless additional deficiencies or defects are observed and then appropriate remedial action shall be taken in accordance with FRA Part 213.

(5) If the ambient temperature is greater than 80°F (rail temperature greater than a temperature of 110°F), no work such as installing plug rails shall be done unless it is an emergency or as directed by MassDOT Rail and Transit Division.

(b) **Tie Renewal In Tangent Track and in Curves <3° that Disturbs CWR Track:**

(1) Installing more than four ties in 39' of track with four undisturbed ties between renewed ties; or

(2) Installing four or less than four ties per 39' of track with fewer than four undisturbed ties between renewed ties.

(3) In any case no more than four ties per 39' of track (540 ties per mile) can be replaced in one pass.

(4) **When old ties are removed, and new ties and plates installed, do not lift the rail.**

(5) **When tamping ties installed, tamper should be set so that no lifting of the track occurs.**

(6) **MassDOT shall review means, methods, and equipment before ties are removed and installed.**

(7) If the ambient temperature is greater than 80°F (rail temperature greater than a temperature of 110°F), no work shall be done unless it is an emergency or as directed by MassDOT Rail and Transit Division.

(8) Ties shall not be installed at ambient temperature of less than 40°F unless approved by the MassDOT Field Representative.

(9) Fill out Track Disturbance Report (Form "TD").

(10) The track shall be inspected by a person qualified under FRA §213.7 to ensure that the track is safe for the passage of the first train.

(11) **Protective Slow Order (without stabilizer) (Ambient ≤80°F):** Not to exceed 25F and 30P MPH shall be applied for a period of 24 hours and a minimum of 12 trains over the affected track.

(12) **Protective Slow Order (with stabilizer) (Ambient ≤80°F):** Not to exceed 25F and 30P MPH shall be applied for the first train over the affected track.

(13) **Protective Slow Order (with or without stabilizer) (Ambient >80°F):** If ambient temperature >80°F and rail temperature is >110°F, a slow order of 10F and 15P shall be applied until the ambient temperature drops to 80°F. When the ambient temperature is ≤80°F, the Protective Slow Order applied is described as above in (11) or (12).

(14) Following steps (11) and/or (12), (13), track will be returned to MAS unless deficiencies or defects are observed and then appropriate remedial action shall be taken in accordance with FRA Part 213.

(c) **Tie Renewal in Curves ≥3° that Disturbs CWR Track:**

(1) In addition to the protective action required when installing ties in tangent track in Paragraph (b) above, if 540 ties per mile or more are installed in curves ≥3° the following shall be done:

(i) The curve or curves ≥3° in question shall be staked as described in Attachment E, using Form "TM," Report of Track Movement.

(ii) Movement of the curve(s) when ties are installed shall be recorded on Form "TM"; and,

(iii) If a curve greater or equal to 3° moves inward and/or outward when installing ties, the curve shall be inspected by a person qualified under FRA §213.7(a)(b)(c), and appropriate remedial action taken as conditions warrant.

(iv) If movement limits to the inside of the curve are exceeded then the RNT shall be adjusted by distressing the rail in the curve and/or lining the curve out (see Attachment B).

(2) **When old ties are removed, and new ties and plates installed, do not lift the rail.**

(3) **When tamping ties installed, tamper should be set so that no lifting of the track occurs.**

(4) **MassDOT shall review means, methods, and equipment before ties are removed and installed.**

(5) If the ambient temperature is greater than 80°F (rail temperature greater than a temperature of 110°F), no work shall be done unless it is an emergency or as directed by MassDOT Rail and Transit Division.

(6) Ties shall not be installed at ambient temperature of less than 40°F unless approved by the MassDOT Field Representative.

(7) Fill out Track Disturbance Report (Form "TD") and Report of Track Movement (Form "TM") as appropriate.

(8) **Protective Slow Order (with or without stabilizer) (Ambient ≤80°F)**: Same as for Tie Renewal in Tangent Track if curve movement for curves ≥3° is less than 3"as given on the table for Form "TM" (see Attachment E for table).

(9) **Protective Slow Order (without or with stabilizer) (Ambient >80°F):** If ambient temperature is >80°F and rail temperature is >110°F, a slow order of 10F and 15P MPH shall be applied until the ambient temperature drops below 80°F. When the temperature drops below 80°F, the Protective Slow Order is applied as described above in (8).

(10) **Protective Slow Order for Curve Movement (with or without stabilizer) (Ambient ≤80°F)**: If a curve ≥3° has movement ≥3" to the inside (see Form "TM," Attachment E), a protective slow order not to exceed 25F and 30P shall be applied. In addition:

(i) The track must be inspected by a person qualified under FRA §213.7 to ensure that the track is safe for the passage of the first train.

(ii) The restriction shall remain in effect until the curve is lined out back to its original position and/or both rails are readjusted to the target neutral temperature of 105°F in accordance with Section 3.0 and Attachment B

(11) **Protective Slow Order for Curve Movement (with or without stabilizer) (Ambient >80°F)**: If a curve ≥3° has movement ≥3" to the inside (see Form "TM," Attachment E), a protective slow order not to exceed 10F and 15P shall be applied. In addition:

(i) The track must be inspected by a person qualified under FRA §213.7 to ensure that the track is safe for the passage of the first train.

(ii) The slow order of 10F and 15P MPH shall be applied until the ambient temperature drops below 80°F. When the temperature drops below 80°F, the protective slow order is applied as described above in (10); and

(iii) The restriction of 25F and 30P shall remain in effect until the curve is lined out back to its original position and/or both rails are readjusted to the target neutral temperature of 105°F in accordance with Section 3.0 and Attachment B.

(12) Following steps (7) through (11), track will be returned to MAS unless deficiencies or defects are observed and then appropriate remedial action shall be taken in accordance with FRA Part 213.

(d) **Surfacing, Smoothing and/or Lining that Disturbs CWR Track (Tangent and Curves <3°):**

(1) **The normal balancing of throws done during high speed surfacing operations does not constitute out-of-face curve realignment.**

(2) If the ambient temperature is greater than 80°F (rail temperature greater than a temperature of 110°F), no work shall be done unless it is an emergency or as directed by MassDOT Rail and Transit Division.

(3) If the ambient temperature and/or rail temperature is less than 40°F, all work will be suspended unless it is an emergency or directed by the MassDOT Field Representative.

(4) **Protective Slow Order: T**he protection of CWR Track which has been surfaced is shown in the following table, "Protection Required for CWR Track Surfaced Based on Air and Rail Temperatures."

(5) The track must be inspected by a person qualified under FRA §213.7 to ensure that the track is safe for the passage of the first train.

(6) When operating speeds change during the time a restriction (TSR) is in effect, the worked track must be re-inspected by a qualified Operating Railroad Employee each time the speed is to be raised.

(7) Whenever a dynamic stabilizer is to be used as part of a surfacing operation, it will be:

(i) Operated after each pass of the tamper; and

(ii) Both vibration units must be fully operable and the frequency of oscillation shall be in the range of 30-35 Hz, with a minimum vertical loading pressure of 870-1,000 psi and working speed shall be in the range of 1-2 MPH.

(iii) A ballast compactor may be used if approved by MassDOT Rail and Transit Division.

Protective Slow Order Required for CWR Track Surfaced Based on Air and Rail Temperatures

Air Temperature	Distance	Wood Tie Track Protection	Concrete Tie Track Protection
Applies to ALL Surfacing: STOP Work			
Ambient Does Exceed 80° or the and Rail Temperature Exceeds 110°F***	All Distances	STOP Work	STOP Work
Protections to be applied for Surfacing with NO Dynamic Stabilizer			
Ambient Does Not Exceed 80° (Rail Temp ≤110°F)	0 ft. to 19'-6"	None*	None*
	Over 19'-6"	25F-30P MPH for 24 hours **and** the passage of 12 trains	25F-30P MPH for 24 hours **and** the passage of 12 trains**
In an Emergency, Ambient Does Exceed 80° (Rail Temp >110°F)	All Distances Ambient >80°F	10F-15P MPH until ambient temperature ≤80°F	10F-15P MPH until ambient temperature ≤80°
	All Distances Ambient ≤80°F	25F-30P MPH for 24 hours **and** the passage of 12 trains	25F-30P MPH for 24 hours **and** the passage of 12 trains**
Protections to be applied for Surfacing USING a Dynamic Stabilizer			
Ambient Does Not Exceed 80° (Rail Temp ≤110°F)	All Distances	10F-15P MPH for the first train 25F-30P MPH for the second train,	10F-15P MPH for the first train 25F-30P MPH for the second train,
	WITH the use of a Dynamic Stabilizer	Then Normal Speed	Then Normal Speed
In an Emergency, Ambient Does Exceed 80° (Rail Temp >110°F)	All Distances	10F-15P MPH first train 25F-30P MPH for the second train,	10F-15P MPH first train 25F-30P MPH for the second train,
	WITH the use of a Dynamic Stabilizer	Then not more than 40F-60P MPH for the passage for 24 hours and 12 additional trains	Then not more than 40F-60P MPH for the passage for 24 hours and 12 additional trains

* If the air temperature does exceed 80°F (rail temperature exceeds 110°F) during the 24 hours following the work then a 25F-30P MPH restriction must be placed on the worked area for 24 hours and the passage of 12 trains.

** A restriction with a speed no greater than 40F-60P MPH may be applied only if a Shoulder and Crib Compactor is used immediately after surfacing. If a restriction greater than 25F and 30P MPH is applied, the first train over the affected area must be limited to 25F and 30P MPH.

***If the air temperature exceeds 80°F and the rail temperature exceeds 110°F, there is no work permitted except in an emergency or as directed by MassDOT Rail and Transit Division.

(e) **Surfacing, Smoothing and/or Lining that Disturbs CWR Curved Track: Curves ≥3°**:

(1) **The normal balancing of throws done during high speed surfacing operations does not constitute out-of-face curve realignment.**

(2) If the ambient temperature is greater than 80°F (rail temperature greater than a temperature of 110°F), no work shall be done unless it is an emergency or as directed by MassDOT Rail and Transit Division.

(3) If the ambient temperature and/or rail temperature is less than 40°F, all work will be suspended unless it is an emergency or directed by the MassDOT Field Representative.

(4) Curves 3° or over being surfaced and aligned shall be staked to monitor movement.

(i) To stake a curve, place reference points uniformly around the curve in the track along the gage side of the high rail, starting at the tangent to spiral point (TS). As a minimum, tag and stake the following points:

- Tangent to Spiral Point (TS)
- Spiral to Curve Point (CS)
- Full Body of Curve: at least every 200'
- Curve to Spiral Point (CS)
- Spiral to Tangent Point (TS)

(ii) The reference points shall be 200' or less apart. Each reference point around the curve shall be staked on the field side of the high rail (where possible). Stakes should be set a minimum of 15' from the gage corner side of the high rail out of the way of ballast unloading and the ballast regulator wings.

(iii) The reference points are to be recorded on Form "TM," "Report of Track Movement" (see Attachment E).

(iv) Measure from the reference points to the stakes on the field side of the high rail to obtain initial values of distance between reference points and stakes before any work is conducted and record on Form "TM".

(v) The reference point to stake distances shall be re-measured immediately after the final surfacing pass by the surfacing gang. These measurements are made to determine track movement, if any, at the reference points. The measurements shall be measured and recorded on Form "TM" before track is returned to normal speed.

(vi) In addition, the track movement at the reference points should also be re-measured seven days after the work is completed.

(vii) Track movements shall be calculated and compared to the values given on Form "TM" (see Attachment E).

(5) **Protective Slow Order (any temperature):** If in surfacing and aligning a curve ≥3°, the limits of out-of-face curve realignment given in Attachment E, Form "TM", are NOT EXCEEDED:

(i) If the curve is moving outward and/or inward, inspect the curve with a person qualified under FRA §213.7(a)(b)(c), and provide protection and/or TSRs as given in Section 6(d), "Surfacing, Smoothing and/or Lining that Disturbs CWR Track (Tangent and Curves <3°)"; or

(ii) If the curve is moving outward and/or inward, inspect the curve with a person qualified under FRA §213.7(a)(b)(c), and, if conditions warrant, take

remedial action ad provide more restrictive protection than required in Section (6)(d), "Surfacing, Smoothing and/or Lining that Disturbs CWR Track (Tangent and Curves <°3)."

(6) **Protective Slow Order (when curve movements in Attachment E, Form "TM", are exceeded):** If in surfacing and aligning a curve ≥3°, the limits of out-of-face curve realignment (≥3") given in Attachment E, Form "TM" are exceeded (≥3"), proceed as follows.

(i) Fill out Form "TD" Track Disturbance Report and Form "TM" Report of Track Movement.

(ii) The track must be inspected by a person qualified under FRA §213.7 to ensure that the track is safe for the passage of the first train.

(iii) The curve will have been considered to have lost its neutral temperature and will have to be adjusted in accordance with Section 3.0, "Installation and Adjustment of CWR" and/or realigned out to original position as determined by staking.

(iv) **Protective Slow Order (Ambient ≤80°F):** Not to exceed 25F and 30P MPH until rail has been cut and RNT adjusted to 105°F and/or curve has been lined out to original position.

(v) **Protective Slow Order (Ambient >80°F):** Not to exceed 10F and 15P until:

- The ambient temperature drops below 80°F. When the temperature drops below 80°F, the protective slow order is applied as described above in (iv) above; and.
- The restriction of 25F and 30P shall remain in effect until the curve is lined out back to its original position and/or both rails are readjusted to the target neutral temperature of 105°F in accordance with Section 3.0 and Attachment B

(7) Following steps (4) through (6), the track will be returned to MAS unless deficiencies or defects are observed and then appropriate remedial action shall be taken in accordance with FRA Part 213.

(f) **Cut and Throw of Track that Disturbs CWR Track:**

(1) If the ambient temperature is greater than 80°F (rail temperature greater than a temperature of 110°F), no work shall be done unless it is an emergency or as directed by MassDOT Rail and Transit Division.

(2) When existing CWR track is cut and thrown, it will be considered to have lost its neutral temperature and will have to be adjusted in accordance with Section 3(b). **DO NOT ADD RAIL.**

(3) Fill out Track Disturbance Report (Form "TD").

(4) The track must be inspected by a person qualified under FRA §213.7 to ensure that the track is safe for the passage of the first train.

(5) **Protective Slow Order (Ambient ≤80°F):** Not to exceed 25F and 30P MPH shall be applied until RNT is readjusted to 105°F.

(6) **Protective Slow order (Ambient >80°F):** Not to exceed 10F and 15P MPH until RNT is readjusted to 105°F.

(7) The area of cut and throw will have been considered to have lost its neutral temperature and the RNT shall be adjusted in accordance with Section 3.0, "Installation and Adjustment of CWR."

(8) RNT adjustments shall be made before the ambient and rail temperatures reach those given in (1).

(9) Following steps (3) through (8), the track will be returned to MAS unless deficiencies or defects are observed and then appropriate remedial action shall be taken in accordance with FRA Part 213.

(g) **Switch or Track Panel Installation that Disturbs CWR Track:** When performing panel installation, the following requirements apply:

(1) Fill out Track Disturbance Report (Form "TD").

(2) Switch and track panel installation shall only be performed at ambient temperatures greater than 30°F unless it is an emergency or as directed by MassDOT Rail and Transit Division; and,

(3) If the ambient temperature is greater than 80°F (rail temperature greater than a temperature of 110°F), no work shall be done unless it is an emergency or as directed by MassDOT Rail and Transit Division.

(4) The track must be inspected by a person qualified under FRA §213.7 to ensure that the track is safe for the passage of the first train.

(5) The area of switch or track panel installation will have been considered to have lost its RNT if:

(i) Rail has been added when the switch and track panel has been installed.

(ii) This can be determined by placing match mark on the rail before the track is cut to install the switch and/or track panel and by measuring the rail gap.

(6) If RNT has been lost, the rail shall be adjusted to a target RNT of 105°F in accordance with Section 3.0, "Installation and Adjustment of CWR."

(7) If rail has been added, a protective slow order shall be placed until the adjacent CWR and RNT is adjusted. These RNT adjustments shall be made before the ambient and rail return temperatures are exceeded as given in Attachment C. These temperatures are related to the rail temperature at which the rail was cut to install the track or switch panel.

(8) **Protective Slow Order (Ambient ≤80°F) (until rail neutral temperature adjustment):** Not to exceed 25F and 30P shall be applied until the RNT adjustment work is accomplished.

(9) Protective Slow Order (Ambient >80°F) (until rail neutral adjustment): Not to exceed 10F and 15P MPH shall be applied until the RNT adjustment work is accomplished.

(10) In addition, the track panel has lost all its lateral stability and the CWR is considered disturbed until the ballast section is restored and recompacted/stabilized by machine action and/or by train traffic.

(11) **Protective Slow Order (at any ambient Temperature) (with correct RNT) (to consolidate ballast without stabilizer):** Place a protective slow order not to exceed 25F and 30P MPH will be applied after surfacing, for a period of 24 hours ***and*** a minimum of 12 trains over the affected track.

(12) **Protective Slow Order (at any ambient Temperature) (with correct RNT) (to consolidate ballast with stabilizer):** Not to exceed 25F and 30P MPH shall be placed for a period of 24 hours and a minimum of three trains over the affected track if a stabilizer has been used.

(13) Following steps (4) through (12), the track will be returned to MAS unless deficiencies or defects are observed and then appropriate remedial action shall be taken in accordance with FRA Part 213.

(h) **Undercutting that disturbs CWR track:** When performing this work, the following requirements apply:

(1) Fill out Track Disturbance Report (Form "TD").

(2) Undercutting shall not be done at an ambient temperature below 30°F and above 80°F (rail temperature greater than a temperature of 110°F) except in an emergency and as approved by MassDOT Rail and Transit Division.

(3) The track must be inspected by a person qualified under FRA §213.7 to ensure that the track is safe for the passage of the first train.

(4) When undercutting track, the neutral temperature shall be considered lost and the rail will have to be adjusted to a target RNT of 105°F in accordance with Section 3.0, "Installation and Adjustment of CWR."

(5) These RNT adjustments shall be made before the ambient and rail return temperatures are reached as given in Attachment C. These temperatures are related to the rail temperature at which the rail was undercut and the existing RNT was substantially altered.

(6) **Protective Slow Order (Ambient ≤80°F) (until rail neutral temperature adjustment):** Not to exceed 25F and 30P shall be applied until the RNT adjustment work is accomplished.

(7) **Protective Slow Order (Ambient >80°F) (until rail neutral adjustment):** Not to exceed 10F and 15P MPH shall be applied until the RNT adjustment work is accomplished.

(8) **Protective Slow Order (at any ambient Temperature) (with correct RNT) (to consolidate ballast without stabilizer):** Place a protective slow order not to exceed 25F and 30P MPH will be applied after surfacing, for a period of 24 hours ***and*** a minimum of 12 trains over the affected track.

(9) **Protective Slow Order (at any ambient Temperature) (with correct RNT) (to consolidate ballast with stabilizer):** Not to exceed 25F and 30P MPH shall be placed for a period of 24 hours and a minimum of three trains over the affected track if a stabilizer has been used.

(10) Following steps (3) through (9), the track will be returned to MAS unless deficiencies or defects are observed and then appropriate remedial action shall be taken in accordance with FRA Part 213.

(i) **Out-of-Face Shoulder Ballast Cleaning that Disturbs CWR Track:**

(1) Fill out Track Disturbance Report (Form "TD").

(2) Out-of-Face shoulder ballast cleaning shall not be done at an ambient temperature below 30°F and above 80°F (rail temperature greater than a temperature of 110°F) except in an emergency and as approved by MassDOT Rail and Transit Division.

(3) After shoulder ballast cleaning is performed, there shall be a full restoration of the standard ballast section to include cribs and shoulders.

(4) The track must be inspected by a person qualified under FRA §213.7 to ensure that the track is safe for the passage of the first train.

(5) **Protective Slow Order (with compactor and/or stabilizer) (Ambient Temperature ≤80°F):** The track may be put back at MAS provided that:

(i) The first train shall operate after out-of-face shoulder ballast cleaning at no more than 25F and 30P MPH.

(ii) The Operating Railroad person qualified under FRA §213.7 shall re-inspect the track and if no deficiencies are found; and

(iii) The track has a fully restored standard ballast section that has been treated with:

- A standard ballast compactor and/or;

- A dynamic stabilizer.

(iv) The track shall be returned to MAS.

(6) **Protective Slow Order (without compactor and/or stabilizer) (Ambient Temperature ≤80°F):** If ballast compaction is not performed with a standard ballast compactor and/or a dynamic stabilizer:

(i) The track shall have a protective slow order of no more than 25F and 30P MPH for 24 hours. for a period of 24 hours ***and*** a minimum of 12 trains over the affected track.

(ii) The Operating Railroad person qualified under FRA §213.7 shall re-inspect the track and if no deficiencies are found;

(iii) The track speed shall be returned to MAS.

(7) **Protective Slow Order (with compactor and/or stabilizer) (Ambient >80°F):** In an emergency, if the ambient temperature exceeds 80°F (rail temperature >110°F), out-of-face shoulder ballast cleaning shall continue only if a shoulder compactor and/or dynamic stabilizer is used. A protective slow order shall be placed as follows:

(i) Wood or concrete tie track: not to exceed 25F and 30P MPH during the period the air temperature exceeds 80°F and/or until 24 hours elapses then re-inspect and return to MAS, if appropriate.

(j) **CWR Installation that is Unacceptable:**

(1) Fill out Track Disturbance Report (Form "TD")

(2) CWR not installed in compliance with Section 3.0.

(3) A protective slow order not to exceed 25F and 30P MPH until the CWR is installed and adjusted to the target neutral temperature of 105°F as per Section 3.0.

(k) **Anchor or Clip Removal that Disturbs CWR Track:**

(1) When more than eight ties per 39' of track have anchors or clips removed and/or missing; or,

(2) The required standard anchor pattern as in Section 4.0 does not exist, CWR track is disturbed; and

(3) Fill out Track Disturbance Report (Form "TD")

(4) **Protective Slow Order (Ambient >80°F):** If anchor/clip replacement is not accomplished before the ambient temperature exceeds 80°F (rail temperature >110°F), a slow order not to exceed 25F and 30P MPH and shall be in effect until the proper number of anchors or clips are applied and/or re-applied in the pattern as described in Section 4.0.

(5) Install all missing anchors and/or clips.

(6) The track must be inspected by a person qualified under FRA §213.7 to ensure that the track is safe for the passage of the first train.

(7) Following steps (3) through ((6), the track will be returned to MAS unless deficiencies or defects are observed and then appropriate remedial action shall be taken in accordance with FRA Part 213.

(l) **Cribbing that Disturbs CWR Track:**

(1) Cribbing more than three ties in a row in 39'; or

(2) Cribbing four or more ties with less than four undisturbed ties between ties cribbed.

(3) In all cases no more than three successive ties or more than four ties per 39' of track can be cribbed in one pass.

(4) Track with the cribs reduced in the rail seat area for the mechanical installation of rail anchors on properly adjusted CWR does not require a slow order for improper ballast section, if this is the only ballast section deficiency and the track has not had lateral resistance reduced.

(5) If the ambient temperature is greater than 80°F (rail temperature greater than a neutral temperature of 110°F), no work shall be done unless it is an emergency or as directed by MassDOT Rail and Transit Division.

(6) Fill out Form "TD" Track Disturbance Report.

(7) The track must be inspected by a person qualified under FRA §213.7 to ensure that the track is safe for the passage of the first train.

(8) Wood or concrete tie track will be returned to service:

(i) When all the cribs are filled with new ballast and dressed and mechanically tamped.

(9) **Protective Slow Order (at any ambient temperature):** Not to exceed 25F and 30P MPH for a period of 24 hours and the passage of 12 trains over the affected track, re-inspect and return track to MAS, as appropriate.

(10) Following steps (6) through (9), track will be returned to MAS unless deficiencies or defects are observed and then appropriate remedial action shall be taken in accordance with FRA Part 213.

6.4 Suspension of Work Due to Heat Where Ambient Temperature >80°F or Rail Temperature >110°F

(a) The following work which can reduce the stability of CWR at higher temperatures will be suspended (except under a continuous track outage) or unless there is an emergency, when air temperatures are expected to be above 80ºF (rail temperature greater than a rail temperature of 110°F):

(1) Tie Renewal

(2) Tie Renewal in Curves

(3) Surfacing, Smoothing and/or Lining

(4) Out-of-face Curve Re-aligning

(5) Cut and Throw of Track

(6) Installation of Track or Switch Panels

(7) Undercutting

(8) Out-of-Face Shoulder Ballast Cleaning

(9) Cribbing

6.5 Protection of Work Areas for Latent Heat Effects

(a) **This requirement applies for work that has been done that disturbs CWR track until seven days of traffic has been accumulated over the work area, or the period of high heat ends.**

(b) The speed restriction shall be placed by a person qualified on FRA §213.7(a)(b)(c), if appropriate, on a case-by-case basis if the air temperature is at 80ºF or above (rail temperature >110°F).

(c) Each Operating Railroad qualified employee in a work block is responsible for the protection and inspection requirements of this Section, as they relate to the work conducted under the railroad's control.

(d) In the case where a Foreman is working in an out-of-service block of track under the control of another Foreman, but at a separate location from the Foreman providing protection:

(1) This Foreman will inspect and report the findings, if any, to the Foreman in charge of the track before reporting clear of the track.

(2) This report must include any required speed restrictions and any other information that would affect the safe movement of trains.

7.0 SPECIAL INSPECTIONS OF CWR TRACK

(a) **Special Inspection in Hot Weather**

(1) When the air temperature is ≥95ºF or the rail temperature is ≥125°F, all main tracks with CWR shall be inspected by qualified Operating Railroad personnel qualified on Track Safety Standards, Part 213, §213.7(a)(b)(c) and in accordance with currently established inspection procedures, outlined in this Appendix.

(2) During periods of extreme heat, when air temperatures exceed 95ºF or the rail temperature is ≥125°F, the Operating Railroad qualified employee should make Special Inspections and place appropriate speed restrictions (TSR) and take remedial action, as required.

(3) Determination of Temperature: The rail temperature is the preferred temperature and is taken with an approved rail thermometer. The air temperature is as reported by the National Weather Service.

(4) Operating Railroad personnel shall make out a “Special Track Inspection Report” (see Appendix F, “Forms”) for this inspection and retain a copy for the duration of the Operating Contract that can be reviewed by the MassDOT Rail and Transit Division.

(5) During this inspection, the track inspector must be particularly alert for wavy track, longitudinal rail movement, kinked joints in compression and evidence of lateral track movement. The track inspector must also be aware that the following conditions increase the possibility of buckling:

(i) Recently worked track

(ii) Fouled ballast and mud spots

(iii) Gaps in the ballast at the ends of the ties indicating tie movement

(iv) Existing deformations in line and surface

(v) Rail canting and/or lifting out of the tie plates

(vi) Shiny marks on the base of the rail indicating that the rail is sliding through the anchors and/or clips

(vii) Kinky or wavy rail

(viii) Bottom of sag curves

(ix) In areas of heavy braking and acceleration

(x) Higher degree curves

(xi) Fixed facilities (i.e., turnouts, road crossings, bridges, etc.)

(xii) Sub-standard ballast section

(xiii) Sub-standard anchor/clip pattern

(xiv) Sub-standard tie conditions

(6) If track is identified as having any conditions which indicate the possibility of buckling, remedial action must be taken immediately by Operating Railroad personnel qualified in FRA §213.7(a)(b)(c).

(b) **Special Inspection in Cold Weather**

(1) When the air temperature or the rail temperature is ≤10°F, all main CWR and jointed tracks will be inspected by qualified Operating Railroad personnel in accordance with currently established inspection procedures, outlined in this Appendix.

(2) Determination of Temperature: The rail temperature is the preferred temperature and is taken with an approved rail thermometer. The air temperature is as reported by the National Weather Service.

(3) Operating Railroad personnel shall make out a "Special Track Inspection Report" (see Appendix F, "Forms") for this inspection and retain a copy for the duration of the Operating Contract that can be reviewed by the MassDOT Rail and Transit Division.

(4) Inspectors will inspect, at a minimum, for:

(i) Broken rails

(ii) Canted rails out of the plates on curves

(iii) Bent bolts

(iv) Pull-aparts

(v) Broken welds

(vi) Wide gap between rail ends

(vii) Cracked or broken joint bars (conventional and insulated)

(viii) Curve movement to the inside

(c) **Semi-Annual Inspections**

(1) A Spring inspection, between April 1 and May 30 (before air temperature of 80°F or a rail temperature of 110°F), and a Fall inspection between October 15 and November 15, shall be made by walking or by a hy-rail on all CWR main track. This inspection shall made using the "Report of Semi-Annual Inspection of CWR Track" found in Attachment E. The Inspection shall be made by a Manager of the Operating Railroad qualified under FRA §213.7(a)(b)(c).

(2) The inspection will concentrate on compliance with standards in the following areas:

(i) Anchor pattern

(ii) Anchor position

(iii) Resilient fasteners

(iv) Tie condition

(v) Ballast condition

(vi) Ballast section

(vii) Joint condition

(viii) Evidence of longitudinal rail movement, particularly at fixed locations, such as turnouts and grade crossings and open deck bridges.

(ix) Drainage condition

(x) Overall roadbed stability

(xi) Curve movement

(xii) Alinement deviations

(3) The Operating Railroad Manager will, within 30 days from the completion of the inspection, submit inspection information to the MassDOT Rail and Transit Division. Some of the information to be included is:

(i) A report of the special inspection that identifies track inspected by number and milepost limits;

(ii) The name of the individuals inspecting;

(iii) Date inspected;

(iv) Any exceptions found; and

(v) Protective and corrective action identified.

(d) **Protection of CWR Track with Deficiencies**

(1) When making Special Inspections (Hot and Cold Weather), Bi-Annual Inspections (Spring and Fall) and/or regular scheduled inspections in CWR track, if any of the above conditions described above in this paragraph are found to exist:

(i) Remedial action shall be taken, if required, as per FRA §213.5 by an individual qualified as per FRA §213.7(a)(b)(c).

(2) It is extremely important that noted deficiencies be corrected before the air temperature is expected to be above 80°F or the rail temperature expected to be above 110°F.

(3) If deficiencies are not corrected before the air temperature is expected to be above 80°F or the rail temperature above 110°F, appropriate remedial action shall be taken as per FRA§213.5, by an individual qualified as per FRA §215.7(a)(b)(c), if warranted.

(4) Determination of Temperature: The rail temperature is the preferred temperature and is taken with an approved rail thermometer. The air temperature is as reported by the National Weather Service.

8.0 JOINTS IN CWR TRACK

8.1 New Installations of CWR

(a) Joints in CWR track when installing CWR:

(1) When a joint or joints are installed in CWR during installation of CWR, one of the following actions per FRA 213.119(c)(2) shall be undertaken within 60 days:

(i) Weld the joint;

(ii) Install additional bolts in the joint bar so that all holes (6 holes) in the bar contain a bolt; or

(iii) Fully box anchor every tie for 195' in both directions from the joint.

8.2 Service Failures in Existing Previously Installed CWR

(a) Bolted joints in existing CWR that experience a service failure:

(1) In the case of a bolted joint in CWR experiencing service failure or a failed bar with a rail gap present, within 30 days either of the following actions per FRA 213.119(c)(3) shall be taken:

(i) Weld the joint;

(ii) Replace the broken bar(s), replace the broken bolts, adjust the anchors and, within 30 days, weld the joint;

(iii) Replace the broken bar(s), replace the broken bolts, install one additional bolt per rail end, and adjust anchors.

(iv) Replace the broken bar(s), replace the broken bolts, and anchor every tie 195' in both directions from the CWR joint; or

(v) Replace the broken bar(s), replace the broken bolts, add rail with provisions for later adjustment pursuant to FRA §213.119(d)(2) and reapply anchors.

8.3 Service Failure of Joint Bars and/or Track Bolts in a CWR Joint

(a) Minimum remedial action required:

(1) In the event of:

(i) Cracked or broken joint bar or bars, and

(ii) Bent and/or broken joint bolt or bolts,

(iii) Take the appropriate minimum remedial action given below and as shown in Attachment D, "Joint Defect Guidelines/Maximum Allowable Temporary Speed Restrictions (TSRs)".

(b) Number of bolts in rail ends required:

(1) In CWR track each rail end shall be bolted with at least two bolts at each bolted joint used to connect CWR strings, or CWR strings to conventional rail.

(2) Where either of the following conditions are found to exist, the track must be protected by the appropriate remedial action until the condition is corrected:

(i) Less than two bolts, but at least one bolt in a rail end: fix or place a TSR of no more than 10F/15P MPH until repaired.

(ii) One rail end unbolted (see Attachment D).

(3) Each joint bar must be held in position by track bolts or fasteners, and tightened sufficiently to provide support for abutting rail ends.

(4) When no-slip, or joint-to-joint rail contact exists by design; these locations are considered to be CWR track, and must meet all the requirements for CWR in this Appendix.

(c) Cracked or broken joint bars (see Attachment D):

(1) If a joint bar is cracked, broken or because of wear allows vertical movement of either rail when all bolts are tight, it shall be replaced.

(2) If a joint bar is cracked between the middle two bolt holes it shall be replaced.

(3) If between the middle two bolt holes, both joint bars are found to be cracked or one joint bar is found to be broken entirely through, trains may not be operated and the track taken out of service (see Attachment D) until the joint bars are replaced.

(4) If both joint bars are found to be broken entirely through between the middle two bolt holes, trains may not be operated and the track taken out of service (see Attachment D) until the joint bars are replaced.

(d) Opening (gap) of joints in CWR (see Attachment D):

(1) Bolted Rail Ends (Both Ends): The gap between rail ends shall be less than 1-1/2". If a joint is found to be open 1-1/2", a maximum 25F and 30P MPH temporary speed restriction shall be applied if there are two effective bolts in each rail end.

(2) Bolted Rail Ends (One End): If the gap between the rail ends is 1-1/2" but less than 2", a person designated under FRA §213.7(a)(b)(c)(d), shall visually supervise each train move. Repair the joint within 24 hours.

(3) Bolted Rail Ends (One End): If the gap between the rail ends is greater than 2" but 4" or less, a person designated under FRA §213.7(a)(b)(c)(d) shall visually supervise each train move. Repair the joint within 24 hours.

(4) Bolted Rail Ends (One End): If the gap between the rail ends is 4" or greater, the track shall be taken out of service until the joint is repaired.

8.4 Inspection of Joints In CWR Track

(a) Joints in CWR track must be inspected on foot according to §213.119. Rail joints in CWR track within turnouts, track crossings, expansion joints or lift rail assemblies need not be inspected during the walking inspection as they shall be inspected monthly in accordance with §213.235.

(b) The limits of the turnout for the purpose of this part are defined as a point 50 feet in advance of the points to the last long timber, or the heel of the frog if weave timbers are found at the heel.

(c) The limits of a track crossing, expansion joint, or lift rail assembly will be any joint within 20 ft. of the device.

(d) This inspection results shall be recorded on the Operating Railroad's Turnout Inspection Form.

(e) During walking inspections of joints in CWR particular attention must be paid to the following conditions of the joint and the track surrounding the joint:

(1) Cracks in the joint bar

(2) Evidence of movement of the bars in relation to the rail ends in the fishing areas ("loose" joints)

(3) Loose, bent or missing joint bolts

(4) Rail end batter

(5) Rail end mismatch

(6) Track surface, particularly hanging ties at the joint

(7) Evidence of excessive longitudinal movement of rail noted by the displacement of rail anchors, or "polished" areas at the ends of the bars or at rail anchors or clips

(f) All requirements per FRA Part 213 applying to Gage, Track Surface, Crossties, Defective Rails, Rail End Mismatch, Rail Joints, Rail End Batter, Tie Plates, and Rail Fasteners still apply. If there is a combination of conditions that substantially increases the chance of a broken joint bar an appropriate speed restriction should be applied.

8.4.1 Embedded Joints

(a) Permanently Embedded Joints:

(1) Where embedded joints exist, it is not necessary to disassemble or remove the track structure (e.g., remove pavement or crossing pads), to conduct an inspection of CWR joints unless there a deficiency or defect is suspected. Every effort must be made to inspect the visible portions of the joint bar and/or joint in embedded track construction.

(2) In new construction there shall be no embedded joints without the permission of the MassDOT Rail and Transit Division.

(b) Temporarily Embedded Joints:

(1) Joints may be embedded in a temporary crossing.

(2) Every effort should be made to keep the joint bar visible for inspection through the use of flangeway protection such as timbers, etc.

8.4.2 Joint Inspection in CWR

(a) Each joint in CWR shall be identified by using:
   (1) Route;
   (2) Track designation;
   (3) Milepost;
   (4) Joint type;
   (5) Rail designation; or
   (6) Other information so that the joint can be identified in the field.

(b) The Operating Railroad Company will maintain a computer-based inventory of each joint and furnish a copy to MassDOT Rail and Transit Division annually. The annual report shall also include the past five years of data as developed by the Operating Railroad Company.

(c) Each time a joint is removed from track by welding and/or is removed by the installation of rail that eliminates the joint, a Report of Joint Elimination by Field Welding shall be filled out (see Attachment E). The disposition of joints in track removed shall be noted on the next report when inspecting joints in CWR. By doing this, joints in CWR are reported from the time they are introduced until the time they are removed from track.

(d) The joint inventory will not contain those joints considered part of a turnout, track crossing, expansion joint, or lift rail assembly as the inspection of these joints is contained on the Monthly Switch Inspection Form as per §213.235.

8.4.3 Record of Inspections

(a) Each walking inspection of a joint in CWR track shall be recorded on the Operating Railroad Company's Special Track Inspection Report.

