

COMMONWEALTH OF MASSACHUSETTS



**CONTRACT DOCUMENTS
AND SPECIAL PROVISIONS**

| | |
|--------------|----------------|
| PROPOSAL NO. | 613129-126584 |
| P.V. = | \$2,546,000.00 |
| PLANS | YES |

FOR

**Federal Aid Project No. HSI(VUS)-003S(749)X
Intersection Improvements at Milestone Road and Polpis Road
and Extension of ‘Sconset Bikepath**

in the Town of

NANTUCKET

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

This Proposal to be opened and read:

TUESDAY, JULY 30, 2024 at 2:00 P.M.

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DOCUMENT 00104

**NOTICE TO CONTRACTORS**

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

TUESDAY, JULY 30, 2024 at 2:00 P.M. **

NANTUCKET

Federal Aid Project No. HSI(VUS)-003S(749)X

**Intersection Improvements at Milestone Road and Polpis Road
and Extension of 'Sconset Bike Path**

****Date Subject to Change**

PROJECT VALUE = \$2,546,000.00

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

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

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

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

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

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

NOTICE TO CONTRACTORS (Continued)

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

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

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

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

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

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

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

NOTICE TO CONTRACTORS (Continued)

PRICE ADJUSTMENTS

This Contract contains price adjustments for hot mix asphalt and Portland cement mixtures, diesel fuel, and gasoline. For reference the base prices are as follows: liquid asphalt \$610.00 per ton, Portland cement \$425.53 per ton, diesel fuel \$2.901 per gallon, and gasoline \$2.848 per gallon, and Steel Base Price Index 428.4. MassDOT posts the **Price Adjustments** on their Highway Division's website at

<https://www.mass.gov/massdot-contract-price-adjustments>

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

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

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

BY: Monica G. Tibbits-Nutt, Secretary and CEO, MassDOT
Jonathan L. Gulliver, Administrator, MassDOT Highway Division
SATURDAY, JUNE 29, 2024

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DOCUMENT 00210

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

July 1, 1981, updated October 2016

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

- (a) The words defined herein shall have the meaning stated below whenever they appear in this section:
- (1) "Contractor" means any person, corporation, partnership, joint venture, sole proprietorship, or other entity awarded a contract pursuant to sections thirty-eight A1/2 to thirty-eight O, inclusive, of chapter seven and any contract awarded or executed pursuant to section eleven C of chapter twenty-five A, section thirty-nine M of chapter thirty, or sections forty-four A to forty-four H, inclusive, of chapter one hundred and forty-nine, which is for an amount or estimated amount greater than one hundred thousand dollars.
 - (2) "Contract" means any contract awarded or executed pursuant to sections thirty-eight A1/2 to thirty-eight O, inclusive, of chapter seven and any contract awarded or executed pursuant to section eleven C of chapter twenty-five A, section thirty-nine M of chapter thirty, or sections forty-four A through forty-four H, inclusive, of chapter one hundred and forty-nine, which is for amount or estimated amount greater than one hundred thousand dollars.
 - (3) "Records" means books of original entry, accounts, checks, bank statements and all other banking documents, correspondence, memoranda, invoices, computer printouts, tapes, discs, papers and other documents or transcribed information of any type, whether expressed in ordinary or machine language.
 - (4) "Independent Certified Public Accountant" means a person duly registered in good standing and entitled to practice as a certified public accountant under the laws of the place of his residence or principal office and who is in fact independent. In determining whether an accountant is independent with respect to a particular person, appropriate consideration should be given to all relationships between the accountant and that person or any affiliate thereof. Determination of an accountant's independence shall not be confined to the relationships existing in connection with the filing of reports with the awarding authority.
 - (5) "Audit", when used in regard to financial statements, means an examination of records by an independent certified public accountant in accordance with generally accepted accounting principles and auditing standards for the purpose of expressing a certified opinion thereon, or, in the alternative, a qualified opinion or a declination to express an opinion for stated reasons.
 - (6) "Accountant's Report", when used in regard to financial statements, means a document in which an independent certified public accountant indicates the scope of the audit which he has made and sets forth his opinion regarding the financial statements taken as a whole with a listing of noted exceptions and qualifications, or an assertion to the effect that an overall opinion cannot be expressed. When an overall opinion cannot be expressed the reason therefor shall be stated. An accountant's report shall include as a part thereof a signed statement by the responsible corporate officer attesting that management has fully disclosed all material facts to the independent certified public accountant, and that the audited financial statement is a true and complete statement of the financial condition of the contractor.
 - (7) "Management", when used herein, means the chief executive officers, partners, principals or other person or persons primarily responsible for the financial and operational policies and practices of the contractor.
 - (8) Accounting terms, unless otherwise defined herein, shall have a meaning in accordance with generally accepted accounting principles and auditing standards.

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

- (1) The contractor shall make, and keep for at least six years after final payment, books, records, and accounts which in reasonable detail accurately and fairly reflect the transactions and dispositions of the contractor, and
- (2) Until the expiration of six years after final payment, the office of inspector general, and the commissioner of capital asset management and maintenance shall have the right to examine any books, documents, papers or records of the contractor or of his subcontractors that directly pertain to, and involve transactions relating to, the contractor or his subcontractors, and
- (3) If the agreement is a contract as defined herein, the contractor shall describe any change in the method of maintaining records or recording transactions which materially affect any statements filed with the awarding authority, including in his description the date of the change and reasons therefor, and shall accompany said description with a letter from the contractor's independent certified public accountant approving or otherwise commenting on the changes, and
- (4) If the agreement is a contract as defined herein, the contractor has filed a statement of management on internal accounting controls as set forth in paragraph (c) below prior to the execution of the contract, and
- (5) If the agreement is a contract as defined herein, the contractor has filed prior to the execution of the contracts and will continue to file annually, an audited financial statement for the most recent completed fiscal year as set forth in paragraph (d) below.

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

- (1) transactions are executed in accordance with management's general and specific authorization;
- (2) transactions are recorded as necessary
 - i. to permit preparation of financial statements in conformity with generally accepted accounting principles, and
 - ii. to maintain accountability for assets;
- (3) access to assets is permitted only in accordance with management's general or specific authorization; and
- (4) the recorded accountability for assets is compared with the existing assets at reasonable intervals and appropriate action was taken with respect to any difference.

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

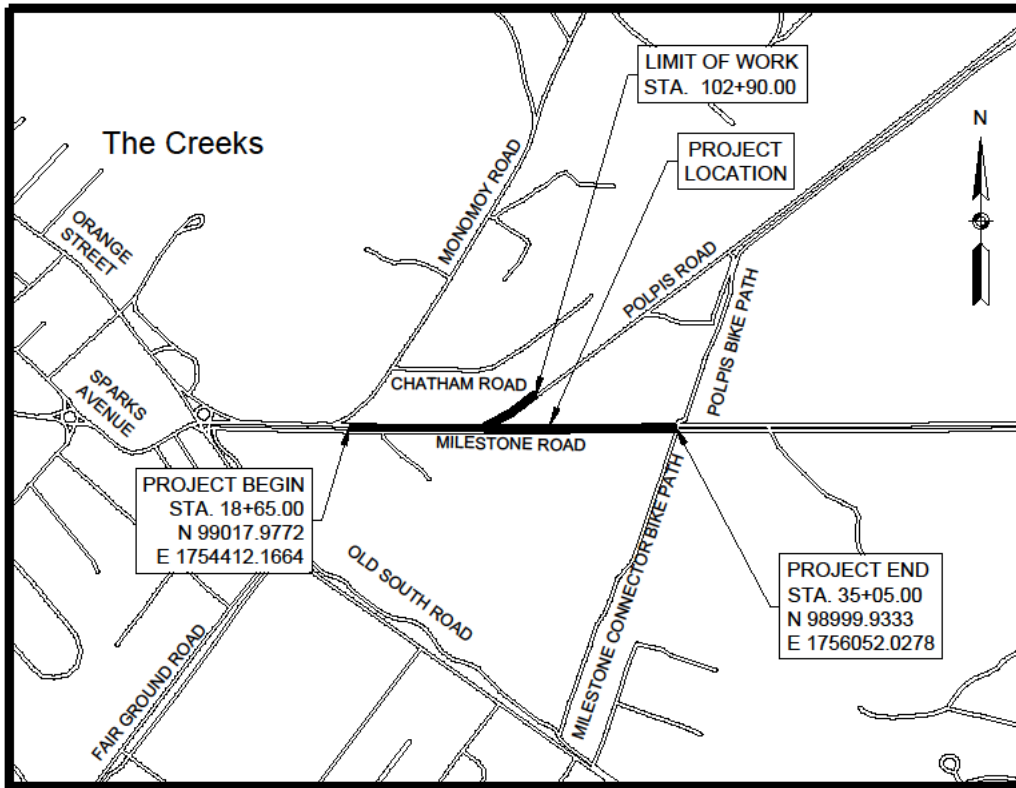
- (1) whether the representations of management in response to this paragraph and paragraph (b) above are consistent with the result of management's evaluation of the system of internal accounting controls; and
- (2) whether such representations of management are, in addition, reasonable with respect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

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DOCUMENT 00331

LOCUS MAP

NANTUCKET
Federal Aid Project No. HSI(VUS)-003S(749)X
Intersection Improvements at Milestone Road and Polpis Road
and Extension of 'Sconset Bike Path



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Final Report
Interim Report

CONTRACTOR PROJECT EVALUATION FORM

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

Date: _____

City/Town: _____ Contractor: _____

Project: _____ Address: _____

F.A. No. _____ Contract Number: _____

Bid Price: _____ Notice to Proceed: _____

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

Date Work Started: _____ Date Work Completed*: _____

Contractor's Superintendent: _____

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

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

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

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

District Construction Engineer's Signature/Date

Resident Engineer's Signature/Date

Contractor's Signature Acknowledging Report/Date

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

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

CONTRACTOR PROJECT EVALUATION FORM (Continued)

Date: _____ Contract Number: _____

INFORMATION FOR DISTRICT HIGHWAY DIRECTORS RELATING TO PREQUALIFICATION

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

RECOMMENDATIONS FOR DEDUCTIONS FROM CONTRACTORS' ASSIGNED FACTOR

(Write Yes or No in space provided)

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

I recommend a deduction for project completed late: _____

Signed: _____

District Highway Director

EXPLANATION OF RATINGS 1 – 9: _____

WORK NOT COMPLETED WITHIN SPECIFIED TIME: _____



Final Report

Interim Report

SUBCONTRACTOR PROJECT EVALUATION FORM

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

Date: _____

City/Town: _____

Subcontractor: _____

Project: _____

Address: _____

F.A. No.: _____

Contract Number: _____

Prime Contractor _____

Current Contract Completion Date: _____

Date Work Started: _____

Date Work Completed*: _____

Subcontractor's Superintendent: _____

Type of Work Performed by Subcontractor: _____

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

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

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

District Construction Engineer's Signature/Date

Resident Engineer's Signature/Date

Contractor Signature Acknowledging Report/Date

Subcontractor Signature Acknowledging Report/Date

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

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

Contractor's Comments: _____

SUBCONTRACTOR PROJECT EVALUATION FORM (Continued)

Date: _____ Contract Number: _____

INFORMATION FOR DISTRICT HIGHWAY DIRECTORS RELATING TO PREQUALIFICATION

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

RECOMMENDATIONS FOR DEDUCTIONS FROM CONTRACTORS' ASSIGNED FACTOR

(Write Yes or No in space provided)

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

I recommend a deduction for project completed late: _____

Signed: _____
District Highway Director

EXPLANATION OF RATINGS 1 – 8: _____

WORK NOT COMPLETED WITHIN SPECIFIED TIME: _____

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

NOTICE OF AVAILABILITY

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

SPECIAL PROVISIONS FOR RIGHT-TO-KNOW ACT REQUIREMENTS

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

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

1. Deliver to the Department, prior to the start of any work under this contract, copies of MSDS for all MSL substances to be used, stored, processed or manufactured at the worksite by the Contractor.
2. Train employees of the Department, who may be exposed to MSL substances as a result of the Contractor's work under this contract, with regard to those specific substances in accordance with requirements of the Right-To-Know Act.
3. Observe all safety precautions recommended on the MSDS for any MSL substance to be used, stored, processed, or manufactured at the worksite by the Contractor.
4. Inform the Department in writing regarding specific protective equipment recommended in the MSDS for MSL substances to which employees of the Department may be exposed as a result of the Contractor's work under this contract.

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

ALTERNATIVE DISPUTE RESOLUTION

Forum, Choice of Law and Mediations:

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

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DOCUMENT 00713

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

(March 31, 2022)

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

Replace this Subsection with the following:

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

DESCRIPTION

701.20: General

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

MATERIALS

701.30: General

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

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

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

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

A. Combined Aggregate System.

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

1. Tarantula Curve.

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

Table 701.30-1: Tarantula Curve Particle Size Distribution

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

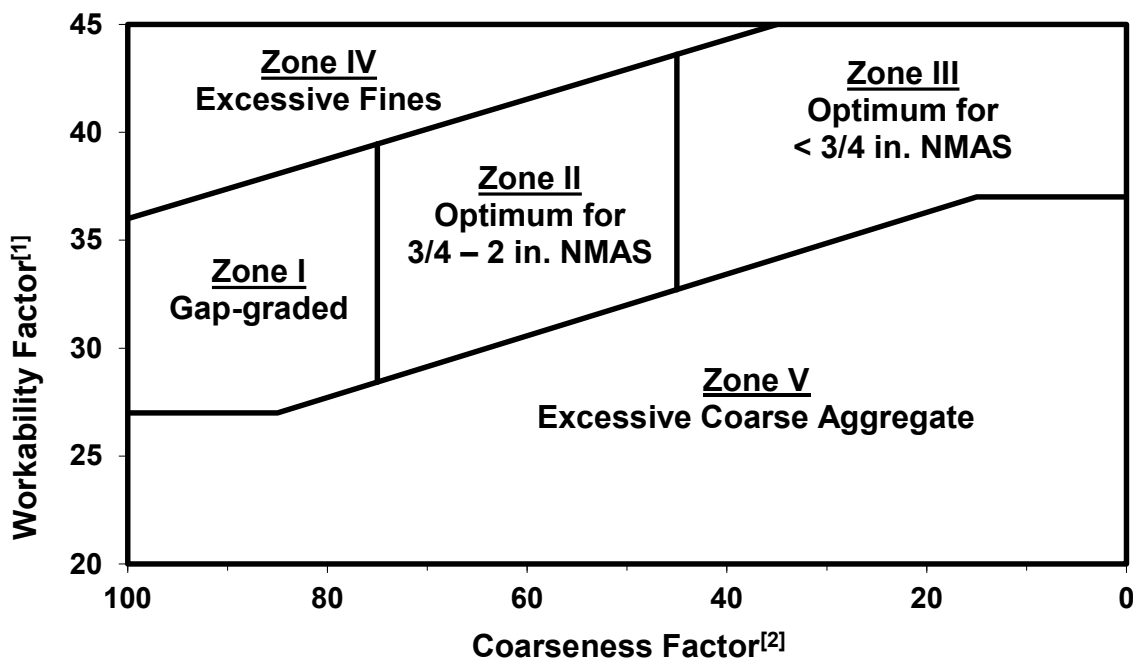
2. Shilstone Workability-Coarseness Chart.

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

Table 701.30-2: Shilstone Workability-Coarseness

| Zone | Property | Cause |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| Zone I | Gap-graded; High potential for segregation during placement and consolidation; Cracking, blistering, spalling, and scaling | Deficiency in intermediate particles; Non-cohesive |
| Zone II | Optimum mixture for nominal maximum aggregate size from 2 in. – 3/4 in. | Optimized workability factor and coarseness factor |
| Zone III | Optimum mixture for nominal maximum aggregate size < 3/4 in. | Optimized workability factor and coarseness factor |
| Zone IV | Sticky; High potential for segregation during consolidation and finishing; Variable strength, high shrinkage, cracking, curling, spalling, and scaling | Excessive fines |
| Zone V | Rocky; Lacking plasticity | Excessive amount of coarse and intermediate aggregate |

Figure 701.30-1: Shilstone Workability-Coarseness Chart



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

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

3. Fineness Modulus.

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

4. Coarse Aggregate Content.

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

B. Paste System.

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

1. Water-Cementitious Ratio.

The water-cementitious ratio for the mix design may be analyzed to evaluate potential properties of the concrete, including strength, concrete and reinforcement bonding, and resistance to freezing, thawing, de-icing, sulfate reaction, corrosion of steel reinforcement, drying shrinkage, cracking, and

volume change from wetting and drying. The water-cementitious ratio is determined by calculating the total water content by mass and dividing by the total cement and supplementary cementitious material (SCM) content by mass. The recommended water-cementitious ratio design target is identified in Table 701.30-3. The water-cementitious ratio shall be less than or equal to 0.45.

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

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

2. Air Content.

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

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

| Exposure Class | Severity | Condition | Nominal Maximum Aggregate Size (in.) | Air Content Target Recommendation (%) |
|----------------|-------------|--------------------------------------------------------------------------------------------------------------------------|--------------------------------------|---------------------------------------|
| F3 | Very Severe | Exposed to freezing and thawing cycles and accumulation of snow, ice, and de-icing chemicals; Frequent exposure to water | 3/8 | 7.5 |
| | | | 1/2 | 7.0 |
| | | | 3/4 | 7.0 |
| | | | 1 | 6.5 |
| | | | 1 1/2 | 6.5 |

3. Cement and Supplementary Cementitious Materials Content.

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

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

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

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

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

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

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

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

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

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

4. Chemical Admixtures.

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

Table 701.30-7: Chemical Admixtures

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

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

5. Paste Content.

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

Table 701.30-8: Paste Content

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

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

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

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

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

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

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

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

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

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

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

C. Initial Curing Materials.

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

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

1. Liquid-Applied Evaporation Reducers.

Liquid-applied evaporation reducers used for initial curing methods shall produce an effective monomolecular film over the bleed water layer, to reduce the rate of evaporation of the bleed water from the surface and plastic shrinkage when the evaporation rate equals or exceeds the bleeding rate.

D. Intermediate Curing Materials.

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

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

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

E. Final Curing Materials.

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

Curing water shall be free of deleterious impurities, causing staining and deterioration. The potential staining ability of curing water shall be evaluated by means of CRD-C401 (US Army Corps

of Engineers 1975) for instances where curing water quality is questioned. Curing water shall not exceed a temperature differential of more than 20°F from the internal concrete temperature, to prevent cracking due to temperature gradients causing strain that exceeds the strain capacity of concrete. Curing water shall remain above freezing temperatures throughout the duration of the curing cycle.

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

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

Final curing materials applied to the concrete shall allow the concrete to mature sufficiently to achieve its designed and desired properties, including strength, volume stability, permeability, durability, and resistance to freezing, thawing, and de-icing cycles. Insufficient application of final curing materials results in decreased strength and durability of the top surface of concrete.

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

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

1. Saturated Covers.

Saturated covers used for final curing methods shall meet AASHTO M 182, Class 3. Saturated covers shall be in good condition, free from holes, tears, or other defects that would render it unsuitable for curing cement concrete and cementitious materials. Saturated covers shall be dried to prevent mildew when storing. Prior to application, saturated covers shall be thoroughly rinsed in water and free of harmful substances that are deleterious or cause discoloration to cement concrete and cementitious materials. Saturated covers shall have sufficient thickness and proper positioning onto the surface to maximize moisture retention. Saturated covers shall contain a sufficient amount of moisture to prevent moisture loss from the surface of cement concrete and cementitious materials. Saturated covers shall have the ability to retain sufficient moisture from continuous watering so that a film of water remains on the surface of cement concrete and cementitious materials throughout the entire duration of the final curing method cycle. Saturated covers shall not absorb water from cement concrete and cementitious materials. Polyethylene film may be applied over the saturated cover to limit the amount of continuous watering required for sufficient moisture retainage. Saturated covers shall accommodate uniform and slow drying of cement concrete and cementitious materials surfaces immediately prior to removal.

2. Sheet Materials.

Sheet materials, including polyethylene film, white burlap-polyethylene sheeting, and reinforced paper, used for final curing methods shall meet ASTM C171 and the requirements specified herein. Sheet materials shall inhibit moisture loss and reduce temperature rise in concrete exposed to radiation from the sun during the final curing method cycle. Adjoining covers shall overlap not less than 12 inches. All edges of the sheet materials shall be secured to maintain a moist environment.

a. Polyethylene Film.

Polyethylene film shall be clear, white, or black in color and consist of a single sheet manufactured from polyethylene resins, be free of visible defects, including tears, wrinkles, and discontinuity. The film shall prohibit mottling and uneven spots from appearing on the surface of concrete, due to variations in temperature, moisture content, or both. Application of additional curing water under the film or application of a polyethylene film bonded to absorbent fabric to the concrete surface may be required to prevent mottling and to retain and evenly distribute the moisture. Polyethylene film shall accommodate concrete surfaces with constant contact without damage. The film shall be sufficient in length to extend beyond the edges of the concrete surface. Edges of adjacent polyethylene film shall overlap a minimum of 6 inches and be tightly sealed with the use of sand, wood planks, pressure-sensitive tape, mastic, or glue to maintain close contact with the concrete surface, retain moisture, and prevent the formation of air pockets throughout the entire duration of the final curing method cycle.

i. White Polyethylene Film.

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

ii. Clear and Black Polyethylene Films.

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

b. White Burlap-Polyethylene Sheeting.

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

c. Reinforced Impervious Paper.

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

3. Liquid Membrane-Forming Compounds.

Compounds shall form a continuous, non-yellowing, and durable film with quality moisture-retention properties. Compounds shall maintain the relative humidity of the concrete surface

above 80% for seven days to sustain cement hydration. Compounds shall not affect the original color of the concrete surface. Compounds shall not degrade due to exposure to ultraviolet light from direct sunlight. Compounds shall meet the local and federal allowable Volatile Organic Compound (VOC) content limits.

White-pigmented compounds shall be used in instances where solar-heat gain is concern to the concrete surface. White-pigmented compounds shall be agitated in the container prior to application to prevent pigment from settling out resulting in non-uniform overage and ineffective curing.

Careful considerations shall be made by the Contractor to determine if the evaporation rate is exceeding the rate of bleeding, thus causing the surface to appear dry even though bleeding is still occurring. To diagnose and prevent this condition, the Contractor may place a transparent plastic sheet over a test area of the uncured and unfinished concrete surface and shall determine if any bleed water accumulates under the plastic. Under such conditions, the application of liquid membrane-forming compounds to the concrete surface shall be delayed to prevent bleed water from being sealed below the concrete surface, map cracking of the membrane films, reduction in moisture-retention capability, and the need for reapplication of the compound.

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

Compounds shall be applied continuously and uniformly to the surface of the concrete per the Manufacturer's instructions and recommendations. Compounds shall be applied immediately after the disappearance of the surface water sheen following final finishing. Applying of the compound immediately after final finishing and before all free water on the surface has evaporated will help prevent the formation of cracks. When using compounds to reduce moisture loss from formed surfaces, the exposed surface shall be wetted immediately after form removal and kept moist until the curing compound is applied. The concrete shall be allowed to reach a uniformly damp appearance with no free water on the surface, and then application of the compound shall begin at once. Delayed application will result in surface drying, absorption of the compound into the concrete, and no forming of a continuous membrane.

The concrete surface shall be damp when the compound is applied. Power-driven spray equipment shall be used for uniform application of compounds on large paving projects. Spray nozzles recommended by the compound Manufacturer and use of windshields shall be arranged by the Contractor to prevent wind-blown loss of compound and to ensure proper coverage application rates are achieved. The compound shall be applied by power sprayer, using appropriate wands and nozzles with pressures between 25 and 100 psi. The Contractor shall fill the power sprayer with curing compound from the Manufacturer's original container in the presence of the Engineer. Any dilution as recommended by the Manufacturer shall take place in the presence of the Engineer. For very small areas such as repairs, the compound shall be applied with a wide, soft-bristled brush or paint roller.

The Contractor shall verify the application rate and procedures are in accordance with the Manufacturer's instructions and recommendations. At least one uniform coat shall be applied at a rate of 150 to 200 ft²/gallon. On very deeply textured surfaces, the surface area to be treated shall be at least twice the surface area of the surface. In such cases, two separate applications may be needed, each at 200 ft²/gallon or greater if specified by the Manufacturer to achieve the desired

moisture retention rate, with the first being allowed to become tacky before the second is applied. If two coats are necessary to ensure complete coverage, for effective protection the second coat should be applied at right angles to the first. Complete coverage of the surface shall be attained due to the potential for formation of small pinholes in the membrane, which will result in loss of moisture from the concrete. Compounds shall not sag, run off peaks, or collect in grooves.

Compounds and procedures shall be compatible with concrete surfaces receiving subsequent applications or placements of concrete, overlays, coatings, paints, sealers, finishes or other toppings to ensure acceptable bonding to the concrete. Testing to establish compatibility among the curing compound, subsequent surface treatments, concrete moisture content and the actual finished surface texture of the concrete shall be conducted when compatibility is not known. The compound Manufacturer shall be consulted by the Contractor to determine the compatibility of the application. Compounds shall not be applied to concrete surfaces where bonding of subsequent applications or placements is incompatible or is of concern. The use of wax-based curing compounds shall be prohibited in instances where concrete surfaces are subject to additional toppings and vehicular, pedestrian, or other traffic. Deliberate removal of compounds in the presence of the Engineer and in accordance with Manufacturer’s instructions and recommendations shall be conducted as an alternative to compatibility testing, incompatibility, or in instances where bonding is of concern. Bonding of subsequent materials may still be inhibited by the presence of the compound even after the moisture retention characteristics of the compound have diminished.

a. Liquid Membrane-Forming Compounds for Curing.

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

Table 701.30-1: Types of Compounds for Curing

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

Table 701.30-2: Composition Class of Compounds for Curing

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

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

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

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

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

| Type | Description |
|---------|----------------------|
| Type I | Clear or translucent |
| Type II | White pigmented |

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

| Type | Description |
|---------|---------------|
| Class A | Non-yellowing |

F. Protective Sealing Compounds.

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

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

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

G. Cold Weather Concreting Materials.

Cold weather concreting shall be defined as the procedures, operations, materials, and equipment required for the mixing, delivery, placement, finishing, curing, and protection of concrete during cold weather conditions, while exposed to air temperatures falling below, or expected to fall below 40°F.

The protection period shall be defined as the minimum duration required to prevent concrete from the negative effects of cold weather exposure. The protection period shall remain in place while

cold weather conditions exist. Controlled and gradual termination of the protection period shall be conducted only after 100% f'c is attained and all specified conditions are met.

The procedures, operations, materials, and equipment selected for cold weather concreting shall adequately maintain specified temperature ranges by addressing all variables, including ambient weather conditions, geometry of the structure, and mix design proportions. Concrete temperatures for cold weather concreting shall meet Table 701.30-5.

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

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

Cold weather concreting procedures, operations, materials, and equipment shall be developed and performed to prevent damage to concrete due to freezing at early ages, to ensure that the concrete develops the recommended strength for safe removal of forms, to maintain curing conditions that promote quality strength and durability development, to limit rapid temperature fluctuation, and to provide protection consistent with intended serviceability of the structure. The Contractor shall develop and submit to the Department for review and approval, cold weather concreting procedures for the mixing, delivery, placement, finishing, curing, and protection of concrete during cold weather, including:

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

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

1. Insulating Materials.

Insulating materials used for cold weather concreting shall meet the requirements specified herein. The thermal resistance of the proposed insulation system shall be determined to meet the concrete temperature range requirements specified herein. Supplemental heat, including hydronic heating systems, shall be applied in instances where insulating materials cannot achieve the concrete temperature requirements.

2. Heaters.

Heaters used for cold weather concreting including direct fired, indirect fired, and hydronic heaters shall meet ANSI A10.10 carbon monoxide limits, safety regulations for ventilation, and the stability, operation, fueling, and maintenance of heaters and the requirements specified herein.

a. Direct Fired Heaters.

Direct fired heaters generate heat to an enclosed space through the combustion of fossil fuels, including oil, kerosene, propane, gasoline, and natural gas. Hot air comprised of carbon dioxide and carbon monoxide combustion products, is discharged into the enclosed space. Direct fired heaters shall be prohibited from heating the air directly surrounding the concrete surface due to calcium carbonate formation interfering with the hydration reaction, from the reaction between the carbon dioxide generated from the combustion of fossil fuels and the calcium hydroxide on the surface of freshly placed concrete, resulting in a soft, chalky, and nondurable concrete surface. Direct fired heaters shall only be used on concrete surfaces protected from fossil fuel combustion products.

b. Indirect Fired Heaters.

Indirect fired heaters generate heat to an enclosed space through the combustion of fossil fuels, including oil, kerosene, propane, gasoline, and natural gas. The carbon dioxide and carbon monoxide combustion products are expelled through venting, resulting in clean heated air discharged into the enclosed space. Indirect fired heaters are suitable for heating the air directly surrounding the concrete surface.

c. Hydronic Heaters.

Hydronic heaters generate heat to an enclosed space through the circulation of the heat-transfer fluid in a closed system of pipes or hoses. The heat-transfer fluid is comprised of a propylene glycol water solution and is heated through the combustion of fossil fuels, including diesel fuel and kerosene. The combustion of fossil fuel occurs outside of the enclosed space and does not expose the concrete surface to the deleterious effects of carbon dioxide.

After the concrete placement achieves final set, polyethylene film or other suitable material shall sufficiently serve as a vapor barrier. The heat-transfer hoses shall be placed on top of the vapor barrier and covered with insulating materials meeting 701.30.G.1. Hydronic heaters shall be used to thaw or preheat subgrades prior to concrete placement and provide supplementary heat to insulating materials. Hydronic heaters shall provide an even distribution of heat to prevent curling and cracking induced by temperature gradients within concrete.

3. Enclosures.

Enclosures shall be made of wood, canvas tarpaulins, polyethylene film, or prefabricated rigid plastic. Enclosures shall be airtight, block wind, prevent admittance of cold air, conserve heat, and withstand wind and snow loads. Enclosures shall provide adequate headroom for craftsmen and sufficient space between the concrete and the enclosure to permit free circulation of warm air. Supplementary heat shall be supplied to enclosures by hydronic heaters, live steam, hot forced air, or indirect fired combustion heaters. Icing along the perimeter of the enclosure shall be prevented when live steam is utilized. Heaters and ducts shall be positioned to prevent the hot, dry air from overheating or drying the concrete surface. Insulating materials meeting 701.30.G.1 shall be applied as a vapor barrier to the concrete surface immediate after final set is attained.

H. Hot Weather Concreting Materials.

Hot weather concreting shall be defined as the procedures, operations, materials, and equipment required for the mixing, delivery, placement, finishing, bleed water evaporation, curing, and protection of concrete during hot weather conditions, while exposed to air temperatures exceeding, or expected to exceed 80°F; concrete temperatures approaching, or expected to approach 90°F; evaporation rates of surface water approaching, or expected to approach the bleeding rate of the concrete; high solar radiation; low relative humidity; and high wind speed.

The protection period shall be defined as the minimum duration required to prevent concrete from the negative effects of hot weather exposure, including the acceleration of rate of moisture loss and rate of cement hydration, difficulties in curing, increased concrete temperature, increased water demand, accelerated slump loss, increased rate of setting, increased tendency for plastic shrinkage and thermal cracking, increased potential for cold joints, and difficulties in controlling entrained air content. The protection period shall remain in place while hot weather conditions exist. Controlled and gradual termination of the protection period shall be conducted when conditions permit. The allowable rate of temperature decrease shall not exceed 5°F per hour and meet the allowable rate of temperature decrease specified in 701.30.G: Cold Weather Concreting Materials.

The procedures, operations, materials, and equipment selected for hot weather concreting shall adequately maintain specified temperature ranges and evaporation rates by addressing all variables, including ambient weather conditions, geometry of the structure, and mix design proportions. Initial materials meeting 701.30.C: Initial Curing Materials shall be applied to the concrete surface while the concrete and air temperatures, relative humidity of the air, and the wind speed have the capacity to evaporate free water from the fresh concrete surface at a rate that is equal to or greater than bleeding rate of the concrete. The evaporation rate of surface water shall be determined by the following equation:

$$E = (T_c^{2.5} - r * T_a^{2.5})(1 + 0.4V) \times 10^{-6}$$

where E = evaporation rate of water-covered surface (lb/ft²/hr), T_c = concrete temperature of the evaporating surface (°F), r = relative humidity of air surrounding the evaporating surface (%), T_a = temperature of the air surrounding the evaporative surface (°F), and V = average wind speed 20 inches above the evaporating surface. The air surrounding the evaporating surface shall be defined as the air approximately 4 to 6 feet above the evaporating surface on the windward side and shielded from the sun's rays.

Hot weather concreting procedures, operations, materials, and equipment shall be developed and performed to prevent damage to concrete and promote long-term durability. The Contractor shall develop and submit to the Department for review and approval, hot weather concreting procedures for the mixing, delivery, placement, finishing, curing, and protection of concrete during hot weather, including:

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

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

CONSTRUCTION METHODS

701.40: Pre-Placement

A. Excavation.

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

B. Subgrade and Subbase.

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

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

C. Forms.

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

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

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

All forms shall be oiled before placing concrete.

701.41: Placement

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

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

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

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

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

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

701.42: Initial Curing

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

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

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

701.43: Finishing

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

701.44: Intermediate Curing

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

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

701.45: Final Curing

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

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

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

Table 701.45-1: Termination of Curing Cycle

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

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

701.46: Protective Sealing

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

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

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

701.47: Cold Weather Concreting

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

701.48: Hot Weather Concreting

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

CONTRACTOR QUALITY CONTROL**701.60: General**

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

701.61: Contractor Quality Control Plan

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

701.62: Production Personnel

A. Foreman.

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

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

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

Table 701.62-1: Minimum Foreman Activities

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

B. Operators.

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

Table 701.62-2: Minimum Operator Activities

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

^[1] Recommended number of operators.

Table 701.62-2: Minimum Operator Activities (Continued)

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

^[1] Recommended number of operators.

701.63: Quality Control Inspection

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

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

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

DEPARTMENT ACCEPTANCE

701.70: General

Acceptance shall be performed by the Department, including consultants under direct contract with the Department independent of the Contractor, to evaluate the degree of compliance with contract requirements, to monitor each Contractor entity’s Quality Control activities, to determine the

corresponding value for a given product, and to determine the acceptability of all material produced and placed.

701.71: Acceptance of Contractor Quality Control Plan

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

701.72: Acceptance Inspection

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

701.73: Acceptance Sampling and Testing

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

Table 701.73-1: Minimum Acceptance Sampling and Testing Requirements

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

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

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

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

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

COMPENSATION

701.80: Method of Measurement

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

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

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

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

701.81: Basis of Payment

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

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

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

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

701.82: Payment Items

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

GUIDE TO THE INTERIM SUBSECTION 701 CEMENT CONCRETE SIDEWALK SPECIFICATION

MATERIALS ACTIVITIES

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

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

CONTRACTOR ACTIVITIES

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

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

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

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

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

DOCUMENT 00715



SUPPLEMENTAL SPECIFICATIONS

MARCH 31, 2024

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

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

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

DIVISION I

GENERAL REQUIREMENTS AND COVENANTS

SECTION 4: SCOPE OF WORK

Subsection 4.06: Increased or Decreased Contract Quantities

Replace the second paragraph with the following:

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

DIVISION II

CONSTRUCTION DETAILS

DIVISION II: Construction Details

Replace M4.02.15 Cement Mortar with M4.04.0 Grout, Mortar, and Concrete Products where encountered, including in sections 230.40, 485.40, 501.40, 685.40, 940.40A and 983.40.

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

SECTION 160: CONTROLLED LOW-STRENGTH MATERIAL

Section 160: Controlled Low-Strength Material

Add this new Section:

DESCRIPTION

160.20: General

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

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

MATERIALS

160.40: General

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

- CLSM – Manual Excavatable (≤ 100 psi)
- CLSM – Mechanical Excavatable (101-300 psi)
- CLSM – Structural Non Excavatable (> 300 psi)

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

CONSTRUCTION METHODS

160.60: General

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

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

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

COMPENSATION

160.80: Method of Measurement

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

160.81: Basis of Payment

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

160.82: Payment Items

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

SECTION 200: DRAINAGE

SECTION 201: BASINS, MANHOLES AND INLETS

Section 201.40: General

Replace "Cement Mortar M4.02.15" with "Mortar M4.04.0".

SECTION 690: HIGHWAY GUARD, FENCES AND WALLS

SECTION 690: WALLS REMOVED AND RESET

Section 690.40: General

Replace the last sentence with the following:

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

SECTION 800: TRAFFIC CONTROL DEVICES

SECTION 825: RECTANGULAR RAPID FLASHING BEACONS

Section 825: Rectangular Rapid Flashing Beacons

Add this new Section:

DESCRIPTION

825.20: General

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

MATERIALS

825.40: General

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

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

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

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

The Contractor shall supply cement concrete foundations per the Plans.

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

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

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

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

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

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

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

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

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

825.41: Shop Drawings

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

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

825.42: Material Warranties

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

CONSTRUCTION METHODS

825.60: General

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

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

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

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

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

Solar panels shall be oriented to maximize sunlight gain.

SYSTEM OPERATION

825.70: APS Pushbuttons

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

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

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

825.71: Light Bar

The Light Bar shall remain dark until actuated.

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

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

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

K. Both yellow beacons shall be illuminated for approximately 50 milliseconds.

L. Both yellow beacons shall be dark for approximately 250 milliseconds.

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

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

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

COMPENSATION

825.80: Method of Measurement

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

825.81: Basis of Payment

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

825.82: Payment Item

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

SECTION 900: STRUCTURES

SECTION 970: DAMP-PROOFING

Subsection 970.30: General

Add the following material to this subsection:

| | |
|-------------|---------|
| Mortar..... | M4.04.0 |
|-------------|---------|

Subsection 970.40: General

Replace the second sentence in the second paragraph with the following;

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

SECTION 983: REVETMENT

Subsection 983.64 Special Slope Paving Under Bridges

Replace the last sentence under B. Quarry Stone or Precast Concrete Blocks. with the following:

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

Subsection 983.65 Channel Paving and Grouted Channel Paving

Replace the last sentence with the following:

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

DIVISION III

MATERIALS SPECIFICATIONS

SECTION M4: CEMENT AND CEMENT CONCRETE MATERIALS

Section M4.02.00 Cement Concrete

Add the following to the end of this section.

Alkali Silica Reactivity - Resistant Portland Cement Concrete

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

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

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

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

| Procedure | Description | Limits |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| AASHTO T 303: Accelerated Detection of Potentially Deleterious Expansion of Mortar Bars Due to Alkali-Silica Reaction | Mean mortar bar expansion at 14 days. Perform a polynomial fit ⁽¹⁾ of 4, 7, 11, and 14 days to determine reliability of results | 0.08% maximum metamorphic aggregate; 0.10% maximum all other aggregates. Repeat AASHTO T 303 if r ² is less than 0.95. |
| ASTM C295: Petrographic Examination of Aggregates for Concrete | Optically strained, microfractured, or microcrystalline quartz | 5.0% maximum ⁽²⁾ |
| | Chert or chalcedony | 3.0% maximum ⁽²⁾ |
| | Tridymite or cristobolite | 1.0% maximum ⁽²⁾ |
| | Opal | 0.5% maximum ⁽²⁾ |
| | Natural volcanic glass | 3.0% maximum ⁽²⁾ |
| ⁽¹⁾ Use a second order polynomial of %Exp = A ⁰ + A ¹ SQRT(t) + A ² t. See publication SD92-04-F. ⁽²⁾ Based on the total aggregate sample. | | |

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

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

⁽¹⁾ Measure this minimum content of cementitious material as percent by weight of cement plus pozzolan.
⁽²⁾ This single criterion is not effective in all cases in remediating ASR. Low alkali cement (0.60% maximum ⁽³⁾) must be used in combination with other pozzolanic materials in Table B.
⁽³⁾ $\text{Na}_2\text{O equivalent} = \% \text{Na}_2\text{O} + 0.658 (\% \text{K}_2\text{O})$
⁽⁴⁾ Fly ash, Type F, shall replace 15% by weight of the design cement content, and any additional fly ash will be considered as fine aggregate.
⁽⁵⁾ Silica fume shall only be used in silica fume cement concrete.
⁽⁶⁾ The total amount of Type F fly ash and silica fume shall constitute 20% by weight of the design cement content, and any additional fly ash shall be considered as fine aggregate.

Section M4.02.15 Cement Mortar

Delete this section.

Section M4.04.0: Grout, Mortar and Concrete Products

Replace this section with the following.

M4.04.0: Grout, Mortar, and Concrete Products

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

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

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

A. Technical Data Sheet.

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

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

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

B. Mix Design Formulation.

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

C. Product Verification Testing.

Verification test results shall be within the limits specified herein.

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

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

M4.04.2: Rapid Hardening Cementitious Mortar and Concrete Products

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

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

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

Table M4.04.2-2: Verification Testing Requirements

| Property | Method | Quality Characteristic | | Limits | | | | | |
|------------|---------------------|-----------------------------------------------------|-----------|----------------------------|------|------|------|------|------|
| | | | | R1 | | R2 | | R3 | |
| | | | | Min. | Max. | Min. | Max. | Min. | Max. |
| Setting | T 197 | Initial Set (min.) | | Technical Data Sheet | | | | | |
| | | Final Set (min.) | | Technical Data Sheet | | | | | |
| Strength | T 97 ^[1] | Flexural Strength (psi) | 24 Hours | - | - | - | - | 650 | - |
| | | | 7 Days | - | - | - | - | - | - |
| Durability | T 358 | Surface Chloride Ion Penetration Resistance (kΩ-cm) | 28 Days | 21 | - | 21 | - | 21 | - |
| | | | T 161 (A) | Relative Durability Factor | | 90 | - | 90 | - |
| | | Mass Loss (%) | | - | 6.0 | - | 6.0 | - | 6.0 |

[1] Not applicable to vertical and overhead repair applications.

M4.04.3: Mortar Products for Unit Masonry

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

M4.04.4: Grout Products for Unit Masonry

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

M4.04.5: Non-Shrink Grout Products

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

SECTION M5: PIPE, CULVERT SECTIONS AND CONDUIT

Section M5.01.0: Joint Material for Pipe

Replace M4.02.15 Cement Mortar with M4.04.0 Grout, Mortar, and Concrete Products in paragraph B.

SECTION M8: METALS AND RELATED MATERIALS

Section M8.18.1: Traffic Signal Supports

Delete the heading Posts and the two paragraphs under it. Delete the heading Bases and the three paragraphs under it.

SECTION M10: TRAFFIC CONTROL DEVICES

Section M10.05.0: Traffic Signal Structures (General)

Add this new Section:

M10.05.0: Traffic Signal Structures (General)

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

Section M10.05.1: Signal Posts and Bases

Add this new Section:

M10.05.1: Signal Posts and Bases

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

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

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

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

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

Signal Post Bases shall be square or octagonal.

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

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

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

Section M10.11.0: RRFB Assemblies

Add this new Section:

M10.11.0: RRFB Assemblies

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

Light Bar

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

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

DOCUMENT 00719

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

**SPECIAL PROVISIONS FOR PARTICIPATION BY
DISADVANTAGED BUSINESS ENTERPRISES
(IMPLEMENTING TITLE 49 OF THE CODE OF FEDERAL REGULATIONS, PART 26)**

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POLICY

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

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

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

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

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

1. DEFINITIONS

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

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

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

“Contract” shall mean the Contract for work between the Contractor and MassDOT.

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

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

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

- (a) that is at least fifty-one (51%) percent owned by one or more individuals who are both socially and economically disadvantaged, or, in the case of any corporation, in which at least fifty-one (51%) percent of the stock is owned by one or more such individuals; and
- (b) where the management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals who own it.

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

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

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

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

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

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

- (a) To be a regular dealer, the firm must be an established, regular business that engages, as its principal business, and under its own name, in the purchase and sale of the products in question.
- (b) A person may be a regular dealer in such bulk items as petroleum products, steel, cement, gravel, stone, or asphalt without owning, operating, or maintaining a place of business as provided above if the person both owns and operates distribution equipment for the products. Any supplementing of regular dealers' own distribution equipment shall be by long term lease agreement and not on an ad hoc or contract by contract basis.
- (c) Packagers, brokers, manufacturers' representatives, or other persons who arrange or expedite transactions are not regular dealers within the meaning of this definition.

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

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

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

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

- (a) Individuals found by SDO to be socially and economically disadvantaged individuals on a case by case basis.
- (b) Individuals in the following groups, members of which are rebuttably presumed to be socially and economically disadvantaged:

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

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

2. DBE PARTICIPATION

a. Goal

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

Design-Bid-Build Projects: DBE Participation Goal 16 %
(One half of this goal shall be met in the form of Subcontractor construction activity)

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

b. Bidders List

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

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

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

3. CONTRACTOR ASSURANCES

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

4. REQUIRED SUBCONTRACT PROVISIONS

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

5. ELIGIBILITY OF DBES

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

a. Massachusetts DBE Directory

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

Contractors are encouraged to make use of the DBE Directory maintained by SDO on the Internet.

This listing is updated daily and may be accessed at the SDO's website at:

<https://www.diversitycertification.mass.gov/BusinessDirectory/BusinessDirectorySearch.aspx>

b. DBE Certification

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

c. Joint Venture Approval

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

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

6. COUNTING DBE PARTICIPATION TOWARDS DBE PARTICIPATION GOALS

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

a. Commercially Useful Function

- (1) In general, a DBE performs a commercially useful function when it is responsible for execution of the work of the contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. With respect to materials and supplies used on the Contract, the DBE must be responsible for negotiating price, determining quality and quantity, ordering the material, installing (where applicable) and paying for the material itself.
- (2) To determine whether a DBE is performing a commercially useful function, MassDOT will evaluate the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the Contract is commensurate with the work it is actually performing and the DBE credit claimed for its performance of the work, and other relevant factors.
- (3) A DBE does not perform a commercially useful function if its role is limited to that of an extra participant in a transaction, contract, or project through which funds are passed in order to obtain the appearance of DBE participation. In determining whether a DBE is such an extra participant, MassDOT will examine similar transactions, particularly those in which DBEs do not participate.

b. Counting Participation Toward The Contract Participation Goal

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

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

- (2) MassDOT will count the entire amount of fees or commissions charged by a DBE firm for providing bona fide services, such as professional, technical, consultant, or managerial services, or for providing bonds or insurance specifically required for the performance of a U.S. DOT assisted Contract, toward DBE participation goals, provided it is determined that the fee is reasonable and not excessive as compared with fees customarily allowed for similar services.
- (3) When a DBE performs as a participant in a joint venture, MassDOT will count toward DBE participation goals a portion of the total dollar value of the contract that is equal to the distinct, clearly defined portion of the work of the Contract that the DBE performs with its own forces.
- (4) MassDOT will use the following factors in determining whether a DBE trucking company is performing a commercially useful function:
 - (i) the DBE must be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular contract; there cannot be a contrived arrangement for the purpose of meeting DBE participation goals.
 - (ii) the DBE must itself own and operate at least one fully licensed, insured, and operational truck used on the Contract.
 - (iii) the Contractor will receive DBE credit for the total value of the transportation services the DBE provides on the Contract using trucks owned, insured, and operated by the DBE itself and using drivers the DBE employs alone.
 - (iv) the DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The Contractor who has a contract with a DBE who leases trucks from another DBE will receive credit for the total value of the transportation services of the lease.
 - (v) the DBE may also lease trucks from a non-DBE firm, including an owner-operator. The Contractor who has a Contract with a DBE who leases trucks from a non-DBE is entitled to credit for the total value of the transportation services provided by non-DBE lessees not to exceed the value of transportation services provided by DBE-owned trucks on the Contract. Additional participation by non-DBE lessees receives credit only for the fee or commission it receives as a result of the lease arrangement, fee or commission it receives as a result of the lease arrangement. The DBE does not receive credit for the total value of the transportation services provided by the lessee, since these services are not provided by a DBE.
 - (vi) the lease must indicate that the DBE has exclusive use of, and control over, the truck. This does not preclude the leased truck from working for others during the term of the lease with the consent of the DBE, so long as the lease gives the DBE absolute priority for use of the leased truck. Leased trucks must display the name and identification number of the DBE.

- (5) MassDOT will count the Prime Contractor's expenditures with DBEs for materials or supplies toward DBE participation goals as follows:
- (i) if the materials or supplies are obtained from a DBE manufacturer, as defined in Section 1 above, MassDOT will count one hundred (100%) percent of the cost of the materials or supplies toward DBE participation goals, provided the DBE meets the other requirements of the regulations.
 - (ii) if the materials or supplies are purchased from a DBE regular dealer, as defined in Section 1 above, MassDOT will count sixty (60%) percent of the cost of the materials or supplies toward the Contract participation goal, provided the DBE meets the other requirements of the regulations.
 - (iii) for materials or supplies purchased from a DBE which is neither a manufacturer nor a regular dealer, MassDOT will count the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, or fees or transportation charges for the delivery of materials or supplies required on a job site toward the Contract participation goal, provided that MassDOT determines the fees to be reasonable and not excessive as compared with fees customarily allowed for similar services; the cost of the materials and supplies themselves will not be counted; and provided the DBE meets the other requirements of the regulations.

c. Joint Check Policy

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

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

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

Other factors MassDOT may consider:

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

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

d. Joint Check Procedure(s)

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

7. AWARD DOCUMENTATION AND PROCEDURES

- a. The two lowest bidders/the two bidders with the lowest price per quality score point, shall submit, by the close of business on the third (3rd) business day after the bid opening, a completed Schedule of Participation by DBEs (Document B00853) which shall list:
- (1) The full company name, address and telephone number of each DBE with whom the bidder intends to make a commitment.
 - (2) The contract item(s), by number(s) and quantity(ies), if applicable, or specific description of other business activity to be performed by each DBE as set forth in the Letters of Intent. The Bidder shall list only firms which have the capacity to perform, manage and supervise the work proposed in accordance with the requirements of 49 CFR Part 26 and Section **6.b** of these Special Provisions.
 - (3) The total dollar amount to be paid to each DBE. (Bidders are cautioned that at least one half of the participation goal must be met with construction activity work.)
 - (4) The total dollar amount to be paid to each DBE that is eligible for credit toward the DBE participation goal under the counting rules set out in Section **6.b**.
 - (5) The total creditable DBE participation as a percentage of the total bid price.
- b. All firms listed on the Schedule must be currently certified.
- c. The two lowest bidders/the two bidders with the lowest price per quality score point, shall each submit, with their Schedules of Participation, fully completed, signed Letters of Intent (Document B00854) from each of the DBEs listed on the Schedule. The Letters of Intent shall be in the form attached and shall identify specifically the contract activity the DBE proposes to perform, expressed as contract item number, if applicable, description of the activity, NAICS code, quantity, unit price and total price. In the event of discrepancy between the Schedule and the Letter of Intent, the Letter of Intent shall govern.
- d. Evidence of good faith efforts will be evaluated by MassDOT in the selection of the lowest responsible bidder.

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

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

- f. If MassDOT finds that the percentage of DBE participation submitted by the bidder on its Schedule does not meet the Contract participation goal, or that Schedule and Letters of Intent were not timely filed, and that the bidder has not demonstrated good faith efforts to comply with these requirements, it shall propose that the bidder be declared ineligible for award. In that case, the bidder may request administrative reconsideration. Such requests must be sent in writing within three (3) calendar days of receiving notice of proposed ineligibility to: The Office of the General Counsel, Massachusetts Department of Transportation, 10 Park Plaza, Boston, MA, 02116.
- g. If, after administrative reconsideration, MassDOT finds that the bidder has not shown that sufficient good faith efforts were made to comply with the requirements of these Special Provisions, it shall reject the bidder's proposal and may retain the proposal guaranty.
- h. Actions which constitute evidence of good faith efforts to meet a DBE participation goal include, but are not limited to, the following examples, which are set forth in 49 CFR Part 26, Appendix A:
- (1) Soliciting through all reasonable and available means (e.g., attendance at pre-bid meetings, advertising and/or written notices) the interest of all certified DBEs who have the capability to perform the work of the Contract. The bidder must solicit this interest within sufficient time to allow the DBEs to respond to the solicitation. The bidder must determine with certainty if the DBEs are interested by taking appropriate steps to follow up initial solicitations.
 - (2) Selecting portions of the work to be performed by DBEs in order to increase the likelihood that the DBE participation goal will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the Prime Contractor might otherwise prefer to perform these work items with its own forces.
 - (3) Providing interested DBEs with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.
 - (4) Negotiating in good faith with interested DBEs. It is the bidder's responsibility to make a portion of the work available to DBE Subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE Subcontractors and suppliers, so as to facilitate DBE participation. Evidence of such negotiation includes the names, addresses, and telephone number of DBEs that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for DBEs to perform the work.

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

- (5) Not rejecting DBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. Contractors should be careful of adding additional requirements of performance that would in effect limit participation by DBEs or any small business. The Contractor's standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. nonunion employee status) are not legitimate causes for the rejection or non-solicitation of bids in the Contractor's efforts to meet the Contract participation goal.
- (6) Making efforts to assist interested DBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or contractor.
- (7) Making efforts to assist interested DBEs in obtaining necessary equipment, supplies, materials, or related assistance or services.
- (8) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; local, state, and federal minority/women business assistance offices; and other organizations as allowed on a case by case basis to provide assistance in the recruitment and placement of DBEs.

8. COMPLIANCE

- a. All activity performed by a DBE for credit toward the Contract participation goal must be performed, managed and supervised by the DBE in accordance with all commercially useful function requirements of 49 CFR Part 26. The Prime Contractor shall not enter into, or condone, any other arrangement.
- b. The Prime Contractor shall not perform with its own organization, or assign to any other business, an activity designated for the DBE(s) named on the Schedule(s) submitted by the Prime Contractor under Section 7 or under paragraph 8.f of this section, without the approval of MassDOT in accordance with the requirements of paragraphs 8.f and 8.j of this section.
- c. MassDOT may suspend payment for any activity that was not performed by the DBE to whom the activity was committed on the approved Schedule of Participation, or that was not performed in accordance with the requirements of Section 6.
- d. MassDOT retains the right to approve or disapprove of any or all Subcontractors. Requests by the Prime Contractor for approval of participation by a DBE Subcontractor for credit toward the Contract participation goal must include, in addition to any other requirements for Subcontractor approval, the following:
 - (1) A copy of the proposed subcontract. The subcontract must be for at least the dollar amount, and for the work described, in the Bidder's Schedule of Participation.
 - (2) A resume stating the qualifications and experience of the DBE Superintendent and/or foreperson who will supervise the on-site work. A new resume will be required for any change in supervisory personnel during the progress of the work.
 - (3) A Schedule of Operations indicating when the DBE is expected to perform the work.
 - (4) A list of (1) equipment owned by the DBE to be used on the Project, and (2) equipment to be leased by the DBE for use on the Project.

- (5) A list of: (1) all projects (public and private) which the DBE is currently performing; (2) all projects (public and private) to which the DBE is committed; and (3) all projects (public and private) to which the DBE intends to make a commitment. For each Contract, list the contracting organization, the name and telephone number of a contact person for the contracting organization, the dollar value of the work, a description of the work, and the DBE's work schedule for each project.
- e. If, pursuant to the Subcontractor approval process, MassDOT finds that a DBE Subcontractor does not have sufficient experience or resources to perform, manage and supervise work of the kind proposed in accordance with the requirements of 49 CFR Part 26, approval of the DBE Subcontractor may be denied. In the event of such denial, the Prime Contractor shall proceed in accordance with the requirements paragraphs **8.f** and **8.j** of this section.
 - f. If, for reasons beyond its control, the Prime Contractor cannot comply with its DBE participation commitment in accordance with the Schedule of Participation submitted under Section 7, the Prime Contractor shall submit to MassDOT the reasons for its inability to comply with its obligations and shall submit, and request approval for, a revised Schedule of Participation. If approved by MassDOT, the revised Schedule shall govern the Prime Contractor's performance in meeting its obligations under these Special Provisions.
 - g. A Prime Contractor's compliance with the participation goal in Section 2 shall be determined by reference to the established percentage of the total contract price, provided, however, that no decrease in the dollar amount of a bidder's commitment to any DBE shall be allowed without the approval of MassDOT.
 - h. If the contract amount is increased, the Prime Contractor may be required to submit a revised Schedule of Participation in accordance with paragraphs **8.f** and **8.j** of this section.
 - i. In the event of the decertification of a DBE scheduled to participate on the Contract for credit toward the participation goal, but not under subcontract, the Contractor shall proceed in accordance with paragraphs **8.f** and **8.j** of this section.
 - j. The Prime Contractor shall notify MassDOT immediately of any facts that come to its attention indicating that it may or will be unable to comply with any aspect of its DBE obligation under this Contract.
 - k. Any notice required by these Special Provisions shall be given in writing to: (1) the Resident Engineer; (2) the District designated Compliance Officer; and (3) the DBE Liaison Officer, MassDOT Office of Civil Rights, 10 Park Plaza, – 3rd Floor - West, Boston, MA, 02116 and cc'd to the Deputy Chief of External Programs.
 - l. The Prime Contractor and its Subcontractors shall comply with MassDOT's Electronic Reporting System Requirements (MassDOT Document 00821) and submit all information required by MassDOT related to the DBE Special Provisions through the Equitable Business Opportunity Solution ("EBO"). MassDOT reserves the right to request reports in the format it deems necessary anytime during the performance of the Contract.
 - m. Termination of DBE by Prime Contractor
 - (1) A Prime Contractor shall not terminate a DBE Subcontractor or an approved substitute DBE firm without the prior written consent of MassDOT. This includes, but is not limited to, instances in which a Prime Contractor seeks to perform work originally designated for a DBE Subcontractor with its own forces or those of an affiliate, a non-DBE firm, or with another DBE firm.

- (2) MassDOT may provide such written consent only if MassDOT agrees, for reasons stated in its concurrence document, that the Prime Contractor has good cause to terminate the DBE firm.
- (3) For purposes of this paragraph, good cause includes the following circumstances:
 - (i) The DBE Subcontractor fails or refuses to execute a written contract;
 - (ii) The DBE Subcontractor fails or refuses to perform the work of its subcontract in a way consistent with normal industry standards. Good cause, however, does not exist if the failure or refusal of the DBE Subcontractor to perform its work on the subcontract results from the bad faith or discriminatory action of the Prime Contractor;
 - (iii) The DBE Subcontractor fails or refuses to meet the Prime Contractor's reasonable, nondiscriminatory bond requirements.
 - (iv) The DBE Subcontractor becomes bankrupt, insolvent, or exhibits credit unworthiness;
 - (v) The DBE Subcontractor is ineligible to work on public works projects because of suspension and debarment proceedings pursuant 2 CFR Parts 180, 215 and 1,200 or applicable State law;
 - (vi) (vii) MassDOT has determined that the listed DBE Subcontractor is not a responsible contractor;
 - (vii) The listed DBE Subcontractor voluntarily withdraws from the Project and provides written notice of its withdrawal;
 - (viii) The listed DBE is ineligible to receive DBE credit for the type of work required;
 - (ix) A DBE owner dies or becomes disabled with the result that the listed DBE Contractor is unable to complete its work on the Contract;
 - (x) Other documented good cause that MassDOT determines compels the termination of the DBE Subcontractor. Good cause, however, does not exist if the Prime Contractor seeks to terminate a DBE it relied upon to obtain the Contract so that the Prime Contractor can self-perform the DBE work or substitute another DBE or non-DBE Contractor after Contract Award.
- (4) Before transmitting to MassDOT a request to terminate and/or substitute a DBE Subcontractor, the Prime Contractor must give notice in writing to the DBE Subcontractor, with a copy to MassDOT, of its intent to request to terminate and/or substitute, and the reason for the request.
- (5) The Prime Contractor must give the DBE five (5) business days to respond to the Prime Contractor's notice. The DBE must advise MassDOT and the Contractor of the reasons, if any, why it objects to the proposed termination of its subcontract and why MassDOT should not approve the Prime Contractor's action. If required in a particular case as a matter of public necessity (e.g., safety), MassDOT may provide a response period shorter than five (5) business days.
- (6) In addition to post-award terminations, the provisions of this section apply to pre-award deletions of or substitutions for DBE firms.

n. Prompt Payment.

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

9. SANCTIONS

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

- a. Retain, in connection with final acceptance and final payment processing, an amount determined by multiplying the total contract amount by the percentage in Section 2, less the amount paid to approved DBE(s) for work performed under the Contract in accordance with the provisions of Section 8.
- b. Suspend, terminate or cancel this Contract, in whole or in part, and call upon the Prime Contractor's surety to perform all terms and conditions in the Contract.
- c. In accordance with 720 CMR 5.05(1)(f), modify or revoke the Prime Contractor's Prequalification status or recommend that the Prime Contractor not receive award of a pending Contract. The Prime Contractor may appeal the determination of the Prequalification Committee in accordance with the provisions of 720 CMR 5.06.
- d. Initiate debarment proceedings pursuant to M.G.L. c. 29 §29F and, as applicable, 2 CFR Parts 180, 215 and 1,200.
- e. Refer the matter to the Massachusetts Attorney General for review and prosecution, if appropriate, of any false claim or pursuant to M.G.L. c. 12, §§ 5A to 5O (the Massachusetts False Claim Act).
- f. Refer the matter to the U.S. DOT's Office of the Inspector General or other agencies for prosecution under Title 18, U.S.C. § 1001, 49 CFR Parts 29 and 31, and other applicable laws and regulations.

10. FURTHER INFORMATION; ENFORCEMENT, COOPERATION AND CONFIDENTIALITY.

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

- (1) If you are a firm that does not meet the eligibility criteria of 49 CFR, Parts 26.61 to 26.73 (“subpart D”), that attempts to participate in a DOT- assisted program as a DBE on the basis of false, fraudulent, or deceitful statements or representations or under circumstances indicating a serious lack of business integrity or honesty, MassDOT or FHWA may initiate suspension or debarment proceedings against you under 49 CFR Part 29.
 - (2) If you are a firm that, in order to meet DBE Contract participation goals or other DBE Program requirements, uses or attempts to use, on the basis of false, fraudulent or deceitful statements or representations or under circumstances indicating a serious lack of business integrity or honesty, another firm that does not meet the eligibility criteria of subpart D, FHWA may initiate suspension or debarment proceedings against you under 49 CFR Part 29.
 - (3) In a suspension or debarment proceeding brought either under subparagraph a.(1) or b.(2) of this section, the concerned operating administration may consider the fact that a purported DBE has been certified by a recipient. Such certification does not preclude FHWA from determining that the purported DBE, or another firm that has used or attempted to use it to meet DBE participation goals, should be suspended or debarred.
 - (4) FHWA may take enforcement action under 49 CFR Part 31, Program Fraud and Civil Remedies, against any participant in the DBE Program whose conduct is subject to such action under 49 CFR Part 31.
 - (5) FHWA may refer to the Department of Justice, for prosecution under 18 U.S.C. 1001 or other applicable provisions of law, any person who makes a false or fraudulent statement in connection with participation of a DBE in any DOT-assisted program or otherwise violates applicable Federal statutes.
- b. Pursuant to 49 CFR Part 26.109, the rules governing information, confidentiality, cooperation, and intimidation or retaliation are as follows:
- (1) Availability of records.
 - (i) In responding to requests for information concerning any aspect of the DBE Program, FHWA complies with provisions of the Federal Freedom of Information and Privacy Acts (5 U.S.C. 552 and 552a). FHWA may make available to the public any information concerning the DBE Program release of which is not prohibited by Federal law.
 - (ii) MassDOT shall safeguard from disclosure to unauthorized persons information that may reasonably be considered as confidential business information, consistent with Federal and Massachusetts General Law (M.G.L. c. 66, § 10, M.G.L. c. 4, §7 (26), 950 CMR 32.00).
 - (2) Confidentiality of information on complainants. Notwithstanding the provisions of subparagraph b.(1) of this section, the identity of complainants shall be kept confidential, at their election. If such confidentiality will hinder the investigation, proceeding or hearing, or result in a denial of appropriate administrative due process to other parties, the complainant must be advised for the purpose of waiving the privilege. Complainants are advised that, in some circumstances, failure to waive the privilege may result in the closure of the investigation or dismissal of the proceeding or hearing.

- (3) Cooperation. All participants in FHWA's DBE Program (including, but not limited to, recipients, DBE firms and applicants for DBE certification, complainants and appellants, and Contractors using DBE firms to meet Contract participation goals) are required to cooperate fully and promptly with U.S. DOT and recipient compliance reviews, certification reviews, investigations, and other requests for information. Failure to do so shall be a ground for appropriate action against the party involved (e.g., with respect to recipients, a finding of noncompliance; with respect to DBE firms, denial of certification or removal of eligibility and/or suspension and debarment; with respect to a complainant or appellant, dismissal of the complaint or appeal; with respect to a Contractor which uses DBE firms to meet participation goals, findings of non-responsibility for future Contracts and/or suspension and debarment).
- (4) Intimidation and retaliation. No recipient, Contractor, or any other participant in the program, may intimidate, threaten, coerce, or discriminate against any individual or firm for the purpose of interfering with any right or privilege secured by this part or because the individual or firm has made a complaint, testified, assisted, or participated in any manner in an investigation, proceeding, or hearing under this part. If any recipient or contractor violates this prohibition, that entity is in noncompliance with this 49 CFR Part 26.

11. LIST OF ADDITIONAL DOCUMENTS.

- a. The following documents shall be completed and signed by the bidder and designated DBEs in accordance with Section 7 - Award Documentation and Procedures. These documents must be returned by the bidder to MassDOT's Bid Document Distribution Center:
- Schedule of DBE Participation (Document B00853)
 - Letter of Intent (Document B00854)
 - DBE Joint Check Arrangement Approval Form (Document B00855), if Contractor and DBE plan, or if DBE is required to use a Joint Check
- b. The following document shall be signed and returned by Contractor and Subcontractors/DBEs to the MassDOT District Office overseeing the Project, as applicable:
- Contractor/Subcontractor Certification Form (Document No. 00859) (a checklist of other documents to be included with every subcontract (DBEs and non-DBEs alike)).
- c. The following document shall be provided to MassDOT's Office of Civil Rights and Prequalification Office at least fourteen (14) business days before the bid opening date, if applicable:
- Affidavit of DBE/Non-DBE Joint Venture (Document B00856)
- d. The following document shall be provided to MassDOT's District Office of Civil Rights within 30 calendar days after the work of the DBE is completed, or no later than 30 calendar days after the work of the DBE is on a completed and processed CQE. This document shall be completed and submitted by the Prime Contractor:
- Certificate of Completion by a Minority/Women or Disadvantaged Business Enterprise (M/W/DBE) (Form No. CSD-100)

**REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS**

- I. General
- II. Nondiscrimination
- III. Non-segregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion
- XI. Certification Regarding Use of Contract Funds for Lobbying
- XII. Use of United States-Flag Vessels:

ATTACHMENTS

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

I. GENERAL

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

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

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

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

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work

performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract. 23 CFR 633.102(d).

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

6. Training and Promotion:

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

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

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

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

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

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

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

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

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide

sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

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

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

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

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

10. Assurances Required:

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

b. The contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate, which may include, but is not limited to:

- (1) Withholding monthly progress payments;
- (2) Assessing sanctions;
- (3) Liquidated damages; and/or
- (4) Disqualifying the contractor from future bidding as non-responsible.

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

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

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

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

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

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

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

III. NONSEGREGATED FACILITIES

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

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

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

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

Projects funded under 23 U.S.C. 117, and National Highway Freight Program projects funded under 23 U.S.C. 167.

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

1. Minimum wages (29 CFR 5.5)

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

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

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

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

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

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

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

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

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

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

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

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

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

(5) The contracting officer must promptly notify the contractor of the action taken by the Wage and Hour Division

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

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

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

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

2. Withholding (29 CFR 5.5)

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

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

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

- (1) A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;
- (2) A contracting agency for its procurement costs;
- (3) A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;
- (4) A contractor's assignee(s);
- (5) A contractor's successor(s); or
- (6) A claim asserted under the Prompt Payment Act, [31 U.S.C. 3901–3907](#).

3. Records and certified payrolls (29 CFR 5.5)

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

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

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

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

b. Certified payroll requirements (1) Frequency and method of submission. The contractor or subcontractor must submit weekly, for each week in which any DBA- or Related Acts-covered work is performed, certified payrolls to the contracting

agency. The prime contractor is responsible for the submission of all certified payrolls by all subcontractors. A contracting agency or prime contractor may permit or require contractors to submit certified payrolls through an electronic system, as long as the electronic system requires a legally valid electronic signature; the system allows the contractor, the contracting agency, and the Department of Labor to access the certified payrolls upon request for at least 3 years after the work on the prime contract has been completed; and the contracting agency or prime contractor permits other methods of submission in situations where the contractor is unable or limited in its ability to use or access the electronic system.

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

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

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

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

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

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

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

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

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

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

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

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

(3) *Required information disclosures.* Contractors and subcontractors must maintain the full Social Security number and last known address, telephone number, and email address

of each covered worker, and must provide them upon request to the contracting agency, the State DOT, the FHWA, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or other compliance action.

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

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

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

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

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

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

the equal employment opportunity requirements of Executive Order 11246, as amended, and [29 CFR part 30](#).

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

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

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

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

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

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

3. Withholding for unpaid wages and liquidated damages

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

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

- (1) A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;
- (2) A contracting agency for its procurement costs;
- (3) A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;
- (4) A contractor's assignee(s);
- (5) A contractor's successor(s); or
- (6) A claim asserted under the Prompt Payment Act, [31 U.S.C. 3901](#)–3907.

4. Subcontracts. The contractor or subcontractor must insert in any subcontracts the clauses set forth in paragraphs 1. through 5. of this section and a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor is responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs 1. through 5. In the

event of any violations of these clauses, the prime contractor and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss, due to any workers of lower-tier subcontractors, and associated liquidated damages and may be subject to debarment, as appropriate.

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

- a. Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the Contract Work Hours and Safety Standards Act (CWHSSA) or its implementing regulations in this part;
- b. Filing any complaint, initiating or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under CWHSSA or this part;
- c. Cooperating in any investigation or other compliance action, or testifying in any proceeding under CWHSSA or this part; or
- d. Informing any other person about their rights under CWHSSA or this part.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

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

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

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

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

- (3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
- (4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

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

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

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

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

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

VII. SAFETY: ACCIDENT PREVENTION

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

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

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and

health standards (29 CFR Part 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704). 29 CFR 1926.10.

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

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

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

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

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

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

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

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

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

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

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

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

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

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

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

1. Instructions for Certification – First Tier Participants:

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

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

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

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

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

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

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

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

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

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

* * * * *

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

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

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

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

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

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

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

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

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

3. Instructions for Certification - Lower Tier Participants:

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

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

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

this transaction originated may pursue available remedies, including suspension and/or debarment.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

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

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

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or

cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

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

XII. USE OF UNITED STATES-FLAG VESSELS:

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

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

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

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

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

**ATTACHMENT A - EMPLOYMENT AND MATERIALS
PREFERENCE FOR APPALACHIAN DEVELOPMENT
HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS
ROAD CONTRACTS (23 CFR 633, Subpart B, Appendix B)**

This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

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

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

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

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

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

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

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

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

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

DOCUMENT 00811

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

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

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

Base Price

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

Period Price

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

Price Adjustment Determination, Calculation and Payment

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

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

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

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

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

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

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DOCUMENT 00812

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

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

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

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

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

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

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

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

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

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

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DOCUMENT 00813

SPECIAL PROVISIONS

PRICE ADJUSTMENTS FOR STRUCTURAL STEEL AND REINFORCING STEEL

June 13, 2024

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

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

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

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

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

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

Base Prices and Period Prices are defined as follows:

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

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

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

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

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

Period Prices are determined as follows:

Period Price = Base Price X Index Factor

Index Factor = Period Price Index / Base Price Index

Example of a Period Price Calculation:

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

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

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

Index Factor = Period Price Index / Base Price Index = 218.0 / 229.4 = 0.950

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

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

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

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

End of example.

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

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

Structural Steel

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

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

Reinforcing Steel

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

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

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

TABLE

| Steel Type | Price per Pound | |
|------------|---------------------------------------------------------------------------------------------------------------|--------|
| 1 | ASTM A615/A615M Grade 60 (AASHTO M31 Grade 60 or 420) Reinforcing Steel | \$0.66 |
| 2 | ASTM A27 (AASHTO M103) Steel Castings, H-Pile Points & Pipe Pile Shoes (See Note below.) | \$0.91 |
| 3 | ASTM A668 / A668M (AASHTO M102) Steel Forgings | \$0.91 |
| 4 | ASTM A108 (AASHTO M169) Steel Forgings for Shear Studs | \$0.94 |
| 5 | ASTM A709/A709M Grade 36 / AASHTO M270M/M270 Grade 36 or 250 Structural Steel Plate | \$1.01 |
| 6 | ASTM A709/A709M Grade 36 / AASHTO M270M/M270 Grade 36 or 250 Structural Steel Shapes | \$0.93 |
| 7 | ASTM A709/A709M Grade 50 / AASHTO M270M/M270 Grade 50 or 345 Structural Steel Plate | \$1.01 |
| 8 | ASTM A709/A709M Grade 50 / AASHTO M270M/M270 Grade 50 or 345 Structural Steel Shapes | \$0.93 |
| 9 | ASTM A709/A709M Grade 50WT / AASHTO M270M/M270 Grade 50WT or 345WT Structural Steel Plate | \$1.05 |
| 10 | ASTM A709/A709M Grade 50WT / AASHTO M270M/M270 Grade 50WT or 345WT Structural Steel Shapes | \$0.94 |
| 11 | ASTM A709/A709M Grade 50W / AASHTO M270M/M270 Grade 50W 345W Structural Steel Plate | \$1.05 |
| 12 | ASTM A709/A709M Grade 50W / AASHTO M270M/M270 Grade 50W or 345W Structural Steel Shapes | \$0.94 |
| 13 | ASTM A709/A709M Grade HPS 50W / AASHTO M270M/M270 Grade HPS 50W or 345W Structural Steel Plate | \$1.10 |
| 14 | ASTM A709/A709M Grade HPS 70W / AASHTO M270M/M270 Grade HPS 70W or 485W Structural Steel Plate | \$1.17 |
| 15 | ASTM A514/A514M-05 Grade HPS 100W / AASHTO M270M/M270 Grade HPS 100W or 690W Structural Steel Plate | \$1.79 |
| 16 | ASTM A992/A992M Grade 50S / AASHTO M270M/M270 Grade 50S or 345S Structural Steel Plate | \$1.05 |
| 17 | ASTM A992/A992M Grade 50S / AASHTO M270M/M270 Grade 50S or 345S Structural Steel Shapes | \$0.94 |
| 18 | ASTM A276 Type 316 Stainless Steel | \$5.33 |
| 19 | ASTM A240 Type 316 Stainless Steel | \$5.33 |
| 20 | ASTM A148 Grade 80/50 Steel Castings (See Note below.) | \$1.84 |
| 21 | ASTM A53 Grade B Structural Steel Pipe | \$1.17 |
| 22 | ASTM A500 Grades A, B, 36 & 50 Structural Steel Pipe | \$1.17 |
| 23 | ASTM A252, Grades 240 (36 KSI) & 414 (60 KSI) Pipe Pile | \$0.92 |
| 24 | ASTM 252, Grade 2 Permanent Steel Casing | \$0.92 |
| 25 | ASTM A36 (AASHTO M183) for H-piles, steel supports and sign supports | \$0.99 |
| 26 | ASTM A328 / A328M, Grade 50 (AASHTO M202) Steel Sheetpiling | \$1.76 |
| 27 | ASTM A572 / A572M, Grade 50 Sheetpiling | \$1.76 |
| 28 | ASTM A36/36M, Grade 50 | \$1.01 |
| 29 | ASTM A570, Grade 50 | \$0.99 |
| 30 | ASTM A572 (AASHTO M223), Grade 50 H-Piles | \$1.01 |
| 31 | ASTM A1085 Grade A (50 KSI) Steel Hollow Structural Sections (HSS), heat-treated per ASTM A1085 Supplement S1 | \$1.17 |
| 32 | AREA 140 LB Rail and Track Accessories | \$0.60 |

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

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DOCUMENT 00814

SPECIAL PROVISIONS
PRICE ADJUSTMENT FOR PORTLAND CEMENT CONCRETE MIXES

January 12, 2009

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

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

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

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

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

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

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

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

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

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DOCUMENT 00820

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

I. Definitions

For purposes of this contract,

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

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

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

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

II. Equal Opportunity, Non-Discrimination and Affirmative Action

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

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

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

The Contractor shall post hereafter in conspicuous places, available for employees and applicants for employment, notices to be provided by the Massachusetts Commission Against Discrimination setting forth the provisions of the Fair Employment Practices Law of the Commonwealth (Massachusetts General Laws Chapter 151 B).

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

III. Minority and Women Workforce Participation

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

IV. Liaison Committee

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

V. Reports and Records

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

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

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

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

VI. Access to Work Site

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

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

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

VIII. Sanctions

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

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

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

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

IX. Severability

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

X. Contractor's Certification

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

XI. Subcontractor Requirements

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

Rev'd 03/07/14

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DOCUMENT 00821

ELECTRONIC REPORTING REQUIREMENTS
CIVIL RIGHTS PROGRAMS AND CERTIFIED PAYROLL

Implemented on March 2, 2009

Revised June 04, 2019

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

Contractor and Sub-Contractor EBO User Certification

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

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

Vetting of Firms and Designated Firm Individuals

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

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

Interim Reporting Requirements

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

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DOCUMENT 00859

CONTRACTOR/SUBCONTRACTOR CERTIFICATION FORM ‡

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

_____ (Contractor) Date: _____

_____ (Subcontractor) District Approved Subcontractor

Contract No: 126584 Project No. 613129 Federal Aid No.: HSI(VUS)-003S(749)X

Location: NANTUCKET

Project Description: Intersection Improvements at Milestone Road and Polpis Road and Extension of ‘Sconset Bike Path

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

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

This is not a Federally-aided construction project

Document #

- 00718 –Participation By Minority Or Women's Business Enterprises and SDVOBE†
- 00761 –Certification Regarding Debarment, Suspension, Ineligibility, and Voluntary Exclusion
- 00820 – MA Supplemental Equal Employment Opportunity, Non-Discrimination, and Affirmative Action Program
- 00821 – Electronic Reporting Requirements, Civil Rights Programs, and Certified Payroll
- 00859 – Contractor/Subcontractor Certification Form (this document)
- 00860 – MA Employment Laws
- 00861 – Applicable State Wage Rates in the Contract Proposal**
- B00842 – MA Schedule of Participation By Minority or Women Business Enterprises (M/WBEs)†
- B00843 – MA Letter of Intent – M/WBEs†
 - ** Does not apply to Material Suppliers, unless performing work on-site
 - † Applies only if Subcontractor is a M/WBE; only include these forms for the particular M/WBE Entity
- B00844 - Schedule of Participation By SDVOBE
- B00845 - Letter of Intent – SDVOBE
- B00846 – M/WBE or SDVOBE Joint Check Arrangement Approval Form
- B00847 – Joint Venture Affidavit

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

Document #

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



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

*Applicable only to Contracts or Subcontracts in excess of \$10,000

**Does not apply to Material Suppliers, unless performing work on-site

† Applies only if Subcontractor is a DBE; only include these forms for the particular DBE Entity

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

(Print Name and Title)

(Authorized Signature)

PART 2

PART 2. SUBCONTRACTOR CERTIFICATION: I hereby certify, as an authorized official of this company, that the required documents in Part 1 above were physically incorporated in our Agreement/Subcontract with the Contractor and give assurance that this company will fully comply or make every good faith effort to comply with the same. I further certify that:

1. This company recognizes that if this is a Federal-Aid Project, then this Contract is covered by the equal employment opportunity laws administered and enforced by the United States Department of Labor (“USDOL”), Office of Federal Contract Compliance Programs (“OFCCP”). By signing below, we acknowledge that this company has certain reporting obligations to the OFCCP, as specified by 41 CFR Part 60-4.2.
2. This company further acknowledges that any contractor with fifty (50) or more employees on a Federal-aid Contract with a value of fifty-thousand (\$50,000) dollars or more must annually file an EEO-1 Report (SF 100) to the EEOC, Joint Reporting Committee, on or before September 30th, each year, as specified by 41 CFR Part 60-1.7a.
3. For more information regarding the federal reporting requirements, please contact the USDOL, OFCCP Regional Office, at 1-646-264-3170 or EEO-1, Joint Reporting Committee at 1-866-286-6440. You may also find guidance at: <http://www.dol.gov/ofccp/TAGuides/consttag.pdf> or <http://www.wdol.gov/dba.aspx#0>.
4. This company has, has not, participated in a previous contract or subcontract subject to the Equal Opportunity clauses set forth in 41 CFR Part 60-4 and Executive Order 11246, and where required, has filed with the Joint Reporting Committee, the Director of the Office of Federal Contract Compliance Programs or the EEO Commission all reports due under the applicable filing requirements.
5. This company is in full compliance with applicable Federal and Commonwealth of Massachusetts laws, rules, and regulations and is not currently debarred or disqualified from bidding on or participating in construction contracts in any jurisdiction of the United States. See : <https://www.mass.gov/service-details/contractors-and-vendors-suspended-or-debarred-by-massdot>
6. This company is properly registered and in good standing with the Office of the Secretary of the Commonwealth.

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

Firm: _____

Address: _____

(Print Name and Title)

Telephone Number: _____

Federal I.D. Number: _____

(Authorized Signature)

Estimated Start Date: _____

Estimated Completion Date: _____

Estimated Dollar Amount: _____

(Date)

DOCUMENT 00860

COMMONWEALTH OF MASSACHUSETTS PUBLIC EMPLOYMENT LAWS

Revised February 20, 2019

The Contractor's attention is directed to Massachusetts General Laws, Chapter 149, Sections 26 through 27H, and 150A. This contract is considered to fall within the ambit of that law, which provides that in general, the Prevailing Rate or Total Rate must be paid to employees working on projects funded by the Commonwealth of Massachusetts or any political subdivision including Massachusetts Department of Transportation (MassDOT).

A Federal Aid project is also subject to the Federal Minimum Wage Rate law for construction. When comparing a state minimum wage rate, monitored by the Massachusetts Attorney General, versus federal minimum wage rate, monitored by the U.S. Department of Labor Wage and Hour Division, for a particular job classification the higher wage is at all times to be paid to the affected employee.

Every contractor or subcontractor engaged in this contract to which sections twenty-seven and twenty-seven A apply will keep a true and accurate record of all mechanics and apprentices, teamsters, chauffeurs and laborers employed thereon, showing the name, address and occupational classification of each such employee on this contract, and the hours worked by, and the wages paid to, each such employee, and shall furnish to the MassDOT's Resident Engineer, on a weekly basis, a copy of said record, in a form approved by MassDOT and in accordance with M.G.L. c. 149, § 27B, signed by the employer or his/her authorized agent under the penalties of perjury.

Each such contractor or subcontractor shall preserve its payroll records for a period of three years from the date of completion of the contract.

The Prevailing Wage Rate generally includes the following:

Minimum Hourly Wage + Employer Contributions to Benefit Plans = Prevailing Wage Rate or Total Rate

Any employer who does not make contributions to Benefit Plans must pay the total Prevailing Wage Rate directly to the employee.

Any deduction from the Prevailing Wage Rate or Total Rate for contributions to benefit plans can only be for a Health & Welfare, Pension, or Supplementary Unemployment plan meeting the requirements of the Employee Retirement Income Security Act (ERISA) of 1974. The maximum allowable deduction for these benefits from the prevailing wage rate cannot be greater than the amount allowed by Executive Office of Labor (EOL) for the specified benefits. Any additional expense of providing benefits to the employees is to be borne by the employer and cannot be deducted from the Minimum Hourly Wage. If the employer's benefit expense is less than that so provided by EOL the difference will be paid directly to the employee. The rate established must be paid to all employees who perform work on the project.

When an employer makes deductions from the Minimum Hourly Wage for an employee's contribution to social security, state taxes, federal taxes, and/or other contribution programs, allowed by law, the employer shall furnish each employee a suitable pay slip, check stub or envelope notifying the employee of the amount of the deductions.

No contractor or subcontractor contracting for any part of the contract week shall require or permit any laborer or mechanic to be employed on such work in excess of forty hours in any workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times his basic rate of pay for all hours worked in excess of forty hours in such workweek, whichever is the greater number of overtime hours.

Apprentice Rates are permitted only when there is an Apprentice Agreement registered with the Massachusetts Division of Apprentice Training in accordance with M.G.L. c. 23, § 11E-11L.

The Prevailing Wage Rates issued for each project shall be the rates paid for the entire project. The Prevailing Wage Rates must be posted on the job site at all times and be visible from a public way.

In addition, each such contractor and subcontractor shall furnish to the MassDOT's Resident Engineer, within fifteen days after completion of its portion of the work, a statement, executed by the contractor or subcontractor or by any authorized officer or employee of the contractor or subcontractor who supervises the payment of wages, in the following form:

STATEMENT OF COMPLIANCE

Date: _____

I, _____ do hereby state:
(Name of signatory party) (Title)

That I pay or supervise the payment of the persons employed by:

(Contractor or Subcontractor)

on the _____
(MassDOT Project Location and Contract Number)

and that all mechanics and apprentices, teamsters, chauffeurs and laborers employed on said project have been paid in accordance with wages determined under the provisions of sections twenty-six and twenty-seven of chapter one hundred and forty-nine of the General Laws.

Signature _____

Title _____

The above-mentioned copies of payroll records and statements of compliance shall be available for inspection by any interested party filing a written request to the MassDOT's Resident Engineer for such inspection and copying.

Massachusetts General Laws c. 149, §27, requires annual updates to prevailing wage schedules for all public construction contracts lasting longer than one year. MassDOT will request the required updates and furnish them to the Contractor. The Contractor is required to pay no less than the wage rates indicated on the annual updated wage schedules.

MassDOT will request the updates no later than two weeks before the anniversary of the Notice to Proceed date of the contract to allow for adequate processing by the Department of Labor Standards (DLS). The effective date for the new rates will be the anniversary date of the contract (i.e. the notice to proceed date), regardless of the date of issuance on the schedule from DLS.

All bidders are cautioned that the aforementioned laws require that employers pay to covered employees no less than the applicable minimum wages. In addition, the same laws require that the applicable prevailing wages become incorporated as part of this contract. The prevailing minimum wage law establishes serious civil and criminal penalties for violations, including imprisonment and exclusion from future public contracts. Bidders are cautioned to carefully read the relevant sections of the Massachusetts General Laws.

*** END OF DOCUMENT ***

DOCUMENT 00861

STATE PREVAILING WAGE RATES

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MAURA HEALEY
Governor

KIM DRISCOLL
Lt. Governor

Proposal No. 613129-126584
THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT
DEPARTMENT OF LABOR STANDARDS

Prevailing Wage Rates

**As determined by the Director under the provisions of the
Massachusetts General Laws, Chapter 149, Sections 26 to 27H**

LAUREN JONES
Secretary

MICHAEL FLANAGAN
Director

Awarding Authority: MassDOT Highway
Contract Number: 126584 **City/Town:** NANTUCKET
Description of Work: NANTUCKET: Federal Aid Project Number HSI(VUS)-003S(749)X Intersection Improvements at Milestone Road and Polpis Road and Extension Of 'Sconset Bikepath
Job Location: Polpis Road and Extension Of 'Sconset Bikepath

Information about Prevailing Wage Schedules for Awarding Authorities and Contractors

- **The wage rates will remain in effect for the duration of the project, except in the case of multi-year public construction projects. For construction projects lasting longer than one year, awarding authorities must request an updated wage schedule no later than two weeks before the anniversary of the date the contract was executed by the awarding authority and the general contractor.** For multi-year CM AT RISK projects, the awarding authority must request an annual update no later than two weeks before the anniversary date, determined as the earlier of: (a) the execution date of the GMP Amendment, or (b) the execution date of the first amendment to permit procurement of construction services. The annual update requirement is not applicable to 27F "rental of equipment" contracts. **The updated wage schedule must be provided to all contractors, including general and sub-contractors, working on the construction project.**
- This wage schedule applies only to the specific project referenced at the top of this page and uniquely identified by the "Wage Request Number" on all pages of this schedule.
- An Awarding Authority must request an updated wage schedule if it has not opened bids or selected a contractor within 90 days of the date of issuance of the wage schedule. For CM AT RISK projects (bid pursuant to G.L. c.149A), the earlier of: (a) the execution date of the GMP Amendment, or (b) the bid for the first construction scope of work must be within 90-days of the wage schedule issuance date.
- The wage schedule shall be incorporated in any advertisement or call for bids for the project as required by M.G.L. c. 149, § 27. The wage schedule shall be made a part of the contract awarded for the project. The wage schedule must be posted in a conspicuous place at the work site for the life of the project in accordance with M.G.L. c. 149 § 27. The wages listed on the wage schedule must be paid to employees performing construction work on the project whether they are employed by the prime contractor, a filed sub-bidder, or a sub-contractor.
- Apprentices working on the project are required to be registered with the Massachusetts Division of Apprentice Standards (DAS). Apprentices must keep their apprentice identification card on their persons during all work hours on the project. An apprentice registered with DAS may be paid the lower apprentice wage rate at the applicable step as provided on the prevailing wage schedule. **Any apprentice not registered with DAS regardless of whether they are registered with another federal, state, local, or private agency must be paid the journeyworker's rate.**
- Every contractor or subcontractor working on the construction project must submit weekly payroll reports and a Statement of Compliance directly to the awarding authority by mail or email and keep them on file for three years. Each weekly payroll report must contain: the employee's name, address, occupational classification, hours worked, and wages paid. Do not submit weekly payroll reports to DLS. For a sample payroll reporting form go to <http://www.mass.gov/dols/pw>.
- Contractors with questions about the wage rates or classifications included on the wage schedule have an affirmative obligation to inquire with DLS at (617) 626-6953.
- Contractors must obtain the wage schedules from awarding authorities. Failure of a contractor or subcontractor to pay the prevailing wage rates listed on the wage schedule to all employees who perform construction work on the project is a violation of the law and subjects the contractor or subcontractor to civil and criminal penalties.
- Employees not receiving the prevailing wage rate set forth on the wage schedule may file a complaint with the Fair Labor Division of the office of the Attorney General at (617) 727-3465.

| Classification | Effective Date | Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|----------------------------------------------------------------------------------------------------------|----------------|-----------|---------|---------|---------------------------|------------|
| Construction | | | | | | |
| (2 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i> | 06/01/2024 | \$39.95 | \$15.07 | \$18.67 | \$0.00 | \$73.69 |
| | 12/01/2024 | \$39.95 | \$15.07 | \$20.17 | \$0.00 | \$75.19 |
| | 01/01/2025 | \$39.95 | \$15.57 | \$20.17 | \$0.00 | \$75.69 |
| | 06/01/2025 | \$40.95 | \$15.57 | \$20.17 | \$0.00 | \$76.69 |
| | 12/01/2025 | \$40.95 | \$15.57 | \$21.78 | \$0.00 | \$78.30 |
| | 01/01/2026 | \$40.95 | \$16.17 | \$21.78 | \$0.00 | \$78.90 |
| | 06/01/2026 | \$41.95 | \$16.17 | \$21.78 | \$0.00 | \$79.90 |
| | 12/01/2026 | \$41.95 | \$16.17 | \$23.52 | \$0.00 | \$81.64 |
| | 01/01/2027 | \$41.95 | \$16.77 | \$23.52 | \$0.00 | \$82.24 |
| (3 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i> | 06/01/2024 | \$40.02 | \$15.07 | \$18.67 | \$0.00 | \$73.76 |
| | 12/01/2024 | \$40.02 | \$15.07 | \$20.17 | \$0.00 | \$75.26 |
| | 01/01/2025 | \$40.02 | \$15.57 | \$20.17 | \$0.00 | \$75.76 |
| | 06/01/2025 | \$41.02 | \$15.57 | \$20.17 | \$0.00 | \$76.76 |
| | 12/01/2025 | \$41.02 | \$15.57 | \$21.78 | \$0.00 | \$78.37 |
| | 01/01/2026 | \$41.02 | \$16.17 | \$21.78 | \$0.00 | \$78.97 |
| | 06/01/2026 | \$42.02 | \$16.17 | \$21.78 | \$0.00 | \$79.97 |
| | 12/01/2026 | \$42.02 | \$16.17 | \$23.52 | \$0.00 | \$81.71 |
| | 01/01/2027 | \$42.02 | \$16.77 | \$23.52 | \$0.00 | \$82.31 |
| (4 & 5 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i> | 06/01/2024 | \$40.14 | \$15.07 | \$18.67 | \$0.00 | \$73.88 |
| | 12/01/2024 | \$40.14 | \$15.07 | \$20.17 | \$0.00 | \$75.38 |
| | 01/01/2025 | \$40.14 | \$15.57 | \$20.17 | \$0.00 | \$75.88 |
| | 06/01/2025 | \$41.14 | \$15.57 | \$20.17 | \$0.00 | \$76.88 |
| | 12/01/2025 | \$41.14 | \$15.57 | \$21.78 | \$0.00 | \$78.49 |
| | 01/01/2026 | \$41.14 | \$16.17 | \$21.78 | \$0.00 | \$79.09 |
| | 06/01/2026 | \$42.14 | \$16.17 | \$21.78 | \$0.00 | \$80.09 |
| | 12/01/2026 | \$42.14 | \$16.17 | \$23.52 | \$0.00 | \$81.83 |
| | 01/01/2027 | \$42.14 | \$16.77 | \$23.52 | \$0.00 | \$82.43 |
| ADS/SUBMERSIBLE PILOT <i>PILE DRIVER LOCAL 56 (ZONE 1)</i> | 08/01/2020 | \$103.05 | \$9.40 | \$23.12 | \$0.00 | \$135.57 |
| For apprentice rates see "Apprentice- PILE DRIVER" | | | | | | |
| AIR TRACK OPERATOR <i>LABORERS - ZONE 2</i> | 12/01/2023 | \$38.61 | \$9.65 | \$17.14 | \$0.00 | \$65.40 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| AIR TRACK OPERATOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY & HIGHWAY)</i> | 06/01/2024 | \$39.28 | \$9.65 | \$17.80 | \$0.00 | \$66.73 |
| | 12/01/2024 | \$40.61 | \$9.65 | \$17.80 | \$0.00 | \$68.06 |
| | 06/01/2025 | \$42.00 | \$9.65 | \$17.80 | \$0.00 | \$69.45 |
| | 12/01/2025 | \$43.38 | \$9.65 | \$17.80 | \$0.00 | \$70.83 |
| | 06/01/2026 | \$44.82 | \$9.65 | \$17.80 | \$0.00 | \$72.27 |
| | 12/01/2026 | \$46.26 | \$9.65 | \$17.80 | \$0.00 | \$73.71 |
| For apprentice rates see "Apprentice- LABORER (Heavy and Highway)" | | | | | | |
| ASBESTOS WORKER (PIPES & TANKS) <i>HEAT & FROST INSULATORS LOCAL 6 (SOUTHERN MASS)</i> | 06/01/2024 | \$41.80 | \$14.50 | \$11.05 | \$0.00 | \$67.35 |
| | 12/01/2024 | \$42.80 | \$14.50 | \$11.05 | \$0.00 | \$68.35 |
| | 06/01/2025 | \$43.80 | \$14.50 | \$11.05 | \$0.00 | \$69.35 |
| | 12/01/2025 | \$44.80 | \$14.50 | \$11.05 | \$0.00 | \$70.35 |

| Classification | Effective Date | Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|-------------------------------------------------------------------------------------------------------|----------------|-----------|---------|---------|---------------------------|------------|
| ASPHALT RAKER <i>LABORERS - ZONE 2</i> | 12/01/2023 | \$38.11 | \$9.65 | \$17.14 | \$0.00 | \$64.90 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| ASPHALT RAKER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY & HIGHWAY)</i> | 06/01/2024 | \$38.78 | \$9.65 | \$17.80 | \$0.00 | \$66.23 |
| | 12/01/2024 | \$40.11 | \$9.65 | \$17.80 | \$0.00 | \$67.56 |
| | 06/01/2025 | \$41.50 | \$9.65 | \$17.80 | \$0.00 | \$68.95 |
| | 12/01/2025 | \$42.88 | \$9.65 | \$17.80 | \$0.00 | \$70.33 |
| | 06/01/2026 | \$44.32 | \$9.65 | \$17.80 | \$0.00 | \$71.77 |
| | 12/01/2026 | \$45.76 | \$9.65 | \$17.80 | \$0.00 | \$73.21 |
| For apprentice rates see "Apprentice- LABORER (Heavy and Highway)" | | | | | | |
| ASPHALT/CONCRETE/CRUSHER PLANT-ON SITE <i>OPERATING ENGINEERS LOCAL 4</i> | 06/01/2024 | \$56.03 | \$15.30 | \$16.40 | \$0.00 | \$87.73 |
| | 12/01/2024 | \$57.48 | \$15.30 | \$16.40 | \$0.00 | \$89.18 |
| | 06/01/2025 | \$58.78 | \$15.30 | \$16.40 | \$0.00 | \$90.48 |
| | 12/01/2025 | \$60.23 | \$15.30 | \$16.40 | \$0.00 | \$91.93 |
| | 06/01/2026 | \$61.53 | \$15.30 | \$16.40 | \$0.00 | \$93.23 |
| | 12/01/2026 | \$62.98 | \$15.30 | \$16.40 | \$0.00 | \$94.68 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| BACKHOE/FRONT-END LOADER <i>OPERATING ENGINEERS LOCAL 4</i> | 06/01/2024 | \$56.03 | \$15.30 | \$16.40 | \$0.00 | \$87.73 |
| | 12/01/2024 | \$57.48 | \$15.30 | \$16.40 | \$0.00 | \$89.18 |
| | 06/01/2025 | \$58.78 | \$15.30 | \$16.40 | \$0.00 | \$90.48 |
| | 12/01/2025 | \$60.23 | \$15.30 | \$16.40 | \$0.00 | \$91.93 |
| | 06/01/2026 | \$61.53 | \$15.30 | \$16.40 | \$0.00 | \$93.23 |
| | 12/01/2026 | \$62.98 | \$15.30 | \$16.40 | \$0.00 | \$94.68 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| BARCO-TYPE JUMPING TAMPER <i>LABORERS - ZONE 2</i> | 12/01/2023 | \$38.11 | \$9.65 | \$17.14 | \$0.00 | \$64.90 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| BLOCK PAVER, RAMMER / CURB SETTER <i>LABORERS - ZONE 2</i> | 12/01/2023 | \$38.61 | \$9.65 | \$17.14 | \$0.00 | \$65.40 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| BLOCK PAVER, RAMMER / CURB SETTER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY & HIGHWAY)</i> | 06/01/2024 | \$39.28 | \$9.65 | \$17.80 | \$0.00 | \$66.73 |
| | 12/01/2024 | \$40.61 | \$9.65 | \$17.80 | \$0.00 | \$68.06 |
| | 06/01/2025 | \$42.00 | \$9.65 | \$17.80 | \$0.00 | \$69.45 |
| | 12/01/2025 | \$43.38 | \$9.65 | \$17.80 | \$0.00 | \$70.83 |
| | 06/01/2026 | \$44.82 | \$9.65 | \$17.80 | \$0.00 | \$72.27 |
| | 12/01/2026 | \$46.26 | \$9.65 | \$17.80 | \$0.00 | \$73.71 |
| For apprentice rates see "Apprentice- LABORER (Heavy and Highway)" | | | | | | |
| BOILER MAKER <i>BOILERMAKERS LOCAL 29</i> | 01/01/2024 | \$48.12 | \$7.07 | \$20.60 | \$0.00 | \$75.79 |

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - BOILERMAKER - Local 29

Effective Date - 01/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 65 | \$31.28 | \$7.07 | \$13.22 | \$0.00 | \$51.57 |
| 2 | 65 | \$31.28 | \$7.07 | \$13.22 | \$0.00 | \$51.57 |
| 3 | 70 | \$33.68 | \$7.07 | \$14.23 | \$0.00 | \$54.98 |
| 4 | 75 | \$36.09 | \$7.07 | \$15.24 | \$0.00 | \$58.40 |
| 5 | 80 | \$38.50 | \$7.07 | \$16.25 | \$0.00 | \$61.82 |
| 6 | 85 | \$40.90 | \$7.07 | \$17.28 | \$0.00 | \$65.25 |
| 7 | 90 | \$43.31 | \$7.07 | \$18.28 | \$0.00 | \$68.66 |
| 8 | 95 | \$45.71 | \$7.07 | \$19.32 | \$0.00 | \$72.10 |

Notes:

Apprentice to Journeyworker Ratio:1:4

| | | | | | | |
|--------------------------------------------------------------|------------|---------|---------|---------|--------|----------|
| BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY WATERPROOFING) | 02/01/2024 | \$62.40 | \$11.49 | \$23.59 | \$0.00 | \$97.48 |
| BRICKLAYERS LOCAL 3 (NEW BEDFORD) | 08/01/2024 | \$64.50 | \$11.49 | \$23.59 | \$0.00 | \$99.58 |
| | 02/01/2025 | \$65.80 | \$11.49 | \$23.59 | \$0.00 | \$100.88 |
| | 08/01/2025 | \$67.95 | \$11.49 | \$23.59 | \$0.00 | \$103.03 |
| | 02/01/2026 | \$69.30 | \$11.49 | \$23.59 | \$0.00 | \$104.38 |
| | 08/01/2026 | \$71.50 | \$11.49 | \$23.59 | \$0.00 | \$106.58 |
| | 02/01/2027 | \$72.90 | \$11.49 | \$23.59 | \$0.00 | \$107.98 |

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - BRICK/PLASTER/CEMENT MASON - Local 3 New Bedford

Effective Date - 02/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 50 | \$31.20 | \$11.49 | \$23.59 | \$0.00 | \$66.28 |
| 2 | 60 | \$37.44 | \$11.49 | \$23.59 | \$0.00 | \$72.52 |
| 3 | 70 | \$43.68 | \$11.49 | \$23.59 | \$0.00 | \$78.76 |
| 4 | 80 | \$49.92 | \$11.49 | \$23.59 | \$0.00 | \$85.00 |
| 5 | 90 | \$56.16 | \$11.49 | \$23.59 | \$0.00 | \$91.24 |

Effective Date - 08/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 50 | \$32.25 | \$11.49 | \$23.59 | \$0.00 | \$67.33 |
| 2 | 60 | \$38.70 | \$11.49 | \$23.59 | \$0.00 | \$73.78 |
| 3 | 70 | \$45.15 | \$11.49 | \$23.59 | \$0.00 | \$80.23 |
| 4 | 80 | \$51.60 | \$11.49 | \$23.59 | \$0.00 | \$86.68 |
| 5 | 90 | \$58.05 | \$11.49 | \$23.59 | \$0.00 | \$93.13 |

Notes:

Apprentice to Journeyworker Ratio:1:5

| | | | | | | |
|------------------------------------|------------|---------|---------|---------|--------|---------|
| BULLDOZER/GRADER/SCRAPER | 06/01/2024 | \$55.41 | \$15.30 | \$16.40 | \$0.00 | \$87.11 |
| <i>OPERATING ENGINEERS LOCAL 4</i> | 12/01/2024 | \$56.85 | \$15.30 | \$16.40 | \$0.00 | \$88.55 |
| | 06/01/2025 | \$58.13 | \$15.30 | \$16.40 | \$0.00 | \$89.83 |
| | 12/01/2025 | \$59.57 | \$15.30 | \$16.40 | \$0.00 | \$91.27 |
| | 06/01/2026 | \$60.85 | \$15.30 | \$16.40 | \$0.00 | \$92.55 |
| | 12/01/2026 | \$62.29 | \$15.30 | \$16.40 | \$0.00 | \$93.99 |

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

| | | | | | | |
|----------------------------------------------|------------|---------|--------|---------|--------|---------|
| CAISSON & UNDERPINNING BOTTOM MAN | 06/01/2024 | \$46.63 | \$9.65 | \$18.22 | \$0.00 | \$74.50 |
| <i>LABORERS - FOUNDATION AND MARINE</i> | 12/01/2024 | \$48.10 | \$9.65 | \$18.22 | \$0.00 | \$75.97 |
| | 06/01/2025 | \$49.60 | \$9.65 | \$18.22 | \$0.00 | \$77.47 |
| | 12/01/2025 | \$51.10 | \$9.65 | \$18.22 | \$0.00 | \$78.97 |
| | 06/01/2026 | \$52.65 | \$9.65 | \$18.22 | \$0.00 | \$80.52 |
| | 12/01/2026 | \$54.15 | \$9.65 | \$18.22 | \$0.00 | \$82.02 |

For apprentice rates see "Apprentice- LABORER"

| | | | | | | |
|-------------------------------------------|------------|---------|--------|---------|--------|---------|
| CAISSON & UNDERPINNING LABORER | 06/01/2024 | \$45.48 | \$9.65 | \$18.22 | \$0.00 | \$73.35 |
| <i>LABORERS - FOUNDATION AND MARINE</i> | 12/01/2024 | \$46.95 | \$9.65 | \$18.22 | \$0.00 | \$74.82 |
| | 06/01/2025 | \$48.45 | \$9.65 | \$18.22 | \$0.00 | \$76.32 |
| | 12/01/2025 | \$49.95 | \$9.65 | \$18.22 | \$0.00 | \$77.82 |
| | 06/01/2026 | \$51.50 | \$9.65 | \$18.22 | \$0.00 | \$79.37 |
| | 12/01/2026 | \$53.00 | \$9.65 | \$18.22 | \$0.00 | \$80.87 |

For apprentice rates see "Apprentice- LABORER"

| Classification | Effective Date | Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|---------------------------------------------------------------------------|----------------|-----------|--------|---------|---------------------------|------------|
| CAISSON & UNDERPINNING TOP MAN <i>LABORERS - FOUNDATION AND MARINE</i> | 06/01/2024 | \$45.81 | \$9.65 | \$18.22 | \$0.00 | \$73.68 |
| | 12/01/2024 | \$47.28 | \$9.65 | \$18.22 | \$0.00 | \$75.15 |
| | 06/01/2025 | \$48.78 | \$9.65 | \$18.22 | \$0.00 | \$76.65 |
| | 12/01/2025 | \$50.28 | \$9.65 | \$18.22 | \$0.00 | \$78.15 |
| | 06/01/2026 | \$51.83 | \$9.65 | \$18.22 | \$0.00 | \$79.70 |
| | 12/01/2026 | \$53.33 | \$9.65 | \$18.22 | \$0.00 | \$81.20 |

For apprentice rates see "Apprentice- LABORER"

| | | | | | | |
|---------------------------------------------------------|------------|---------|--------|---------|--------|---------|
| CARBIDE CORE DRILL OPERATOR <i>LABORERS - ZONE 2</i> | 12/01/2023 | \$38.11 | \$9.65 | \$17.14 | \$0.00 | \$64.90 |
|---------------------------------------------------------|------------|---------|--------|---------|--------|---------|

For apprentice rates see "Apprentice- LABORER"

| | | | | | | |
|-------------------------------------------------------|------------|---------|--------|---------|--------|---------|
| CARPENTER <i>CARPENTERS -ZONE 1 (Metro Boston)</i> | 03/01/2024 | \$57.46 | \$9.83 | \$19.97 | \$0.00 | \$87.26 |
| | 09/01/2024 | \$58.96 | \$9.83 | \$19.97 | \$0.00 | \$88.76 |
| | 03/01/2025 | \$60.46 | \$9.83 | \$19.97 | \$0.00 | \$90.26 |
| | 09/01/2025 | \$61.96 | \$9.83 | \$19.97 | \$0.00 | \$91.76 |
| | 03/01/2026 | \$63.46 | \$9.83 | \$19.97 | \$0.00 | \$93.26 |
| | 09/01/2026 | \$64.96 | \$9.83 | \$19.97 | \$0.00 | \$94.76 |
| | 03/01/2027 | \$66.46 | \$9.83 | \$19.97 | \$0.00 | \$96.26 |

Apprentice - CARPENTER - Zone 1 Metro Boston

Effective Date - 03/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 45 | \$25.86 | \$9.83 | \$1.73 | \$0.00 | \$37.42 |
| 2 | 45 | \$25.86 | \$9.83 | \$1.73 | \$0.00 | \$37.42 |
| 3 | 55 | \$31.60 | \$9.83 | \$3.40 | \$0.00 | \$44.83 |
| 4 | 55 | \$31.60 | \$9.83 | \$3.40 | \$0.00 | \$44.83 |
| 5 | 70 | \$40.22 | \$9.83 | \$16.51 | \$0.00 | \$66.56 |
| 6 | 70 | \$40.22 | \$9.83 | \$16.51 | \$0.00 | \$66.56 |
| 7 | 80 | \$45.97 | \$9.83 | \$18.24 | \$0.00 | \$74.04 |
| 8 | 80 | \$45.97 | \$9.83 | \$18.24 | \$0.00 | \$74.04 |

Effective Date - 09/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 45 | \$26.53 | \$9.83 | \$1.73 | \$0.00 | \$38.09 |
| 2 | 45 | \$26.53 | \$9.83 | \$1.73 | \$0.00 | \$38.09 |
| 3 | 55 | \$32.43 | \$9.83 | \$3.40 | \$0.00 | \$45.66 |
| 4 | 55 | \$32.43 | \$9.83 | \$3.40 | \$0.00 | \$45.66 |
| 5 | 70 | \$41.27 | \$9.83 | \$16.51 | \$0.00 | \$67.61 |
| 6 | 70 | \$41.27 | \$9.83 | \$16.51 | \$0.00 | \$67.61 |
| 7 | 80 | \$47.17 | \$9.83 | \$18.24 | \$0.00 | \$75.24 |
| 8 | 80 | \$47.17 | \$9.83 | \$18.24 | \$0.00 | \$75.24 |

Notes:

Apprentice to Journeyworker Ratio:1:5

| Classification | Effective Date | Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|---------------------------------------|----------------|-----------|--------|---------|---------------------------|------------|
| CARPENTER WOOD FRAME | 10/01/2023 | \$25.55 | \$7.02 | \$4.80 | \$0.00 | \$37.37 |
| <i>CARPENTERS-ZONE 3 (Wood Frame)</i> | 10/01/2024 | \$26.65 | \$7.02 | \$4.80 | \$0.00 | \$38.47 |
| | 10/01/2025 | \$27.75 | \$7.02 | \$4.80 | \$0.00 | \$39.57 |
| | 10/01/2026 | \$28.85 | \$7.02 | \$4.80 | \$0.00 | \$40.67 |

All Aspects of New Wood Frame Work

Apprentice - CARPENTER (Wood Frame) - Zone 3

Effective Date - 10/01/2023

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 60 | \$15.33 | \$7.02 | \$0.00 | \$0.00 | \$22.35 |
| 2 | 60 | \$15.33 | \$7.02 | \$0.00 | \$0.00 | \$22.35 |
| 3 | 65 | \$16.61 | \$7.02 | \$1.00 | \$0.00 | \$24.63 |
| 4 | 70 | \$17.89 | \$7.02 | \$1.00 | \$0.00 | \$25.91 |
| 5 | 75 | \$19.16 | \$7.02 | \$4.80 | \$0.00 | \$30.98 |
| 6 | 80 | \$20.44 | \$7.02 | \$4.80 | \$0.00 | \$32.26 |
| 7 | 85 | \$21.72 | \$7.02 | \$4.80 | \$0.00 | \$33.54 |
| 8 | 90 | \$23.00 | \$7.02 | \$4.80 | \$0.00 | \$34.82 |

Effective Date - 10/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 60 | \$15.99 | \$7.02 | \$0.00 | \$0.00 | \$23.01 |
| 2 | 60 | \$15.99 | \$7.02 | \$0.00 | \$0.00 | \$23.01 |
| 3 | 65 | \$17.32 | \$7.02 | \$1.00 | \$0.00 | \$25.34 |
| 4 | 70 | \$18.66 | \$7.02 | \$1.00 | \$0.00 | \$26.68 |
| 5 | 75 | \$19.99 | \$7.02 | \$4.80 | \$0.00 | \$31.81 |
| 6 | 80 | \$21.32 | \$7.02 | \$4.80 | \$0.00 | \$33.14 |
| 7 | 85 | \$22.65 | \$7.02 | \$4.80 | \$0.00 | \$34.47 |
| 8 | 90 | \$23.99 | \$7.02 | \$4.80 | \$0.00 | \$35.81 |

Notes:

% Indentured After 10/1/17; 45/45/55/55/70/70/80/80
 Step 1&2 \$18.52/ 3&4 \$21.07/ 5&6 \$28.70/ 7&8 \$31.26

Apprentice to Journeyworker Ratio:1:5

| | | | | | | |
|------------------------------------------|------------|---------|---------|---------|--------|---------|
| CEMENT MASONRY/PLASTERING | 01/01/2024 | \$49.33 | \$13.00 | \$23.57 | \$1.30 | \$87.20 |
| <i>BRICKLAYERS LOCAL 3 (NEW BEDFORD)</i> | | | | | | |

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

Apprentice - CEMENT MASONRY/PLASTERING - Eastern Mass (New Bedford)

Effective Date - 01/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 50 | \$24.67 | \$13.00 | \$15.93 | \$0.00 | \$53.60 |
| 2 | 60 | \$29.60 | \$13.00 | \$18.57 | \$1.30 | \$62.47 |
| 3 | 65 | \$32.06 | \$13.00 | \$19.57 | \$1.30 | \$65.93 |
| 4 | 70 | \$34.53 | \$13.00 | \$20.57 | \$1.30 | \$69.40 |
| 5 | 75 | \$37.00 | \$13.00 | \$21.57 | \$1.30 | \$72.87 |
| 6 | 80 | \$39.46 | \$13.00 | \$22.57 | \$1.30 | \$76.33 |
| 7 | 90 | \$44.40 | \$13.00 | \$23.57 | \$1.30 | \$82.27 |

Notes:
Steps 3,4 are 500 hrs. All other steps are 1,000 hrs.