(b) The information on the Form shall include at a minimum, the Joint Identification Number, the route, the track, the milepost, the rail type, and any defects that require a remedial action and/or a permanent repair.

9.0 TRAINING

(a) To be considered qualified under §213.7 to supervise or conduct the installation, maintenance, adjustment and inspection of CWR track; individuals will receive instruction in, and be tested on, the **Operating Railroad's Approved CWR Plan.**

(b) All Operating Railroad MW employees responsible for the inspection, installation, adjustment, or maintenance of CWR track must successfully complete training on the Operating Railroad's Approved CWR Plan every calendar year.

(c) In addition, Operating Railroad MW employees shall be provided with a copy of these procedures which they shall make available at any CWR job site, if requested.

(d) The Operating Railroad shall maintain a list of those employees qualified to supervise restorations and inspect track in CWR territory. The Operating Railroad shall make this list available upon request.

(e) Annual CWR training programs will address the following:
   (i) The Operating Railroad's Approved CWR Plan and the application of written CWR procedures issued by the Operating Railroad.
   (ii) The qualification and designation of the Operating Railroad's MW personnel to:
      - Know and understand the requirements of the Operating Railroad's CWR Plan; and
      - Have the ability to detect deviations from the Operating Railroad's CWR Plan; and

- Can prescribe appropriate remedial action when deviations are discovered from the Operating Railroad's CWR Plan; and
- Have written authorization from the Operating Railroad to prescribe remedial action and/or make necessary repairs.

(iii) Subjects to be discussed during the annual training on the Operating Railroad's CWR Plan include, but are not limited to, the following:

- Installation and Adjustment of CWR
- Anchoring of CWR
- Maintenance of Desired Rail Neutral Temperature in Previously Installed CWR
- Trackwork That Disturbs CWR Track and Protection of Disturbed Track
- Special Inspections of CWR Track
- Joint Inspections in CWR Track
- Training
- Record Keeping

10.0 REPORTING REQUIREMENTS FOR CWR TRACK

(a) **Report of Disturbance of CWR Track (Form "TD") (Attachment E)**

(1) When any maintenance operations are considered to have disturbed CWR track as per Section 6.0, or if any rail is cut in CWR track or a service failure occurs in CWR track, a "Report of Track Disturbance", Form "TD", will be filled out by the Operating Railroad.

(i) Part A of this Form shall be completed for any work listed in Section 6.0 above which causes the CWR track to be considered disturbed.

(ii) Part B shall be completed whenever there is a Service Failure or CWR in main track is cut or broken for any reason.

(iii) The "Report of Track Disturbance Form" with instructions is found in Attachment E.

(iv) When this report is completed, a copy shall be retained on file for the duration of the Operating Contract for review by the MassDOT Rail and Transit Division.

(b) **Report of Track Movement (Form "TM") (Attachment E)**

(1) During out-of-face surfacing operations and/or the out-of-face installation of ties, the neutral temperature can be adversely affected on curved track. The track may be line in and/or the track may pull in due to reduced longitudinal and lateral resistance of the track structure.

(i) For curves of 3° and greater, a "Report of Track Movement, Form "TM" shall be made out when the curve is surfaced out-of-face or when more than 540 ties per mile are installed.

(ii) This report shall be required in addition to the Report of Track Disturbance of CWR Track (Form "TD").

(iii) The curve shall be stationed at key geometric locations. Reference stakes shall be added to the field side of the high side of the curve so that curve movement during and/or after maintenance work is performed can be obtained.

(iv) This report shall be completed by the Contractor or Operating Railroad Company on whose territory the work is being performed. The "Report of Track Movement" Form with instructions is found in Attachment E.

(v) When this report is completed, a copy shall be retained on file for the duration of the Operating Contract for review by the Operating Railroad Company.

(c) **Report of Joint Elimination by Field Welding (Form "JE") (Attachment E)**

(1) Any time a field weld is made to eliminate a joint, either by the thermite or flash butt method, Form "JE" must be completed by the Contractor/Operating Railroad Company in charge of the work.

(i) The "Report of Joint Elimination by Field Welding" is found in Attachment E.

(ii) This report shall be required in addition to the Report of Track Disturbance of CWR Track (Form "TD").

(iii) This report shall be completed by the Contractor/Operating Railroad Company on whose territory the work is being performed.

(iv) When this report is completed, a copy shall be retained on file for the duration of the Operating Contract for review by the Mass DOT Rail and Transit Division.

(d) **Report of Rail Clipping/Anchoring (Form "RC") (Attachment E)**

(1) Any time CWR is adjusted according to the requirements of Section 3.0 of this document the Form, "Record of Rail Clipping/Anchoring," Form "RC," must be completed by the Contractor/Operating Railroad Company in charge of the work.

(i) The "Record of Rail Clipping/Anchoring", Form "RC" with instructions, is found in Attachment E.

(ii) When this report is completed, a copy shall be retained on file for the duration of the Operating Contract for review by the Operating Railroad Company.

(e) **Report of Semi-Annual (Spring/Fall) Inspection of CWR Track (Form "CWR") (Attachment E)**

(1) Any time CWR is inspected annually either in the Spring and/or the Fall according to the requirements of Section 7.0 of this document the Form, **"**Report of Semi-Annual (Spring/Fall) Inspection of CWR Track," Form "CWR" must be completed by the Contractor/Operating Railroad Company in charge of the work.

(i) The **"**Report of Semi-Annual (Spring/Fall) Inspection of CWR Track," Form "CWR", is found in Attachment E.

(ii) When this report is completed, a copy shall be retained on file for the duration of the Operating Contract for review by the Operating Railroad Company.

(f) **Special Inspections – Earthquakes**

(1) When an earthquake occurs, each quake's magnitude – or inherent strength is measured and reported by the National Earthquake Information Service operated by the U.S. Geological Survey in Golden, Colorado.

(2) The Richter scale gages the energy released by an earthquake, as measured by the ground motion recorded on a seismograph. The magnitude of an earthquake is the same no matter where one is located. Its intensity – or the degree to which it is felt in a specific location – varies depending on one's distance from the earthquake's epicenter, or center of energy.

(3) When an earthquake is reported, the Operating Railroad notifies Maintenance-of-Way to begin a Special Track Inspection.

(4) Use the criteria in the Table below to determine whether a special inspection is warranted.

Magnitude (Richter Scale)	Initiate Special Track Inspection	Criteria/Action
Unknown	Yes	Reports of ground shaking in a geographic area. Trains stop within 50-mile radius of reported shaking until inspection is complete.
0.1 to 4.9	No	No action required.
5.0 to 5.4	Yes	When track is within a 30-mile radius of the epicenter, trains in affected areas slow to restricted speed until inspection is complete.
5.5 to 5.9	Yes	When track is within a 50-mile radius of the epicenter, trains stop in the affected area until inspection is complete.
6.0 to 6.9	Yes	When track is within a 100-mile radius of the epicenter, trains stop in the affected area until inspection is complete.
7.0 and above	Yes	When track is within a 150-mile radius of the epicenter, trains stop in the affected area until inspection is complete.

(5) Special inspections shall identify hazards and identify necessary remedial action(s) to protect the safety of trains operating in the affected areas.

(6) When conducting a special inspection, check the following:

- Materials fouling the track, such as trees, pole lines, wires, etc.
- Alignment, cross level, and profile of the track.
- Bridge piers, abutments, and bulkheads for signs of structural damage.
- Substructure and superstructure for damage from large objects falling into structures.
- Piers, bents, and bridge members for missing components.
- Signal outages and malfunctions.
- Landslides in cuts and slope failures in fills.

(7) Fill out "Special Track Inspection Report" and retain for duration of Operating Contract.

11.0 RECORD KEEPING

(a) **Report of CWR Installations**

(1) Rail temperature, neutral temperature, location, and date of CWR installations must be recorded in system logs or data management system and must be retained by the Operating Railroad for the duration of the Contract with the MassDOT Rail and Transit Division.

(b) **Report of Maintenance Work in CWR**

(1) Because track maintenance can substantially impact CWR stability and safety, the following records of work done must be recorded on Form "TD" and must be kept by the Operating Railroad for the duration of the Contract with the MassDOT Rail and Transit Division.

(i) Rail that is added for any reason.

(ii) Repair of broken or defective rails, pull-aparts and welding of rail joints, and changing glued plug insulated joints.

(iii) A record of pre-break/cut RNT when rail has pulled apart, broken, or been cut for defect removal (see Attachment C).

(iv) A record of the readjusted RNT after a rail has pulled apart, broken, or been cut for defect removal (see Attachment C).

(v) Where a curve has been staked and the curve has chorded as a result of surfacing and lining track (Form "TM", Attachment E).

(vi) CWR installation or maintenance work that does not conform to Appendix "A" procedures.

(2) Any time work is performed in CWR territory by a Contractor and/or the Operating Railroad, an Operating Railroad qualified person under FRA §213.7(c) shall make out a Track Disturbance Form (Form "TD", Attachment E).

(3) The Contractor and/or the Operating Railroad shall review the Form "TD" to ensure necessary corrections and adjustments and permanent repairs are made so as to maintain the overall stability of CWR track.

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ATTACHMENT A

DETERMINATION OF ESTIMATE OF PRE-BREAK / PRE-CUT NEUTRAL TEMPERATURE FOR A SERVICE FAILURE IN CWR

(a) General

(1) In line with Section 5.0's requirements, the RNT will be estimated and recorded on Form "TD" where a weld has broken or a rail has pulled apart, broken or been cut for defect removal (service failure).

(2) This attachment addresses how to calculate the rail's neutral temperature before the break or before the cut for defect removal.

(3) Attachment A provides an estimate of neutral temperature based on the measured field gap size, rail size and fastener type.

(4) The rail size is given in terms of a 6" base rail (i.e., for rail sizes above 115# rails) and for 5-1/2" rail (i.e., for 115# and below).

(5) The fastener types are given as EOTA (every other tie anchored) and ETA (every tie anchored).

(6) Concrete tie elastic fasteners, CTEF, and elastic fasteners on wood ties (such as Pandrol type) fall into the ETA category.

(7) The pre-break/pre-cut estimated RNT must be recorded on Form "TD" when making field repairs and kept in a data base by the Operating Railroad for managing subsequent readjustments.

(b) Use of the following tables: **NOTE**

(1) For wood tie tracks 200' from a fixed point (switches, turnouts, crossings, bridges, tunnels, etc.) they **DO NOT apply**. For such the data entry on the Form "TD" should be: ***NA**.

(2) For wood tie tracks between 200' - 400' of a fixed point apply EOTA tables, but data entry Form "TD" should be: ***AP** (for approximate)

(3) Tables for concrete ties and for wood ties with elastic fasteners, apply 200' beyond a fixed point, but **DO NOT apply within 200'**. For the latter, data entry on Form "TD" should be: ***NA**.

(4) For wood or concrete tie tracks where breaks/cuts on the same rail are clustered in close proximity (i.e., within 800' of each other). The data entry on Form "TD" should be: ***NA**.

(5) For iced rail/frozen ballast, tables **DO NOT apply**. For such, data entry on Form "TD" should indicate: ***FB**.

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Table 1a. 6" Base Rail
Wood Tie Track / Every Other Tie Anchored (EOTA)

Field Measured Rail Break/Rail Cut Temp (°F)	Measured Rail Gap (in)																	
	0.5	**1**	**1.5**	**2**	**2.5**	**3**	**3.5**	**4**	**4.5**	**5**	**5.5**	**6**	**6.5**	**7**	**7.5**	**8**	**8.5**	**9**
60	84	94	102	109	114	119	124	129	133	137	140	144	147	151	154			
55	79	89	97	104	109	114	119	124	128	132	135	139	142	146	149	152		
50	74	84	92	99	104	109	114	119	123	127	130	134	137	141	144	147	150	153
45	69	79	87	94	99	104	109	114	118	122	125	129	132	136	139	142	145	148
40	64	74	82	89	94	99	104	109	113	117	120	124	127	131	134	137	140	143
35	59	69	77	84	89	94	99	104	108	112	115	119	122	126	129	132	135	138
30	54	64	72	79	84	89	94	99	103	107	110	114	117	121	124	127	130	133
25	49	59	67	74	79	84	89	94	98	102	105	109	112	116	119	122	125	128
20	44	54	62	69	74	79	84	89	93	97	100	104	107	111	114	117	120	123
15	39	49	57	6	69	74	79	84	88	92	95	99	102	106	109	112	115	118
10	34	44	52	59	64	69	74	79	83	87	90	94	97	101	104	107	110	113
5	29	39	47	54	59	64	69	74	78	82	85	89	92	96	99	102	105	108
0	24	34	42	49	54	59	64	69	73	77	80	84	87	91	94	97	100	103
-5	19	29	37	44	49	54	59	64	68	72	75	79	82	86	89	92	95	98
-10	14	24	32	39	44	49	54	59	63	67	70	74	77	81	84	87	90	93
-15	9	19	27	34	39	44	49	54	58	62	65	69	72	76	79	82	85	88
-20	4	14	22	29	34	39	44	49	53	57	60	64	67	71	74	77	80	83
-25	-1	9	17	24	29	34	39	44	48	52	55	59	62	66	69	72	75	78
-30	-6	4	12	19	24	29	34	39	43	47	50	54	57	61	64	67	70	73
-35	-11	-1	7	14	19	24	29	34	38	42	45	49	52	56	59	62	65	68
-40	-15	-6	2	9	14	19	24	29	33	37	40	44	47	51	54	57	60	63
-45	-21	-11	-3	4	9	14	19	24	28	32	35	39	42	46	49	52	55	58
Estimated RNT in °F																		

Note: For rail temperatures above 60°F, the estimated RNTs must be developed by interpolating the existing table.

Table 1b. 5-1/2" Base Rail
Wood Tie Track / Every Other Tie Anchored (EOTA)

Field Measured Rail Break/Rail Cut Temp (°F)	Measured Rail Gap (in)																	
	0.5	**1**	**1.5**	**2**	**2.5**	**3**	**3.5**	**4**	**4.5**	**5**	**5.5**	**6**	**6.5**	**7**	**7.5**	**8**	**8.5**	**9**
60	86	97	106	113	119	125	130	135	139	144	148	152	155					
55	81	92	101	108	114	120	125	130	134	139	143	147	150	154				
50	76	87	96	103	109	115	120	125	129	134	138	142	145	149	153			
45	71	82	91	98	104	110	115	120	124	129	133	137	140	144	148	151		
40	66	77	86	93	99	105	110	115	119	124	128	132	135	139	143	146	149	152
35	61	72	81	88	94	100	105	110	114	119	123	127	130	134	138	141	144	147
30	56	67	76	83	89	95	100	105	109	114	118	122	125	129	133	136	139	142
25	51	62	71	78	84	90	95	100	104	109	113	117	120	124	128	131	134	137
20	46	57	66	73	79	85	90	95	99	104	108	112	115	119	123	126	129	132
15	41	52	61	68	74	80	85	90	94	99	103	107	110	114	118	121	124	127
10	36	47	56	63	69	75	80	85	89	94	98	102	105	109	113	116	119	122
5	31	42	51	58	64	70	75	80	84	89	93	97	100	104	108	111	114	117
0	26	37	46	53	59	65	70	75	79	84	88	92	95	99	103	106	109	112
-5	21	32	41	48	54	60	65	70	74	79	83	87	90	94	98	101	104	107
-10	16	27	36	43	49	55	60	65	69	74	78	82	85	89	93	96	99	102
-15	11	22	31	38	44	50	55	60	64	69	73	77	80	84	88	91	94	97
-20	6	17	26	33	39	45	50	55	59	64	68	72	75	79	83	86	89	92
-25	1	12	21	28	34	40	45	50	54	59	63	67	70	74	78	81	84	87
-30	-4	7	16	23	29	35	40	45	49	54	58	62	65	69	73	76	79	82
-35	-9	2	11	18	24	30	35	40	44	49	53	57	60	64	68	71	74	77
-40	-14	-3	6	13	19	25	30	35	39	44	48	52	55	59	63	66	69	72
-45	-19	-8	1	8	14	20	25	30	34	39	43	47	50	54	58	61	64	67
Estimated RNT in °F																		

Note: For rail temperatures above 60°F, the estimated RNTs must be developed by interpolating the existing table.

Table 2a. 6" Base Rail
Wood or Concrete Tie Track / Every Tie Anchored (ETA)

Field Measured Rail Break/Rail Cut Temp (°F)	Measured Rail Gap (in)																	
	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9
60	90	102	111	119	126	133	139	144	149	154	159							
55	85	97	106	114	121	128	134	139	144	149	154	158						
50	80	92	101	109	116	123	129	134	139	144	149	153	157					
45	75	87	96	104	111	118	124	129	134	139	144	148	152	156				
40	70	82	91	99	106	113	119	124	129	134	139	143	147	151	155			
35	65	77	86	94	101	108	114	119	124	129	134	138	142	146	150	154		
30	60	72	81	89	96	103	109	114	119	124	129	133	137	141	145	149	153	
25	55	67	76	84	91	98	104	109	114	119	124	128	132	136	140	144	148	151
20	50	62	71	79	86	93	99	104	109	114	119	123	127	131	135	139	143	146
15	45	57	66	74	81	88	94	99	104	109	114	118	122	126	130	134	138	141
10	40	52	61	69	76	83	89	94	99	104	109	113	117	121	125	129	133	136
5	35	47	56	64	71	78	84	89	94	99	104	108	112	116	120	124	128	131
0	30	42	51	59	66	73	79	84	89	94	99	103	107	111	115	119	123	126
-5	25	37	46	54	61	68	74	79	84	89	94	98	102	106	110	114	118	121
-10	20	32	41	49	56	63	69	74	79	84	89	93	97	101	105	109	113	116
-15	15	27	36	44	51	58	64	69	74	79	84	88	92	96	100	104	108	111
-20	10	22	31	39	46	53	59	64	69	74	79	83	87	91	95	99	103	106
-25	5	17	26	34	41	48	54	59	64	69	74	78	82	86	90	94	98	101
-30	0	12	21	29	36	43	49	54	59	64	69	73	77	81	85	89	93	96
-35	-5	7	16	24	31	38	44	49	54	59	64	68	72	76	80	84	88	91
-40	-10	2	11	19	26	33	39	44	49	54	59	63	67	71	75	79	83	86
-45	-15	-3	6	14	21	28	34	39	44	49	54	58	62	66	70	74	78	81
Estimated RNT in °F																		

Note: For rail temperatures above 60°F, the estimated RNTs must be developed by interpolating the existing table.

Table 2b. 5-1/2" Base Rail
Wood or Concrete Tie Track / Every Tie Anchored (ETA)

Field Measured Rail Break/Rail Cut Temp (°F)	Measured Rail Gap (in)																	
	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9
60	92	106	116	125	133	139	146	152										
55	87	101	111	120	128	134	141	147	152									
50	82	96	106	115	123	129	136	142	147	153								
45	77	91	101	110	118	124	131	137	142	148	153							
40	72	86	96	105	113	119	126	132	137	143	148	152						
35	67	81	91	100	108	114	121	127	132	138	143	147	152					
30	62	76	86	95	103	109	116	122	127	133	138	142	147	151				
25	57	71	81	90	98	104	111	117	122	128	133	137	142	146	151			
20	52	66	76	85	93	99	106	112	117	123	128	132	137	141	146	150		
15	47	61	71	80	88	94	101	107	112	118	123	127	132	136	141	145	149	153
10	42	56	66	75	83	89	96	102	107	113	118	122	127	131	136	140	144	148
5	37	51	61	70	78	84	91	97	102	108	113	117	122	126	131	135	139	143
0	32	46	56	65	73	79	86	92	97	103	108	112	117	121	126	130	134	138
-5	27	41	51	60	68	74	81	87	92	98	103	107	112	116	121	125	129	133
-10	22	36	46	55	63	69	76	82	87	93	98	102	107	111	116	120	124	128
-15	17	31	41	50	58	64	71	77	82	88	93	97	102	106	111	115	119	123
-20	12	26	36	45	53	59	66	72	77	83	88	92	97	101	106	110	114	118
-25	7	21	31	40	48	54	61	67	72	78	83	87	92	96	101	105	109	113
-30	2	16	26	35	43	49	56	62	67	73	78	82	87	91	96	100	104	108
-35	-3	11	21	30	38	44	51	57	62	68	73	77	82	86	91	95	99	103
-40	-8	6	16	25	33	39	46	52	57	63	68	72	77	81	86	90	94	98
-45	-13	1	11	20	28	34	41	47	52	58	63	67	72	76	81	85	89	93
Estimated RNT in °F																		

Note: For rail temperatures above 60°F, the estimated RNTs must be developed by interpolating the existing table.

ATTACHMENT B

RECOMMENDED PROCEDURES FOR DISTRESSING CONTINUOUS WELDED RAIL (CWR) PREVIOUSLY LAID IN TRACK (IN CONFORMANCE WITH SECTION 5.0 REQUIREMENTS)

(a) MassDOT's CWR Policy prescribes distressing requirements for newly installed CWR as per Section 3.0, including a general procedure for distressing rail.

(1) **Attachment B provides more detailed Recommended Procedures for distressing CWR previously laid in track based on current industry best practice guidelines.**

(b) **Definition**: Distressing is the operation of removing (or sometimes adding) rail in CWR to make the longitudinal thermal stress (force) to be zero at a prescribed temperature.

(1) MassDOT's preferred Rail Laying Temperature (RLT) is 105°F.

(c) **Common Distressing Types for Existing CWR in Track:**

(1) There are typically three types, or categories, of distressing which are driven by specific maintenance needs:

(i) **programmed distressing**,

(ii) **reactive or emergency distressing**, and

(iii) **curve distressing**. (Note: although curve distressing can be both programmed and reactive, a separate category is given here due to its general complexity).

(2) **Programmed distressing** is when one or more strings of rail are deemed to be sufficiently below (or above) RLT to warrant rail neutral temperature (RNT) adjustment. When several strings require distressing on MassDOT-owned rail lines, often the out-of-face distressing shall be accomplished by a Contractor working directly for MassDOT Rail and Transit.

(3) **Reactive or emergency distressing** is an imminent action that addresses tight, wavy, kinky rail, and other buckling prone conditions. This type of work on MassDOT-owned rail lines is usually accomplished by the Operating Railroad Personnel.

(4) **Curve distressing** applies to stress adjustments of curves due to cold temperature chording-in or to excessive curve movements resulting from maintenance actions performed when rail is in tension. This type of work on MassDOT-owned rail lines is usually accomplished by Operating Railroad Personnel or by a Contractor working directly for MassDOT Rail and Transit.

(d) **General Guidelines for Programmed Distressing of CWR Strings In Track Up to 1600' In Length.**

(1) **Programmed Distressing may be used for:**

(i) Rail that was laid at colder temperatures sufficiently below a target RNT of 105°F; or

(ii) Rail laid at "hot" temperatures, which exhibits excessive rail movement (running rail); or

(iii) Locations where recent track maintenance (lining, surfacing, lifting, etc.) has lowered RNT below RLT -10°F or 95°F; or

(iv) Locations where the Operating Railroad and/or MassDOT Rail and Transit Division deems it necessary.

(2) The following applies when distressing:

(i) The means, methods, and equipment used when distressing rail shall be approved by MassDOT Rail and Transit or its representative.

(ii) The range of rail temperature at which rail is distressed shall be approved by MassDOT Rail and Transit or its representative.

(iii) Distressing should be scheduled and completed when the ambient temperature provides sufficient heat so that the rail temperature is as near as possible to the target RLT of 105°F; unless approved by MassDOT Rail and Transit.

(iv) **No more than 1,600' of rail may be distressed at any given time (1,600' strings).** This is a continuous 1600' string and/or a 1600' string with a cut or joint in the middle (800'+/- each side of cut and/or joint).

(3) The following preparatory work shall be performed:

(i) Make reference match marks around the existing joint or rail cut location:

- On the base of rail and tie plates on unanchored ties within 10'+/- of the joint and/or cut in the rail; or
- On the left side of the elastic fastener tie plate or the side opposite the drive on elastic fastener or clip within 10'+/- of the joint and/or cut in the rail; and

(ii) When distressing one or more strings, mark the quarter points of the string to be distressed.

(iii) When out-of-face distressing, set offset stakes at the far end of the rail to be distressed to measure any rail panel “pull” back at the end of the CWR string where the rail is cut and/or a joint is located.

(iv) Rail panel “pull back” is often associated with wood tie track anchored on every tie with elastic fasteners or in areas with weak crib ballast.

(v) Rail panel “pull back” movements (inches) shall be measured after:

- The rail has been correctly expanded at the quarter points and at the end by using the ambient temperature, a rail heater and/or a. hydraulic rail puller, and;
- The CWR string has been anchored and/or clipped.

(vi) Rail panel “pull back” measured is the same as ADDING RAIL and the CWR shall have to be unclipped and expanded again to eliminate any pull back when it is finally anchored and clipped before it is finally jointed and/or welded.

(vii) Measured rail end movements away from the joint or cut at the end of the CWR string at the match marks is the same as ADDING RAIL. The CWR shall have to be unclipped and expanded again to eliminate any rail end movement away from the joint and/or cut before the CWR is finally jointed and/or welded.

(viii) The total expansion length required, using the temperature differential, shall be calculated so as to achieve a target RLT of at least 105°F.

(ix) The amount of rail to be expanded when using the temperature differential moved can be determined by using the Report of Rail Clipping/Anchoring, Form “RC” found in Attachment E.

(x) To improve RNT, the total required expansion for any string, shall consist of the following:

- The calculated expansion required from the temperature "differential", and;
- Any measured "rail panel pull back", and;
- Any measured rail end movements away from the joint and/or cut.

(xi) If in compression, the rail shall be cut with a torch (see Paragraph (g) below) and placed in a position that will permit the rail ends to bypass each other, so as to permit the rail to expand freely.

(xii) If in compression, the rail shall be unanchored or unclipped from the cut or joint at the end of the string to be expanded back to the beginning of the string.

(xiii) If the base of rail is caught in the elastic rail fastener plates, the rail shall be raised from the tie plates or tie pads. Place base of rail on risers (spikes and/or rollers) to allow the rail to expand freely; risers shall be placed every 12^{th} to 15^{th} tie (especially in areas of elastic fastener plates). There may be a need to add additional risers at closer intervals on curves.

(xiv) If risers are required, all rail anchors, clips and insulators must be removed and risers placed to ensure the base of the rail is free to move relative to the tie plate and/or tie seat (i.e., stress free).

(xv) If power vibrators are used, it may not be necessary to place the rail on risers in areas of cut spikes and conventional tie plates.

(xvi) Ensure that vibrated rail is totally free to expand/contract longitudinally (i.e., stress free).

(e) **Programmed Distressing: Adjusting Short CWR Lengths (Spot Distressing) Already in Track in Wood and Concrete Tie Territory)**

(1) This method is generally used by the Operating Railroad MW forces to repair a service failure such as a pull-apart, broken rail, or broken weld and to remove a defective rail and/or add a plug rail or by making a cut in CWR.

(2) When distressing short lengths Operating Railroad MW forces generally use the ambient temperature and/or a rail puller to obtain the expansion required.

(3) In this case, the rail to be distressed should be centered, if possible, on an existing joint that can be removed and/or a cut made in the CWR string. Approximately 50% of the area to be distressed should be on either side of the joint and/or cut.

(4) In this case, the rail on either side of the joint and/or cut is expanded towards the rail cut and/or joint location.

(5) The base of the rail and plate should be marked at or within 10' of either side of the joint or cut and then at 50' stations or the quarter points for the full length of the rail to be expanded.

(6) Generally the amount of rail to be expanded on either side of the joint and/or cut is from 195' (380' total) to 390' (780' total). However, longer lengths of CWR, up to 800' (1600' total) may be distressed by this method.

(7) The movement at these stations should be recorded when the joint is removed and/or the rail is cut and recorded on Form "TD."

(8) A rail puller can be used, along with the ambient temperature and/or a heater, to increase the RNT, to at least **RLT -10°F**, when making repairs.

(9) Because of the need to expand rail in two directions, it may be somewhat easier to achieve the required expansion by using the ambient temperature in warmer periods of the year and/or by using a rail puller. A rail heater is more problematic because of the need to have the heater working on both sides of the joint and/or cut and having to move the heater over the joint or cut to expand rail in two directions.

(10) See Attachment C "Recommended Procedures for Adjusting CWR After a Break (Service Failure) or Cut Below the Target RLT (105°F)."

(f) **Programmed Distressing: Adjusting Numerous CWR Strings Out-of-Face Already in Track in Wood and Concrete Tie Territory (Preferred Method)**

(1) This procedure applies to distressing CWR in track as part of programmed maintenance when a length of rail(s) is deemed to be sufficiently below (or above) the target RLT of105°F to warrant RNT readjustment.

(2) The preferred way to expand rail is to heat the rail naturally or with a rail heater. A rail puller may be used when expanding rail to help achieve the required expansion and/or hold the expanded rail in place while installing anchors and/or clips.

(3) The rail to be distressed is usually expanded from the starting point to the end of the string being distressed in one continuous direction.

(4) The maximum length of rail to be distressed at any time in 1600'.

(i) Once a string to be distressed is identified, the end of the string at an existing joint, or a location where the rail is cut, shall have the rail ends mismatched to allow unobstructed movement of the rail string. Then, as the rail is heated naturally by sunlight and/or with a rail heater, the rail is expanded in the direction towards the joint and/or cut.

(ii) Before expanding the rail string, anchors, and/or clips shall be removed starting at the far end of the string at the joint and/or rail cut back to the beginning of the rail string.

(iii) Measure the existing rail temperature and subtract from the target RLT of at least 105°F to determine the temperature differential to be used. See the Report of Rail Clipping/Anchoring (Form "RC") in Attachment E to calculate the total expansion required. The expansion required depends upon the rail temperature differential and total length of the CWR string. The required amount of expansion shall be marked at the one-quarter points on the base of the rail and plates.

(iv) Mark the quarter points on the base of the rail and tie plates of rail strings to be expanded.

(v) Expanding rail continuously in one direction allows MW crews to mark and expand rail at the quarter points and then re-clip rail in a continuous motion from the point of beginning to the end of the string at the joint and/or cut in the CWR.

(vi) Heat (natural or with a rail heater) should be uniformly applied along the string to be distressed until the required expansion has been obtained at the quarter points to include the end of the string at the joint and/or cut rail.

(vii) When using a rail heater, if any quarter point does not have the required expansion, either before or after anchoring/clipping, the string shall have to be reheated. The rail heater will back over the portion that needs to be reheated without applying heat.

(viii) Then the heater shall work towards the end of the string at the joint or rail cut applying heat until the required expansion is obtained.

(ix) Re-clip and/or re-anchor the rail as soon as expansion at the quarter points has been achieved. Clip and/or anchor using the standard anchor patterns given in Section 4.0 "Anchoring of Rail."

(x) The CWR shall not be considered to be distressed until the required expansion at all the quarter points have been realized. When distressing strings of CWR, rail expansion, and not rail temperature, determines if a string of CWR has been distressed.

(xi) A rail puller can be used to hold the required expansion and/or to help get the required expansion. At least 20 ties on the next string to be distressed should be solid box anchored and/or clipped to provide sufficient holing power for the rail puller to hold or pull the string being expanded.

(g) **Torch Cutting CWR in Track**

(1) The preferred method of cutting CWR in compression is with a torch.

(2) Rail shall only be torch cut in an emergency to relieve thermal stress in the rail prior to expanding and then cutting with a rail saw.

(3) Operating Railroad personnel and/or Contractors shall be trained to cut rail with a torch in accordance with their in-house Safety Procedures.

(4) Operating Railroad personnel and/or Contractors shall not cut rail with a torch on MassDOT property unless trained to do so by their respective companies.

(5) A recommended procedure for torch cutting rail in compression is illustrated in Attachment F "Torch Cutting Rail."

(6) Person making torch cut:

(i) Shall stand on opposite side of rail from which it is expected to move when making torch cut.

(ii) In curve if buckle/alignment is on high side of curve; stand on low side of curve.

(iii) In tangent track, stand on side opposite from misalignment or buckle.

(7) Initially, remove anchors only in an area large enough to facilitate the torch cut. Do not remove any additional anchors until the torch cut is made.

(8) Clear personnel from misalignment area when rail is cut as rail/track may move suddenly when compressive stress is relieved by torch cutting.

(9) Additional anchors shall be removed after the rail is torch cut to facilitate the necessary rail expansion movement, the misalignment of rail ends and repair.

(10) If a torch cut rail is to be welded within 15 minutes of cutting, it shall be trimmed back at least 3/8" on each rail end with a saw before welding. **This practice requires the approval of the local MassDOT Rail and Transit Field Representative.**

(11) All torch cut rail ends shall be trimmed back:

(i) At least 2" (AREMA Chapter 4.7.3) and/or;

(ii) Beyond the heat affected zone on either side of the torch cut which will appear as a different color on the web of the rail; or whichever is greater;

(iii) With a rail saw before a field weld is made and/or a joint is applied.

(12) If necessary, in an emergency, to pass a train over a torch cut rail end, before the torch cut ends are trimmed back:

(i) Joint bars may be installed with at least two bolts in each rail end, if possible.

(ii) Each train may be passed over the joint at a maximum of 10F/15P provided the move is under the supervision of a qualified person under FRA §213.217(a)(b)(c)(d).

(h) **Reactive or Emergency Distressing: Cutting Tight Track/CWR in Compression**

(1) If a misalignment (wavy, kinky or nervous rail) is found in track that exceeds values for any class of track found in FRA §213.55, Alinement, take appropriate remedial action per FRA §213.9.

(2) Locate point of maximum misalignment.

(3) Fill out Form "TD" and include rail temperature and alinement deviation/defect as per FRA §213.55.

(4) Select a point to make a torch cut. It may be advisable to cut at a point near, but not exactly at the center of the misalignment where compressive stresses may be the highest.

(5) A recommended procedure for torch cutting rail in compression is illustrated in Attachment F "Torch Cutting Rail." See additional torch cutting information found in (g).

(6) Make repairs in accordance with, "Reactive or Emergency Distressing" (see Example 3).

(i) **Reactive Distressing: Adjusting Tight, Wavy Nervous Rail: Procedures**

(1) Reactive distressing consists of actions taken to address tight, wavy, kinky rail conditions seen in CWR track. Usually tight, wavy, or nervous rail is discovered when the rail temperatures are warm.

(2) Such conditions typically are associated with large reductions in rail temperatures and indicate a possible imminent track buckle.

(3) First establish the length of rail exhibiting the tight, wavy condition (i.e., the length of rail requiring neutral temperature adjustment through distressing).

(4) **The total length for distressing is a recommended minimum of 1.5 times the estimated tight, wavy length (although 2 times is the MassDOT preferred).**

(5) **Note: 400' of unfastening (200' either side of torch cut) is a *minimum* distance.** More length is required if the estimated $L_{distress}$ is longer than **260'**, in which case the unfastening length rule of thumb is:

Unfastening Length = 1.5 x $L_{distress}$

(6) Generally *both* rails should be distressed unless otherwise dictated.

(7) The procedure to follow is as described below.

(i) Estimate the length of the tight, kink, wavy rail segment; locate the midpoint where rail is to be cut.

(ii) Record the length of rail to be distressed (i.e., $L_{distress}$ = _____ ft.).

(iii) Cut rail. (**Note: typically torch cutting is required)** and misalign rail ends.

(iv) Keep cutting rail with rail saw until it stops moving; this may require several cuts.

(v) **After rail stops moving, unfasten rail for minimum required distance on both sides of the cut starting at the cut and working away from the cut.**

(vi) After unfastening CWR, continue cutting rail out until there is no more movement; at this point the rail ends should just be touching.

(vii) Measure and record the rail temperature.

(viii) Refer to MassDOT's preferred RLT (105°F) and compare it with the measured rail temperature to determine the distress *temperature differential*. If the measured rail temperature is *lower* than the RLT, proceed to Form "RC," "Report of Rail Clipping/Anchoring" in Attachment E to determine the additional rail to be removed.

(ix) If the measured rail temperature is *above* RLT, no additional rail needs to be removed, and proceed to next step.

(8) Rail shall be expanded by ambient temperature and/or pulled with a rail puller.

(9) f CWR is cut with a torch, both rails on either side of the torch cut shall have to be cut back at least 2" with a rail saw (see Paragraph (g) above).

(10) A plug rail **shall** have to be added. A minimum 18' plug in tangent track shall be installed.

(11) Rail to be cut out when an 18' plug rail is installed includes:

(i) The length of the plug rail.

(ii) The amount that the rails on either side of the torch cut are to be expanded from Form "RC," "Report of Rail Clipping/Anchoring." See Attachment E.

(iii) An additional 1" allowance for each end of the plug if it is to be field welded (2x1" = 2").

(iv) If installed plug rail is to be jointed and not welded, no additional rail for welding needs to be removed. Comply with FRA §213.119(c).

(v) DO NOT ADD RAIL.

(12) If field welding, add the weld allowance (usually 1") to the CWR rail expansion value and cut out the indicated amount of rail.

(13) Make the weld or install joint bars and reapply rail fasteners or anchors. (Note: some pulling of the rail may be required to close rail to welding gap.)

(14) Record distress temperature differential, distress length, unfastening length, the readjusted RNT, and the amount of rail removed on Form "TD."

(15) Proceed to distress the other rail.

(j) Distressing Curves Procedures:

(1) Curve distressing may be required in curves when curves have chorded in or moved in during cold temperatures or due to heavy maintenance activities in curves such as:

(i) Out-of-face surfacing and aligning of track

(ii) Out-of-face tie installation

(iii) Undercutting of track

(iv) Shoulder ballast cleaning

(2) Heavy maintenance activities performed when CWR is in tension generally makes curve move in and/or chord in.

(3) More specifically, when curves undergo lateral movements due to temperature changes, either naturally or due to maintenance, the result can be substantial changes in neutral temperature which requires readjustment by distressing.

(4) There are two methods of distressing curves: (1) cutting rail out (preferred), and (2) curve realignment out.

(5) Distressing via curve realignment is the easier of the two methods, but requires knowledge of the curve position (i.e., the amount of movement), hence, requires curve staking, monitoring, record keeping, and correct tamper lining management.

(6) Appendix "A" addresses the need to stake curves ≥3°. **At a minimum, curves ≥3° shall be staked when surfacing and aligning when the rail temperature is below 55°F or 50°F below the preferred RLT of 105°F.** See Form "TM," "Report of Track Movement" in Attachment E.

(7) Staking of curves: At a minimum, stake curves ≥3° prior to out-of-face surfacing and lining.

(8) MassDOT Rail and Transit Division may require the staking of curves for other types of work as given in (j) (1).

(9) Place a minimum of three reference stakes uniformly spaced around the curve. Additional stakes may be required due to the overall length of the curve (see Form "TM," Attachment E).

(10) Inspecting for curve movement: Inspect for curve movement periodically after the work, especially during periods of large temperature changes. **Where a curve has been staked and curve has chorded 3" or more (≥3") to the inside, the curve shall be lined out and/or distressed.**

(11) **A temporary speed restriction (TSR) of 40F/40P MPH or less shall be applied if the curve is not lined out or the rail is not distressed when the rail temperature reaches the target RLT of 105°F.** Take additional remedial action as required.

Example 1: Programmed Distressing (spot distressing): It is suspected that a 1,000' section of rail on wood ties with cut spikes and DSC plates and anchors was laid "cold" (well below the territory's RLT), and it needs to be distressed to readjust to RLT = 105°F. The rail is being cut for distressing at a rail temperature of 70°F. How to proceed?

Step 1: Add match marks on both sides and within 10' of the rail to be cut. From these match marks determine the amount of rail moving together when the rail is cut. Place marks at 50' stations for up to 200' on either side of the proposed rail cut to monitor and record rail movement when rail is cut and then when rail is expanded to a RNT of 105°F.

Step 2: Add "witness stakes" in area where rail is to be cut. Measure any panel "pull back" on both sides of rail cut. Panel "pull back," if any in inches, must be added to required rail expansion discussed below. **DO NOT ADD RAIL**

Step 3: For this example assume that the rail is in compression. Cut rail at midpoint with a rail saw if possible and bypass rail ends. If the rail is in compression, torch cutting may be required. If torch cutting is required an 18' plug or larger shall have to be cut in because the minimum cut back with a rail saw on either side of a torch cut is 2" or a minimum of 4" of rail plus the width of the torch cut is removed.

Step 4: For this example assume the rail was able to be cut with a saw. This means that the rail had a neutral temperature just below 70°F.

Step 5: From match marks determine amount of rail moving together.

Step 6: Unfasten 500' in both directions starting from the rail cut and working away from the rail cut. After anchors are removed, tap or vibrate rail and let rail continue to run. Place base of rail on spikes and/or rollers to get rail out of plates if that helps to expand rail. Add spikes and/or rollers starting at joint or cut and working backwards to beginning of string to be expanded.

Step 7: Record total rail movement on Form "TD" at a rail temperature of 70°F.

Step 8: Cut out the excess rail moved together, leaving the rail ends just touching. At this point this unfastened rail has a neutral temperature of 70°F which needs to be raised to RLT=105°F.

Step 9: Check rail temperature and refer to "Report of Rail Clipping/Anchoring," Form "RC" in Attachment E to compute required expansion in inches for a temperature differential of 105°F - 70°F = 35°F and calculate the gap required for two pieces at 500' or; 2 x 1-3/8" = 2-6/8" or 2-3/4".

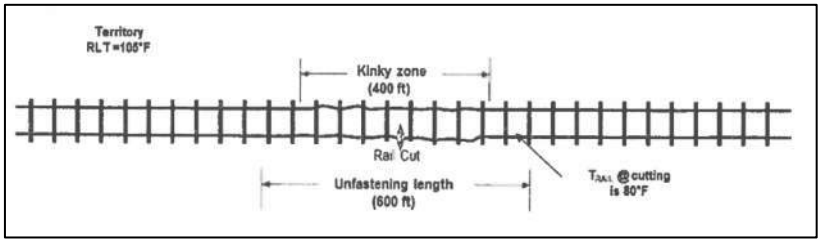
Step 10: Expand rail with ambient temperature and/or rail puller.

Step 11: Cut out the 2-3/4" + 1" for field weld allowance; pull the rail together for the 1" gap, field weld and reapply anchors.

Step 12: Record total amount of rail removed, distressing temperature, temperature differential, and the readjusted neutral temperature on Form "TD."

Step 13: Proceed to distress the other rail.

Example 2: Reactive Distressing: Adjusting Tight, Wavy, Nervous Rail: There is a 400' rail segment exhibiting a wavy/tight rail condition or rail kink. A kink is a formation or a misalignment greater than 1" on track not related to work done by MW Forces. A kink normally occurs when rail temperatures are thought to be high. The territory's RLT is 105°F, and the distressing is done at a rail temperature of 80°F. How to proceed with the distressing?



Step 1: Distress length is 400'; cut rail out with torch at midpoint until no more rail movement.

Step 2: Remove fasteners for 1.5 x kinky zone or 600' (300' on either side of cut note 600' = 1.5 x 400). Start at the torch cut and remove fasteners moving away from the cut. Keep letting rail run until no more rail movement.

Step 3: Measure rail temperature (here 80°F); and compare with RLT = 105°. The temperature differential is 25°F.

Step 4: Here the rail temperature is **lower** than laying temperature; therefore more rail needs to be removed. So rail needs to be expanded. See Form "RC," Attachment E.

Step 5: Proceed to Attachment E to determine additional rail to cut out for a 25°F distress temperature differential and the (2x300') 600' length, this is 1-1/4".

Step 6: Cut out the rail expansion required of 1-1/4" plus the 1" weld allowance if rail is to be field welded.

Step 7: If CWR is torch cut, both rails on either side of the torch cut shall have to be cut back at least 2" with a rail saw. Because only 1-¼" of expansion is required, a plug rail will have to be cut in. A minimum of 18' plug shall be installed in tangent track. Rail to be cut out if an 18' plug rail is installed includes:

- The length of the plug rail.
- The amount that the rails on either side of the torch cut are to be expanded from Form "RC." In this case 2 x 5/8" = 1-1/4" total.

- An additional 1" allowance for each end of the plug if it is to be field welded (2X1" = 2").
- If the plug is to be jointed and not welded, no additional rail other than the plug length and the required expansion amount of 1-¼" needs to be removed. Comply with FRA §213.119(c).
- **DO NOT ADD RAIL.**

Step 8: Expand rails (both sides of torch cut) by the ambient temperature and with a rail heater and/or rail puller, cut in plug rail, reapply anchors or fasteners, make field welds and/or drill rail ends and apply 6 hole joint bars.

Step 9: Record rail temperature (80°F); RLT (105°F); distress length (400'); unfastening length (600') and 1-1/4" rail cut out on Form "RC."

Step 10: Proceed to distress other rail.

ATTACHMENT C

RECOMMENDED PROCEDURES (RPS) FOR READJUSTING/DISTRESSING CONTINUOUS WELDED RAIL (CWR) AFTER A BREAK, PULL-APART (SERVICE FAILURE) OR CUT BELOW THE TARGET RAIL LAYING TEMPERATURE (RLT = 105°F)

(a) **Definitions:**

(1) The "Rail Laying Temperature" (RLT) is the target installation temperature of welded rail for the MassDOT Rail and Transit Division.

(2) For existing CWR in track, when service failures are repaired and cuts in CWR are made by Railroad Operating Companies, the minimum acceptable RLT to be achieved when making repairs and/or cuts is RLT -10°F or 95°F.

(3) All readjustments/distressing of CWR on MassDOT Rail and Transit Division shall be made to achieve a target RLT of at least 105°F.

(4) As per Section 3.0, "Installation and Adjustment of CWR," MassDOT requires rail to be installed at RLT=105°F with construction tolerance of -10 to +10°F (i.e., 95°F to 115°F).

(5) The "Rail Neutral Temperature" (RNT) is the rail temperature at which the net longitudinal force in the rail is zero, and is referred to as rail neutral temperature.

(b) **Overview:**

(1) These procedures address readjusting the RNT under the following conditions:

(i) Service Failures:

- Broken joint bars
- Broken welds/field or plant
- Pull-aparts with broken bolts and bent bolts
- Broken rails
- Defective glued plug insulated joint rails

(ii) Rail defect or rail removals (cutting rail).

(iii) Cutting rails and installing plug rails.

(2) Rail that has pulled apart, broken, or been cut for defect removal must be readjusted to the RLT -10 safe range prior to rail temperatures exceeding those outlined in Table 1 below.

Table 1. Temperature When CWR (RNT) Must be Adjusted or Speed Restrictions Applied For Rail Breaks on One Rail Only

Rail Temperature (°F) at Which Rail Break or Cut Occurred	Rail Temperature (°F) at Which to Readjust or Apply Temporary Speed Restriction (TSR)
60	110*
50	110*
40	110*
30	110*
20	110*
10	110*
0	105*
-10	100*
-20	95*
-30	90*
*Table based on FRA/RSAC, but modified for MassDOT Rail and Transit Division requirements.	

Note: For the special case where both rails break and/or are cut within 200' of each other and when both rail's readjustment and permanent repairs are deferred to warm temperatures, the following formula shall apply:

T Return = (T RB1 + T RB2)/ 2 +70°F, and T Return shall not exceed 110°F.

(As an example, rail 1 breaks at 10°F, and rail 2 at 30° F, the return temperature is 90°F, and NOT as would be individually designated by Table 1)

(3) If rail RNT has not been adjusted prior to rail return temperatures exceeding the values in Table 1:

(i) **A temporary speed restriction (TSR) of not more than 25F/25P MPH shall be applied**, or

(ii) A temporary speed restriction of not more than 40F/40P MPH can be applied when a mandatory daily inspection is conducted during the heat of the day.

(iii) **If rail return temperatures do not exceed Table 1 values, the RNT shall be readjusted within 365 days.**

(4) The following data must be recorded on Form "TD" at the time of the break, pull-apart, and/or cut:

(i) Rail temperature at the time of the pull-apart/break/cut,

(ii) Gap size (as measured within ± 1/32"),

(iii) Rail size,

(iv) Tie type (wood or concrete),

(v) Anchor/fastener type (anchors or elastic fasteners); and the condition as described by "weak", "average", and "strong" as described below:

- Weak: missing anchors; the majority are not tight against the ties; evidence of rail slipping or moving longitudinally through anchors/clips;

crib ballast more than 2" below the tops of the ties; poor tie condition; more than half of the tie insulators are cracked, broken or not seated in the shoulder; tie pads are slipping or deteriorated; evidence of rail seat abrasion.

- Average: anchors are in place and tight against the ties; no evidence of rail creep; tie condition is good; full ballast section; most insulators are sound and seated correctly; tie pads are not worn or moving in the rail seat; no evidence of rail seat abrasion.
- Strong: new construction or relay rail with new anchors or fasteners; full ballast section and well consolidated AND which do not exhibit any of the "weak" or "average" characteristics.

(vi) The anchor pattern (every tie versus every other tie), and

(vii) If any "special conditions" apply* (see (5) below).

(5) Attachment A tables for the determination of pre-break/cut RNTs, do not apply for "special conditions" which are defined as:

(i) Breaks/cuts clustered in "close" proximity to each other on the same rail (i.e., within 800' of each other);

(ii) Breaks/cuts are within 400' of a "fixed" point; or

(iii) Breaks/cuts in iced rail/frozen ballast conditions.

(6) Use the tables in Attachment A to determine the pre-break/cut RNT, but note special conditions and/or exclusions (as above). Table 2 provides a guide as to the information found and where it is located in Attachment A (see below):

Table 2. Attachment A Table Use

Rail Base Size	Rail Weight	Anchorage Type	Attachment A Table to Use
6"	136/132	Every other tie anchored	1A
5-1/2"	115/100	Every other tie anchored	1B
6"	136/132	Every tie anchored*	2A*
5-1/2"	115/100	Every tie anchored*	2B*
* Use for concrete ties, and for wood ties with elastic fasteners.			

(7) 6" base rail found in Attachment A is currently the standard rail being purchased and installed by the MassDOT Rail and Transit Division.

(8) 5-½" base rail found in Attachment A was laid on MassDOT Rail and Transit owned rail lines and is still in track.

(c) **Procedures Used to Readjust Rail When A Service Failure Occurs and/or CWR Is Cut**

(1) The procedures used to readjust rail after a break or cut vary based upon Table 3's summary below.

Table 3 – RNT Readjustment Procedures Summary

APPLICATION	DESCRIPTION
Attachment A + Tables 1 & 2	Evaluation of pre-break/cut RNTs and return temperatures for adjustment. Results are required inputs Scenarios 1-3.
Scenario 1a	RNT readjustment procedure when repairing broken/defect cut rail when it can be performed at the time of break/cut. Such requires a pre-break/cut RNT in the RLT-10 range thus allowing rails to be pulled together through anchors and fasteners for an RNT restoration to RLT-10
Scenario 1b	Same as 1a, but when additional rail removal is required for readjustment, and when rail is pullable through anchors/fasteners. This Scenario provides additional rail removal required for RNT restoration to RLT-10
Scenario 2	Procedure for readjusting RNT after rail break/defect cut when interim repairs are required (such rail addition via plug) and when RNT readjustment are deferred for a later time as per Table 1 at which time conventional destressing of 780 ft of rail is required to RLT
Scenario 3	Readjustment procedure for special cases when Attachment A is NOT applicable. These include: (a) Multiple breaks on same rail within close proximity (800 ft) of each other (b) Breaks/cuts within 400 ft of fixed points (bridges, tunnels, crossings, switches/turnouts, etc.) (c) Extremely stiff, frozen rail/ballast conditions

Notes: (i) if for any reason in 1a or 1b the rail gap to be closed for adjustment is NOT pullable through anchors/fasteners, revert to Scenario 2, (ii) Scenario 3's (a) and (b) reverts to Scenario 2, and (iii) Scenario3's (c) is as indicated in Table 5

(2) **Scenario 1a: Breaks or cuts occurring when the pre-break/neutral temperature was within the RLT -10°F range when a permanent repair is possible**. Repairs can be made at the time of the break/cut by pulling rail ends together with a rail puller without any removal of anchors or clips. Attachment A is used to determine existing and final (repaired) RNT.

(3) **Scenario 1b: Breaks or cuts occurring when the pre-break/cut neutral temperature was below the RLT -10°F range when a permanent repair is possible by cutting additional rail out**. Repairs can be made at the time of the break/cut by pulling rail ends together with a rail puller without any removal of anchors or clips. Attachment A is used to determine extra rail to cut out, and existing and final (repaired) RNT. If repairs cannot be made by pulling, then see Scenario 2 under (4).

(4) **Scenario 2: Breaks or cuts occurring, when permanent repairs cannot be made at the time of the break/cut.** If a plug is added (RAIL IS ADDED), or the rail pulled together and bolted as an interim repair, then permanent repairs or adjustments to the RNT shall be made before reaching the rail return temperature in Table 1, and by distressing 780' of rail.

Note that under this Scenario:

(i) the readjustment here is to RLT (and NOT to RLT-10), and

(ii) the potential benefit of the single joint interim repair approach versus the plug rail (i.e., offering the 1 weld vs. 2 welds later upon readjustment), and

(iii) the interim benefit of rail pulled together approach's resetting reduced RNT to the pre-break value.

(5) **Scenario 3: For "Special Cases"** where breaks or cuts occur:

(i) in close proximity on the same rail, or;

(ii) near fixed structures, or;

(iii) in extremely stiff or frozen rail/ballast conditions.

NOTES:

(a) **IN THE ABOVE CASES, TABLES IN ATTACHMENT "A" DO NOT APPLY (I.E. PRE-BREAK/CUT RNTs CANNOT BE DETERMINED.)**

(b) **SCENARIO 3 ADJUSTMENT OF RLT IS AS GIVEN IN SCENARIO 2 (I.E. REQUIRING RETURN TEMPERATURES AS PER TABLE 1, AND UNFASTENING/DISTRESSING 390' OF RAIL ON EITHER SIDE OF THE BREAK/CUT, OR 780' TOTAL, WITH THE EXCEPTION OF (iii) WHICH ADOPTS TABLE 5 FOR DISTRESS LENGTHS). SEE BELOW.**

(d) **Recommended Procedures to Readjust Rail RNT.** The procedures used to readjust rail after a break and/or service failure or cut are given below for the above Scenarios:

(1) **Scenario 1a: Single Break/Cut Occurred when the RNT was Within 10° of the RLT (105°-10=95°F), when a permanent repair is possible at the time of break/cut. Note the following:**

(i) Rail can be pulled together through the anchors or fasteners and the gap can be closed. A minimal amount of anchors are removed around the service failure and/or at the cut in CWR.

(ii) Permanent repair is made when service failure is discovered or CWR is cut.

(iii) RNT is restored to within the range of RLT -10°F.

(iv) No rail is added.

(v) No additional repairs are required (except for repositioning displaced anchors/fasteners resulting from rail pulling).

(vi) Following are the steps to be followed when making a repair:

- Step 1: Obtain the rail temperature at the time of the break/cut, gap size, rail size, tie type (wood or concrete), anchor/fastener type, and the anchor pattern (every tie versus every other tie) and record on Form "TD."
- Step 2: Use Table 2 above to determine which table in Attachment A should be used to determine the pre-break/cut RNT.
- Step 3: determine if the pre-break/cut temperature is within 10°F of the RLT. If so, proceed to Step 5.
- Step 4: If not, proceed to Scenario 1b or 2 depending upon the conditions.
- Step 5: No adjustment is required for breaks or cuts that occurred when the pre-break/cut RNT was within the RLT -10°F. The gap can be closed using the following procedures:
  - Remove a limited number of anchors or fasteners (~5-10 ties) either side of the break/cut (to facilitate an easier rail pull).
  - Cut 1" for the weld allowance if the rail ends are to be welded.

- Use a rail puller to close the gap or to leave the 1" weld allowance. If the gap closes, apply joint bars or make the weld and record all pertinent data.
- If the gap does not close, close the gap by adding a plug rail. Record the gap size, temperature, and the rail added, and return later to readjust using Scenario (2).
- After applying joint bars or making the weld, record the gap size, pre-break/cut RNT, the restored RNT and rail temperature on Form "TD." Permanent repairs at the service failure, break and/or cut location shall be made within 30 days in accordance with FRA §213.119(c)(3).
- If working in a curve, proceed to check alignment to be sure rail has not chorded in after pulling rail with a rail puller. Realign if necessary.

(vii) Above procedure requires pulling rail through the anchors or fasteners; hence, needing sufficient puller/tensor capacity especially in concrete tie track or on wood ties with elastic fasteners. If puller capacity is not adequate or puller is not available, use procedures in Scenario 2

(viii) MassDOT Rail and Transit Division requires that all permanent repairs that can be made immediately (Scenario 1), be accomplished by adjusting RNT to at least RLT -10°F or 95°F.

(ix) ILLUSTRATIVE EXAMPLE OF SCENARIO 1a:

Consider a rail break or defect removal on wood tie, every other tie anchored (EOTA) 136# rail segment, when the rail broke/cut at 40°F, and the resulting gap size is 3 inches. How to make the repair/readjustment?

ANSWER: from Table 1a (ATTACHMENT "A") the pre-break cut RNT is: 99°F. This is within MassDOT's RLT-10 safe range (i.e. within 105 – 10), hence a candidate for Scenario 1a! After cutting an extra inch for the weld allowance, close the gap to the 1" weld gap via rail puller (without any anchor removal), and proceed to make the weld. Record all pertinent data, and be sure to reposition any moved/displaced anchors. Then the readjusted RNT here is 99°F.

Note: if for any reason the rail could not be pulled together, proceed to make an interim repair via a plug rail requiring adding 3" of rail, and then apply Scenario 2 to readjust before rail temperature exceed 110°F (as per Table 1)

(2) **Scenario 1b: Single Break/Cut RNT is below the RLT -10°F Range (<95°F), when a permanent repair is still possible. Note the following:**

(i) This is a modification of Scenario 1a as it requires more rail to be cut out to compensate for the RNT being below RLT -10°F. As such, this requires pulling rail together through "*larger*" gaps. The gap now consists of the sum of present break/cut gap, and the additional rail removal required to compensate for pre-break/cut RLT being below RLT -10°F as well as the 1" weld allowance if field welding. The **Required Steps When RNT is below RLT -10°F Range (<95°F):**

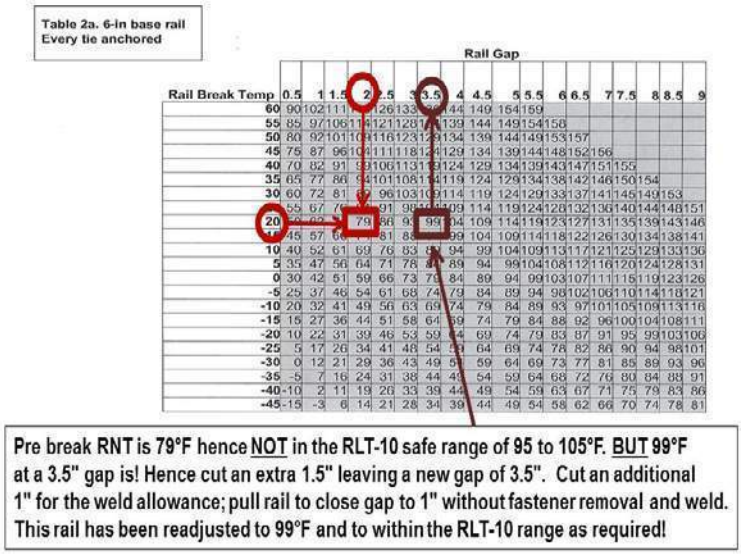
- Step 1: Measure/record the rail temperature at the time of the break/cut, gap size, rail size, tie type (wood or concrete), anchor/fastener type, and the anchor pattern (every tie versus every other tie) and record on Form "TD."

- Step 2: Use Table 2 information to choose appropriate table in Attachment A to determine the pre-break/cut RNT.
- Step 3: Determine if the pre-break/cut temperature is below the RLT -10°F. If so proceed to Step 4. If above the RLT -10°F range, proceed to Scenario 1a depending on the conditions and schedule readjustments in compliance with the rail return temperature in Table 1. **Step 4: Use the selected table in Attachment A to determine the *additional* amount of rail to cut out to readjust to at least 95°F.** Add this amount rail to be removed to the existing gap size plus the 1" weld allowance, if a weld is to be made. This is known as the final pull-gap amount (i.e., FG.).
- Step 5: Determine if FG is *pullable,* with the rail puller on site, to the 1" gap required for welding or closing the gap if joint bars are to be added, remembering that rail is to be pulled through the anchors/fasteners without removal. If gap is pullable, proceed to Step 6.
- Step 6: Cut out additional rail required for expansion and closing the joint by adding joint bars or by field welding. Pull rail through the anchors to close the gap for joint bars and/or leave 1" to close with a field weld.
- Step 7: If required gap cannot be closed, there are two possible temporary repairs. They are:
  - Only close the gap that was found in the field when the rail broke and/or was cut. The RNT will be the existing RNT when the rail broke and/or was cut as determined from Attachment A. Return to make permanent repair in accordance with Scenario 2 and Step 8.
  - If initial gap observed when rail broke and/or was cut cannot be closed, add rail by installing a plug rail. The RNT will be the existing rail temperature when the rail broke and/or was cut. Return to make permanent repair in accordance with Scenario 2.
- Step 8 After making permanent repairs as in Step 6, inspect fasteners and readjust (reposition anchors) where necessary so they are tight against the tie.
- Step 9: If working in a curve, proceed to check the alignment to determine if the rail has chorded in. Realign if necessary and or take appropriate remedial action.

(3) ILLUSTRATIVE EXAMPLE OF SCENARIO 1b:

Consider a 136# rail is cut for a defect removal at a rail temperature of 20°F in an every tie fastened rail segment resulting in a rail gap of 2". The territory's designated laying temperature is 105°F. How to make readjustment in line with the RLT-10 criterion at the time of defect cut?

Answer: apply Scenario 1b (as illustrated below)



(e) **Procedures to Readjust Rail RNT for Scenario 2**

(1) Scenario 2: Breaks or cuts occurring when permanent repairs cannot be made at the time of the break/cut. If a plug is added as an interim fix, then permanent repairs or adjustments to the RNT shall be made before reaching the rail return temperature in Table 1.

(i) Step 1: Use Attachment A Tables to document pre-break RNTs.

(ii) Step (2): **If a plug rail is cut in, record the amount of rail added on Form "TD."**

(iii) Step (3): A special requirement of Scenario 2 is to distress by removing anchors or clips on 390' of CWR on both sides of plug or joint (for a total of 780') when returning for repair, and readjusting to RLT of 105 **°F** (and not to RLT-10)

(2) ILLUSTRATIVE EXAMPLE OF SCENARIO 2:

Example: a 136# rail is cut for a defect removal at a rail temperature of 20°F in a concrete tie territory resulting in a rail gap of 2". The territory's designated laying temperature is 105°F. Scenario 1b was attempted but the rail could not be pulled together to close the 3.5"gap (see example above). How to proceed?

ANSWER: follow Scenario 2 (with Options 1 or 2 below):

OPTION 1 - in case rail could not be pulled together to close the 3.5" gap, the procedure is to apply Scenario 2. This requires recording/documenting all pertinent data, and making interim plug repair of adding 2" of rail and applying Table 1 to establish return temperature for adjustment (i.e. in this case prior to rail temperatures exceeding 110°F). Return at or prior to this rail temperature and make adjustment as per Scenario 2 which requires adjustment by destressing via unfastening ± 390 ft of rail (total of 780 ft).

OPTION 2 - instead of making interim plug repair of adding 2" of rail as per above, consider pulling rail together through the 2" gap (without unfastening) and closing rail via bolted joint. This restores RNT to 79°F. It is still required to return for a later adjustment, but Table 1 doesn't apply anymore in this case, hence more flexibility on when to return for the final adjustment. The required unfastening length is still ±390ft (780ft total).

Note: Option 2 has the benefit of some immediate *partial RNT restoration* (thereby offering some interim safety against a buckling potential during the onset of warm temperatures), and an easier final adjustment of requiring one weld versus two.

(f) **Procedures to Readjust Rail RNT for Scenario 3 (Special Cases) when:**

(1) Case 1: Multiple breaks/cuts occurring in "close" proximity on the same rail (i.e., within 800' of each other).

(2) Case 2: Breaks/cuts within 400' of "fixed structures/locations."

(3) Case 3: Breaks/cuts in iced rail/frozen ballast conditions.

(4) Case 4: Where the break/cut occurs on both rails within 200' of each other.

(5) For detailed readjustment procedure for Special Cases 1 and 2 above refer to conventional distressing procedure and application of Scenario 2 as in (e) above, requiring the adjustment of 780' of rail and cutting rail out as dictated by the temperature differential (TD).

(6) Use Table 4 below with the caveat that additional rail removal may be required if the end points at ±390 are measured to be moving in when applying the rail puller to close the gap.

Table 4. Special Cases: Additional Rail to Remove for Readjustment for the 780' of Unfastening Length

Temperature Differential (°F)*	Additional Rail to Remove (inches)
5	1/4
10	1/2
15	1
20	1-1/4
25	1-1/2
30	1-3/4
35	2-1/4
40	2-1/2
45	2-3/4
50	3-1/4
55	3-1/2
60	3-3/4
65	4
70	4-1/2
*MassDOT Rail and Transit Division Preferred Rail Laying Temperature (RLT=105°F)	

Note: The above procedures for Scenario 2 and Scenario 3"s Special Cases 1 and 2 are based on best practice engineering assumption, that for **all** rail break/defect cut/pull-apart cases, **one** unfastening length of 390' on either side of the cut/break is adequate for readjustments. Although some break/cut influence zones can be longer, hence requiring longer unfastening lengths, the 780' total length is an acceptable "best practice" compromise. For "*bad*" breaks (i.e., break gaps exceeding 3"), longer unfastening lengths are recommended. Additionally, note that the above Scenario 2 procedure readjusts to RLT instead of the RLT -10°F value! This is for "added safety" to counteract the "*one unfastening length of ± 390' satisfying all break/cut influence zone"* assumption.

(g) **Procedures to Readjust Rail RNT Scenario 3:** For Special Case 3 (breaks/cuts in frozen rail/ballast conditions):

(1) Apply Scenario 2 as per (e) above; however, the recommended unfastening lengths are reduced as per Table 5 below.

(2) Use Form "RC" in Attachment E to calculate the required expansion amounts that correspond to the unfastening lengths given in Table 5.

Table 5. Unfastening Lengths for Frozen Ballast Conditions

Measured Gap Size (in) when Broke/Cut	Unfastening Length (ft) in Each Direction
<1/2	100
½ - 1	150
>1	200

(h) **Procedures to Readjust Rail RNT Scenario 3:** For Special Case 4 where the break/cut occurs on both rails within 200' of each other.

(1) Use Scenarios 1-3 as applicable for rail breaks on each individual rail.

(2) The return/readjustment time (return rail temperature) given in Table 1 is not applicable for this Special Case 4 when both rails have breaks in close proximity (within 200' of each other).

(3) The following formula must be used to determine the "return rail temperature."

$$T_{RETURN} = (T_{RB_1} + T_{RB_2})/2 + 70°F$$

Where T_{RB1} is the rail break temperature of one rail, and T_{RB2} is the rail break temperature of the other (opposite) rail.

(4) Example: One rail breaks or is cut for defect removal at 10°F and left for a later adjustment in line with Scenarios 2 or 3. The other rail breaks or is cut later at 30°F which is also deferred for later return adjustment. If both repairs were not made at the time of the rail break and/or cut, but were deferred to at a later date, then the return temperature is at/below a rail temperature of 90°F. The calculation is shown below:

T_{RETURN} = (10°F +30°F)/2 + $70°F$ or 20°F+70°F = 90°F

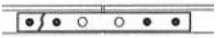
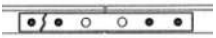
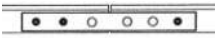
Note that this is a lower return temperature than either individual breaks/cut temperature given by Table 1.

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ATTACHMENT D

JOINT DEFECT GUIDELINES / MAXIMUM ALLOWABLE TEMPORARY SPEED RESTRICTIONS (TSR's)

Joint Defect Guidelines in CWR Track

Condition	FRA Part 213 Reference	Illustration****	Action
One Broken Joint Bar Not Between Middle Holes	§213.121(b) §213.121(e)		10F/15P MPH* (per FRA §213.9(b))
One Broken Joint Bar Between Middle Holes	§213.121(c)		Out of Service until Repaired (per FRA §213.9(b)) and Visually Supervise**
Both Joint Bars Broken Not Between Middle Holes	§213.121(b) §213.121(e)		10F/15P MPH* (per FRA §213.9(b))
Both Joint Bars Broken Between Middle Holes	§213.121(c)		Out of Service until Repaired (per FRA §213.9(b))and Visually Supervise**
Less than Two Bolts in Rail End	§213.121(e)		10F/15P MPH* (per FRA §213.9(b))
Unbolted Rail End Pulled Apart 1-1/2" - 2"	§213.121(e)		Inspect (per FRA §213.9(b)) Repair within 24 hrs.
Unbolted Rail End Pulled Apart 2" - 4"	§213.121(e)		Visually Supervise** Must maintain continuous communications w/train crew (per FRA §213.9(b)) Repair within 24 hrs.
Unbolted Rail End Pulled Apart >4"	§213.121(e)		Out of Service until Repaired

Notes:

* All speeds shown are maximum allowable. Qualified employees may impose more stringent remedial action (FRA §231.7(a)(b)(c)(d)), depending on the presence of a combination of defects or particular site conditions.

** "Visually supervise" means that an employee qualified under FRA §213.7(a)(b)(c) must observe each operation over the defect and/or in accordance with FRA §213.7(d).

*** Solid circle is bolt hole with bolt. Open circle is bolt hole without bolt.

**** Track surface and joint tie conditions shall be considered when determining temporary slow order (TSO) maximum speeds.

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ATTACHMENT E

PREPARATION OF FORMS

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FORM "TD"
REPORT OF DISTURBANCE OF CWR TRACK

Part A: CWR Track Disturbance Due to Track Work					
Route:		**Date:**		**Rail Temp**	**Time:**
M.P. Location From:		**To:**		**Track No:**	
Type of Work Performed:					
Additional Repairs Required:					
Remedial Action Required:					
Part B: Rail Cut Or Service Failure in CWR Territory					
Route:		**Date:**		**Rail: North / South / East / West**	
M.P. Location From:		**To:**		**Track No:**	
Type of Work Performed:					
Additional Repairs Required:					
Remedial Action Required:					
Operating Railroad Employee (Print):					
Operating Railroad Employee (Signature):					

ATTACHMENT E

**INSTRUCTIONS FOR PREPARATION OF THE
REPORT OF DISTURBANCE OF CWR TRACK (FORM "TD")**

A report of disturbed track , Form "TD", shall be made out as required by Section 10.0. The report will be completed and signed by the Contractor/Operating Railroad Employee in charge of the work as follows:

Part A - This part will be completed in its entirety any time heavy maintenance work is performed on CWR track. See Section 6.0, "Trackwork that Disturbs CWR Track and the Protection of Disturbed Track" for the information required on Form "TD", Part A.

Part B - This part will be completed any time main track CWR is cut or broken and/or there is a service failure.

A. See Section 5.0, "Maintenance of the Desired Rail Neutral Temperature in Previously Installed CWR" for the information required on Form "TD", Part B.

B. See Attachment C, "Recommended Procedures for Readjusting Continuous Welded Rail (CWR), After a Break, Pull-Apart (Service Failure) or Cut Below the Target Rail Laying Temperature (105°F)" for the information required on Form "TD", Part B.

C. See Attachment A, "Determination of Estimate of Pre-Break/Pre-Cut Neutral Temperature for a Service Failure in CWR" for the information required on Form "TD", Part B.

Parts A & B

A. Form "TD" shall be filled out in accordance with Section 10.0, "Reporting Requirements for CWR Track."

B. Form "TD" shall be filled out and kept by the Operating Railroad in accordance with Section 11.0, "Record Keeping."

FORM "TM"
REPORT OF TRACK MOVEMENT: CURVES ≥3°

Route:		**Type of Work Performed*:**	**Surfacing ☐ Install Ties ☐**	**Date of Work:**	
M.P. Location :	**From:**		**To:**	**Track No:**	
Curve No:		**Degree of Curve:**		**Elevation:**	
Rail Temperature at which Surfacing Tie Installation was Done:					

Distance from Reference
(Reference Points Must be no Further than 200 ft. apart):

Reference Point Number	Location of Reference Point	Before Work	After Work	Movement	Within 7 Days	Movement
TS (Tangent to Spiral Tag)						
SC (Spiral to Curve Full Body Tag)						
Additional Full Body Tag As Required**						
Additional Full Body Tag As Required**						
CS (Curve to Spiral Full Body Tag)						
ST (Spiral to Tangent Tag)						
Uniform Movement	----------	----------				

***Types of work that requires a Form "TD." Out-of-face surfacing and alinement and installing more than 540 ties per mile.**

Railroad Employee Making Measurements (Print Name): _____

Railroad Employee Making Measurements (Signature): _____

Railroad Employee in Charge of Surfacing (Print Name): _____

Railroad Employee in Charge of Surfacing (Signature): _____

**Use additional sheets if the number of stations exceeds the number of lines.

ATTACHMENT E

INSTRUCTIONS FOR PREPARATION OF THE REPORT OF TRACK MOVEMENT DUE TO SURFACING OR OUT-OF-FACE TIE RENEWAL (FORM "TM")

(a) In curves of 3° or over, prior to the start of high speed surfacing, or installing more than 540 ties per mile, the Operating Railroad and/or Contractor shall set reference points each curve at the locations given on Form "TM" along the gage side of the high rail of the curve.

In no case may the points be more than 200' apart.

(1) In no case will the points be more than 200' apart.

(2) In addition, offset stakes shall be set at each of the reference mark locations. These stakes will be set to the outside (high side) of the track, and out of the way of regulators or other equipment.

(3) In multiple track locations, a mark on the high rail or a tack in a tie on an adjacent and/or parallel track, may be used as an offset location.

(4) Adjacent and/or parallel tracks may be used for offset locations only if the track is not to be disturbed or will have any maintenance work performed when it is being used as for offset locations.

(5) Initial measurements shall be made from the reference points to the offset locations before any heavy maintenance work (The "Work") is performed and shall be recorded on Form "TM".

(b) Immediately after completion of the Work, the Operating Railroad Employee in charge of the track surfacing or tie installation will again measure and record the distances from the reference point to the offset locations. Both the distances and any movement shall be recorded on Form "TM".

(c) Within seven days after the Work, the Operating Railroad will again measure and record the distance from the reference point to the offset locations. Again, both distances and movement shall be recorded on Form "TM".

(d) If the curve has moved and/or chorded in at any location is 3" or more (≥3"), the curve shall be distressed by lining out and/or distressing the rail prior.

(e) The lining out of the curve and/or distressing of the curve shall be accomplished before:

(1) If the ambient temperature is greater than 80°F (rail temperature greater than a temperature of 110°F), no work shall be done unless it is an emergency or as directed by MassDOT Rail and Transit Division and; or

(2) If the ambient temperature and/or rail temperature is less than 40°F, all work will be suspended unless it is an emergency or directed by the MassDOT Field Representative.