Apprentice to Journeyworker Ratio:1:3

| | | | | | | |
|----------------------------------------------------------------------------|------------|---------|---------|---------|--------|---------|
| CHAIN SAW OPERATOR LABORERS - ZONE 2 | 12/01/2023 | \$38.11 | \$9.65 | \$17.14 | \$0.00 | \$64.90 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| CLAM SHELLS/SLURRY BUCKETS/HEADING MACHINES OPERATING ENGINEERS LOCAL 4 | 06/01/2024 | \$57.15 | \$15.30 | \$16.40 | \$0.00 | \$88.85 |
| | 12/01/2024 | \$58.63 | \$15.30 | \$16.40 | \$0.00 | \$90.33 |
| | 06/01/2025 | \$59.96 | \$15.30 | \$16.40 | \$0.00 | \$91.66 |
| | 12/01/2025 | \$61.43 | \$15.30 | \$16.40 | \$0.00 | \$93.13 |
| | 06/01/2026 | \$62.76 | \$15.30 | \$16.40 | \$0.00 | \$94.46 |
| | 12/01/2026 | \$64.24 | \$15.30 | \$16.40 | \$0.00 | \$95.94 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| COMPRESSOR OPERATOR OPERATING ENGINEERS LOCAL 4 | 06/01/2024 | \$36.17 | \$15.30 | \$16.40 | \$0.00 | \$67.87 |
| | 12/01/2024 | \$37.12 | \$15.30 | \$16.40 | \$0.00 | \$68.82 |
| | 06/01/2025 | \$37.97 | \$15.30 | \$16.40 | \$0.00 | \$69.67 |
| | 12/01/2025 | \$38.92 | \$15.30 | \$16.40 | \$0.00 | \$70.62 |
| | 06/01/2026 | \$39.78 | \$15.30 | \$16.40 | \$0.00 | \$71.48 |
| | 12/01/2026 | \$40.73 | \$15.30 | \$16.40 | \$0.00 | \$72.43 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| DELEADER (BRIDGE) PAINTERS LOCAL 35 - ZONE 2 | 01/01/2024 | \$56.06 | \$9.95 | \$23.95 | \$0.00 | \$89.96 |
| | 07/01/2024 | \$57.26 | \$9.95 | \$23.95 | \$0.00 | \$91.16 |
| | 01/01/2025 | \$58.46 | \$9.95 | \$23.95 | \$0.00 | \$92.36 |

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

Apprentice - PAINTER Local 35 - BRIDGES/TANKS

Effective Date - 01/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 50 | \$28.03 | \$9.95 | \$0.00 | \$0.00 | \$37.98 |
| 2 | 55 | \$30.83 | \$9.95 | \$6.66 | \$0.00 | \$47.44 |
| 3 | 60 | \$33.64 | \$9.95 | \$7.26 | \$0.00 | \$50.85 |
| 4 | 65 | \$36.44 | \$9.95 | \$7.87 | \$0.00 | \$54.26 |
| 5 | 70 | \$39.24 | \$9.95 | \$20.32 | \$0.00 | \$69.51 |
| 6 | 75 | \$42.05 | \$9.95 | \$20.93 | \$0.00 | \$72.93 |
| 7 | 80 | \$44.85 | \$9.95 | \$21.53 | \$0.00 | \$76.33 |
| 8 | 90 | \$50.45 | \$9.95 | \$22.74 | \$0.00 | \$83.14 |

Effective Date - 07/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 50 | \$28.63 | \$9.95 | \$0.00 | \$0.00 | \$38.58 |
| 2 | 55 | \$31.49 | \$9.95 | \$6.66 | \$0.00 | \$48.10 |
| 3 | 60 | \$34.36 | \$9.95 | \$7.26 | \$0.00 | \$51.57 |
| 4 | 65 | \$37.22 | \$9.95 | \$7.87 | \$0.00 | \$55.04 |
| 5 | 70 | \$40.08 | \$9.95 | \$20.32 | \$0.00 | \$70.35 |
| 6 | 75 | \$42.95 | \$9.95 | \$20.93 | \$0.00 | \$73.83 |
| 7 | 80 | \$45.81 | \$9.95 | \$21.53 | \$0.00 | \$77.29 |
| 8 | 90 | \$51.53 | \$9.95 | \$22.74 | \$0.00 | \$84.22 |

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

| | | | | | | |
|------------------------------------|------------|---------|--------|---------|--------|---------|
| DEMO: ADZEMAN LABORERS - ZONE 2 | 12/01/2023 | \$44.48 | \$9.65 | \$18.07 | \$0.00 | \$72.20 |
|------------------------------------|------------|---------|--------|---------|--------|---------|

For apprentice rates see "Apprentice- LABORER"

| | | | | | | |
|-----------------------------------------------------------|------------|---------|--------|---------|--------|---------|
| DEMO: BACKHOE/LOADER/HAMMER OPERATOR LABORERS - ZONE 2 | 12/01/2023 | \$45.48 | \$9.65 | \$18.07 | \$0.00 | \$73.20 |
|-----------------------------------------------------------|------------|---------|--------|---------|--------|---------|

For apprentice rates see "Apprentice- LABORER"

| | | | | | | |
|------------------------------------|------------|---------|--------|---------|--------|---------|
| DEMO: BURNERS LABORERS - ZONE 2 | 12/01/2023 | \$45.23 | \$9.65 | \$18.07 | \$0.00 | \$72.95 |
|------------------------------------|------------|---------|--------|---------|--------|---------|

For apprentice rates see "Apprentice- LABORER"

| | | | | | | |
|---------------------------------------------------|------------|---------|--------|---------|--------|---------|
| DEMO: CONCRETE CUTTER/SAWYER LABORERS - ZONE 2 | 12/01/2023 | \$45.48 | \$9.65 | \$18.07 | \$0.00 | \$73.20 |
|---------------------------------------------------|------------|---------|--------|---------|--------|---------|

For apprentice rates see "Apprentice- LABORER"

| | | | | | | |
|------------------------------------------------|------------|---------|--------|---------|--------|---------|
| DEMO: JACKHAMMER OPERATOR LABORERS - ZONE 2 | 12/01/2023 | \$45.23 | \$9.65 | \$18.07 | \$0.00 | \$72.95 |
|------------------------------------------------|------------|---------|--------|---------|--------|---------|

For apprentice rates see "Apprentice- LABORER"

| | | | | | | |
|---------------------------------------------|------------|---------|--------|---------|--------|---------|
| DEMO: WRECKING LABORER LABORERS - ZONE 2 | 12/01/2023 | \$44.48 | \$9.65 | \$18.07 | \$0.00 | \$72.20 |
|---------------------------------------------|------------|---------|--------|---------|--------|---------|

For apprentice rates see "Apprentice- LABORER"

| Classification | Effective Date | Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|--------------------------------------------------------------------------|----------------|-----------|---------|---------|---------------------------|------------|
| DIRECTIONAL DRILL MACHINE OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i> | 06/01/2024 | \$55.41 | \$15.30 | \$16.40 | \$0.00 | \$87.11 |
| | 12/01/2024 | \$56.85 | \$15.30 | \$16.40 | \$0.00 | \$88.55 |
| | 06/01/2025 | \$58.13 | \$15.30 | \$16.40 | \$0.00 | \$89.83 |
| | 12/01/2025 | \$59.57 | \$15.30 | \$16.40 | \$0.00 | \$91.27 |
| | 06/01/2026 | \$60.85 | \$15.30 | \$16.40 | \$0.00 | \$92.55 |
| | 12/01/2026 | \$62.29 | \$15.30 | \$16.40 | \$0.00 | \$93.99 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| DIVER <i>PILE DRIVER LOCAL 56 (ZONE 1)</i> | 08/01/2020 | \$68.70 | \$9.40 | \$23.12 | \$0.00 | \$101.22 |
| For apprentice rates see "Apprentice- PILE DRIVER" | | | | | | |
| DIVER TENDER <i>PILE DRIVER LOCAL 56 (ZONE 1)</i> | 08/01/2020 | \$49.07 | \$9.40 | \$23.12 | \$0.00 | \$81.59 |
| For apprentice rates see "Apprentice- PILE DRIVER" | | | | | | |
| DIVER TENDER (EFFLUENT) <i>PILE DRIVER LOCAL 56 (ZONE 1)</i> | 08/01/2020 | \$73.60 | \$9.40 | \$23.12 | \$0.00 | \$106.12 |
| For apprentice rates see "Apprentice- PILE DRIVER" | | | | | | |
| DIVER/SLURRY (EFFLUENT) <i>PILE DRIVER LOCAL 56 (ZONE 1)</i> | 08/01/2020 | \$103.05 | \$9.40 | \$23.12 | \$0.00 | \$135.57 |
| For apprentice rates see "Apprentice- PILE DRIVER" | | | | | | |
| DRAWBRIDGE OPERATOR (Construction) <i>DRAWBRIDGE - SEIU LOCAL 888</i> | 07/01/2020 | \$26.77 | \$6.67 | \$3.93 | \$0.16 | \$37.53 |
| ELECTRICIAN <i>ELECTRICIANS LOCAL 223</i> | 09/01/2023 | \$47.87 | \$11.75 | \$16.86 | \$0.00 | \$76.48 |

Apprentice - ELECTRICIAN - Local 223

Effective Date - 09/01/2023

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 40 | \$19.15 | \$11.75 | \$0.57 | \$0.00 | \$31.47 |
| 2 | 45 | \$21.54 | \$11.75 | \$0.65 | \$0.00 | \$33.94 |
| 3 | 50 | \$23.94 | \$11.75 | \$0.72 | \$0.00 | \$36.41 |
| 4 | 55 | \$26.33 | \$11.75 | \$0.79 | \$0.00 | \$45.87 |
| 5 | 60 | \$28.72 | \$11.75 | \$0.83 | \$0.00 | \$48.78 |
| 6 | 65 | \$31.12 | \$11.75 | \$0.86 | \$0.00 | \$51.52 |
| 7 | 70 | \$33.51 | \$11.75 | \$0.93 | \$0.00 | \$54.64 |
| 8 | 75 | \$35.90 | \$11.75 | \$0.99 | \$0.00 | \$57.55 |

Notes:

Apprentice to Journeyworker Ratio:2:3***

| | | | | | | |
|--------------------------------------------------------------|------------|---------|---------|---------|--------|----------|
| ELEVATOR CONSTRUCTOR <i>ELEVATOR CONSTRUCTORS LOCAL 4</i> | 01/01/2022 | \$65.62 | \$16.03 | \$20.21 | \$0.00 | \$101.86 |
|--------------------------------------------------------------|------------|---------|---------|---------|--------|----------|

| Classification | Effective Date | Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|----------------------------------------------------|----------------|----------------------|---------|---------|---------------------------|------------|
| Apprentice - ELEVATOR CONSTRUCTOR - Local 4 | | | | | | |
| Effective Date - 01/01/2022 | | | | | | |
| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
| 1 | 50 | \$32.81 | \$16.03 | \$0.00 | \$0.00 | \$48.84 |
| 2 | 55 | \$36.09 | \$16.03 | \$20.21 | \$0.00 | \$72.33 |
| 3 | 65 | \$42.65 | \$16.03 | \$20.21 | \$0.00 | \$78.89 |
| 4 | 70 | \$45.93 | \$16.03 | \$20.21 | \$0.00 | \$82.17 |
| 5 | 80 | \$52.50 | \$16.03 | \$20.21 | \$0.00 | \$88.74 |

Notes:
Steps 1-2 are 6 mos.; Steps 3-5 are 1 year

Apprentice to Journeyworker Ratio:1:1

| | | | | | | |
|------------------------------------------------------------------------------------------------|------------|---------|---------|---------|--------|---------|
| ELEVATOR CONSTRUCTOR HELPER <i>ELEVATOR CONSTRUCTORS LOCAL 4</i> | 01/01/2022 | \$45.93 | \$16.03 | \$20.21 | \$0.00 | \$82.17 |
| For apprentice rates see "Apprentice - ELEVATOR CONSTRUCTOR" | | | | | | |
| FENCE & GUARD RAIL ERECTOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY & HIGHWAY)</i> | 06/01/2024 | \$38.78 | \$9.65 | \$17.80 | \$0.00 | \$66.23 |
| | 12/01/2024 | \$40.11 | \$9.65 | \$17.80 | \$0.00 | \$67.56 |
| | 06/01/2025 | \$41.50 | \$9.65 | \$17.80 | \$0.00 | \$68.95 |
| | 12/01/2025 | \$42.88 | \$9.65 | \$17.80 | \$0.00 | \$70.33 |
| | 06/01/2026 | \$44.32 | \$9.65 | \$17.80 | \$0.00 | \$71.77 |
| | 12/01/2026 | \$45.76 | \$9.65 | \$17.80 | \$0.00 | \$73.21 |
| For apprentice rates see "Apprentice- LABORER (Heavy and Highway)" | | | | | | |
| FIELD ENG.INST.PERSON-BLDG,SITE,HVY/HWY <i>OPERATING ENGINEERS LOCAL 4</i> | 05/01/2024 | \$50.79 | \$15.00 | \$16.40 | \$0.00 | \$82.19 |
| | 11/01/2024 | \$52.08 | \$15.00 | \$16.40 | \$0.00 | \$83.48 |
| | 05/01/2025 | \$53.52 | \$15.00 | \$16.40 | \$0.00 | \$84.92 |
| | 11/01/2025 | \$54.81 | \$15.00 | \$16.40 | \$0.00 | \$86.21 |
| | 05/01/2026 | \$56.25 | \$15.00 | \$16.40 | \$0.00 | \$87.65 |
| | 11/01/2026 | \$57.54 | \$15.00 | \$16.40 | \$0.00 | \$88.94 |
| | 05/01/2027 | \$58.97 | \$15.00 | \$16.40 | \$0.00 | \$90.37 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| FIELD ENG.PARTY CHIEF-BLDG,SITE,HVY/HWY <i>OPERATING ENGINEERS LOCAL 4</i> | 05/01/2024 | \$52.37 | \$15.00 | \$16.40 | \$0.00 | \$83.77 |
| | 11/01/2024 | \$53.67 | \$15.00 | \$16.40 | \$0.00 | \$85.07 |
| | 05/01/2025 | \$55.12 | \$15.00 | \$16.40 | \$0.00 | \$86.52 |
| | 11/01/2025 | \$56.42 | \$15.00 | \$16.40 | \$0.00 | \$87.82 |
| | 05/01/2026 | \$57.87 | \$15.00 | \$16.40 | \$0.00 | \$89.27 |
| | 11/01/2026 | \$59.17 | \$15.00 | \$16.40 | \$0.00 | \$90.57 |
| | 05/01/2027 | \$60.62 | \$15.00 | \$16.40 | \$0.00 | \$92.02 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |

Proposal No. 613129-126584

| Classification | Effective Date | Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|----------------------------------------------------------------------------------------|----------------|-----------|---------|---------|---------------------------|------------|
| FIELD ENG.ROD PERSON-BLDG,SITE,HVY/HWY <i>OPERATING ENGINEERS LOCAL 4</i> | 05/01/2024 | \$24.91 | \$15.00 | \$16.40 | \$0.00 | \$56.31 |
| | 11/01/2024 | \$25.67 | \$15.00 | \$16.40 | \$0.00 | \$57.07 |
| | 05/01/2025 | \$26.52 | \$15.00 | \$16.40 | \$0.00 | \$57.92 |
| | 11/01/2025 | \$27.28 | \$15.00 | \$16.40 | \$0.00 | \$58.68 |
| | 05/01/2026 | \$28.13 | \$15.00 | \$16.40 | \$0.00 | \$59.53 |
| | 11/01/2026 | \$28.89 | \$15.00 | \$16.40 | \$0.00 | \$60.29 |
| | 05/01/2027 | \$29.74 | \$15.00 | \$16.40 | \$0.00 | \$61.14 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| FIRE ALARM INSTALLER <i>ELECTRICIANS LOCAL 223</i> | 09/01/2020 | \$43.66 | \$10.90 | \$14.66 | \$0.00 | \$69.22 |
| For apprentice rates see "Apprentice- ELECTRICIAN" | | | | | | |
| FIRE ALARM REPAIR / MAINTENANCE <i>/ COMMISSIONING ELECTRICIANS LOCAL 223</i> | 09/01/2020 | \$36.86 | \$10.90 | \$12.45 | \$0.00 | \$60.21 |
| For apprentice rates see "Apprentice- TELECOMMUNICATIONS TECHNICIAN" | | | | | | |
| FIREMAN (ASST. ENGINEER) <i>OPERATING ENGINEERS LOCAL 4</i> | 06/01/2024 | \$45.23 | \$15.30 | \$16.40 | \$0.00 | \$76.93 |
| | 12/01/2024 | \$46.41 | \$15.30 | \$16.40 | \$0.00 | \$78.11 |
| | 06/01/2025 | \$47.47 | \$15.30 | \$16.40 | \$0.00 | \$79.17 |
| | 12/01/2025 | \$48.64 | \$15.30 | \$16.40 | \$0.00 | \$80.34 |
| | 06/01/2026 | \$49.70 | \$15.30 | \$16.40 | \$0.00 | \$81.40 |
| | 12/01/2026 | \$50.88 | \$15.30 | \$16.40 | \$0.00 | \$82.58 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| FLAGGER & SIGNALER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY & HIGHWAY)</i> | 06/01/2024 | \$27.01 | \$9.65 | \$17.80 | \$0.00 | \$54.46 |
| | 12/01/2024 | \$27.01 | \$9.65 | \$17.80 | \$0.00 | \$54.46 |
| | 06/01/2025 | \$28.09 | \$9.65 | \$17.80 | \$0.00 | \$55.54 |
| | 12/01/2025 | \$28.09 | \$9.65 | \$17.80 | \$0.00 | \$55.54 |
| | 06/01/2026 | \$29.21 | \$9.65 | \$17.80 | \$0.00 | \$56.66 |
| | 12/01/2026 | \$29.21 | \$9.65 | \$17.80 | \$0.00 | \$56.66 |
| For apprentice rates see "Apprentice- LABORER (Heavy and Highway)" | | | | | | |
| FLOORCOVERER <i>FLOORCOVERERS LOCAL 2168 ZONE 1</i> | 03/01/2024 | \$54.73 | \$8.83 | \$20.27 | \$0.00 | \$83.83 |
| | 09/01/2024 | \$56.23 | \$8.83 | \$20.27 | \$0.00 | \$85.33 |
| | 03/01/2025 | \$57.73 | \$8.83 | \$20.27 | \$0.00 | \$86.83 |
| | 09/01/2025 | \$59.23 | \$8.83 | \$20.27 | \$0.00 | \$88.33 |
| | 03/01/2026 | \$60.73 | \$8.83 | \$20.27 | \$0.00 | \$89.83 |
| | 09/01/2026 | \$62.23 | \$8.83 | \$20.27 | \$0.00 | \$91.33 |
| | 03/01/2027 | \$63.73 | \$8.83 | \$20.27 | \$0.00 | \$92.83 |

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - FLOORCOVERER - Local 2168 Zone I

Effective Date - 03/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 45 | \$24.63 | \$8.83 | \$1.76 | \$0.00 | \$35.22 |
| 2 | 45 | \$24.63 | \$8.83 | \$1.76 | \$0.00 | \$35.22 |
| 3 | 55 | \$30.10 | \$8.83 | \$3.52 | \$0.00 | \$42.45 |
| 4 | 55 | \$30.10 | \$8.83 | \$3.52 | \$0.00 | \$42.45 |
| 5 | 70 | \$38.31 | \$8.83 | \$16.75 | \$0.00 | \$63.89 |
| 6 | 70 | \$38.31 | \$8.83 | \$16.75 | \$0.00 | \$63.89 |
| 7 | 80 | \$43.78 | \$8.83 | \$18.51 | \$0.00 | \$71.12 |
| 8 | 80 | \$43.78 | \$8.83 | \$18.51 | \$0.00 | \$71.12 |

Effective Date - 09/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 45 | \$25.30 | \$8.83 | \$1.76 | \$0.00 | \$35.89 |
| 2 | 45 | \$25.30 | \$8.83 | \$1.76 | \$0.00 | \$35.89 |
| 3 | 55 | \$30.93 | \$8.83 | \$3.52 | \$0.00 | \$43.28 |
| 4 | 55 | \$30.93 | \$8.83 | \$3.52 | \$0.00 | \$43.28 |
| 5 | 70 | \$39.36 | \$8.83 | \$16.75 | \$0.00 | \$64.94 |
| 6 | 70 | \$39.36 | \$8.83 | \$16.75 | \$0.00 | \$64.94 |
| 7 | 80 | \$44.98 | \$8.83 | \$18.51 | \$0.00 | \$72.32 |
| 8 | 80 | \$44.98 | \$8.83 | \$18.51 | \$0.00 | \$72.32 |

Notes: Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

| | | | | | | |
|--------------------------------------------------------|------------|---------|---------|---------|--------|---------|
| FORK LIFT/CHERRY PICKER OPERATING ENGINEERS LOCAL 4 | 06/01/2024 | \$56.03 | \$15.30 | \$16.40 | \$0.00 | \$87.73 |
| | 12/01/2024 | \$57.48 | \$15.30 | \$16.40 | \$0.00 | \$89.18 |
| | 06/01/2025 | \$58.78 | \$15.30 | \$16.40 | \$0.00 | \$90.48 |
| | 12/01/2025 | \$60.23 | \$15.30 | \$16.40 | \$0.00 | \$91.93 |
| | 06/01/2026 | \$61.53 | \$15.30 | \$16.40 | \$0.00 | \$93.23 |
| | 12/01/2026 | \$62.98 | \$15.30 | \$16.40 | \$0.00 | \$94.68 |

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

| | | | | | | |
|-----------------------------------------------------------------|------------|---------|---------|---------|--------|---------|
| GENERATOR/LIGHTING PLANT/HEATERS OPERATING ENGINEERS LOCAL 4 | 06/01/2024 | \$36.17 | \$15.30 | \$16.40 | \$0.00 | \$67.87 |
| | 12/01/2024 | \$37.12 | \$15.30 | \$16.40 | \$0.00 | \$68.82 |
| | 06/01/2025 | \$37.97 | \$15.30 | \$16.40 | \$0.00 | \$69.67 |
| | 12/01/2025 | \$38.92 | \$15.30 | \$16.40 | \$0.00 | \$70.62 |
| | 06/01/2026 | \$39.78 | \$15.30 | \$16.40 | \$0.00 | \$71.48 |
| | 12/01/2026 | \$40.73 | \$15.30 | \$16.40 | \$0.00 | \$72.43 |

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

| | | | | | | |
|---------------------------------------------------------------------------|------------|---------|---------|---------|--------|---------|
| GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS) GLAZIERS LOCAL 1333 | 06/01/2020 | \$39.18 | \$10.80 | \$10.45 | \$0.00 | \$60.43 |
|---------------------------------------------------------------------------|------------|---------|---------|---------|--------|---------|

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - GLAZIER - Local 1333

Effective Date - 06/01/2020

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 50 | \$19.59 | \$10.80 | \$1.80 | \$0.00 | \$32.19 |
| 2 | 56 | \$22.04 | \$10.80 | \$1.80 | \$0.00 | \$34.64 |
| 3 | 63 | \$24.49 | \$10.80 | \$2.45 | \$0.00 | \$37.74 |
| 4 | 69 | \$26.94 | \$10.80 | \$2.45 | \$0.00 | \$40.19 |
| 5 | 75 | \$29.39 | \$10.80 | \$3.15 | \$0.00 | \$43.34 |
| 6 | 81 | \$31.83 | \$10.80 | \$3.15 | \$0.00 | \$45.78 |
| 7 | 88 | \$34.28 | \$10.80 | \$10.45 | \$0.00 | \$55.53 |
| 8 | 94 | \$36.73 | \$10.80 | \$10.45 | \$0.00 | \$57.98 |

Notes:

Apprentice to Journeyworker Ratio:1:3

| | | | | | | |
|-----------------------------------|------------|---------|---------|---------|--------|---------|
| HOISTING ENGINEER/CRANES/GRADALLS | 06/01/2024 | \$56.03 | \$15.30 | \$16.40 | \$0.00 | \$87.73 |
| OPERATING ENGINEERS LOCAL 4 | 12/01/2024 | \$57.48 | \$15.30 | \$16.40 | \$0.00 | \$89.18 |
| | 06/01/2025 | \$58.78 | \$15.30 | \$16.40 | \$0.00 | \$90.48 |
| | 12/01/2025 | \$60.23 | \$15.30 | \$16.40 | \$0.00 | \$91.93 |
| | 06/01/2026 | \$61.53 | \$15.30 | \$16.40 | \$0.00 | \$93.23 |
| | 12/01/2026 | \$62.98 | \$15.30 | \$16.40 | \$0.00 | \$94.68 |

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - OPERATING ENGINEERS - Local 4

Effective Date - 06/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 55 | \$30.82 | \$15.30 | \$0.00 | \$0.00 | \$46.12 |
| 2 | 60 | \$33.62 | \$15.30 | \$16.40 | \$0.00 | \$65.32 |
| 3 | 65 | \$36.42 | \$15.30 | \$16.40 | \$0.00 | \$68.12 |
| 4 | 70 | \$39.22 | \$15.30 | \$16.40 | \$0.00 | \$70.92 |
| 5 | 75 | \$42.02 | \$15.30 | \$16.40 | \$0.00 | \$73.72 |
| 6 | 80 | \$44.82 | \$15.30 | \$16.40 | \$0.00 | \$76.52 |
| 7 | 85 | \$47.63 | \$15.30 | \$16.40 | \$0.00 | \$79.33 |
| 8 | 90 | \$50.43 | \$15.30 | \$16.40 | \$0.00 | \$82.13 |

Effective Date - 12/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 55 | \$31.61 | \$0.00 | \$0.00 | \$0.00 | \$31.61 |
| 2 | 60 | \$34.49 | \$15.30 | \$16.40 | \$0.00 | \$66.19 |
| 3 | 65 | \$37.36 | \$15.30 | \$16.40 | \$0.00 | \$69.06 |
| 4 | 70 | \$40.24 | \$15.30 | \$16.40 | \$0.00 | \$71.94 |
| 5 | 75 | \$43.11 | \$15.30 | \$16.40 | \$0.00 | \$74.81 |
| 6 | 80 | \$45.98 | \$15.30 | \$16.40 | \$0.00 | \$77.68 |
| 7 | 85 | \$48.86 | \$15.30 | \$16.40 | \$0.00 | \$80.56 |
| 8 | 90 | \$51.73 | \$15.30 | \$16.40 | \$0.00 | \$83.43 |

Notes:

Apprentice to Journeyworker Ratio:1:6

| | | | | | | |
|----------------------------------------------------|------------|---------|---------|---------|--------|---------|
| HVAC (DUCTWORK) SHEETMETAL WORKERS LOCAL 17 - B | 04/01/2024 | \$41.08 | \$14.59 | \$19.04 | \$2.24 | \$76.95 |
| | 10/01/2024 | \$42.33 | \$14.59 | \$19.04 | \$2.24 | \$78.20 |
| | 04/01/2025 | \$43.83 | \$14.59 | \$19.04 | \$2.24 | \$79.70 |
| | 10/01/2025 | \$45.08 | \$14.59 | \$19.04 | \$2.24 | \$80.95 |
| | 04/01/2026 | \$46.58 | \$14.59 | \$19.04 | \$2.24 | \$82.45 |

For apprentice rates see "Apprentice- SHEET METAL WORKER"

| | | | | | | |
|------------------------------------------------------|------------|---------|---------|---------|--------|---------|
| HVAC (ELECTRICAL CONTROLS) ELECTRICIANS LOCAL 223 | 09/01/2020 | \$43.66 | \$10.90 | \$14.66 | \$0.00 | \$69.22 |
|------------------------------------------------------|------------|---------|---------|---------|--------|---------|

For apprentice rates see "Apprentice- ELECTRICIAN"

| | | | | | | |
|-----------------------------------------------------------------------|------------|---------|---------|---------|--------|---------|
| HVAC (TESTING AND BALANCING - AIR) SHEETMETAL WORKERS LOCAL 17 - B | 04/01/2024 | \$41.08 | \$30.43 | \$19.04 | \$2.24 | \$92.79 |
| | 10/01/2024 | \$42.33 | \$30.43 | \$19.04 | \$2.24 | \$94.04 |
| | 04/01/2025 | \$43.83 | \$30.43 | \$19.04 | \$2.24 | \$95.54 |
| | 10/01/2025 | \$45.08 | \$30.43 | \$19.04 | \$2.24 | \$96.79 |
| | 04/01/2026 | \$46.58 | \$30.43 | \$19.04 | \$2.24 | \$98.29 |

For apprentice rates see "Apprentice- SHEET METAL WORKER"

| | | | | | | |
|-------------------------------------------------------------------------|------------|---------|---------|---------|--------|---------|
| HVAC (TESTING AND BALANCING - WATER) PLUMBERS & PIPEFITTERS LOCAL 51 | 08/28/2023 | \$51.99 | \$10.15 | \$19.95 | \$0.00 | \$82.09 |
| | 08/26/2024 | \$54.74 | \$10.15 | \$19.95 | \$0.00 | \$84.84 |
| | 08/25/2025 | \$57.49 | \$10.15 | \$19.95 | \$0.00 | \$87.59 |

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

| Classification | Effective Date | Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|-----------------------------------------------------------------------------------------|----------------|-----------|---------|---------|---------------------------|------------|
| HVAC MECHANIC <i>PLUMBERS & PIPEFITTERS LOCAL 51</i> | 08/28/2023 | \$51.99 | \$10.15 | \$19.95 | \$0.00 | \$82.09 |
| | 08/26/2024 | \$54.74 | \$10.15 | \$19.95 | \$0.00 | \$84.84 |
| | 08/25/2025 | \$57.49 | \$10.15 | \$19.95 | \$0.00 | \$87.59 |
| For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER" | | | | | | |
| HYDRAULIC DRILLS <i>LABORERS - ZONE 2</i> | 12/01/2023 | \$38.61 | \$9.65 | \$17.14 | \$0.00 | \$65.40 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| HYDRAULIC DRILLS (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY & HIGHWAY)</i> | 06/01/2024 | \$39.28 | \$9.65 | \$17.80 | \$0.00 | \$66.73 |
| | 12/01/2024 | \$40.61 | \$9.65 | \$17.80 | \$0.00 | \$68.06 |
| | 06/01/2025 | \$42.00 | \$9.65 | \$17.80 | \$0.00 | \$69.45 |
| | 12/01/2025 | \$43.38 | \$9.65 | \$17.80 | \$0.00 | \$70.83 |
| | 06/01/2026 | \$44.82 | \$9.65 | \$17.80 | \$0.00 | \$72.27 |
| | 12/01/2026 | \$46.26 | \$9.65 | \$17.80 | \$0.00 | \$73.71 |
| For apprentice rates see "Apprentice- LABORER (Heavy and Highway)" | | | | | | |
| INSULATOR (PIPES & TANKS) <i>HEAT & FROST INSULATORS LOCAL 6 (SOUTHERN MASS)</i> | 09/01/2023 | \$48.15 | \$14.75 | \$19.61 | \$0.00 | \$82.51 |
| | 09/01/2024 | \$51.23 | \$14.75 | \$19.61 | \$0.00 | \$85.59 |
| | 09/01/2025 | \$54.31 | \$14.75 | \$19.61 | \$0.00 | \$88.67 |
| | 09/01/2026 | \$57.38 | \$14.75 | \$19.61 | \$0.00 | \$91.74 |

Apprentice - ASBESTOS INSULATOR (Pipes & Tanks) - Local 6 Southern MA

Effective Date - 09/01/2023

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 50 | \$24.08 | \$14.75 | \$14.32 | \$0.00 | \$53.15 |
| 2 | 60 | \$28.89 | \$14.75 | \$15.37 | \$0.00 | \$59.01 |
| 3 | 70 | \$33.71 | \$14.75 | \$16.43 | \$0.00 | \$64.89 |
| 4 | 80 | \$38.52 | \$14.75 | \$17.49 | \$0.00 | \$70.76 |

Effective Date - 09/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 50 | \$25.62 | \$14.75 | \$14.32 | \$0.00 | \$54.69 |
| 2 | 60 | \$30.74 | \$14.75 | \$15.37 | \$0.00 | \$60.86 |
| 3 | 70 | \$35.86 | \$14.75 | \$16.43 | \$0.00 | \$67.04 |
| 4 | 80 | \$40.98 | \$14.75 | \$17.49 | \$0.00 | \$73.22 |

Notes:

Steps are 1 year

Apprentice to Journeyworker Ratio:1:4

| | | | | | | |
|--------------------------------------------------|------------|---------|--------|---------|--------|---------|
| IRONWORKER/WELDER <i>IRONWORKERS LOCAL 37</i> | 03/16/2021 | \$42.46 | \$7.70 | \$17.10 | \$0.00 | \$67.26 |
|--------------------------------------------------|------------|---------|--------|---------|--------|---------|

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - IRONWORKER - Local 37

Effective Date - 03/16/2021

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 70 | \$29.72 | \$7.70 | \$17.10 | \$0.00 | \$54.52 |
| 2 | 75 | \$31.85 | \$7.70 | \$17.10 | \$0.00 | \$56.65 |
| 3 | 80 | \$33.97 | \$7.70 | \$17.10 | \$0.00 | \$58.77 |
| 4 | 85 | \$36.09 | \$7.70 | \$17.10 | \$0.00 | \$60.89 |
| 5 | 90 | \$38.21 | \$7.70 | \$17.10 | \$0.00 | \$63.01 |
| 6 | 95 | \$40.34 | \$7.70 | \$17.10 | \$0.00 | \$65.14 |

Notes:

Apprentice to Journeyworker Ratio:1:4

| | | | | | | |
|-----------------------------------------------------------|------------|---------|--------|---------|--------|---------|
| JACKHAMMER & PAVING BREAKER OPERATOR LABORERS - ZONE 2 | 12/01/2023 | \$38.11 | \$9.65 | \$17.14 | \$0.00 | \$64.90 |
|-----------------------------------------------------------|------------|---------|--------|---------|--------|---------|

For apprentice rates see "Apprentice- LABORER"

| | | | | | | |
|------------------------------|------------|---------|--------|---------|--------|---------|
| LABORER LABORERS - ZONE 2 | 12/01/2023 | \$37.86 | \$9.65 | \$17.14 | \$0.00 | \$64.65 |
|------------------------------|------------|---------|--------|---------|--------|---------|

Apprentice - LABORER - Zone 2

Effective Date - 12/01/2023

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 60 | \$22.72 | \$9.65 | \$16.89 | \$0.00 | \$49.26 |
| 2 | 70 | \$26.50 | \$9.65 | \$16.89 | \$0.00 | \$53.04 |
| 3 | 80 | \$30.29 | \$9.65 | \$16.89 | \$0.00 | \$56.83 |
| 4 | 90 | \$34.07 | \$9.65 | \$16.89 | \$0.00 | \$60.61 |

Notes:

Apprentice to Journeyworker Ratio:1:5

| | | | | | | |
|------------------------------------------------------------------|------------|---------|--------|---------|--------|---------|
| LABORER (HEAVY & HIGHWAY) LABORERS - ZONE 2 (HEAVY & HIGHWAY) | 06/01/2024 | \$38.53 | \$9.65 | \$17.80 | \$0.00 | \$65.98 |
| | 12/01/2024 | \$39.86 | \$9.65 | \$17.80 | \$0.00 | \$67.31 |
| | 06/01/2025 | \$41.25 | \$9.65 | \$17.80 | \$0.00 | \$68.70 |
| | 12/01/2025 | \$42.63 | \$9.65 | \$17.80 | \$0.00 | \$70.08 |
| | 06/01/2026 | \$44.07 | \$9.65 | \$17.80 | \$0.00 | \$71.52 |
| | 12/01/2026 | \$45.51 | \$9.65 | \$17.80 | \$0.00 | \$72.96 |

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

Apprentice - LABORER (Heavy & Highway) - Zone 2

Effective Date - 06/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 60 | \$23.12 | \$9.65 | \$17.80 | \$0.00 | \$50.57 |
| 2 | 70 | \$26.97 | \$9.65 | \$17.80 | \$0.00 | \$54.42 |
| 3 | 80 | \$30.82 | \$9.65 | \$17.80 | \$0.00 | \$58.27 |
| 4 | 90 | \$34.68 | \$9.65 | \$17.80 | \$0.00 | \$62.13 |

Effective Date - 12/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 60 | \$23.92 | \$9.65 | \$17.80 | \$0.00 | \$51.37 |
| 2 | 70 | \$27.90 | \$9.65 | \$17.80 | \$0.00 | \$55.35 |
| 3 | 80 | \$31.89 | \$9.65 | \$17.80 | \$0.00 | \$59.34 |
| 4 | 90 | \$35.87 | \$9.65 | \$17.80 | \$0.00 | \$63.32 |

Notes:

Apprentice to Journeyworker Ratio:1:5

| | | | | | | |
|-------------------------------------------------------|------------|---------|--------|---------|--------|---------|
| LABORER: CARPENTER TENDER <i>LABORERS - ZONE 2</i> | 12/01/2023 | \$37.86 | \$9.65 | \$17.14 | \$0.00 | \$64.65 |
|-------------------------------------------------------|------------|---------|--------|---------|--------|---------|

For apprentice rates see "Apprentice- LABORER"

| | | | | | | |
|-------------------------------------------------------------|------------|---------|--------|---------|--------|---------|
| LABORER: CEMENT FINISHER TENDER <i>LABORERS - ZONE 2</i> | 12/01/2023 | \$38.36 | \$9.40 | \$16.89 | \$0.00 | \$64.65 |
|-------------------------------------------------------------|------------|---------|--------|---------|--------|---------|

For apprentice rates see "Apprentice- LABORER"

| | | | | | | |
|-----------------------------------------------------------------------|------------|---------|--------|---------|--------|---------|
| LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER <i>LABORERS - ZONE 2</i> | 12/01/2023 | \$37.95 | \$9.65 | \$17.20 | \$0.00 | \$64.80 |
|-----------------------------------------------------------------------|------------|---------|--------|---------|--------|---------|

For apprentice rates see "Apprentice- LABORER"

| | | | | | | |
|---------------------------------------------------|------------|---------|--------|---------|--------|---------|
| LABORER: MASON TENDER <i>LABORERS - ZONE 2</i> | 12/01/2023 | \$38.11 | \$9.65 | \$17.14 | \$0.00 | \$64.90 |
|---------------------------------------------------|------------|---------|--------|---------|--------|---------|

For apprentice rates see "Apprentice- LABORER"

| | | | | | | |
|-------------------------------------------------------------------------------------------|------------|---------|--------|---------|--------|---------|
| LABORER: MASON TENDER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY & HIGHWAY)</i> | 06/01/2024 | \$38.78 | \$9.65 | \$17.80 | \$0.00 | \$66.23 |
| | 12/01/2024 | \$40.11 | \$9.65 | \$17.80 | \$0.00 | \$67.56 |
| | 06/01/2025 | \$41.50 | \$9.65 | \$17.80 | \$0.00 | \$68.95 |
| | 12/01/2025 | \$42.88 | \$9.65 | \$17.80 | \$0.00 | \$70.33 |
| | 06/01/2026 | \$44.32 | \$9.65 | \$17.80 | \$0.00 | \$71.77 |
| | 12/01/2026 | \$45.76 | \$9.65 | \$17.80 | \$0.00 | \$73.21 |

For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"

| | | | | | | |
|---------------------------------------------------------|------------|---------|--------|---------|--------|---------|
| LABORER: MULTI-TRADE TENDER <i>LABORERS - ZONE 2</i> | 12/01/2023 | \$37.86 | \$9.65 | \$17.14 | \$0.00 | \$64.65 |
|---------------------------------------------------------|------------|---------|--------|---------|--------|---------|

For apprentice rates see "Apprentice- LABORER"

| | | | | | | |
|---------------------------------------------------|------------|---------|--------|---------|--------|---------|
| LABORER: TREE REMOVER <i>LABORERS - ZONE 2</i> | 12/01/2023 | \$37.86 | \$9.65 | \$17.14 | \$0.00 | \$64.65 |
|---------------------------------------------------|------------|---------|--------|---------|--------|---------|

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 <i>LABORERS - ZONE 2</i> | 12/01/2023 | \$38.11 | \$9.65 | \$17.14 | \$0.00 | \$64.90 |
|-------------------------------------------------|------------|---------|--------|---------|--------|---------|

For apprentice rates see "Apprentice- LABORER"

| Classification | Effective Date | Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|-----------------------------------------------------------------------------------------|----------------|-----------|--------|---------|---------------------------|------------|
| LASER BEAM OPERATOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY & HIGHWAY)</i> | 06/01/2024 | \$38.78 | \$9.65 | \$17.80 | \$0.00 | \$66.23 |
| | 12/01/2024 | \$40.11 | \$9.65 | \$17.80 | \$0.00 | \$67.56 |
| | 06/01/2025 | \$41.50 | \$9.65 | \$17.80 | \$0.00 | \$68.95 |
| | 12/01/2025 | \$42.88 | \$9.65 | \$17.80 | \$0.00 | \$70.33 |
| | 06/01/2026 | \$44.32 | \$9.65 | \$17.80 | \$0.00 | \$71.77 |
| | 12/01/2026 | \$45.76 | \$9.65 | \$17.80 | \$0.00 | \$73.21 |

For apprentice rates see "Apprentice- LABORER (Heavy and Highway)

| | | | | | | |
|---------------------------------------------------------------------------|------------|---------|---------|---------|--------|---------|
| MARBLE & TILE FINISHERS <i>BRICKLAYERS LOCAL 3 - MARBLE & TILE</i> | 02/01/2024 | \$47.89 | \$11.49 | \$21.37 | \$0.00 | \$80.75 |
| | 08/01/2024 | \$49.57 | \$11.49 | \$21.37 | \$0.00 | \$82.43 |
| | 02/01/2025 | \$50.61 | \$11.49 | \$21.37 | \$0.00 | \$83.47 |
| | 08/01/2025 | \$52.33 | \$11.49 | \$21.37 | \$0.00 | \$85.19 |
| | 02/01/2026 | \$53.41 | \$11.49 | \$21.37 | \$0.00 | \$86.27 |
| | 08/01/2026 | \$55.17 | \$11.49 | \$21.37 | \$0.00 | \$88.03 |
| | 02/01/2027 | \$56.29 | \$11.49 | \$21.37 | \$0.00 | \$89.15 |

Apprentice - MARBLE & TILE FINISHER - Local 3 Marble & Tile

Effective Date - 02/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 50 | \$23.95 | \$11.49 | \$21.37 | \$0.00 | \$56.81 |
| 2 | 60 | \$28.73 | \$11.49 | \$21.37 | \$0.00 | \$61.59 |
| 3 | 70 | \$33.52 | \$11.49 | \$21.37 | \$0.00 | \$66.38 |
| 4 | 80 | \$38.31 | \$11.49 | \$21.37 | \$0.00 | \$71.17 |
| 5 | 90 | \$43.10 | \$11.49 | \$21.37 | \$0.00 | \$75.96 |

Effective Date - 08/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 50 | \$24.79 | \$11.49 | \$21.37 | \$0.00 | \$57.65 |
| 2 | 60 | \$29.74 | \$11.49 | \$21.37 | \$0.00 | \$62.60 |
| 3 | 70 | \$34.70 | \$11.49 | \$21.37 | \$0.00 | \$67.56 |
| 4 | 80 | \$39.66 | \$11.49 | \$21.37 | \$0.00 | \$72.52 |
| 5 | 90 | \$44.61 | \$11.49 | \$21.37 | \$0.00 | \$77.47 |

Notes:

Apprentice to Journeyworker Ratio:1:3

| | | | | | | |
|---------------------------------------------------------------------------------------------|------------|---------|---------|---------|--------|----------|
| MARBLE MASONS, TILELAYERS & TERRAZZO MECH <i>BRICKLAYERS LOCAL 3 - MARBLE & TILE</i> | 02/01/2024 | \$62.42 | \$11.49 | \$23.56 | \$0.00 | \$97.47 |
| | 08/01/2024 | \$64.52 | \$11.49 | \$23.56 | \$0.00 | \$99.57 |
| | 02/01/2025 | \$65.82 | \$11.49 | \$23.56 | \$0.00 | \$100.87 |
| | 08/01/2025 | \$67.97 | \$11.49 | \$23.56 | \$0.00 | \$103.02 |
| | 02/01/2026 | \$69.32 | \$11.49 | \$23.56 | \$0.00 | \$104.37 |
| | 08/01/2026 | \$71.52 | \$11.49 | \$23.56 | \$0.00 | \$106.57 |
| | 02/01/2027 | \$72.92 | \$11.49 | \$23.56 | \$0.00 | \$107.97 |

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - MARBLE-TILE-TERRAZZO MECHANIC - Local 3 Marble & Tile

Effective Date - 02/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 50 | \$31.21 | \$11.49 | \$23.56 | \$0.00 | \$66.26 |
| 2 | 60 | \$37.45 | \$11.49 | \$23.56 | \$0.00 | \$72.50 |
| 3 | 70 | \$43.69 | \$11.49 | \$23.56 | \$0.00 | \$78.74 |
| 4 | 80 | \$49.94 | \$11.49 | \$23.56 | \$0.00 | \$84.99 |
| 5 | 90 | \$56.18 | \$11.49 | \$23.56 | \$0.00 | \$91.23 |

Effective Date - 08/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 50 | \$32.26 | \$11.49 | \$23.56 | \$0.00 | \$67.31 |
| 2 | 60 | \$38.71 | \$11.49 | \$23.56 | \$0.00 | \$73.76 |
| 3 | 70 | \$45.16 | \$11.49 | \$23.56 | \$0.00 | \$80.21 |
| 4 | 80 | \$51.62 | \$11.49 | \$23.56 | \$0.00 | \$86.67 |
| 5 | 90 | \$58.07 | \$11.49 | \$23.56 | \$0.00 | \$93.12 |

Notes:

Apprentice to Journeyworker Ratio:1:5

| | | | | | | |
|---------------------------------------------------------------------------------------|------------|---------|---------|---------|--------|---------|
| MECH. SWEEPER OPERATOR (ON CONST. SITES) <i>OPERATING ENGINEERS LOCAL 4</i> | 06/01/2024 | \$55.41 | \$15.30 | \$16.40 | \$0.00 | \$87.11 |
| | 12/01/2024 | \$56.85 | \$15.30 | \$16.40 | \$0.00 | \$88.55 |
| | 06/01/2025 | \$58.13 | \$15.30 | \$16.40 | \$0.00 | \$89.83 |
| | 12/01/2025 | \$59.57 | \$15.30 | \$16.40 | \$0.00 | \$91.27 |
| | 06/01/2026 | \$60.85 | \$15.30 | \$16.40 | \$0.00 | \$92.55 |
| | 12/01/2026 | \$62.29 | \$15.30 | \$16.40 | \$0.00 | \$93.99 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| MECHANICS MAINTENANCE <i>OPERATING ENGINEERS LOCAL 4</i> | 06/01/2024 | \$55.41 | \$15.30 | \$16.40 | \$0.00 | \$87.11 |
| | 12/01/2024 | \$56.85 | \$15.30 | \$16.40 | \$0.00 | \$88.55 |
| | 06/01/2025 | \$58.13 | \$15.30 | \$16.40 | \$0.00 | \$89.83 |
| | 12/01/2025 | \$59.57 | \$15.30 | \$16.40 | \$0.00 | \$91.27 |
| | 06/01/2026 | \$60.85 | \$15.30 | \$16.40 | \$0.00 | \$92.55 |
| | 12/01/2026 | \$62.29 | \$15.30 | \$16.40 | \$0.00 | \$93.99 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| MILLWRIGHT (Zone 2) <i>MILLWRIGHTS LOCAL 1121 - Zone 2</i> | 01/01/2024 | \$42.76 | \$10.08 | \$21.47 | \$0.00 | \$74.31 |
| | 01/06/2025 | \$45.09 | \$10.08 | \$21.47 | \$0.00 | \$76.64 |
| | 01/05/2026 | \$47.42 | \$10.08 | \$21.47 | \$0.00 | \$78.97 |

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - MILLWRIGHT - Local 1121 Zone 2

Effective Date - 01/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 55 | \$23.52 | \$10.08 | \$5.50 | \$0.00 | \$39.10 |
| 2 | 65 | \$27.79 | \$10.08 | \$6.50 | \$0.00 | \$44.37 |
| 3 | 75 | \$32.07 | \$10.08 | \$18.97 | \$0.00 | \$61.12 |
| 4 | 85 | \$36.35 | \$10.08 | \$19.97 | \$0.00 | \$66.40 |

Effective Date - 01/06/2025

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 55 | \$24.80 | \$10.08 | \$5.50 | \$0.00 | \$40.38 |
| 2 | 65 | \$29.31 | \$10.08 | \$6.50 | \$0.00 | \$45.89 |
| 3 | 75 | \$33.82 | \$10.08 | \$18.97 | \$0.00 | \$62.87 |
| 4 | 85 | \$38.33 | \$10.08 | \$19.97 | \$0.00 | \$68.38 |

Notes: Step 1&2 Appr. indentured after 1/6/2020 receive no pension, but do receive annuity. (Step 1 \$5.72, Step 2 \$6.66)
Steps are 2,000 hours

Apprentice to Journeyworker Ratio:1:4

| | | | | | | |
|---------------------------------------------------------------------------------------|------------|---------|---------|---------|--------|---------|
| MORTAR MIXER <i>LABORERS - ZONE 2</i> | 12/01/2023 | \$38.11 | \$9.65 | \$17.14 | \$0.00 | \$64.90 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| OILER (OTHER THAN TRUCK CRANES,GRADALLS) <i>OPERATING ENGINEERS LOCAL 4</i> | 06/01/2024 | \$24.71 | \$15.30 | \$16.40 | \$0.00 | \$56.41 |
| | 12/01/2024 | \$25.37 | \$15.30 | \$16.40 | \$0.00 | \$57.07 |
| | 06/01/2025 | \$25.97 | \$15.30 | \$16.40 | \$0.00 | \$57.67 |
| | 12/01/2025 | \$26.63 | \$15.30 | \$16.40 | \$0.00 | \$58.33 |
| | 06/01/2026 | \$27.22 | \$15.30 | \$16.40 | \$0.00 | \$58.92 |
| | 12/01/2026 | \$27.89 | \$15.30 | \$16.40 | \$0.00 | \$59.59 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| OILER (TRUCK CRANES, GRADALLS) <i>OPERATING ENGINEERS LOCAL 4</i> | 06/01/2024 | \$30.28 | \$15.30 | \$16.40 | \$0.00 | \$61.98 |
| | 12/01/2024 | \$31.08 | \$15.30 | \$16.40 | \$0.00 | \$62.78 |
| | 06/01/2025 | \$31.80 | \$15.30 | \$16.40 | \$0.00 | \$63.50 |
| | 12/01/2025 | \$32.60 | \$15.30 | \$16.40 | \$0.00 | \$64.30 |
| | 06/01/2026 | \$33.32 | \$15.30 | \$16.40 | \$0.00 | \$65.02 |
| | 12/01/2026 | \$34.12 | \$15.30 | \$16.40 | \$0.00 | \$65.82 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| OTHER POWER DRIVEN EQUIPMENT - CLASS II <i>OPERATING ENGINEERS LOCAL 4</i> | 06/01/2024 | \$55.41 | \$15.30 | \$16.40 | \$0.00 | \$87.11 |
| | 12/01/2024 | \$56.85 | \$15.30 | \$16.40 | \$0.00 | \$88.55 |
| | 06/01/2025 | \$58.13 | \$15.30 | \$16.40 | \$0.00 | \$89.83 |
| | 12/01/2025 | \$59.57 | \$15.30 | \$16.40 | \$0.00 | \$91.27 |
| | 06/01/2026 | \$60.85 | \$15.30 | \$16.40 | \$0.00 | \$92.55 |
| | 12/01/2026 | \$62.29 | \$15.30 | \$16.40 | \$0.00 | \$93.99 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| PAINTER (BRIDGES/TANKS) <i>PAINTERS LOCAL 35 - ZONE 2</i> | 01/01/2024 | \$56.06 | \$9.95 | \$23.95 | \$0.00 | \$89.96 |
| | 07/01/2024 | \$57.26 | \$9.95 | \$23.95 | \$0.00 | \$91.16 |
| | 01/01/2025 | \$58.46 | \$9.95 | \$23.95 | \$0.00 | \$92.36 |

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - PAINTER Local 35 - BRIDGES/TANKS

Effective Date - 01/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 50 | \$28.03 | \$9.95 | \$0.00 | \$0.00 | \$37.98 |
| 2 | 55 | \$30.83 | \$9.95 | \$6.66 | \$0.00 | \$47.44 |
| 3 | 60 | \$33.64 | \$9.95 | \$7.26 | \$0.00 | \$50.85 |
| 4 | 65 | \$36.44 | \$9.95 | \$7.87 | \$0.00 | \$54.26 |
| 5 | 70 | \$39.24 | \$9.95 | \$20.32 | \$0.00 | \$69.51 |
| 6 | 75 | \$42.05 | \$9.95 | \$20.93 | \$0.00 | \$72.93 |
| 7 | 80 | \$44.85 | \$9.95 | \$21.53 | \$0.00 | \$76.33 |
| 8 | 90 | \$50.45 | \$9.95 | \$22.74 | \$0.00 | \$83.14 |

Effective Date - 07/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 50 | \$28.63 | \$9.95 | \$0.00 | \$0.00 | \$38.58 |
| 2 | 55 | \$31.49 | \$9.95 | \$6.66 | \$0.00 | \$48.10 |
| 3 | 60 | \$34.36 | \$9.95 | \$7.26 | \$0.00 | \$51.57 |
| 4 | 65 | \$37.22 | \$9.95 | \$7.87 | \$0.00 | \$55.04 |
| 5 | 70 | \$40.08 | \$9.95 | \$20.32 | \$0.00 | \$70.35 |
| 6 | 75 | \$42.95 | \$9.95 | \$20.93 | \$0.00 | \$73.83 |
| 7 | 80 | \$45.81 | \$9.95 | \$21.53 | \$0.00 | \$77.29 |
| 8 | 90 | \$51.53 | \$9.95 | \$22.74 | \$0.00 | \$84.22 |

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

| | | | | | | |
|-----------------------------------------------------------------------------------------------------------------------------|------------|---------|--------|---------|--------|---------|
| PAINTER (SPRAY OR SANDBLAST, NEW) * | 01/01/2024 | \$46.96 | \$9.95 | \$23.95 | \$0.00 | \$80.86 |
| * If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.PAINTERS LOCAL 35 - ZONE 2 | 07/01/2024 | \$48.16 | \$9.95 | \$23.95 | \$0.00 | \$82.06 |
| | 01/01/2025 | \$49.36 | \$9.95 | \$23.95 | \$0.00 | \$83.26 |

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - PAINTER Local 35 Zone 2 - Spray/Sandblast - New

Effective Date - 01/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 50 | \$23.48 | \$9.95 | \$0.00 | \$0.00 | \$33.43 |
| 2 | 55 | \$25.83 | \$9.95 | \$6.66 | \$0.00 | \$42.44 |
| 3 | 60 | \$28.18 | \$9.95 | \$7.26 | \$0.00 | \$45.39 |
| 4 | 65 | \$30.52 | \$9.95 | \$7.87 | \$0.00 | \$48.34 |
| 5 | 70 | \$32.87 | \$9.95 | \$20.32 | \$0.00 | \$63.14 |
| 6 | 75 | \$35.22 | \$9.95 | \$20.93 | \$0.00 | \$66.10 |
| 7 | 80 | \$37.57 | \$9.95 | \$21.53 | \$0.00 | \$69.05 |
| 8 | 90 | \$42.26 | \$9.95 | \$22.74 | \$0.00 | \$74.95 |

Effective Date - 07/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 50 | \$24.08 | \$9.95 | \$0.00 | \$0.00 | \$34.03 |
| 2 | 55 | \$26.49 | \$9.95 | \$6.66 | \$0.00 | \$43.10 |
| 3 | 60 | \$28.90 | \$9.95 | \$7.26 | \$0.00 | \$46.11 |
| 4 | 65 | \$31.30 | \$9.95 | \$7.87 | \$0.00 | \$49.12 |
| 5 | 70 | \$33.71 | \$9.95 | \$20.32 | \$0.00 | \$63.98 |
| 6 | 75 | \$36.12 | \$9.95 | \$20.93 | \$0.00 | \$67.00 |
| 7 | 80 | \$38.53 | \$9.95 | \$21.53 | \$0.00 | \$70.01 |
| 8 | 90 | \$43.34 | \$9.95 | \$22.74 | \$0.00 | \$76.03 |

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

| | | | | | | |
|---------------------------------------|------------|---------|--------|---------|--------|---------|
| PAINTER (SPRAY OR SANDBLAST, REPAINT) | 01/01/2024 | \$45.02 | \$9.95 | \$23.95 | \$0.00 | \$78.92 |
| PAINTERS LOCAL 35 - ZONE 2 | 07/01/2024 | \$46.22 | \$9.95 | \$23.95 | \$0.00 | \$80.12 |
| | 01/01/2025 | \$47.42 | \$9.95 | \$23.95 | \$0.00 | \$81.32 |

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - PAINTER Local 35 Zone 2 - Spray/Sandblast - Repaint

Effective Date - 01/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 50 | \$22.51 | \$9.95 | \$0.00 | \$0.00 | \$32.46 |
| 2 | 55 | \$24.76 | \$9.95 | \$6.66 | \$0.00 | \$41.37 |
| 3 | 60 | \$27.01 | \$9.95 | \$7.26 | \$0.00 | \$44.22 |
| 4 | 65 | \$29.26 | \$9.95 | \$7.87 | \$0.00 | \$47.08 |
| 5 | 70 | \$31.51 | \$9.95 | \$20.32 | \$0.00 | \$61.78 |
| 6 | 75 | \$33.77 | \$9.95 | \$20.93 | \$0.00 | \$64.65 |
| 7 | 80 | \$36.02 | \$9.95 | \$21.53 | \$0.00 | \$67.50 |
| 8 | 90 | \$40.52 | \$9.95 | \$22.74 | \$0.00 | \$73.21 |

Effective Date - 07/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 50 | \$23.11 | \$9.95 | \$0.00 | \$0.00 | \$33.06 |
| 2 | 55 | \$25.42 | \$9.95 | \$6.66 | \$0.00 | \$42.03 |
| 3 | 60 | \$27.73 | \$9.95 | \$7.26 | \$0.00 | \$44.94 |
| 4 | 65 | \$30.04 | \$9.95 | \$7.87 | \$0.00 | \$47.86 |
| 5 | 70 | \$32.35 | \$9.95 | \$20.32 | \$0.00 | \$62.62 |
| 6 | 75 | \$34.67 | \$9.95 | \$20.93 | \$0.00 | \$65.55 |
| 7 | 80 | \$36.98 | \$9.95 | \$21.53 | \$0.00 | \$68.46 |
| 8 | 90 | \$41.60 | \$9.95 | \$22.74 | \$0.00 | \$74.29 |

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

| | | | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------|------------|---------|--------|---------|--------|---------|
| PAINTER / TAPER (BRUSH, NEW) * | 01/01/2024 | \$45.56 | \$9.95 | \$23.95 | \$0.00 | \$79.46 |
| * If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used. <i>PAINTERS LOCAL 35 - ZONE 2</i> | 07/01/2024 | \$46.76 | \$9.95 | \$23.95 | \$0.00 | \$80.66 |
| | 01/01/2025 | \$47.96 | \$9.95 | \$23.95 | \$0.00 | \$81.86 |

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - PAINTER - Local 35 Zone 2 - BRUSH NEW

Effective Date - 01/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 50 | \$22.78 | \$9.95 | \$0.00 | \$0.00 | \$32.73 |
| 2 | 55 | \$25.06 | \$9.95 | \$6.66 | \$0.00 | \$41.67 |
| 3 | 60 | \$27.34 | \$9.95 | \$7.26 | \$0.00 | \$44.55 |
| 4 | 65 | \$29.61 | \$9.95 | \$7.87 | \$0.00 | \$47.43 |
| 5 | 70 | \$31.89 | \$9.95 | \$20.32 | \$0.00 | \$62.16 |
| 6 | 75 | \$34.17 | \$9.95 | \$20.93 | \$0.00 | \$65.05 |
| 7 | 80 | \$36.45 | \$9.95 | \$21.53 | \$0.00 | \$67.93 |
| 8 | 90 | \$41.00 | \$9.95 | \$22.74 | \$0.00 | \$73.69 |

Effective Date - 07/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 50 | \$23.38 | \$9.95 | \$0.00 | \$0.00 | \$33.33 |
| 2 | 55 | \$25.72 | \$9.95 | \$6.66 | \$0.00 | \$42.33 |
| 3 | 60 | \$28.06 | \$9.95 | \$7.26 | \$0.00 | \$45.27 |
| 4 | 65 | \$30.39 | \$9.95 | \$7.87 | \$0.00 | \$48.21 |
| 5 | 70 | \$32.73 | \$9.95 | \$20.32 | \$0.00 | \$63.00 |
| 6 | 75 | \$35.07 | \$9.95 | \$20.93 | \$0.00 | \$65.95 |
| 7 | 80 | \$37.41 | \$9.95 | \$21.53 | \$0.00 | \$68.89 |
| 8 | 90 | \$42.08 | \$9.95 | \$22.74 | \$0.00 | \$74.77 |

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

| | | | | | | |
|----------------------------------|------------|---------|--------|---------|--------|---------|
| PAINTER / TAPER (BRUSH, REPAINT) | 01/01/2024 | \$43.62 | \$9.95 | \$23.95 | \$0.00 | \$77.52 |
| PAINTERS LOCAL 35 - ZONE 2 | 07/01/2024 | \$44.82 | \$9.95 | \$23.95 | \$0.00 | \$78.72 |
| | 01/01/2025 | \$46.02 | \$9.95 | \$23.95 | \$0.00 | \$79.92 |

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - PAINTER Local 35 Zone 2 - BRUSH REPAINT

Effective Date - 01/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 50 | \$21.81 | \$9.95 | \$0.00 | \$0.00 | \$31.76 |
| 2 | 55 | \$23.99 | \$9.95 | \$6.66 | \$0.00 | \$40.60 |
| 3 | 60 | \$26.17 | \$9.95 | \$7.26 | \$0.00 | \$43.38 |
| 4 | 65 | \$28.35 | \$9.95 | \$7.87 | \$0.00 | \$46.17 |
| 5 | 70 | \$30.53 | \$9.95 | \$20.32 | \$0.00 | \$60.80 |
| 6 | 75 | \$32.72 | \$9.95 | \$20.93 | \$0.00 | \$63.60 |
| 7 | 80 | \$34.90 | \$9.95 | \$21.53 | \$0.00 | \$66.38 |
| 8 | 90 | \$39.26 | \$9.95 | \$22.74 | \$0.00 | \$71.95 |

Effective Date - 07/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 50 | \$22.41 | \$9.95 | \$0.00 | \$0.00 | \$32.36 |
| 2 | 55 | \$24.65 | \$9.95 | \$6.66 | \$0.00 | \$41.26 |
| 3 | 60 | \$26.89 | \$9.95 | \$7.26 | \$0.00 | \$44.10 |
| 4 | 65 | \$29.13 | \$9.95 | \$7.87 | \$0.00 | \$46.95 |
| 5 | 70 | \$31.37 | \$9.95 | \$20.32 | \$0.00 | \$61.64 |
| 6 | 75 | \$33.62 | \$9.95 | \$20.93 | \$0.00 | \$64.50 |
| 7 | 80 | \$35.86 | \$9.95 | \$21.53 | \$0.00 | \$67.34 |
| 8 | 90 | \$40.34 | \$9.95 | \$22.74 | \$0.00 | \$73.03 |

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

| | | | | | | |
|------------------------------------------|------------|---------|--------|---------|--------|---------|
| PAINTER TRAFFIC MARKINGS (HEAVY/HIGHWAY) | 06/01/2024 | \$38.53 | \$9.65 | \$17.80 | \$0.00 | \$65.98 |
| LABORERS - ZONE 2 (HEAVY & HIGHWAY) | 12/01/2024 | \$39.86 | \$9.65 | \$17.80 | \$0.00 | \$67.31 |
| | 06/01/2025 | \$41.25 | \$9.65 | \$17.80 | \$0.00 | \$68.70 |
| | 12/01/2025 | \$42.63 | \$9.65 | \$17.80 | \$0.00 | \$70.08 |
| | 06/01/2026 | \$44.07 | \$9.65 | \$17.80 | \$0.00 | \$71.52 |
| | 12/01/2026 | \$45.51 | \$9.65 | \$17.80 | \$0.00 | \$72.96 |

For apprentice rates see "Apprentice- LABORER (Heavy and Highway)

| | | | | | | |
|---------------------------------------|------------|---------|---------|---------|--------|---------|
| PANEL & PICKUP TRUCKS DRIVER | 06/01/2024 | \$39.78 | \$15.07 | \$18.67 | \$0.00 | \$73.52 |
| TEAMSTERS JOINT COUNCIL NO. 10 ZONE B | 12/01/2024 | \$39.78 | \$15.07 | \$20.17 | \$0.00 | \$75.02 |
| | 01/01/2025 | \$39.78 | \$15.57 | \$20.17 | \$0.00 | \$75.52 |
| | 06/01/2025 | \$40.78 | \$15.57 | \$20.17 | \$0.00 | \$76.52 |
| | 12/01/2025 | \$40.78 | \$15.57 | \$21.78 | \$0.00 | \$78.13 |
| | 01/01/2026 | \$40.78 | \$16.17 | \$21.78 | \$0.00 | \$78.73 |
| | 06/01/2026 | \$41.78 | \$16.17 | \$21.78 | \$0.00 | \$79.73 |
| | 12/01/2026 | \$41.78 | \$16.17 | \$23.52 | \$0.00 | \$81.47 |
| | 01/01/2027 | \$41.78 | \$16.77 | \$23.52 | \$0.00 | \$82.07 |

| Classification | Effective Date | Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|-------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------|--------|---------|---------------------------|------------|
| PIER AND DOCK CONSTRUCTOR (UNDERPINNING AND DECK) <i>PILE DRIVER LOCAL 56 (ZONE 1)</i> For apprentice rates see "Apprentice- PILE DRIVER" | 08/01/2020 | \$49.07 | \$9.40 | \$23.12 | \$0.00 | \$81.59 |
| PILE DRIVER <i>PILE DRIVER LOCAL 56 (ZONE 1)</i> | 08/01/2020 | \$49.07 | \$9.40 | \$23.12 | \$0.00 | \$81.59 |

Apprentice - PILE DRIVER - Local 56 Zone 1

Effective Date - 08/01/2020

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 50 | \$24.54 | \$9.40 | \$23.12 | \$0.00 | \$57.06 |
| 2 | 60 | \$29.44 | \$9.40 | \$23.12 | \$0.00 | \$61.96 |
| 3 | 70 | \$34.35 | \$9.40 | \$23.12 | \$0.00 | \$66.87 |
| 4 | 75 | \$36.80 | \$9.40 | \$23.12 | \$0.00 | \$69.32 |
| 5 | 80 | \$39.26 | \$9.40 | \$23.12 | \$0.00 | \$71.78 |
| 6 | 80 | \$39.26 | \$9.40 | \$23.12 | \$0.00 | \$71.78 |
| 7 | 90 | \$44.16 | \$9.40 | \$23.12 | \$0.00 | \$76.68 |
| 8 | 90 | \$44.16 | \$9.40 | \$23.12 | \$0.00 | \$76.68 |

Notes:

% Indentured After 10/1/17; 45/45/55/55/70/70/80/80
Step 1&2 \$34.01/ 3&4 \$41.46/ 5&6 \$62.80/ 7&8 \$69.25

Apprentice to Journeyworker Ratio:1:5

| | | | | | | |
|-----------------------------------------------------------------------------------------|------------|---------|---------|---------|--------|---------|
| PIPELAYER <i>LABORERS - ZONE 2</i> For apprentice rates see "Apprentice- LABORER" | 12/01/2023 | \$38.11 | \$9.65 | \$17.14 | \$0.00 | \$64.90 |
| PIPELAYER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY & HIGHWAY)</i> | 06/01/2024 | \$38.78 | \$9.65 | \$17.80 | \$0.00 | \$66.23 |
| | 12/01/2024 | \$40.11 | \$9.65 | \$17.80 | \$0.00 | \$67.56 |
| | 06/01/2025 | \$41.50 | \$9.65 | \$17.80 | \$0.00 | \$68.95 |
| | 12/01/2025 | \$42.88 | \$9.65 | \$17.80 | \$0.00 | \$70.33 |
| | 06/01/2026 | \$44.32 | \$9.65 | \$17.80 | \$0.00 | \$71.77 |
| | 12/01/2026 | \$45.76 | \$9.65 | \$17.80 | \$0.00 | \$73.21 |
| For apprentice rates see "Apprentice- LABORER (Heavy and Highway) | | | | | | |
| PLUMBER & PIPEFITTER <i>PLUMBERS & PIPEFITTERS LOCAL 51</i> | 08/28/2023 | \$51.99 | \$10.15 | \$19.95 | \$0.00 | \$82.09 |
| | 08/26/2024 | \$54.74 | \$10.15 | \$19.95 | \$0.00 | \$84.84 |
| | 08/25/2025 | \$57.49 | \$10.15 | \$19.95 | \$0.00 | \$87.59 |

| Classification | Effective Date | Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|--------------------------------------------------------------------------------------|----------------|-----------|---------|---------|---------------------------|------------|
| POWER SHOVEL/DERRICK/TRENCHING MACHINE <i>OPERATING ENGINEERS LOCAL 4</i> | 06/01/2024 | \$56.03 | \$15.30 | \$16.40 | \$0.00 | \$87.73 |
| | 12/01/2024 | \$57.48 | \$15.30 | \$16.40 | \$0.00 | \$89.18 |
| | 06/01/2025 | \$58.78 | \$15.30 | \$16.40 | \$0.00 | \$90.48 |
| | 12/01/2025 | \$60.23 | \$15.30 | \$16.40 | \$0.00 | \$91.93 |
| | 06/01/2026 | \$61.53 | \$15.30 | \$16.40 | \$0.00 | \$93.23 |
| | 12/01/2026 | \$62.98 | \$15.30 | \$16.40 | \$0.00 | \$94.68 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| PUMP OPERATOR (CONCRETE) <i>OPERATING ENGINEERS LOCAL 4</i> | 06/01/2024 | \$55.41 | \$15.30 | \$16.40 | \$0.00 | \$87.11 |
| | 12/01/2024 | \$56.85 | \$15.30 | \$16.40 | \$0.00 | \$88.55 |
| | 06/01/2025 | \$58.13 | \$15.30 | \$16.40 | \$0.00 | \$89.83 |
| | 12/01/2025 | \$59.57 | \$15.30 | \$16.40 | \$0.00 | \$91.27 |
| | 06/01/2026 | \$60.85 | \$15.30 | \$16.40 | \$0.00 | \$92.55 |
| | 12/01/2026 | \$62.29 | \$15.30 | \$16.40 | \$0.00 | \$93.99 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| PUMP OPERATOR (DEWATERING, OTHER) <i>OPERATING ENGINEERS LOCAL 4</i> | 06/01/2024 | \$36.17 | \$15.30 | \$16.40 | \$0.00 | \$67.87 |
| | 12/01/2024 | \$37.12 | \$15.30 | \$16.40 | \$0.00 | \$68.82 |
| | 06/01/2025 | \$37.97 | \$15.30 | \$16.40 | \$0.00 | \$69.67 |
| | 12/01/2025 | \$38.92 | \$15.30 | \$16.40 | \$0.00 | \$70.62 |
| | 06/01/2026 | \$39.78 | \$15.30 | \$16.40 | \$0.00 | \$71.48 |
| | 12/01/2026 | \$40.73 | \$15.30 | \$16.40 | \$0.00 | \$72.43 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| READY-MIX CONCRETE DRIVER <i>TEAMSTERS 653 - Southeastern Concrete (Weymouth)</i> | 08/01/2023 | \$25.00 | \$13.91 | \$6.90 | \$0.00 | \$45.81 |
| RECLAIMERS <i>OPERATING ENGINEERS LOCAL 4</i> | 06/01/2024 | \$55.41 | \$15.30 | \$16.40 | \$0.00 | \$87.11 |
| | 12/01/2024 | \$56.85 | \$15.30 | \$16.40 | \$0.00 | \$88.55 |
| | 06/01/2025 | \$58.13 | \$15.30 | \$16.40 | \$0.00 | \$89.83 |
| | 12/01/2025 | \$59.57 | \$15.30 | \$16.40 | \$0.00 | \$91.27 |
| | 06/01/2026 | \$60.85 | \$15.30 | \$16.40 | \$0.00 | \$92.55 |
| | 12/01/2026 | \$62.29 | \$15.30 | \$16.40 | \$0.00 | \$93.99 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| RIDE-ON MOTORIZED BUGGY OPERATOR <i>LABORERS - ZONE 2</i> | 12/01/2023 | \$38.11 | \$9.65 | \$17.14 | \$0.00 | \$64.90 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| ROLLER/SPREADER/MULCHING MACHINE <i>OPERATING ENGINEERS LOCAL 4</i> | 06/01/2024 | \$55.41 | \$15.30 | \$16.40 | \$0.00 | \$87.11 |
| | 12/01/2024 | \$56.85 | \$15.30 | \$16.40 | \$0.00 | \$88.55 |
| | 06/01/2025 | \$58.13 | \$15.30 | \$16.40 | \$0.00 | \$89.83 |
| | 12/01/2025 | \$59.57 | \$15.30 | \$16.40 | \$0.00 | \$91.27 |
| | 06/01/2026 | \$60.85 | \$15.30 | \$16.40 | \$0.00 | \$92.55 |
| | 12/01/2026 | \$62.29 | \$15.30 | \$16.40 | \$0.00 | \$93.99 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| ROOFER (Inc.Roofers Waterproofing &Roofers Damproofing) <i>ROOFERS LOCAL 33</i> | 02/01/2024 | \$50.03 | \$12.78 | \$21.45 | \$0.00 | \$84.26 |
| | 08/01/2024 | \$51.53 | \$12.78 | \$21.45 | \$0.00 | \$85.76 |
| | 02/01/2025 | \$52.78 | \$12.78 | \$21.45 | \$0.00 | \$87.01 |
| | 08/01/2025 | \$54.28 | \$12.78 | \$21.45 | \$0.00 | \$88.51 |
| | 02/01/2026 | \$55.53 | \$12.78 | \$21.45 | \$0.00 | \$89.76 |

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - ROOFER - Local 33

Effective Date - 02/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 50 | \$25.02 | \$12.78 | \$6.21 | \$0.00 | \$44.01 |
| 2 | 60 | \$30.02 | \$12.78 | \$21.45 | \$0.00 | \$64.25 |
| 3 | 65 | \$32.52 | \$12.78 | \$21.45 | \$0.00 | \$66.75 |
| 4 | 75 | \$37.52 | \$12.78 | \$21.45 | \$0.00 | \$71.75 |
| 5 | 85 | \$42.53 | \$12.78 | \$21.45 | \$0.00 | \$76.76 |

Effective Date - 08/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 50 | \$25.77 | \$12.78 | \$6.21 | \$0.00 | \$44.76 |
| 2 | 60 | \$30.92 | \$12.78 | \$21.45 | \$0.00 | \$65.15 |
| 3 | 65 | \$33.49 | \$12.78 | \$21.45 | \$0.00 | \$67.72 |
| 4 | 75 | \$38.65 | \$12.78 | \$21.45 | \$0.00 | \$72.88 |
| 5 | 85 | \$43.80 | \$12.78 | \$21.45 | \$0.00 | \$78.03 |

Notes: ** 1:5, 2:6-10, the 1:10; Reroofing: 1:4, then 1:1
 Step 1 is 2000 hrs.; Steps 2-5 are 1000 hrs.
 (Hot Pitch Mechanics' receive \$1.00 hr. above ROOFER)

Apprentice to Journeyworker Ratio:**

| | | | | | | |
|----------------------------------------|------------|---------|---------|---------|--------|---------|
| ROOFER SLATE / TILE / PRECAST CONCRETE | 02/01/2024 | \$50.28 | \$12.78 | \$21.45 | \$0.00 | \$84.51 |
| ROOFERS LOCAL 33 | 08/01/2024 | \$51.78 | \$12.78 | \$21.45 | \$0.00 | \$86.01 |
| | 02/01/2025 | \$53.03 | \$12.78 | \$21.45 | \$0.00 | \$87.26 |
| | 08/01/2025 | \$54.53 | \$12.78 | \$21.45 | \$0.00 | \$88.76 |
| | 02/01/2026 | \$55.78 | \$12.78 | \$21.45 | \$0.00 | \$90.01 |

For apprentice rates see "Apprentice- ROOFER"

| | | | | | | |
|---------------------------------|------------|---------|---------|---------|--------|---------|
| SHEETMETAL WORKER | 04/01/2024 | \$41.08 | \$14.59 | \$19.04 | \$2.24 | \$76.95 |
| SHEETMETAL WORKERS LOCAL 17 - B | 10/01/2024 | \$42.33 | \$14.59 | \$19.04 | \$2.24 | \$78.20 |
| | 04/01/2025 | \$43.83 | \$14.59 | \$19.04 | \$2.24 | \$79.70 |
| | 10/01/2025 | \$45.08 | \$14.59 | \$19.04 | \$2.24 | \$80.95 |
| | 04/01/2026 | \$46.58 | \$14.59 | \$19.04 | \$2.24 | \$82.45 |

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - SHEET METAL WORKER - Local 17-B

Effective Date - 04/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 40 | \$16.43 | \$14.59 | \$4.18 | \$1.09 | \$36.29 |
| 2 | 45 | \$18.49 | \$14.59 | \$4.71 | \$1.17 | \$38.96 |
| 3 | 50 | \$20.54 | \$14.59 | \$11.84 | \$1.45 | \$48.42 |
| 4 | 55 | \$22.59 | \$14.59 | \$11.84 | \$1.52 | \$50.54 |
| 5 | 60 | \$24.65 | \$14.59 | \$15.53 | \$1.64 | \$56.41 |
| 6 | 65 | \$26.70 | \$14.59 | \$15.84 | \$1.71 | \$58.84 |
| 7 | 70 | \$28.76 | \$14.59 | \$16.15 | \$1.78 | \$61.28 |
| 8 | 75 | \$30.81 | \$14.59 | \$16.45 | \$1.86 | \$63.71 |
| 9 | 80 | \$32.86 | \$14.59 | \$16.76 | \$1.93 | \$66.14 |
| 10 | 85 | \$34.92 | \$14.59 | \$17.07 | \$2.00 | \$68.58 |

Effective Date - 10/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 40 | \$16.93 | \$14.59 | \$4.18 | \$1.09 | \$36.79 |
| 2 | 45 | \$19.05 | \$14.59 | \$4.71 | \$1.17 | \$39.52 |
| 3 | 50 | \$21.17 | \$14.59 | \$11.84 | \$1.45 | \$49.05 |
| 4 | 55 | \$23.28 | \$14.59 | \$11.84 | \$1.52 | \$51.23 |
| 5 | 60 | \$25.40 | \$14.59 | \$15.53 | \$1.64 | \$57.16 |
| 6 | 65 | \$27.51 | \$14.59 | \$15.84 | \$1.71 | \$59.65 |
| 7 | 70 | \$29.63 | \$14.59 | \$16.15 | \$1.78 | \$62.15 |
| 8 | 75 | \$31.75 | \$14.59 | \$16.45 | \$1.86 | \$64.65 |
| 9 | 80 | \$33.86 | \$14.59 | \$16.76 | \$1.93 | \$67.14 |
| 10 | 85 | \$35.98 | \$14.59 | \$17.07 | \$2.00 | \$69.64 |

Notes:

Apprentice to Journeyworker Ratio:1:3

| | | | | | | |
|-----------------------------------------------------------------------------------|------------|---------|---------|---------|--------|---------|
| SPECIALIZED EARTH MOVING EQUIP < 35 TONS TEAMSTERS JOINT COUNCIL NO. 10 ZONE B | 06/01/2024 | \$40.24 | \$15.07 | \$18.67 | \$0.00 | \$73.98 |
| | 12/01/2024 | \$40.24 | \$15.07 | \$20.17 | \$0.00 | \$75.48 |
| | 01/01/2025 | \$40.24 | \$15.57 | \$20.17 | \$0.00 | \$75.98 |
| | 06/01/2025 | \$41.24 | \$15.57 | \$20.17 | \$0.00 | \$76.98 |
| | 12/01/2025 | \$41.24 | \$15.57 | \$21.78 | \$0.00 | \$78.59 |
| | 01/01/2026 | \$41.24 | \$16.17 | \$21.78 | \$0.00 | \$79.19 |
| | 06/01/2026 | \$42.24 | \$16.17 | \$21.78 | \$0.00 | \$80.19 |
| | 12/01/2026 | \$42.24 | \$16.17 | \$23.52 | \$0.00 | \$81.93 |
| | 01/01/2027 | \$42.24 | \$16.77 | \$23.52 | \$0.00 | \$82.53 |

| Classification | Effective Date | Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------------------------------------------------------------------------------------------|----------------|-----------|---------|---------|---------------------------|------------|
| SPECIALIZED EARTH MOVING EQUIP > 35 TONS <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i> | 06/01/2024 | \$40.53 | \$15.07 | \$18.67 | \$0.00 | \$74.27 |
| | 12/01/2024 | \$40.53 | \$15.07 | \$20.17 | \$0.00 | \$75.77 |
| | 01/01/2025 | \$40.53 | \$15.57 | \$20.17 | \$0.00 | \$76.27 |
| | 06/01/2025 | \$41.53 | \$15.57 | \$20.17 | \$0.00 | \$77.27 |
| | 12/01/2025 | \$41.53 | \$15.57 | \$21.78 | \$0.00 | \$78.88 |
| | 01/01/2026 | \$41.53 | \$16.17 | \$21.78 | \$0.00 | \$79.48 |
| | 06/01/2026 | \$42.53 | \$16.17 | \$21.78 | \$0.00 | \$80.48 |
| | 12/01/2026 | \$42.53 | \$16.17 | \$23.52 | \$0.00 | \$82.22 |
| | 01/01/2027 | \$42.53 | \$16.77 | \$23.52 | \$0.00 | \$82.82 |
| SPRINKLER FITTER <i>SPRINKLER FITTERS LOCAL 550 - (Section B) Zone 2</i> | 03/01/2024 | \$62.14 | \$11.51 | \$23.30 | \$0.00 | \$96.95 |
| | 10/01/2024 | \$63.76 | \$11.51 | \$23.30 | \$0.00 | \$98.57 |
| | 03/01/2025 | \$65.38 | \$11.51 | \$23.30 | \$0.00 | \$100.19 |

Apprentice - SPRINKLER FITTER - Local 550 (Section B) Zone 2

Effective Date - 03/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 35 | \$21.75 | \$11.51 | \$12.90 | \$0.00 | \$46.16 |
| 2 | 40 | \$24.86 | \$11.51 | \$13.70 | \$0.00 | \$50.07 |
| 3 | 45 | \$27.96 | \$11.51 | \$14.50 | \$0.00 | \$53.97 |
| 4 | 50 | \$31.07 | \$11.51 | \$15.30 | \$0.00 | \$57.88 |
| 5 | 55 | \$34.18 | \$11.51 | \$16.10 | \$0.00 | \$61.79 |
| 6 | 60 | \$37.28 | \$11.51 | \$16.90 | \$0.00 | \$65.69 |
| 7 | 65 | \$40.39 | \$11.51 | \$17.70 | \$0.00 | \$69.60 |
| 8 | 70 | \$43.50 | \$11.51 | \$18.50 | \$0.00 | \$73.51 |
| 9 | 75 | \$46.61 | \$11.51 | \$19.30 | \$0.00 | \$77.42 |
| 10 | 80 | \$49.71 | \$11.51 | \$20.10 | \$0.00 | \$81.32 |

Effective Date - 10/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 35 | \$22.32 | \$11.51 | \$12.90 | \$0.00 | \$46.73 |
| 2 | 40 | \$25.50 | \$11.51 | \$13.70 | \$0.00 | \$50.71 |
| 3 | 45 | \$28.69 | \$11.51 | \$14.50 | \$0.00 | \$54.70 |
| 4 | 50 | \$31.88 | \$11.51 | \$15.30 | \$0.00 | \$58.69 |
| 5 | 55 | \$35.07 | \$11.51 | \$16.10 | \$0.00 | \$62.68 |
| 6 | 60 | \$38.26 | \$11.51 | \$16.90 | \$0.00 | \$66.67 |
| 7 | 65 | \$41.44 | \$11.51 | \$17.70 | \$0.00 | \$70.65 |
| 8 | 70 | \$44.63 | \$11.51 | \$18.50 | \$0.00 | \$74.64 |
| 9 | 75 | \$47.82 | \$11.51 | \$19.30 | \$0.00 | \$78.63 |
| 10 | 80 | \$51.01 | \$11.51 | \$20.10 | \$0.00 | \$82.62 |

Notes: Apprentice entered prior 9/30/10:
40/45/50/55/60/65/70/75/80/85
Steps are 850 hours

Apprentice to Journeyworker Ratio:1:3

| Classification | Effective Date | Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|--------------------------------------------------------------------------------|----------------|-----------|---------|---------|---------------------------|------------|
| STEAM BOILER OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i> | 06/01/2024 | \$55.41 | \$15.30 | \$16.40 | \$0.00 | \$87.11 |
| | 12/01/2024 | \$56.85 | \$15.30 | \$16.40 | \$0.00 | \$88.55 |
| | 06/01/2025 | \$58.13 | \$15.30 | \$16.40 | \$0.00 | \$89.83 |
| | 12/01/2025 | \$59.57 | \$15.30 | \$16.40 | \$0.00 | \$91.27 |
| | 06/01/2026 | \$60.85 | \$15.30 | \$16.40 | \$0.00 | \$92.55 |
| | 12/01/2026 | \$62.29 | \$15.30 | \$16.40 | \$0.00 | \$93.99 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| TAMPERS, SELF-PROPELLED OR TRACTOR DRAWN <i>OPERATING ENGINEERS LOCAL 4</i> | 06/01/2024 | \$55.41 | \$15.30 | \$16.40 | \$0.00 | \$87.11 |
| | 12/01/2024 | \$56.85 | \$15.30 | \$16.40 | \$0.00 | \$88.55 |
| | 06/01/2025 | \$58.13 | \$15.30 | \$16.40 | \$0.00 | \$89.83 |
| | 12/01/2025 | \$59.57 | \$15.30 | \$16.40 | \$0.00 | \$91.27 |
| | 06/01/2026 | \$60.85 | \$15.30 | \$16.40 | \$0.00 | \$92.55 |
| | 12/01/2026 | \$62.29 | \$15.30 | \$16.40 | \$0.00 | \$93.99 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| TELECOMMUNICATION TECHNICIAN <i>ELECTRICIANS LOCAL 223</i> | 09/01/2023 | \$39.40 | \$11.50 | \$13.91 | \$0.00 | \$64.81 |
| | 09/01/2024 | \$40.69 | \$11.75 | \$14.53 | \$0.00 | \$66.97 |

Apprentice - TELECOMMUNICATION TECHNICIAN - Local 223

Effective Date - 09/01/2023

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | \$0.00 |

Notes: See Electrician Apprentice Wages

Telecom Apprentice Wages shall be the same as the Electrician Apprentice Wages

Apprentice to Journeyworker Ratio:2:3***

| | | | | | | |
|----------------------------------------------------------------------|------------|---------|---------|---------|--------|----------|
| TERRAZZO FINISHERS <i>BRICKLAYERS LOCAL 3 - MARBLE & TILE</i> | 02/01/2024 | \$61.34 | \$11.49 | \$23.59 | \$0.00 | \$96.42 |
| | 08/01/2024 | \$63.44 | \$11.49 | \$23.59 | \$0.00 | \$98.52 |
| | 02/01/2025 | \$64.74 | \$11.49 | \$23.59 | \$0.00 | \$99.82 |
| | 08/01/2025 | \$66.89 | \$11.49 | \$23.59 | \$0.00 | \$101.97 |
| | 02/01/2026 | \$68.24 | \$11.49 | \$23.59 | \$0.00 | \$103.32 |
| | 08/01/2026 | \$70.44 | \$11.49 | \$23.59 | \$0.00 | \$105.52 |
| | 02/01/2027 | \$71.84 | \$11.49 | \$23.59 | \$0.00 | \$106.92 |

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - TERRAZZO FINISHER - Local 3 Marble & Tile

Effective Date - 02/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 50 | \$30.67 | \$11.49 | \$23.59 | \$0.00 | \$65.75 |
| 2 | 60 | \$36.80 | \$11.49 | \$23.59 | \$0.00 | \$71.88 |
| 3 | 70 | \$42.94 | \$11.49 | \$23.59 | \$0.00 | \$78.02 |
| 4 | 80 | \$49.07 | \$11.49 | \$23.59 | \$0.00 | \$84.15 |
| 5 | 90 | \$55.21 | \$11.49 | \$23.59 | \$0.00 | \$90.29 |

Effective Date - 08/01/2024

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 50 | \$31.72 | \$11.49 | \$23.59 | \$0.00 | \$66.80 |
| 2 | 60 | \$38.06 | \$11.49 | \$23.59 | \$0.00 | \$73.14 |
| 3 | 70 | \$44.41 | \$11.49 | \$23.59 | \$0.00 | \$79.49 |
| 4 | 80 | \$50.75 | \$11.49 | \$23.59 | \$0.00 | \$85.83 |
| 5 | 90 | \$57.10 | \$11.49 | \$23.59 | \$0.00 | \$92.18 |

Notes:

Apprentice to Journeyworker Ratio:1:3

| | | | | | | |
|-----------------------------------------------------------------------|------------|---------|--------|---------|--------|---------|
| TEST BORING DRILLER <i>LABORERS - FOUNDATION AND MARINE</i> | 06/01/2024 | \$49.81 | \$9.65 | \$18.22 | \$0.00 | \$77.68 |
| | 12/01/2024 | \$51.28 | \$9.65 | \$18.22 | \$0.00 | \$79.15 |
| | 06/01/2025 | \$52.78 | \$9.65 | \$18.22 | \$0.00 | \$80.65 |
| | 12/01/2025 | \$54.28 | \$9.65 | \$18.22 | \$0.00 | \$82.15 |
| | 06/01/2026 | \$55.83 | \$9.65 | \$18.22 | \$0.00 | \$83.70 |
| | 12/01/2026 | \$57.33 | \$9.65 | \$18.22 | \$0.00 | \$85.20 |

For apprentice rates see "Apprentice- LABORER"

| | | | | | | |
|------------------------------------------------------------------------------|------------|---------|--------|---------|--------|---------|
| TEST BORING DRILLER HELPER <i>LABORERS - FOUNDATION AND MARINE</i> | 06/01/2024 | \$45.60 | \$9.65 | \$18.22 | \$0.00 | \$73.47 |
| | 12/01/2024 | \$47.07 | \$9.65 | \$18.22 | \$0.00 | \$74.94 |
| | 06/01/2025 | \$48.57 | \$9.65 | \$18.22 | \$0.00 | \$76.44 |
| | 12/01/2025 | \$50.07 | \$9.65 | \$18.22 | \$0.00 | \$77.94 |
| | 06/01/2026 | \$51.62 | \$9.65 | \$18.22 | \$0.00 | \$79.49 |
| | 12/01/2026 | \$53.12 | \$9.65 | \$18.22 | \$0.00 | \$80.99 |

For apprentice rates see "Apprentice- LABORER"

| | | | | | | |
|-----------------------------------------------------------------------|------------|---------|--------|---------|--------|---------|
| TEST BORING LABORER <i>LABORERS - FOUNDATION AND MARINE</i> | 06/01/2024 | \$45.48 | \$9.65 | \$18.22 | \$0.00 | \$73.35 |
| | 12/01/2024 | \$46.95 | \$9.65 | \$18.22 | \$0.00 | \$74.82 |
| | 06/01/2025 | \$48.45 | \$9.65 | \$18.22 | \$0.00 | \$76.32 |
| | 12/01/2025 | \$49.95 | \$9.65 | \$18.22 | \$0.00 | \$77.82 |
| | 06/01/2026 | \$51.50 | \$9.65 | \$18.22 | \$0.00 | \$79.37 |
| | 12/01/2026 | \$53.00 | \$9.65 | \$18.22 | \$0.00 | \$80.87 |

For apprentice rates see "Apprentice- LABORER"

| Classification | Effective Date | Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|-------------------------------------------------------------------------------------|----------------|-----------|---------|---------|---------------------------|------------|
| TRACTORS/PORTABLE STEAM GENERATORS <i>OPERATING ENGINEERS LOCAL 4</i> | 06/01/2024 | \$55.41 | \$15.30 | \$16.40 | \$0.00 | \$87.11 |
| | 12/01/2024 | \$56.85 | \$15.30 | \$16.40 | \$0.00 | \$88.55 |
| | 06/01/2025 | \$58.13 | \$15.30 | \$16.40 | \$0.00 | \$89.83 |
| | 12/01/2025 | \$59.57 | \$15.30 | \$16.40 | \$0.00 | \$91.27 |
| | 06/01/2026 | \$60.85 | \$15.30 | \$16.40 | \$0.00 | \$92.55 |
| | 12/01/2026 | \$62.29 | \$15.30 | \$16.40 | \$0.00 | \$93.99 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| TRAILERS FOR EARTH MOVING EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i> | 06/01/2024 | \$40.82 | \$15.07 | \$18.67 | \$0.00 | \$74.56 |
| | 12/01/2024 | \$40.82 | \$15.07 | \$20.17 | \$0.00 | \$76.06 |
| | 01/01/2025 | \$40.82 | \$15.57 | \$20.17 | \$0.00 | \$76.56 |
| | 06/01/2025 | \$41.82 | \$15.57 | \$20.17 | \$0.00 | \$77.56 |
| | 12/01/2025 | \$41.82 | \$15.57 | \$21.78 | \$0.00 | \$79.17 |
| | 01/01/2026 | \$41.82 | \$16.17 | \$21.78 | \$0.00 | \$79.77 |
| | 06/01/2026 | \$42.82 | \$16.17 | \$21.78 | \$0.00 | \$80.77 |
| | 12/01/2026 | \$42.82 | \$16.17 | \$23.52 | \$0.00 | \$82.51 |
| 01/01/2027 | \$42.82 | \$16.77 | \$23.52 | \$0.00 | \$83.11 | |
| TUNNEL WORK - COMPRESSED AIR <i>LABORERS (COMPRESSED AIR)</i> | 06/01/2024 | \$57.71 | \$9.65 | \$19.00 | \$0.00 | \$86.36 |
| | 12/01/2024 | \$59.18 | \$9.65 | \$19.00 | \$0.00 | \$87.83 |
| | 06/01/2025 | \$60.68 | \$9.65 | \$19.00 | \$0.00 | \$89.33 |
| | 12/01/2025 | \$62.18 | \$9.65 | \$19.00 | \$0.00 | \$90.83 |
| | 06/01/2026 | \$63.73 | \$9.65 | \$19.00 | \$0.00 | \$92.38 |
| | 12/01/2026 | \$65.23 | \$9.65 | \$19.00 | \$0.00 | \$93.88 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE) <i>LABORERS (COMPRESSED AIR)</i> | 06/01/2024 | \$59.71 | \$9.65 | \$19.00 | \$0.00 | \$88.36 |
| | 12/01/2024 | \$61.18 | \$9.65 | \$19.00 | \$0.00 | \$89.83 |
| | 06/01/2025 | \$62.68 | \$9.65 | \$19.00 | \$0.00 | \$91.33 |
| | 12/01/2025 | \$64.18 | \$9.65 | \$19.00 | \$0.00 | \$92.83 |
| | 06/01/2026 | \$65.73 | \$9.65 | \$19.00 | \$0.00 | \$94.38 |
| | 12/01/2026 | \$67.23 | \$9.65 | \$19.00 | \$0.00 | \$95.88 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| TUNNEL WORK - FREE AIR <i>LABORERS (FREE AIR TUNNEL)</i> | 06/01/2024 | \$49.78 | \$9.65 | \$19.00 | \$0.00 | \$78.43 |
| | 12/01/2024 | \$51.25 | \$9.65 | \$19.00 | \$0.00 | \$79.90 |
| | 06/01/2025 | \$52.75 | \$9.65 | \$19.00 | \$0.00 | \$81.40 |
| | 12/01/2025 | \$54.25 | \$9.65 | \$19.00 | \$0.00 | \$82.90 |
| | 06/01/2026 | \$55.80 | \$9.65 | \$19.00 | \$0.00 | \$84.45 |
| | 12/01/2026 | \$57.30 | \$9.65 | \$19.00 | \$0.00 | \$85.95 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| TUNNEL WORK - FREE AIR (HAZ. WASTE) <i>LABORERS (FREE AIR TUNNEL)</i> | 06/01/2024 | \$51.78 | \$9.65 | \$19.00 | \$0.00 | \$80.43 |
| | 12/01/2024 | \$53.25 | \$9.65 | \$19.00 | \$0.00 | \$81.90 |
| | 06/01/2025 | \$54.75 | \$9.65 | \$19.00 | \$0.00 | \$83.40 |
| | 12/01/2025 | \$56.25 | \$9.65 | \$19.00 | \$0.00 | \$84.90 |
| | 06/01/2026 | \$57.80 | \$9.65 | \$19.00 | \$0.00 | \$86.45 |
| | 12/01/2026 | \$59.30 | \$9.65 | \$19.00 | \$0.00 | \$87.95 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |

| Classification | Effective Date | Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|-----------------------------------------------------------------------------------------------------|----------------|-----------|---------|---------|---------------------------|------------|
| VAC-HAUL <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i> | 06/01/2024 | \$40.24 | \$15.07 | \$18.67 | \$0.00 | \$73.98 |
| | 12/01/2024 | \$40.24 | \$15.07 | \$20.17 | \$0.00 | \$75.48 |
| | 01/01/2025 | \$40.24 | \$15.57 | \$20.17 | \$0.00 | \$75.98 |
| | 06/01/2025 | \$41.24 | \$15.57 | \$20.17 | \$0.00 | \$76.98 |
| | 12/01/2025 | \$41.24 | \$15.57 | \$21.78 | \$0.00 | \$78.59 |
| | 01/01/2026 | \$41.24 | \$16.17 | \$21.78 | \$0.00 | \$79.19 |
| | 06/01/2026 | \$42.24 | \$16.17 | \$21.78 | \$0.00 | \$80.19 |
| | 12/01/2026 | \$42.24 | \$16.17 | \$23.52 | \$0.00 | \$81.93 |
| | 01/01/2027 | \$42.24 | \$16.77 | \$23.52 | \$0.00 | \$82.53 |
| WAGON DRILL OPERATOR <i>LABORERS - ZONE 2</i> | 12/01/2023 | \$38.11 | \$9.65 | \$17.14 | \$0.00 | \$64.90 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| WAGON DRILL OPERATOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 2 (HEAVY & HIGHWAY)</i> | 06/01/2024 | \$38.78 | \$9.65 | \$17.80 | \$0.00 | \$66.23 |
| | 12/01/2024 | \$40.11 | \$9.65 | \$17.80 | \$0.00 | \$67.56 |
| | 06/01/2025 | \$41.50 | \$9.65 | \$17.80 | \$0.00 | \$68.95 |
| | 12/01/2025 | \$42.88 | \$9.65 | \$17.80 | \$0.00 | \$70.33 |
| | 06/01/2026 | \$44.32 | \$9.65 | \$17.80 | \$0.00 | \$71.77 |
| | 12/01/2026 | \$45.76 | \$9.65 | \$17.80 | \$0.00 | \$73.21 |
| For apprentice rates see "Apprentice- LABORER (Heavy and Highway)" | | | | | | |
| WASTE WATER PUMP OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i> | 06/01/2024 | \$56.03 | \$15.30 | \$16.40 | \$0.00 | \$87.73 |
| | 12/01/2024 | \$57.48 | \$15.30 | \$16.40 | \$0.00 | \$89.18 |
| | 06/01/2025 | \$58.78 | \$15.30 | \$16.40 | \$0.00 | \$90.48 |
| | 12/01/2025 | \$60.23 | \$15.30 | \$16.40 | \$0.00 | \$91.93 |
| | 06/01/2026 | \$61.53 | \$15.30 | \$16.40 | \$0.00 | \$93.23 |
| | 12/01/2026 | \$62.98 | \$15.30 | \$16.40 | \$0.00 | \$94.68 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| WATER METER INSTALLER <i>PLUMBERS & PIPEFITTERS LOCAL 51</i> | 08/28/2023 | \$51.99 | \$10.15 | \$19.95 | \$0.00 | \$82.09 |
| | 08/26/2024 | \$54.74 | \$10.15 | \$19.95 | \$0.00 | \$84.84 |
| | 08/25/2025 | \$57.49 | \$10.15 | \$19.95 | \$0.00 | \$87.59 |
| For apprentice rates see "Apprentice- PLUMBER/PIPEFITTER" or "PLUMBER/GASFITTER" | | | | | | |
| Outside Electrical - East | | | | | | |
| CABLE TECHNICIAN (Power Zone) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i> | 08/30/2020 | \$29.67 | \$9.25 | \$1.89 | \$0.00 | \$40.81 |
| For apprentice rates see "Apprentice- LINEMAN" | | | | | | |
| CABLEMAN (Underground Ducts & Cables) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i> | 08/30/2020 | \$42.03 | \$9.25 | \$10.27 | \$0.00 | \$61.55 |
| For apprentice rates see "Apprentice- LINEMAN" | | | | | | |
| DRIVER / GROUNDMAN CDL <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i> | 08/30/2020 | \$34.62 | \$9.25 | \$10.07 | \$0.00 | \$53.94 |
| For apprentice rates see "Apprentice- LINEMAN" | | | | | | |
| DRIVER / GROUNDMAN -Inexperienced (<2000 Hrs) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i> | 08/30/2020 | \$27.20 | \$9.25 | \$1.82 | \$0.00 | \$38.27 |
| For apprentice rates see "Apprentice- LINEMAN" | | | | | | |
| EQUIPMENT OPERATOR (Class A CDL) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i> | 08/30/2020 | \$42.03 | \$9.25 | \$14.35 | \$0.00 | \$65.63 |
| For apprentice rates see "Apprentice- LINEMAN" | | | | | | |
| EQUIPMENT OPERATOR (Class B CDL) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i> | 08/30/2020 | \$37.09 | \$9.25 | \$10.87 | \$0.00 | \$57.21 |
| For apprentice rates see "Apprentice- LINEMAN" | | | | | | |

| Classification | Effective Date | Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------|--------|---------|---------------------------|------------|
| GROUNDMAN <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i> For apprentice rates see "Apprentice- LINEMAN" | 08/30/2020 | \$27.20 | \$9.25 | \$1.82 | \$0.00 | \$38.27 |
| GROUNDMAN -Inexperienced (<2000 Hrs.) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i> For apprentice rates see "Apprentice- LINEMAN" | 08/30/2020 | \$22.25 | \$9.25 | \$1.82 | \$0.00 | \$33.32 |
| JOURNEYMAN LINEMAN <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i> | 08/30/2020 | \$49.45 | \$9.25 | \$17.48 | \$0.00 | \$76.18 |

Apprentice - LINEMAN (Outside Electrical) - East Local 104

Effective Date - 08/30/2020

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 60 | \$29.67 | \$9.25 | \$3.39 | \$0.00 | \$42.31 |
| 2 | 65 | \$32.14 | \$9.25 | \$3.46 | \$0.00 | \$44.85 |
| 3 | 70 | \$34.62 | \$9.25 | \$3.54 | \$0.00 | \$47.41 |
| 4 | 75 | \$37.09 | \$9.25 | \$5.11 | \$0.00 | \$51.45 |
| 5 | 80 | \$39.56 | \$9.25 | \$5.19 | \$0.00 | \$54.00 |
| 6 | 85 | \$42.03 | \$9.25 | \$5.26 | \$0.00 | \$56.54 |
| 7 | 90 | \$44.51 | \$9.25 | \$7.34 | \$0.00 | \$61.10 |

Notes:

Apprentice to Journeyworker Ratio:1:2

| | | | | | | |
|---------------------------------------------------------------------------------------------|------------|---------|--------|--------|--------|---------|
| TELEDATA CABLE SPLICER <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i> | 02/04/2019 | \$30.73 | \$4.70 | \$3.17 | \$0.00 | \$38.60 |
| TELEDATA LINEMAN/EQUIPMENT OPERATOR <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i> | 02/04/2019 | \$28.93 | \$4.70 | \$3.14 | \$0.00 | \$36.77 |
| TELEDATA WIREMAN/INSTALLER/TECHNICIAN <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i> | 02/04/2019 | \$28.93 | \$4.70 | \$3.14 | \$0.00 | \$36.77 |

Additional Apprentice Information:

Minimum wage rates for apprentices employed on public works projects are listed above as a percentage of the pre-determined hourly wage rate established by the Commissioner under the provisions of the M.G.L. c. 149, ss. 26-27D. Apprentice ratios are established by the Division of Apprenticeship Training pursuant to M.G.L. c. 23, ss. 11E-11L.