(f) **Temporary Speed Restriction:** A temporary speed restriction (TSR) shall be placed if the curve has moved inward 3" or more in accordance with Section 6(e), until the curve is lined out and/or distressed. The curve will be considered to have lost its neutral temperature if movement is recorded as given below:

Curves 3° and Over	Measured Curve Movement that Requires Lining Out the Curve and/or Distressing the Rail
	3" or greater (≥3") to the inside

FORM "JE"
REPORT OF JOINT ELIMINATION BY FIELD WELDING
THERMITE (T) / FLASH BUTT (FB)

Track Name/No.	Rail (N/S/E/W)	MP	Rail Weight	Date/ Weld No.	Field Weld Type(2)	Mold Date	Portion Date	Weld Company/ Welder's Name	Weather/ Rail Temp °F	Rail Cut Out / or Consumed and/or Added (Inches)	Remarks	Weld Inspections			Results
												Date Inspected	Inspection Company	Test Results	

Notes:
(1) Reason for weld:
EJ – Eliminate Joint
EPR – Eliminate Plug Rail
EDW – Eliminate Defective Weld
RNT – Increase Rail Neutral Temperature
(2) Field Weld Types:
T – Thermite
FB – Flash butt
(3) A Form "TD" shall be made out when rail is cut and/or broken.

Operating Railroad Contractor's Signature: _____ **Date:** _____

Operating Railroad Contractor's Name (Print): _____

ATTACHMENT E

INSTRUCTIONS FOR THE PREPARATION OF THE REPORT OF JOINT ELIMINATION BY FIELD WELDING (FORM "JE")

(a) A Report of Joint Elimination by Field Welding shall be made out as required in Section 10.0. The report shall be completed by the Contractor/Operating Railroad Employee in charge of the work.

FORM "RC"
REPORT OF RAIL CLIPPING/ANCHORING

Operating Railroad/Contractor:	**Weather:**
Line Segment:	**Copy sent to MassDOT Rail and Transit Division (Yes/No)"**

Date	Rail[6]	String Number	Start MP	End MP	String Length (Feet)	Rail Temp (°F)[(1)]	Required Temp. Change (°F)[(2)]	Required Expansion (Inches)[(3)]	Method of Expansion[(5)]	String Vibrated (Y/N)	Time Started/ Finished Clipping	Actual Expansion Recorded (Inches) Obtained at ¼ Points[(4)]				Notes
												1/4	1/2	3/4	Full	

Notes:
(1) Temperature to be measured with approved rail thermometer.
(2) Required temperature change in °F is preferred RNT of 105°F minus the actual rail temperature at the time of expansion.
(3) See formula and table on reverse side of Form.
(4) After string is anchored and/or clipped.
(5) Method of Expansion: Natural (N); Rail Heater (RH); Rail Puller (RP); Cooled (C).
(6) Rail locations" N, S, E, W

Operating Railroad Contractor's Signature: _____ **Date:** _____

Operating Railroad Contractor's Name (Print): _____

ATTACHMENT E

INSTRUCTIONS FOR THE PREPARATION OF THE REPORT OF RAIL CLIPPING/ANCHORING (FORM "RC")

Formula for Coefficient of Linear Expansion of Rail:

$A = 0.000078 \times (T_D - T_E) \times L$

A	=	Adjustment or Required Expansion amount for rail string (in inches)
T_D	=	Desired RNT which should be 105°F if possible as conditions permit
T_E	=	Existing or Actual Rail Temperature (°F) prior to heating or expansion measured with an approved rail thermometer
L	=	Length of string to be adjusted (in feet)

Calculations:

Change In Rail Length Due to Change In Rail Temperature

A = Change In Rail Length In Inches = 0.000078ΔT x L
L = Length of Rail to be Expanded in Feet
ΔT = Change in Temperature in Degrees Fahrenheit: Desired RNT minus Actual Rail Temperature

Length of Rail (ft)	Change in Temperature in Degrees Fahrenheit															
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
	Change in Rail Length in Inches															
100	1/8	1/8	1/8	1/4	1/4	1/4	3/8	3/8	3/8	1/2	1/2	1/2	5/8	5/8	5/8	5/8
200	1/8	1/4	1/4	3/8	1/2	1/2	5/8	5/8	3/4	7/8	7/8	1	1-1/8	1-1/8	1-1/4	1-1/4
300	1/8	1/4	3/8	1/2	5/8	3/4	7/8	1	1-1/8	1-1/4	1-3/8	1-1/2	1-5/8	1-3/4	1-7/8	1-7/8
400	1/4	3/8	1/2	5/8	7/8	1	1-1/8	1-1/4	1-1/2	1-5/8	1-3/4	1-7/8	2-1/8	2-1/4	2-3/8	2-1/2
500	1/4	1/2	5/8	7/8	1	1-1/4	1-3/8	1-5/8	1-7/8	2	2-1/4	2-3/8	2-5/8	2-3/4	3	3-1/8
600	1/4	1/2	3/4	1	1-1/4	1-1/2	1-3/4	1-7/8	2-1/8	2-3/8	2-5/8	2-7/8	3-1/8	3-3/8	3-5/8	3-3/4
700	3/8	5/8	7/8	1-1/8	1-3/8	1-3/4	2	2-1/4	2-1/2	2-3/4	3-1/8	3-3/8	3-5/8	3-7/8	4-1/8	4-3/8
800	3/8	5/8	1	1-1/4	1-5/8	1-7/8	2-1/4	2-1/2	2-7/8	3-1/8	3-1/2	3-3/4	4-1/8	4-3/8	4-3/4	5
900	3/8	3/4	1-1/8	1-1/2	1-7/8	2-1/8	2-1/2	2-7/8	3-1/4	3-5/8	3-7/8	4-1/4	4-5/8	5	5-3/8	5-5/8
1000	1/2	7/8	1-1/4	1-5/8	2	2-3/8	2-3/4	3-1/8	3-5/8	4	4-3/8	4-3/4	5-1/8	5-1/2	5-7/8	6-1/4
1100	1/2	7/8	1-3/8	1-3/4	2-1/4	2-5/8	3-1/8	3-1/2	3-7/8	4-3/8	4-3/4	5-1/4	5-5/8	6-1/8	6-1/2	6-7/8
1200	1/2	1	1-1/2	1-7/8	2-3/8	2-7/8	3-3/8	3-3/4	4-1/4	4-3/4	5-1/4	5-5/8	6-1/8	6-5/8	7-1/8	7-1/2
1300	5/8	1-1/8	1-5/8	2-1/8	2-5/8	3-1/8	3-5/8	4-1/8	4-5/8	5-1/8	5-5/8	6-1/8	6-5/8	7-1/8	7-5/8	8-1/8
1400	5/8	1-1/8	1-3/4	2-1/4	2-3/4	3-3/8	3-7/8	4-3/8	5	5-1/2	6-1/8	6-5/8	7-1/8	7-3/4	8-1/4	8-3/4
1440	5/8	1-1/8	1-3/4	2-1/4	2-7/8	3-3/8	4	4-1/2	5-1/8	5-5/8	6-1/4	6-3/4	7-3/8	7-7/8	8-1/2	9
1600	5/8	1-1/4	1-7/8	2-1/2	3-1/8	3-3/4	4-3/8	5	5-5/8	6-1/4	6-7/8	7-1/2	8-1/8	8-3/4	9-3/8	10

FORM "CWR"

REPORT OF SEMI-ANNUAL INSPECTION (SPRING/FALL) OF CWR TRACK

Operating Railroad/Contractor:	**Weather:**
Line Segment:	**Copy sent to MassDOT Rail and Transit Division (Yes/No):**

Track No.	Rail (N/S/E/W)	MP (Start)	MP (Finish)	Ties		Ballast		Anchors			Longitudinal Rail Movement					Remarks/ Remedial Action Required
				Type	Condition	Crib	Shoulder	Type	Pattern	Position	Turnouts	Crossovers	Grade X-ings	Open Deck Bridges	Other	

Operating Railroad Contractor's Signature: _____ **Date:** _____

Operating Railroad Contractor's Name (Print): _____

ATTACHMENT E

INSTRUCTIONS FOR THE PREPARATION OF THE
REPORT OF SEMI-ANNUAL INSPECTION (SPRING/FALL) OF CWR TRACK

(FORM "CWR")

(a) A Report of Semi-Annual Inspection (Spring/Fall) of CWR Tack shall be filled out as required in Section 10.0. The report shall be completed by the Operating Railroad Employee making the inspection.

ATTACHMENT F

TORCH CUTTING RAIL (FIGURE/REMARKS)

(a) General: Cutting Continuous Welded Rail (CWR) In Compression:

(1) Cut rail with a torch any time the existing rail temperature is suspected of being above the Rail Neutral Temperature (RNT) and/or the rail is in tension.

(2) Rail in compression has many forms to include:

(i) Tight rail

(ii) Nervous/wavy rail

(iii) Kinky rail

(iv) Misaligned track

(v) Buckled track

(3) The area where the rail is in compression may exhibit the following characteristics:

(i) Rail is lifting out of the tie plates; or,

(ii) Rail is bunching and/or crowding shoulders of the tie plates; or,

(iii) Rail is moving longitudinally in anchors and/or elastic fasteners; or,

(iv) Ties are skewing; or,

(v) Crib and/or shoulder ballast is pushing due to longitudinal and/or lateral track movement; or,

(vi) There are numerous consecutive high spikes; or

(vii) The rail appears to be kinking; or

(viii) One rail appears to be straighter than the other opposite rail; or

(ix) There is noticeable variation in track gage.

(b) The Contractor and Operating Railroad shall have their own specific Safety Procedures developed for torch cutting rail.

(c) The Contractor and/or Operating Railroad shall designate personnel that are qualified and are trained on an annual basis to torch cut rail using the above Safety Procedures.

(d) Minimum Recommended Procedures When Torch Cutting CWR:

(1) Locate the area where the rail appears to be in compression; and

(2) If the track is already misaligned and/or buckled:

(i) Line track out at misalignment and/or buckle to reduce compressive stresses in the rail; and

(ii) Make cut away from misalignment and/or buckle area to make cut in an area of potentially reduced compressive forces.

(3) In all cases, make the torch cut, as shown below, before removing any spikes, lags or fasteners; and

(4) In all cases, make the torch cut, as shown below, before removing any joints and/ or anchors or elastic fasteners; and,

(5) In all cases, make the torch cut in the rail as described and shown below.

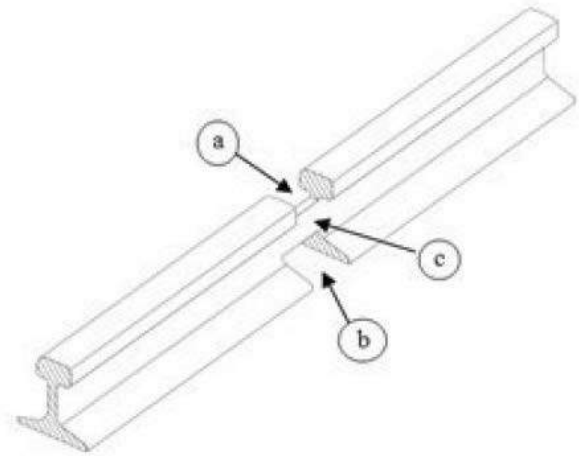
(e) Torch Cutting Rail In Compression: Use the so called “H” Pattern Method:

(1) First, cut and remove the rail head as shown in “a”; then

(2) Second, cut and remove both sides of the base as shown in “b”; then

(3) Third, cut and remove the remaining portion of the web from the top of the web near the rail head towards the base of the rail as shown in “c”.

(4) Note: Removing the rail head and then both sides of the rail base, before removing the web of the rail, is preferred, in order, if possible, to minimize excessive vertical and/or lateral movement of the rail when the rail is cut.



(f) After Torch Cutting Rail:

(1) If the rail that is torch cut is to be field welded and/or jointed:

(i) Trim or cut back the torch cut rail ends with a rail saw.

(ii) Remove all indication of the torch cut and/or heat affected zone which can be accomplished by:

- Cutting back a minimum of 2" behind the torch cut on each rail end (AREMA Chapter 4); and/or
- Cutting back the heat affected zone from behind the torch cut on each rail end;
- Use whichever cut back amount is larger.

(iii) Also see Attachment B, Paragraph (g) “Torch Cutting CWR in Track.”



APPENDIX B

UNDERBALANCE TABLES
MAXIMUM ALLOWABLE OPERATING SPEED ON CURVES

APPENDIX B

UNDERBALANCE TABLES
MAXIMUM ALLOWABLE OPERATING
SPEED ON CURVES

Page

Table 1 3" Underbalance Table..... B-1

Notes:

(a) The enclosed tables can be used to determine V_{max} in accordance with FRA §213.57.

(b) The Chief Engineer shall maintain a list of curves and the designated “underbalance” to be used.

(c) To operate at speeds which use “underbalance” greater than 3", the equipment must be qualified and approved by the Federal Railroad Administration.

(d) The Chief Engineer shall authorize all elevations in excess of 4".

Table 1.
Maximum Allowable Operating Speed on Curves
Underbalance = 3" (E_u)

Degree Curve (D)[1]	Degree Curve (D)[2]	Superelevation in inches (E_a)			
		0-0	0-1/4	0-1/2	0-3/4
		Speed in Miles Per Hour (V_{max})			
0° 10'	0.17	90	90	90	90
0° 20'	0.33	90	90	90	90
0° 30'	0.50	90	90	90	90
0° 40'	0.67	80	83	86	89
0° 50'	0.83	71	74	77	80
1° 00'	1.00	65	68	70	73
1° 15'	1.25	58	60	63	65
1° 30'	1.50	53	55	57	59
1° 45'	1.75	49	51	53	55
2° 00'	2.00	46	48	50	51
2° 15'	2.25	43	45	47	48
2° 30'	2.50	41	43	44	46
2° 45'	2.75	39	41	42	44
3° 00'	3.00	37	39	40	42
3° 15'	3.25	36	37	39	40
3° 30'	3.50	34	36	37	39
3° 45'	3.75	33	35	36	37
4° 00'	4.00	32	34	35	36
4° 15'	4.25	31	33	34	35
4° 30'	4.50	30	32	33	34
4° 45'	4.75	30	31	32	33
5° 00'	5.00	29	30	31	32
5° 30'	5.50	27	29	30	31
6° 00'	6.00	26	27	28	29
6° 30'	6.50	25	26	27	28
7° 00'	7.00	24	25	26	27
7° 30'	7.50	23	24	25	26
8° 00'	8.00	23	24	25	25
8° 30'	8.50	22	23	24	25
9° 00'	9.00	21	22	23	24
9° 30'	9.50	21	22	22	23
10° 00'	10.00	20	21	22	23
10° 30'	10.50	20	21	21	22
11° 00'	11.00	19	20	21	22
11° 30'	11.50	19	20	20	21
12° 00'	12.00	18	19	20	21
12° 30'	12.50	18	19	20	20
13° 00'	13.00	18	18	19	20
13° 30'	13.50	17	18	19	19
14° 00'	14.00	17	18	18	19
14° 30'	14.50	17	17	18	19
15° 00'	15.00	16	17	18	18

[1] In degrees and minutes
[2] In decimals

Table 1.
Maximum Allowable Operating Speed on Curves
Underbalance = 3" (E_u)

Degree Curve (D)[1]	Degree Curve (D)[2]	Superelevation in inches (E_a)			
		1	1-1/4	1-1/2	1-3/4
		Speed in Miles Per Hour (V_{max})			
0° 10'	0.17	90	90	90	90
0° 20'	0.33	90	90	90	90
0° 30'	0.50	90	90	90	90
0° 40'	0.67	90	90	90	90
0° 50'	0.83	82	85	87	90
1° 00'	1.00	75	77	80	82
1° 15'	1.25	67	69	71	73
1° 30'	1.50	61	63	65	67
1° 45'	1.75	57	58	60	62
2° 00'	2.00	53	55	56	58
2° 15'	2.25	50	51	53	54
2° 30'	2.50	47	49	50	52
2° 45'	2.75	45	46	48	49
3° 00'	3.00	43	44	46	47
3° 15'	3.25	41	43	44	45
3° 30'	3.50	40	41	42	44
3° 45'	3.75	39	40	41	42
4° 00'	4.00	37	38	40	41
4° 15'	4.25	36	37	38	39
4° 30'	4.50	35	36	37	38
4° 45'	4.75	34	35	36	37
5° 00'	5.00	33	34	35	36
5° 30'	5.50	32	33	34	35
6° 00'	6.00	30	31	32	33
6° 30'	6.50	29	30	31	32
7° 00'	7.00	28	29	30	31
7° 30'	7.50	27	28	29	30
8° 00'	8.00	26	27	28	29
8° 30'	8.50	25	26	27	28
9° 00'	9.00	25	25	26	27
9° 30'	9.50	24	25	26	26
10° 00'	10.00	23	24	25	26
10° 30'	10.50	23	24	24	25
11° 00'	11.00	22	23	24	24
11° 30'	11.50	22	22	23	24
12° 00'	12.00	21	22	23	23
12° 30'	12.50	21	22	22	23
13° 00'	13.00	20	21	22	22
13° 30'	13.50	20	21	21	22
14° 00'	14.00	20	20	21	22
14° 30'	14.50	19	20	21	21
15° 00'	15.00	19	20	20	21

[1] In degrees and minutes
[2] In decimals

Table 1.
Maximum Allowable Operating Speed on Curves
Underbalance = 3" (E_u)

Degree Curve (D)[1]	Degree Curve (D)[2]	Superelevation in inches (E_a)			
		2	2-1/4	2-1/2	2-3/4
		Speed in Miles Per Hour (V_{max})			
0° 10'	0.17	90	90	90	90
0° 20'	0.33	90	90	90	90
0° 30'	0.50	90	90	90	90
0° 40'	0.67	90	90	90	90
0° 50'	0.83	90	90	90	90
1° 00'	1.00	84	86	88	90
1° 15'	1.25	75	77	79	81
1° 30'	1.50	69	70	72	74
1° 45'	1.75	63	65	67	68
2° 00'	2.00	59	61	62	64
2° 15'	2.25	56	57	59	60
2° 30'	2.50	53	54	56	57
2° 45'	2.75	50	52	53	54
3° 00'	3.00	48	50	51	52
3° 15'	3.25	46	48	49	50
3° 30'	3.50	45	46	47	48
3° 45'	3.75	43	44	45	46
4° 00'	4.00	42	43	44	45
4° 15'	4.25	40	42	42	43
4° 30'	4.50	39	40	41	42
4° 45'	4.75	38	39	40	41
5° 00'	5.00	37	38	39	40
5° 30'	5.50	36	36	37	38
6° 00'	6.00	34	35	36	37
6° 30'	6.50	33	33	34	35
7° 00'	7.00	31	32	33	34
7° 30'	7.50	30	31	32	33
8° 00'	8.00	29	30	31	32
8° 30'	8.50	28	29	30	31
9° 00'	9.00	28	28	29	30
9° 30'	9.50	27	28	28	29
10° 00'	10.00	26	27	28	28
10° 30'	10.50	26	26	27	27
11° 00'	11.00	25	26	26	27
11° 30'	11.50	24	25	26	26
12° 00'	12.00	24	25	25	26
12° 30'	12.50	23	24	25	25
13° 00'	13.00	23	24	24	25
13° 30'	13.50	23	23	24	24
14° 00'	14.00	22	23	23	24
14° 30'	14.50	22	22	23	23
15° 00'	15.00	21	22	22	23

[1] In degrees and minutes
[2] In decimals

Table 1.
Maximum Allowable Operating Speed on Curves
Underbalance = 3" (E_u)

Degree Curve (D)[1]	Degree Curve (D)[2]	Superelevation in inches (E_a)			
		3	3-1/4	3-1/2	3-3/4
		Speed in Miles Per Hour (V_{max})			
0° 10'	0.17	90	90	90	90
0° 20'	0.33	90	90	90	90
0° 30'	0.50	90	90	90	90
0° 40'	0.67	90	90	90	90
0° 50'	0.83	90	90	90	90
1° 00'	1.00	90	90	90	90
1° 15'	1.25	82	84	86	87
1° 30'	1.50	75	77	78	80
1° 45'	1.75	69	71	72	74
2° 00'	2.00	65	66	68	69
2° 15'	2.25	61	62	64	65
2° 30'	2.50	58	59	60	62
2° 45'	2.75	55	56	58	59
3° 00'	3.00	53	54	55	56
3° 15'	3.25	51	52	53	54
3° 30'	3.50	49	50	51	52
3° 45'	3.75	47	48	49	50
4° 00'	4.00	46	47	48	49
4° 15'	4.25	44	45	46	47
4° 30'	4.50	43	44	45	46
4° 45'	4.75	42	43	44	45
5° 00'	5.00	41	42	43	43
5° 30'	5.50	39	40	41	41
6° 00'	6.00	37	38	39	40
6° 30'	6.50	36	37	37	38
7° 00'	7.00	34	35	36	37
7° 30'	7.50	33	34	35	35
8° 00'	8.00	32	33	34	34
8° 30'	8.50	31	32	33	33
9° 00'	9.00	30	31	32	32
9° 30'	9.50	30	30	31	31
10° 00'	10.00	29	29	30	31
10° 30'	10.50	28	29	29	30
11° 00'	11.00	27	28	29	29
11° 30'	11.50	27	27	28	28
12° 00'	12.00	26	27	27	28
12° 30'	12.50	26	26	27	27
13° 00'	13.00	25	26	26	27
13° 30'	13.50	25	25	26	26
14° 00'	14.00	24	25	25	26
14° 30'	14.50	24	24	25	25
15° 00'	15.00	23	24	24	25

[1] In degrees and minutes
[2] In decimals

Table 1.
Maximum Allowable Operating Speed on Curves
Underbalance = 3" (E_u)

Degree Curve (D)[1]	Degree Curve (D)[2]	Superelevation in inches (E_a)			
		4	4-1/4	4-1/2	4-3/4
		Speed in Miles Per Hour (V_{max})			
0° 10'	0.17	90	90	90	90
0° 20'	0.33	90	90	90	90
0° 30'	0.50	90	90	90	90
0° 40'	0.67	90	90	90	90
0° 50'	0.83	90	90	90	90
1° 00'	1.00	90	90	90	90
1° 15'	1.25	89	90	90	90
1° 30'	1.50	81	83	84	85
1° 45'	1.75	75	76	78	79
2° 00'	2.00	70	71	73	74
2° 15'	2.25	66	67	69	70
2° 30'	2.50	63	64	65	66
2° 45'	2.75	60	61	62	63
3° 00'	3.00	57	58	59	60
3° 15'	3.25	55	56	57	58
3° 30'	3.50	53	54	55	56
3° 45'	3.75	51	52	53	54
4° 00'	4.00	50	50	51	52
4° 15'	4.25	48	49	50	51
4° 30'	4.50	47	47	48	49
4° 45'	4.75	45	46	47	48
5° 00'	5.00	44	45	46	47
5° 30'	5.50	42	43	44	44
6° 00'	6.00	40	41	42	42
6° 30'	6.50	39	39	40	41
7° 00'	7.00	37	38	39	39
7° 30'	7.50	36	37	37	38
8° 00'	8.00	35	35	36	37
8° 30'	8.50	34	34	35	36
9° 00'	9.00	33	33	34	35
9° 30'	9.50	32	33	33	34
10° 00'	10.00	31	32	32	33
10° 30'	10.50	30	31	31	32
11° 00'	11.00	30	30	31	31
11° 30'	11.50	29	30	30	31
12° 00'	12.00	28	29	29	30
12° 30'	12.50	28	28	29	29
13° 00'	13.00	27	28	28	29
13° 30'	13.50	27	27	28	28
14° 00'	14.00	26	27	27	28
14° 30'	14.50	26	26	27	27
15° 00'	15.00	25	26	26	27

[1] In degrees and minutes
[2] In decimals

Table 1.
Maximum Allowable Operating Speed on Curves
Underbalance = 3" (E_u)

Degree Curve (D)[1]	Degree Curve (D)[2]	Superelevation in inches (E_a)				
		5	5-1/4	5-1/2	5-3/4	6
		Speed in Miles Per Hour (V_{max})				
0° 10'	0.17	90	90	90	90	90
0° 20'	0.33	90	90	90	90	90
0° 30'	0.50	90	90	90	90	90
0° 40'	0.67	90	90	90	90	90
0° 50'	0.83	90	90	90	90	90
1° 00'	1.00	90	90	90	90	90
1° 15'	1.25	90	90	90	90	90
1° 30'	1.50	87	88	89	90	90
1° 45'	1.75	80	82	83	84	85
2° 00'	2.00	75	76	77	79	80
2° 15'	2.25	71	72	73	74	75
2° 30'	2.50	67	68	69	70	71
2° 45'	2.75	64	65	66	67	68
3° 00'	3.00	61	62	63	64	65
3° 15'	3.25	59	60	61	62	62
3° 30'	3.50	57	58	58	59	60
3° 45'	3.75	55	56	56	57	58
4° 00'	4.00	53	54	55	55	56
4° 15'	4.25	51	52	53	54	55
4° 30'	4.50	50	51	51	52	53
4° 45'	4.75	49	49	50	51	52
5° 00'	5.00	47	48	49	50	50
5° 30'	5.50	45	46	46	47	48
6° 00'	6.00	43	44	44	45	46
6° 30'	6.50	41	42	43	43	44
7° 00'	7.00	40	41	41	42	42
7° 30'	7.50	39	39	40	40	41
8° 00'	8.00	37	38	38	39	40
8° 30'	8.50	36	37	37	38	38
9° 00'	9.00	35	36	36	37	37
9° 30'	9.50	34	35	35	36	36
10° 00'	10.00	33	34	34	35	35
10° 30'	10.50	32	33	34	34	34
11° 00'	11.00	32	32	33	33	34
11° 30'	11.50	31	32	32	32	33
12° 00'	12.00	30	31	31	32	32
12° 30'	12.50	30	30	31	31	32
13° 00'	13.00	29	30	30	31	31
13° 30'	13.50	29	29	29	30	30
14° 00'	14.00	28	29	29	29	30
14° 30'	14.50	28	28	28	29	29
15° 00'	15.00	27	28	28	28	29

[1] In degrees and minutes
[2] In decimals



APPENDIX C

GLOSSARY

APPENDIX C

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APPENDIX C

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- A -

Adjusting/De-stressing
The procedure by which a rail's temperature is re-adjusted to the desired neutral temperature range. It typically consists of cutting the rail and removing rail anchoring devices, which provides for the necessary expansion, and then re-assembling the track.

Alignment – General
The physical appearance of the railroad as viewed from above, which consists of a series of straight lengths of track, referred to as tangents and spirals, connecting simple, compound or reverse curves.

Alignment-Line
The condition of track in regard to uniformity of direction over short distances on tangents and in curves.

Aggregate
The sand, gravel, broken stone or combinations thereof with which the cementing material is mixed to form a mortar or concrete. The fine material used to produce mortar for stone and brick masonry and for the mortar component of concrete is commonly termed "fine aggregate," while the coarse material used in concrete only is termed "course aggregate."

- B -

Ballast
Select material placed on the roadbed to support and hold track in line and surface. Ballast preferably consists of sized hard particles that distribute the load, drains well and maintains proper line and surface.

Ballast Cleaning
The process of separating contaminants from the ballast by shaking and then depositing stone back onto the track.

Ballast Section
The cross section of a track between and under the crossties and between the ballast shoulders.

Ballast Shoulder
The portion of ballast between the end of the tie and the bottom of the ballast slope. It distributes the traffic load over a greater width of roadway and helps hold the track in alignment by providing lateral resistance.

Bar - Joint
Bars that are used to physically connect two rail ends and ensure proper rail head and gage face alignment. Also called a joint bar.

Batter - Rail
Deformation of the surface of the rail head, usually close to the end of the rail, caused generally by wheel impact loads.

Braking Force
The longitudinal and lateral force induced into the rail as a result of the brake application of a train.

Bridge - Ballast Deck
A bridge with a solid floor provided with drains and covered with ballast to provide uniform support for track.

Bridge Timber
A sawed tie usually pre-framed on all four sides and of the size and length required for track on an open deck bridge.

Buckling Incident
The formation of a lateral misalignment sufficient in magnitude to cause a general instability of track which may constitute a deviation from Class requirements specified in §213.55 of Part I. These normally occur when rail temperatures are relatively high and are caused by high longitudinal compressive forces.

- C -

Cant
Tilt or inclination of the base of the rail. Canting of the rail is achieved with the use of a tie plate or rail seat designed to cant the rail inward towards the center-line of track and should be installed accordingly. Typical cant is 1:40.

Clip
An elastic fastener that is applied parallel or perpendicular to the base of the rail and replaces and eliminates the need for a cut spike and anchor. A clip can be used on wood or concrete ties.

Clip - Switch
The device by which the switch rod is joined to the switch points. It is normally connected to the switch points by bolts protected by cotter keys or pins. It sometimes has staggered bolt holes in the horizontal leg for making detailed adjustments in the positions of the switch points.

Closure Rail
The lead rails connecting the heel end of the switch with the toe ends of a frog.

Coefficient of Thermal Expansion – Rail
A multiplier based on the physical properties of rail steel used to calculate the change in rail length with change in temperature. The coefficient is 0.000078 when the length of the rail is in feet.

Compression
A uniform axial force within the rail caused by equal and opposite forces pushing at the ends of the rail.

Compromise Joint Bar
See Joint Bar – Compromise

Continuous Welded Rail (CWR)
Rail that has been welded together into lengths exceeding 400 feet. See Part I, §213.119.

Crossing – At Grade (Highway)
A crossing or intersection of a railroad and a highway at the same level or grade.

Crossing – At Grade (Track)
A structure, used where one track crosses another at grade, which consists of four connected frogs. Crossing angles can be defined as:

Low angle:	Up to and including 30°
Medium angle:	31° to 60°
High angle:	61° to 90°

Crosslevel
The difference in elevation between the rails at the same location.

Crossover
Two turnouts with the track connected at their frogs, arranged to form a passage between two nearby and generally parallel tracks.

Curvature - Degree of
A measure of the sharpness of a simple curve where a 1" offset at the mid-point of a 62' chord is equal to 1°.

Curve - Compound
A curve composed of two or more simple curves that are joined by easement spirals and that lead in the same general direction (i.e., to left or right, but each with different radii).

Curve - Reverse
A curve composed of two simple curves that are joined by a common tangent point or by a short tangent track which bear in opposite directions.

Curve - Simple (Horizontal)
A curve in the form of a circular arc that is bounded by two tangents. By definition these curves do not have spirals and may be found in yards and on secondary track.

Curve - Vertical
A curve in the profile of a track to connect intersecting grade lines and to permit safe and smooth operation of trains over summits and across sags.

- D -

Derail
A track device to guide rolling stock off the rails at a selected spot and divert the rolling stock away from the track that is being protected. Derails provide protection against collisions or side swipes. Derails are generally of three kinds: the “split switch,” the “sliding block,” and the “hinged block” type.

Derailment
Anytime a wheel of a car or engine comes off the head of the rail.

Desired Rail Installation Temperature Range (DRTR)
The rail temperature range, within a specific geographical area, at which forces in CWR should not cause a buckling incident in extreme heat, or a pull apart during extreme cold weather. Definition from FRA Part 213, §213.119(g).

Deviation
Difference between a design or published standard and actual measurement at any one location.

Disturbed Track
The disturbance of the roadbed or ballast section, as a result of track maintenance or any other event, which reduces the lateral and longitudinal resistance of the track.

Dynamic Train Loading
Vertical, horizontal and longitudinal forces that are imparted to the track structure during the passing of a train due to wheel action and vehicle response.

- E -

Elastic Rail Fastener
A rail hold down system that secures the running rail to wood or concrete ties and/or a concrete slab. The fastener uses rail clips and a base plate with or without resilient pads. This system provides lateral, longitudinal and vertical rail restraint during the passage of trains. (See additional information under “Rail Fastening System.”)

Engine Burn
Damage to the rail head metal caused by slipping or “spinning” powered wheels. Engine burn fracture is a rail break caused by an engine burn.

Expansion Joint
A device that allows thermal movement in rail to be relieved by allowing the rail on one side of the joint to freely expand and contract. Often installed on the approaches to moveable bridges so that thermal forces and movements in continuous welded rail adjacent to the bridge cannot be transferred into the bridge or the miter rail assembly, where it could jam and prevent needed movement.

- F -

Facing Point
A facing point move is one where the rail vehicle moves over the switch points and then the frog.

Federal Railroad Administration (FRA)
A government agency in the U.S. Department of Transportation.

Fishing Space
Space between the head and base of a rail occupied by a splice bar (angle bar, joint bar).

Flangeway
Measured space between running rail, guard rail, frog casting, frog wing rail and road crossing to provide clearance for passage of wheel flanges.

Flow of Metal (Rail)
Deformation of the top of the rail head on the crown of a rail toward the gage or field side. Common on the low side of a curve where trains run at less than balanced speed.

Fracture – Detail
A progressive transverse fracture originating in the head of a rail.

Frog
A device used where two running rails intersect, with flangeways to permit wheels and wheel flanges on either rail to cross one another.

Frog – 1/2" Point
The 1/2" point of frog is the point at which the spread between gage lines is 1/2". All measurements in the field are usually made from the 1/2" point of frog.

Frog – Railbound Manganese (RBM)
A frog assembly that consists of wing rails surrounding a manganese casting with a rigid frog point and flangeways. A conventional guard rail is used with this type of frog.

Frog – Self-Guarded (SGM)
A frog with a guard member for guiding the flange of a wheel past the point of frog by engaging the tread rim of the wheel in a horizontal plane above the top of the running surface of the frog. This makes a conventional guard rail unnecessary.

Frog – Spring
An appliance that contains, among other things, a fixed frog point, a moveable spring wing rail, a rigid wing rail, frog hold-down assemblies, and spring box. The frog makes use of a long guard rail (on the straight side). The spring frog design provides a continuous bearing surface for the wheel tread as it traverses through the frog point area on the straight side of the turnout.

Frog – Theoretical Point
The theoretical point of the intersection of the gage lines. The theoretical frog point is at a distance, in inches, ahead of the 1/2" point which is equal to one-half the frog number (i.e., number 10 frog is 5").

Frog – Throat of
Point at which the converging wings of a frog are closest together.

Frogs – End
The two frogs at the opposite ends of the long diagonal of a crossing or slip.

Frog Angle
Angle formed by intersecting gage lines of the rails in a frog.

Frog Number
The frog angle expressed as the number of units of centerline length in which the spread is one unit (i.e., 10:1 is a number 10 frog).

- G -

Gage Line
A line 5/8" below the running surface of a rail on the side of the head nearest the track center. The line from which measurements of gage are made.

Gage of Track
Distance between gage lines of rails laid in track.

Gage Rod
A device for holding track to correct gage, generally consisting of 1-1/4" rod with a forged jaw on one end and a malleable jaw on the other end, adjustable through a locknut. Sometimes consists of a rod made in two parts with a solid jaw on each end, united by a turnbuckle.

Gaging of Track
Bringing the rail heads of a track into their correct distance apart.

Grade
Rate of rise or fall of the grade line, expressed as a percentage of the feet of rise or fall per 100' of length. A steady rise or fall of 1' per 100' is a 1% grade.

Grade Line
The line representing top-of-rail elevations and the profile of the track.

Grade Rail
The rail first surfaced to track elevation; the line rail on tangents, the inner or low rail on curves.

Guard Rail - Frog
A rail section assembly used in a turnout with a railbound manganese (RBM) frog, spring rail frog, or in track crossings. The guard rail is designed to guide the wheel set through the proper flangeway of the frog. The guard rail prevents the wheel flange from wearing, striking or picking the frog point.

Guard Rail – Inner Track
An additional rail or rails laid parallel to and between the running rails of bridges, bridge approaches, and at other critical locations to prevent derailed equipment from striking a bridge or other structure and to keep the derailed wheels on the ties of the bridge.

Guard Rail – Outer Track
Additional timber laid parallel to the running rails of long-span viaducts.

- H -

Head Block - Switch
Ties used to support the switch-point operating mechanism (powered or unpowered) and the switch stand.

Head or No. 1 Rod
The switch rod nearest the point of a switch, usually placed between the two head block ties.

Heel Block - Fixed
A rigid heel block assembly at the switch heel to maintain the proper horizontal heel spread between the switch rail and stock rail. The heel block limits the amounts of longitudinal movement between the switch point and stock rail. The heel block is bolted to the switch rail and stock rail.

Heel Block - Floating
An assembly at the switch heel to maintain the proper horizontal heel spread between the switch rail and stock rail. If the assembly is bolted to the switch rail only, the switch heel "floats" and is called a floating heel block.

Heel Length - Frog
Distance between the heel end and half-inch point of a frog measured along gage lines.

Heel of Frog
The end of a frog farthest from the switch point.

Heel of Switch
The end of the switch where the switch point connects to the closure rails (see Heel Block – Fixed and Floating). The heel of the switch can be either fixed to the stock rail or allowed to float freely.

Heel Spread - Frog
Distance between gage lines at the heel end of a frog.

Heel Spread - Switch
The distance between the gage lines of the stock rail and switch rail at the heel of the switch.

Highway-Crossing Warning Devices (Active)
An arrangement of one or more highway-crossing signals, with or without gates at a highway grade crossing.

- I -

Interlockings
An arrangement of signals, switch locks, and signal appliances so interconnected that their movements succeed each other in a predetermined order. It may be operated manually or automatically.

- J -

Joint Bar
A steel angle bar or other shape used to fasten together the ends of rails in a track. They are used in pairs and are designed to fit the space between head and base of rail (fishing space) closely. They are held in place by track bolts. Also called angle bar, rail joint bar and splice bar.

Joint Bar – Compromise
A special rail joint, sometimes called a step joint, for joining rails of different sections. The joint is made so that it brings gage faces and rail heads into line so that a continuous smooth surface is present for the treads and flanges of passing wheels. The hand of a compromise joint is designated by standing in the gage of track at the small rail section looking or facing towards the heavier rail section to be joined or compromised. In this location in track, the right hand compromise joint is on the right and left hand is on the left. A compromise joint is described by indicating the heavier rail section and then the light rail section to be compromised (i.e., 136/115).

Joint – Frozen
A joint so tight that the rails cannot move within the joint bar as temperature varies.

Joint – Insulated
A rail joint designed to prevent the flow of electric current from rail to rail by means of insulation so placed as to separate the rail ends and other connecting metal parts at the joint.

Joints – Supported and Suspended
A supported rail joint has a tie directly under the rail ends. A suspended joint is one in which ends of the rail joint are not resting on a tie.

Joint Tie
A cross tie used under a rail joint.

- L -

Latch - Switch Stand
A device for catching and holding the lever of switch stand in position, also called a switch keeper. Two latches are used at each switch stand.

Lateral Acceleration
The horizontal acceleration experienced by a rail vehicle that is perpendicular to the direction of travel. Lateral acceleration is a measure of ride quality and measured in units of ft./sec^2(g).

Lateral Resistance
The ability of the track structure to remain in position under the influence of in-service forces that are generated in a plane perpendicular to the line of the rail. Lateral resistance is a product of interaction of the ballast with the sides, bottom and end face of the tie.

Lead (Conventional)
The length between the actual point of switch and the 1/2" point of frog, measured on the line of the straight track.

Lead – Theoretical (Tangential)
The length between the actual point of switch and the theoretical point of a moveable point frog, measured on the line of the straight track.

Level Board
A tool used to determine the cross-level or super elevation of a track.

Lift Rail
The portion of a miter rail assembly that is attached to the moveable span of a moveable bridge. Sometimes called the bridge rail or moveable rail.

Line
The condition of a track in regard to uniformity in direction over short distances on tangents or uniformity in variation in direction over short distances on curves.

Line Rail
The rail on which alignment is based; the east rail of tangent track running north and south, the north rail of tangent track running east and west, the outer rail on curves, or the outside rails in multiple track territory.

Lining Track
Shifting the track laterally to conform to an established alignment. Maintenance lining is ordinarily done during repairs. Lining is done to make the track conform to predetermined alignment.

Longitudinal Resistance
The ability of the track structure to remain in position under the influence of train and temperature forces that run parallel with the rail. Longitudinal resistance is a product of the interaction of the ballast, the tie, rail anchors, rail clips and other elastic fasteners.

L/V Ratio
The relationship of lateral force on the rail to the vertical force on the rail, which is produced by the wheel of railroad rolling stock, locomotives, work equipment and other equipment moving along the track.

- M -

Maximum Authorized Speed (MAS)
That maximum speed for a portion of track as specified in the current Employee's Timetable.

Mechanical Stabilization
A procedure used to restore lateral and longitudinal stability of disturbed track following maintenance operations. This procedure may incorporate dynamic track stabilizers which are units of work equipment that are used as a substitute for the action provided by the passage of tonnage trains.

Middle Ordinate
The distance measured from gage line of rail to the middle of a string drawn taut and held to contact with the gage line of rail at its end. The middle ordinate provides a means of measuring curvature. Can also be used in bending rails to a desired curvature.

Miter Rail
A rail assembly on a moveable bridge that spans the gap between the moveable span and the adjacent stationary portion of the bridge. The miter rail typically consists of two pieces. One rail is stationary or fixed and attached to the non-moving portion of the bridge and the second rail is attached to and moves with the moving portion of the bridge.

The term miter is used because typically the abutting ends of the two portions of the miter rail assembly, rather than being cut square as in a conventional rail joint, are cut at an acute angle or "mitered" relative to each other. The miter can provide the wheels with continuous support over the rail gap.

Because one rail must be able to move relative to the other when the bridge is being opened, the abutting ends of the miter rail assembly are not bolted to each other as in a conventional rail joint, but rather sit in bed plates that align one end of the miter rail relative to the other.

Moveable Bridge
Any bridge span over a navigable waterway that can be moved to accommodate the passage of vessels taller than the normal underclearance of the bridge.

- N -

Neutral Temperature
The temperature at which rail is secured in a stress-free condition.

Neutral Temperature Management (See Appendix A)
Maintaining the condition of the track structure so that the neutral temperature of the rail remains within the acceptable neutral temperature range.

Number - Turnout
The number corresponding to the number of the frog used in a turnout.

- O -

Out-of-Face Surfacing or Lining (See Appendix A)
The continuous surfacing and/or lining of a piece of track greater than 200' in length.

Out-of-Face Tie Renewal (See Appendix A)
Tie replacement at the rate of more than six (6) ties per 39' of rail. Not more than two (2) consecutive ties nor more than six (6) ties per 39' of rail can be replaced in any one pass.

Out-of-Face Undercutting (See Appendix A)
Undercutting of more than two (2) consecutive ties or more than six (6) ties in 39' of track.

- P -

Post – Bumping
A device at the end of stub track to prevent rolling stock from going off the ends of the rails.

Preferred Rail Laying Temperature (PRLT)
The desired temperature (i.e., 95ºF) at which continuous welded rail (CWR) is to be laid. The PRLT is region-specific and is the temperature at which there will be no stress in the CWR.

Profile
A longitudinal section through a track that shows elevation of the grade rails. The profile is usually obtained from levels taken on top of the rail.

- R -

Rail - High
The outer or elevated rail of a curved track, which is maintained as the line rail.

Rail - Low
The inner rail of a curve which is maintained as the grade rail.

Rail – Nervous Track
CWR which exhibits minute alignment irregularities which indicate that the rail is in a considerable amount of compression.

Rail - Scrap
Rails of standard section not fit for use as relayer rail.

Rail Anchors
Those devices which are attached to the base of the rail and bear against the side of the crosstie to control longitudinal rail movement. Certain types of rail fasteners also act as rail anchors and control longitudinal rail movement by exerting a downward clamping force on the upper surface of the rail base.

Rail Bender
A tool for bending stock rails.

Rail Bond
A device used to transfer an electric circuit across rail ends at a rail joint or discontinuity in the rail.

Rail Brace
A device used at switches, moveable-point frogs, guardrails, etc., in combination with switch, tie or gage plates, for holding rail in place in the plate and preventing lateral displacement.

Rail Brand
An identification mark, including manufacturer's name or initials, month and year the rail was rolled, manufacturer's identification label, weight per lineal yard, initials of section, number of the heat, portion of the ingot and process of manufacture.

Rail Fastening System
The hold-down appliances that provide the required combination of horizontal, lateral and vertical restraint to permit the safe operation of rail vehicles. Examples of conventional systems found include the cut spike and rail anchor. Examples of elastic fastening systems include the Pandrol "e" clip, fast clip with a pin (lock spike) or lag screw.

Rail Joint - Pumping
A poorly supported rail joint that has excessive up and down movement under the passage of trains.

Rail Section
The pattern of dimensional details of rail, such as width of base, height of rail, thickness of web, width and thickness of head, angle of head and angle of base. Each particular pattern is identified by a brand name or symbol, such as ASCE, AREA, ARA, PRR, PS, etc., in addition to its weight per yard.

Rail Stretcher Expander
A rail puller/expander operated by hand or by machine that is used to increase or decrease the gap between adjoining rail ends.

Rail Temperature
The temperature of the rail, measured with a rail thermometer on the shaded side of the web.

Rail Weight
The weight of a three (3) foot-long section of rail expressed in pounds per yard.

Relay Material
Useable secondhand rail, ties or other track material (OTM).

Roadbed
The finished sub-grade surface upon which the track and ballast rest.

Rod - Operating
A rod attached to a switch, derail, or other device, for moving it from one position to another. The operating or throw rod can be reset to adjust the amount of throw occurring at the switch.

Running Rail
The rail or surface on which the wheel bears.

Runoff - Curve
The change in superelevation in the spiral/easement from the full body of a curve to tangent or between compound curves.

Runoff - Surface
An area of grade change in track where the raised portion of a track is connected with the existing grade. The runoff between the two elevations is made along the two rails at a designated rate of change per 31' station for comfort and safety.

- S -

Scrap
Rail, ties or other track materials (OTM) that are not suitable for reuse.

Screw - Lag
A cylindrical threaded steel spike with a square head designed to be turned with a special appliance into holes bored into ties.

Shim - Track
A bearing piece, usually wood or metal of various thickness, at least equal to the width and length of the tie plate, for temporary use between the tie plate and ties to raise (surface) the rail to a desired relative elevation. Usually used to spot surface a track when the roadbed is frozen and the ties cannot be tamped and surfaced.

Side Planing - Undercutting
Cuts made on sides of the head of the switch rail to form a taper from the full width of the head to the switch point. Also used in a stock rail to match undercut switch points.

Spot Surfacing (See Appendix A)
Surfacing a piece of track up to 200' in length.

Spot Tie Renewal (See Appendix A)
The installation of six (6) or less ties per 39' of rail with no more than two adjacent ties replaced in a row. The new ties must be promptly tamped and the ballast properly dressed.

Stock Rail
The two running rails that support the operation of the switch points. The straight stock rail is on the straight side of a lateral turnout The bent stock rail or curved rail is on the diverging side of the turnout. The switch points fit securely against or are undercut into the stock rail to permit the transfer of wheel load from the stock rail to the switch point. An equilateral turnout has two straight stock rails.

Stock Rail Bend
The bend or set that must be given the stock rail to allow the switch point to follow the gage line through the turnout. Usually, the stock rail on the diverging side of a turnout is bent. The opposite stock rail is straight .

Stringlining
A method for determining the alignment of a curve, by measuring mid-ordinates to the outer rail with string and paddles.

Sub-ballast
Any approved granular material which is placed between the ballast and finished sub-grade of the roadbed, to provide distribution of the load to the roadbed, better drainage, and prevent upheaval of the sub-grade by frost.

Sub-grade
The top of natural materials, gravel or crushed rock, usually inferior to ballast or sub-ballast, placed in fills or at the bottom of cuts that lie directly below the sub-ballast and ballast.

Superelevation – Equilibrium
The elevation of the outer rail which balances the centrifugal forces while negotiating a curve at a given design speed.

Superelevation
The height at which the outer rail is raised above the inner or grade rail on curves to resist the centrifugal force of moving trains.

Switch
A connection between two lines of track to permit flange wheeled rail vehicles to pass from one track to another.

Switch – Insulated
A switch in which the fixtures, principally the gage plates and the switch rods connecting one rail to the other, are provided with insulation so that electric currents will not be shunted.

Switch – Spiked/Clamped
A switch point that is secured in one position through the use of spikes, blocks and clamps.

Switch – Throw of
The distance measured between the switch point and stock rail at the point of switch.

Switch Heater
A device for melting snow with heat generated by an electric current, gas or propane. This device enables a switch which is so equipped to be thrown in inclement weather when there are accumulations of sleet, ice or snow.

Switch Lock
A fastener, usually a spring padlock used to secure the switch or derail stand in place.

Switch Machine
The signal appliance that powers and provides for the positive movement and locking of the switch points and/or moveable point frog to permit the safe, uninterrupted movement of rail vehicles through a turnout.

Switch Machine Rod Basket
The appliance that connects the operating rod to the No. 1 tie rod in the switch or to the frog point lug of a moveable point frog

Switch Obstruction Test
This test is used as part of the criteria to determine if the switch points in signal territory are properly fitting up against the straight and bent stock rails or if the moveable point of a moveable point frog fits against the moveable point frog housing. This test ensures that the proper signal indication is being conveyed as the points move and are seated.

Switch Plate
A special metal tie plate for use on switch ties, each plate being long enough to extend not only under the stock rail and its supporting braces, but also under the switch point in the open position. Switch plates are furnished in sets to correspond with switch length. There are two plates to each tie. However, at the point of switch and at helper locations, the two plates may be replaced by a gage plate(s) that carries both switch points. A type of high-profile switch plate used in some turnouts which contain two elastic clips to secure the stock rail to the switch plate.

Switch Point
The moveable rail of a switch which determines the direction of train movement.

Switch Point – Undercut
A switch point that is planed on the field side to fit securely against an undercut stock rail.

Switch Point Guard
A structure made of rail or manganese steel secured to the field side of the running rail at the point of switch, with suitable flares to engage the tread rims of wheels and guide the wheel past the switch point. This appliance is intended to reduce or eliminate switch point contact and wear. This appliance is to be used where operating speeds are 15 mph and less.

Switch Point Lug (Clips)
The lug attached to a switch point, to which the front rod is connected.

Switch Point with Graduated Risers
A switch in which the switch points are gradually elevated by means of graduated riser plates, until they reach the required height above a stock rail and sloping back to zero at the fixed heel block.

Switch Point with Uniform Risers
A switch in which the switch points have a uniform elevation on riser plates for the entire length of the switch, and therefore do not have a heel slope. The switch point rail rise is run off in back of the floating heel block.

Switch Rod
The rods that connect the left hand and right hand switch point to ensure proper gage, alignment and adjustment throughout the switch.

Switch Stand
A manually operated device by which a switch is thrown, locked, and its position indicated. It consists essentially of a base, spindle, lever, connecting rod and target.

Switch Target
A signal placed adjacent to or fixed on the spindle of a switch stand with reflective materials indicating the position of the switch.

- T -

Tension
An axial force caused by equal and opposite forces pulling at the ends of the rail.

Thimble (Insulated Joints)
The cylindrical pieces of an insulating joint that surround portions of the bolts.

Throat of Frog
The point at which the converging wing rails of a frog are close together just ahead of frog point.

Tie
A transverse support to which rails are fastened to keep them in line, gage and grade. Usually wooden or concrete.

Tie - Centerbound
Ballast condition where an unusually large percentage of the wheel load is carried at the center of the tie. This is an undesirable situation as compacted ballast under the rail seats should carry the load.

Tie Plate
A metal plate at least 6" wide and long enough to provide a safe bearing area on the tie, with a shoulder to restrain lateral movements of the rail.

Tie Plate - Twin
A tie plate in two parts that mate to form a combined width equal to that of the stand tie plate, for use back of the heel of switch to the point where standard tie plates may be applied.

Tie Plug
A wooden plug driven in to fill an unused spike hole or lag hole in a tie, to exclude moisture, prevent decay, and provide solid wood for re-driving of the spike. Usually supplied in the form of sticks containing several plugs.

Tie Spacing
The distances between tie centers in track or turnouts.

Toe End of Frog
The end of a frog nearest the switch.

Toe Spread
The distance between gage lines at the toe end of the frog.

Track
The rail, ties, rail fastenings, hardware and roadbed between points not less than 4' outside of each rail.

Track Buckling
The sudden formation of large lateral misalignments caused by high compressive forces, in the presence of some other influencing factors.

Track Lateral Resistance
The resistance provided to the rail/crosstie structure against lateral displacement.

Track Longitudinal Resistance
The resistance provided by the rail anchors/rail fasteners and the ballast section to the rail/crosstie structure against longitudinal displacement.

Track - Skeletonized
Track with ballast removed from the cribs between ties.

Track Spike (Cut Spike)
A rectangular metal fastener with an elliptical head designed to secure tie plates and/or rail to wood ties and timber.

Track - Surface
The condition of the track structure as to vertical evenness or smoothness.

Tractive Force
The longitudinal force induced into the rail as a result of the tractive effort exerted by the powered axles of rail vehicles.

Trailing Point
A trailing point move would pass over the frog and then the switch points.

Train-induced Forces
The vertical, longitudinal and lateral dynamic forces which are generated during train movement.

Transition Rail
A rail that joins two rails of different sections. It consists of two different rails flash butt welded to a middle forged section of rail. This rail is used in place of compromise bars.

Transition Spiral
An easement curve from the tangent to the curve.

Transpose Rail
Changing rail from one side to the other on curves because of headwear.

Turnout (TO)
An arrangement of a switch and a frog with closure rails, by which rolling stock can be diverted from one track to another.

Turnout (Premium Design)
A turnout that contains premium materials such as fully heat treated rail with elastic fasteners on wood and/or concrete ties. The design of premium turnouts may incorporate such things as tangential geometry, asymmetrical switch points and moveable point frogs or spring frogs.

Turnout – Conventional
A turnout whose transition from tangent to curve is abrupt because of alignment changes between the switch point and frog. These turnouts are usually constructed on wood ties, but can also be constructed on concrete ties. These turnouts usually have a “tee” rail switch point section and a self-guarded manganese (SGM) frog or railbound manganese (RBM) frog.

- U -

Underbalance
The difference between the actual superelevation and the amount of superelevation calculated for equilibrium conditions. Design underbalance on the MassDOT operated railroads is 1-1/2".

- W -

Washer – Spring (Lock)
A spring tensioned member designed to prevent movement of a nut and the loosening of a bolted member due to wear, stretch or other deterioration.

Weld – Flash Butt
A butt weld joining two abutting rails. This weld serves to join the rail ends using only parent materials. Electric flash_butt rail welding is accomplished with a stationary or portable electrical plant.

Weld - Thermite
A weld joining two abutting rails. The weld serves to unite the abutting rails with the introduction of metal weldment into a preset gap. This is an alumnothermic process that is accomplished by using weld kits..

Wheel Tread
The flat or tapered surface of a railway wheel that contacts the top surface of the rail head.

Wing Rail
The left and right rails that are run from the toe to the flared end of a moveable point frog, railbound manganese frog (RBM) or spring frog.



APPENDIX D

PLACEMENT OF TEMPORARY SPEED SIGNS

APPENDIX D

PLACEMENT OF TEMPORARY SPEED SIGNS

1.0 TEMPORARY SPEED RESTRICTION

(a) Protection shall be provided for any track that is considered not satisfactory for the passage of trains at maximum authorized speed, including placing an appropriate temporary speed restriction and notification to the Train Dispatcher.

(b) Portions of Tracks, on which temporary speed restrictions have been placed, are to be marked by placing a reflectorized Advanced Speed Limit sign, and Speed Limit and Resume Speed signs to the right of each track for both directions of traffic.

(1) The general arrangement, details of construction and assembly, height and distance from the track, of signs, shall be as shown on the following plans.

(2) Signs are to be placed so as to give the greatest practical unobstructed view considering alignment and other local physical conditions. Reflecting surfaces of signs must be kept clean to preserve their reflecting ability.

(3) Speed Limit and Resume Speed signs are to be placed with the Speed Limit sign at the point where the actual restriction begins and the Resume Speed sign at the point where it ends.

(4) Advanced Speed Limit signs, with numerals indicating the speed restriction, are to be placed far enough ahead of the Speed Limit signs in the direction from which trains are approaching to permit trains to reduce from normal speed to the speed permitted by the restriction.

(c) When a condition arises requiring a speed restriction, the following must be done:

(1) Notification must be given to the dispatcher governing movement on the track where restriction is required.

(2) Notification must be given to Track Supervisor.

(3) Notification must include:

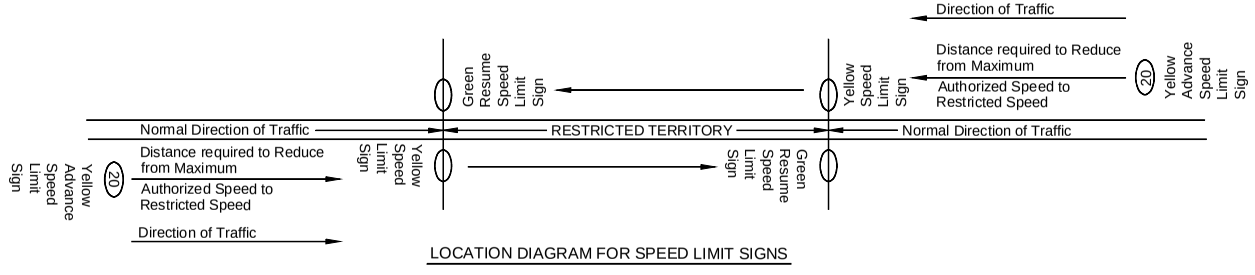
(i) Limits of restriction by milepost station.

(ii) Speed to which track is restricted.

(iii) Reason for restriction.

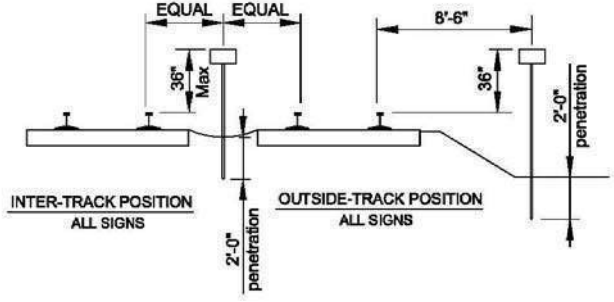
(iv) Action being taken to correct condition.

(4) Immediate action must be initiated to remove restriction.



LOCATION DIAGRAM FOR SPEED LIMIT SIGNS

SPEED LIMIT SIGNS FOR TEMPORARY SPEED RESTRICTIONS



SPEED LIMIT SIGNS
FOR
TEMPORARY SPEED RESTRICTIONS

Note:
Where local conditions make it desirable, the Resume Speed Sign and The Speed Limit Sign may be mounted back to back on the same support

Temporary Speed Limit Signs

Advance Speed Limit sign with numerals indicating restricted speed shall be placed a sufficient distance in advance of restricted territory to permit a train to reduce from maximum authorized speed to the restricted speed.

Speed Limit sign shall be placed to mark the entrance to the restricted territory.

Resume Speed sign shall be placed to mark the end of restricted territory. When entire train has passed this point, speed may be resumed.

Advance Speed Limit sign shall have background of Flat Top Yellow Scotchlite. Superimposed on the yellow background shall be 7" high x 11-1/2" wide black numerals showing speed permitted over restricted territory. Numerals shall be furnished in multiples of 10 miles per hour.

Speed Limit sign shall have background of Flat Top Yellow Scotchlite.

Resume Speed sign shall have background of Flat Top Green Scotchlite.

(d) Marking of Temporary Speed Restrictions:

(1) Where it is anticipated that restriction will be of other than the most temporary nature, reflectorized slow boards will be used.

(2) Information concerning slow orders:

(i) Will be communicated to train and engine service personnel by train order or general notice.

(ii) Limits of slow orders in train order or general notice must be consistent with placement of slow boards on the ground, and order must so state.

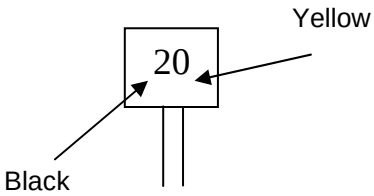
(iii) Where slow order is of short duration and is issued on train order, slow boards need not be displayed.

(3) Slow board placement:

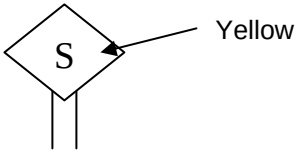
(i) Slow boards will be of reflectorized material, clean and in good repair.

(ii) They will be located to the right of and adjacent to the track protected, where they are unobstructed and can be clearly seen.

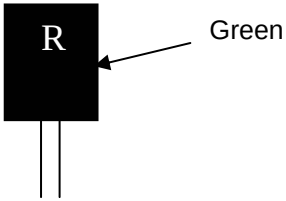
(iii) Advance Speed Limit Sign – a yellow sign with the speed to which trains are restricted displayed thereon in black numerals will be placed ahead of the point of restriction to allow a train moving at maximum authorized speed to reduce to the restricted speed at the point of restriction.



(iv) Yellow Speed Limit Sign – placed at the point at which restriction begins:



(v) Green Resume Sign – placed at the point at which restriction ends:





APPENDIX E

WEIGHTS AND MEASURES

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APPENDIX E

WEIGHTS AND MEASURES

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APPENDIX E

WEIGHTS AND MEASURES

The weights contained in these tables are for informational purposes only. Before moving and handling materials, the weights should be ascertained by contacting the appropriate manufacturer and/or supplier.

1. TIE PLATES

Tie Plate Description Conventional	Length of Plate	Width of Plate	Rail Base	Approximate Weight (lbs)
SSC(1)	10"	7-1/2"	4-7/16" to 5-1/8"	11.3
SSC	11"	7-1/2"	5-1/8" to 5-1/2"	13.1
DSC(2)	12"	7-3/4"	5-3/8"	16.2
DSC	11"	7-3/4"	5-1/2"	13.6
DSC	12"	7-3/4"	5-1/2"	16.2
DSC	13"	7-3/4"	5-1/2"	19.9
DSC	14"	7-3/4"	5-1/2"	23.3
Pandrol	15-1/8"	7-3/4"	5-1/2"	23.5
Pandrol	15-3/4"	7-3/4"	6"	24.5

Notes:
(1) Single Shoulder Canted
(2) Double Shoulder Canted

2. JOINT BARS(1)

Rail Section	Length of Bar	Approximate Weight Per Single Bar (lbs)
115/119 RE	36"	46.9
136 RE	36"	55.2

Note:
(1) If handling compromise bars, use the heavier rail weight section for the estimate of the bar weight.

3. BALLAST

	Average Weight Per Cubic Foot		Average Weight Per Cubic Yard	
Type of Ballast	**Loose (lbs)**	**Compacted (1bs)**	**Loose (1bs)**	**Compacted (lbs)**
Granite	88	98	2,375	2,650
Trap Rock	104	114	2,800	3,075

4. FASTENERS

Type	Approximate Weight (lbs)
Fast Clips (Bag of 50)	75
“e” Clips (Bag of 50)	88
Track Bolts (including Keg) (1" x 5-1/2")	210
Track Spikes (including Keg)	210
Lag Screws (Bag of 100)	110
115/119 RE Rail Anchors (Bag of 50)	125
136 RE Rail Anchors (Bag of 50)	150

5. TIES AND TIMBERS

Type	Size	Approximate Weight (lbs)
Wood Cross Tie Red or White Oak	7"x 9" x 8'-6"	246
Concrete Cross Tie	8'-6"	780
Concrete Switch Tie	9' to 16'	105 lbs/ linear foot
Wood Switch Timber (7"x 9" x Length) Total Tie Weight	9' 10' 11' 12' 13' 14' 15' 16' 21' 22'	260 289 318 347 376 405 434 462 607 636

6.0 BONDED JOINTS AND RAILS

6.a BONDED INSULATED RAIL JOINTS

Rail Size	Rail Length	Approximate Total Weight (lbs)
115 RE	19'-6"	860
115 RE	26’	1,110
115 RE	39'	1,490
136 RE	19'-6"	995
136 RE	26'	1,290
136 RE	39'	1,880

6.b RAILS

Rail Size	Calculated Weight Per Yard (lbs)	Approximate Weight (lbs)
100 NH @ 33'	100.00	1,100
107 NH @ 39'	107.00	1,391
115 RE @ 39'	114.75	1,492
136 RE @ 39'	135.80	1,766

7.0 TURNOUT PANELS

7.a TURNOUT PANELS – Conventional No. 8 on Wood Ties

(136 RE)	Panel Length	Approximate Panel Weight (tons)
Nose Panel	39'	7.5
Frog Panel	39'	9.2

7.b TURNOUT PANELS – Conventional No. 10 on Wood Ties

(136 RE)	Panel Length	Approximate Panel Weight (tons)
Nose Panel	39'	7.5
Frog Panel	39'	10.8

7.c TURNOUT PANELS – Conventional No. 15 on Wood Ties (26' Curved Switch)

(136 RE)	Panel Length	Approximate Panel Weight (tons)
Nose Panel	66'	11.5
Frog Panel	52'	15.0

7.d TURNOUT PANELS – Conventional No. 20 on Wood Ties (39' Curved Switch)

(136 RE)	Panel Length	Approximate Panel Weight (tons)
Nose Panel	70'	14.0
Frog Panel	44'	13.9

8. HOOK FLANGE GUARD RAILS

Length (136 RE)	Approximate Weight	
	(lbs)	(tons)
9'	950	0.5
13'	1,350	0.8
20'	2,100	1.1
27'	2,800	1.5

9. RAILBOUND MANGANESE FROGS[(1)]

Turnout No.	Length	Approximate Weight	
		(lbs)	(tons)
8	18'	4,025	2.1
10	23'	5,025	2.6
15	26'-8"	5,625	2.9
20	34'-2"	6,925	3.5

Note:
(1) Approximate weights are for maintenance frogs with extended wing rails.

10. DIAMOND TRACK CROSSINGS

3 Rail	Approximate Weight	
	(lbs)	(tons)
High Angle Crossing (Ties Not Included)	14,000	7.0
Low Angle Crossing (Ties Not Included)	18,000	9.0

11a. AREMA SWITCH RAILS (115-119 RE)

Turnout No.	Stock Rail			Split Switch Point		
	Length	Approximate Weight		Length	Approximate Weight	
		(lbs)	(tons)		(lbs)	(tons)
10	27'-0"	1071	0.55	16'-6"	655	0.35
15	38'-0"	1,507	0.75	26'-0"	1,031	0.55
20	59'-6"	2,360	1.2	39'-0"	1,547	0.78

11b. AREMA SWITCH RAILS (136 RE)

Turnout No.	Stock Rail			Split Switch Point		
	Length	Approximate Weight		Length	Approximate Weight	
		(lbs)	(tons)		(lbs)	(tons)
10	27'-0"	1,223	0.62	16'-6"	748	0.38
15	38'-0"	1,721	0.87	26'-0"	1,177	0.59
20	59'-6"	2,695	1.35	39'-0"	1,767	0.89

12. WOOD-TIE TRACK PANELS

(136 RE)	Approximate Weight (tons)
39' Panel Length[(1)] (w/o 3rd rail ties)	4.5
39' Panel Length[(1)] (with 3rd rail ties)	4.6

Note:
(1) Pandrol plates 6" base and 21-1/4" tie spacing

13. HIGHWAY GRADE CROSSINGS – CONCRETE

Std. Track Panel[(1)] (lbs/track foot)	Crossing Track Panel[(2,4)] (lbs/track foot)	Concrete Gage Crossing Module[(3,4)] (lbs/track foot)	Concrete Field Modules[(3,4)] (lbs/track foot)
490.5	629.1	458	247

Notes:

(1) Concrete ties 8'6" long, spaced at 24" o.c. with Pandrol fasteners including galvanized e-clips, and 136 RE CWR.
(2) Concrete ties 10'0" long, spaced at 24" o.c. with Pandrol fasteners including galvanized e-clips and 136 RE CWR.
(3) Concrete crossing modules (available 8' or 12' lengths) for gage of track or field side.
(4) Total approximate weight per track foot is the crossing panel weight, the gage crossing module weight and two (2) times the field module weight.

14. HIGHWAY GRADE CROSSINGS – RUBBER

Shipping Weight Average per Skid (lbs)	Full Depth Heavy Duty Rubber Gage Crossing Pad[(1,3)] (each)	Full Depth Heavy Duty Rubber Field Crossing Pad[(2,3)] (each)
3,111	595	224

Notes:

(1) Rubber gage pad 3' length x 58-1/2" width x 8-1/4" depth for 136 RE rail.
(2) Rubber field pad 3' length x 22" width x 8-1/4" depth for 136 RE rail.
(3) Total approximate weight per track foot is the crossing panel weight, the gage crossing module weight and two (2) times the field module weight.

15. DECIMALS OF AN INCH

Fraction (inches)	Decimal (inches)
1/32	0.03125
1/16	0.06250
3/32	0.09375
1/8	0.12500
5/32	0.15625
3/16	0.18750
7/32	0.21875
1/4	0.25000
9/32	0.28125
5/16	0.31250
11/32	0.34375
3/8	0.37500
13/32	0.40625
7/16	0.43750
15/32	0.46875
1/2	0.50000
17/32	0.53125
9/16	0.56250
19/31	0.59375
5/8	0.62500
21/32	0.65625
11/16	0.68750
23/32	0.71875
3/4	0.75000
25/32	0.78125
13/16	0.81250
27/32	0.84375
7/8	0.87500
29/32	0.90625
15/16	0.93750
31/32	0.96875
1	1.00000



APPENDIX F

FORMS

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APPENDIX F

FORMS

These forms are typical forms used in the inspection of maintenance of track and special track work by the MassDOT Rail and Transit Division.

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RAIL DEFECT INSPECTION REPORT

massDOT
Massachusetts Department of Transportation
Rail & Transit Division

Operating Railroad Name: _____ Date of Inspection: _____

Detector Car Operator Name: _____

Route Tested: _____ Track _____ MP _____ to MP _____

Inspection Company: _____ Track _____ MP _____ to MP _____

Detector Car #: _____ Track _____ MP _____ to MP _____

Detector Car Defect Number	Defect Type	Defect Size	Track Number	Mile Post	Immediate Corrective Action	Date	Final Corrective Action	Date

To be signed and submitted after all final active correction is complete:

*Operating Railroad Supervisor's Name: _____ Date: _____

*Operating Railroad Supervisor's Signature: _____

*NOTE: Operating Railroad Supervisor is the Railroad Supervisor riding the detector car.

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SPECIAL TRACK INSPECTION REPORT

massDOT
Massachusetts Department of Transportation
Rail & Transit Division

Name of Operating Railroad:			
Date Inspection Made:		Line Segment:	
Reason for Inspection:		Weather:	Temperature:
Location		Conditions Noted / Repairs Made	
Track Name/No.	M.P. – M.P.		
Deficiencies/Defects Found		Corrective Action Taken	
Operating Railroad Inspector's Name: (Print)			
Operating Railroad Inspector's Signature:			

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RAIL FAILURE REPORT

massDOT
Massachusetts Department of Transportation
Rail & Transit Division

Name of Operating Railroad:			
Date Discovered:		**Date Repaired:**	
Line Segment:	**MP:**	**Track:**	**Rail:** N / S / E / W
Defect Location:			
Rail: Tangent	**Curve:** High Rail Low Rail	Degree of curve:	
Notes:			
Special Work Type:	**MP:**	**Turnout Name:**	
Notes:			
Detector Car Defect: No Yes		**Defect No:**	
Type of Defect:		**Size of Defect:**	
Service Failure Defect: No Yes	**Type:**	**Found by:**	
Type of Rail: Jointed CWR			
Rail Weight:	**Rail Section:**	**Manufacturer:**	
Year Rolled:	**Month Rolled:**		
Type of Weld: Field Plant		**Joint Bars to Weld:** No Yes	
Rail Information:			
Temporary Speed Restriction (TSR): No Yes _____ MPH			
Defective Glued Plugged Rail: No Yes Length _____			
CWR Plug Rail Installed: No Yes Length _____		**Plug Rail Number:** _____ - _____ - _____	
Boxed Anchored 200' from Joints: No Yes		**Form "TD" Required:** No Yes	
Rail Temperature when Anchoring:			
To be signed and submitted after all final active correction is complete:			
Operating Railroad Supervisor's Name: (Print)			
Operating Railroad Supervisor's Signature:		**Date:**	

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CWR RAIL EXPANSION/HEAT RECORD REPORT

massDOT
Massachusetts Department of Transportation
Rail & Transit Division

Operating Railroad/Contractor:		Weather:
Line Segment:	MP:	Track:

Date	Track Name/No.	Rail (N,S,E,W)	String Number	Start MP	End MP	Rail Temp. (°F)[1]	Req'd Temp. Change (°F)[2]	String Length (Feet)	Required Expansion (Inches)[3]	Installation Temp. Achieved (°F)	String Vibrated (Y/N)	Actual Expansion Recorded (Inches) Obtained at 1/4 Points[4]			
												1/4	1/2	3/4	Full

Notes:
(1) Temperature to be measured with approved rail thermometer.
(2) Required temperature change in °F is preferred rail neutral temperature of 110°F (RNT) minus the actual rail temperature at the time of expansion.
(3) See formula and table on reverse side of form.
(4) After string is anchored and/or clipped.