All apprentices must be registered with the Division of Apprenticeship Training in accordance with M.G.L. c. 23, ss. 11E-11L.

All steps are six months (1000 hours.)

Ratios are expressed in allowable number of apprentices to journeymen or fraction thereof, unless otherwise specified.

** Multiple ratios are listed in the comment field.

*** APP to JM; 1:1, 2:2, 2:3, 3:4, 4:4, 4:5, 4:6, 5:7, 6:7, 6:8, 6:9, 7:10, 8:10, 8:11, 8:12, 9:13, 10:13, 10:14, etc.

**** APP to JM; 1:1, 1:2, 2:3, 2:4, 3:5, 4:6, 4:7, 5:8, 6:9, 6:10, 7:11, 8:12, 8:13, 9:14, 10:15, 10:16, etc.

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STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT
SPECIFICATIONS
(EXECUTIVE ORDER 11246)
Revised April 9, 2019

1. As used in these specifications:
 - a. "Covered area" means the geographical area described in the solicitation from which this contract resulted:
 - b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority.
 - c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.
 - d. "Minority" includes:
 - (i) Black (all persons having origins in any of the black African racial groups not of Hispanic origin);
 - (ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
 - (iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
 - (iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).
2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$ 10,000 the provisions of the specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.
3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.
4. The Contractor shall implement the specific affirmative action standards provided in Paragraphs 7a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. The Contractor is expected to make substantially uniform progress toward its goals in each craft during the period specified.
5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.
7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:
 - a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.
 - b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.
 - c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.
 - d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
 - e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.
 - f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.
 - g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
 - h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.

- i. Direct its recruitment efforts both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
 - j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.
 - k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.
 - l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.
 - m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.
 - n. Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
 - o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.
 - p. Conduct a review, at least annually, of all supervisor's adherence to and performance under the Contractor's EEO policies and affirmative action obligations.
8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these Specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female work force participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.
9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).
10. The Contractor shall not use the goals and timetables of affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.
- 11 The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.
13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.
14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as many be required by the Government and keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.
15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

APPENDIX A

The following goals and timetables for female utilization shall be included in all Federal and federally assisted construction contracts and subcontracts in excess of \$ 10,000. The goals are applicable to the Contractor's aggregate on-site construction workforce whether or not part of that workforce is performing work on a Federal or federally-assisted construction contract or subcontract.

Area covered: Goal for Women apply nationwide

Goals and Timetables

Timetable

Goals (percent)

From Apr. 1, 1980 until further notice

6.9

APPENDIX B-80

Until further notice, the following goals for minority utilization in each construction craft and trade shall included in all Federal or federally assisted construction contracts and subcontracts in excess of \$ 10,000 to be performed in the respective geographical areas. The goals are applicable to each nonexempt contractor's total on- site construction workforce, regardless of whether or not part of that workforce is performing work on a Federal, federally assisted or nonfederally related project, contract or subcontract.

Construction contractors participating in an approved Hometown Plan (see 41 CFR 6-4.5) are required to comply with the goals of the Hometown Plan with regard to construction work they perform in the area covered by the Hometown Plan. With regard to all their other covered construction work, such contractors are required to comply with the applicable SMSA or EA goal contained in this Appendix B-80.

Economic Areas

| <u>STATE:</u> | <u>Goals (percent)</u> |
|--------------------------------------------------------------------------------|------------------------|
| MASSACHUSETTS | |
| 004 Boston MA: | |
| SMSA Counties: | |
| 1123 Boston-Lowell-Brockton-Lawrence-Haverhill, MA-NH | 4.0 |
| MA Essex, MA Middlesex, MA Norfolk, MA Plymouth, MA Suffolk, NH Rockingham. | |
| 5403 Fall River- New Bedford MA, Bristol | 1.6 |
| 9243 Worcester-Fitchburg-Leominster, MA | 1.6 |
| 6323 Springfield-Chicopee-Holyoke MA-CT MA Hampden, MA Hampshire | |
| Non-SMSA Counties: MA Barnstable, MA Dukes, MA Nantucket | 3.6 |
| Non-SMSA Counties: MA Franklin | 5.9 |

APPENDIX C

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the “contractor”) agrees as follows:

1. **Compliance with Regulations:** The contractor (hereinafter includes consultants) will comply with the Acts and Regulations relative to Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, Federal Highway Administration (FHWA), as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.
2. **Non-discrimination:** The contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, national origin (including limited English proficiency), age, sex, disability, or low-income status in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor will not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.
3. **Solicitations for Subcontractors, including Procurements of Materials and Equipment:** In all solicitations, either by competitive bidding, or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the contractor of the contractor’s obligations under this contract and the Acts and the Regulations relative to nondiscrimination on the grounds of race, color, national origin (including limited English proficiency), age, sex, disability, or low-income status.
4. **Information and Reports:** The contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto, and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Massachusetts Department of Transportation (MassDOT) or FHWA to be pertinent to ascertain compliance with such Acts, Regulations, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, the contractor will so certify to MassDOT or FHWA, as appropriate, and will set forth what efforts it has made to obtain the information.
5. **Sanctions for Noncompliance:** In the event of a contractor’s noncompliance with the Nondiscrimination provisions of this contract, MassDOT will impose such contract sanctions as it or FHWA may determine to be appropriate, including, but not limited to:
 - a. withholding payments to the contractor under the contract until the contractor complies; and/or
 - b. cancelling, terminating, or suspending a control, in whole or in part.
6. **Incorporation of Provisions:** The contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations, and directives issued pursuant thereto. The contractor will take action with respect to any subcontract or procurement as MassDOT or FHWA may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the contractor may request MassDOT to enter into any litigation to protect the interests of MassDOT. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

APPENDIX D

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the “contractor,” which includes consultants) agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

PERTINENT NON-DISCRIMINATION AUTHORITIES:

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d *et seq.*, 78 stat. 252) (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 U.S.C. § 4601) (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-Aid programs and projects)
- Federal-Aid Highway Act of 1973 (23 U.S.C. § 324 *et seq.*) (prohibits discrimination on the basis of sex)
- Section 504 of the Rehabilitation Act of 1973 (29 U.S.C. § 794 *et seq.*), as amended (prohibits discrimination on the basis of disability) and 49 CFR Part 27
- The Age Discrimination Act of 1975, as amended (42 U.S.C. § 6101 *et seq.*) (prohibits discrimination on the basis of age)
- Airport and Airway Improvement Act of 1982 (49 U.S.C. § 471, Section 47123), as amended (prohibits discrimination based on race, creed, color, national origin, or sex)
- The Civil Rights Restoration Act of 1987 (PL 100-209) (broadened the scope, coverage, and applicability of Title VI of the Civil Rights Act of 1964, the Age Discrimination Act of 1975, and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms “programs or activities” to include all of the programs or activities of Federal-Aid recipients, sub-recipients, and contractors, whether such programs or activities are Federally funded or not)
- Titles II and III of the Americans with Disabilities Act (42 U.S.C. §§ 12131-12189), as implemented by Department of Transportation regulations at 49 CFR parts 37 and 38 (prohibits discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities)
- The Federal Aviation Administration’s Non-Discrimination Statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex)
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (ensures discrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations)
- Executive Order 13166, Improving Access to Services for People with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100)
- Title IX of the Education Amendments Act of 1972, as amended (20 U.S.C. 1681 *et seq.*) (prohibits discrimination on the basis of sex in education programs or activities)

*** END OF DOCUMENT ***

DOCUMENT 00880

Revised January 12, 2022



DEPARTMENT OF LABOR

Employment Standards Administration

MINIMUM WAGES FOR FEDERAL AND FEDERALLY ASSISTED CONTRACTS

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

| Modification Number | Publication Date |
|---------------------|------------------|
| 0 | 01/05/2024 |
| 1 | 01/19/2024 |
| 2 | 03/22/2024 |
| 3 | 05/31/2024 |

CARP0336-015 03/01/2024

| | Rates | Fringes |
|----------------|----------|---------|
| CARPENTER..... | \$ 40.96 | 27.39 |

ENGI0098-009 12/01/2016

| | Rates | Fringes |
|------------------------------|----------|---------|
| POWER EQUIPMENT OPERATOR | | |
| (1) | | |
| Backhoe/Excavator/Trackhoe.. | \$ 33.68 | 23.96+A |
| (1) Loader..... | \$ 33.68 | 23.96+A |
| (4) Roller..... | \$ 32.54 | 23.96+A |

A. Paid Holidays: New year's Day, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Columbus Day, Veterans Day, Thanksgiving Day and Christmas Day

* IRON0007-030 03/16/2024

| | Rates | Fringes |
|------------------------------|----------|---------|
| IRONWORKER, REINFORCING..... | \$ 39.51 | 32.98 |

IRON0037-004 09/16/2023

| | Rates | Fringes |
|-----------------------------|----------|---------|
| IRONWORKER, STRUCTURAL..... | \$ 40.00 | 32.58 |

LABO0596-004 12/01/2021

| | Rates | Fringes |
|-----------------------------------------------------------------------------------|----------|---------|
| LABORER (Asphalt, Includes Raker, Shoveler, Spreader, and Distributor)..... | \$ 32.75 | 23.96 |

SUMA2014-004 01/11/2017

| | Rates | Fringes |
|---------------------------------|----------|---------|
| LABORER: Common or General..... | \$ 30.80 | 4.49 |
| OPERATOR: Crane..... | \$ 40.83 | 23.49 |

WELDERS - Receive rate prescribed for craft performing
operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

State Adopted Rate Identifiers

Classifications listed under the ""SA"" identifier indicate that the prevailing wage rate set by a state (or local) government was adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 01/03/2024 reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION"

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DOCUMENT A00801

SPECIAL PROVISIONS

NANTUCKET

**Federal Aid Project Number: HIS(VUS)-003S(749)X
Intersection Improvements at Milestone Road and Polpis Road
and Extension of 'Sconset Bikepath**

Labor participation goals for this Project shall be 15.3% for minorities and 6.9% for women for each job category. The goals are applicable to both Contractor's and Subcontractor's on-site construction workforce. Refer to Document 00820 for details.

SCOPE OF WORK

All work under this Contract shall be done in conformance with the *2024 Standard Specifications for Highways and Bridges*, the *Supplemental Specifications* contained in this book, the *2017 Construction Standard Details*, the *Traffic Management Plans and Detail Drawings*, *MassDOT Work Zone Safety Temporary Traffic Control*, the *1990 Standard Drawings for Signs and Supports*; the *2015 Overhead Signal Structure and Foundation Standard Drawings*, the *2009 Manual on Uniform Traffic Control Devices (MUTCD) with Revisions 1, 2, and 3* and the *November 2022 Massachusetts Amendments to the MUTCD*; the *1968 Standard Drawings for Traffic Signals and Highway Lighting*; *The American Standard for Nursery Stock*; the Plans and these Special Provisions.

The work under the Contract consists of the reconstruction of an intersection and the construction of an off roadway HMA shared use path separated with a grass strip. The work will involve clearing and grubbing, excavation, full depth construction, full depth widening less than 4', HMA removal, pavement standard milling and paving, hot mix asphalt driveways, hot mix asphalt shared use path, cement concrete pedestrian curb ramps; reconstructing drainage systems, including a sediment forebay and infiltration basin, tree trimming, landscaping, loam and seeding, traffic signing and pavement markings, traffic control management and other street improvements.

All work shall be performed within, and accessed by, existing State, City or Town roadway layouts. No rights to enter on, or occupy, private property have been acquired for this project.

SUBSECTION 7.05 INSURANCE REQUIREMENTS

B. Public Liability Insurance

The insurance requirements set forth in this subsection are in addition to the requirements of the Standard Specifications and supersede all other requirements.

Paragraphs 1 and 2

The Massachusetts Department of Transportation and applicable railroads shall be named as additional insureds.

CONTRACTOR QUESTIONS AND ADDENDUM ACKNOWLEDGEMENTS

Prospective bidders are required to submit all questions to the Construction Contracts Engineer by 3:00 P.M. on the Tuesday of the previous week before the scheduled bid opening date. Any questions received after this time will not be considered for review by the Department.

Contractors should email questions and addendum acknowledgements to the following email address massdotSpecifications@dot.state.ma.us The MassDOT project file number and municipality is to be placed in the subject line.

WORK SCHEDULE

Work on this Project is restricted to a normal eight (8) hour day, five (5) day week, with the prime Contractor and all subcontractors working on the same shift. In general, the Contractor shall work between the hours of 7 AM – 3:30 PM. The Contractor shall not perform work or accept deliveries that will interfere with through traffic (lane shifts, lane closures, trenching, etc.) during peak hourly volumes, which occur between the hours of 7:00 AM to 9:00 AM and 3:00 PM to 6:00 PM.

No work will be performed between Memorial Day and Labor Day, without prior written approval of the District Highway Director and the Town.

BUS ROUTES

The project has several bus routes running thru the work zone. The Contractor is responsible to coordinate his work with the Nantucket Regional Transit Authority (NRTA). Such coordination shall include, but is not limited to, providing the NRTA with schedules of lane closures or road closures two months in advance of operations to allow time to notify passengers and reschedule routes as needed.

The Contractor shall notify the NRTA of the Pre-Construction meeting time and date to allow the NRTA to attend.

HOLIDAY WORK RESTRICTIONS

(Supplementing Subsection 7.09)

The District Highway Director (DHD) may authorize work to continue during these specified time periods if it is determined by the District that the work will not negatively impact the traveling public. DHD may allow work in those areas on a case by case basis and where work is behind barrier and will not impact traffic

Below are the holiday work restrictions:

New Years Day (Federal Holiday)

No work on major arterial roadways from 5:00 AM on the day before until the normal start of business on the next subsequent business day. No work on local roadways on the holiday without permission by the DHD and the local police chief.

Martin Luther King's Birthday (Federal Holiday)

No work restrictions due to traffic concerns, however work on local roadways requires permission by the DHD and local police chief.

President's Day (Federal Holiday)

No work restrictions due to traffic concerns, however work on local roadways requires permission by the DHD and local police chief.

Evacuation Day (Suffolk County State Holiday)

No work restrictions due to traffic concerns.

Patriot's Day (State Holiday)

Work restrictions will be in place for Districts 3 and 6 along the entire Boston Marathon route and any other locations that the DHD in those districts determine are warranted so as to not to impact the marathon. All other districts work restrictions will be as per DHD.

Mother's Day

No work on Western Turnpike and Metropolitan Highway System from 5:00 AM on the Friday before, until the normal start of business on the following day.

Memorial Day (Federal Holiday)

No work on major arterial roadways from 5:00 AM on the Friday before, until the normal start of business on the following day.

Bunker Hill Day (Suffolk County State Holiday)

No work restrictions due to traffic concerns.

HOLIDAY WORK RESTRICTIONS (Continued)

Juneteenth

No work restrictions due to traffic concerns, however work on local roadways requires permission by the DHD and local police chief.

Independence Day (Federal Holiday)

No work on major arterial roadways from 5:00 AM on the day before until the normal start of business on the next subsequent business day. No work on local roadways on the holiday without permission by the DHD and the local police chief.

Labor Day (Federal Holiday)

No work on major arterial roadways from 5:00 AM on the Friday before, until the normal start of business on the following day.

Columbus Day (Federal Holiday)

No work on major arterials from 5:00 AM on the Friday before, until the normal start of business on the following day

Veterans' Day (Federal Holiday)

No work restrictions due to traffic concerns.

Thanksgiving Day (Federal Holiday)

No work on major arterials from 5:00 AM two days before until the normal start of business on the following Monday.

Christmas Day (Federal Holiday)

No work on major arterial roadways from 5:00 AM on the day before until the normal start of business on the next subsequent business day.

SUBSECTION 8.02 SCHEDULE OF OPERATIONS

Replace this subsection with the following:

An integrated cost and schedule controls program shall be implemented by the Contractor to track and document the progress of the Work from Notice to Proceed (NTP) through the Contractor Field Completion (CFC) Milestone. The Contractor's schedules will be used by the Engineer to monitor project progress, plan the level-of-effort required by the Department's work force and consultants and as a critical decision-making tool. Accordingly, the Contractor shall ensure that it complies fully with the requirements specified herein and that its schedules are both accurate and updated as required by the specification throughout the life of the project. Detailed requirements are provided in Division II, Section 722 Construction Scheduling.

SUBSECTION 8.14 UTILITY COORDINATION, DOCUMENTATION, AND MONITORING RESPONSIBILITIES

A. GENERAL

In accordance with the provisions of Section 8.00 Prosecution and Progress, utility coordination is a critical aspect to this Contract. This section defines the responsibility of the Contractor and MassDOT, with regard to the initial utility relocation plan and changes that occur as the prosecution of the Work progresses. The Engineer, with assistance from the Contractor shall coordinate with Utility companies that are impacted by the Contractor's operations. To support this effort, the Contractor shall provide routine and accurate schedule updates, provide notification of delays, and provide documentation of the steps taken to resolve any conflicts for the temporary and/or permanent relocations of the impacted utilities. The Contractor shall provide copies to the Engineer of the Contractor communication with the Utility companies, including but not limited to:

- Providing advanced notice, for all utility-related meetings initiated by the Contractor.
- Providing meeting minutes for all utility-related meetings that the Contractor attends.
- Providing all test pit records.
- Request for Early Utility work requirements of this section (see below).
- Notification letters for any proposed changes to Utility start dates and/or sequencing.
- Written notification to the Engineer of all apparent utility delays within seven (7) Calendar Days after a recognized delay to actual work in the field – either caused by a Utility or the Contractor.
- Any communication, initiated by the Contractor, associated with additional Right-of-Way needs in support of utility work.
- Submission of completed Utility Completion Forms.

B. PROJECT UTILITY COORDINATION (PUC) FORM

The utility schedule and sequence information provided in the Project Utility Coordination Form (if applicable) is the best available information at the time of the bid and has been considered in setting the contract duration. The Contractor shall use all of this information in developing the bid price and the Baseline Schedule Submission, inclusive of the individual utility durations sequencing requirements, and any work that has been noted as potentially concurrent utility installations.

C. INITIATION OF UTILITY WORK

The Engineer will issue all initial notice-to-proceed dates to each Utility company based on either the:

- 1) Contractor's accepted Baseline Schedule
- 2) An approved Early Utility Request in the form of an Early Utility sub-net schedule (in accordance with the requirements of this Subsection)
- 3) An approved Proposal Schedule

C.1 - BASELINE SCHEDULE – UTILITY BASIS

The Contractor shall provide a Baseline Schedule submission in accordance with the requirements of Subsection 8.02 and inclusive of all of the information provided in the PUC Form that has been issued in the Contract documents. This is to include the utility durations, sequencing of work, allowable concurrent work, and all applicable considerations that have been depicted on the PUC Form.

SUBSECTION 8.14 (Continued)

C.2 – EARLY UTILITY REQUEST – (aka SUBNET SCHEDULE) PRIOR TO THE BASELINE
All early utility work is defined as any anticipated/required utility relocations that need to occur prior to the Baseline Schedule acceptance. In all cases of proposed early utility relocation, the Contractor shall present all known information at the pre-construction conference in the form of a ‘sub-net’ schedule showing when each early utility activity needs to be issued a notice-to-proceed. The Contractor shall provide advance notification of this intent to request early utility work in writing at or prior to the Pre-Construction meeting. Prior to officially requesting approval for early utility work, the Contractor shall also coordinate with MassDOT and all utility companies (private, state or municipal) which may be impacted by the Contract. If this request is acceptable to the Utilities and to MassDOT, the Engineer will issue a notice-to-proceed to the affected Utilities, based on these accepted dates.

C.3 – PROPOSAL SCHEDULE - CHANGES TO THE PUC FORM

If the Contractor intends to submit a schedule (in accordance with MassDOT Standard Specifications, Division I, Subsection 8.02) that contains durations or sequencing that vary from those provided in the Project Utility Coordination (PUC) Form, the Contractor must submit this as an intended change, in the form of a Proposal Schedule and in accordance with MassDOT Standard Specifications, Division I, Subsection 8.02. These proposed changes are subject to the approval of the Engineer and the impacted utilities, in the form of this Proposal Schedule and a proposed revision to the PUC form. The Contractor shall not proceed with any changes of this type without written authorization from the Engineer, that references the approved Proposal Schedule and PUC form changes. The submission of the Baseline Schedule should not include any of these types of proposed utility changes and should not delay the submission of the Baseline Schedule. As a prerequisite to the Proposal Schedule submission, and in advance of the utility notification(s) period, the Contractor shall coordinate the proposed utility changes with the Engineer and the utility companies, to develop a mutually agreed upon schedule, prior to the start of construction.

D. UTILITY DELAYS

The Contractor shall notify the Engineer upon becoming aware that a Utility owner is not advancing the work in accordance with the approved utility schedule. Such notice shall be provided to the Engineer no later than seven (7) calendar days after the occurrence of the event that the Contractor believes to be a utility delay. After such notice, the Engineer and the Contractor shall continue to diligently seek the Utility Owner’s cooperation in performing their scope of Work.

In order to demonstrate that a critical path delay has been caused by a third-party Utility, the Contractor must demonstrate, through the requirements of the monthly Progress Schedule submissions and the supporting contract records associated with Subsection 8.02, 8.10 and 8.14, that the delays were beyond the control of the Contractor.

SUBSECTION 8.14 (Continued)

All documentation provided in this section is subject to the review and verification of the Engineer and, if required, the Utility Owner. In accordance with MassDOT Specifications, Division I, Subsection 8.10, a Time Extension will be granted for a delay caused by a Utility, only if the actual duration of the utility work is in excess of that shown on the Project Utility Coordination Form, and only if;

- 1) proper Notification of Delay was provided to MassDOT in accordance with the time requirements that are specified in this Section
- 2) the utility delay is a critical path impact to the Baseline Schedule (or most recently approved Progress Schedule)

E. LOCATION OF UTILITIES

The locations of existing utilities are shown on the Contract drawings as an approximation only. The Contractor shall perform a pre-construction utility survey, including any required test pits, to determine the location of all known utilities no later than thirty (30) calendar days before commencing physical site work in the affected area.

F. POST UTILITY SURVEY – NOTIFICATION

Following completion of a utility survey of existing locations, the Contractor will be responsible to notify the Engineer of any known conflicts associated with the actual location of utilities prior to the start of the work. The Engineer and the Contractor will coordinate with any utility whose assets are to be affected by the Work of this Contract. A partial list of utility contact information is provided in the Project Utility Coordination Form.

G. MEETINGS AND COOPERATION WITH UTILITY OWNERS

The Contractor shall notify the Engineer in advance of any meeting they initiate with a Utility Owner's representative to allow MassDOT to participate in the meeting if needed.

Prior to the Pre-Construction Meeting, the Contractor should meet with all Utility Owners who will be required to perform utility relocations within the first 6 months of the project, to update the affected utilities of the Project Utility Coordination Form and all other applicable Contract requirements that impact the Utilities. The Contractor shall copy the Engineer on any correspondence between the Utility Owner and the Contractor.

H. FORCE ACCOUNT / UTILITY MONITORING REQUIREMENTS

The Engineer will be responsible for recording daily Utility work force reports. The start, suspension, re-start, and completion dates of each of the Utilities, within each phase of the utility relocation work, will be monitored and agreed to by the Engineer and the Contractor as the work progresses.

I. ACCESS AND INSPECTION

The Contractor shall be responsible for allowing Utility owners access to their own utilities to perform the relocations and/or inspections. The Contractor shall schedule their work accordingly so as not to delay or prevent each utility from maintaining their relocation schedule.

COMPLIANCE WITH THE NATIONAL DEFENSE AUTHORIZATION ACT

(Supplementing Subsection 7.01)

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

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

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

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

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

BIDDERS LIST

Pursuant to the provisions of 49 CFR Part 26.11 all official bidders will be required to report the names, addresses and telephone numbers of all firms that submitted bids or quotes in connection with this project. Failure to comply with a written request for this information within 15 business days may result in a recommendation to the Prequalification Committee that prequalification status be suspended until the information is received.

The Department will survey all firms that have submitted bids or quotes during the previous year prior to setting the annual goal and shall request that each firm report its age and gross receipts for the year.

BUILD AMERICA BUY AMERICA PREFERENCE

On Federally-aid projects the Buy America (23.CFR § 635.410) and Build America, Buy America Act (Pub. L. No. 117-58, §§ 70901-52). requires the following,

- (1) all iron and steel used in the project are produced in the United States--this means all manufacturing processes, from the initial melting stage through the application of coatings, must occur in the United States. Foreign steel and iron can be used if the cost of the materials does not exceed 0.1% of the total Contract cost or \$2,500, whichever is greater. The action of applying a coating to a covered material (i.e., steel and iron) is deemed a manufacturing process subject to Buy America. Coating includes epoxy coating, galvanizing, painting and any other coating that protects or enhances the value of a material subject to requirements of Build America, Buy America. Steel used for temporary support of excavation, including H piles, soldier piles, and sheeting when the steel is required to be left in place is subject to requirements of Build America, Buy America. Temporary steel, shall remain in place when it falls within the influence zone of the soil supporting any structure or railroad tracks.
- (2) all manufactured products used in the project are produced in the United States—this means the manufactured product was manufactured in the United States; and the cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55 percent of the total cost of all components of the manufactured product, unless another standard for determining the minimum amount of domestic content of the manufactured product has been established under applicable law or regulation; and
- (3) all construction materials are manufactured in the United States—this means that all manufacturing processes for the construction material occurred in the United States. “Construction materials” includes an article, material, or supply—other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives—that is or consists primarily of:
 - non-ferrous metals,
 - plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables),
 - glass (including optic glass),
 - lumber; or
 - drywall.

BUILD AMERICA BUY AMERICA PREFERENCE (Continued)

The Buy America preference only applies to articles, materials, and supplies that are consumed in, incorporated into, or affixed to an infrastructure project. As such, it does not apply to tools, equipment, and supplies, such as temporary scaffolding, brought to the construction site and removed at or before the completion of the infrastructure project. Nor does a Buy America preference apply to equipment and furnishings, such as movable chairs, desks, and portable computer equipment, that are used at or within the finished infrastructure project but are not an integral part of the structure or permanently affixed to the infrastructure project.

NOTE: The requirements for manufactured products indicated in paragraph (2) above are not in effect for this Contract.

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.

CLEARING RESTRICTIONS

Vegetation clearing, especially Pitch Pine, shall be done between the first frost (December / January) through April 1st due to the risk of Southern Pine Beetle and Black Turpentine Beetle infestations in the area. The Contractor shall coordinate the timing of clearing operations with the Nantucket DPW and the Town Arborist, Dale Gary at (774) 229-7527.

NOTICE TO OWNERS OF UTILITIES

(Supplementing Subsection 7.13)

Written notice shall be given by the Contractor to all public service corporations or municipal and State officials owning or having charge of publicly or privately owned utilities of his intention to commence operations affecting such utilities at least one week in advance of the commencement of such operations. The Contractor shall, at the same time, file a copy of such notice with the Engineer.

The following are the names of owners of the principal utilities affected as well as other major contacts, but completeness of this list is not guaranteed:

Electric Company

National Grid Electric
40 Sylvan Rd
Contact: Noah Skole

Waltham, MA
noah.skole@nationalgrid.com

Gas

NONE

Telephone Company

Verizon
385 Myles Standish Blvd.
Contact: Karen Mealey

Taunton, MA 02780
(774) 409-3160

Water

Wannacomet Water Co. (Municipal)
1 Milestone Rd
Contact: Mark Willett

Nantucket, MA 02554
(508) 228-0022

Sewer

Nantucket DPW
188 Madaket Rd
Contact: Andrew Patnode

Nantucket, MA 02554
(508) 228-7200

Cable

Comcast Cable Corporation
PO Box 6505, 5 Omni Way
Contact: Wendy Brown

Chelmsford, MA 01824
(978) 848-5163

Crown Castle

80 Center St
Contact: Mark Bonanno

Boxborough, MA 01719
(508) 616-7818

Fire Alarm

Nantucket Fire Alarm
131 Pleasant St
Contact: Robert Bates

Nantucket, MA 02554
(508) 228-7244

NOTICE TO OWNERS OF UTILITIES (Continued)

Department of Public Works

Nantucket DPW

188 Madaket Rd

Contact: Andrew Patnode

Nantucket, MA 02554

(508) 228-7200

Other

MCI-Verizon Business

P.O. Box 600

Contact: Stephen Parretti

Charlton, MA 01507

(508) 248-1305

Verizon Wireless Small Cell

20 Alexander Drive

Contact: Liz Glidden

Wallingford, CT 06492

Elizabeth.glidden@verizonwireless.com

Nantucket Regional Transit Authority

20-R S. Water St

Contact:

Nantucket, MA 02554

(508) 325-9571

Additionally, utility contact information is available on the MassDOT website:

<https://hwy.massdot.state.ma.us/webapps/utilities/select.asp>

Select District 5, then select the Town of Nantucket, and then select the required utility.

Town officials are shown at the website [City and Town Officials Directory](#) click on Nantucket on the left of the webpage and locate the official to contact.

NATIONAL GRID EMERGENCY TELEPHONE NUMBERS

ELECTRIC:

Outage/ Emergency: 1-800-465-1212

New Service: 1-800-375-7405

Customer Support: 1-800-322-3223

NORTHERN LONG-EARED BAT PROTECTION

The U.S. Fish and Wildlife Service (USFWS) has listed the northern long-eared bat (NLEB) as threatened under the Endangered Species Act (ESA) and the following requirements exist to protect the bat and its habitat. This project has been consulted with the USFWS through the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), and Federal Transit Administration (FTA) Programmatic Biological Opinion for Transportation Projects in the Range of the Indiana Bat and Northern Long-Eared Bat revised February 5, 2018.

On August 4-8th, 2023, VHB, on behalf of MassDOT Highway Division Environmental Services, conducted a northern long-eared bat summer presence/absence survey using acoustic detection methods, in accordance with the 2023 survey guidelines. The survey did not detect northern long-eared bat, and as stated within the survey guidelines, the survey is valid for five years. Due to the 5-year validity of the negative presence/absence survey, it is recommended that the contractor conduct all activities that could result in stressors to the bats such as tree removal/trimming, bridge and/or structure removal/maintenance, lighting, or use of percussive, by August 4th, 2025. If additional stressor producing work is proposed by the Contractor past this date, additional review is required by the MassDOT Highway Division's Environmental Services Section, and additional review and restrictions may be required by the USFWS.

Due to the negative survey results, the project is eligible for a May Affect, Not Likely to Adversely Affect (NLAA) determination, in accordance with the FHWA, FRA and FTA Range-wide Programmatic Consultation for Indiana Bat and Northern Long-eared Bat. On behalf of FHWA, the lead federal agency for Section 7 consultation, MassDOT submitted a Programmatic Consultation for Transportation Projects affecting NLEB or Indiana Bat to the USFWS through the Information for Planning and Consultation (IPaC) webpage and generated a NLAA documentation letter (see Document A00855 included herein). Therefore, the project has completed Section 7 consultation through the Endangered Species Act.

In order to protect female northern long-eared bats and their young during the maternity roosting season, **no tree cutting shall be conducted from April 1 to August 31**. If additional cutting is proposed by the Contractor that is outside the scope of this contract, additional review is required by the MassDOT Highway Division's Environmental Services Section, and additional review and restrictions may be required by the USFWS. The Contractor shall ensure all personnel working in on the project site are aware of all environmental commitments related to NLEB, including the TOY restriction. If this restriction needs to be waived at any location(s) the Resident Engineer shall send a locus map of the proposed work to MassDOT Highway Division's Environmental Services Section for review and a determination if the restriction can be waived.

The Contractor shall ensure all personnel working in on the project site are aware of all environmental commitments related to NLEB, including all applicable AMMs. NLEB Bat information (<https://www.fws.gov/midwest/endangered/mammals/nleb/>) shall be made available to all personnel.

ENVIRONMENTAL PERMITTING

Environmental permits have not been obtained, as no work (either temporary or permanent) is proposed to occur in water or wetland resource areas. 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 District 5 Highway Director and Resident Engineer 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 District 5 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.

DRAINAGE STRUCTURES

Where new pipe is shown on the drawings to be connected into an existing drainage structure to remain, the existing structure shall be first cleaned to remove all mud, debris, and other material. The existing structure wall shall be carefully and neatly cut to provide the minimum size opening required for the insertion of the new pipe. The proposed pipe end shall be set or cut off flush with the inside face of the existing structure wall and the remaining space around the pipe completely filled with red brick set in cement grout for the full thickness of the structure wall. Existing shaped inverts shall be reconstructed as necessary to provide a smooth and uniform flow channel from the new pipe through the existing structure.

Where new structures shown on the plans are to connect to existing pipes to remain, the remaining pipe shall be cleaned from the new structure to the next structure downstream. Test pits to locate and survey the existing pipe shall be performed prior to ordering structure. The existing pipe or pipes shall be carefully cut or removed to allow the installation of the new drainage system. The existing pipe end shall be cut off flush with the inside face of the proposed structure wall and the remaining space around the pipe completely filled with red brick set in cement grout for the full thickness of the structure wall.

No separate payment will be made for the cost of connecting existing pipes to new structures, but all costs in connection therewith shall be included in the unit price bid for the various structure items. If new pipe or pipe section are required to extend the existing line to and through the new structure wall, the new pipe will be paid for under the unit price per foot established under that item.

No separate payment will be made for the cost of connecting new pipes into existing structures and necessary alterations of existing structures, but all costs in connection therewith shall be included in the unit prices bid for the various pipe items.

No separate payment will be made for the cost of connecting new pipes to existing pipes, but all costs in connection therewith shall be included in the unit prices bid for the various pipe items.

QUALITY CONTROL FOR INFILTRATION BASIN CONSTRUCTION

To ensure the highest standards of construction for the infiltration basin, a comprehensive quality control protocol will be implemented. Prior to final payment, the infiltration basin will undergo a thorough inspection and approval process conducted by the Engineer. This inspection will confirm that the basin has been constructed in strict accordance with the approved Plans. Furthermore, it will assess the functionality of the infiltration basin, ensuring that it operates as intended and is free from any piping issues. Verify that side slope stabilization has been implemented to prevent erosion. In addition to these inspections, the Contractor shall provide a one-year warranty for the infiltration basin to guarantee its continued optimal performance for a full year after the project construction completion date.

EQUIVALENT SINGLE AXLE LOADS (ESALS)

The estimated traffic level to be used for SUPERPAVE HMA mixture designs for this contract, expressed in Equivalent Single Axle Loads (ESALs) for the design travel lane over a 20-year period, is 2.8 million 18-kip (80-kn) ESALs.

DEWATERING

Any dewatering performed during excavation of trenches for pipes, culverts and/or manholes shall have the water treated to remove sediment prior to discharge. The cost for sediment removal shall be incidental to the item for which the work is performed.

CONTAMINATED SOIL

Soil to be removed from the project area shall not be assumed to be uncontaminated and must be evaluated prior to off-site management for potential contamination with hazardous materials. No soil may be disposed of off-site without proper assessment by the Contractor and approval from the Resident Engineer (RE), District Environmental Engineer (DEE), or the project designer.

SOIL STOCKPILING DIRECTIVE P-22-001

Any stockpiling of soil must be performed in compliance with Policy Directive P-22-001 (included herein as Document A00875), Off-Site Stockpiling of Soil from MassDOT Construction Projects. This directive limits the allowable locations for off-site stockpiling of soil generated during MassDOT projects and includes various requirements that must be satisfied by the contractor prior to off-site stockpiling.

SECTION 722 CONSTRUCTION SCHEDULING

DESCRIPTION

722.20 General

The Contractor's approach to prosecution of the Work shall be disclosed to the Department by submission of a Critical Path Method (CPM) schedule and a cost/resource loaded Construction Schedule when required in this Subsection. These requirements are in addition to, and not in limitation of, requirements imposed in other sections.

The requirements for scheduling submissions are established based on the Project Value at the time of the bid and are designated as Type A, B, C or D. The definitions of these Schedule Requirement Types are summarized below. Complete descriptions of all detailed requirements are established elsewhere in this specification.

Type A – for all Site-Specific Contracts with a Project Value over \$20 Million

- Schedule Planning Session
- Baseline CPM Schedule
- Monthly Update CPM Schedule
- Short-term Construction Schedule
- Contract Schedule Update Meeting
- Resource-Loading
- Resources Graphic Reporting
- Cash Flow Projections from the CPM
- Cash Flow Charts
- Cost-loaded CPM
- Contractor-furnished CPM software, computer and training

Type B – for all Site-Specific Contracts with a Project Value between \$10 Million and \$20 Million

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

SECTION 722 (Continued)

Type C – for all Site-Specific Contracts with a Project Value between \$3 Million and \$10 Million

- Schedule Planning Session
- Baseline CPM Schedule
- Monthly Update CPM Schedule
- Short-term Construction Schedule
- Contract Schedule Update Meeting
- Monthly Projected Spending Report (PSR)
- Contractor-furnished CPM software, computer and training

Type D - for all contracts with a Project Value less than \$3 Million; various locations contracts of any dollar amount; contracts with durations less than one-hundred and eighty (180) Calendar Days; and other contracts as determined by the Engineer.

- Bar chart schedule updated monthly or at the request of the Engineer (See Section 722.62.B - Bar Charts.)
- Monthly Projected Spending Report (PSR) (See Section 722.62.F - Projected Spending Reports.)

MATERIALS, EQUIPMENT, PERSONNEL**722.40 General****A. Software Requirements** (Types A, B and C)

The Contractor shall use Primavera P6 computer scheduling software.

In addition to the requirements of Section 740 – Engineer’s Field Office and Equipment, the Contractor shall provide to the Department one (1) copy of the scheduling software, one (1) software license and one (1) computer capable of running the scheduling software for the duration of the Contract. This computer and software shall be installed in the Engineer’s Field Office within twenty-eight (28) Calendar Days after Notice to Proceed. The computer and software shall be maintained and serviced as recommended by the computer manufacturer and/or as required by the Engineer during the duration of the Contract at no additional cost to the Department. The Contractor shall provide professional training in the basic use of the software for up to eight (8) Department employees. The trainer shall be approved by the Engineer. This training shall be provided within twenty-eight (28) Calendar Days after Notice to Proceed.

B. Scheduler Requirements

For all schedule types, if the Contractor plans to use outside scheduling services, the scheduler shall be approved as a subcontractor by the Engineer.

For Type A, B and C Schedules the name of the Contractor’s Project Scheduler together with his/her qualifications shall be submitted to the Department for approval by the Engineer within seven (7) Calendar Days after NTP. The Project Scheduler shall have a minimum of five [5] years of project CPM scheduling experience, three [3] years of which shall be on projects of similar scope and value as the project for which the Project Scheduler is being proposed. References shall be provided from past projects that can attest to the capabilities of the Project Scheduler.

SECTION 722 (Continued)**CONSTRUCTION METHODS****722.60 General****A. Schedule Planning Session**

(Types A, B and C)

The Contractor shall conduct a schedule planning session within seven (7) Calendar Days after the Contractor receives the NTP and prior to submission of the Baseline Schedule. This session will be attended by the Department and its consultants. During this session, the Contractor shall present its planned approach to the project including, but not limited to:

1. the Work to be performed by the Contractor and its subcontractors;
2. the planned construction sequence and phasing; planned crew sizes;
3. summary of equipment types, sizes, and numbers to be used for each work activity;
4. all early work related to third party utilities;
5. identification of the most critical submittals and projected submission timelines;
6. estimated durations of major work activities;
7. the anticipated Critical Path of the project and a summary of the activities on that Critical Path;
8. a summary of the most difficult schedule challenges the Contractor is anticipating and how it plans to manage and control those challenges;
9. a summary of the anticipated quarterly cash flow over the life of the project.

This will be an interactive session and the Contractor shall answer all questions that the Department and its consultants may have. The Contractor shall provide a minimum of five (5) copies of a written summary of the information presented and discussed during the session to the Engineer. The Contractor's Baseline Schedule and accompanying Schedule Narrative shall incorporate the information discussed at this Schedule Planning Session.

B. Schedule Reviews by the Department (All Types)**1. Baseline Schedule Reviews**

The Engineer will respond to the Baseline Schedule Submission within thirty (30) Calendar Days of receipt providing comments, questions and/or disposition that either accepts the schedule or requires revision and resubmittal. Baseline Schedules shall be resubmitted within fifteen (15) Calendar Days after receipt of the Engineer's comments.

2. Contract Progress Schedule / Monthly Update Reviews

The Engineer will respond to each submittal within twenty one (21) Calendar Days. Schedules shall be resubmitted by the Contractor within five (5) Calendar Days after receipt of the Engineer's comments.

Failure to submit schedules as and when required could result in the withholding of full or partial pay estimate payments by the Engineer.

SECTION 722 (Continued)**722.61 Schedule Content and Preparation Requirements**
(Types A, B and C unless otherwise noted)

Each Contract Progress Schedule shall fully conform to these requirements.

A. LOGIC

The schedules shall divide the Work into activities with appropriate logic ties to show:

1. conformance with the requirements of this Section and Division I, Subsection 8.02 - Schedule of Operations
2. the Contractor's overall approach to the planning, scheduling and execution of the Work
3. conformance with any additional sequences of Work required by the Contract Documents, including, but not limited to, Subsection 8.03 - Prosecution of Work and Subsection 8.06 – Limitations of Operations.

B. ACTIVITIES

The schedules shall clearly define the progression of the Work from NTP to Contractor Field Completion (CFC) by using separate activities for each of the following items:

1. NTP
2. Each component of the Work defined by specific activities
3. Detailed activities to satisfy permit requirements
4. Procurement of fabricated materials and equipment with long lead times, including time for review and approval of submittals required before purchasing
5. The preparation and submission of shop drawings, procedures and other required submittals, with a planned duration that is to be demonstrated to the Engineer as reasonable
6. The review and return of shop drawings, procedures and other required submittals, approved or with comments, the duration of which shall be thirty (30) Calendar Days, unless otherwise specified or as approved by the Engineer
7. Interfaces with adjacent work, utility companies, other public agencies, sensitive abutters, and/or any other third party work affecting the Contract
8. The Critical Path, clearly defined and organized
9. Float shall be clearly identified
10. Access Restraints – restrictions on access to areas of the Work that are defined by the Department in the bid package, in Subsection 8.06 – Limitations of Operations or elsewhere in the Contract
11. Milestones listed in Subsection 8.03 - Prosecution of Work or elsewhere in the Contract Documents
12. Subcontractor approvals at fifteen (15) Calendar Days from submittal to response
13. Full Beneficial Use (FBU) Contract Milestone per the requirements of Subsection 8.03 - Prosecution of Work
14. Contractor's request for validation of FBU (ready to open to traffic)
15. The Department's confirmation of completed work to allow for FBU

SECTION 722 (Continued)

16. Substantial Completion Contract Milestone per the requirements of Subsections 7.15 - Claims Against Contractors for Payment of Labor, Materials and Other Purposes and 8.03 - Prosecution of Work
17. Contractor's request for validation of Substantial Completion
18. Punchlist Completion Period of at least thirty (30) Calendar Days per the requirements of Subsections 5.11 - Final Acceptance, 7.15 - Claims Against Contractors for Payment of Labor, Materials and Other Purposes and 8.03 - Prosecution of Work
19. Contractor confirmation that all punchlist work and documentation has been completed
20. Physical Completion of the Work Contract Milestone per the requirements of Subsections 5.11 - Final Acceptance and 8.03 - Prosecution of Work
21. Documentation Completion per the requirements of Subsections 5.11 - Final Acceptance and 8.03 - Prosecution of Work
22. Contractor Field Completion Contract Milestone per the requirements of Subsections 5.11 - Final Acceptance and 8.03 - Prosecution of Work
23. Utility work to be performed in accordance with the Project Utility Coordination (PUC) Form as provided in Section 8.14 - Utilities Coordination, Documentation and Monitoring Responsibilities
24. Traffic work zone set-up and removal, night work and phasing
25. Early Utility Relocation (by others) that has been identified in the Contract
26. Right-of-Way (ROW) takings that have been identified in the Contract
27. Material Certifications
28. Work Breakdown Structure in accordance with the MassDOT-Highway Division Contractor Construction Schedule Toolkit located on the MassDOT-Highway Division website at:
<https://www.mass.gov/info-details/massdot-highway-contractors-schedule-toolkit>
29. For Type A and B Contracts only: All items to be paid, including all Unit Price and Lump Sum pay items, shall be identified by activity. This shall include all non-construction activities such as engineering work; purchase of permanent materials and equipment, purchase of structural steel stock, equipment procurement, equipment delivery to the site or storage location and the representative amount of overhead/indirect costs that was included in the Contractor's Bid Prices.

C. EARLY AND LATE DATES

Early Dates shall be based on proceeding with the Work or a designated part of the Work exactly on the date when the corresponding Contract Time commences. Late Dates shall be based on completing the Work or a designated part of the Work exactly on the corresponding Contract Time, even if the Contractor anticipates early completion.

SECTION 722 (Continued)**D. DURATIONS**

Activity durations shall be in Work Days. Planned Original Durations shall be established with consideration to resources and production rates that correspond to the Contractor's Bid Price. Within all of the Department-required schedules, the Contractor shall plan the Work using durations for all physical construction activities of no less than one (1) Work Day and no greater than fourteen (14) Work Days, unless approved by the Engineer as part of the Baseline Schedule Review.

Should there be an activity with a duration that is determined by the Engineer to be unreasonable, the Contractor will be asked to provide a basis of the duration using bid documents, historic production rates for similar work, or other form of validation that is acceptable to the Engineer. Should the Contractor and the Engineer be unable to agree on reasonable activity durations, the Engineer will, at a minimum, note the disagreement in the Baseline Schedule Review along with a duration the Engineer considers reasonable and the basis for that duration. A schedule that contains a substantial number of activities with durations that are deemed unreasonable by the Engineer will not be accepted.

E. MATERIALS ON HAND (for Types A and B only)

The Contractor shall identify in the Baseline Schedule all items of permanent materials (Materials On Hand) for which the Contractor intends to request payment prior to the incorporation of such items into the Work.

F. ACTIVITY DESCRIPTIONS

The Contractor shall use activity descriptions in all schedules that clearly describe the work to be performed using a combination of words, structure numbers, station numbers, bid item numbers, work breakdown structure (WBS) and/or elevations in a concise and compact label as specified in the MassDOT-Highway Division Contractor Construction Schedule Toolkit located on the MassDOT-Highway Division website at:

<https://www.mass.gov/info-details/massdot-highway-contractors-schedule-toolkit>

G. ACTIVITY IDENTIFICATION NUMBERS

The Contractor shall use the activity identification numbering system specified in the MassDOT-Highway Division Contractor Construction Schedule Toolkit located online at the address above.

H. ACTIVITY CODES

The Contractor shall use the activity codes specified in the MassDOT-Highway Division Contractor Construction Schedule Toolkit located online at the address above.

I. CALENDARS

Different calendars may be created and assigned to all activities or to individual activities. Calendars define the available hours of work in each Calendar Day, holidays and general or project-specific non-Work Days such as Fish Migration Periods, time of year (TOY) restrictions and/or area roadway restrictions.

SECTION 722 (Continued)

Examples of special calendars include, but are not limited to:

- Winter Shutdown Period, specific work is required by separate special provision to be performed during the winter. See Special Provision 8.03 (if applicable)
- Peak traffic hours on heavily traveled roadways. This shall be from 6:30 am to 9:30 am and from 3:30 pm to 7:00 pm, unless specified differently elsewhere in the Contract.
- Special requirements by sensitive abutters, railroads, utilities and/or other state agencies as defined in the Contract.
- Cape Cod and the Islands Summer Roadway Work Restrictions: A general restriction against highway and bridge construction is enforced between Memorial Day and Labor Day, unless otherwise required by the Engineer. Refer to the Project Special Provisions for specific restrictions.
- Cape Ann Summer Roadway Work Restrictions: While there are no general restrictions for Cape Ann as there are for Cape Cod and the Islands, project-specific restrictions may be enforced. Refer to the Project Special Provisions for specific restrictions.
- Turtle and/or Fish Migration Periods and/or other in-water work restrictions: Refer to the Project Special Provisions for specific restrictions.
- Working over Waterways Restricted Periods: Refer to the Project Special Provisions for specific restrictions.
- Night-time paving and striping operations, traffic and temperature restrictions: Refer to the Project Special Provisions for specific restrictions.
- Utility Restrictions shall be as specified within the Contract.

J. FLOAT

For the calculation of float in the CPM schedule, the setting for *Retained Logic* is required for all schedule submissions, starting with the Baseline Schedule Submission. Should the Contractor have a reason to propose that an alternative calculation setting such as *Progress Override* be used, the Contractor shall obtain the Engineer's approval prior to modifying to this setting.

K. COST AND RESOURCE LOADING (Types A and B only)

For all Type A and B Schedules, the Contractor shall provide a cost and resource-loaded schedule with an accurate allocation of the costs and resources necessary to complete the Work. The costs and resources shall be assigned to all schedule activities in order to enable the Contractor to efficiently execute the Contract requirements and the Engineer to validate the original plan, monitor progress, provide cash flow projections and analyze delays.

1. Each schedule activity shall have an assigned cost that accurately represents the value of the Work. Each schedule activity shall have its resources assigned to it by craft and the anticipated hours to accomplish the work. Each schedule activity's equipment resources shall be assigned to it by equipment type and hours operated. Front-loading or other unbalancing of the cost distribution will not be permitted.
2. The sum of the cost of all schedule activities shall be equal to the Contractor's Bid Price.
3. Indicating the labor hours per individual, per day, by craft and equipment hours/day will be acceptable.

SECTION 722 (Continued)

4. The Engineer reserves the right to use the cost-loading as a means to resolve changes, disputes, time entitlement evaluations, increases or decreases in the scope of Work, unit price renegotiations and/or claims.
5. For all Type A and B Schedules, all subnets, fragnets, Proposal Schedules, and Recovery Schedules shall be cost and resource- loaded to help to quickly validate and monitor the duration of the Work to be performed.
6. For Type A Schedules, cost-loading of the schedule will also be used for cash flow projection purposes.
7. The cost-loading of each activity shall indicate the portion of the cost for that activity that is applicable to a specific bid item (cost account.) The total cost for each cost account must equal the bid item price.
8. For Type A Schedules, each month, the Contractor will be paid using the Cost-loaded CPM activities for Lump Sum payment items. This requirement supersedes any requirements elsewhere in this Contract regarding partial payments of schedule-of-values for all Lump Sum items.

L. NOT TO BE USED IN THE CONTRACTOR'S CPM SCHEDULE

1. Milestones or constraint dates not specified in the Contract
2. Scheduled work not required for the accomplishment of a Contract Milestone
3. Use of activity durations, logic ties and/or sequences deemed unreasonable by the Engineer
4. Delayed starts of follow-on trades
5. Float suppression techniques

722.62 Submittal Requirements

All schedules shall be prepared and submitted in accordance with the requirements listed below.

Each monthly Contract Progress Schedule submittal shall be uniquely identified.

Except as stated elsewhere in this subsection, schedule submittals shall include each of the documents listed below, prepared in two formats, for distribution as follows:

- a. four (4) compact discs (CD); one (1) each for the Office of Project Controls and Performance Oversight (O-PC&PO), the Boston Construction Section Office, the District Construction Office and the Resident Engineer's Office. Additional copies shall be required if the work is performed in more than one district.
- b. two (2) hard copies plotted in color on 24" X 36" paper; one (1) copy each for the District Construction Office and the Resident Engineer's Office. No copies for the O-PC&PO and the Boston Construction Section Office. Additional copies shall be required if the work is performed in more than one district.

SECTION 722 (Continued)**A. Narratives**

A written narrative shall be submitted with every schedule submittal. The narrative shall:

1. itemize and describe the flow of work for all activities on the Critical Path in a format that includes any changes made to the schedule since the previous Contract Progress Schedule / Monthly Update or the Baseline Schedule, whichever is most recent;
2. provide a description of any specification requirements that are not being followed. Identify those that are improvements and those that are not considered to be meeting the requirements;
3. provide all references to any Notice of Delay that has been issued, within the time period of the Contract Progress Schedule Update, by letter to the Engineer. Note that any Notice of Delay that is not issued by letter will not be recognized by the Engineer. See Subsection 722.64.A - Notice of Delay;
4. provide a description of each third-party utility's planned vs. actual progress and note any that are trending late or are late per the durations and commitments as provided in the PUC Form; provide a description of the five (5) most important responses needed from the Department and the need date for the responses in order to maintain the current Schedule of Record;
5. provide a description of all critical issues that are not within the control of the Contractor or the Department (third party) and any impact they had or may have on the Critical Path;
6. provide a description of any possible considerations to improve the probability of completing the project early or on-time;
7. compare Early and Late Dates for activities on the Critical Path and describe reasons for changes in the top three (3) most critical paths ;
8. describe the Contractor's plan, approach, methodologies and resources to be employed for completing the various operations and elements of the Work for the top three (3) most critical paths. For update schedules, describe and propose changes to those plans and verify that a Proposal Schedule is not required;
9. describe, in general, the need for shifts that are not 5 days/week, 8 hours/day, the holidays that are inserted into each calendar and a tabulation of each calendar that has been used in the schedule;
10. describe any out-of-sequence logic and provide an explanation of why each out-of-sequence activity does not require a correction, if one has not been provided, and an adequate demonstration that these changes represent the basis of how these activities will be built, including considerations for resources, dependencies and previously-approved production rates;
11. identify any possible duration increases resulting from actual or anticipated unit price item quantity overruns as compared to the baseline duration, with a corresponding suggestion to mitigate any possible delays to the Critical Path. If the delay is anticipated to impact the Critical Path, refer to Subsections 4.06 - Increased or Decreased Contract Quantities and 8.10 - Determination and Extension of Contract Time for Completion and submit a letter to the Engineer notifying of a potential delay;
12. include a schedule log consisting of the name of the schedule, the data date and the date submitted.

SECTION 722 (Continued)**B. Bar Charts (Types A, B, C and D)**

One (1) time-scaled bar chart containing all activities shall be prepared and submitted using a scale that yields readable plots and that meets the requirements of Subsection 722.61 - Schedule Content and Preparation Requirements. Activities shall be linked by logic ties and shown on their Early Dates. Critical Paths shall be highlighted and Total Float shall be shown for all activities.

A second time-scaled bar chart shall also be prepared containing only the Critical Path or, if the Critical Path is not the longest path, the Longest Path using a scale that yields readable plots and that meets the requirements of Subsection 722.61 - Schedule Content and Preparation Requirements. Activities shall be linked by logic ties and shown on their Early Dates. Total Float shall be shown for all activities.

Bar Charts shall be printed in color and submitted on 11" X 17" paper or, if approved by the Engineer, as a .pdf file.

C. Detailed Activity Schedule Comparisons

A Detailed Activity Schedule Comparison (DASC) is a simple reporting tool in the format of a graphical report that will provide Resident Engineers with immediate, timely and up-to-date information. The DASC consists of an updated bar chart that overlays the current time period's bar chart onto the previous time period's bar chart for an easily-read comparison of progress during the present and previous reporting periods. The DASC shall be prepared and submitted in accordance with the instructions contained in the Construction Schedule Toolkit located on the MassDOT-Highway Division website at:

<https://www.mass.gov/info-details/massdot-highway-contractors-schedule-toolkit>

The reports described in Subsections D, E and F below shall be submitted with all of the schedules listed in Subsection 722.20 - General:

D. Activity Cost Report and Monthly Cash Flow Projections (Type A only)

With each Contractor Quantity Estimate (CQE), the Contractor shall submit an Activity Cost Report and Cash Flow Projection that includes all activities grouped by Contract Bid Item.

The Activity Cost Report shall be generated from the Schedule of Record and shall be the basis of the Monthly Cash Flow Projection. Within each contract Bid Item, activities shall be sequenced by ascending activity identification number and shall show:

1. activity ID and description,
2. forecast start and finish dates for each activity and,
3. when submitted as a revised schedule, actual start and finish dates for each completed activity.

For Unit Price pay items, in addition to the above, estimates to complete and any variance to the estimated Contract quantity shall be shown.

E. Resource Graphs (Type A only)

Monthly and cumulative resource graphs for the remaining Contract period using the Early Dates and Late Dates in the Contract Progress Schedule shall be included as part of each schedule submittal.

SECTION 722 (Continued)**F. Projected Spending Reports (Types B, C and D)**

A Projected Spending Report (PSR) shall be prepared and submitted in accordance with the instructions listed at the end of this section. The PSR shall indicate the monthly spending (cash flow) projection for each month from NTP to Contractor Field Completion (CFC). Each month's actual spending shall be calculated using all CQEs paid during that month. If the difference between the Contractor's monthly projections vs. the actual spending is greater than 10%, the Contractor's monthly spending projection shall be revised and resubmitted within fifteen (15) Calendar Days.

The Projected Spending Report (PSR) shall be depicted in a tabular format and printed in color on 11 x 17-sized paper or larger as approved by the Engineer. For additional instructions and a template for preparing the Projected Spending Report (PSR), refer to the Contractor's Construction Schedule Toolkit located on the MassDOT-Highway Division website at:

<https://www.mass.gov/info-details/massdot-highway-contractors-schedule-toolkit> or consult with the District Construction Scheduler.

722.63. Progress Schedule Requirements**A. Baseline Schedule**

The Baseline Schedule shall be due thirty (30) Calendar Days after Notice to Proceed (NTP.) The Baseline Schedule shall only reflect the Work awarded to the Contractor and shall not include any additional work involving Extra Work Orders or any other type of alleged delay. The Baseline Schedule shall be prepared and submitted in accordance with Subsections 722.61 - Schedule Content and Preparation Requirements and 722.62 - Submittal Requirements. Once the Baseline Schedule has been accepted by the Engineer, with or without comments, it shall represent the as-planned schedule for the Work and become the Contract Progress Schedule of Record until such time as the schedule is updated or revised under Subsections 722.63.C - Contract Progress Schedules / Monthly Updates, 722.64.C - Recovery Schedules and 722.64.D - Proposal Schedules.

The Cost and Resource-Loading information (Types A and B only) shall be provided by the Contractor within forty-five (45) Calendar Days after NTP.

The Engineer's review comments on the Baseline Schedule and the Contractor's responses to them will be maintained for the duration of the Contract and will be used by the Engineer to monitor the Contractor's work progress by comparing it to the Contract Progress Schedule / Monthly Update.

B. Interim Progress-Only Schedule Submissions

The first monthly update of the Contract Progress Schedule/Monthly Update is due within seventy (70) Calendar Days after Notice to Proceed (NTP.) The Baseline Schedule review period ends at sixty (60) Calendar Days after NTP, see Subsection 722.60.B - Schedule Reviews by the Department. If the Baseline Schedule has not been accepted within sixty (60) Calendar Days after NTP, an Interim Progress-Only Schedule shall be due within seventy (70) Calendar Days after NTP. The purpose of the Interim Progress-Only Schedule is to document the actual progress of all activities, including non-construction activities, from NTP until the Baseline Schedule is accepted.

SECTION 722 (Continued)**C. Contract Progress Schedules / Monthly Updates (Types A, B, C and D)**

The first Contract Progress Schedule shall be submitted by the Contractor no later than seventy (70) Calendar Days after NTP. The data date for this first Progress Schedule shall be sixty (60) Calendar Days after NTP. Subsequent Progress Schedules shall be submitted monthly.

Each Contract Progress Schedule shall reflect progress up to the data date. Updated progress shall be limited to as-built sequencing and as-built dates for completed and in-progress activities. As-built data shall include actual start dates, remaining Work Days and actual finish dates for each activity, but shall not change any activity descriptions, the Original Durations, or the Original Resources (as planned at the time of bid), without the acceptance of the Engineer. If any activities have been completed out-of-sequence, the Contractor shall propose new logic ties for affected in-progress and future activities that accurately reflect the previously-approved sequencing. Alternatively, the Contractor may submit to the Engineer for approval an explanation of why an out-of-sequence activity does not require a correction and an adequate demonstration that the changes accurately represent how the activities will be built, including considerations for resources, dependencies and previously approved production rates. Once approved by the Engineer, the Contractor may incorporate the changes in the next Contract Progress Schedule/Monthly Update with the affected activities clearly identified and explained in the Schedule Narrative.

No revisions to logic ties; sequence, description or duration of future activities; or planned resource costs shall be made without prior approval by the Engineer.

Any proposed logic changes for in-progress or future activities shall be submitted to the Engineer for approval before being incorporated into a Contract Progress Schedule. The logic changes must be submitted using a Proposal Schedule or a schedule fragment submission. Once approved by the Engineer, the Contractor may incorporate the logic in the next Contract Progress Schedule/Monthly Update with the affected activities clearly identified and explained in the Schedule Narrative.

For any proposed changes to the original sequence, description or duration of future activities, the Contractor shall submit to the Engineer for approval an explanation of how the proposed description or duration change reflects how the activity will be progressed, including considerations for resources and previously approved production rates. Any description or duration change that does not accurately reflect how the activity will be progressed will not be approved by the Engineer. Once approved by the Engineer, the Contractor may incorporate the changes in the next Contract Progress Schedule/Monthly Update with the affected activities clearly identified and explained in the Schedule Narrative.

Except as otherwise designated by a Contract Modification, no Contract Progress Schedule that extends performance beyond the Contract Time and/or beyond any Contract Milestone shall be approved by the Engineer. The Contractor shall submit a Recovery Schedule if any Contract Progress Schedule/Monthly Update indicates a failure to meet the Contract Dates.

D. Short-Term Construction Schedule

The Contractor shall provide a Short-Term Construction Schedule that details daily work activities, including any multiple shift work that the Contractor intends to conduct, in a bar chart format. The daily activities shall directly correspond to the Contract Progress Schedule activities, with a matching reference to the activity identification number in the Contract Progress Schedule, and may be at a greater level of detail.

SECTION 722 (Continued)

The Short-Term Construction Schedule shall be submitted every two weeks. It shall display all work for a thirty-five (35) Calendar Day period consisting of completed work for the two (2) week period prior and all planned work for the following three (3) week period. The initial submission shall be provided no later than thirty (30) Calendar Days after NTP or as required by the Engineer.

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

Failure to submit Short-Term Construction Schedules every two (2) weeks may result in withholding of full or partial payments by the Engineer.

722.64 Impacted Schedule Requirements**A. Notice of Delay**

The Contractor shall notify the Engineer in writing, with copies to the District and State Construction Engineers, within three (3) Calendar Days of the start of any delays to the Critical Path that are caused by actions or inactions that were not within the control of the Contractor. Delay notifications that are not provided in a letter to the Engineer, such as a delay notification in the schedule narrative, will not be recognized as contractual notice in the determination of any Time Extension related to the impacts to the work associated with this specific alleged delay. Should such delay continue for more than one (1) week, the Contractor shall note it in the Schedule Narrative until the delay is no longer impacting the Critical Path for the completion of the Contract Milestones. The Engineer will evaluate the alleged delay and its impact and will respond to the Contractor within ten (10) Calendar Days after receipt of a notice of delay.

B. Time Entitlement Analysis

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

TEAs shall be prepared and submitted in accordance with the requirements of Subsections 722.61 - Schedule Content and Preparation Requirements and 722.62 - Submittal Requirements and shall be based on the Contract Progress Schedule of Record applicable at the start of the delay or impact from an EWO. A TEA fragment must start with a specific new activity describing the work contained in either a Notice of Delay previously submitted to the Department per Subsection 722.64.A - Notice of Delay or an EWO.

SECTION 722 (Continued)

TEAs shall be submitted:

1. as part of any Extra Work Order that may impact Contract Time,
2. with a request for a Time Extension,
3. within fourteen (14) Calendar Days after a request for a TEA by the Engineer for any other reason.

A TEA shall be submitted to the Engineer before any Time Extension is granted to the Contractor. Time Extensions will not be granted unless the TEA accurately reflects an evaluation of all past delays and the actual events that occurred that impacted the Critical Path. The TEA must also demonstrate a plan for the efficient completion of all of the remaining work through an optimized CPM Schedule. The analysis shall include all delays, including Contractor-caused delays, and shall be subdivided into timeframes and causes of delays.

TEAs shall incorporate any proposed activities, logic ties, resource considerations, and activity costs required to most efficiently demonstrate the schedule impacts in addition to detailing all impacts to existing activities, logic ties, the Critical Path, Contract Milestones and the Contract Completion Date. In addition, TEAs shall accurately reflect any changes made to activities, logic ties, restraints and activity costs, necessitated by an Extra Work Order or other schedule impact, for the completion of the remaining work. The Contractor shall provide TEAs that demonstrate that all delays have been mitigated to the fullest extent possible without requiring an Equitable Adjustment to the original bid basis.

All TEAs shall clearly indicate any overtime hours, additional shifts and the resource that are proposed to be incorporated in the schedule. The Engineer shall have final discretion over the use of overtime hours and additional shifts. The Engineer shall have the right to require that overtime hours and/or additional shifts be used to minimize the duration of Time Extensions if it is determined to be in the best interest of the Department to do so.

When accepted, the changes included in a TEA shall be incorporated into the next Contract Progress Schedule per the requirements of Subsection 722.63.C - Contract Progress Schedules / Monthly Updates.

During the review of any TEA, all Contract Progress Schedules shall continue to be submitted as required.

The Engineer may request that the Contractor prepare a Proposal Schedule or a Recovery Schedule to further mitigate any delays that are shown in the accepted TEA/Contract Progress Schedule.

C. Recovery Schedules

The Contractor shall promptly report to the Engineer all schedule delays during the prosecution of the Work. Except as otherwise designated by a Contract Modification, no Contract Progress Schedule that extends performance beyond the Contract Time and/or beyond any Contract Milestone shall be approved by the Engineer. The Contractor shall submit a Recovery Schedule within fourteen (14) Calendar Days of a Contract Progress Schedule submission that shows failure to meet the Contract Dates. This requirement is critical to the Department's ability to make informed decisions regarding Contract Time and costs.

SECTION 722 (Continued)

During the prosecution of the Work, should the Contractor's progress on a critical operation clearly not meet anticipated production, without cause by fault of the Department, or should a critical activity or series of activities not be staffed in accordance with the Contractor's approved Baseline Schedule resource planning, the Contractor shall be obligated to recover such delay. Recovery Schedules shall be prepared and submitted in accordance with Subsections 722.61 - Schedule Content and Preparation Requirements and 722.62 - Submittal Requirements within fourteen (14) Calendar Days of any of the cases listed above.

Recovery Schedules shall clearly indicate any proposed overtime hours, additional shifts, and the resources that are proposed to be incorporated in to the schedule. The Engineer shall have final discretion over the use of overtime hours and additional shifts and shall have the right to require that overtime hours and/or additional shifts be used to minimize the duration of Time Extensions, without additional compensation for any Contractor delays, if it is determined to be in the best interest of the Department to do so.

During the review of any Recovery Schedule, all Contract Progress Schedules shall continue to be required every month.

The Engineer may request that the Contractor prepare a Recovery Schedule to further mitigate any delays that are shown in an accepted TEA/Contract Progress Schedule.

Changes represented in accepted Recovery Schedules shall be incorporated into the next Contract Progress Schedule.

D. Proposal Schedules

A Proposal Schedule is an alternative schedule used to evaluate proposed changes to the Contract scope or significant alternatives to previously approved approaches to complete the Work, which may include changes to activity durations, logic and sequence. For Types A and B Schedules, the Proposal Schedule shall be cost and resource-loaded.

A Proposal Schedule may be requested by the Department at any time or may be offered by the Contractor. The Engineer may request that the Contractor prepare a Proposal Schedule to further mitigate any delays that are shown in an accepted TEA/Contract Progress Schedule.

The Contractor shall submit the Proposal Schedule within thirty (30) Calendar Days of a request from the Department.

The Proposal Schedule shall not be considered a Schedule of Record until the logic, durations, narrative and basis of the Proposal Schedule have been accepted by the Engineer. If the Proposal Schedule took the form of a fragnet, it must be incorporated into the Contract Progress Schedule of Record showing the current progress of all other activities and the impacts/results of the changes made by the Proposal Schedule before the Proposal Schedule is accepted by the Department.

Proposal Schedules shall clearly indicate any proposed overtime hours, additional shifts, and the resources that are proposed to be incorporated in the schedule. The Engineer shall have final discretion over the use of overtime hours and additional shifts.

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

SECTION 722 (Continued)**E. Disputes (Types A, B, C and D)**

All schedules shall be submitted, reviewed, dispositioned and accepted in the timely manner specified herein so as to provide the greatest possible benefit to the execution of this Contract.

Any dispute concerning the acceptance of a schedule or any other question of fact arising under this subsection shall be determined by the Engineer. Pending resolution of any dispute, the last schedule accepted by the Engineer will remain the Contract Schedule of Record.

COMPENSATION**722.80 Method of Measurement and Basis of Payment (Types A, B, C and D)**

The Special Provisions will specify the fixed-price amount to be paid to the Contractor for the Project Schedule requirements contained herein. Each bidder shall include this lump-sum, fixed-price bid item amount in his/her bid. Failure to do so may be grounds for the rejection of the bid.

All required schedule-related work, including, but not limited to computers, computer software, the planning and coordination with utilities, training, schedule preparation and schedule submittals will be paid for under the fixed price amount.

This fixed price amount is for payment purposes only and is separate from what the Department considers to be the Contractor's General Condition costs. If the Contractor deems it necessary to include additional costs to provide all of the requirements of this section, these additional costs shall be included in the Contractor's overall bid price.

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

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

$$\text{Monthly Payment} = \frac{\text{Remaining Fixed Price amount (80\% of Item 100.)}}{\text{Contract Duration in whole months} - 2 \text{ months}}$$

The timely and accurate submission of the Baseline Schedule is critical to the Contract and the Department's ability to make informed decisions. Only payments under Item 740 - Engineer's Field Office and Item 748 - Mobilization will be made until the Baseline Schedule is accepted by the Engineer.

SECTION 722 (Continued)

No payment for any other pay item will be processed beyond seventy-five (75) Calendar Days from Notice to Proceed (NTP) until the Baseline Schedule is accepted by the Engineer. Until the Engineer's acceptance of the Baseline Schedule, the combined total of all payments made to the Contractor will be limited to an amount no greater than the total price for Item 748 - Mobilization or 3% of the contract price, whichever is less.

All Contract Progress Schedule Updates submitted later than ten (10) Calendar Days after the CQE (Contract Quantity Estimate) completion date, or greater than forty (40) Calendar Days from the Data Date of the previous submission, will be deemed to be no longer useful and will not qualify for payment. Late submittal of missed Contract Progress Monthly Updates will not result in recovery of the previously forfeited portion of the Schedule of Operations Fixed Price Payment Item.

Failure to submit schedules as and when required may result in the forfeiture of that portion of the Schedule of Operations Fixed Price Payment and/or the withholding of the full or partial CQE payments by the Engineer.

Failure to submit schedules that are acceptable to the Engineer may result in the forfeiture of that portion of the Schedule of Operations Fixed Price Payment and/or the withholding of the full or partial CQE payments by the Engineer.

The Schedule of Operations pay item will be adjusted to pay for only the actual quantity of schedules that have been submitted in accordance with this section.

The Contractor's failure or refusal to comply with the requirements of this Section shall be reasonable evidence that the Contractor is not prosecuting the Work with due diligence and may result in the withholding of full or partial payments by the Engineer.

Should there be a Time Extension granted to the Contractor, the Engineer may provide an Equitable Adjustment for additional Contract Progress Schedule Updates at intervals required by the Engineer. Item 100. will be the basis for this Equitable Adjustment.

722.82 Payment Items

100. SCHEDULE OF OPERATIONS - FIXED PRICE \$ _____ LUMP SUM

ITEM 102.2**TREE TRIMMING****LUMP SUM**

The work to be done under this Item shall conform to the relevant provisions of Subsections 8.08 and 101 of the Standard Specifications and the following.

The work under this Item consists of removing all living, dead, dying, broken and certain other limbs and branches in areas adjacent to proposed overhead wire relocations, highway lighting, traffic signals, and traffic signage, pruning to prevent injury to the tree from construction equipment and activities, removing limbs and branches restricting sight distances, extending over roadways, shoulders, turn outs, etc., trimming to produce the minimum vertical clearance, pruning for health and balance of trees to mitigate impacts of construction activities, and as required by the Engineer from trees located within the limits of the Project and the satisfactory disposal of all such removed debris.

The work also includes removing all sucker growth and vines, including (but not limited to) bittersweet and poison ivy, on all tree trunks within the limits of the Contract from the ground level to the beginning of the main branch system. This work shall be coordinated with Item 102.3 – Herbicide Treatment of Invasive Plants and Item 102.33 – Invasive Plant Management Strategy.

Tree trimming shall be done as required by the Engineer. Any tree trimming for overhead wire relocations shall meet the current requirements of each Utility. Prior to commencing work the Contractor shall verify each location with the Utility Companies.

All pruning and tree work shall be in conformance with the most current version of the American National Standards Institute (ANSI) Standard Z-133.1 and A300 Standard Practices for Tree, Shrub, and Other Woody Plant Maintenance.

All tree trimming work within 10 feet of energized power lines and equipment shall be in conformance with the most current version of the United States Department of Labor (DOL) OSHA Standard 1910.269(r) along with subsections (1) through (8).

All work under this Item will be performed or supervised by a Massachusetts Certified Arborist.

Contractor shall be required to provide a crew, consisting of a bucket truck with operator and grounds man for pruning and removal. The minimum crew shall consist of the following: a supervisor and three tree-trimmers/laborers. The crew shall be equipped with all necessary equipment needed to complete the work including, but not limited to, pickup trucks, chippers, gas powered chain saws, hand saws, loppers, shears, pruners, branch trimmers, ladders, tree-climbing equipment, etc. Fuel for equipment shall also be considered incidental to this Item. The crew shall be OSHA certified as line-clearance tree trimmers in order to work within 10 feet of energized power lines and equipment.

SUBMITTALS

Prior to start of work, the Contractor shall submit to the Engineer the name, certification number and resume of the Massachusetts Certified Arborist referenced herein. Cost for Certified Arborist for all activities pertaining to this Item shall be incidental to this Item.

ITEM 102.2 (Continued)

Incidental to this Item, the Contractor shall provide to the Engineer one (1) copy of the most current version of the American National Standards Institute (ANSI) Standard Z-133.1 and A300 Standard Practices for Tree, Shrub, and Other Woody Plant Maintenance, Part 1: Pruning. These references shall be kept by the Engineer at his/her office for the length of the Contract.

Prior to start of work, the Contractor shall coordinate with the Engineer, the Arborist, the Electric Utility Company, and the Utility Company with poles set in the field to confirm number, location, and extent of selective tree trimming.

DESCRIPTION OF WORK

LINE-CLEARANCE TREE TRIMMING: Shall be defined as the pruning, trimming, repairing, maintaining, removing, or clearing of trees or the cutting of brush that is near (within 10 feet of) energized power lines.

TREE: Shall be defined as having a diameter of 4 inches or over, measured at a point 3 feet above the average ground.

LIMBS AND BRANCHES: Shall be defined as wood having a diameter of ½ inch or over and wood that has a diameter of less than ½ inch shall be considered a TWIG.

A DYING LIMB OR BRANCH: May have live growth at some point but shall be removed if found to be in an unhealthy condition.

While it is not the intent that every dead, dying and/or broken twig be removed from trees requiring trimming, the tree worker will be required to remove all such twigs accessible in the areas of the tree in which he/she is working.

If required by the Engineer, specific trees, or parts thereof which are so located that damage may result from dropping shall be reduced by rope or cable lowering.

Tree shaping may be required on trees, where up-branching done under this Contract has distorted the natural symmetry of the tree. Tree shaping shall consist of the removal of limbs and branches from other locations of the tree where removal is desirable to restore natural symmetry.

All sucker growth and vines on all tree trunks within the limits of the Contract shall be removed from the ground level to the beginning of the main branch system.

Any and all trees, branches, or brush conflicting with utility poles, equipment, overhead wires, and service connections, shall be removed and/or cut back using best practices to satisfy the requirements of all Utilities with an attachment to the pole line.

ITEM 102.2 (Continued)

Any and all branches extending directly below a street luminaire as to limit the light reaching the street or path/sidewalk surfaces shall be removed and all branches shall be cut back to afford a minimum of 5-foot clearance on all sides of the luminaire. The path/sidewalk surface shall be considered as the area from the edge of the roadway surface to the edge of the path/sidewalk surface farthest from the roadway.

By cutting NEARLY, but not quite, flush with the trunk, limb or branch, the "collar" is left at the top of the wound (in the crotch of the union). This will permit the callus growth to cover the wound in a shorter period of time.

BASIS OF PAYMENT

Item 102.2 will be paid for at the Contract unit price per LUMP SUM, which price shall include all labor, certifications, materials, equipment, apparatus, tools and all incidental costs required to complete the work.

No separate payment will be made for services provided by the Certified Arborist, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 102.3 **HERBICIDE TREATMENT OF INVASIVE PLANTS** **HOUR**

This work must be performed by persons who meet the qualifications below and are approved by the Landscape Design Section.

Work under this item consists of herbicide treatment of invasive plants currently existing within the project limits and as required. An Invasive Plant Management Strategy (IPMS) shall be submitted to the Engineer for review and approval and the IPMS shall be implemented on-site. The IPMS shall be measured and paid for under Item 102.33 Invasive Plant Management Strategy.

Work under this item shall be coordinated with work and schedule for Selective Clearing, Clearing and Grubbing, Mowing, Tree Removal, Planting, and Wetland Mitigation items.

Payment is per hour on-site and shall be compensation for a minimum crew of 2 licensed applicators, 2 back-pack sprayers and mist-blowers, a properly equipped spray truck with spray hoses, and a tank with sufficient capacity for a full day of work. If there is only one applicator, hourly payment shall be adjusted to 50 percent of the unit price. This item is not intended for manual removal of plants.

Management of plants determined to have been introduced to the site via imported loam, compost, mulch, plants, equipment, or other construction activities will be the Contractor's responsibility and at the Contractor's expense.

Herbicide shall be applied during daytime hours only.

Measures to prevent the introduction of invasive plant species to the site and to address introduction due to construction-related activities shall be covered under the Standard Specifications, Division I - Subsections 7.01(D) Plant Pest Control and 7.13 Protection and Restoration of Property as amended in these Special Provisions.

Plant species targeted for management under this item shall be as determined in the field per the site walk and as specified in the IPMS.

The definition of invasive plant species shall be as described by Massachusetts Invasive Plant Advisory Group (MIPAG): "non-native species that have spread into native or minimally managed plant systems in Massachusetts, causing economic or environmental harm by developing self-sustaining populations and becoming dominant and/or disruptive to those systems."

Control of invasive plants shall begin immediately with the initiation of construction activities and prior to any clearing or site disturbance. Treatment areas shall include stockpile locations and may, upon approval of the Engineer, extend outside the project limit. Treatment shall be done each consecutive year for the duration of the contract unless specified otherwise in the IPMS or unless required otherwise by the MassDOT invasive species contact. Work shall be done during the growing season from May – October unless otherwise specified in the IPMS.

ITEM 102.3 (Continued)

Areas identified for vegetation control measures shall be as shown on the plans and as determined in the field by the Engineer and a MassDOT Landscape Architect. Contact at MassDOT Landscape Design Section may be contacted at: tara.mitchell@dot.state.ma.us.

QUALIFICATIONS

The applicators shall submit and meet the qualifications outlined below. A list of contractors specializing in invasive management and approved by MassDOT Landscape Design Section is available on the following website: <https://www.mass.gov/lists/landscape-design-and-roadside-maintenance> under Invasive Plant Management.

Requirements

1. Company must provide proof of qualifications by providing the following:
 - a. Narrative describing company, its expertise and experience with invasive plant control.
 - b. Demonstrate experience with herbicide treatment as part of restorations and in sensitive areas.
 - c. Describe company's technical qualifications and past performance.
2. Company must meet licensing requirements:
 - a. All crew applicators must have a Massachusetts Commercial Applicator License (CORE).
 - b. At least one or more applicator must have a ROW certification, if required for work.
 - c. Company must provide name(s) of applicator(s) and Applicator License/Certification number for all contractor crew leaders working on the project.
 - d. Company must provide documentation of any warnings, penalties or fines received in the last three (3) years.
3. Company must provide proof of experience with invasive plant control and include following:
 - a. At least five (5) references from prior invasive plant control work completed in last five (5) years. Provide contact information including address, phone number and email.
 - b. Provide a summary of each of these projects including nature of the problem, specific invasive vegetation treated, dates and period of treatment, methodologies used, and summary of success or not in terms of meeting performance objectives. Include summary of equipment used.
 - c. Photo documentation of these projects.
 - d. GPS coordinates of project locations, if available.
4. Crew leader must have expertise with invasive plant control and provide the following:
 - a. Have held Core license for at least five (5) years.
 - b. Resume listing five (5) or more years of experience applying pesticides with the company or with another company specializing in vegetation management.

SUBMITTALS

No work shall begin without approval of the submittals.

ITEM 102.3 (Continued)

Submittals include the following items:

Invasive Plant Management Strategy (IPMS)

At least thirty (30) days prior to proposed treatment the IPMS shall be submitted for approval by the Engineer and MassDOT Landscape Architect. All chemicals, methods and work done under this item shall be consistent with the IPMS. The IPMS shall be as described under Item 102.33.

Herbicide Use Report

Within two (2) weeks after each application, the Contractor shall provide to the Engineer a completed and signed MassDOT Herbicide Use Report.

Photo Documentation

Digital photos with date and time of herbicide application work may be required and shall be submitted upon request.

MATERIALS

All proposed herbicides shall be as approved in the IPMS. Herbicides shall be labeled for the method of treatment and shall meet all federal, state and local regulation requirements. Application rates will depend on herbicide proposed and shall be per the manufacturer's label for specific application.

METHODS

All methods used shall be as approved in the IPMS which shall be determined during the Initial Site Walk as described under Item 102.33 Invasive Plant Management Strategy.

The Contractor shall be responsible for marking delineated areas and plants to be preserved, removed, or otherwise treated. Fencing or other materials needed for marking and delineating protected areas shall be incidental to this item.

The Contractor shall notify the Engineer a minimum of 3 days prior to date of expected herbicide application. Applicators shall notify the Engineer upon arriving on-site and upon leaving the site.

Herbicide Applications

All herbicide application shall conform to Massachusetts Pesticide Laws and Regulations per the Massachusetts Department of Agricultural Resources (MDAR) Pesticide Bureau.

Mixing, applying and/or disposing of herbicides shall always be in accordance with instructions on their labels and all applicable federal, state, and local regulations. Mixing shall not occur within sensitive areas, wetlands, or buffer zones.

ITEM 102.3 (Continued)

Contractor shall not spray 2 hours prior to precipitation, during rain, or during windy conditions. The Contractor shall be responsible for monitoring weather conditions and adjusting the work schedule as appropriate for the herbicide and application method to be used.

Targeted vegetation shall be identified and marked prior to treatment. Plants treated by foliar spray, injection or glove application or other methods that leave standing vegetation, as opposed to cut-stump application, shall remain clearly marked for identification through the contract period.

Desirable vegetation shall be protected from both spray and other physical damage.

Contractor is responsible for any damage to vegetation not designated for removal or treatment. Vegetation damaged shall be restored. Cost of replacement plants and/or restoration shall be borne by the Contractor.

Contractor shall ensure that the public does not enter a work area while herbicide application or spraying is underway.

Disposal Of Invasive Plant Material

All material to be cleared shall become the property of the Contractor. The satisfactory disposal of all cleared plant material (seeds, roots, woody vegetation, associated soils, etc.) shall be the Contractor's responsibility.

The Contractor shall take measures to prevent viable plant material from leading to further infestations (seeds, roots, woody material, etc.) while stockpiled, in transit, or at final disposal locations. All precautions shall be taken to avoid contamination of natural landscapes with invasive plants or invasive plant material.

Chipping, shredding, or on-site burning of plant material must be approved by the Engineer and included in the IPMS.

For plant material taken to an incinerating facility per the IPMS, a receipt from that facility shall be submitted to the Engineer as proof of disposal.

Where feasible, it is preferable to dispose of plants on-site or to bury them on-site with on-going monitoring for re-sprouting. Disposal locations and methods must be approved and included in the IPMS. Site work such as grading and seeding to stabilize and restore disposal area shall be incidental to this item.

The Contractor shall be responsible for treating or otherwise managing areas of re-growth due to improper disposal. Treatment shall be at the Contractor's expense.

ITEM 102.3 (Continued)

Follow-Up Treatment

Plants and areas shall be re-treated as necessary and as appropriate to the time of year. Treatment shall be for the duration of the contract and per the IPMS.

MEASURE OF SUCCESS

The expectation is a minimum of 85-95 percent control achieved after the first treatment, depending on plants targeted and extent of population, and based on the expectations laid out in the IPMS. The expectation for the contract duration is 95-100% eradication by the end of the treatment period, unless otherwise specified in the IPMS.

METHOD OF MEASUREMENT

Item 102.3 will be measured for payment by the HOUR of crew time spent on the project doing actual herbicide application work. A crew shall be defined as a minimum of two licensed applicators each equipped with (at minimum) back-pack sprayer and mist blower. The crew shall also have a properly equipped spray truck with hoses and a tank with sufficient capacity for a full day of work.

BASIS OF PAYMENT

Item 102.3 will be paid at the Contract unit price per HOUR, which price shall include all labor, materials, equipment, tools, and all incidentals required to complete the work.

Payment will be based upon time spent on the project doing actual work and shall not include travel time to and from the Contractor's place of business and shall also not include time for investigative field trips.

If there is only one applicator, hourly payment shall be adjusted to 50 percent of the unit price.

The Invasive Plant Management Strategy will be paid for under Item 102.33.

ITEM 102.33 **INVASIVE PLANT MANAGEMENT STRATEGY** **HOUR**

This Item consists of providing an Invasive Plant Management Strategy (IPMS) for the control of invasive plants currently existing on the project site and/or as required and shall be coordinated with Item 102.3 Herbicide Treatment of Invasive Plants. The IPMS shall be submitted for review and approval and the IPMS shall be implemented on-site.

Herbicide treatment for invasive plants shall be as described under Item 102.3 Herbicide Treatment of Invasive Plants and shall be compensated per that Item.

Work under this item shall be coordinated with work and schedule for Selective Clearing, Clearing and Grubbing, Mowing, Tree Removal, Planting, and Wetland Mitigation as relevant to the project.

Individual attending the site walk and determining the Invasive Plant Management Strategy must demonstrate expertise with vegetation management and invasive plant control and submit qualifications as described below.

QUALIFICATIONS

Individual shall be from the same company as that providing services for Item 102.3 Herbicide Treatment of Invasive Plants and shall submit the following, if not submitted under Item 102.3:

- Submit copy of current Core license.
- Submit a resume listing five (5) or more years of experience managing invasive plants with a company specializing in vegetation management.
- References shall be submitted if requested.

SUBMITTALS

Task Summary & Reports

For measurement of payment, the contractor shall submit the total sum and a breakdown of hours for the tasks performed. At a minimum, the tasks shall include the Initial Site Walk, the IPMS Written Report, and if necessary to accommodate project or site changes, a Follow-up Site Inspection and accompanying IPMS Amendment.

Interim Site Monitoring Reports and/or a Final Report shall be submitted if requested by the MassDOT Landscape Design contact. The MassDOT Landscape Design contact must be notified to attend the final walk through when a Final Report has been requested.

ITEM 102.33 (Continued)**Invasive Plant Management Strategy (IPMS)**

At least thirty (30) days prior to construction activities and/or any proposed treatment, submit a written IPMS proposal for approval by the Engineer and MassDOT Landscape Architect. All chemicals and methods proposed shall be consistent with applicable Massachusetts Wetlands Protection Act Order of Conditions.

The IPMS shall be completed in coordination with the Roadway Contractor and the Engineer and shall include the following as appropriate to the project:

- I. Project Information**
 - a. Company writing IPMS and performing herbicide application.
 - b. Date of site walk
 - c. Attendees at site walk
 - d. Expected end date of contract and expected last treatment (month/season)
- II. Brief Description of Conditions**
 - a. Provide a free-hand sketch on construction plans or aerial image showing species, location, and as relevant, show or note extent of population as relevant to Strategy (i.e., population extends off ROW preventing eradication, small population and eradication deemed feasible within contract schedule, etc.).
- III. Coordination with Roadway Contractor regarding other work**
 - a. Tree Work: Note coordination to be implemented with tree removal, clearing, and clearing and grubbing as applicable to the project.
 - b. Wetland Mitigation - Include management proposed for wetland mitigation areas in the IPMS, if and as required.
 - c. Planting: If there will be planting in areas proposed for treatment, propose treatment and schedule to avoid herbicide damage to plants.
 - d. Mowing: If coordination is required with state mowers, note need in IPMS.
- IV. Soil Management**
 - a. Provide specifics on how soil with invasive plant roots (in particular) or seeds will be handled (i.e., separate stockpiles, plant material will be buried on-site, re-used on-site, disposed off site and if so, where?).
 - b. Show stockpile locations on plan and include treatment schedule.
 - c. Note measures that will be implemented to avoid spread through equipment, including how and where equipment will be cleaned.

ITEM 102.33 (Continued)**V. Invasive Plant Treatment & Management**

- a. Proposed chemical and methods of treatment for each species or area.
- b. Time of treatment based on target plant species.
- c. Submit product label including application methods and rates (entire MSDS information need not be submitted if available online).
- d. Proposed performance metrics or measure of treatment success if different from that specified under Item 102.3.
- e. Method for disposing invasive plant material. This includes material that may result in spread (i.e., seeds, roots) and material that has been treated and/or is not viable (foliage, dead wood, etc.). Methods may include grinding in place, stockpiling and treating, and incinerating offsite.
- f. Expected follow-up treatment for duration of contract.

VI. Monitoring Schedule if requested by MassDOT.

Note: The IPMS is critical for identifying pre-construction conditions as well as strategies for minimizing import or spread of invasive plants. Failure to provide an approved IPMS may jeopardize this item, in which case, the contractor will be responsible for management of invasive plants found on-site at no cost to the contract.

Photo Documentation

Digital photos with date and time verification shall be provided with the IPMS and with any follow-up monitoring or reporting.

METHODS**Initial Site Walk**

Prior to any construction activities and soil disturbance, the Contractor shall walk the site with the Engineer and the MassDOT Landscape Architect to determine the IPMS. During the site walk the Contractor shall identify limits of work and, as necessary, mark locations of areas designated for treatment and individual plants targeted for treatment or removal. The Contractor shall be responsible for marking delineated areas and plants to be preserved, removed, or otherwise treated. Fencing or other materials needed for marking and delineating protected areas shall be incidental to this item.

IPMS Follow-up Amendment

The IPMS may be amended to address additional concerns or adjust to conditions if required by the MassDOT Landscape Architect. The amended IPMS shall be submitted to the Engineer and MassDOT Landscape Architect for approval at least fourteen (14) days prior to any proposed treatment.

ITEM 102.33 (Continued)

Interim Site Monitoring Inspection Reports

If required by the MassDOT Landscape Architect and Engineer, Interim Site Monitoring and an accompanying report shall be conducted.

Final Inspection

A final inspection and report documenting the status of the invasive control may be required for regulatory purposes or for instances where control will be continued by others. The report shall include photo documentation of pre-construction (existing) and post-treatment conditions, notations on a plan or aerial image of area treated, summary of treatment performed, and control achieved.

METHOD OF MEASUREMENT

Item 102.33 will be measured for payment by the HOUR. The basis for measurement shall be per the completion of tasks as approved under the Task Summary submittal.

BASIS OF PAYMENT

Item 102.33 will be paid at the Contract unit price per HOUR, which price shall include all labor, materials, equipment, tools, and all incidentals required to complete the work.

Payment shall not include travel time to and from the Contractor's place of business.

ITEM 102.511 TREE PROTECTION – ARMORING AND PRUNING EACH

The work under this Item shall conform to the relevant provisions of Subsection 771 of the Standard Specifications and shall be for furnishing and installing temporary tree trunk protection and for minor limb pruning or removal of lower tree limbs to prevent injury to the tree from construction equipment and activities.

Trunk armoring is for instances where construction activity (the use of heavy equipment) comes close enough to potentially damage the tree trunk or limbs. It is to be used where shown on the plans and as required by the Engineer.

REFERENCES

If requested, the Contractor shall provide to the Engineer one copy of the latest edition of the American National Standards Institute (ANSI) A300 Standard Practices for Tree, Shrub, and Other Woody Plant Maintenance: Part 1-Pruning and Part 5-Construction Management Standard. Provision of reference shall be incidental to this item.

MATERIALS

Trunk armoring shall be such that it prevents damage to the trunk from construction equipment. Selected material shall be such that installation and removal will not damage the trunk.

Acceptable materials include 2x4 wood cladding with wire or metal strapping, or, for instances when duration of construction activities is less than three months, corrugated plastic pipe mounted with duct tape. Height of cladding shall be from base of tree (including root flare) to the bottom of the first branch, eight feet above the ground, or as required by the Engineer. Material and methods shall be approved by the Engineer.

Other materials or methods may be acceptable if approved by MassDOT Landscape Design or by an Arborist (if included in the contract).

METHODS OF WORK

Prior to construction activities, the Engineer, the Contractor, the Town Tree Warden, and the Arborist (if item is included in the contract), shall review trees noted on the plans to be protected. Final decision as to trees armored and/or pruned shall be per the Engineer.

Care shall be taken to avoid damage to the bark during installation and removal of armoring. Trunk armoring shall be replaced and maintained such that it is effective for as long as required and shall be removed immediately upon completion of work activities adjacent to trees.

Pruning of limbs shall conform to the techniques and standards of the most recent ANSI A300 standards.

ITEM 102.511 (Continued)**DAMAGES**

If trees designated for protection under this item are damaged, including root damage from unapproved trespassing onto the root zone, the Contractor shall, at his own expense obtain an Arborist. The Arborist shall be approved by MassDOT.

If, based on the recommendations of the Arborist, the Engineer determines that damages can be remedied by corrective measures, such as repairing trunk or limb injury, soil compaction remediation, pruning, and/or watering, the damage will be repaired as soon as possible within the appropriate season for such work and according to industry standards.

If the Engineer determines that damages are irreparable, the Contractor shall pay for the damages in the amount of \$500.00 per diameter inch at breast height (DBH) per tree.

Additionally, if the Engineer determines that the damages are such that the tree is sufficiently compromised as to pose a future safety hazard, the tree shall be removed. Tree removal will include clean up of all wood parts, grinding of the stump to a depth sufficient to plant a replacement tree or plant, removal of all chips from the stump site, and filling the resulting hole with topsoil.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 102.511 will be measured and paid at the Contract unit price per EACH. This will include full compensation for all labor, equipment, materials, and incidentals for the satisfactory completion of the work and the subsequent removal and satisfactory disposal of the protective materials upon completion of the contract.

In the event of tree damage, cost of Arborist services, of remediation measures, and/or tree removal will be borne by the Contractor.

Payment under this item will be scheduled throughout the length of Contract:

- 40% of value shall be paid upon installation of trunk armoring and completion of pruning work, if required.
- 60% shall be paid at the end of construction operations that would damage the tree and after protection materials have been removed and properly disposed of by the Contractor. In the event of repairable damages, payment shall be made after the completion of remediation measures.

In the event of irreparable damage due to lack of proper protective measures being take there will be no compensation in addition to the \$500.00 per diameter inch damage deduction.

ITEM 102.521 **TREE AND PLANT PROTECTION FENCE** **FOOT**

The work under this Item shall conform to the relevant provisions of Subsections 644 and 771 of the Standard Specifications and the following:

Work under this Item consists of furnishing, installing, removing and resetting, maintaining fence in a vertical and effective position at all times, and final removal of temporary fence.

The purpose of the fence is to prevent damage to tree roots, tree trunks, soil, and all other vegetation within a delineated Tree and Plant Protection Zone (TPPZ) as shown on the plans, as required by the Engineer, and as described herein.

Protection shall be for the duration of the construction activities unless otherwise required.

MATERIALS

Temporary Fence shall be such that it provides a minimum 48-inch tall barrier that remains vertical and effective (not sagging) for the duration of period required. Fence shall be plastic orange safety fence (recommended where high visibility is necessary), wooden snow fencing, or other approved material.

Per the Engineer, additional posts, deeper post depths, and/or additional attachments will be used if the fabric or fence sags, leans or otherwise shows signs of failing to create a sufficient barrier to access.

REFERENCES

If requested, the Contractor shall provide to the Engineer one copy of the American National Standards Institute (ANSI) A300 Standard Practices for Tree, Shrub, and Other Woody Plant Maintenance Part 1, Pruning and Part 5, Construction Management Standard. Provision of reference shall be incidental to this item.

ESTABLISHMENT OF TPPZ

Fencing shall be used for construction areas, staging areas, and stockpile areas as shown on the plans and as required by the Engineer to establish the Tree and Plant Protection Zone (TPPZ).

Fence shall be located as close to the work zone limit and as far from the trunk as possible to maximize the area to be protected. Fence shall run parallel and adjacent to construction activity to create a barrier between the work zone and the root zone or designated limit of plants and soils to be protected.

When construction activities surround (or have the potential to surround) trees or plants to be protected, a circular enclosure shall be used. In these instances, the TPPZ limit shall be the Drip Line of each tree or as close as possible to the Drip Line, and as shown on the plans and details. The Drip Line is defined as the limit of tree canopy.

ITEM 102.521 (Continued)

The Contractor shall not engage in any construction activity within the TPPZ without the approval of the Engineer, including operating, moving, or storing equipment; storing supplies or materials; locating temporary facilities including trailers or portable toilets; and shall not permit employees to traverse the area to access adjacent areas of the project or use the area for lunch or any other work breaks.

METHOD OF WORK

Fence shall be installed prior to any construction work or staging activities and shall be installed and maintained in a vertical and effective position at all times.

Fence shall be repositioned where and as necessary for optimum effectiveness. Repositioning shall be incidental to this item. Fence shall not be moved without prior approval by the Engineer.

The TPPZ shall be protected at all times from compaction of the soil; damage of any kind to trunks, bark, branches, leaves, and roots of all plants; and contamination of the soil with construction materials, debris, silt, fuels, oils, and any chemicals substance.

After construction activities are completed, or when required by the Engineer, fence, stakes, and other materials shall be removed and disposed off-site by the Contractor.

REQUIRED WORK WITHIN THE TPPZ

In the event that grading, trenching, utility work, or storage is unavoidable within the TPPZ, the Engineer shall be notified. Measures may be required for tree protection and preservations, including air spading, the use of six-inch depth of wood chips or approved matting for root protection, pruning of branches, and/or trunk protection. These protection measures will be paid under applicable items.

Landscaping work specified within the TPPZ shall be accomplished by hand tools. Where hand work is not feasible, with permission of the Engineer, work shall be conducted with the smallest mechanized equipment necessary.

TREE AND PLANT DAMAGES OR LOSS

If the TPPZ is intruded upon, at the discretion of the Engineer, the Contractor will be required to provide a more durable barrier (e.g., Jersey Barriers) to secure the area. Cost of furnishing and installing additional or more durable barrier shall be borne by the Contractor.

If the Contractor intrudes into a TPPZ without approval, soil will be considered compacted and tree root damage will be assumed. Action will be taken as specified below.

ITEM 102.521 (Continued)

In the event that trees designated for protection under this Item are damaged, including root damage from unapproved trespassing onto the root zone, the Contractor shall, at his own expense obtain an Arborist. The Arborist shall be approved by MassDOT.

In the event of spills, compaction or damage, the Contractor shall take corrective action immediately using methods approved by the Engineer in coordination with the Arborist.

If, based on the recommendations of the Arborist, the Engineer determines that damages can be remedied by corrective measures, such as repairing trunk or limb injury, soil compaction remediation, pruning, and/or watering, the damage will be repaired as soon as possible within the appropriate season for such work and according to industry standards.

If the Engineer determines that damages are irreparable, the Contractor shall pay for the damages in the amount of \$500.00 per diameter inch at breast height (DBH) per tree.

Additionally, if the Engineer determines that the damages are such that the tree is sufficiently compromised as to pose a future safety hazard, the tree shall be removed. Tree removal will include cleanup of all wood parts, grinding of the stump to a depth sufficient to plant a replacement tree or plant, removal of all chips from the stump site, and filling the resulting hole with topsoil.

Shrubs will be replaced with a plant of similar species and equal size or the largest size plants reasonably available. The Engineer will approve the size and quality of the replacement plant. Replacement will include a minimum of one year of watering and care.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 102.521 will be measured and paid for by the FOOT of Tree and Plant Protection Fence, complete in place. This includes all labor, materials, equipment, maintenance, final removal and disposal of the protective materials, damages repair, and all incidental costs required to complete the work.

Payment of 40 percent of value will be made upon installation of Fence. The remaining 60 percent will be made when protection materials have been removed and disposed off-site.

No separate payment will be made for costs of remedial actions, including addition of more durable barriers, or arborist services, but all costs in connection therewith shall be included in the Contract unit price bid.

In the event of irreparable damage due to lack of proper protective measures being take there will be no compensation in addition to the \$500.00 per diameter inch damage deduction.