Operating Railroad Foreman's Signature: _____ **Date:** _____

Operating Railroad Foreman's Name (Print): _____

Formula for Coefficient of Linear Expansion of Rail:

$A = 0.000078 \times (T_D - T_E) \times L$

- A = Adjustment or Required Expansion amount of rail string (in inches)
- T_D = Desired Rail Neutral Temperature (RNT) should be 110°F if possible as conditions permit
- T_E = Existing or Actual Rail Temperature (°F) prior to heating or expansion measured with an approved rail thermometer
- L = Length of string to be adjusted (in feet)

Calculations:

Change in Rail Length Due to Change in Rail Temperature

A = Change in Rail Length in Inches = 0.000078ΔT x L
L = Length of Rail to be Expanded in Feet
ΔT = Change in Temperature in Degrees Fahrenheit: Desired RNT minus Actual Rail Temperature

Length of Rail (ft)	Change in Temperature in Degrees Fahrenheit															
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
	Change in Rail Length in Inches															
100	1/8	1/8	1/8	1/4	1/4	1/4	3/8	3/8	3/8	1/2	1/2	1/2	5/8	5/8	5/8	5/8
200	1/8	1/4	1/4	3/8	1/2	1/2	5/8	5/8	3/4	7/8	7/8	1	1-1/8	1-1/8	1-1/4	1-1/4
300	1/8	1/4	3/8	1/2	5/8	3/4	7/8	1	1-1/8	1-1/4	1-3/8	1-1/2	1-5/8	1-3/4	1-7/8	1-7/8
400	1/4	3/8	1/2	5/8	7/8	1	1-1/8	1-1/4	1-1/2	1-5/8	1-3/4	1-7/8	2-1/8	2-1/4	2-3/8	2-1/2
500	1/4	1/2	5/8	7/8	1	1-1/4	1-3/8	1-5/8	1-7/8	2	2-1/4	2-3/8	2-5/8	2-3/4	3	3-1/8
600	1/4	1/2	3/4	1	1-1/4	1-1/2	1-3/4	1-7/8	2-1/8	2-3/8	2-5/8	2-7/8	3-1/8	3-3/8	3-5/8	3-3/4
700	3/8	5/8	7/8	1-1/8	1-3/8	1-3/4	2	2-1/4	2-1/2	2-3/4	3-1/8	3-3/8	3-5/8	3-7/8	4-1/8	4-3/8
800	3/8	5/8	1	1-1/4	1-5/8	1-7/8	2-1/4	2-1/2	2-7/8	3-1/8	3-1/2	3-3/4	4-1/8	4-3/8	4-3/4	5
900	3/8	3/4	1-1/8	1-1/2	1-7/8	2-1/8	2-1/2	2-7/8	3-1/4	3-5/8	3-7/8	4-1/4	4-5/8	5	5-3/8	5-5/8
1000	1/2	7/8	1-1/4	1-5/8	2	2-3/8	2-3/4	3-1/8	3-5/8	4	4-3/8	4-3/4	5-1/8	5-1/2	5-7/8	6-1/4
1100	1/2	7/8	1-3/8	1-3/4	2-1/4	2-5/8	3-1/8	3-1/2	3-7/8	4-3/8	4-3/4	5-1/4	5-5/8	6-1/8	6-1/2	6-7/8
1200	1/2	1	1-1/2	1-7/8	2-3/8	2-7/8	3-3/8	3-3/4	4-1/4	4-3/4	5-1/4	5-5/8	6-1/8	6-5/8	7-1/8	7-1/2
1300	5/8	1-1/8	1-5/8	2-1/8	2-5/8	3-1/8	3-5/8	4-1/8	4-5/8	5-1/8	5-5/8	6-1/8	6-5/8	7-1/8	7-5/8	8-1/8
1400	5/8	1-1/8	1-3/4	2-1/4	2-3/4	3-3/8	3-7/8	4-3/8	5	5-1/2	6-1/8	6-5/8	7-1/8	7-3/4	8-1/4	8-3/4
1440	5/8	1-1/8	1-3/4	2-1/4	2-7/8	3-3/8	4	4-1/2	5-1/8	5-5/8	6-1/4	6-3/4	7-3/8	7-7/8	8-1/2	9
1600	5/8	1-1/4	1-7/8	2-1/2	3-1/8	3-3/4	4-3/8	5	5-5/8	6-1/4	6-7/8	7-1/2	8-1/8	8-3/4	9-3/8	10

DOCUMENT A00901

MASS COASTAL RAILROAD (MCRR)
ON TRACK SAFETY MANUAL

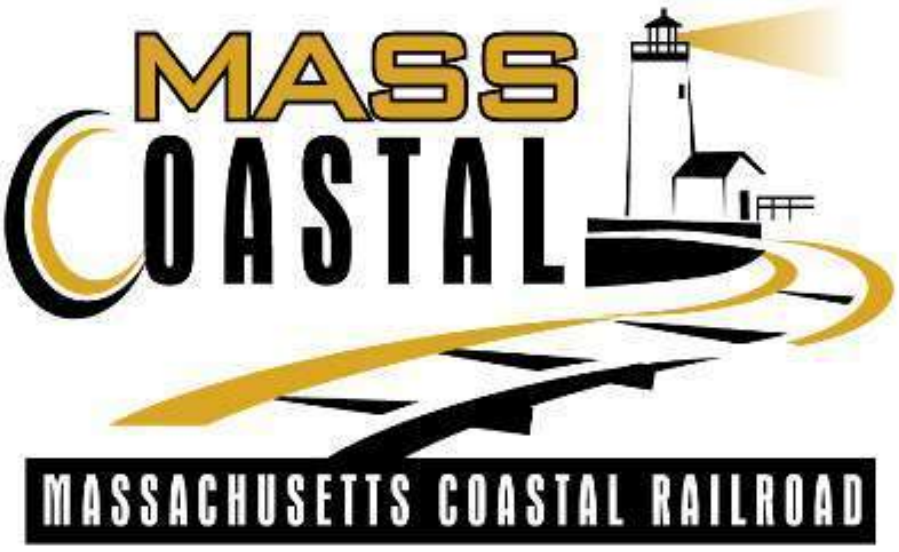
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On-Track Safety Manual

Roadway Worker Protection

Bridge Worker Safety

On-Track Maintenance Machines and Hyrail Vehicles



Mass Coastal Railroad

January 2018 Edition

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MASSACHUSETTS COASTAL RAILROAD, LLC

SAFETY STATEMENT

The On-Track Safety Program outlined in this manual contains Mass Coastal's interpretation of the minimum rules established by the Federal Railroad Administration in an effort to promote and ensure Roadway Worker Protection. The program requires the whole-hearted commitment of both the Mass Coastal management and its employees and contractors. Responsibilities fall to both the railroad and the individual. Safety of all employees, including roadway workers, is our primary concern at Mass Coastal Railroad.

This Program Manual is provided to each affected employee as required by FRA Regulations and is intended to be utilized for that purpose. The Program Manual remains the property of Massachusetts Coastal Railroad, LLC.

The Program Manual is adapted from the On-Track Safety Program developed by the American Short Line and regional Railroad Association, Updated April 2017.

The On-Track Safety Program is effective on January 6, 2008.

P. Christopher Podgurski

President

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OPERATING AUTHORITIES IN EFFECT:

NORAC Operating Rules 11th Edition
Mass Coastal RWP Manual
Mass Coastal Timetable #7 and all related Bulletin or General Orders

ON-TRACK SAFETY (OTS) PROCEDURES IN EFFECT:

For Controlled Track:
Exclusive Track Occupancy
Train Approach Warning (TAW)
Individual Train Detection (ITD)
Foul Time

For Non-Controlled Track:
Inaccessible Track
Train Approach Warning (TAW)
Individual Train Detection (ITD)

DEFINITIONS

Adjacent Track

A controlled or non-controlled track whose track center is spaced less than 25 feet from the track center of the occupied track

Competent Person

A person who is capable of identifying existing and predictable hazards in the workplace and who is authorized to take prompt corrective measures to eliminate them.

Controlled Tracks

Tracks upon which the rules require that all movements of trains must be authorized by a train dispatcher or a control operator/train dispatcher

Effective Securing Device

When used in relation to a manually operated switch or derail, one that is:

- Vandal resistant
- Tamper resistant
- Designed to be applied, secured, uniquely tagged and removed only by the class, craft or group of employees for whom protection is being provided.

Employee

An individual who is engaged or compensated by a railroad or by a contractor to perform any of the duties defined in this part.

Employer

A railroad or a contractor to a railroad, that directly engages or compensates individuals to perform any of the duties defined in this part.

Exclusive Track Occupancy (ETO)

A method of establishing working limits on controlled track.

Form D Control System (DCS)

A block system as defined by the NORAC Operating Rules, signaled or non-signaled, in which the movement of trains and or other mobile on rail equipment including hyrails and track cars operating outside of yard limits is authorized by Form D.

DCS in the context of Road Worker Protection is also used to authorize working limits established through “exclusive track occupancy”.

Foul Time

Method of establishing working limits on controlled track in which a roadway worker is notified by the train dispatcher or the control operator/train dispatcher that no trains will operate within a specific segment of controlled track until the roadway worker reports clear of the track.

Fouling

Placement of an individual or a piece of equipment in such proximity to a track that the individual or equipment could be struck by a moving train or on-track equipment, or in any case is within **4 feet** of the field side of the rail.

Hyrail Vehicle

A roadway maintenance machine that is manufactured to meet Federal Vehicle Motor Safety Standards and is equipped with retractable flanged wheels so that the vehicle may travel over the highway or on railroad tracks.

Inaccessible Track

Method of establishing working limits on non-controlled track by physically preventing entry and movement of trains and equipment.

Individual Train Detection (ITD)

Procedure by which **a Lone Worker** acquires On-Track Safety by seeing approaching trains and leaving the track before they arrive.

Interlocking Limits

The tracks between the opposing home signals of an interlocking

Lone Worker

An individual roadway worker who is not receiving On-track Safety by another roadway worker, who is not a member of a roadway work group and who is not engaged in a common task with another roadway worker.

Minor Correction

Minor correction means one or more repairs of a minor nature, including but not limited to, welding, spiking, anchoring, hand tamping, and joint bolt replacement that are accomplished with hand tools or handheld, hand supported or hand-guided power tools. The term does not include machine spiking, machine tamping, or any similarly distracting repair.

Non-Controlled Track

Track upon which trains are permitted by railroad rule or special instruction to move without receiving authorization from a train dispatcher or a control operator/train dispatcher. NORAC Rule 96 and 98.

NORAC (Northeast Operating Rules Advisory Committee)

Rules that govern the operation of the Mass Coastal Railroad

Occupied Track

Occupied track means a track on which on-track self-propelled equipment or coupled equipment is authorized or permitted to be located while engaged in a common task with a roadway work group with at least one of the roadway workers on the ground.

On-Track Roadway Maintenance Machine

A self-propelled, rail mounted, non-highway maintenance machine whose light weight is in excess of 7500 pounds, and whose purpose is not for the inspection of railroad track

On-Track Safety (OTS)

A state of freedom from the danger of being struck by a moving train or other railroad equipment, provided by operating or safety rules that govern track occupancy by personnel, trains and on-track equipment

Qualified Employee

A Mass Coastal Railroad employee who has successfully completed all required training, demonstrated proficiency in and been authorized to perform duties of a particular position or function.

Railroad Bridge

A structure that supports one or more railroad tracks above land or water and has a **span length of 10 feet or more**, as measured along the track centerline. The term **railroad bridge** applies to the entire structure between the faces of the back walls of abutments or equivalent components, regardless of the number of spans.

Railroad Bridge Worker or Bridge Worker

Any employee of a contractor and/or of a railroad owning or responsible for the construction, inspection, testing, or maintenance of a bridge whose assigned duties, if performed on a bridge. In general, any employee working on or about a bridge structure 12' above ground or water is subject to the requirements of 214 sub Part B, section 214.105.

Restricted Speed

When required to move at restricted speed, movement must be made at a speed that allows stopping within half the range of vision short of train, engine, railroad car, men or equipment fouling the track, stop signal or derail or switch lined against movement.
When a train or engine is required to move at restricted speed, the crew must keep a lookout for broken rail and not exceed 20 MPH.
Comply with these requirements until the leading wheels reach a point where movement at restricted speed is no longer required.

Roadway Machine

A machine used on or near the track for maintenance, repair, construction or inspection of track, bridges, roadway, signal and communications systems. Roadway Machines may be on-track, off-track or both. The machines include hi- rails, motor cars, Roadway Machines, work equipment and other forms of track cars.

Roadway Maintenance Work Train

A train which is being operated within working limits in conjunction with roadway maintenance, construction or repairs under the direction of a designated roadway worker

Roadway Worker in Charge (RWIC)/Employee in Charge (EIC)

A Mass Coastal Railroad qualified employee designated to provide On-Track Safety for one or more roadway work groups.

Roadway Work Group

Two or more roadway workers organized to work together on a common task.

Roadway Worker

Any employee of a railroad, or of a contractor to a railroad, whose duties include inspection, construction, maintenance or repair of railroad track, bridges, roadway, signal and communication systems, roadway facilities or roadway machines on or near the track or with the potential of fouling a track and flagmen and watchmen/lookouts as defined in this program.

Track

Term designating the area between rails and an area that extends to **4 feet** outside of each rail

Track Car

Equipment (other than trains) operated on track for inspection or maintenance

Track Center

Distance from the center of one track to the center of an adjacent track

Train

A locomotive with or without cars, with the rear piece of equipment displaying a marker

Train Approach Warning (TAW)

A method of establishing On-Track Safety by warning roadway workers of the approach of trains in ample time to move to, or remain in, a place of safety in accordance with requirements of FRA Roadway Worker Protection Rules

Watchman/Lookout

An employee who has been annually trained, qualified and designated to provide warning to roadway workers of approaching trains or on-track equipment.

Watchmen/Lookouts must be properly equipped to provide visual and auditory warning such as a whistle, air horn, white disk, red flag, lantern, or fusee. A Watchmen/Lookout sole duty is to look out for approaching trains, on-track equipment and provide at least *fifteen (15) seconds* advance warning to employees before arrival of trains and on-track equipment

Working Limits

A segment of track with definite boundaries upon which trains, engines and roadway machines may move only as authorized by the roadway worker designated as the RWIC/EIC

Work Zone

The area around a roadway machine that must not be entered without first communicating with the operator to establish safe work procedures.

1.0 ROADWAY WORKER PROTECTION ACT

1.1 Purpose of the Roadway Protection Act

The purpose of these rules is to define procedures to prevent roadway workers (both company and contractor employees) from being struck by railroad cars, locomotives, track units or other equipment while performing their duties. These rules have been prepared in accordance with Federal Railroad Administration Regulations found in 49 CFR, Part 214.

1.2 Training

1.2.1 All Roadway Workers

On-Track Safety training must be conducted ***ANNUALLY*** for all Roadway Workers.

Each Mass Coastal roadway worker is responsible for:

- Following the Rules governing on-track safety
- Staying clear of any track until the work activity requires fouling the track
- Determining that proper track protection is in fact being provided in accordance with this manual before fouling a track
- Making sure that a job briefing precedes any on-track work
- Wearing the proper Personal Protective Equipment required by Mass Coastal
    - Roadway Worker Employees and/or Contractors including:
        - Reflective Vest
        - Hardhat
        - Safety Glasses
        - Steel Toed Boots
        - Gloves
- All Roadway Workers must have the proper safety vest and their current RWP training card at all times while they are engaged in their RWP related duties.
- RWIC/EIC's and Roadway workers must have access to the On-Track Safety Manual at the work location.

1.2.2 Rules Qualified Employees

Employees whose duties include the inspection, construction, maintenance or repair of track, bridges, roadway, signals, and machinery or provides protection for other employees or themselves must be qualified on these rules and have access to these rules while on duty.

In addition to the training and qualification that all roadway workers receive, every roadway worker who is required to be Rules Qualified must also be trained and qualified annually as an **Employee-In-Charge (EIC) or Roadway Worker-In-Charge (RWIC)**. Employees required to provide protection for themselves or others must be Rules Qualified.

1.2.3 Contractors

Contractors to a railroad who perform work and/or foul of any track must be trained in the On-Track Safety procedures. This training can occur at the work site in the form of an extended job briefing containing applicable railroad on-track safety rules and all elements of 214.345.

Contractors to a railroad must not be allowed to foul a track unless:

- They have been properly trained in the On-Track Safety procedures, and/or
- A railroad employee who is trained and qualified as a lookout, flagman or RWIC/EIC is present at the work site.

1.3 Job Briefings

A Job Briefing *must* be conducted *PRIOR* to any roadway worker fouling any track. A Job Briefing is complete only when each roadway worker acknowledges understanding of the On-Track Safety procedures and instructions.

1.3.1 Job Briefing for Roadway Work Group

The RWIC/EIC must conduct a Job Briefing that includes all information related to On-Track Safety. This Job Briefing is given to every roadway worker ***PRIOR*** to fouling the track.

In addition to other safety issues, the *minimum* On-Track Safety information must include:

- Designated RWIC/EIC; name and telephone number
- Type of On-Track Safety provided
- A general plan and procedures the work will follow
- Additional briefings if on-track protection changes
- Track limits and time limits of track authority
- Track(s) that may be fouled
- Nature and characteristics of the work to be performed, to determine if adjacent track protection is necessary
- Information about any adjacent tracks, on-track safety on adjacent tracks if required or deemed necessary by the RWIC, and identification of any roadway maintenance machines that will foul such tracks.
- Procedure to arrange for On-Track Safety on other tracks, if necessary
- Method of warning when On-Track Safety is provided by a lookout

- Designated place of safety where workers clear for trains
- Designated work zones around machines
- Safe working/traveling distances between machines

Note: When working limits overlap, those roadway workers in charge of the respective working limits must determine who will be the sole RWIC/EIC of the overlapping limits.

The RWIC/EIC must give a follow-up Job Briefing whenever:
- Working conditions or procedures change
- Other workers enter the working limits
- On-Track Safety is changed or extended, or
- The main track has been cleared and On-Track Safety or track authority is to be released

1.3.2 Job Briefing for Lone Workers

A Lone Worker must participate in an On-Track Safety Job Briefing with his supervisor or other designated employee at the beginning of each tour of duty. This briefing must include:
- Planned itinerary, and
- On-Track Safety procedure to be used, and
- Completion of a Statement of On-Track Safety if Individual Train Detection per rule 1.4.3 is to be used.

Exception: **When communication has failed, On-Track Safety Job Briefing must be conducted as soon as possible after communication is restored.**

1.3.3 Contractor/Employee Responsibilities
- Acknowledge Job Briefing
- Be able to provide the following information
    - EIC name and cell phone number
    - Type of On Track Safety (OTS)
        - Form D if appropriate
        - Adjacent Track Protection if appropriate
        - Inaccessible Track Protection if appropriate

1.3.4 Communication Requirements

Each employee designated by the railroad to provide on-track safety for a roadway worker group or groups, must be equipped with a wireless communication devise capable of reaching the control center of the railroad. The employee must, where practicable, maintain immediate access to the communication device. When immediate access is not practicable, the employee in charge or lone worker must be equipped with a radio capable of monitoring transmissions from train movements in the vicinity.

1.4 On-Track Safety Procedures

The employee in charge of the roadway work group, or the Lone Worker, determines the type of On-Track Safety to be used. The type of On-Track Safety must comply with these provisions, as well as:

- NORAC Operating Rules
- Timetable
- General Orders
- Special Instructions

On-Track Safety can be provided for roadway workers by the following methods:

- Exclusive Track Occupancy
- Inaccessible Track
- Individual Train Detection (ITD)
- Train Approach Warning (TAW)
- Foul Time

1.4.1 Exclusive Track Occupancy

Exclusive Track Occupancy establishes working limits on **Controlled Tracks**.
Examples of Controlled Track include:

- Form D Control System Territory (DSC)
- Manual Interlocking
- Yard Limits (main line)

Exclusive Track Occupancy on **Controlled Track** can be established by the following four methods:

1. Exclusive Track Occupancy (NORAC Rule 133)
    a. Line 4 or 5
2. Train Approach Warning (TAW)
3. Individual Train Detection (ITD)
4. Foul Time (NORAC Rule 140)

Note: Trains and/or roadway maintenance machines must not enter the limits of the Form D unless verbally authorized by the RWIC/EIC. When so authorized, trains may move as specified by the RWIC/EIC. Restricted speed does apply unless higher speed is authorized by the RWIC/EIC not to exceed 30mph.

1.4.2 Inaccessible Track

Inaccessible Track is a method of establishing working limits on **non-controlled** tracks by making the track physically inaccessible to trains, engines, rolling equipment and on-track equipment.

Trains and roadway maintenance machines within working limits established by means of inaccessible track shall move only under the direction of the RWIC/EIC and must move prepared to stop within one half the range of vision, short of men and equipment. No operable locomotives or other items of on-track equipment except those under the direction of the RWIC/EIC may be located within these limits.

Non-controlled track consists of:

- Yard Tracks (not main line Yard Limits)
- Industrial Leads
- Non-controlled Sidings
- Rule 98 Tracks

The RWIC/EIC or Lone Worker establishes working limits using Inaccessible Track with one of the following methods:

- Line a switch or derail to prevent access to the working limits. Lock, spike and/or clamp switch or derail securely. A MOW lock must be used so train service employees cannot unlock it; or
- Place a portable derail(s) with red flag(s). Derails and red flags should be placed 300' in advance of work area, if possible; or
- Place a flagman with instructions and the capability to hold all trains and equipment from entering the working limits; or
- Establish discontinuity in the rail to prevent movement into the working limits.

1.4.3 Individual Train Detection (ITD)

Individual Train Detection is a form of On-Track Safety that can be used ***only*** by Lone Workers. A Lone Worker has the right to use On-Track Safety procedures other than ITD if the Lone Worker feels the situation requires it. ITD can be used to provide On-Track Safety only if all the following conditions are met:

- The Lone Worker is trained, qualified, and designated to use ITD, and
- Only routine inspection or minor repair is being performed. The Lone Worker may not occupy any position or engage in any activity that would interfere with the ability to detect the approach of train or equipment in either direction, and
- The Lone Worker is not inside the limits of a Manual Interlocking, and
- The Lone Worker can visually detect the approach of trains or equipment moving at maximum speed and can move to a place of safety at least 15 seconds before its arrival.

NOTE: The place of safety must not be on a track unless working limits have been established on that track.

- No power operated tools or machines are in use within hearing range. The Lone Worker's ability to hear and see approaching trains and equipment is not impaired by:
    - Background noise
    - Lights
    - Inclement Weather
    - Passing Trains
    - Other Physical Conditions

- The Lone Worker has completed a written Statement of On-Track Safety. When using ITD, the Lone Worker must produce the completed Statement of On-Track Safety upon request.

1.4.4 Train Approach Warning (TAW)

Members of a roadway work group may foul a track without establishing working limits by using Train Approach Warning to **perform routine inspections or other minor corrections; or to provide warning on adjacent non-controlled tracks for large scale maintenance work.** The RWIC/EIC will establish On-Track Safety by designating one or more Lookouts to provide warning of all approaching movements. Lookouts will provide the warning using:

- A whistle or an air horn

And/or

- Any method agreed upon in Job Briefing

Train Approach Warning may be used to provide On-Track Safety only when all the following conditions are met:

- Each Lookout must be a qualified employee and equipped to provide Train Approach Warning, and
- A Lookout can give a Train Approach Warning in time to allow each roadway worker to move to a previously arranged place of safety at least 15 seconds before the arrival of a train, engine or other equipment, and
- Each roadway worker is in a position to receive a Train Approach Warning

Lookouts must devote their entire attention to detecting approaching trains and engines and warning the roadway workers. Lookouts must:

- Not be assigned other duties while functioning as a lookout.
- Remain at their duties until the RWIC/EIC either determines that protection is no longer necessary or sends another Lookout to relieve them.

Note: **The RWIC/EIC may provide Train Approach Warning by acting as the Lookout as long as the RWIC/EIC is not performing other duties.**

The Lookout's method of communicating a Train Approach Warning must be distinctive and clearly understood, regardless of noise or work distraction and regardless of the direction that the warned worker is looking and agreed upon during the Job Briefing.

The method that a Lookout will use to warn roadway workers will consist of:

- Blowing a whistle and/or sounding an air horn
- Verbal Communication
- Visual aid (ex. Paddle, flag, etc.)

Note: Touching a roadway worker can be utilized to replace the above aids when only two roadway workers are present. The two roadway workers must always remain within arm's length of each other when fouling the track.

The following chart identifies the minimum distance required for the maximum authorized speed **to provide employees the minimum 15 seconds necessary to clear the track prior to the arrival of a train or engine. Time requirements to distribute or receive warning, removing tool/materials, etc. must be added to the 15 seconds.**

Speed (Mph)	Distance (Ft)	Speed (Mph)	Distance (Ft)
5	110	35	770
10	220	40	880
15	330	45	990
20	440	50	1,100
25	550	55	1,210
30	660	60	1,320

1.4.5 Foul Time

Use Foul Time to establish working limits on **controlled track** in:

- DCS Territory
- Manual interlocking's

To establish working limits using Foul Time:

- Obtain Foul Time from the control operator/train dispatcher.
- Copy and repeat the Foul Time back to the control operator/train dispatcher.
- When protection is no longer required, report clear of the limits to the control operator/train dispatcher. The control operator/train dispatcher then releases the Foul Time.

1.4.6 Adjacent Track Protection on Non-Controlled Track

Inaccessible Track per rule 1.4.2 can be used to establish working limits when it is necessary to foul adjacent **non-controlled tracks**.

If working limits are not established on an adjacent non-controlled track, Train Approach Warning per rule 1.4.4 may be used to protect roadway workers fouling that track.

1.4.7 Adjacent Track Protection on Controlled Track

Protection for roadway workers and roadway work groups performing minor or major track maintenance with or without roadway maintenance machines will be established for adjacent controlled tracks within 25' of ongoing work.

Note: The RWIC/EIC may establish protection on any adjacent track (s), even when not specifically required by this rule, at any time as deemed necessary by the RWIC/EIC to ensure the safety of the roadway work group

1.4.7.1 Occupying a Track with an Adjacent Controlled Track (s)

Exclusive track occupancy per rule 1.4.1 or train approach warning per rule 1.4.4 must be utilized to provide protection for roadway workers on an adjacent controlled track(s) (adjacent controlled track(s) spaced 25ft or less center to center).

NOTE: Train approach warning must not be utilized to provide protection on an adjacent controlled track if any component of the on track equipment such as a boom, arm or crane will foul the adjacent protected track. If any component of the equipment will foul the adjacent protected track, the RWIC/EIC must establish exclusive track occupancy per rule 1.4.1 for protection and not permit movements on the adjacent track. RWIC/EIC must not permit movements on the adjacent track until all men and equipment are clear.

1.4.7.2 Passing of Trains on Adjacent Controlled Tracks

When the RWIC/EIC permits the passing of trains or other on-track equipment on the controlled adjacent track(s), roadway workers must stop work and move to a pre-determined place of safety upon receiving a watchman/lookout warning, or notification that the RWIC/EIC intends to permit one or more trains or on track equipment movements within the working limits of the adjacent controlled track. The pre-determined place of safety must not be fouling any track unless working limits have been established for that track and no movements on that track within those limits are permitted by the RWIC/EIC. Machine operators must stop the operation of their equipment, and when practicable, persons using them must remove themselves to a pre-determined place of safety. Prior to authorizing movements through working limits on an

adjacent track, the RWIC/EIC must notify roadways workers and receive verification that personnel and equipment are clear of the adjacent track(s).

1.5 Audible Warning from Trains

Trains must sound their locomotive whistle and ring their bell per the railroad operating rules when approaching roadway workers on or near the track, regardless of local whistle prohibitions.

To give trains advance notice of roadway workers on or near the track, each roadway worker fouling the track must wear company-approved work wear with reflectorized striping.

1.6 Operating and Working Near Roadway Machines

1.6.1 Purpose

The purpose of this section is to prevent accidents and casualties caused by the lawful operation of on-track roadway maintenance machines and hi-rail vehicles**.** This section prescribes minimum safety standards for on-track roadway maintenance machines and hi-rail vehicles.

1.6.2 On-Track Equipment Operator Training and Qualifications

1.6.2.1 General Training Requirements

No employee may operate a roadway machine without first:

- Having been trained in accordance with the rules;
- Having been informed of the safety procedures applicable to persons working near the machine; and
- Acknowledging full understanding of those safety procedures

1.6.2.2 Machine Specific Training Requirements

The operator's manual, which includes instructions for safe operation, shall be provided and maintained with each machine large enough to carry the document. A machine operator must have a clear understanding of the information contained in the associated manual prior to operating a roadway machine.

1.6.2.3 Qualifications

An employee will not be considered qualified to operate a unit of on-track equipment without having been trained to be competent in the operation of

that machine. This training may be accomplished on-the-job through peer instruction or through a combination of classroom training and peer training.

1.6.3 Working with On-Track Equipment

When Working with On-Track Equipment, spacing guidelines must be adhered to in order to prevent contact between machines and to prevent machines from contacting workers. When work or travel conditions dictate that the machine spacing must be less than the guidelines require, the machine operators and the RWIC/EIC must have a thorough understanding of the specific task, the conditions under which the task is to be done and how the task is to proceed. In addition, the operator of a machine approaching workers who are to foul the track must communicate with the workers before getting closer than 15 feet to them.

Before a reverse move is made, the operator must ascertain that a backup alarm is activated and/or the appropriate horn or signal is provided. In addition, the operator must observe that the track is clear of men and machines before the reverse movement is made.

1.6.3.1 Work Zones around Machines

When roadway workers' tasks require that they occupy the center of the track, they must not enter a machine's Work Zone without first communicating with the operator to establish safe work procedures. Unless a different understanding is established through a job briefing, *this Work Zone extends from a point 15 feet in front of the machine to a point 15 feet behind the machine.*

1.6.3.2 Safe Working Distance between Machines

Unless a different understanding is established through a job briefing, the *minimum distance between machines while working is 40 feet.*

1.6.3.3 Safe Traveling Distance between Machines

On-track equipment must maintain a *minimum distance of 200 feet* between each other, except when traveling through a crossing, In addition to the 200 feet, on-track equipment must operate at a speed which will allow stopping within half the range of vision.

Note: Adverse weather and/or rail conditions may require greater separation distances.

1.6.3.4 Stopping On-Track Equipment

When necessary to slow or stop on-track equipment during travel, the operator must signal following equipment operators either by radio or hand signal and be understood.

1.6.3.5 Tying Up Equipment

All equipment must be properly secured by the following procedures when left unattended to ensure safety:

- Secure all brakes, booms, locks, and hooks.
- Dismount the machine on the field side of the track, away from live traffic.

EXCEPTION: If the track is between live tracks, dismount on the side designated in the job briefing

1.7 Right to Challenge On-Track Safety

The railroad and each roadway worker share joint responsibility for ensuring that On-Track Safety is provided.

1.7.1 Responsibilities of the Railroad

The Railroad must:

- Provide proper training of every roadway worker as outlined in 1.2.
- Guarantee each employee and/or operator the absolute right to challenge, in good faith, whether the On-Track Safety procedures to be applied at the job site comply with the Railroad Rules. Each employee has the right to remain clear of the track until the challenge is resolved.
- Follow the procedures outlined in 1.7.3 to resolve challenges promptly and equitably.

1.7.2 Responsibilities of the Roadway Worker

Each roadway worker has the following responsibilities:

- Follow the Railroad's On-Track Safety procedures.
- Avoid fouling a track except when necessary to perform your duties.
- Before fouling a track, determine that On-Track Safety is being provided.

Note: A roadway worker or roadway machine is considered to be fouling a track when within 4 feet of the nearest rail.

- Refuse any directive to violate an On-Track Safety or machine/hyrail rule and promptly notify a supervisor when the safety provisions to be applied at the job site do not comply with the railroad rules.

1.7.3 Good Faith Challenges and Resolution of Those Challenges

A roadway worker may make a Good Faith Challenge to on-track safety procedures and conditions of roadway maintenance machines and hyrail vehicles. Follow these steps when resolving a challenge:

1. The roadway worker informs the RWIC/EIC that he or she does not believe that the procedure and/or condition complies with the railroad's rules.

   Note: Employees may not be subject to any retribution or punishment for making a good faith challenge.

2. The RWIC/EIC will review procedure and/or condition with the employee to verify that the procedure and/or condition complies with the railroad's rules.
3. If the employee is still not satisfied that the procedure or condition complies with the railroad's rules, the RWIC/EIC will contact the Manager of Engineering, Track & Bridges and complete the "Good Faith Challenge Form."
4. Upon the review:
   - If the Manager determines that the procedure and/or condition is not in compliance with the railroad rules, the RWIC/EIC will correct procedure and/or condition to ensure compliance.
   - If the Manager of Engineering, Track & Bridges determines that procedure and/or condition is in compliance with the railroad rules, the challenging employee must perform the assigned task.

2.0 Bridge Worker Safety

2.1 General Requirements

2.1.1 General Fall Protection Requirements

When working on a railroad bridge at a height of **12 feet** or more above the ground or creek bed, use personal fall arrest equipment. If fall protection is required to perform bridge repairs and proper equipment is not available for a rescue plan, the supervisor should be contacted prior to making repairs.

Note: If rescue equipment is unavailable, the work cannot be attempted until equipment is available and all involved workers are properly trained.

Where there is no deck openings through which an employee can fall, the use of personal fall arrest equipment is not required when:

- Walking within the gage of the rails.
- Performing minor inspections or repairs exclusively between the outside rails.
- Working on a bridge that has walkways or railings that meet the requirements of the American Railway Engineering & Maintenance of Way Association Manual for Railway Engineering.
- Conducting bridge inspections when:
    - A written program in place that requires training in, adherence to, and use of safe procedures associated with climbing techniques and procedures to be used
    - The inspector has been trained and qualified according to that program
    - The inspector has been previously and voluntarily designated to perform inspection under the provisions of that program and has accepted the designation
    - The inspector is familiar with the appropriate climbing techniques associated with bridge structures
    - The inspector is engaged solely in moving on or about the bridge or observing, measuring and recording the dimensions and condition of the bridge
    - The inspector is provided all equipment necessary to meet the needs of safety, including any specialized alternative systems required
    - The installation or use of fall arrest equipment poses a greater exposure to risk than the work to be performed

Note: Minor repairs include, but are not limited to, routine welding, spiking, anchoring, spot surfacing and joint bolt replacement. Replacing bridge ties or rail is *NOT* considered minor repairs.

2.1.2 Fall Protection System Standards

Fall protections systems utilized must be compliant with *49CFR Part 214.105.*

Note: Body belts shall not be utilized.

2.2 Safety Net Systems

Safety net systems must be compliant with *49CFR Part 214.105*.

2.3 Working Over or Adjacent to Water

When working over or adjacent to water 4' feet or greater in depth or where the potential of drowning exists utilize a:

- Personal fall protection system. (Fall protection is require if 12 or more feet above the water.) or life vest
- Ring buoy with a minimum of 90 feet of line and no more than 200 feet between buoys; and inflatable boat, manned if necessary.

2.4 Inspecting Equipment and System

- Prior to use, Inspect fall protection equipment and systems according to the manufacturers' instructions and as reviewed in training sessions.
- A fall protection system or component involved in a fall shall be immediately and permanently removed from service until fully inspected and determined by a competent person to be undamaged and suitable for reuse.

2.5 Cleaning and Storing Equipment

- Clean fall protection equipment components according to the manufacturers' instructions provided with the equipment, and as reviewed in training sessions.
- Store fall protection equipment components where they cannot be accessed by unauthorized personnel. Protect from adverse weather conditions, chemical exposure and open flames and sparks.

2.6 Scaffolding

Scaffolding systems utilized must be compliant with 49CFR Part 214.109.

2.7 Bridge Worker Rescue Plan

Prior to utilizing fall protection equipment, a job briefing should be conducted to identify and prepare for implementation of emergency rescue needs.

2.8 Personal Protective Equipment (PPE) for Bridge Workers

- Hard hats, conforming to the ANSI standards, must be utilized by bridge workers when on or under a bridge.
- Steel-toed boots, conforming to the ASTM standards, must be utilized by bridge workers when on or under a bridge.
- Safety glasses, conforming to ANSI standards, must be utilized by bridge workers when on or under a bridge.
- Face shield should be utilized when safety glasses will not provide adequate protection.
- All PPE will be kept clean and in good repair with no structural or optical damage.

Hard hats, face shields, non-prescription safety glasses and googles (cover-all type for workers wearing prescription glasses) shall be provided to the bridge workers.

3.0 ON-TRACK MAINTENANCE MACHINES AND HI-RAIL VEHICLES

3.1 General Prestart Checks

Prior to starting work equipment, check the following levels:

- Engine oil
- Radiator coolant
- Transmission fluid
- Hydraulic fluid
- Hydraulic brake fluid
- Fuel
- Other parts that use any type of fluid

3.2 Equipment Inspection and Condition

- Machine Operators must maintain work equipment in a safe condition
- Machine Operators should have the necessary tools to perform daily maintenance and basic repairs
- Machine Operators must inspect work equipment before and periodically during use
- Any non-compliant FRA condition must be red tagged, dated and reported to the Supervisor.

  Non-compliant conditions are as follows:
  - Headlights/work light: Machine can be operated for 7 days during daylight hours
  - Horn: Portable horn can be utilized for 7 days
  - Fire extinguisher: Portable fire extinguisher can be utilized for 7 days
  - Back-up alarm/strobe light: Must be repaired within 7 days
  - Operator's seat: Must be repaired within 24 hours
  - Braking system: Move machine to clearance point and place out of service if unable to couple to other machine to provide braking or no secondary braking system.

3.2.1 Repairs

- If parts are available, repairs must be completed immediately. If repairs cannot be made immediately, contact Supervisor
- If parts have been ordered within 24 hours of defect notification (excluding brake system and operator seat failure), the machine can be operated for 30 days
- Repairs must be made within the 30 days
- If equipment is not repaired after 30 days, it must be removed from service

3.2.2 Towing

- Must be equipped with towing bar or coupler
- Must not exceed braking system capabilities

3.3 On-Track Roadway Maintenance Machine Safety Requirements (General)

- Secure position (e.g., handhold, handrails, or seat) for each operator and transported roadway worker
- Rider position must be clearly identified
- Functional horn with triggering device easily identifiable and within reach of operator
- Headlights capable of lighting 300ft ahead of equipment
- Overhead covers at the operator(s) position if previously equipped
- Floors, decks stairs, and ladders must provide secure access and free of obstructions, grease and oil
- Flagging kit, if operated alone or lead/trailing machine in gang
- Operator's manual

3.4 On-Track Roadway Maintenance Machines Safety Requirements (Built on or after January 1, 1991)

In addition to the general requirements the following also apply:

- Back-up alarm or rearward viewing mirror if feasible
- Operative heater when operated below 50 degrees or equipped or has been equipped by manufacturer
- Light weight of machine clearly displayed, if more than 7,500 pounds
- Reflective material/device or operable brake lights
- Safety glass
- Turntable lock or warning light

3.5New On-Track Roadway Maintenance Machine Safety Requirements (Built after September 27, 2004)

In addition to the general requirements the following also apply:

- Tampers, regulators, mechanical brooms, rotary scarifiers, undercutters or mechanical equivalent must have operational heater, AC and pressurized ventilation system.
- Operator's seat, unless designed to travel by standing, then equipped with handholds or handrails to a safe and secure position
- Locking turntable (e.g., hooks latches, pins, etc.)
- Windshield with safety glass if designed with windshield. Power windshield wipers or suitable equivalent if wipers or incompatible with windshield
- Capable braking system

- First-aid kit
- Fire extinguisher (5BC rating or higher)
- Display as-built light weight in a conspicuous location
- Headlights capable of lighting 300ft ahead of equipment
- Work lights if operated at night, unless equivalent light is provided
- Operational 360-degree strobe light, unless designed without roof and light weight is less than 17,500
- Brake light activated by application of braking system and visible at 300ft
- Functional horn with triggering device clearly identifiable
- Back-up alarm with review mirror
- Speed indicator, if light weight exceed 32,500 pounds and is operated at speeds in excess of 20 mph

3.6 Hi-rail Safety Inspection Checklist

Tram, wheel wear and gage must be inspected annually with no more than 14 months between inspections. Inspection must be documented and retained by Supervisor unit next required annual inspection. Prior to use, the operator must ensure the following:

- The annual inspection is current.
- Any non-compliant FRA condition must be red tagged and reported to your Supervisor.