ITEM 180.01 ENVIRONMENTAL HEALTH AND SAFETY PROGRAM LUMP SUM

The work shall consist of ensuring the health and safety of the Contractor's employees and subcontracting personnel, the Engineer, their representatives, the environment, and public welfare from any on-site chemical contamination present in air, soil, water and sediment.

The Contractor shall prepare and implement a site-specific Environmental Health and Safety Plan (EHASP) which has been approved and stamped by a Certified Industrial Hygienist (CIH) and includes the preparer's name and work experience. The EHASP shall include appropriate components required by OSHA Standard 29 CFR 1910.120(b) and the Massachusetts Contingency plan (MCP) 310 CMR 40.0018 and must comply with all applicable state and federal laws, regulations, standards and guidelines, and provide a degree of protection and training appropriate for implementation on the project. The EHASP shall be a dynamic document with provision for change to reflect new information, new practices or procedures, changing site environmental conditions or other situations which may affect site workers and the public. The EHASP shall be developed and implemented independently from the standard construction HASP required to work on all MassDOT construction projects.

Health and safety procedures provided by the Contractor shall comply with all the appropriate regulations that address employee working conditions, including but not limited to standards established by OSHA and National Institute for Occupational Safety and Health (NIOSH). Equipment used for the purpose of health and safety shall be approved by and meet pertinent standards and specifications of the appropriate regulatory agencies.

A copy of the most up-to-date version of the EHASP shall be maintained on-site at all times by the Contractor. The on-site copy shall contain the signature of the Engineer and each on-site employee of the MassDOT, Contractor, and Subcontractors involved with on-site activities. The employee's signature on the EHASP shall be deemed prima facie evidence that the employee has read and understands the plan. Updated copies of signature sheets shall be submitted to the Engineer.

The EHASP shall specify a Contractor Site Safety and Health Officer responsible for implementation of the EHASP and to oversee all construction activities, including handling, storage, sampling, and transport, which require contact with or exposure to potentially hazardous materials.

The level of protection, required to ensure the health and safety of on-site personnel will be stipulated in the EHASP. The Site Safety and Health Officer shall implement the EHASP based on changing site and weather conditions, type of operation or activity, chemical compounds identified on-site, concentration of the chemicals, air monitoring data, physical state of the hazardous materials, potential duration of exposure to hazardous materials, dexterity required to perform work, decontamination procedures, necessary personnel and type of equipment to be utilized.

ITEM 180.01 (Continued)

During implementation of the EHASP, a daily log shall be kept by the Site Safety and Health Officer and a copy shall be provided weekly to the Engineer. This log shall be used to record a description of the weather conditions, levels of personal protection being employed, screening data and any other information relevant to on-site environmental safety conditions. The Site Safety and Health Officer shall sign and date the daily log.

Method of Measurement and Basis of Payment

Preparation and implementation of the Environmental Health and Safety Program, including the monitoring, protection and storage of all contaminated materials, as well as subsequent modifications to the EHASP, will be measured and paid for at the Lump Sum Bid Price.

Payment of 50% of the Environmental Health and Safety Program contract price will be made upon the initial acceptance of the EHASP by the Engineer. Payment of the remaining 50% of the Environmental Health and Safety Program contract price will be made upon completion of the work. The bid price shall include preparation and implementation of the EHASP as well as the cost for its enforcement by the Site Safety and Health Officer along with any necessary revisions and updates. The work of implementing the Environmental Health and Safety Program includes work involving, but not limited to, the monitoring, protection, and storage of all contaminated materials.

ITEM 180.02 **PERSONAL PROTECTION LEVEL C UPGRADE** **HOUR**

The work shall consist of providing appropriate personal protective equipment (PPE) for all personnel in an area either containing or suspected of containing a hazardous environment.

Contingencies for upgrading the level of protection for on-site workers will be identified in the EHASP and the Contractor shall have the capability to implement the personal protection upgrade in a timely manner. The protective equipment and its use shall be in compliance with the EHASP and all appropriate regulations and/or standards for employee working conditions.

Personal Protection Level C Upgrade will be measured and paid only upon upgrade to Level C and will be at the contract unit price, per hour, per worker, required in Level C personal protection. No payment will be made to the Contractor to provide Level D PPE.

ITEM 180.03**LICENSED SITE PROFESSIONAL SERVICES****HOUR**

Within limited areas of the project site, soils, sediments and/or groundwater may be contaminated. A Licensed Site Professional (LSP) shall be required to provide the services necessary to comply with the requirements of the MCP. These services may include sampling, analysis and characterization of potentially contaminated media, preparation of Immediate Response Action (IRA) Plans, Utility-Related Abatement Measure (URAM) and Release Abatement Measure (RAM) Plans, Imminent Hazard Evaluations, status reports, transmittal forms, release notification forms, risk assessments, completion statements, and related documents required pursuant to the Massachusetts Contingency Plan (MCP). LSP hours related to the characterization and disposal of contaminated soil and/or sediment are incidental to the disposal items. An estimate of LSP services to be provided shall be submitted to the Engineer for approval before any LSP activity begins.

The name and qualifications of the LSP and all environmental technicians to be assigned to the project shall be submitted to the Engineer for approval at least four weeks prior to initial site activities. The LSP shall have a current, valid license issued by the Massachusetts Board of Registration of Hazardous Waste Site Cleanup Professionals. The LSP shall have significant experience in the oversight of MCP activities at active construction sites. Qualification packages for the LSP and each technician shall include a resume, all recent work assignments with responsibilities identified (previous 5 years), and applicable training and certifications. A list of all Notices of Noncompliance, Notice of Audit Findings and Enforcement Orders issued by the DEP shall be submitted for all work assignments listed for the LSP and environmental technicians.

The LSP shall evaluate soil and/or sediment with discoloration, odor, and presence of petroleum liquid or sheening on the groundwater surface, or any abnormal gas or materials in the ground which are known or suspected to be oil or hazardous materials. Excavated soil and sediment which is suspected of petroleum contamination shall be field screened using the jar headspace procedures according to established DEP Guidance. All field screening equipment must be pre-approved by the Engineer. The LSP shall ensure proper on site calibration of all field screening instrumentation.

The Engineer shall be contacted immediately when observations or any field screening results verify contamination requiring further analysis, and/or enhanced management of suspect soil and/or sediment. Any enhanced management of contaminated soil to ensure proper stockpiling and storage is incidental to the LSP Services item. The LSP shall adequately characterize subsurface conditions prior to backfill in areas where contaminated material has been excavated. The Engineer shall approve the locations of the testing sites prior to the sampling.

ITEM 180.03 (Continued)

Contaminated soil, sediment and/or groundwater shall be handled in accordance with all applicable state and federal statutes, regulations and policies. The LSP shall adequately characterize contaminated media for comparison to the requirements of the MCP. The Contractor and the LSP shall be aware of the reporting requirements for releases of oil and/or other hazardous material (OHM) as set forth in federal and state laws and regulations, and shall both be held responsible for performing the work in accordance with all applicable Federal and State laws and regulations. The LSP shall maintain written records in a clear and concise format which tracks the excavation, stockpiling, analysis and reuse/disposal of all suspect contaminated soils, sediments and groundwater. These records shall be up-to-date and available to the Engineer on a bi-weekly basis. The LSP shall review and summarize the laboratory data from any analyses performed on contaminated media. A report shall be delivered to the Engineer outlining the material sampling methods, laboratory analysis results and proposed course of action. The laboratory report together with Chain of Custody forms for all analytical results shall be submitted to the Engineer within 14 days after completion of such analyses.

The LSP and Contractor shall be held responsible for the submission of all MCP-related documents to the Engineer at least 14 days in advance of any timeframe specified in the MCP and for the timely submission of data and tracking information as noted within this Item. All documents prepared under this Item must be reviewed and signed by the approved LSP. The Contractor and LSP shall be responsible for all fines, penalties and enforcement requirements imposed by applicable regulatory agencies for failure to meet regulatory and contract timeframes. No compensation will be provided for such fines, penalties and enforcement actions.

The Contractor and the LSP shall be aware of the reporting requirements for releases of oil and/or other hazardous material (OHM) as set forth in federal and state laws and regulations, and shall both be held responsible for performing the work in accordance with all applicable Federal and State laws and regulations.

If the Contractor causes a release of OHM, the Contractor shall be responsible for assessing and remediating the release in accordance with all pertinent State and Federal regulations, including securing the services of a LSP, at his own expense.

The LSP shall coordinate all activities involving both MassDOT and the DEP through the Engineer. Any notification of release shall be approved by the Department before submittal to the DEP, except if an imminent hazard condition exists as defined in 309 CMR 4.03(4)(b).

ITEM 180.03 (Continued)**Laboratory Testing in Support of LSP Services**

Laboratory testing provides for analytical testing in support of LSP services related to maintaining MCP compliance, such as delineating the extent and type of contamination present. Sampling and testing for disposal purposes are not included.

In order to maintain compliance with the MCP or other regulatory requirements, the LSP shall request approval from the Engineer to obtain samples from various locations and depths within the project area and to perform laboratory analyses on those samples. The samples shall be delivered to a DEP-certified laboratory using proper chain-of-custody documentation for analyses which, depending upon site conditions and suspected and/or identified contaminants of concern, may include, but are not limited to, metals, polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, polycyclic aromatic hydrocarbons (PAHs), extractable petroleum hydrocarbons (EPHs) and volatile petroleum hydrocarbons (VPHs). Subsequent testing, depending upon initial results, may be required for Toxicity Characteristic Leaching Procedure (TCLP) analyses (EPA Method 1311) for metals.

Method of Measurement and Basis of Payment

LSP Services for work under this item will be measured per person, per hour of service provided by LSP, Environmental Technicians and other approved personnel. Travel time shall not be included in the billable hours. LSP hours related to soil/sediment disposal (disposal characterization, landfill acceptance, disposal package preparation, etc.) shall be incidental to disposal items.

The quantity and type of laboratory tests must be approved by the Engineer beforehand. The contractor will be reimbursed upon satisfactory written evidence of payment. The contractor may be required to obtain cost estimates from three DEP certified laboratories for the Engineer to choose the service provider. Laboratory testing related to soil/sediment disposal (disposal characterization, landfill acceptance, disposal package preparation, etc.) shall be incidental to disposal items.

LSP Services will be paid at the Contractor bid price for each hour, or fraction thereof, spent to perform the work as described above. The bid price shall be a blended rate that includes the cost of the LSP, environmental technicians and other personnel, the performance of all work tasks and field screening, including required equipment, materials and instrumentation, and production of all documentation described above. All requests for payment must be accompanied by the following information: the names of the personnel associated with the work charged under LSP Services, dates and hours worked, work conducted, including, where appropriate, locations as identified on the construction plans, and a copy of the field diary for the dates submitted.

Laboratory Testing will be reimbursed upon receipt of paid invoices for testing approved by the Engineer.

| | | |
|---------------------------|------------------------------------------------------------------|-------------------|
| <u>ITEM 181.11</u> | <u>DISPOSAL OF UNREGULATED SOIL</u> | <u>TON</u> |
| <u>ITEM 181.12</u> | <u>DISPOSAL OF REGULATED SOIL - IN-STATE FACILITY</u> | <u>TON</u> |
| <u>ITEM 181.13</u> | <u>DISPOSAL OF REGULATED SOIL - OUT-OF-STATE FACILITY</u> | <u>TON</u> |
| <u>ITEM 181.14</u> | <u>DISPOSAL OF HAZARDOUS WASTE</u> | <u>TON</u> |

The work under these Items shall include the transportation and disposal of contaminated material excavated, or excavated and stockpiled. It shall also include the cost of any additional laboratory analyses required by a particular disposal facility beyond the standard disposal test set.

Excavation of existing subsurface materials may include the excavation of contaminated soils. The Contractor shall be responsible for the proper coordination of characterization, transport and disposal, recycling or reuse of contaminated soils. Disposal, recycling or reuse will be referred to as “disposal” for the purposes of this specification. However, regardless of the use of the term herein, there will be no compensation under these items for reuse within the project limits. The Contractor will be responsible for coordinating the activities necessary for characterization, transport and disposal of contaminated soils. Such coordination will include the Engineer and his/her designee overseeing management of contaminated materials. Contaminated soils must be disposed of in a manner appropriate for the soil classification as described below and in accordance with the applicable laws of local, state and federal authorities. The Contractor shall be responsible for identifying disposal facility (ies) licensed to accept the class of contaminated soils to be managed and assure that the facility can accept the anticipated volume of soil contemplated by the project. The Contractor shall be responsible for hiring a Licensed Site Professional (LSP) and all ancillary professional services including laboratories as needed for this work. The Contractor will be responsible for obtaining all permits, approvals, manifests, waste profiles, Bills of Lading, etc. subject to the approval of the Engineer prior to the removal of the contaminated soil from the site. The Contractor and LSP shall prepare and submit to the Engineer for approval all documents required under the Massachusetts Contingency Plan (MCP) and related laws and environmental regulations to conduct characterization, transport, and disposal of contaminated materials.

CLASSES OF CONTAMINATED SOILS

The Contractor and its LSP shall determine if soil excavated or soil to be excavated is unregulated soil or contaminated soil as defined in this section. Such materials shall be given a designation for purposes of reuse or disposal based on the criteria of the MCP. Soils and sediments which are not suitable for reuse will be given a designation for purposes of off-site disposal based on the characterization data and disposal facility license requirements. The Classes of Contaminated Soils are defined as follows:

ITEMS 181.11 through 181.14 (Continued)

UNREGULATED SOIL consists of soil, fill and dredged material with measured levels of oil and hazardous material (OHM) contamination at concentrations below the applicable Reportable Concentrations (RCs) presented in the MCP. Unregulated soil consists of material which may be reused (or otherwise disposed) as fill within the Commonwealth of Massachusetts subject to the non-degradation criteria of the MCP (310 CMR 40.0032(3), in a restricted manner, such that they are sent to a location with equal or higher concentrations of similar contaminants. Disposal areas include licensed disposal facilities, approved industrial settings in areas which will be capped or covered with pavement or loamed and seeded, and for purposes of this project should be reused as fill within the project site construction corridor whenever possible. The material cannot be placed in residential and/or environmentally sensitive (e.g. wetlands) areas. Under no circumstances shall contaminated soils be placed in an uncontaminated or less contaminated area (including the area above the groundwater table if this area shows no sign of contamination).

The Contractor shall submit to MassDOT the proposed disposal location for unregulated soils for approval. If such a disposal location is not a licensed disposal facility, the Contractor shall submit to the Engineer analytical data to characterize the disposal area sufficiently to verify that the unregulated material generated within the MassDOT construction project limits is equal to or less than the contaminant levels at the disposal site and meets the non-degradation requirements of the MCP. In addition, the Contractor shall provide written confirmation from the owner of the proposed disposal location that they have been provided with the analytical data for both the materials to be disposed as well as the disposal site characterization and that s/he agrees to accept this material. A Material Shipping Record or Bill of Lading, as appropriate, shall be used to track the off-site disposal of unregulated soil and a copy, signed by the disposal facility or property owner, shall be provided to the Engineer in order to document legal disposal of the unregulated material.

The cost of on-site disposal of unregulated soil within the project area will be considered incidental to the item of work to which it pertains.

ITEMS 181.11 through 181.14 (Continued)

REGULATED SOIL consists of materials containing measurable levels of OHM that are equal to or exceed the applicable Reportable Concentrations for the site as defined by the MCP, 310 CMR 40.0000. Regulated soil which meets the MCP reuse criteria of the applicable soil/groundwater category for this project area may be reused on site provided that it meets the appropriate geotechnical criteria established by the Engineer. Regulated Soil may be reused (as daily or intermediate cover or pre-cap contouring material) or disposed (as buried waste) at lined landfills within the Commonwealth of Massachusetts or at an unlined landfill that is approved by the Massachusetts Department of Environmental Protection (DEP) for accepting such material, in accordance with DEP Policy #COMM-97-001, or at a similar out-of-state facility. It should be noted that soils which exceed the levels and criteria for disposal at in-state landfills, as outlined in COMM-97-001, may be shipped to an in-state landfill, but require approval from the DEP Division of Solid Waste Management and receiving facility. An additional management alternative for this material is recycling into asphalt. Regulated Soils may also be recycled at a DEP approved recycling facility possessing a Class A recycling permit subject to acceptance by the facility and compliance with DEP Policy #BWSC-94-400. Regulated Soil removed from the site for disposal or treatment must be removed via an LSP approved Bill of Lading, Manifest or applicable material tracking form. This type of facility shall be approved/permitted by the State in which it operates to accept the class of contaminated soil in accordance with all applicable local, state and federal regulations.

HAZARDOUS WASTE consists of materials which must be disposed of at a facility permitted and operated in full compliance with Federal Regulation 40 CFR 260-265, Massachusetts Regulation 310 CMR 30.000, Toxic Substances Control Act (TSCA) regulations, or the equivalent regulations of other states, and all other applicable local, state, and federal regulations. All excavated materials classified as hazardous waste shall be disposed of at an out-of-state permitted facility. This facility shall be a RCRA hazardous waste or TSCA facility, or RCRA hazardous waste incinerator. This type of facility shall be approved/permitted by the State in which it operates to accept hazardous waste in accordance with all applicable local, state and federal regulations and shall be permitted to accept all contamination which may be present in the soil excavate. The Contractor shall ensure that, when needed, the facility can accept TSCA waste materials i.e. polychlorinated biphenyls (PCBs). Hazardous waste must be removed from the site for disposal or treatment via an LSP approved Manifest.

MONITORING/SAMPLING/TESTING REQUIREMENTS

The Contractor shall be responsible for monitoring, sampling and testing during and following excavation of contaminated soils to determine the specific class of contaminated material. Monitoring, sampling and testing frequency and techniques should be performed in accordance with Item 180.03 – LSP Services. Additional sampling and analysis may be necessary to meet the requirements of the disposal facility license. The cost of such additional sampling and analysis shall be included in the bid cost for the applicable disposal items. The Contractor shall obtain sufficient information to demonstrate that the contaminated soil meets the disposal criteria set by the receiving facility that will accept the material.

ITEMS 181.11 through 181.14 (Continued)

No excavated material will be permanently placed on-site or removed for off-site disposal until the results of chemical analyses have been received and the materials have been properly classified. The Contractor shall submit to the Engineer results of field and laboratory chemical analyses tests within seven days after their completion, accompanied by the classification of the material determined by the Contractor, and the intended disposition of the material. The Contractor shall submit to the Engineer for review all plans and documents relevant to LSP services, including but not limited to, all documents that must be submitted to the DEP.

WASTE TRACKING:

Copies of the fully executed Weight Slips/Bills of Lading/ Manifests/Material Shipping Records or other material tracking form received by the Contractor from each disposal facility and for each load disposed of at that facility, shall be submitted to Engineer and the Contractor's LSP within three days of receipt by the Contractor. The Contractor is responsible for preparing and submitting such documents for review and signature by the LSP or other appropriate person with signatory authority, three days in advance of transporting soil off-site. The Contractor shall furnish a form attached to each manifest or other material tracking form for all material removed off-site, certifying that the material was delivered to the site approved for the class of material. If the proposed disposition of the material is for reuse within the project construction corridor, the Contractor shall cooperate with MassDOT to obtain a suitable representative sample(s) of the material to establish its structural characteristics in order to meet the applicable structural requirements as fill for the project.

All material transported off-site shall be loaded by the Contractor into properly licensed and permitted vehicles and transported directly to the selected disposal or recycling facility and be accompanied by the applicable shipping paper. At a minimum, truck bodies must be structurally sound with sealed tail gates, and trucks shall be lined and loads covered with a liner, which shall be placed to form a continuous waterproof tarpaulin to protect the load from wind and rain.

DECONTAMINATION OF EQUIPMENT

Tools and equipment which are to be taken from and reused off site shall be decontaminated in accordance with applicable local, state and federal regulations. This requirement shall include, but not be limited to, all tools, heavy machinery and excavating and hauling equipment used during excavation, stockpiling and handling of contaminated material. Decontamination of equipment is considered incidental to the applicable excavation item.

ITEMS 181.11 through 181.14 (Continued)**REGULATORY REQUIREMENTS**

The Contractor shall be responsible for adhering to regulations, specifications and recognized standard practices related to contaminated material handling during excavation and disposal activities. MassDOT shall not be responsible at any time for the Contractor's violation of pertinent State or Federal regulations or endangerment of laborers and others. The Contractor shall comply with all rules, regulations, laws, permits and ordinances of all authorities having jurisdiction including, but not limited to, Massachusetts DEP, the U.S. Environmental Protection Agency (EPA), Federal Department of Transportation (DOT), Massachusetts Water Resources Authority (MWRA), the Commonwealth of Massachusetts and other applicable local, state and federal agencies governing the disposal of contaminated soils.

All labor, materials, equipment and services necessary to make the work comply with such regulations shall be provided by the Contractor without additional cost to MassDOT. Whenever there is a conflict or overlap within the regulations, the most stringent provisions shall apply. The Contractor shall reimburse MassDOT for all costs it incurs, including penalties and/or for fines, as a result of the Contractor's failure to adhere to the regulations, specifications, recognized standard practices, etc., that relate to contaminated material handling, transportation and disposal.

SUBMITTALS**I. Summary of Sampling Results, Classification of Material and Proposed Disposal Option.**

The following information, presented in tabular format, must be submitted to the Engineer for review and approval prior to any reuse on-site or disposal off-site. This requirement is on-going throughout the project duration. At least two weeks prior to the start of any excavation activity, the Contractor shall submit a tracking template to be used to present the information as stipulated below. Excavation will not begin until the format is acceptable to MassDOT.

Characterization Reports will be submitted for all soil, sediment, debris and groundwater characterized through the sampling and analysis program. Each report will include a site plan which identifies the sampling locations represented in the Report. The Construction Plan sheets may be used as a baseplan to record this information.

The Sampling Results will be presented in tabular format. Each sample will be identified by appropriate identification matching the sample identification shown on the Chain of Custody Record. The sample must also be identified by location (e.g. grid number or stockpile number). For each sample, the following information must be listed: the classification (unregulated, regulated, etc.), proposed disposal option for the stockpile or unit of material represented, and, all analytical results.

ITEMS 181.11 through 181.14 (Continued)

Each Characterization Report will include the laboratory analytical report and Chain of Custody Record for the samples included in the Report.

II. Stockpiling, Transport, and Disposal.

At least two weeks prior to the start of any excavation activity, the Contractor shall submit, in writing, the following for review and shall not begin excavation activity until the entire submittal is acceptable to MassDOT.

Excavation and Stockpiling Protocol:

Provide a written description of the management protocols for performing excavation and stockpiling and/or direct loading for transport, referencing the locations and methods of excavating and stockpiling excavated material.

Disposal and Recycling Facilities:

1. Provide the name, address, applicable licenses and approved waste profile for disposal and/or recycling location(s) where contaminated soil will be disposed. Present information substantiating the suitability of proposed sites to receive classifications of materials intended to be disposed there, including the ability of the facility to accept anticipated volumes of material.
2. Provide a summary of the history of compliance actions for each disposal/recycling facility proposed to be used by the Contractor. The compliance history shall include a comprehensive list of any state or federal citations, notices of non-compliance, consent decrees or violations relative to the management of waste (including remediation waste) at the facility. Material should not be sent to facilities which are actively considered by the DEP, USEPA or other responsible agency to be in violation of federal, state or local hazardous waste or hazardous material regulations. MassDOT reserves the right to reject any facility on the basis of poor compliance history.

Transportation:

The name, address, applicable license and insurance certificates of the licensed hauler(s) and equipment and handling methods to be used in excavation, segregation, transport, disposal or recycling.

III. Material Tracking and Analytical Documentation for Reuse/Disposal.

The following documents are required for all excavation, reuse and disposal operations and shall be in the format described. At least two weeks prior to the start of any excavation or demolition activity, the Contractor shall submit the tracking templates required to present the information as stipulated below. Excavation or demolition will not begin until the format is acceptable to MassDOT.

ITEMS 181.11 through 181.14 (Continued)

All soils, sediments and demolition debris must be tracked from the point of excavation to stockpiling to onsite treatment/processing operations to off-site disposal or onsite reuse as applicable.

Demolition Debris:

Demolition debris must be tracked if the debris is stockpiled at a location other than the point of origin or if treatment or material processing is conducted. Identification of locations will be based on the station-offset of the location. The tracking table will identify date and point of generation, any field screening such as PID or dust monitoring, visual observations/comments, quantity, and stockpile ID/processing operation location. For each unit of material tracked, the table will also track reuse of the material on-site, providing reuse date, location of reuse as defined by start and end station, width of reuse location by offset, the fill elevation range, quantity, and finish grade for said location. For demolition debris which is not reused on site, the table will also track disposal of the material as defined by disposal date, quantity and disposal facility. The table must provide a reference to any analytical data generated for the material.

Soil/Sediment:

Soil excavation will be identified based on the station-offset of the excavation location limits. The tracking table will identify date and point of generation, any field screening such as PID or dust monitoring, visual observations, quantity, and stockpile number/location. For each unit of material tracked, the table will also track reuse of the material on-site and disposal of the material off-site using the same categories identified for demolition debris above.

Method Of Measurement And Basis Of Payment

Disposal of contaminated soil shall be measured for payment by the Ton of actual and verified weight of contaminated materials removed and disposed of. The quantities will be determined only by weight slips issued by and signed by the disposal facility. The most cost-effective, legal disposal method shall be used. The work of the LSP for disposal under all of these items shall be incidental to the work with no additional compensation.

ITEM 181.11 Measurement for Disposal of Unregulated Soil shall be under the Contract Unit Price by the weight, in tons, of contaminated materials removed from the site and transported to and disposed of at an approved location or licensed facility, and includes any and all costs for approvals, permits, fees and taxes, additional testing/characterization required by the facility beyond the standard disposal test set, decontamination procedures, transportation and disposal.

ITEM 181.12 Measurement for Disposal of Regulated Soil – In-State Facility shall be under the Contract Unit Price by the weight in tons of contaminated materials removed from the site and transported to and disposed of at an approved in-state facility, and includes any and all costs for approvals, permits, fees and taxes, testing/characterization required by the facility beyond the standard disposal test set, decontamination procedures, transportation and disposal.

ITEMS 181.11 through 181.14 (Continued)

ITEM 181.13 Measurement for Disposal of Regulated Soil - Out-of-State Facility shall be under the Contract Unit Price by the weight in tons of contaminated materials removed from the site and transported to and disposed of at an approved out-of-state facility, and includes any and all costs for approvals, permits, fees and taxes, testing/characterization required by the facility beyond the standard disposal test set, decontamination procedures, transportation and disposal.

ITEM 181.14 Measurement for Disposal of Hazardous Waste shall be under the Contract Unit Price by the weight in tons of hazardous waste removed from the site and transported to and disposed of at the licensed hazardous waste facility, and includes any and all costs for approvals, permits, fees and taxes, testing/characterization required by the facility beyond the standard disposal test set, decontamination procedures, transportation and disposal.

ITEM 184.1

DISPOSAL OF TREATED WOOD PRODUCTS

TON

(Rev 08/09/2016)

Work under this item shall include the transportation and disposal of all treated existing wood product as required by the Engineer.

The timber components of the existing structure are suspected to be treated with creosote, pentachlorophenol and/or CCA. This item shall include all costs for sampling, laboratory testing, loading, transportation and disposal of the treated wood. The Contractor is required to submit disposal manifests to the Engineer prior to the completion of the project. All aspects of this Item are to be completed in accordance with state and federal regulations.

Compensation

Measurement and payment will be by the weight, in tons, of treated timber transported and accepted at a licensed facility. The work shall be considered full compensation for all labor, tools, equipment, materials, testing, loading, transportation, approvals, and permits necessary for the completion of the work.

ITEM 201.
ITEM 202.

CATCH BASIN
MANHOLE

EACH
EACH

The work under these Items shall conform to the relevant provisions of Subsections 150 and 201 of the Standard Specifications and the following:

All castings located within the pavement area shall not be set to finished grade until after the binder course has been placed.

The Contractor shall install brick and concrete shelves as shown in the manhole Standard Details.

All catch basins and manholes shall be placed on a bedding of 6 inches crushed stone as determined by the Engineer to remove unsuitable material and provide a stable structure foundation in accordance with Subsection 150.68 of the Standard Specifications.

Where required, cone sections of manholes and catch basins shall be replaced by flat top sections or eccentric sections at no additional cost.

All frames shall be set in a concrete collar conforming to Construction Standard Detail E 202.9.0 prior to placement of top course. All frames shall be set on a minimum of two courses of mortared brick or precast grade rings as specified in the Standard Specifications. Cost of such work shall be included in the cost of the structure or item of which it forms a part.

Where new catch basins or manholes are shown on the drawings to be constructed over existing pipes, the work shall also include the connecting of the pipe to the structures and the necessary cutting and removal of the existing pipe within the structures. The existing pipe shall be neatly cut to provide a smooth uniform face flush with the inside wall surface of the structure and totally removed or neatly cut longitudinally and partially removed to retain the lower half of the existing pipe barrel to form the required (manhole) shaped invert.

All proposed catch basins shall be constructed with a minimum 4-foot sump.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

The method of measurement and basis of payment will be as per Subsections 201.80 & 201.81 of the Standard Specifications.

Over excavation to remove unsuitable subgrade material and provide a stable foundation, as determined by the Engineer, will be paid for under Item 142. Class B Trench Excavation.

Crushed stone bedding material, as required by the Engineer to provide a stable foundation, will be paid for under Item 156. Crushed Stone.

ITEM 221.

FRAME AND COVER

EACH

Work under this Item shall be in accordance with the relevant provisions of Subsection 220 of the Standard Specifications and the following:

DESCRIPTION

Manhole covers shall have a diamond pattern; pick holes and the appropriate word “DRAIN” or “SEWER” cast in 3-inch letters to match the corresponding utility.

Casting frames shall be set in a full mortar bed with bricks, a maximum of 8 inches thick. All castings shall be set in a full concrete collar, conforming to Construction Standard Detail E 202.9.0. Concrete collar shall be included in the cost of the structure.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 221. will be measured and paid for in accordance with the provisions of Subsections 220.80 and 201.81 of the Standard Specifications.

ITEM 272.12 12 INCH AND UNDER PIPE REMOVED AND DISCARDED FOOT

The work under this Item shall conform to the relevant provisions of Subsection 230 of the Standard Specifications and the following:

The work under this Item shall consist of removing and discarding abandoned drainage and sewer pipe and backfilling trench with gravel borrow as required and as designated on the Plans to be removed and are located outside the pay limits of excavation required under other items of Work. The pipe shall become the property of the Contractor and shall be removed from the project and disposed of legally.

Existing utility pipes designated on the Plans to be removed and are located within the excavation limits of other work shall be considered incidental to that item of work.

METHOD OF MEASUREMENT

Item 272.12 will be measured for payment by the FOOT of pipe removed and discarded. No additional measurement will be made for any bells or overlapping segments.

BASIS OF PAYMENT

Item 272.12 will be paid for at the Contract unit price per FOOT, which price shall include all labor, materials, equipment, and all incidental costs required to complete the work. No separate payment will be made for excavation regardless of depth, gravel borrow backfill and compaction, but all costs in connection therewith shall be included in the Contract unit bid price.

ITEM 371.06

6 INCH COUPLING

EACH

The work under this Item shall conform to the relevant provisions of Subsection 301 of the Standard Specifications and the following:

Couplings shall be ductile iron solid sleeves and used as required by the Engineer only when conditions encountered do not permit the joining of new water pipe and fittings with the existing water pipe when relocating or lowering a water main is required.

METHOD OF MEASUREMENT

Item 371.06 will be measured for payment by the EACH, complete in place.

BASIS OF PAYMENT

Item 371.06 will be paid for at the Contract unit price per EACH., which price shall include all labor, material, equipment, and incidental costs required to complete the work.

ITEM 376.1 **HYDRANT – EXCLUDING COST OF HYDRANT** **EACH**

The work under this Item shall conform to the relevant provisions of Subsection 301 of the Standard Specifications and the following:

The work shall consist of installing hydrants provided by the Town.

The Contractor shall coordinate with the Town for a time to pick up hydrant from the Town's Water Department (1 Milestone Road, Nantucket MA). The Contractor shall then transport the hydrant to the work site. All other construction methods shall be per the relevant provisions of Subsection 301 of the Standard Specifications.

METHOD OF MEASUREMENT

Item 376.1 will be measured for payment by the EACH Hydrant installed, complete in place.

BASIS OF PAYMENT

Item 376.1 will be paid for at the Contract unit price per EACH, which price shall include all labor, materials, equipment, and all incidental costs required to complete the work.

ITEM 376.3 **HYDRANT – REMOVED AND STACKED** **EACH**

The work under this item shall conform to the relevant provisions of Subsection 301 of the Standard Specifications and the following:

The work shall consist of removing existing hydrants as noted on the plans and stacking said hydrants at a protected location on site for removal by the Town.

CONSTRUCTION METHODS

The Contractor shall stack hydrants in a temporary stockpile prior to transporting. The Contractor is responsible for the protection of the hydrants until removed by the Town.

A certified notice (with a copy sent to the Engineer) shall be sent to the owner of the material advising him that it is available for removal. The Contractor's responsibility shall cease upon final acceptance of the work or 60 days from the time the certified notice is sent to the owner.

Hydrants lost, damaged, or otherwise made unsuitable for reuse during removal, transportation, or storage, through lack of protection or carelessness on the part of the Contractor, shall be replaced by the Contractor at his own expense.

If the Engineer determines that any part of the stacked material is unsuitable for reuse, or if other owners decide to abandon part or all of such materials, said materials shall become the property of the Contractor, and the Contractor shall dispose of them away from the site. Compensation for the removal and disposal of unsuitable or abandoned materials shall be included under the respective remove and stack item.

The Contractor shall backfill with compacted gravel all holes resulting from the removal of the existing hydrant and restore the area to match existing conditions of adjacent areas.

METHOD OF MEASUREMENT

Item 376.3 will be measured for payment by the EACH hydrant removed and stacked.

BASIS OF PAYMENT

Item 376.3 will be paid for at the Contract unit price per EACH, which price shall include all labor, materials, equipment, and incidental costs required to complete the work. No separate payment will be made for removal and stacking of hydrant assembly, excavation, backfill and area restoration, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 382.3

METER BOX ADJUSTED

EACH

The work under this Item shall conform to the relevant provisions of Subsection 301 of the Standard Specifications and the following:

DESCRIPTION

The work shall include adjusting existing water meter boxes, generally located in or adjacent to driveways at property lines, to match the proposed line and grade. The work shall also include setting the frame and cover in a concrete collar conforming to Standard Detail 202.9.0 prior to placement of final pavement.

METHOD OF MEASUREMENT

Item 382.3 will be measured for payment by the EACH, regardless of how much the frame needs to be adjusted to meet proposed grade.

BASIS OF PAYMENT

Item 382.3 will be paid for at the Contract unit price per EACH, which price shall include all labor, materials, equipment, and all incidental costs required to complete the work.

ITEM 470.2 **HOT MIX ASPHALT BERM, TYPE A – MODIFIED** **FOOT**

The work under this Item shall conform to the relevant provisions of Subsection 470 of the Standard Specifications and the following:

CONSTRUCTION METHODS

Hot Mix Asphalt Berm, Type A – Modified, shall be constructed by means of an approved extrusion machine in conformance with the dimensions and at the locations shown on the Plans.

METHOD OF MEASUREMENT

Item 470.2 will be measured for payment by the FOOT of Hot Mix Asphalt Berm, Type A – Modified installed, complete in place.

BASIS OF PAYMENT

Item 470.2 will be paid for at the Contract unit price per FOOT; which price shall include all labor, materials, equipment, and incidental costs required to complete the work.

ITEM 697.1**SILT SACK****EACH**

Work under this Item shall conform to the relevant provisions of Subsections 227 and 670 of the Standard Specifications and the following:

The work under this Item includes the furnishing, installation, maintenance and removal of a reusable fabric sack to be installed in drainage structures for the protection of wetlands and other resource areas and the prevention of silt and sediment from the construction site from entering the storm water collection system. Devices shall be ACF Environmental (800)-448-3636; Reed & Graham, Inc. Geosynthetics (888)-381-0800; The BMP Store (800)-644-9223; or approved equal.

CONSTRUCTION

Silt sacks shall be installed in retained existing and proposed catch basins and drop inlets within the project limits and as required by the Resident Engineer.

The silt sack shall be as manufactured to fit the opening of the drainage structure under regular flow conditions, and shall be mounted under the grate. The insert shall be secured from the surface such that the grate can be removed without the insert discharging into the structure. The filter material shall be installed and maintained in accordance with the manufacturer's written literature and as required by the Engineer.

Silt sacks shall remain in place until the placement of the pavement overlay or top course and the graded areas have become permanently stabilized by vegetative growth. All materials used for the filter fabric will become the property of the Contractor and shall be removed from the site.

The Contractor shall inspect the condition of silt sacks after each rainstorm and during major rain events. Silt sacks shall be cleaned periodically to remove and disposed of accumulated debris as required. Silt sacks, which become damaged during construction operations, shall be repaired or replaced immediately at no additional cost to the Department.

When emptying the silt sack, the Contractor shall take all due care to prevent sediment from entering the structure. Any silt or other debris found in the drainage system at the end of construction shall be removed at the Contractors expense. The silt and sediment from the silt sack shall be legally disposed of offsite. Under no condition shall silt and sediment from the insert be deposited on site and used in construction.

All curb openings shall be blocked to prevent stormwater from bypassing the device.

All debris accumulated in silt sacks shall be handled and disposed of as specified in Subsection 227 of the Standard Specifications

ITEM 697.1 (Continued)

COMPENSATION

Silt sacks will be measured and paid at the Contract unit price per EACH, complete in place, which price shall include all labor, materials, equipment, and incidental costs required to complete the work. No separate payment will be made for removal and disposal of the sediment from the insert, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 698.3 **GEOTEXTILE FABRIC FOR SEPARATION** **SQUARE YARD**

The work under this Item shall consist of placing a geotextile fabric in the construction of Stone for Pipe Ends and Modified Rockfill at the Infiltration Basin.

The geotextile fabric shall conform to Department Material Specification for Geotextile Fabric Separation in Subsection M9.50.0 of the Standard Specifications.

CONSTRUCTION

Fabric shall be placed in intimate contact with the crushed stone. Seams shall be overlapped by at least two feet. If the Contractor elects to sew seams instead of overlap, colored thread must be used. The Contractor shall take care not to allow more than two weeks of exposure to direct sunlight. Fabric rolls shall not be dropped more than two feet.

METHOD OF MEASUREMENT

Item 698.3 will be measured for payment by the SQUARE YARD of Geotextile Fabric for Separation furnished and installed, complete in place. No additional payment will be made for overlapping material.

BASIS OF PAYMENT

Item 698.3 will be paid for at the Contract unit price per SQUARE YARD, which price shall include all labor, materials, equipment, and all incidental costs required to complete the work.

ITEM 701.2 CEMENT CONCRETE PEDESTRIAN CURB RAMP SQUARE YARD

The work under this Item shall conform to the relevant provisions of Subsection 701 of the Standard Specifications and the following:

Detectable warning panels shall be brick red.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 701.2 will be measured and paid for in accordance with the provisions of Subsections 701.80 and 701.81 of the Standard Specifications.

ITEM 740. ENGINEER'S FIELD OFFICE AND EQUIPMENT (TYPE A) MONTH

The work under this Item shall conform to the relevant provisions of Subsection 740 of the Standard Specifications and the following:

Two computer systems and a printer system meeting minimum requirements set forth below including installation, maintenance, power, paper, disks, and other supplies shall be provided at the Resident Engineer's Office:

All equipment shall be UL approved and Energy Star compliant.

The Computer System shall meet the following minimum criteria or better:

| | |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Processor: | Intel, 3.5 GHz |
| System Memory (RAM): | 12 GB |
| Hard Drive: | 500 GB |
| Optical Drive: | DVD-RW/DVD+RW/CD-RW/CD+RW |
| Graphics Card: | 8 GB |
| Network Adapter: | 10/100 Mbit/s |
| USB Ports: | 6 USB 3.0 ports |
| Keyboard: | Generic |
| Mouse: | Optical mouse with scroll, MS-Mouse compliant |
| Video/Audio | the computer system shall be capable of allow video calling and recording: |
| Video camera | shall be High Definition 1080p widescreen capable video calling and recording with built in microphone. The microphone system shall capture natural audio while filtering out background noise. |
| Audio | shall be stereo multimedia speaker system delivering premium sound. |
| OS: | Latest Windows Professional with all security updates |
| Web Browser: | Latest Internet Explorer with all security updates |
| Applications: | Latest MS Office Professional with all security updates Latest Adobe Acrobat Professional with all security updates Latest Autodesk AutoCAD LT Antivirus software with all current security updates maintained through the life of the contract. |
| Monitors: | Two 27" LED with Full HD resolution. Max. resolution 1920 x 1080 |
| Flash drives: | 2 (two) - 128GB USB 3.0 |
| Internet access: | High Speed (min. 24 mbps) internet access with wireless router. |

ITEM 740. (Continued)

The Multifunction Printer System shall meet the following minimum criteria or better:

Color laser printer, fax, scanner, email and copier all in one with the following minimum capabilities:

- Estimated volume 8,000 pages per month
- LCD touch panel display
- 50 page reversing automatic document feeder
- Reduction/enlargement capability
- Ability to copy and print 11" x 17" paper size
- email and network pc connectivity
- Microsoft and Apple compatibility
- ability to overwrite latent images on hard drive
- 600 x 600 dpi capability
- 30 pages per minute print speed (color),
- 4 Paper Trays Standard (RADF) (not including the bypass tray)
- Automatic duplexing
- Finisher with staple functions
- Standard Ethernet. Print Controller
- Scan documents to PDF, PC and USB
- ability to print with authenticated access protection

The Contractor shall supply a maintenance contract for next day service, and all supplies (toner, staples, paper) necessary to meet estimated monthly usage.

The Engineer's Field Office and the equipment included herein including the computer systems, and printer shall remain the property of the Contractor at the completion of the project. Disks, flash drives, and card readers with cards shall become the property of the Department.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Compensation for this work will be made at the Contract unit price per MONTH which price includes full compensation for all services and equipment, and incidentals necessary to provide equipment, maintenance, insurance as specified and as required by the Engineer.

ITEM 751.01

SANDY LOAM

CUBIC YARD

Loam shall meet the requirements of Subsection 751. of the Standard Specifications except that the texture analysis (sieve analysis) shall meet the parameters of sandy loam, as defined by the USDA. (see [Soil Texture Calculator | Natural Resources Conservation Service \(usda.gov\)](#))

ITEM 751.8

TILLING

SQUARE YARD

The work under this Item shall conform to the relevant provisions of Subsection 751 of the Standard Specifications and the following:

The work under this Item shall include preparing the soil within planting beds that are coincidental with construction staging areas to allow for root growth and infiltration of water by alleviating soil compaction using tilling equipment.

CONSTRUCTION METHODS

Soil shall be tilled to a 6" depth within the planting bed limits using tilling equipment such as a chisel plow, ripper, or subsoiler. The Contractor shall notify the Engineer when the planting areas have been fully graded and tilled. The Engineer shall inspect these locations as necessary.

METHOD OF MEASUREMENT

Item 751.8 will be measured for payment by the SQUARE YARD of soil tilled within planting beds that are coincidental with construction staging areas, complete in place.

BASIS OF PAYMENT

Item 751.8 will be paid for at the Contract unit price per SQUARE YARD, which price shall include all labor, materials, equipment, and all incidental costs required to complete the work.

ITEM 756. NPDES STORM WATER POLLUTION PREVENTION PLAN LUMP SUM

This Item addresses the preparation and implementation of a Storm Water Pollution Prevention Plan required by the National Pollutant Discharge Elimination System (NPDES) and applicable Construction General Permit (CGP) issued by the U.S. Environmental Protection Agency (EPA).

Pursuant to the Federal Clean Water Act, construction activities which disturb one acre or more are required to apply to the EPA for coverage under the NPDES General Permit for Storm Water Discharges from Construction Activities. The Contractor shall be fully responsible for compliance with the most recently issued CGP and any subsequent revisions. Should a fine or penalty be assessed against it, or MassDOT, as a result of a local, state, or federal enforcement action due to non-compliance with the CGP, the Contractor shall take full responsibility.

The NPDES CGP requires the submission of a Notice of Intent (NOI) to the EPA prior to the start of construction (defined as any activity which disturbs land, including clearing and grubbing). There is a fourteen (14) day review period commencing from the date on which EPA enters the Notice into their database. Based on the review of the NOI, EPA may require additional information, including but not limited to, the submission of the Storm Water Pollution Prevention Plan (SWPPP) for review. Work may not commence on the project until final authorization has been granted by EPA. Any additional time required by EPA for review of submittals will not constitute a basis for claim of delay.

In addition, if the project discharges to an Outstanding Resource Water, vernal pool, or is within a coastal ACEC as identified by the Massachusetts Department of Environmental Protection (DEP), a separate notification to DEP is required. DEP may also require submission of the Storm Water Pollution Prevention Plan for review and approval. Filing fees associated with the notification to DEP and, if required, the SWPPP filing to DEP shall be paid by the Contractor.

The CGP also requires the preparation and implementation of a SWPPP in accordance with the afore-mentioned statutes and regulations. The Plan will include the CGP conditions and detailed descriptions of controls of erosion and sedimentation to be implemented during construction. The contractor shall prepare the SWPPP and update it as necessary. The Contractor shall submit the Plan to the Engineer for approval at least four (4) weeks prior to any site activities. It is the responsibility of the Contractor to comply with the CGP conditions and the conditions of any state Wetlands Protection Act Order, Water Quality Certification, Corps of Engineers Section 404 Permit and other environmental permits applicable to the project and to include in the SWPPP the methods and means necessary to comply with applicable conditions of said permits.

ITEM 756. (Continued)

It is the responsibility of the Contractor to complete the SWPPP in accordance with the EPA CGP, provide all information required, and obtain any and all certifications as required by the CGP. Any amendments to the SWPPP required by site conditions, schedule changes, revised work, regulations, construction methodologies, and the like are the responsibility of the Contractor. Amendments will require the approval of the Engineer prior to implementation.

In addition to the CGP requirements for inspections, MassDOT requires inspection of all erosion controls and site conditions on a weekly basis. Inspections are also required at portions of sites that discharge to sediment or nutrient impaired or high quality waters per the CGP when each incidence of rainfall exceeding 0.25 inches in twenty-four hours or after snowmelt discharge from a storm event that produces 3.25 inches or more of snow within twenty-four hours occurs. The CGP requires that inspections be performed by a qualified individual as outlined in the CGP. MassDOT requires proof of completion of a 4 hour minimum sedimentation and erosion control training class current to the latest CGP. This individual can be, but not limited to, someone that is either a certified inspector, certified professional, or certified storm water inspector. The documentation shall be included as an appendix in the SWPPP. The inspector's qualifications shall be submitted to the Engineer for approval prior to beginning any work. This individual shall be on-site during construction to perform these inspections. In addition, if the Engineer determines at any time that the inspector's performance is inadequate, the Contractor shall provide an alternate inspector. Written weekly inspection forms, storm event inspection forms, and Monthly Summary Reports must be completed and provided to the Engineer. Monthly Summary Reports must include a summary of construction activities undertaken during the reporting period, general site conditions, erosion control maintenance and corrective actions taken, the anticipated schedule of construction activities for the next reporting period, any SWPPP amendments, and representative photographs.

The Contractor is responsible for preparation of the Plan, all SWPPP certifications, inspections, reports and any and all corrective actions necessary to comply with the provisions of the CGP. The Standard Specifications require adequate erosion control for the duration of the Contract. All control measures must be properly selected, installed, and maintained in accordance with manufacturer specifications and good engineering practices. If periodic inspections or other information indicates a control has been used inappropriately or is no longer adequate, it is the responsibility of the Contractor to replace or modify the control for site conditions at no additional cost to the Department. Contractor must maintain all control measures and other protective measures in effective operating conditions and shall consider replacement of erosion controls for each construction season.

This Item addresses acceptable completion of the SWPPP, any revisions/amendments required during construction, and preparation of monthly reports. In addition, any erosion controls beyond those specified in bid items which are selected by the Contractor to facilitate and/or address the Contractor's schedule, methods and prosecution of the work shall be considered incidental to this item.

ITEM 756. (Continued)

The CGP provides specific requirements for temporary and final stabilization. This shall be incorporated into the project schedule. The permit defines specific deadline requirements for Initial Stabilization (“immediately”, i.e., no later than the end of the next work day following the day when earth-disturbing activities have temporarily or permanently ceased) and for Complete Stabilization Activities (no later than 14 calendar days after the initiation of stabilization). Stabilization criteria for vegetative and non-vegetative measures are provided in the CGP.

The CGP requires the submission of a Notice of Termination (NOT) from all operators when final stabilization has been achieved, as well as removal and proper disposal of all construction materials, waste and waste handling devices, removal of all equipment and construction vehicles, removal of all temporary stormwater controls, etc. Approval of final stabilization by the Engineer and confirmation of submission of the NOT will be required prior to submission of the Resident Engineer’s Final Estimate. The permittee shall use EPA’s website to prepare and submit the NOT.

BASIS OF PAYMENT

Payment for all work under this Item shall be made at the contract unit price, lump sum, which shall include all work detailed above, including Plan preparation, required revisions, revisions/addenda during construction, monthly reports and filing fees.

Payment of fifty (50) % of the contract price shall be made upon acceptance of the NPDES Stormwater Pollution Prevention plan. Payment of forty (40) % of the contract price shall be made in equal installments over the expected duration of stormwater pollution prevention measures. Payment of the final ten (10) % of the contract price shall be paid upon satisfactory submission of a Notice of termination (NOT) when final stabilization has been achieved.

ITEM 765.554 WETLAND SEED - SEASONALLY FLOODED MIX POUND

Work under this item shall consist of furnishing the mix(es) specified below in the required quantity.

SUBMITTALS

- 1) Pre-Verification of Seed Availability. Within 30 days after the Notice to Proceed, the Contractor shall submit to the Engineer the supplier's verification of availability of seed species in the required quantities and for the anticipated date of seeding. Verification shall be on the supplier's letterhead and notarized by the supplier's notary. Species not expected to be available should be noted and substitutions recommended.
- 2) Final Verification of Seed Availability. No earlier than 21 days prior to ordering, the Contractor shall submit to the Engineer the supplier's verification of availability of seed species and in the required quantities. Verification shall be on the supplier's letterhead and notarized by the supplier's notary. A copy of this submittal shall be forwarded to the MassDOT Landscape Design Section. Substitutions or changes in the mix at this time must be approved by MassDOT Landscape Design Section.
- 3) Seed Worksheet provided herein shall be submitted to the Engineer prior to ordering seed to determine the number of pounds of Pure Live Seed required.
- 4) Seed Tags. The contractor shall submit original seed tags from each bag of seed used on the project or ensure that each tag is photo documented by the Engineer while on the unopened bag.

Number of tags submitted must correspond to number of bags delivered.

Species listed on the seed tag shall match the Final Verification of Seed Availability (Submittal #2) unless approved otherwise. Tag must include variety and species name; lot number; purity; percentage of inert matter; percentage of weeds, noxious seeds, and other crop seeds; germination, dormant or hard seed; total viability; origin of seed; germination test date, net weight, and name and address of seller. The origin of seed must be listed on the seed tag for all species in the mix to provide verification of original (generation 0) seed source. The smallest known geographic area (township, county, ecotype region, etc.) shall be listed. Ecotypes and cultivars shall be as close to Massachusetts as possible and appropriate to the site conditions.

A copy of this submittal shall be forwarded to the MassDOT Landscape Design Section.

- 5) Verification of Seed Delivery. Prior to payment, contractor shall submit the Seed Delivery Verification form contained within the contract or the Supplier's Verification on company letterhead or a bill of lading. Supplier verification must include all information requested on the Verification form within this contract. The bill of lading must include variety and species name, lot number, net weight shipped, date of sale, invoice, project or seeding location, and name and address of Supplier. All information must be filled in and complete for acceptance. Information must match the seed tags and quantity of seed used on the job. A copy of this submittal shall be forwarded to the MassDOT Landscape Design Section

ITEM 765.554 (Continued)

- 6) Seed Sample. If requested or if seed is from a previously opened bag, the contractor may be asked to submit to the Engineer a sample of seed from the seed bag (1-2 cups) at the time of seeding.

SEEDING SEASON

The appropriate seeding seasons are:

Spring: April 1 - May 15

Fall: October 1 - December 1 for dormant seeding

PERMANENT SEED MIX(ES)

Calculating Pure Live Seed (PLS)

Quantities specified are PURE LIVE SEED. Greater quantities of ordered seed may be required to achieve actual specified seeding rates.

Pure Live Seed (PLS) is defined as a percentage calculated by multiplying the percent of pure seed by the percent of viable seed (total germination, hard seed, and dormant seed). For example:

If a seed label indicates 90% purity, 78% germination, 10% hard seed, and 2% dormancy, it is calculated to be $90\% \times [78 + 10 + 2]\% = 81\%$ PLS.

Therefore, each pound of PLS would need $1 \text{ pound} / 0.81 = 1.2$ pounds of seed with a 90% purity and 90% total germination

Seed Mix(es) shall be as specified below. Ecotypes and cultivars shall be as close to Massachusetts as possible and appropriate to the site conditions.