  Non-compliant conditions are as follows:
  - Functional strobe light
  - Back-up Alarm
  - Flagging kit

3.6.1 Repairs

- If parts are available, repairs must be completed immediately. If repairs cannot be made immediately, contact Supervisor
- If parts have been ordered within 24 hours of defect notification (excluding brake system and operator seat failure), the hi-rail can be operated for 30 days
- Repairs must be made within the 30 days.
- If equipment is not repaired after 30 days, it must be removed from service

Appendix A

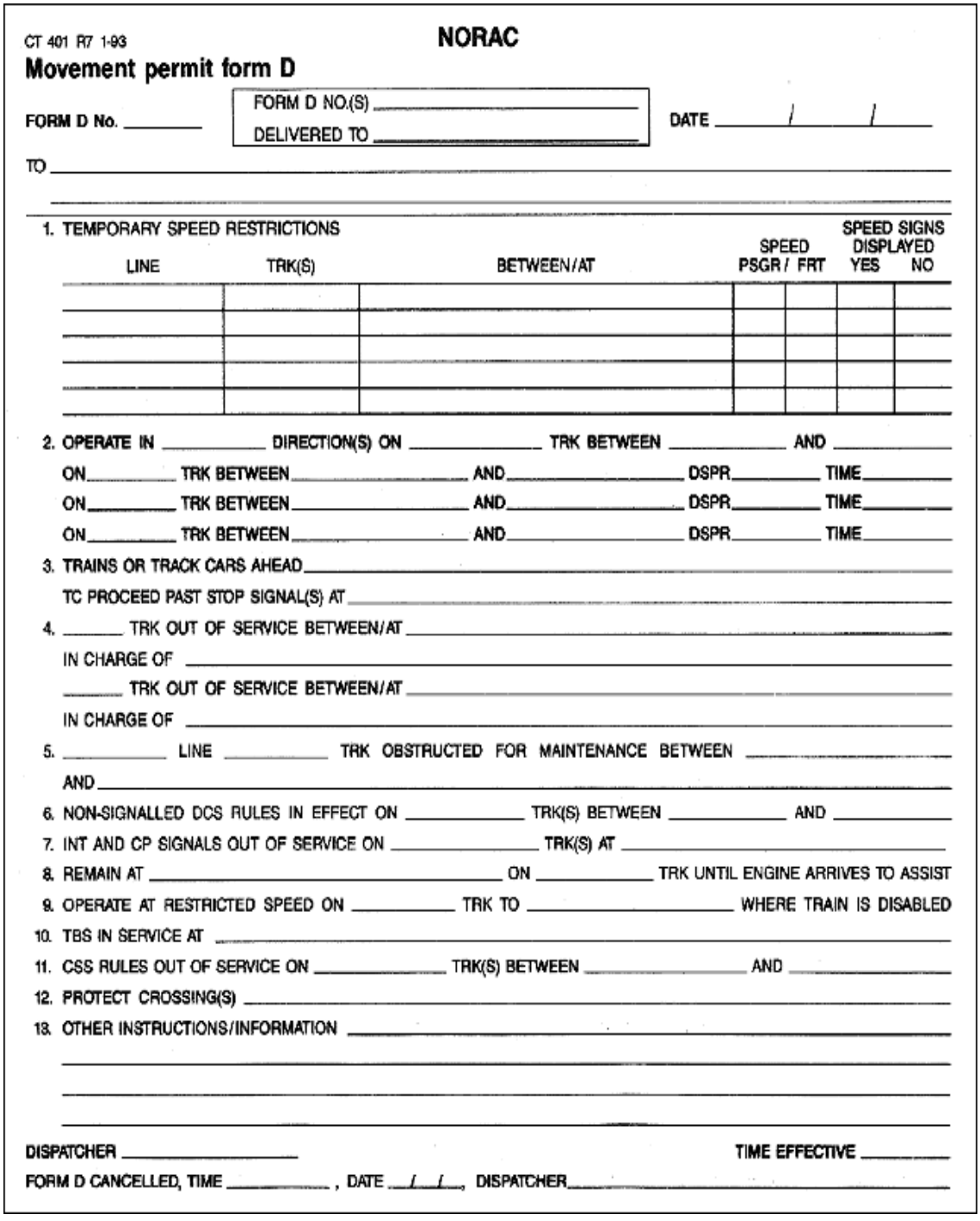
SAFETY TIPS FOR ROADWAY WORKERS

1. Never foul a track unless your work requires you to do so.
2. Never foul a track until you are absolutely certain that on-track safety has been established and that the OTS is appropriate for the work to be performed.
3. You have the right to challenge the on-track safety procedures to be applied at the job location if you believe that they do not comply with the rules of the railroad. You should remain clear of the track until the challenge is resolved.
4. An on-track safety job briefing must be conducted before fouling the track, and you should understand all aspects of your on-track safety to ensure that you are adequately protected. You must acknowledge that you understand the briefing and the on-track safety must be appropriate for the work that you are performing.
5. Remind the person providing you the on-track safety job briefing that you must be notified of any changes that may occur throughout the day.
6. You must know the identity and cell phone number of the EIC.
7. It is critical to know the type of on-track safety for all of the track(s) you are to foul.
8. When train approach warning is to be provided, the designated place of safety must be known and established in the job briefing. It is imperative that you are able to be clear of the track before any train is not less than 15 seconds from your work location.
9. If the work activity is on a track with adjacent track(s), you must know what type of on-track safety is provided on those adjacent track(s).

10. If you are a lone worker using individual train detection:
    a. The on-track safety statement must be completed. (continued on next page)
    b. You have the right to use an alternative form of on-track safety other than individual train detection.
    c. You cannot be working where there is noise (e.g., environmental, power tools, machines, etc.) or other impairments interfering with your ability to detect approaching trains.
    d. You must be outside a manual interlocking, controlled point, or remote hump yard facility.
    e. You must have the ability to clear to a protected area.
    f. The required sight distance must be available in order for you to be in the clear before any train is not less than 15 seconds away from your work location.
    g. Only minor repairs, inspection, or correction work may be performed as long as they do not interfere with your ability to detect approaching trains.
11. If the task involves Roadway Maintenance Machines (RMM), you must know the RMM procedures to ensure your safety.
12. Before fouling any track be sure to be wearing the proper high-visibility clothing/PPE.
13. The specific Working Limits boundaries must be clearly defined by mile posts and/or other physical characteristics such as stations found in the time table.
14. **Stop, look, and listen before crossing any track, regardless of the on-track safety status of the track(s).**

You can expect the movement of trains, engines, cars, or other moveable equipment at any time, on any track, in either direction.

Appendix B



CT 401 R7 1-93

NORAC

Movement permit form D

FORM D No. _____

FORM D NO.(S) _____

DELIVERED TO _____

DATE ___/___/___

TO _____

_____

1. TEMPORARY SPEED RESTRICTIONS

LINE	TRK(S)	BETWEEN/AT	SPEED PSGR / FRT		SPEED SIGNS DISPLAYED YES	NO

2. OPERATE IN _____ DIRECTION(S) ON _____ TRK BETWEEN _____ AND _____

ON _____ TRK BETWEEN _____ AND _____ DSPR _____ TIME _____

ON _____ TRK BETWEEN _____ AND _____ DSPR _____ TIME _____

ON _____ TRK BETWEEN _____ AND _____ DSPR _____ TIME _____

3. TRAINS OR TRACK CARS AHEAD _____

TC PROCEED PAST STOP SIGNAL(S) AT _____

4. _____ TRK OUT OF SERVICE BETWEEN/AT _____

IN CHARGE OF _____

_____ TRK OUT OF SERVICE BETWEEN/AT _____

IN CHARGE OF _____

5. _____ LINE _____ TRK OBSTRUCTED FOR MAINTENANCE BETWEEN _____

AND _____

6. NON-SIGNALLED DCS RULES IN EFFECT ON _____ TRK(S) BETWEEN _____ AND _____

7. INT AND CP SIGNALS OUT OF SERVICE ON _____ TRK(S) AT _____

8. REMAIN AT _____ ON _____ TRK UNTIL ENGINE ARRIVES TO ASSIST

9. OPERATE AT RESTRICTED SPEED ON _____ TRK TO _____ WHERE TRAIN IS DISABLED

10. TBS IN SERVICE AT _____

11. CSS RULES OUT OF SERVICE ON _____ TRK(S) BETWEEN _____ AND _____

12. PROTECT CROSSING(S) _____

13. OTHER INSTRUCTIONS/INFORMATION _____

_____

_____

_____

DISPATCHER _____ TIME EFFECTIVE _____

FORM D CANCELLED, TIME _____ , DATE ___/___/___, DISPATCHER _____

Appendix C

Massachusetts Coastal Railroad

GOOD FAITH CHALLENGE FORM

Name: _____

Job Position: _____

Job Location: _____

Supervisor's Name: _____ Supervisor's Title: _____

Date and Time of Occurrence: _____

Work Location: _____

Track and Mile Post: _____

Nearest City/Town: _____

On-Track Safety Procedure applied (or lacking) at working location:

_____

_____

_____

Railroad Safety or Operating Rule not being complied with:

_____

_____

_____

Reason for this Challenge:

_____

_____

_____

Other Employees with information regarding this situation:

_____

_____

_____

Signature: _____ Date: _____

Determination by Supervisor:

_____

_____

_____

Supervisor Signature: _____ Date: _____

INSTRUCTIONS: The employee making challenge shall complete this form, sign and date it, and give it to his Supervisor who shall document his determination, sign and forward to the Roadmaster.

Appendix D

Railroad Matrix

The following Matrix will assist the Railroad Supervisor, or the RWIC/EIC and any Roadway Worker responsible for establishing working limits in the determination of On-Track Safety Protection. To determine the protection available, the RWIC/EIC or Lone Worker decides what track is to be occupied and the appropriate type of protection to be used.

TYPE OF ON-TRACK SAFETY (OTS)	NORAC	CONTROLLED TRACK		NON-CONTROLLED TRACK		MANUAL INTERLOCK OR CP	
		GANG	LONE	GANG	LONE	GANG	LONE
EXCLUSIVE TRACK OCCUPANCY (ETO) (1)	Rule 133	•	•			•	•
FOUL TIME (1)	Rule 140	•	•			•	•
INACCESSIBLE TRACK (1)	Rule 141			•	•		
TRAIN APPROACH WARNING (TAW)		•		•			
INDIVIDUAL TRAIN DETECTION (ITD)			•		•		

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GENERAL ORDER B-9
EFFECTIVE 12:01 A.M., OCTOBER 12, 2021

General Orders In Effect In This Series: B-1, B-5, B-6, B-7, B-8 and B-9.

++

SUBJECT: ADDITIONS/AMENDMENTS TO THE ON-TRACK SAFETY MANUAL

Changes that are new to this general order are underlined.

Make the following changes to Massachusetts Coastal Railroad On-Track Safety Manual dated January 1, 2018:

On Page 13, in order to remove Train Approach Warning (TAW) and Individual Train Detection (ITD) from the list of methods of Exclusive Track Occupancy, **1.4.1 Exclusive Track Occupancy** is replaced with the following:

1.4.1 Exclusive Track Occupancy
Exclusive Track Occupancy establishes working limits on **Controlled Tracks**.
Examples of Controlled Track include:

- Form D Control System Territory (DCS)
- Manual Interlocking
- Yard Limits - Main Track Only

Exclusive Track Occupancy on Controlled Track may be established by the following methods:

- NORAC Rule 133 – Form D Line 4 or 5
- NORAC Rule 140 – Foul Time
- NORAC Rule 93 – Yard Limits – Applies only to the Main Track, and only when the dispatcher providing the required permission provides it exclusively to the Roadway Worker In Charge.

Note: Trains and/or roadway maintenance machines must not enter the limits of the Form D unless verbally authorized by the RWIC. When verbally authorized by the RWIC to enter the limits, trains must move at Restricted Speed, unless otherwise authorized by the RWIC. The RWIC must not authorize any speed greater than 20 MPH.

Permission must be given in the following manner:
"Extra 453 (or TC 1234) may proceed North through my out-of-service limits at (**Restricted or Normal**) speed, not exceeding (**a speed no greater than 20**) MPH from A to B."

On Page 15, in order to detail the warning method used by a Watchman/Lookout, the first paragraph of **1.4.4 Train Approach Warning (TAW)** is replaced with the following:

1.4.4 Train Approach Warning (TAW)

Members of a roadway work group may foul a track without establishing working limits by using Train Approach Warning to perform routine inspections or other minor corrections; or to provide warning on adjacent non-controlled tracks for large scale maintenance work. The RWIC will establish On-Track Safety (OTS) by designating one or more lookouts to provide warning of all approaching movements. Warning will be provided by one or more Lookouts using any of the following methods:

- Audible Notification, using a whistle or compressed air horn. A Visual Notification using a Red/Orange flag may be used in conjunction with an audible warning, but a visual notification must not be the sole method of notification.
- Physical Touch, when for a single roadway worker within arm's length away from the Watchman/Lookout

(The remainder of **1.4.4 Train Approach Warning (TAW)** remains unchanged.)

On Page 19, in order to correct terminology and provide additional detail, **1.6.3 Working with On-Track Equipment** is replaced with the following:

1.6.3 Working with Roadway Maintenance Machines

When working with Roadway Maintenance Machines, spacing guidelines must be adhered to in order to prevent contact between machines and to prevent machines from contacting workers. When work or travel conditions dictate that the machine spacing must be less than the guidelines require, the machine operators and the RWIC must have a thorough understanding of the specific task, the conditions under which the task is to be done and how the task is to proceed. In addition, the operator of a machine approaching workers who are to foul the track must communicate with the workers before getting closer than 15 feet to them. When the task of a roadway worker requires the roadway worker to occupy the Work Zone of a Roadway Maintenance Machine, the roadway worker must not enter the Work Zone without first communicating with the operator of the Roadway Maintenance Machine. This Work Zone extends from a point 15 feet around the entire machine, which includes extendable attachments and material handled.

Before a reverse move is made, the operator must ascertain that a backup alarm is activated and/or the appropriate horn or signal is provided. In addition, the operator must observe that the track is clear of men and machines before the reverse movement is made.

1.6.3.1 Work Zones around Roadway Maintenance Machines

If a roadway worker needs to enter an operator's Work Zone, the following procedures must be accomplished:

1. The RMM operator and the roadway worker(s) must establish eye contact,
2. The RMM operator must receive verbal communication from the roadway worker(s) stating that the roadway worker(s) wish to enter the Work Zone,
3. The RMM operator must notify the roadway worker(s) when it is safe to enter the Work Zone and roadway worker(s) must not enter until it is safe to do so,
4. The RMM operator must stop all movement of the equipment and place the RMM in neutral, and
5. When safe to do so, the RMM operator must remove and raise hands from controls of the RMM.

When work must occur within the RMM operators work zone, after following steps 1-5 above, roadway workers must also follow these procedures:

1. The RMM operator and roadway worker must verbally communicate the expected movement(s) and
2. If the RMM operator loses sight of the roadway worker, RMM operation and movement must immediately stop, and must not resume until sight is re-established.
3. If roadway worker on the ground is providing movement signals, the signals should be clearly understood by both parties, and the operator must not act on those signals until it is safe to do so.

1.6.3.2 Safe Working Distance Between Roadway Maintenance Machines

Unless a different understanding is established through a job briefing, the minimum distance between machines while working is 40 feet.

1.6.3.3 Safe Traveling Distance Between Roadway Maintenance Machines

On-track equipment must maintain a minimum distance of 200 feet between each other, except when traveling through a crossing, in addition to the 200 feet, on-track equipment must operate at a speed that will allow stopping within half the range of vision.

Note: Adverse weather and/or rail conditions may require greater separation distances.

1.6.3.4 Stopping On-Track Equipment

When necessary to slow or stop on-track equipment during travel, the operator must signal following equipment operators either by radio or hand signals. If a radio is used, the machine operator transmitting must be assured that the following equipment operators have received and understood the message transmitted. If hand signals are used, the signal must be continuous until it is verified that the following equipment operators have observed and understood the movement is to be slowed or stopped.

If machines are to be "bunched" when stopped, all employees must remain clear of the track until the entire movement has stopped unless otherwise instructed by the RWIC. After stopping, the lead machine operator in the movement will dismount that machine and assume a position that is visible to the following machine operator as well as to anyone who could step into the path of the next approaching machine. The dismounted operator will spot the following machine using hand signals. This procedure will be used by each successive operator in the movement to spot the following machine.

Note: All equipment must be properly secured when left unattended.

1.6.3.5 Tying Up Equipment

Follow these procedures to ensure safety:

1. Secure all brakes, booms, locks, and hooks.
2. Dismount the machine on the field side of the track, away from live traffic.
   EXCEPTION: If the track is between live tracks, dismount on the side designated in the job briefing.
3. Stand beside the machine and direct the next roadway machine to a stop.
4. Do not go between machines until all machines have come to a stop or the RWIC has given permission.

Be Governed Accordingly.

Mark Renker, Vice President of Engineering

DOCUMENT A00902

MCRR CAPE MAIN RAILROAD TIMETABLE

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Cape Main

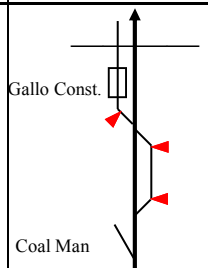
The direction from Bay to Hyannis is South.

Normal Speed PSGR	Normal Speed FRT	Milepost	Station	Track Diagram	Highway Grade Crossings and Bridges	Rules in Effect	Siding Length 50' cars
				(Keolis)	(See Note 1)	**(562)**	
55	**30**	**36.30**	**BAY**			**DCS**	
		37.18			Cherry St. OH Br		
		39.51			Miller St **F, G**		
		41.00	**ROCK VILLAGE**				
		41.65			Spruce St **F, G**		
		43.40		Capeway Rail Terminal	Hells Blazes Pvt.	**DCS** *Middleboro*	
						Rochester	
		44.0	**ROCHESTER**	SEMASS Barker Steel			
						Rochester	
		44.87			County Rd **F, G**	**DCS** *Wareham*	
		45.38			Pierceville Rd OH Br		52 cars
		45.60	**TREMONT**	Marion Pit Trk.			
		45.72			Tail Race Creek UG Br		
		46.24			Main St. OH Br		
		47.09			Main St. UG Br		
		47.19			Station St **F, G**		
		47.50			N Interstate 195 OH Br		
		47.54			S Interstate 195 OH Br		
		47.79			Hathaway Rd **F, G**		
		48.26			Main St. OH Br **F, G**		
		48.35			Elm St		
		49.30	**WAREHAM**	Hi-Level Platform			
		49.44			Wankinco River UG Br **F, G**		
		49.47			Sandwich Rd/Route 6 **F, G**		
		49.89			Indian Neck Rd		
55	**30**					**DCS**	

NOTE: Mass Coastal controlled CM track ends at Bay. Trains must not pass "Entering Signaled Territory" sign at Bay without authorization from the Keolis Old Colony Dispatcher.

Normal Speed PSGR	Normal Speed FRT	Milepost	Station	Track Diagram	Highway Grade Crossings and Bridges	Rules in Effect	Siding Length 50' cars
55	30					DCS	
		50.30	**E WAREHAM**				13 cars
		51.29			Depot St F, G		
		51.80			Walmart Pvt.		
		52.50	**ONSET**				
55	30	52.68			Main Ave F, G	DCS	
30	25	**53.70**	**BUTTERMILK**	*Distant Signal*		DCS	
		53.98			Onset Ave OH Br		28 cars
30	25	**54.20**	**TAYLOR**	Middle XOVER			
15	10	54.31		S XOVER	Cohasset Narrows UG Br		
		54.60			Academy Dr F,G		
		54.62			Army Corp Track		
		54.70			Army Corps Pvt		
15	10	54.72	**BUZZARDS BAY**	Hi-Level Platform		DCS	
				Home Signal		INT	
10	5	54.84			Cape Cod Canal Movable Br		
				INT Signal			
				Falmouth Line			
		54.87			Canal Pedestrian F		
10	5	**54.90**	**CANAL JCT**	*Home Signal*		INT	
30	25	54.91			Bell Rd Pvt.	DCS	
		55.43			Aptuxcet Rd UG Br		
		55.73			Old State Rd OH Br		
				Distant Signal			
		56.00	**APTUXCET**				
		56.36			Bourne OH Br		
		56.37			Bourne Bridge Access Pvt.		
		57.80			Army Corps Pvt.		
30	25	59.54			Sagamore OH Br	DCS	

Wareham
Bourne

Normal Speed PSGR	Normal Speed FRT	Milepost	Station	Track Diagram	Highway Grade Crossings and Bridges	Rules in Effect	Siding Length 50' cars
30	**25**	59.55			Sagamore Br. Access Pvt.	**DCS**	
		59.70	**SAGAMORE**				41 cars
							Bourne
		60.55			Tank Farm Pvt.		*Sandwich*
		61.15			Canal Electric Pvt		
		61.26			Freezer Rd **F, G**		
		61.56			Town Neck Rd **F, G**		
		61.95			Mill Creek UG Br		
		62.09			Willow St **F**		
		62.17			Jarves St **F, G**		
		62.20	**SANDWICH**				17 cars
		62.28			Liberty St **F**		
		62.61			Dewey Ave **F, G**		
		63.10			Old Dump Rd Pvt.		
		63.37			Great Island Rd Pvt. **F, G**		
		63.56			Spring Hill Rd **F**		
		64.05			Lampi's Bog Access Pvt.		
		64.35			Quaker Meetinghouse Rd **F, G**		
		64.91			Route 6A **F, G**		
		65.15			Atkins Rd **F**		
		65.59			Whites Crossing Pvt.		
		65.76			Old County Rd **F**		
		66.24			Game Preserve Pvt.		
		66.56			Talbots Point Pvt. **F, G**		
		66.95			Old County Rd OH Br.		*Sandwich*
							Barnstable
		68.54			Maple St **F, G**		
		69.10			Willow St **F**		
30	**25**					**DCS**	

Normal Speed PSGR	Normal Speed FRT	Milepost	Station	Track Diagram	Highway Grade Crossings and Bridges	Rules in Effect	Siding Length 50' cars
30	**25**					**DCS**	
		69.40	**WEST BARNSTABLE**	Stencil Co. Hi-Level Platform			12 cars
		69.42			Route 149 **F, G**		
		69.95			Route 6A **F, G**		
		71.18			Farrington Way Pvt.		
		71.25			Pilots Path Pvt.		
		71.73			Fergusons Way Pvt.		
		72.00			Route 6A UG Br		
		72.10			Hinckley's Cowpass UG Br		
		72.69			Old Jail Lane **F,G**		
		72.92			Pine Lane **F**		
		72.99			Railroad Ave Pvt.		
		73.25			Hyannis Rd **F, G**		
		73.57			Braggs Lane **F, G**		
		73.90			County Farm Pvt.		
		74.15			Mary Dunn Rd **F,G**		
		75.28			Marstons Lane **F, G**		
							Barnstable
							Yarmouth
		75.50	**YARMOUTH JUNCTION**	S. Dennis Switch; S. Dennis Line; S. Dennis Wye Switch; CM Wye Switch; Yarmouth Wye Track			Wye: 3
		76.35			Route 6 OH Br		
		76.85			Oak Ave **F, G**		
		77.30			Manning Way Pvt. (Airport Access)		
30	**25**					**DCS**	*Yarmouth*
							Barnstable
REST	**REST**	**78.00**	**PORT**			**98**	
		78.50			Route 28 **F, G**		
REST	**REST**	**79.0**	**HYANNIS**	Hi-Level Platform		**98**	

DOCUMENT B00420

PROPOSAL

For: Cape Main Culvert Replacement at MP 63.22
COMMONWEALTH OF MASSACHUSETTS
LOCATION:
Sandwich, MA

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 by June 30th, 2026, except that if the completion date falls between December 1st and March 15th 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

The undersigned, identified as Bidder, declares that Bidder has carefully reviewed and examined the Contract Documents including Notice to Bidders, Bid Form, Special Provisions, General Contract Provisions, Schedule of Prevailing Wage Rates, RAILROAD Timetable, RAILROAD On Track Safety Manual, RAILROAD Procedures for the Installation, Adjustment, Maintenance and Inspection of CWR as Required by 49 CFR 213.118, MassDOT MW-1, Environmental Permits, Plans and other supporting documents (including Addenda thereto), and that Bidder has examined the site upon which the Project Work is to be performed.

After review of all Contract Documents and attesting to understanding and acceptance of same, the undersigned Bidder proposes to furnish all necessary labor, materials (other than those materials stipulated in the Special Provisions as being furnished by Owner), equipment, machinery and tools required to complete the Work as described and specified in the Contract Documents. Bidder understands and agrees that current prevailing wage rates are to be paid in accordance with applicable laws, the General Contract Provisions, and as set forth in this Bid Form.

This proposal includes a bid deposit in the amount of 5% of the Total Amount of Bid identified herein.

In submitting this Bid, Bidder represents that:

1. Bidder has examined copies of all the Contract Documents, including the Addenda thereto:

2. Bidder has examined the site and locality where the Work is to be performed, the legal requirements (federal, state, and local laws, ordinances, rules, and regulations) and the conditions affecting cost, progress, or performance of the Work, and has made such independent investigations as Bidder deems necessary to complete this Bid and carry out the Work in accordance therewith.

3. The Bid is based on the prevailing wage rates identified for the Work to be performed as set forth in the Contract Documents, and as required by applicable laws.

4. This Bid is genuine and not made in the interest or on behalf of any undisclosed person, firm, or corporation; the Bid is not submitted in conformity with any agreement of rules of any group, association, organization, or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any person, firm or a corporation to refrain from bidding; and Bidder has not sought by collusion to obtain for Bidder any advantage over any other Bidder.

(Remainder of Page Intentionally Left Blank)

The undersigned further agrees to perform the Work in its entirety in accordance with the Contract Documents within the prescribed time, and to the total and complete satisfaction of Owner (in consultation with their Authorized Representatives), at the identified Unit Prices and Lump Sum Amounts.

Project # 614254 Contract # 132590				
Location: Sandwich, MA, Cape Main MP 63.22				
Description: Cape Main Culvert Replacement at MP 63.22				
ITEM #	QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE	AMOUNT
129.51	1,000	TRACK EXCAVATION EXCAVATE, STOCKPILE, REINSTALL/WASTE AT _____ CUBIC YARD		
146.1	1	DRAINAGE STRUCTURE CULVERT REMOVAL EXCAVATION &A REMOVAL OF OVERBURDEN & CULVERT - MP 63.22 AT _____ LUMP SUM		
157.1.1	1	WETLAND GABIONS FURNISH AND INSTALL AT _____ LUMP SUM		
180.04	1	LICENSED SITE PROFESSIONAL SERVICES PRE-CONSTRUCTION SURVEY AND AS-BUILT CONSTRUCTION PLANS AT _____ LUMP SUM		
244.48	51	48 INCH REINFORCED CONCRETE PIPE CLASS V AT _____ LINEAR FOOT		
244.48.1	2	PRECAST CONCRETE WINGWALLS/HEADWALLS AT _____ EA		
402.1	150	DENSE GRADED CRUSHED STONE FOR SUBBASE AT _____ TON		
458.6.1	140	TRACK BALLAST FURNISH, DELIVER, INSTALL, & COMPACT AT _____ TON		
492.1	1	TRACK REMOVAL, STORAGE AND RECONSTRUCTION AT _____ LUMP SUM		

Project # 614254 Contract # 132590				
Location: Sandwich, MA, Cape Main MP 63.22				
Description: Cape Main Culvert Replacement at MP 63.22				
ITEM #	QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE	AMOUNT
492.3	1	CLEANUP, REMOVAL, AND DISPOSAL WOOD CROSSTIES, SCRAPS, AND SIX (6) TREES AT _____ LUMP SUM		
493.1	1	RISK ALLOWANCE MISCELLANEOUS WORK AS DIRECTED BY ENGINEER AT **Five Hundred Thousand Dollars max** ALLOWANCE	$500,000	$500,000
748.0	1	MOBILIZATION AND DEMOBILIZATION AT _____ LUMP SUM		
755.46	1	WETLAND MITIGATION REPLICATION AT _____ LUMP SUM		
767.122	1	EROSION AND SEDIMENTATION CONTROL AT _____ LS		
983.11	2555	MODIFIED RIPRAP ARMORED STONE AT _____ TON		
991.1	1	CONTROL OF WATER – MP 63.22 COFFERDAMS, DEWATERING & DIVERSIONS AT _____ LUMP SUM		

The Total Amount of Bid based upon the Contract Documents and proposed Bid Item Unit Prices; Lump Sum Amounts; and Allowances is:

TOTAL AMOUNT OF BID

_____

(Summation of All Bid Items) Written in Words

TOTAL AMOUNT OF BID

_____

(Summation of All Bid Items) Written in Figures

By submitting this Bid, Bidder specifically acknowledges that:

A. The quantities shown on this Bid Form are estimates only and will be used to determine the Total Amount Bid.

B. Owner reserves the right to reject any and all bids, or any bid item, to advertise for new proposals for the project, to waive technicalities as to form, or to proceed to do the work otherwise, as may be deemed in the best interest of Owner. Nothing herein shall be construed as depriving Owner of the right to reject any bid when such bid does not fully comply with the specifications for the project or the applicable bidding laws and regulations, or if Bidder is otherwise not qualified or eligible to receive award of the contract. A bid will be considered irregular and will be rejected if it is determined that any of the unit prices are materially unbalanced to the detriment of Owner. The bidder will be required to justify in writing the price or prices bid for the work in question before MassDOT decides to award the contract or reject the bid.

C. Bidder has prequalification in Class 1 – General Transit Construction under the MBTA and prequalification for Class 3 – Trackwork under the MBTA as of the bid opening. Subcontractors are to be submitted for approval by MassDOT.

D. Subject to the reservations contained in the preceding paragraphs, the contract shall be awarded to the lowest responsible and eligible bidder. The "lowest responsible and eligible bidder" shall mean Bidder who submits a complete bid in accordance with the requirements of the Bid Documents, and whose bid is the lowest of those bidders possessing the skill, ability and integrity necessary for the faithful performance of the work.

E. The Bid shall remain effective for a period of not less than ninety (90) days.

Bid submitted by _____
Name of Bidder

Signed by _____ _____
Duly Authorized Representative of Bidder Date

- **Track Excavation - Excavate, Stockpile, and Reinstall or Waste Up to 1000 Cubic Yards (CY) Existing Trackbed and Subgrade Material at Location of New Culvert**

  Bid price to excavate, stockpile, and reinstall or waste existing track ballast, trackbed and subgrade material at the location of the new 48" round concrete pipe culvert as shown on the Contract Plans and as specified in the Scope of Work, Technical Specifications, and Special Conditions. Bid Price shall include all labor, material, equipment, machinery and tools necessary for the excavation, stockpiling, and reinstallation or wasting of existing track ballast, trackbed and subgrade material, and for all other incidentals required to finish the work, complete and accepted by Engineer.

- **Removal and Disposal of Existing Culvert at MP 63.22**

  Bid Price to include excavation of overburden material and the removal, transportation and disposal of existing 36" x 36" stone box culvert structure in accordance with the Contract Plans, Scope of Work, Technical Specifications, Special Conditions, and MassDOT MW-1. Bid Price shall include all labor, material, equipment, machinery and tools necessary to remove and dispose of existing culvert structure as necessary, remove and legally dispose of the internal pipe sediments (if any) and nearby existing lumber and debris, and for all other incidentals required to finish the work, complete and accepted by Engineer.

- **Wetland Gabions**

  Bid Price to include furnishing and installing non-corrosive wire metal gabions in accordance with the Contract Plans, Scope of Work, Technical Specifications, Special Conditions and AREMA Standards. Bid price shall include all labor, material, equipment, machinery and tools necessary to prefabricate, deliver and install the gabion wall with no less than 6 inch diameter infilled riprap stones and securely tied together in place for stability resistance to tidal action and erosion, and for all other incidentals required to finish the work, complete and accepted by Engineer.

- **Pre-Construction Survey and As-Built Plans**

  Bid price to complete all necessary survey, survey plans and as-built conditions survey plans necessary for the work associated with the culvert replacement work at MP 63.22 in accordance with the Contract Plans, Scope of Work, Technical Specifications, Special Conditions and AREMA Standards.

- **48 Inch Reinforced Concrete Class V - 51 Linear Feet (LF) Culvert**

  Bid Price to include furnishing and installation of the new 48-inch Class V RCP at MP 63.22, including backfill and compaction of re-usable excavated material or gravel borrow. Installation of 48" RCP culvert shall be in accordance with the Contract Plans, Scope of Work, Technical Specifications, Special Conditions, MassDOT MW-1 and AREMA Standards. Bid Price shall include all labor, material, transportation, equipment, machinery and tools necessary to furnish and install 48" Class V RCP culvert, including backfill and compaction of re-usable excavated material or gravel borrow and for all other incidentals required to finish work, complete and accepted by the Engineer.

- **Precast Concrete Wingwalls/Headwalls – 2 EA**

  Bid Price to include furnishing and installation of the 2 new precast concrete wingwalls at MP 63.22, including backfill and compaction of re-usable excavated material or gravel borrow. Installation of precast concrete wingwalls/headwalls shall be in accordance with the Contract Plans, Scope of Work, Technical Specifications, Special Conditions, MassDOT MW-1 and AREMA Standards. Bid Price shall include all labor, material, transportation, equipment, machinery and tools necessary to furnish and install precast concrete wingwalls/headwalls, including backfill and compaction of re-usable excavated material or gravel borrow and for all other incidentals required to finish work, complete and accepted by the Engineer.

- **Crushed Stone Base for Culverts - Furnish and Install up to 150 Tons (TON) of ¾"**

  Bid price to furnish, deliver, install, grade and compact up to 150 TON of ¾" crushed stone base course on existing undisturbed subsoils to provide the bedding for the new reinforced concrete pipe culvert as shown on the Contract Plans. Furnish and install crushed stone base shall be in accordance with the Scope of Work, Technical Specifications, Special Conditions, General Conditions, MassDOT MW-1 and AREMA Standards. Bid price shall include all labor, material, equipment, machinery and tools necessary to furnish, install, grade and compact new crushed stone base, and for all other incidentals required to finish the work, complete and accepted by Engineer.

- **Track Ballast - Furnish, Install and Tamp up to 140 Tons (TON)**

  Bid price to furnish, deliver, install, grade, compact and tamp up to 140 TON of new AREMA #4 stone ballast to the limits shown on the Contract Plans. The ballast will be used for bottom ballast and top ballast to replace material removed for the installation of the new RCP culverts. Ballast shall be tamped to bring track back to existing alignment and profile based on the preconstruction survey.

Furnish, install and tamping of new ballast shall be in accordance with the Scope of Work, Technical Specifications, Special Conditions, General Conditions, MassDOT MW-1 and AREMA Standards. Bid price shall include all labor, material, equipment, machinery and tools necessary to furnish, install and tamp new ballast, and for all other incidentals required to finish the work, complete and accepted by Engineer.

- **Track Removal, Storage and Reconstruction**

  Bid Price to remove, store, and reinstall existing rail, ties and other track material as needed to facilitate the removal and installation of the culvert, including: preparation of the track bed; and reinstallation of the ties, rail and other track material, and all incidental work necessary to reinstall the track in accordance with the Scope of Work, Technical Specifications, Special Conditions, General Conditions, MassDOT MW-1 and AREMA Standards. Bid Price shall include all labor, material, equipment, machinery and tools necessary to remove, store and reinstall track to the pre-construction line and grade, and for all other incidentals required to finish the work, complete and accepted by Engineer.

- **Cleanup, Removal, And Disposal Wood Crossties, Scraps, And Six (6) Trees**

  Bid Price to include removal and legal disposal of the existing wood scraps and six existing trees adjacent to the track in accordance with the Contract Plans, Scope of Work, Technical Specifications, Special Conditions and AREMA Standards. Bid price shall include all labor, material, equipment, machinery and tools necessary to remove and dispose the existing wood scraps and six trees, and for all other incidentals required to finish the work, complete and accepted by Engineer.

- **Risk Allowance**

  This Risk Allowance of contingency funds which is included in this Contract is to reimburse Contractor for all services, personnel, labor, materials, and equipment necessary to address unforeseen issues on the project (if required). Contractor shall include this risk allowance cost in his/her bid proposal.

  The use of this allowance is solely at the discretion of MassDOT Rail and Transit and will be authorized in writing only through execution of a Risk Reallocation. All Risk Reallocations will be processed in the same manner as Change Orders. All provisions contained in the Contract applicable to Change Orders shall also apply to Risk Reallocations.

  MassDOT may at any time at its sole discretion unilaterally issue a Risk Reallocation or Change Order to Contractor for any purpose relating to work under this Contract, including without limitation to address any disagreement between the parties regarding the scope or cost of the work, or whether Contractor has performed in accordance with the requirements of the Contract. A unilaterally issued Risk Reallocation or Change Order need not include a consent or acknowledgement by Contractor. Contractor shall proceed immediately as directed in the unilaterally issued Risk Reallocation or Change Order without prejudice to its rights to assert claims for additional compensation or time.

  Payment for work will be based upon Time & Material costs utilizing Contractor load rates for the actual work performed. Contractor shall submit receipted copies of itemized invoices for such work to MassDOT for payments. Once the Risk Reallocation or Change Order is approved Contractor will be able to invoice against the Risk Allowance Bid Item.

- **Mobilization / Demobilization**

  Bid Price for all mobilization and demobilization of equipment, material and labor resources as required to perform the Project in accordance with the Contract Documents, Special Provisions, MassDOT MW-1 and AREMA Standards. Bid Price to include demobilization of all Contractor resources upon completion of the Work.

  (**Note – Total mobilization/demobilization price must be less than 5% of the Contract Total Price**)

- **Wetland Mitigation Replication**

  Bid Price to include furnishing and installing wetland mitigation plantings in accordance with the Contract Plans, Scope of Work, Technical Specifications, Special Conditions and AREMA Standards. Bid price shall include all labor, material, equipment, machinery and tools necessary to furnish and install the wetland mitigation plantings in place in a stable fashion to assure resistance to tidal action and loss due to erosion, and for all other incidentals required to finish the work, complete and accepted by Engineer.

- **Erosion and Sedimentation Control**

  Bid price to furnish, deliver, install, maintain and remove new, silt fence and straw bale or compost filter tubes, silt sacks, staked floating silt barrier and other erosion control measures. Bid price also includes furnishing, installing and maintaining the wetland restoration area. All work shall be in accordance with the Contract Plans, Scope of Work, Technical Specifications, Special Conditions and AREMA Standards. Price is to include all labor, material, equipment, machinery and tools necessary to furnish/install/maintain and removal of erosion control measures and maintain/restore water resource shorelines and embankment areas, and for all other incidentals required to finish the ork, complete and accepted by Engineer. Clearing and Grubbing shall be considered incidental to this Bid item.

- **Modified Riprap Armored Stone - Up to 2555 Tons (TON)**

  Bid price to furnish, deliver and install up to 2555 TON of armored stone at culvert ends and along embankment slopes as specified in the Scope of Work, Technical Specifications and Special Conditions. Bid Price shall include all labor, material, transportation, equipment, machinery and tools necessary to furnish/install and compact new rip rap at culvert ends, and for all other incidentals required to finish the work, complete and accepted by Engineer.

- **Control of Water - Coffer Dams, Dewatering and Diversions**

  Bid price to design, furnish, install, maintain and remove coffer dams, and temporary dewatering systems in accordance with the Contract Plans, Scope of Work, Technical Specifications, Special Conditions and all Federal and State DEP Regulations. Bid price shall include design and submittal of proposed plans for coffer dams and temporary dewatering systems, and all labor, materials, equipment, machinery and tools necessary to furnish/install/maintain/remove coffer dams and dewatering systems, and for all other incidentals required to finish the work, complete and accepted by Engineer.

Required Documents to be Submitted by Bidder

The Contractor bidding on this project must be experienced in construction projects involving work on and around an active railroad; work consists of the removal and disposal of the existing 36" x 38" stone box culvert and the furnishing and installation of a 48" reinforced concrete Class V pipe (RCP) culvert, precast concrete wingwalls and appurtenances.

The following bonds, forms, certificates and additional documents must be provided and/or completed and submitted as part of this Bid Form and Contractor's Bid Package:

A. Bid Deposit

1. Bid deposit in the amount of 5% of the bid. The bid deposit shall be a bid bond in a form satisfactory to the Department furnished by a surety company incorporated pursuant to Chapter 175, Section 105 of the General Laws or authorized to do business in the Commonwealth under Chapter 175, Section 106 of the General Laws and satisfactory to the Department; or cash; or a certified check drawn on a responsible bank or trust company (or a treasurer's or cashier's check issued by such bank or trust company), payable to the Massachusetts Department of Transportation.

B. Forms and Certifications

1. Certificate of Non-Collusion
2. Certificate of Independent Price Determination
3. Certificate of Compliance with Massachusetts Employment Security Law
4. Certification of Work in Harmony and OSHA Training
5. Affidavit of Compliance; Out of State Certificate
6. Vote of Corporation; Authorized Signatory
7. Executive Order 481 – Certification
8. Certificate Regarding Wage Rates; Statement of Compliance

C. Additional Documents

1. Preliminary Construction Schedule, including key benchmarks.
2. Approved Drug and Alcohol testing plan in compliance with all statutes and regulations administered by the Federal Railroad Administration (FRA) in implementing the required 49 CFR Part 219 Drug and Alcohol Program.
3. List of Equipment which will be used in the performance of the Work on the MassDOT Berkshire Live Civil Improvements Project. Please include the following information:
   - Type of Equipment
   - Manufacturer
   - Model
   - Approximate Year
   - Approximate Hours
   - Operator Requirements

FY 2026 CAPITAL IMPROVEMENT PROGRAM

CAPE MAIN CULVERT REPLACEMENT AT MP 63.22

BID BOND

KNOW ALL MEN BY THESE PRESENTS: that we the undersigned,

_____
(Name of Contractor)

_____
(Address of Contractor)

a _____ hereinafter called Principal, and
(Corporation, Partnership, or Individual)

_____
(Name of Surety)

_____
(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

_____
(Name of Owner)

_____
(Address of Owner)

hereinafter called OWNER, in the penal sum of

_____ Dollars, ($_____)

for payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns.

Signed, this _____ day of _____, 20___.

WHEREAS, the Principal has submitted to _____ a certain BID, attached hereto and hereby made a part hereof to enter into a contract in writing, for the

_____

_____

_____

NOW, THEREFORE,

(a) If said BID shall be rejected, or

(b) If said BID shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said BID) and shall furnish a BOND for his or her faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other aspects perform the agreement created by the acceptance of said bid,

then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its BOND shall be in no way impaired or affected by any extension of the time within which OWNER may accept such BID and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

_____
(Principal)

_____
(Surety)

By: _____

IMPORTANT – An appropriate Power of Attorney, dated the same date as the BOND, and evidencing the authority of the Attorney-in-Fact to act on behalf of the corporation shall be attached to the BID BOND.

(Remainder of Page Intentionally Left Blank)

FY 2026 CAPITAL IMPROVEMENT PROGRAM

CAPE MAIN CULVERT REPLACEMENT AT MP 63.22

Certificate of Non-Collusion

The undersigned certifies under penalties of perjury that this bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this paragraph, the word "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity.

_____
Signature of Authorized Signatory

_____
Name of Company

_____
Date

(Remainder of Page Intentionally Left Blank)

FY 2026 CAPITAL IMPROVEMENT PROGRAM

CAPE MAIN CULVERT REPLACEMENT AT MP 63.22

Certificate of Independent Price Determination

A. By submission of this bid or proposal, each Bidder or offeror certifies, and in the case of a joint bid or proposal, each party thereto certifies as to its own organization, that in connection with this procurement:

   a. The process in this bid or proposal have been arrived at independently, without consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other Bidder or offeror or with any competitor;
   b. Unless otherwise required by law, the prices which have been quoted in this bid or proposal have not been knowingly disclosed by Bidder or offeror and will not knowingly be disclosed by Bidder offeror prior to opening, in the case of a bid, or prior to award, in the case of a proposal, directly or indirectly to any other Bidder or offeror or to any competitor; and
   c. No attempt has been made or will be made by Bidder or offeror to induce any other person or firm to submit or not to submit a bid or proposal for the purpose of restricting competition.

B. Each person signing this bid or proposal certifies that:

   a. They are the person in Bidder's organization responsible within that organization for the decision as to the prices being bid or offered herein and that they have not participated, and will not participate, in any action contrary to (A)(1) through (A)(3) above; or
   b. He or She is not the person in Bidder's or offeror's organization responsible within that organization for the decision as to the prices being bid or offered herein but that he or she has been authorized in writing to act as agent for the persons responsible for such decision(s) and to certify that such persons have not participated, and will not participate, in any action contrary to (A)(1) through (A)(3) above, and as their agent does hereby so certify; and they have not participated, and will not participate, in any action contrary to (A)(1) through (A)(3) above.

(Print Name)	(Company)
(Signature)	(Date)

FY 2026 CAPITAL IMPROVEMENT PROGRAM

CAPE MAIN CULVERT REPLACEMENT AT MP 63.22

Compliance with Massachusetts Employment Security Law

In accordance with the provisions of Section 19A(b) of Chapter 151A of the Massachusetts General Laws,

I,_____,
[Name & Title]

signing on behalf of _____
[Name of Company / Employer]

hereby certify that the aforementioned employer has complied with all employment security laws of the Commonwealth of Massachusetts relating to contributions and payments in lieu of contributions.

Signed under the pains and penalties of perjury this_____day of_____2025.

_____
Signature

_____
Notary Public

_____
My Commission Expires

FY 2026 CAPITAL IMPROVEMENT PROGRAM

CAPE MAIN CULVERT REPLACEMENT AT MP 63.22

Certification of Work in Harmony and OSHA Safety Training

(a) In accordance with the provisions of Massachusetts General Laws Chapter 30, Section 39S, the undersigned certifies under penalties of perjury:

(1) that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed in the work;

(2) that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration (OSHA) that is at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and

(3) that all employees to be employed in the work subject to this bid have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration (OSHA) that is at least 10 hours in duration.

(b) Any employee found on a worksite subject to this section without documentation of successful completion of a course in construction safety and health approved by the United States Occupational Safety and Health Administration (OSHA) that is at least 10 hours in duration shall be subject to immediate removal.

(c) The attorney general, or his designee, shall have the power to enforce this section including the power to institute and prosecute proceedings in the superior court to restrain the award of contracts and the performance of contracts in all cases where, after investigation of the facts, he has made a finding that the award or performance has resulted in violation, directly or indirectly, of subsection (b), and he shall not be required to pay to the clerk of the court an entry fee in connection with the institution of the proceeding.

_____
Authorized Signature

_____
Print Name & Title

_____
Company

_____
Date

FY 2026 CAPITAL IMPROVEMENT PROGRAM

CAPE MAIN CULVERT REPLACEMENT AT MP 63.22

Certificate of Compliance Issued by Commonwealth of Massachusetts Secretary of State to Foreign (Out of State) Corporations

"The Commonwealth and every county, city, town, district, board, commission or other public body which, as the awarding authority, requests proposals, bids or sub-bids for any work in the construction, reconstruction, alteration, remodeling, repair or demolition of any public building or other public works (1) shall not enter into a Contract for the work with, and shall not approve as a Subcontractor furnishing labor and materials for a part of the work, a foreign corporation which has not filed with the awarding authority a certificate of the state secretary stating that such corporation has complied with requirements of section 15.03 of subdivision A of Part 15 of chapter 156D and the date of compliance, and further has filed all annual reports required by section 16.22 of subdivision B of Part 16 of said chapter 156D." M.G.L. c. 30, Section 39L.

If Bidder is a foreign corporation, it shall attach the certificate issued by the Massachusetts Secretary of State showing its compliance with the foregoing statutes.

SIGNED UNDER THE PENALTIES OF PERJURY THIS____day of _____, 20

_____
Authorized Signature

_____
Print Name & Title

_____
Company

_____
Date

FY 2026 CAPITAL IMPROVEMENT PROGRAM

CAPE MAIN CULVERT REPLACEMENT AT MP 63.22

Vote of Corporation; Authorized Signatory

At a meeting of the Board of Directors of _____
[Name of Company]
held on the_____day of_____20___, at which all the Directors were present or

waived notice, it was VOTED, that,_____, who is the duly
[Name of Officer]
elected_____of this company be and hereby is authorized to execute
[Title of Officer]
contracts, bonds and other instruments in the name of and behalf of said company and affix its corporate

seal thereto; and such execution by said_____of any contract
[Name of Officer]
or other instrument or obligation in this company's name and on its behalf by such_____
[Title of Officer]
of the company under seal, shall be valid and binding upon this company.

A True Copy Attest:

Clerk _____
[Signature]

_____
[Print Name &Title]

_____
[Business Address]

_____
[Date]

I,_____, hereby certify that I am the Clerk of _____
[Name of Clerk] [Name of Company]
and that_____is the duly elected _____
[Name of Officer] [Title of Officer]
of said company, and that the above vote has not been amended or rescinded and remains in full force and effect as of this date.

_____
Clerk [Corporate Seal]

FY 2026 CAPITAL IMPROVEMENT PROGRAM

CAPE MAIN CULVERT REPLACEMENT AT MP 63.22

Executive Order 481

INSTRUCTIONS

Executive Order 481 applies to all state agencies in the Executive Branch, including all executive offices, boards, commissions, agencies, departments, divisions, councils, bureaus, and offices, now existing and hereafter established. As it is the policy of the Executive Branch to prohibit the use of undocumented workers in connection with the performance of state contracts, all contracts entered into after February 23, 2007 require that contractors, as a condition of receiving Commonwealth funds under any Executive Branch contract, make the following certification:

CONTRACTOR CERTIFICATION

As evidenced by the signature of the Contractor's Authorized Signatory below, the Contractor certifies under the pains and penalties of perjury that the Contractor shall not knowingly use undocumented workers in connection with the performance of all Executive Branch contracts; that pursuant to federal requirements, the Contractor shall verify the immigration status of all workers assigned to such contracts without engaging in unlawful discrimination; and that the Contractor shall not knowingly or recklessly alter, falsify, or accept altered or falsified documents from any such worker(s). The Contractor understands and agrees that breach of any of these terms during the period of each contract may be regarded as a material breach, subjecting the Contractor to sanctions, including but not limited to monetary penalties, withholding of payments, contract suspension or termination.

Contractor Authorizing Signature	Date
Print Name	
Title	
Email	Telephone

The Contractor is required to sign this Certification only once and may provide a copy of the signed Certification for any contract executed with an Executive Branch Department. A copy of this signed Certification must be attached to the "record copy" of all contracts with this Contractor that are filed with the contracting Department.

FY 2026 CAPITAL IMPROVEMENT PROGRAM

CAPE MAIN CULVERT REPLACEMENT AT MP 63.22

Wage Rates

In accordance with the provisions of Massachusetts General Laws, Chapter 30, Section 39M and Chapter 149, Sections 26 to 27H, the undersigned certifies under penalties of perjury, that

_____
Name of Company

shall comply with prevailing wage requirements as set forth in M.G.L. Chapter 149, Sections 26 to 27H.

Further, the undersigned acknowledges that he / she has read and understands the additional information pertaining to these requirements provided below, including the prevailing wage sheets, payroll certification statements, and payroll certification forms.

_____
Authorized Signature

_____
Print Name & Title

_____
Company

_____
Date

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FY 2026 CAPITAL IMPROVEMENT PROGRAM

CAPE MAIN CULVERT REPLACEMENT AT MP 63.22

Wage Rates Statement of Compliance

Date: _____

I,_____, do hereby state:
(Name of signatory) (Title)

that I pay or supervise the payment of the persons employed by:

_____pertaining to
(Contractor or Subcontractor)

_____
(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.

_____
Authorized Signature

_____
Print Name & Title

_____
Company

_____
Date

The above-referenced copies of payroll records and statements of compliance shall be available for inspection by any interested party filing a written request to MassDOT's Rail and Transit Division for such inspection.

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 Contractor. Contractor is required to pay no less than the wage rates indicated on the annual updated wage schedules.

MassDOT will request the updates no later than two (2) weeks before the anniversary of the Notice to Proceed date of the contract to allow for adequate processing by the Division of Occupational Safety (DOS). 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 DOS.

All Bidders and Contractors 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 and contractors are cautioned to carefully read the relevant sections of the Massachusetts General Laws (most recently amended August, 2008).

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*** END OF DOCUMENT***

DOCUMENT B00421

DOCUMENTS TO BE SUBMITTED BY BIDDER/SUCCESSFUL BIDDER

FY 2026 CAPITAL IMPROVEMENT PROGRAM

CAPE MAIN CULVERT REPLACEMENT AT MP 63.22

Additional Required Documents to be Submitted by Apparent Successful Bidder

The Apparent Successful Bidder will be required to provide and/or complete and submit additional documents after notification of successful bid in order to execute the Contract. The additional required documents include, but are not limited to, the following:

A. Bonds
   1. Completed Performance Bond in the amount of 100% of the Contract Price
      - Form is attached*
   2. Completed Payment Bond in the amount of 100% of the Contract Price
      - Form is attached*

   *The Performance Bond and the Payment Bond shall be in a form satisfactory to the Department, furnished by a surety company incorporated pursuant to Chapter 175, Section 105 of the General Laws or authorized to do business in the Commonwealth under Chapter 175, Section 106 of the General Laws and satisfactory to the awarding authority. The name of the agency or agent writing these bonds shall be identified with or on the bond.

B. Forms and Certifications
   1. Certificate of State Tax Compliance
      - Form is attached
   2. Contractor Forms for Execution of Contract Instructions
      - Instruction Form is Attached
   3. Contract Form
      - Form is attached
   4. Certification of Contractor
      - Form is Attached
   5. Insurer's Affidavit for Worker's Compensation
      - Form is Attached
   6. Power of Attorney
      - Form is Attached
   7. Certification of Construction Equipment Standard Compliance
   8. Diesel Construction Equipment Data Sheet
      - List and certify all large non-road diesel construction equipment (greater than 50 HP) used on this Contract

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FY 2026 CAPITAL IMPROVEMENT PROGRAM

CAPE MAIN CULVERT REPLACEMENT AT MP 63.22

PERFORMANCE BOND

Know all men by these presents, that _____, a corporation duly organized under the laws of the Commonwealth of Massachusetts and having a usual place of business in _____, _____ as principal, and _____ as surety, are held and firmly bound upon the Massachusetts Department of Transportation in the sum of _____ **($_____)** lawful money of the United States of America, to be paid to the Massachusetts Department of Transportation, for which payments, well and truly to be made, we bind ourselves, our respective heirs, executors, administrators, successors and assigns, jointly and severally, firmly be these presents.

Whereas, the said principal has made contract with the Massachusetts Department of Transportation, bearing date of _____, 2026, for the construction of Contract Number **132590 – MassDOT Cape Main Culvert Replacement at MP 63.22.**

Now the condition of this obligation is such that if the principal shall well and truly keep and perform all the undertakings, covenants, agreements, terms, and conditions of the said contract on its part to be kept and performed during the original term of said contract and any extensions thereof that may be granted by the Massachusetts Department of Transportation, with or without notice to the surety, and during the life of any guaranty required under the contract, and shall also well and truly keep and perform all the undertakings, covenants, agreements, terms and conditions of any and all duly authorized modifications, alterations, changes or additions to said contract that may hereafter be made, notice to the surety of such modifications, alterations, changes or additions being hereby waived, then this obligation shall become null and void; otherwise it shall remain in full force and virtue.

In the event that the contract is abandoned by the Contractor, or is terminated by the Massachusetts Department of Transportation, under the provisions of Sec. 8.12 of the Standard Specifications for Highways and Bridges, said surety hereby further agrees that, if required in writing by the Massachusetts Department of Transportation, said surety shall take such action as is necessary to complete said contract.

In witness whereof we hereunto set our hands and seals this _____ day of _____, 2026

_____

Principal

_____

Corporate Seal

_____

_____

Surety

Corporate Seal

_____

_____

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FY 2026 CAPITAL IMPROVEMENT PROGRAM
CAPE MAIN CULVERT REPLACEMENT AT MP 63.22

PAYMENT BOND

Know all men by these presents, that_____, a corporation duly organized under the laws of the Commonwealth of Massachusetts and having a usual place of business in_____, _____, and _____ as surety, are held and firmly bound unto the Massachusetts Department of Transportation in the sum of _____ **($_____)** lawful money of the United States of America, to be paid to the Massachusetts Department of Transportation, for which payments, well and truly to be made, we bind ourselves, our respective heirs, executor administrators, successors and assigns, jointly and severally, firmly by these presents.

Whereas, the said principal has made a contract with the Massachusetts Department of Transportation bearing date of_____, 2026, for the construction of Contract Number **132590 – MassDOT Cape Main Culvert Replacement at MP 63.22.**

Now the condition of this obligation is such that if the principal shall pay for all labor performed or furnished and for all materials used or employed in said contract and in any and all duly authorized modifications, alterations, extensions of time, changes or additions to said contract that may hereafter be made, notice to the surety of such modifications, alterations, extensions of time, changes or additions being hereby waived, the foregoing to include any other purposes or items set out in, and to be subject to, the provisions of Massachusetts General Laws, (Ter. Ed.), Chapter 30, Section 39A as amended and Chapter 149, Section 29 as amended, then this obligation shall become null and void; otherwise it shall remain in full force and virtue.

In witness whereof we hereunto set our hands and seals this_____day of_____, 2026

_____Principal

BY_____Corporate Seal

_____

_____Surety
Corporate Seal

_____

Name and Address of Agent or Agency receiving commission on this Performance and Payment Bond.

_____

_____

Name and Address of Resident Agent, if any, of Surety, or other Agent appointed by Surety to Whom Notice should be sent (Must be completed by Attorney-in-Fact of Surety).

_____

Surety
_____ Corporate Seal

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FY 2026 CAPITAL IMPROVEMENT PROGRAM

CAPE MAIN CULVERT REPLACEMENT AT MP 63.22

Certificate of State Tax Compliance

In accordance with the provisions of Chapter 62C, Section 49A(b) of the Massachusetts

General Laws, I, _____
[Name & Title]

authorized signatory for _____
[Name of Company]

which has a principal place of business at _____

_____

do hereby certify under the pains and penalties of perjury that _____
[Name of Company]

has complied with all laws of the commonwealth relating to taxes, reporting of employees and contractors, and withholding and remitting of child support..

_____
Authorized Signature

_____
Print Name and Title

_____
Company

_____
Date

*** END OF DOCUMENT***

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Proposal No. _____

Commonwealth of Massachusetts
Massachusetts Department of Transportation – Rail and Transit Division
Office of Construction Contracts – Suite 3780
Ten Park Plaza, Boston, MA 02116

CONTRACTOR
FORMS FOR EXECUTION OF CONTRACT

INSTRUCTIONS:

Failure of the Contractor to properly complete or return any Forms for Execution of Contract within fourteen calendar days of the contract award will result in a delay of the execution of your contract. Please ensure the Contract Execution Date is the same across each of the Contractors and Insurance forms.

BEFORE RETURNING CONTRACTOR FORMS FOR EXECUTION OF CONTRACT, PLEASE CHECK THE FOLLOWING:

1. CONTRACT - One Original

- ☐ Clause 1: Fill in the **Contract Execution Date,** defined as a date after the Award date that the Contractor executes these contract forms. This date must coincide with all Contract Execution Dates where indicated on both the Contractor and Insurance forms for execution, and must be *after* the date of Contract Award.
- ☐ Clause 1: Select the appropriate option per the business type and location.
- ☐ Clause 3: Enter contractor's authorized representative(s) name and title. Enter Contractor Company name, affix signature of authorized representative and name of authorized representative. If the company is a corporation, affix the Corporate Seal.

2. CERTIFICATION OF CONTRACTOR - One Original

- ☐ Complete the Certification of Contractor section on the top half of this page. Sign and enter the Contract Execution Date.

3. INSURER'S AFFIDAVIT FOR WORKER'S COMPENSATION – One Original

- ☐ Have affidavit completed with original signatures and notarized
- ☐ Have notary's commission expiration date written on the form

4. POWER OF ATTORNEY

- ☐ Copy to be provided by the Insurance Company. Same must appear on Power of Attorney as on the Performance and Payment Bonds.

[1] Section 3.05 of the Standard Specifications of Highways and Bridges states: the prepared Contract forms, bond forms and certificate of insurance forms will be sent with notification of award to the successful bidder who shall execute and deliver the Contract and furnish the required surety to the Department within fourteen calendar days after the date of the notice of award

Rev: 30 Jan 2023

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Proposal No. _____

CONTRACT

Clause 1. This agreement made _____ (Contract Execution Date), between the Commonwealth of Massachusetts, by the Massachusetts Department of Transportation – Rail & Transit Division, for the said Commonwealth, and

_____ (Contractor Name),

☐ *[OPTION 1 – LLC or JV]* a _____ (Type of Business Structure) registered to do business in the Commonwealth of Massachusetts under MGL Chapter 156C and having a usual place of business in

_____ (Contractor Town/City),

_____ (Contractor State), herein called the Contractor.

or

☒ *[OPTION 2 – In-State Contractor]* a _____ (Type of Business Structure) duly organized under the laws of the C_____ sachusetts and having a usual place of business in _____ (Contractor Town/City), Massachusetts, herein called the Contractor.

or

☐ *[OPTION 3 – Out-of-State Contractor]* a _____ (Type of Business Structure) duly organized under the laws of _____ ___ (Contractor State) and registered to do business in the Commonwealth of Massachusetts and having a usual place of business in_____ (Contractor Town/City),

_____ (Contractor State), herein called the Contractor.

Clause 2. Witnesseth, That the parties to this agreement, each in consideration of the agreements on the part of the other herein contained, do hereby agree, the Commonwealth of Massachusetts for itself, and said Contractor for itself and its successors and assigns as follows: The contractor agrees to furnish all equipment, machinery, tools and labor and furnish and deliver all materials required to be furnished and delivered in and about the improvement and to do and perform all work in

MassDOT Cape Main Culvert Replacement at MP 63.22 in the Town of Sandwich (Project Name)

in strict conformity with the provisions herein contained and of the Notice to Contractors, Proposal and Special Provisions hereto attached, and the applicable 2025 MassDOT Highway Division Standard Specifications for Highways and Bridges Division I, as amended herein, certain subsections of Divisions II and III referenced herein, Supplemental Specifications thereto (March 31, 2025), the 2024 edition of the American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering, and the plans referred to herein. All said plans, Standard Specifications, Supplemental Specifications, AREMA Manual for Railway Engineering Special Provisions, Notice to Contractors and Proposal are hereby made a part of this contract.

Clause 3. In consideration of the foregoing premises the Commonwealth agrees to pay and the Contractor agrees to receive as full compensation for everything furnished and done by the

Contractor under this contract, including all work required but not shown on the plans for the

1. CONTRACT

items herein mentioned, and also for all loss or damage arising out of the nature of the work aforesaid, or from the action of the elements, or from any delay or from any unforeseen obstruction or difficulty encountered in the prosecution of the work, and for all risks of every description connected with the work, and for all expenses incurred by or in consequence of the suspension or discontinuance of the work as herein specified, and for well and faithfully completing the work, and the whole thereof, as herein provided, such unit prices are set out in the accompanying proposal, and for all work required, for which there is no item in the proposal, such compensation as is provided for in the aforesaid specifications.

In witness whereof, the said Contractor has caused these presents to be signed in its name and behalf and its corporate seal to be hereto affixed by

_____(Authorized Signatory Name)

its _____(Authorized Signatory Title)

thereto duly authorized, and the said Commonwealth has executed these presents by The Massachusetts Department of Transportation on the year and day above written.

X_____(Authorized Representative Signature)
Massachusetts Department of Transportation

BY X_____(Authorized Signature)

_____(Authorized Signatory Name)

_____(Contractor Name)

Contractor Corporate Seal

Proposal No. _____

CERTIFICATION OF CONTRACTOR

I hereby certify that I am the _____ (Authorized Signatory Title)

and duly authorized representative of the firm of

_____ (Contractor Name)

whose address is _____ (Contractor Address)

CONSTRUCTION EQUIPMENT STANDARD – HIGHWAY SPECIFICATION 7.02

DEP Mass Clean Diesel Program, whereby any and all large non-road (greater than 50 horsepower) diesel construction equipment (DCE) to be used in this contract has emission control devices installed, such as oxidation catalysts or particulate filters, on the exhaust system side of the diesel combustion engine equipment. Contractor further agrees to provide a list of said DCE to the Massachusetts Department of Transportation – Rail & Transit Division prior to its actual use in connection with this Contract, including but not limited to the number of vehicles subject to this certification and the number of vehicles retrofitted by vehicle type.

I acknowledge that this certificate is furnished as a requirement under this Contract, and is subject to applicable, State and Federal Laws, both criminal and civil.

X_____ _____
Authorized Signature Title of Authorized Signatory

X_____ _____
Name of Authorized Signature Contract Execution Date

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Proposal No. _____

INSURER'S AFFIDAVIT AS TO WORKERS' COMPENSATION INSURANCE

I, _____ (Signatory Name), of _____ (Company) am:

☐ an authorized representative of _____Insurance Company (a producer[2] in the voluntary market)[3]

☐ an authorized agent of _____Insurance Company (an agent in the voluntary market, authorized to sign on behalf of a producer)[2]

☐ an authorized signatory of _____, the Prime Contractor (an insured of a producer in the involuntary market pool)[4]

☐ an authorized signatory of _____, the Sub-Contractor (an insured of a producer in the involuntary market pool, group, or otherwise insured)[3]

located at _____ (Company Address) and do hereby aver that effective _____ (Policy Effective Date), _____ (Contractor Name), the Prime or Sub-Contractor, is insured for Workers' Compensation insurance with _____ (Insurance Company Name) Insurance Company under Policy No[s]. _____ (Policy Number[s]), pursuant to the attached Certificate of Insurance, and in accordance with Massachusetts General Laws, Chapter 152 and Subsection 7.05A of the Standard Specifications for Highways and Bridges of the Highway Division of the Massachusetts Department of Transportation.

X_____
(Signature)

_____
(Signatory Title)

On this _____ (Notary Signature Date), before me, the undersigned notary public, personally appeared _____ (Signatory Name), proved to me through satisfactory evidence of identification, which was/were _____ (Evidence of Identification), to be the person who signed the preceding or attached document in my presence, and who swore or affirmed to me that the contents of the document are truthful and accurate to the best of their knowledge and belief.

X_____
Notary Signature

_____
Notary Printed Name
Commission Expiration Date_____

[2] A producer is an insurance company that provides insurance policies directly, not an insurance agent.
[3] For Prime or Sub-Contractor companies insured through the voluntary market, this Affidavit must be completed by the insurer or an authorized agent of the insurer.
[4] If the Prime or Sub-Contractor is insured through the involuntary insurance market, a pool, such as the Worker's Compensation Inspection and Rating Bureau, or is otherwise insured they may provide a Certificate of Insurance and this Affidavit which may be signed by an authorized signatory (company officer) of the Prime or the Sub-Contractor.

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Proposal No. _____

1. POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS, THAT _____ Insurance Company, a corporation duly organized and existing under laws of the State of _____, and having its principal office in _____, and _____ Insurance Company a corporation organized and existing under the laws of the State of _____and having its principal office in _____, and _____ Insurance Corporation, organized under the laws of the State of _____, and having its principal office in _____ each does hereby make, constitute and appoint:

_____(name(s) of attorney)_____

its true and lawful Attorney(s)-in-Fact, to make, execute, seal and deliver, for and on its behalf and as its act and deed, bonds or other writings obligatory in the nature of a bond on behalf of each of said Companies, as surety, on contracts of suretyship as are or may be required or permitted by law, regulation, contract or otherwise, provided that no bond or undertaking or contract or surety ship executed under this authority shall exceed the contract amount.

This Power of Attorney is granted and is signed by facsimile under and by the authority of the following Resolutions adopted by the Boards of Directors of _____ Insurance Company and _____ Insurance Company at meetings duly called and held on _____ and _____ Insurance Corporation by written consent of its Executive Committee dated _____.

"RESOLVED, that any two of the President, any Senior Vice President, any Vice President, any Assistant Vice President, the Secretary or any Assistant Secretary be, and each or-any of them hereby is authorized to execute a Power of Attorney qualifying the attorney named in the given Power of Attorney to execute on behalf of the Company bonds, undertakings and all contracts of surety, and that each or any of them hereby is authorized to attest to the execution of any such Power of Attorney and to attach therein the seal of the Company; and it is

FURTHER RESOLVED, that the signature of such officers and the seal of the Company may be affixed to any such Power of Attorney or to any certificate relating thereto by facsimile, and. any such Power of Attorney or certificate bearing such facsimile signatures or facsimile seal shall be binding upon the Company when so affixed and in the future with regard to any bond, undertaking or contract of surety to which it is attached."

CORPORATE SEAL By: X_____ CORPORATE SEAL

By: X_____

Proposal No. _____

IN WITNESS WHEREOF, _____ Insurance Company, _____ Insurance Company and _____ Insurance Corporation have caused their official seals to be hereunto affixed, and these presents to be signed by their authorized officers this _____ day of _____, _____.On this ____ day of _____, _____ before me, a Notary Public personally appeared _____, _____ of _____ International Insurance Company and _____ , _____of _____ Insurance Company and _____ , _____ of _____ Insurance Company personally known to me; who being by me duly sworn, acknowledged that they signed the above Power of Attorney as officers of and acknowledged said instrument to be the voluntary act and deed of their respective companies.

I, _____, the duly elected _____ of _____ Insurance Company do hereby certify that the above and foregoing is a true and correct copy of a Power of Attorney given by said North American Specialty Insurance Company, Washington International Insurance Company and Westport Insurance Corporation which is still in full force and effect.

IN WITNESS WHEREOF, I have set my hard and affixed the seals of the Companies this _____ day of _____ , _____.

DOCUMENT B00842

SCHEDULE OF PARTICIPATION
BY MINORITY OR WOMEN BUSINESS ENTERPRISES (M/WBE)

MASSDOT PROJECT NUMBER: 614254

PROJECT LOCATION: SANDWICH, MA

DATE OF BID OPENING: _____

NAME OF PRIME BIDDER: _____

Name Address and Phone Number of M/WBE	Name of Activity	(a) M/WBE Contractor Activity Amount	(b) M/WBE Other Business Amount	(c) Total amount eligible for credit under rules in Section VIII of the Special Provisions
Total Bid Amount $	TOTALS: M/WBE Percentage of Total bid:	$ %		$ %

Column (a) must be at least one-half of the M/WBE percentage goal.

SIGNATURE: _____ Date: _____ Tel No: _____

NAME AND TITLE (PRINT):_____

BIDDERS ARE CAUTIONED TO REVIEW DOCUMENT 00718 -- SPECIAL PROVISION FOR PARTICIPATION BY MINORITY OR WOMEN BUSINESS ENTERPRISES AND SERVICE DISABLED VETERAN OWNED BUSINESS ENTERPRISES.

*** END OF DOCUMENT ***

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DOCUMENT B00843

MINORITY OR WOMEN'S BUSINESS ENTERPRISE PARTICIPATION LETTER OF INTENT
PAGE 1 OF 2

MASSDOT PROJECT NUMBER: 614254

PROJECT LOCATION: SANDWICH, MA

DATE OF BID OPENING: _____

FROM _____
(Minority or Women's Business Enterprise Company)

TO: _____
(Name of Prime Contractor)

1. My company is currently certified as an MBE or WBE by the Massachusetts Supplier Diversity Office, formerly known as the State Office of Minority and Women Business Assistance (SOMWBA). There have been no changes affecting the ownership, control or independence of my company since my last certification review.

2. If any such change occurs prior to my company's completion of this proposed work, I will give written notification to your firm and to the Massachusetts Department of Transportation (MassDOT).

3. (For contractor activity only.) My firm will provide to you, upon request, for the purpose of obtaining subcontractor approval from MassDOT; (1) a resume stating the qualifications and experience of the superintendent or foreperson who will supervise on site-work; (2) a list of equipment owned or leased by my firm for use on the project; (3) a list of all projects (public or private) which my firm is currently performing, is committed to perform, or intends to make a commitment to perform. I shall include, for each project, the names and telephone number of a contact person for the contracting organization, the dollar value of the work, a description of the work, and my firm's work schedule for the Project.

4. If you are awarded the Contract, my company intends to enter into an agreement with your firm to perform the items of work or other activity described on the following sheet for the prices indicated.

5. My firm has the ability to manage, supervise and perform the activity described on the following page.

_____ _____
M/WBE Authorized Signature Date

MINORITY OR WOMEN'S BUSINESS ENTERPRISE PARTICIPATION LETTER OF INTENT
PAGE 2 OF 2

MASSDOT PROJECT NUMBER: 614254

PROJECT LOCATION: SANDWICH, MA

DATE OF BID OPENING: _____

NAME OF PRIME BIDDER: _____

Item number if applicable	Description of Activity with notations such as Labor Only, Material Only, or Complete	Quantity	Unit Price	Amount
		TOTAL AMOUNT:		

M/WBE COMPANY NAME: _____

M/WBE AUTHORIZED SIGNATURE: _____

NAME AND TITLE (PRINT): _____

TELEPHONE NUMBER: _____ FAX NUMBER: _____

*** END OF DOCUMENT ***

DOCUMENT B00846

M/WBE OR SDVOBE JOINT CHECK ARRANGEMENT APPROVAL FORM

(to be submitted by Prime Contractor)

Contract No: 132590 **Project No.** 614254

Location: SANDWICH, MA **Bid Opening Date:**

Project Description: Cape Main Culvert Replacement at MP 63.22

We have received the attached request for the use of a joint check arrangement from _____, a M/WBE or SDVOBE on the above-referenced Contract and _____, a Material Supplier/Vendor for the subject Contract. The M/WBE or SDVOBE has complied with the requirements of Special Provision Document 00718. In particular, the M/WBE or SDVOBE 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 M/WBE or SDVOBE) for payment of sums due pursuant to invoices from the Supplier/Vendor and M/WBE or SDVOBE.

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 B00847

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 M/WBE or SDVOBE, 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 M/WBE or SDVOBE Venturer; (4) the commitment of management, supervisory and operative personnel employed by the M/WBE or SDVOBE 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): _____

3. Other applicable ownership interests, including ownership options or other agreements, which restrict or limit ownership and/or control:

4. Provide copies of all other written agreements between firms concerning bidding and operation of this Project or projects or contracts.

5. 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, M/WBE or SDVOBE 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 ***