ITEM 765.554 (Continued)

Wetland Seed – Seasonally Flooded Mix

| | <u>Botanical Name</u> | <u>Common Name</u> | <u>% PLS by Weight</u> |
|-----------|--------------------------------|-------------------------|------------------------|
| Grass | Elymus riparius | Riverbank Wild Rye | 20.00% |
| | Andropogon gerardii NY Ecotype | Big Bluestem NY Ecotype | 12.00% |
| | Carex lupulina | Hop Sedge | 10.00% |
| | Panicum clandestinum ‘Tioga’ | Deer Tongue ‘Tioga’ | 10.00% |
| | Carex vulpinoidea | Fox Sedge | 10.00% |
| | Carex scoparia | Broom Sedge | 8.00% |
| | Sorghastrum nutans NY Ecotype | Indiangrass NY Ecotype | 8.00% |
| | Panicum virgatum | Switch Grass | 8.00% |
| | Juncus effusus | Soft Rush | 2.00% |
| | Juncus tenuis | Path Rush | 1.00% |
| | | | 89.00% |
| Herb/Forb | Verbena hastata | Blue Vervain | 4.00% |
| | Desmodium canadense | Showy Tick Trefoil | 2.00% |
| | Eupatorium maculatum | Joe-Pye Weed | 1.00% |
| | Asclepias incarnata | Swamp Milkweed | 1.00% |
| | Aster novae-angliae | New England Aster | 1.00% |
| | Eupatorium perfoliatum | Boneset | 0.70% |
| | Helenium autumnale | Common Sneezeweed | 0.50% |
| | Aster puniceus | Aster – Swamp | 0.50% |
| | Mimulus ringens | Monkey Flower | 0.20% |
| | Vernonia noveboracensis | New York Ironweed | 0.10% |
| | | | 11.00% |
| | | | 100.00% |

Application Rate

Wetland Seed – Seasonally Flooded Mix Application Rate: 20 lbs/acre PLS. No cover crop shall be applied.

Any species substitutions shall be with a species having similar characteristics and function. Substitutions must be approved by MassDOT Landscape Design Section per the documentation submittal process.

50% Increase Adjustment for Field Conditions

Seeding under the following conditions requires a 50% increase in the permanent mix at the time of construction:

- Seeding out of season
OR
- Seeding after Compost Blanket has been applied (unless already increased for out of season).

ITEM 765.554 (Continued)

NATIVE SEED WORKSHEET

Project Description: _____ Project No: _____

Contractor: _____ Contract No: _____

Seed Mix Number & Description: _____

Contractor: Complete Prior To Ordering

Pounds of Seed Required Per Contract:

_____ lbs./acre for _____ Acre(s) OR _____ SY

Additional 50% increase if required (out of season or seeding over compost blanket):

_____ **lbs. Total Seed Required**

Calculated Quantity for **Pure Live Seed (PLS¹)**:

_____ **Total Pounds PLS**

Engineer: Verification at Time of Application

Number pounds delivered to site²: _____ Date(s): _____

Actual Seed Bag Tag/s Received or photo documented by Engineer: _____

¹ PLS=% pure seed x % viable seed (total germination, hard seed, and dormant seed).

²Quantity delivered should match pounds **Total Pounds PLS** and **Verification of Seed Delivery**. Pounds should be shown on each Seed Tag.

ITEM 765.554 (Continued)

SUPPLIER VERIFICATION OF SEED DELIVERY FOR MASSDOT PROJECTS

Date _____

We hereby certify that (*Seed Supplier*): _____

Furnished to (*Contractor*): _____

For use on: (*Project Description*) _____

Project #: _____ Contract #: _____

Pounds of Pure Live Seed: _____

Of Mix (*Description*): _____

Lot Number _____

The material was delivered on (*Date*) _____.

The labels and contents meet all State and Federal regulations. The mixture consists of the following species, including cultivars (as applicable) and ecotype region, and at the following percentages (may be attached separately):

Name (print): _____ Title: _____

Supplier: _____

Signature and Seal: _____

ITEM 765.554 (Continued)

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Wetland Seed – Seasonally Flooded Mix will be measured for payment by the pound of Pure Live Seed delivered and complete in place.

Wetland Seed – Seasonally Flooded Mix will be paid at the Contract unit price per POUND of Pure Live Seed delivered upon approval of all Seed Submittal Documentation. Overseeding required to correct poor germination or establishment shall be incidental to the item.

Application and care of Wetland Seed – Seasonally Flooded Mix will be paid for separately under Item 765.635 Native Seeding and Establishment.

ITEM 765.635 NATIVE SEEDING AND ESTABLISHMENT SQUARE YARD

Work shall conform to the relevant provisions of Subsections 765 and 767 of the Standard Specifications and the following:

The work under this Item shall consist of seeding, mowing, and other care to establish a stand of grass at the infiltration basin or as required by the Engineer. For the purposes of these specifications, the term “grass” shall apply to all the forbs, grasses, sedges, and rushes included in the materials.

QUALIFICATIONS

Seeding shall be done by a company having a minimum of five years of experience with native seed establishment. Prior to beginning work, the seeding Contractor shall furnish proof of qualifications to the Engineer for approval. Proof of qualifications shall include providing documentation (photos and contacts) to demonstrate knowledge and expertise with native seeding and establishment and proof of having completed successful native seeding projects.

SEEDING SEASON

Seeding seasons for native mixes is April 1 - May 15 and October 1 - December 1 for dormant seeding. Written approval must be obtained for seeding outside the seeding season and, if approved, the permanent seed rate shall be increased by 50%.

Seeding season for cover crops shall be grain oats January 1 – July 31 and grain rye August 1 – December 1.

MATERIAL AND SUBMITTALS

Seed Mixes and Submittals shall be per the item(s) for permanent and annual (cover crop) seed mixes.

Compost Blanket, if used, shall meet the material and submittal requirements for that item.

Hydromulch shall be wood fiber or straw applied per the Standard Specifications and at the rates specified below and per the manufacturer.

A certified statement shall be furnished, prior to start of work, to the Engineer by the Contractor as to the number of pounds of hydromulch, tackifier, and seed, per 100 gallons of water and as applicable to products used. This statement should also specify the number of square yards of seeding that can be covered with the solution specified above.

Fertilizer

No fertilizers shall be applied.

ITEM 765.635 (Continued)**Water**

Water, including hose and all other watering equipment required for the work, shall be furnished by the Contractor to the site at no additional cost. Water shall be suitable for irrigation and free from ingredients harmful to plant life. All plants injured or work damaged due to the lack of water or the use of too much water shall be the Contractor's responsibility to correct.

SEEDING

Hand broadcast method shall be used for all areas smaller than half an acre and when specified on the plans for areas over half an acre.

Seeding shall occur within 72 hours of placement of loam and final grading or the Contractor shall propose a reasonable, alternative schedule that shall be approved by the Engineer.

Surface Preparation

No seeding or soil preparation shall be done if soils are muddy or dry and compacted. Bare soils shall be raked to remove large stiff clods, lumps, brush, roots, stumps, litter and other foreign matter. Ruts and depressions shall be filled with additional loam or compost and the soil shall be re-graded to a relatively smooth finish corresponding to the required grades.

When seeding over existing or compacted soil or soil that has sat bare for more than 30 days, surface will be prepared by tilling or raking to a minimum depth of 2 inches prior to seeding and prior to Compost Blanket application (when applied).

Surface preparation shall be compensated for under for loam placement or topsoil rehandled and spread as appropriate to the project.

Jute or coir mesh, when specified in the contract, shall be placed after seeding and per the Standard Specifications and the manufacturer's instruction.

Surface preparation shall be approved by the Engineer prior to seeding.

Seeding over Various Substrates

Loam: Seeding shall occur within 72 hours of loam placement to prevent loss of topsoil. Seed shall be manually broadcast for areas less than half an acre (each area, not cumulative area) and when specified on the plans. Broadcasting shall be immediately followed by hydromulching as specified below. When not specified on the plans, larger areas may be hydroseeded as specified below.

Compost Blanket: Compost Blanket shall be applied as specified under that item. Seed should be hand broadcast at the same time as compost application to ensure a thin cover of compost over seed.

ITEM 765.635 (Continued)

When seeding is done after application of Compost Blanket the rate shall be increased by 50%. If the Compost Blanket is applied after December 1, seed shall be broadcast or hydroseeding over the compost in the Spring and the rate increased by 50% specified under Seed Application.

Compost Mulch over Modified Rock: Compost Mulch and seed shall be applied as specified under that item. No hydromulch is required.

Cover Crop

Cover crop shall be used when seeding out of season, when specified with the permanent native seed mix under that item, and as required to prevent erosion until the permanent seed establishes.

A cover crop should not be used with a steep slope mix or other permanent mix which already contains either cereal rye or oats in the composition of the mix. A cover crop is not necessary for wetland seeding and is not typically necessary for soil stabilization when seeding in conjunction with a compost blanket application.

Seed Application

All seed shall be mulched as specified herein.

Seed application shall be by broadcast seeding or by hydroseeding as described below.

Broadcast Seeding

Seed shall be broadcast spread using a cyclone or whirlwind seeder or hand broadcast. Small or light-seeded species such as bluestem may be mixed with approved filler to achieve an even distribution. Seed shall not be broadcast when wind velocities are greater than 15 mph.

Broadcast seeding shall be undertaken in two separate passes at ninety degrees to each other. One-half the seeding rate shall be applied in each direction (horizontally and vertically). To ensure seed to soil contact with broadcasting of seed, seeding shall be followed by rolling or tracking with equipment approved by the Engineer.

Broadcast seed shall be mulched with weed-free straw mulch unless seeding is done as part of Compost Blanket in which case it shall be as specified above under seeding with Compost Blanket application. Hydromulching shall be as specified under Hydromulching.

Hydroseeding and Hydromulching

Hydroseed and mulching shall be per the manufacturer's directions and as follows.

Hydroseeding shall only be used for sites over half an acre in size or with permission of the Engineer.

ITEM 765.635 (Continued)

Tank and hoses shall be cleaned from all previous hydroseeding and hydromulching projects. Seed shall be mixed into the slurry immediately before application and slurry applied within 30 minutes after seeds have been placed in the tank. Once seed has been placed in the tank, tank shall be agitated only enough to mix the seeds and keep slurry from separating.

A 2-step process shall be used for seeding in conjunction with hydromulch. Seed shall be applied with 500 lbs/acre of hydromulch in the first pass. A second pass with 1,000 lbs/ acre of hydromulch shall be applied in a second pass. Each pass shall be applied in a different direction.

Once the seed has been added to the tank mixture a one-hour time limit is set for spreading the mixture on the soil. Once the one hour has passed the excess mixture must be discarded.

For broadcast seeding, hydromulch shall be applied immediately following seeding at a rate of 1,000 lbs/acre. Tank shall be cleaned from any previous hydroseeding.

CARE DURING GERMINATION AND ESTABLISHMENT

Contractor shall care for seeded areas as necessary for successful germination. Care will include watering and weed control as necessary to achieve establishment of the specified seeded species after one growing season as specified below.

The Contractor shall maintain the stand of grasses to ensure healthy growth of the seeded species. Work shall include mowing or weed-whacking for weed control, watering if necessary, and removal of invasive plants.

Watering shall be sufficient to achieve soil moisture to a depth of 2 inches or more and such moisture is uniform. Method of watering shall not erode or damage soil or grassed surfaces.

General Weed Control: Unless otherwise required, mowing shall be as specified under Mowing for Weed Control for seed establishment. Weeds shall be mowed prior to weeds setting seed (by the end of July unless otherwise approved).

Control of Invasive and Aggressive Weeds: Invasive and aggressive weeds, including but not limited to mugwort, ragweed, knapweed, foxtail, crabgrass, and chicory must be cut or treated prior to going to seed. Herbicide treatment must be coordinated with MassDOT. Undesired species (such as chicory) introduced due to use of incorrect seed mix shall be removed at the Contractor's expense.

MOWING FOR WEED CONTROL

Mowing for weed control shall be completed after weeds have sprouted and show leaf and bud growth, but prior to setting seed, generally between July 7th and August 1st, unless required otherwise by the MassDOT Landscape Architect and the Engineer.

Mowing height shall be as needed for weed control, generally to a height of 8 inches and not below 4 inches, unless required otherwise. Mowing shall be with a brush hog mower or string trimmer other approved equipment. Conventional lawn mowers which cannot achieve the appropriate cut shall not be used.

ITEM 765.635 (Continued)

Contractor shall give 48-hour notice prior to mowing work. Mowing shall only occur in dry sunny weather. Litter pickup should occur prior to mowing in all areas. If required, cut grass shall be raked and removed. Litter pickup and raking and removal of grass shall be incidental to the work.

Mowing equipment shall be approved by the Engineer prior to work.

OVER-SEEDING

Areas of bare ground greater than 2-3 feet in diameter shall be over-seeded with the specified mix during the appropriate season for seeding. Where required for overseeding mowing shall be as close to the soil as possible. Soil that is compacted shall be raked or otherwise roughened prior to over-seeding.

Over-seeding rates and methods shall those specified above under Materials and Methods. Following over-seeding, soil shall be lightly tamped to ensure seed to soil contact and areas shall be mulched with straw mulch and watered with a fine mist to moisten soil to a depth of at least 2 inches.

Over-seeding, mulch, watering, and all work for over-seeding shall be incidental.

DETERMINING SATISFACTORY GRASS ESTABLISHMENT

A well-established stand of the specified seeded species as determined by the Engineer and the MassDOT Landscape Architect will be required for Final Acceptance. The expectation is that an acceptable number and variety of the desired permanent seeded species (not the cover crop) will be visible. Generally:

- A minimum of 75% coverage by the specified permanent seeded species after one growing season. Of that percentage, generally, depending on the mix species:
 - At least 3 types of the permanent seeded grass species shall be visible.
 - At least 3 species of wildflowers shall be visible.
- There will be no significant gaps or bare soil (generally 2-3 feet in diameter or greater).
- There will be no more than 25% coverage by weed species.
- All soil shall be stabilized and there shall be no channeling or erosion.
- There will be no invasive or aggressive species within the stand at the time of acceptance.
- There shall be no evidence of seed from non-native mixes (i.e., clover) due to failure to clean the hydroseeding tank or using incorrect mix.

Invasive and aggressive weeds (such as mugwort, ragweed, knapweed, and chicory) must be cut or treated prior to going to seed for Interim Acceptance. Herbicide treatment must be coordinated with MassDOT.

A warm-season grass mix with perennials will not have uniform growth. A uniform stand of grass may indicate use of an incorrect mix.

ITEM 765.635 (Continued)**ACCEPTANCE OF SEEDING AND ESTABLISHMENT WORK**

Conditional Acceptance shall be based on proper application of seed as specified herein.

Interim Acceptance of Care. Seeding will be inspected by mid-July to assess germination and Establishment conditions as described above. When necessary for Interim Acceptance, areas shall be mowed prior to weed species producing seed and as specified above under Weed Control. ***Areas requiring weed control that are not mowed prior to weed seed dispersal will not be approved for Interim Acceptance.*** Seeding that shows good germination and is determined by the Engineer and Landscape Architect to not require weed control at time of inspection shall be accepted for Interim Acceptance payment.

Final Acceptance of Establishment shall be given upon satisfactory Establishment as described above.

If the seeded area fails to meet the requirements of Establishment by the end of the growing season, contractor shall propose and implement remediations and site shall be inspected during the following growing season after July 1st. All remediation shall be at the contractor's expense.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Native Seeding and Establishment will be measured for payment by the square yard, complete in place.

Native Seeding and Establishment will be paid at the Contract unit price by the square yard upon Conditional, Interim, and Final Acceptances as described above. This price shall include all submittals, seeding, rolling to ensure seed-to-soil contact, weed control other than mowing, water, over-seeding, labor, materials, equipment, and all incidental costs required to complete the work of establishing a satisfactory stand of grass.

Native seed mixes shall be compensated under the respective items.

Site preparation, including raking, tilling, removal of debris and stones, and other work to the prepare site for seeding shall be compensated under loam placement or topsoil rehandled and spread as relevant to the project. If used, Compost Blanket shall be compensated under the respective item.

Mowing for weed control will be incidental to this Item.

Schedule of payment shall be as follows:

30% upon Conditional Acceptance

20% upon Interim Acceptance of Care, except this amount will be reduced to zero and final payment will be reduced accordingly when areas requiring weed control are not mowed as specified in the Interim Acceptance criteria.

50% upon Final Acceptance of Establishment

ITEM 767.121**SEDIMENT CONTROL BARRIER****FOOT**

The work under this Item shall conform to the relevant provisions of Subsections 670, 751 and 767 of the Standard Specifications and shall include the furnishing and placement of a sediment control barrier. Sediment control barrier shall be installed prior to disturbing upslope soil.

The purpose of the sediment control barrier is to slow runoff velocity and filter suspended sediments from storm water flow. Sediment barrier may be used to contain stockpile sediments, to break slope length, and to slow or prevent upgradient water or water off road surfaces from flowing into a work zone. Contractor shall be responsible for ensuring that barriers fulfill the intent of adequately controlling siltation and runoff.

Twelve-inch diameter (after installation) compost filter tubes with biodegradable natural fabric (i.e., cotton, jute, burlap) are intended to be the primary sedimentation control barrier. Photo-biodegradable fabric shall not be used.

For small areas of disturbance with minimal slope and slope length, the Engineer may approve the following sediment control methods:

- 9-inch compost filter tubes
- Straw bales which shall be trenched

No straw wattles may be used. Additional compost filter tubes (adding depth or height) shall be used at specific locations of concentrated flow such as at gully points, steep slopes, or identified failure points in the sediment capture line.

When required by permits, additional sediment barrier shall be stored on-site for emergency use and replacement for the duration of the contract.

Where shown on the plans or when required by permits, sedimentation fence shall be used in addition to compost filter tubes and straw bales and shall be compensated under that Item.

Sediment control barriers shall be installed in the approximate location as shown on the plans and as required so that no excavated or disturbed soil can enter mitigation areas or adjacent wetlands or waterways. If necessary to accommodate field conditions and to maximize effectiveness, barrier locations may be shifted with approval from the Engineer. Barriers shall be in place prior to excavation work. No work shall take place outside the barriers.

Materials and Construction

Prior to initial placement of barriers, the Contractor and the Engineer shall review locations specified on the plans and adjust placement to ensure that the placement will provide maximum effectiveness.

Barriers shall be staked, trenched, and/or wedged as specified herein and according to the Manufacturer's instructions. Barriers shall be securely in contact with existing soil such that there is no flow beneath the barrier.

ITEM 767.121 (Continued)**Compost Filter Tube**

Compost material inside the filter tube shall meet M1.06.0, except for the following: no peat, manure or bio-solids shall be used; no kiln-dried wood or construction debris shall be allowed; material shall pass through a 2-inch sieve; and the C:N ratio shall be disregarded.

Outer tube fabric shall be made of 100% biodegradable materials (i.e., cotton, hemp or jute) and shall have a knitted mesh with openings that allow for sufficient water flow and effective sediment capture.

Tubes shall be tamped, but not trenched, to ensure good contact with soil. When reinforcement is necessary, tubes shall be stacked as shown on the detail plans.

Straw Bales

Straw bales shall be used if shown on the plans or when specified by Orders of Condition or other permit requirements.

Bales should be placed in a single row, lengthwise on the contour, with ends of adjacent bales tightly abutting one another. All bales should be either wire-bound or string-tied. Straw bales should be installed so that bindings are oriented around the sides (rather than along the tops and bottoms) of the bales in order to prevent deterioration of the bindings.

The barrier should be entrenched and backfilled. A trench should be excavated the width of a bale and the length of the proposed barrier to a minimum depth of 4 inches. The trench must be deep enough to remove all grass and other material which might allow underflow. After the bales are staked and chinked (filled by wedging), the excavated soil should be backfilled against the barrier. Backfill soil should conform to the ground level on the downhill side and should be built up to 4 inches against the uphill side of the barrier.

Each bale should be securely anchored by at least 2 stakes or re-bars driven through the bale. The first stake in each bale should be driven toward the previously laid bale to force the bales together. Stakes or re-bars should be driven deep enough into the ground to securely anchor the bales. For safety reasons, stakes should not extend above the bales but should be driven in flush with the top of the bale.

The gaps between the bales should be chinked (filled by wedging) with straw to prevent water from escaping between the bales. Loose straw scattered over the area immediately uphill from a straw bale barrier tends to increase barrier efficiency. Wedging must be done carefully in order not to separate the bales.

When used in a swale, the barrier should be extended to such a length that the bottoms of the end bales are higher in elevation than the top of the lowest middle bale to assure that sediment-laden runoff will flow either through or over the barrier but not around it.

ITEM 767.121 (Continued)**Sedimentation Fence**

Materials and Installation shall be per Subsections 670.40 and 670.60 of the Standard Specifications and the following:

Sedimentation fence shall only be used if shown on the plans or when specified by Orders of Condition or other permit requirements.

When used with compost filter tubes, the tube shall be placed on a minimum of 8 inches of folded fabric on the upslope side of the fence. Fabric does not need to be trenched.

When used with straw bales, an 8-inch deep and 4-inch-wide trench or V-trench shall be dug on the upslope side of the fence line. One foot of fabric shall be placed in the bottom of the trench followed by backfilling with compacted earth or gravel. Stakes shall be on the down slope side of the trench and shall be spaced such that the fence remains vertical and effective.

Width of fabric shall be sufficient to provide a 36-inch-high barrier after fabric is folded or trenched. Sagging fabric will require additional staking or other anchoring.

Maintenance

Maintenance of the sediment control barrier shall be per Subsection 670.60 of the Standard Specifications or per the Stormwater Pollution Prevention Plan (SWPPP), whichever is more restrictive.

The Contractor shall inspect the sediment barrier in accordance with relevant permits. At a minimum, barriers shall be inspected at least once every 7 calendar days and after a rain event resulting in 0.25 inches or more of rainfall. Contractor shall be responsible for ensuring that an effective barrier is in place and working effectively for all phases of the Contract.

Barriers that decompose such that they no longer provide the function required shall be repaired or replaced as required. If the resulting berm of compost within the fabric tube is sufficiently intact (despite fabric decay) and continues to provide effective water and sediment control, barrier does not necessarily require replacement.

Dismantling & Removing

Barriers shall be dismantled and/or removed, as required, when construction work is complete and upslope areas have been permanently stabilized and after receiving permission to do so from the Engineer.

Regardless of site context, nonbiodegradable material and components of the sediment barriers, including photo-biodegradable fabric, plastic netting, nylon twine, and sedimentation fence, shall be removed and disposed off-site by the Contractor.

ITEM 767.121 (Continued)

For naturalized areas, biodegradable, natural fabric and material may be left in place to decompose on-site. In urban, residential, or other locations where aesthetics is a concern, the following shall apply:

- Compost filter tube fabric shall be cut and removed, and compost shall be raked to blend evenly (as would be done with a soil amendment or mulch). No more than a 2-inch depth shall be left on soil substrate.
- Straw bales shall be removed and disposed off-site by the Contractor. Areas of trenching shall be raked smooth and disturbed soils stabilized with a seed mix matching adjacent seeding or existing grasses (i.e., lawn or native grass mix).
- Sedimentation fence, stakes, and other debris shall be removed and disposed off-site. Site shall be restored to a neat and clean condition.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 767.121 will be measured and paid for at the Contract unit price per FOOT of sediment control barrier which price shall include all labor, equipment, materials, maintenance, dismantling, removal, restoration of soil, and all incidental costs required to complete the work.

Additional barrier, such as double or triple stacking of compost filter tubes, will be paid for per foot of tube installed.

Barriers that have been driven over or otherwise damaged by construction activities shall be repaired or replaced as required by the Engineer at the Contractor's expense.

ITEM 767.9**JUTE MESH****SQUARE YARD**

The work under this Item shall conform to the relevant provisions of Section 700 of the Standard Specifications and the following.

The work under this Item shall consist of furnishing and installing jute mesh fabric to prevent soil erosion. Jute mesh shall be placed over all areas of exposed soil in locations shown on the plans or as required by the Engineer.

MATERIALS

Jute netting or similar material shall be new, unused, undyed, and unbleached 100% biodegradable yarn (no polypropylene) and of uniform plain weave. The materials should weigh approximately 1.0 (+/- 5%) pounds per linear yard (assuming a 4-foot width).

Shall meet the following minimum requirements:

| | |
|-----------------------|-----------------------------------------------------|
| Open Area: | 70-75% |
| Mesh Size: | approximately 1/2 inch with an open area of 60-65%. |
| Roll Weight: | approximately 1.0 (+/- 5%) pounds per linear yard |
| Warp Ends: | 78 per linear yard |
| Weft Ends: | 41 per linear yard |
| Recommended flow: | 6 fps (1.8 m/s) |
| Functional Longevity: | 6-9 months |

Anchoring devices shall be 11-gauge steel staples 6-inch minimum length. In loose soils the length of the staples shall be 9-inches.

For areas that will be routinely mowed anchoring devices shall consist of minimum 8" wooden stakes. Longer stakes shall be used where loose soils or other conditions obligate, as required by the Engineer.

CONSTRUCTION METHODS

Area shall be seeded prior to installation of jute netting.

Installation shall be such as to ensure continuous contact with soil without folds or wrinkles. Jute netting shall be laid such that upslope fabric is placed over lower slope fabric by a minimum of 3 feet. Adjoining rolls shall be overlapped a minimum 6 inches. The netting shall extend beyond at least 1 foot beyond the edge of the seeded area.

The Contractor shall bury the ends of the jute netting 6-8 inches in anchor trenches at top and bottom of slopes.

ITEM 767.9 (Continued)

Jute netting shall be anchored in place with vertically driven metal staples. The staples shall be driven in until their tops are flush with the soil. Staples shall be placed at 12-inch intervals along the top of a slope and in staggered courses along the face of the slope to achieve a minimum of 3 staples per square yard, or at manufacturer's recommendations for the given site conditions.

Contractor shall reseed all trenched and otherwise disturbed areas with specified seed mix. The Contractor shall maintain the jute netting and make satisfactory repairs of any areas damaged until acceptance of seed establishment.

METHOD OF MEASUREMENT

Jute Mesh will be measured by the number of SQUARE YARDS complete in place, including anchoring, as measured across the surface of grade and does not include buried or overlapped portions. The quantity measured for payment shall not exceed that shown on the plans or as required by the Engineer.

Mesh that becomes loose or that is not otherwise functioning to stabilize soil shall be repaired and new or additional jute matting installed as required at the Contractor's expense. Soil erosion shall be repaired, and area shall be raked and reseeded with the original specified mix as required by the Engineer at the Contractors expense.

BASIS OF PAYMENT

Item 767.9 will be paid for at the Contract unit price per SQUARE YARD, which price shall include all labor, materials, equipment, trenching, placing, and stapling of jute fabric, reseeding of trenched and disturbed areas, and all incidental costs required to complete the work.

| | | |
|---------------------|-----------------------------------------------|-------------|
| <u>ITEM 772.333</u> | <u>CEDAR-RED 2-3 FEET</u> | <u>EACH</u> |
| <u>ITEM 775.026</u> | <u>ELM-PRINCETON 1.5-2 INCH CALIPER</u> | <u>EACH</u> |
| <u>ITEM 776.520</u> | <u>MAPLE-RED 1.5-2 INCH CALIPER</u> | <u>EACH</u> |
| <u>ITEM 783.045</u> | <u>SERVICEBERRY – SHADBLOW 5-6 FEET CLUMP</u> | <u>EACH</u> |

The work under these Items shall conform to the applicable requirements of Subsection 771, PLANTING TREES, SHRUBS AND GROUNDCOVER, of the Standard Specifications.

Plantings are schematic and shall be staked out in the field and confirmed with the MassDOT Landscape Design Section.

Plant substitutions must be approved by the MassDOT Landscape Design Section prior to ordering plants.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Items 772.333, 775.026, 776.520, and 783.045 will be measured and paid for in accordance with the provisions of Subsections 771.80 and 771.81 of the Standard Specifications.

ITEM 801.502 **5 INCH ELECTRICAL CONDUIT** **FOOT**
- TYPE NM (DOUBLE)

The work under this Item shall conform to the relevant provisions of Section 800 and the following:

The trench shall be excavated to the width and depth shown on the plans. All construction of duct banks including trench, excavation, and backfill shall conform to National Grid Electric details and specifications. A representative from National Grid Electric shall be present for all electrical conduit installed. The work must be performed by a National Grid Electric approved Contractor.

For all conduits encased in concrete, use plastic spacers to maintain conduit spacing. Spacers shall meet National Grid Electric specifications for design and spacing.

All trench excavation activities shall comply with all appropriate OSHA standards.

Duct bank shall have 6-inch red warning tape installed above the concrete encasement as shown on the plans.

Conduits shall be blown clean using compressed air. Run mandrel through each conduit to confirm viable pathway.

Woven polyester mule tape with minimum strength of 2500 lb. tensile strength to be installed within each conduit.

PVC conduits shall be schedule 40.

Concrete encasement shall be 2,500 psi, 3/8 inch, 520 cement concrete.

Duct bank shall include 4/0 bare CU counterpoise ground as shown on the plans.

METHOD OF MEASUREMENT

Item 801.502 will be measured for payment by the FOOT of 5 Inch Electrical Conduit Type NM (Double) installed, approved, and maintained in place.

BASIS OF PAYMENT

Item 801.502 will be paid for at the Contract unit price per FOOT, which price shall include all labor, equipment, and materials required to complete the work specified above, including, but not limited to, excavation and backfill, conduit, warning tape, spacers, concrete encasement, 4/0 bare CU counterpoise ground, and all incidental costs required to complete the work.

ITEM 802.402

**4 INCH TELEPHONE CONDUIT
- TYPE NM (DOUBLE)**

FOOT

The work under this Item shall conform to the relevant provisions of Section 800 and the following:

The trench shall be excavated to the width and depth shown on the plans. All construction of duct banks including trench, excavation, and backfill shall conform to Verizon details and specifications. All work shall be performed by a Verizon approved Contractor. A representative from Verizon shall be present for all Telephone conduit installed.

For all conduits encased in concrete, use plastic spacers to maintain conduit spacing. Spacers shall meet Verizon specifications for design and spacing.

All trench excavation activities shall comply with all appropriate OSHA standards.

Duct bank shall have 6-inch orange warning tape installed above the concrete encasement as shown on the plans.

Conduits shall be blown clean using compressed air. Run mandrel through each conduit to confirm viable pathway.

Woven polyester mule tape with minimum strength of 2500 lb. tensile strength to be installed within each conduit.

PVC conduits shall be Schedule 40.

Concrete encasement shall be 2,500 psi, 3/8 inch, 520 cement concrete.

METHOD OF MEASUREMENT

Item 802.402 will be measured for payment by the FOOT of 4 Inch Telephone Conduit – Type NM (Double) conduit installed, approved, and maintained in place.

BASIS OF PAYMENT

Item 802.402 will be paid for at the Contract unit price per FOOT, which price shall include all labor, equipment, and materials required to complete the work specified above, including, but not limited to, excavation, backfill, conduit, warning tape, spacers, concrete encasement, and all incidental costs required to complete the work.

ITEM 803.401

**4 INCH CATV CONDUIT
- TYPE NM (SINGLE)**

FOOT

The work under this Item shall conform to the relevant provisions of Section 800 and the following:

The trench shall be excavated to the width and depth shown on the plans. All construction of duct banks including trench, excavation, and backfill shall conform to Comcast details and specifications. All work shall be performed by a Comcast approved Contractor. A representative from Comcast shall be present for all CATV conduit installed.

For all conduits encased in concrete, use plastic spacers to maintain conduit spacing. Spacers shall meet Comcast specifications for design and spacing.

All trench excavation activities shall comply with all appropriate OSHA standards.

Duct bank shall have 6-inch orange warning tape installed above the concrete encasement as shown on the plans.

Conduits shall be blown clean using compressed air. Run mandrel through each conduit to confirm viable pathway.

Woven polyester mule tape with minimum strength of 2500 lb. tensile strength to be installed within each conduit.

PVC conduits shall be Schedule 40.

Concrete encasement shall be 2,500 psi, 3/8 inch, 520 cement concrete.

METHOD OF MEASUREMENT

Item 803.401 will be measured for payment by the FOOT of 4 Inch CATV Conduit – Type NM (Single) conduit installed, approved, and maintained in place.

BASIS OF PAYMENT

Item 803.401 will be paid for at the Contract unit price per FOOT, which price shall include all labor, equipment, and materials required to complete the work specified above, including, but not limited to, excavation, backfill, conduit, warning tape, spacers, concrete encasement, and all incidental costs required to complete the work.

ITEM 806.5

**5 INCH ELECTRICAL CONDUIT
TYPE RM – GALVANIZED STEEL**

FOOT

The work under this Item shall conform to the relevant provisions of Subsection 801 of the Standard Specifications.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Item 806.5 will be measured and paid for in accordance with the provisions of Subsections 801.80 and 801.81 of the Standard Specifications

ITEM 840.1**PRESSURE TREATED SIGN POST****EACH**

The work under this Item shall conform to the relevant provisions of Subsection 840 of the Standard Specifications and the following:

MATERIALS

Sign supports shall be 4"x4" pressure treated Southern Pine, uniform in treatment and appearance.

1. Timber must be air-dried for 90-120 days to 25% or less moisture content or shall be vapor-dried (not kiln-dried) to 25% or less to prevent excessive surface checking prior to preservation treatment.
2. Standard dressing in accordance with American Lumber Standards SPR-16-53.
3. Grade shall be Southern Pine, Dense Structural 65 according to Paragraph 253, SPIB Rules, latest edition. The size, wane grain deviation, shakes and checks are spelled out under this paragraph.

Timbers shall be pressure-treated with a waterborne preservative non-toxic to human contact and suitable for ground contact. End cuts in field shall be treated with two applications of same preservative treatment.

All hardware shall be fabricated from steel conforming to Subsection 828 and to the latest requirements of ASTM A36 and shall be hot dip galvanized in accordance with ASTM A153 latest requirements.

Concrete foundation materials shall be as specified in Subsection 430, CEMENT CONCRETE BASE in the Standard Specifications; and ACI 301, Standard Specifications for Structural Concrete for Buildings.

Pressure treated sign posts shall be painted, prior to installation. Color shall be "Nantucket Grey". Color samples shall be approved by the Engineer prior to sign posts arriving on the site.

CONSTRUCTION METHODS

Choose wood pieces carefully to eliminate split, warped, damaged, and twisted members. Ease all sharp edges and corners.

The Contractor shall make any corrections necessary to gravel fill furnished and installed to bring the gravel to the sections and elevations shown on the plans.

Install concrete footings in locations as shown on the plans and in conformance with Section 430 of the Standard Specifications.

Securely attach signs to posts using galvanized lag bolts and in conformance with Section 828 of the Standard Specifications.

ITEM 840.1 (Continued)

The sign shall be breakaway by adding a drill hole at the base of the post similar to the temporary Wood Support Detail provided in the MassDOT Standard Drawings for Signs and Supports.

METHOD OF MEASUREMENT

Item 840.1 will be measured for payment by the EACH Pressure Treated Sign Post furnished and installed, complete in place.

BASIS OF PAYMENT

Item 840.1 will be paid for at the Contract unit price per EACH, which price shall include all labor, materials, equipment, concrete foundation, painting, and all incidental costs required to complete the work.

ITEM 852.11
ITEM 852.12**TEMPORARY PEDESTRIAN BARRICADE**
TEMPORARY PEDESTRIAN CURB RAMP**FOOT**
EACH

Work under these Items consist of furnishing, deploying, maintaining in proper operating conditions, and removing temporary pedestrian barricades and temporary pedestrian ramps as part of a Temporary Pedestrian Access Route (TPAR) in order to guide pedestrians around a fully- or partially-closed sidewalk. These devices are intended to prevent pedestrians from entering the work area and to prevent pedestrians from inadvertently entering the vehicle travel lane by providing visual and physical separation between each space.

Materials

The Temporary Pedestrian Barricade shall have a continuous bottom rail or edge no more than two (2) inches above the ground and eight (8) inches in height (minimum) to accommodate cane users, have a smooth and continuous hand railing along the top edge no less than 32 inches above the ground and not obstruct or project into the pedestrian path of travel. Barricade walls shall be nearly vertical and generally within the same plane.

If exposed to traffic, Temporary Pedestrian Barricades shall be crashworthy.

The Temporary Pedestrian Curb Ramp shall provide a 48 inch minimum width, with a firm, stable, and non-slip surface. Protective edging with a two (2) inch minimum height shall be installed when the curb ramp or landing platform has a vertical drop of six (6) inches or greater.

The Temporary Pedestrian Curb Ramp walkway and landing area surface shall be of a solid, continuous, contrasting color abutting up to the existing sidewalk.

If a Temporary Pedestrian Curb Ramp leads to a crosswalk, a detectable warning pad must be used at the base of the ramp; if it leads to a protected path that does not conflict with vehicular traffic then a detectable pad shall not be used.

Construction Methods

The Temporary Pedestrian Barricade shall be placed in an area that will provide pedestrians with a TPAR on a smooth, continuous hard surface for its entirety. The geometry and alignment of the facility shall meet the applicable requirements of the “Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities” and the Massachusetts Architectural Access Board.

The recommended width of the TPAR is 60 inches, but if constraints exist a minimum clear width of 48 inches shall be provided along its entirety. If a 60 inch width cannot be accommodated in full, a 60 inch by 60 inch passing space shall be provided every 200 feet or less along the TPAR.

Turning areas shall be 60 inches by 60 inches minimum.

Lateral joints between any surfaces shall not exceed 0.5 inches. Lateral edges may be vertical up to 0.25 inches high and shall be beveled at 1V:2H between 0.25 inches and 0.5 inches.

ITEMS 852.11 and 852.12 (Continued)

The TPAR shall be kept clear of debris, snow, and ice and the Temporary Pedestrian Barricades and Temporary Pedestrian Curb Ramps shall not obstruct drainage.

Removal and/or resetting of Temporary Pedestrian Barricades and Temporary Pedestrian Curb Ramps shall be considered incidental.

COMPENSATION

Payment for Temporary Pedestrian Barricades will be made at the Contract price per foot installed in place, including all incidental items. This price shall include the cost of furnishing, installing, resetting, removal, and maintaining in good working condition.

Payment for Temporary Pedestrian Curb Ramps will be made at the Contract price per each unit installed in place, including all incidental items. This price shall include the cost of furnishing, installing, resetting, removal, and maintaining in good working condition.

ITEM 859.1 **REFLECTORIZED DRUMS WITH SEQUENTIAL** **DAY**
FLASHING WARNING LIGHTS

The work under this Item shall conform the relevant provisions of Subsection 850 of the Standard Specifications and the following:

Work under this Item consists of furnishing, installing, maintaining in proper operating conditions, and removing reflectorized drums, and any necessary ballast, equipped with sequential flashing warning lights.

MATERIALS

Reflectorized drums shall be listed on the MassDOT Qualified Traffic Control Equipment List. Reflective sheeting on drums shall meet or exceed ASTM D4956 Type VIII. All drums shall be maintained in a satisfactory manner including the removal of oils, dirt, and debris that may cause reduced retroreflectivity.

The Contractor shall use one of the following sequential flashing warning light systems unless otherwise approved by the Engineer:

1. Empco-Lite LWCSO.
2. pi-Lit® Sequential Barricade-Style Lamp; or
3. Unipart Dorman SynchroGUIDE.

Sequential flashing warning lights shall be secured to reflectorized drums per the light manufacturer's specifications.

CONSTRUCTION METHODS

The first ten (10) drums in any merging or shifting taper as designated in the Temporary Traffic Control Plan shall be equipped with sequential flashing warning lights. These lights shall be operating, at a minimum, between dusk and dawn when the taper is deployed.

The successive flashing of the sequential warning lights shall occur from the upstream end of the merging or shifting taper to the downstream end of the taper in order to identify the desired vehicle path. Each warning light in the sequence shall be flashed at a rate of not less than 55, nor more than 75 times per minute.

Warning lights shall be powered off when drums are not deployed in a taper.

ITEM 859.1 (Continued)

METHOD OF MEASUREMENT

A group of ten (10) reflectorized drums with sequential flashing warning lights is considered one (1) unit and will be measured by the day. Each period of up to 24 hours during which this unit is in use will be measured as one day regardless of the number of times that the drums are positioned, repositioned, removed, or returned to service.

BASIS OF PAYMENT

Reflectorized Drums with Sequential Flashing Warning Lights will be paid for at the Contract unit price per day, which shall include full compensation for furnishing, positioning, repositioning, and removing the group of ten (10) drums as required by the Engineer.

| | | |
|---------------------------|------------------------------------------------------------------------------|--------------------|
| <u>ITEM 864.31</u> | <u>SLOTTED PAVEMENT MARKER</u> <u>ONE-WAY WHITE</u> | <u>EACH</u> |
| <u>ITEM 864.32</u> | <u>SLOTTED PAVEMENT MARKER</u> <u>ONE-WAY YELLOW</u> | <u>EACH</u> |
| <u>ITEM 864.35</u> | <u>SLOTTED PAVEMENT MARKER</u> <u>TWO-WAY YELLOW/YELLOW</u> | <u>EACH</u> |

The work under these Items shall conform to the relevant provision of Subsection 860 of the Standard Specifications and the following:

DESCRIPTION

The work to be done under these Items shall consist of furnishing and installing one-way white, one-way yellow and two-way yellow/yellow reflectorized pavement markers (SLOTTED IN PAVEMENT) in accordance with the relevant provisions of Traffic Standard TR.6.2 "Raised Pavement Marker Placement" and TR.6.5 "Typical Pavement Marking for Conventional Roadways".

The work shall include cutting the tapered pavement slot to the dimensions specified by the Manufacturer for one-way and two-way markers, application of the Manufacturer's recommended epoxy adhesive, and placing the reflectorized pavement marker in the proper position within the slot so that the reflective face is visible and perpendicular to oncoming traffic and so that the top of the marker is set 1/8± inch below the top of the adjacent pavement.

Surface preparation and installation shall be strictly in accordance with the Manufacturer's instructions.

Reflectorized pavement markers shall be 3M Series 290, Ennis-Flint Stimsonite C80, Ray-O-Lite Model 2004 or an approved equal.

METHOD OF MEASUREMENT

Items 864.31, 864.32, and 864.35 will be measured for payment respectively by the EACH one-way white, one-way yellow and two-way yellow/yellow Slotted Pavement Marker installed, complete in place.

BASIS OF PAYMENT

Items 864.31, 864.32, and 864.35 will be paid for at the respective Contract unit prices per EACH, which prices shall include all labor, materials, equipment, and all incidental costs required to complete the work. No separate payment will be made for cutting the tapered pavement slot, but all costs in connection therewith shall be included in the Contract unit prices bid.

ITEM 874.2**TRAFFIC SIGN REMOVED AND RESET****EACH**

The work under this Item shall conform to the relevant provisions of Subsection 828 of the Standard Specifications and the following:

CONSTRUCTION METHODS

The Contractor shall carefully remove all existing signs, attachment hardware and sign support posts as shown on the drawings and as required by the Engineer. Existing foundations shall be removed to a depth of at least 12" below proposed sidewalk and 36" below proposed pavement grade and the existing ground and the holes backfilled with gravel. The surface shall be patched with a material to match the existing ground or as required by the Engineer.

Signs and attachment hardware shall be satisfactorily stored and protected until reset in the proposed work. Sign support posts shall be disposed of in a satisfactory manner. New sign support posts shall be provided as called for under Item 840.1.

Signs and attachment hardware lost, damaged, or otherwise made unsuitable for reuse while being removed, transported, stored, or reset shall be replaced with new material at no additional cost. New attachment hardware shall be furnished and installed as necessary to replace any missing or unusable existing hardware.

The sign shall be mounted in accordance with the latest Manual on Uniform Traffic Control Devices (MUTCD) and the 1990 Standard Drawings for Signs and Supports. Sign panels shall be cleaned before being reset.

METHOD OF MEASUREMENT

Item 874.2 will be measured for payment by the EACH Traffic Sign Removed and Reset, complete in place.

BASIS OF PAYMENT

Item 874.2 will be paid for at the Contract unit price per EACH, which price shall include all labor, materials, equipment, and all incidental costs required to complete the work.

No separate payment will be made for dismantling, storing, and resetting of the signs as designated above, the excavation and disposal of the existing foundation, the supplying and placing of compacted gravel backfill where foundations and posts are removed and the restoration of the existing surface, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 874.4 **TRAFFIC SIGN REMOVED AND STACKED** **EACH**

The work under this Item shall conform to the relevant provisions of Subsection 828 of the Standard Specifications and the following:

GENERAL

The work under this Item shall consist of removing and stacking existing regulatory, warning, and directional signs not required for reuse on this project. Signs shall be collected and carefully stacked at a central, secure location on or nearby the project for pickup by the Town. Support and foundations shall be disposed of.

CONSTRUCTION METHODS

Signs and attached hardware shall be carefully removed from their supports. The supports and existing foundations shall be removed to a depth of at least 12" below proposed sidewalk and 36" below proposed pavement grade at the existing ground and the holes backfilled with gravel. The surface shall be patched with a material to match the existing ground or as required by the Engineer. The Contractor shall be responsible for the signs.

Any signs damaged through a lack of protection on the part of the Contractor's operation shall be replaced by the Contractor at his own expense.

The Contractor shall notify the Town the signs and attachment hardware are available for pickup, with a copy to the Engineer. If the signs are not picked up within four weeks of notification, or the Town determines the signs are not needed, the signs and attachment hardware shall become the property of the Contractor and be disposed of off-site at no additional cost.

If signs are attached to existing light poles, utility poles or traffic poles, only the sign and attached hardware shall be removed and stacked.

METHOD OF MEASUREMENT

Item 874.4 will be measured for payment by the EACH Traffic Sign Removed and Stacked..

BASIS OF PAYMENT

Item 874.4 will be paid for at the Contract unit price per EACH, which price shall include all labor, materials, equipment, and all incidental costs required to complete the work.

No separate payment will be made for dismantling, loading, transporting, and stacking of the signs and disposal of the supports as designated above, the excavation and disposal of the existing foundation and the supplying and placing of compacted gravel backfill where foundations and posts are removed, and the patching of the existing surface, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 874.41 **TRAFFIC SIGN REMOVED AND DISCARDED** **EACH**

The work under this Item shall conform to the relevant provisions of Subsection 828 of the Standard Specifications and the following:

GENERAL

The work under this Item shall consist of removing and discarding existing regulatory, warning, and directional signs and supports not required for reuse on this project.

CONSTRUCTION METHODS

The supports and existing foundations shall be removed to a depth of at least 12” below proposed sidewalk and 36” below proposed pavement grade at the existing ground and the holes backfilled with gravel. The surface shall be patched with a material to match the existing ground or as required by the Engineer. The signs and supports shall become the property of the Contractor and the Contractor shall legally dispose of the items at a location not on MassDOT Highway Division property.

If signs are attached to existing light poles, utility poles or traffic poles, only the sign and attached hardware shall be removed and discarded.

METHOD OF MEASUREMENT

Item 874.41 will be measured for payment by the EACH Traffic Sign Removed and Discarded.

BASIS OF PAYMENT

Item 874.41 will be paid for at the Contract unit price per EACH, which price shall include all labor, materials, equipment, and all incidental costs required to complete the work.

No separate payment will be made for dismantling, loading, transporting, and discarding of the signs and supports as designated above, the excavation and disposal of the existing foundation and the supplying and placing of compacted gravel backfill where foundations and posts are removed, and the patching of the existing surface, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 998.01**SEDIMENT FOREBAY PAVERS****SQUARE FOOT****DESCRIPTION**

The work under this Item shall conform to the relevant provisions of Subsections 501 and 983 of the Standard Specifications and the following.

The purpose of this Item is to provide a level protective surface over crushed stone bedding foundation and geotextile fabric for separation to facilitate in maintenance of the pretreatment sedimentation forebay.

CONSTRUCTION MATERIALS AND METHODS

The work shall include the construction to the line and grade of a level sedimentation forebay protective bottom surface conforming to the size and dimensions shown on the Contract Drawings and the following:

Material may either be new or reused granite curb or edging. Each piece of granite curb or edging shall have a minimum length of eighteen (18) inches, minimum width of four (4) inches and minimum depth of four (4) inches. Granite curb or edging shall be placed in an offset tile pattern with one (1) inch spacing on all sides.

Reused granite curb or edging shall include removal, temporary storage, protection, cutting, removal and disposal of all foreign matter and installation.

The layout patterns of the new or reused curb or edging shall be pre-approved by the Engineer.

METHOD OF MEASUREMENT

Item 998.01 will be measured for payment by the SQUARE FOOT of Sediment Forebay Pavers installed, complete in place.

BASIS OF PAYMENT

Item 998.01 will be paid for at the Contract unit price per SQUARE FOOT, which price shall include all labor, equipment, materials, and all incidental costs required to complete the work.

Excavation when required to construct the sediment forebay paving will be paid for by the cubic yard under Item 120. Earth Excavation.

Crushed stone bedding will be paid for separately by the cubic yard under Item 156.

Geotextile Fabric for Separation will be paid for separately by the square yard under Item 698.3.

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DETAIL SHEETS

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PROJECT NO. 613129

THE COMMONWEALTH OF MASSACHUSETTS
 MassDOT - HIGHWAY DIVISION
 TEN PARK PLAZA, BOSTON, MA

PRELIMINARY ESTIMATE OF QUANTITIES - DETAIL SHEETS

TOWN/CITY: NANTUCKET
 STA. 18+65 to 35+05

YEAR: Federal Fiscal Year 2024
 ROAD: Milestone Road
 CLASS: Urban Minor Arterial
 DATE: May 28, 2024

TYPE OF PROJECT: Intersection Improvements

| | | | |
|---------------------------|----------|-----------------|----------|
| Test Pit For Exploration | 30 CY | Ordinary Borrow | 25 CY |
| Pavement Standard Milling | 2,550 SY | Gravel Borrow | 1,325 CY |
| Class A Rock Excavation | 5 CY | Crushed Stone | 50 TON |
| Class B Trench Excavation | 25 CY | | |

PAVEMENT NOTES**FULL DEPTH HMA CONSTRUCTION:****AREA = 1,066 SY**

SURFACE COURSE:

1 ½" SUPERPAVE SURFACE COURSE – 9.5
 POLYMER (SSC-9.5-P) OVER ASPHALT
 EMULSION FOR TACK COAT (RS-1h)

2 ¼" SUPERPAVE INTERMEDIATE COURSE – 19.0
 (SIC-19.0) OVER ASPHALT EMULSION FOR TACK
 COAT (RS-1h)

BASE:

3 ¼" SUPERPAVE INTERMEDIATE COURSE – 19.0
 (SIC-19.0) OVER

SUBBASE:

12" GRAVEL BORROW TYPE B (OR SUITABLE
 EXISTING MATERIAL)

PAVEMENT STANDARD MILLING & STRUCTURAL HMA OVERLAY

AREA = 2,502 SY

PROPOSED RESURFACING:

1 ½" SUPERPAVE SURFACE COURSE - 9.5 POLYMER (SSC-9.5-P) OVER ASPHALT EMULSION FOR TACK COAT (RS-1h)
2 ¼" SUPERPAVE INTERMEDIATE COURSE – 19.0 (SIC-19.0) OVER ASPHALT EMULSION FOR TACK COAT (RS-1h)

SURFACE MILLING:

2" MIN. TO 4" MAX. PAVEMENT MILLING (TO MEET LINES AND GRADES AND HMA QUALITY ASSURANCE)

FULL DEPTH HMA CONSTRUCTION LESS THAN 4 FEET

AREA = 140 SY

SURFACE COURSE:

1 ½" SUPERPAVE SURFACE COURSE - 9.5 POLYMER (SSC-9.5-P) OVER ASPHALT EMULSION FOR TACK COAT (RS-1h)
2 ¼" SUPERPAVE INTERMEDIATE COURSE – 19.0 (SIC-19.0) OVER ASPHALT EMULSION FOR TACK COAT (RS-1h)

BASE:

6" HIGH-EARLY-STRENGTH CEMENT CONCRETE BASE COURSE OVER

SUBBASE:

8" GRAVEL BORROW TYPE B (OR SUITABLE EXISTING MATERIAL)

CEMENT CONCRETE PEDESTRIAN CURB RAMPS

AREA = 64 SY

SURFACE COURSE:

4" CEMENT CONCRETE (AIR ENTRAINED 4000 PSI, ¾", 610) OVER

SUBBASE:

8" GRAVEL BORROW TYPE B

HOT MIX DRIVEWAYS AND SHARED USE PATHS

AREA = 2,465 SY

SURFACE:

1 ½" SUPERPAVE SURFACE COURSE – 9.5 (SSC-9.5) OVER
2 ½" SUPERPAVE SURFACE COURSE – 12.5 (SSC-12.5) OVER

SUBBASE:

8" GRAVEL BORROW TYPE B

ALL ITEMS NOT COMPLETELY DESCRIBED AND LOCATED ON THE PLANS ARE TO BE DETAILED AS SHOWN BELOW:

ITEM 102.2 TREE TRIMMING

For trimming existing trees to remain along the path.

**ITEM 102.3 HERBICIDE TREATMENT OF INVASIVE PLANTS
ITEM 102.33 INVASIVE PLANT MANAGEMENT STRATEGY**

To be used within the project limits for managing invasive species at the discretion of the Engineer.

ITEM 102.511 TREE PROTECTION - ARMORING AND PRUNING

| <u>Station</u> | <u>Offset</u> | <u>Baseline</u> |
|----------------|---------------|-----------------|
| 22+35 | 37' LT | Milestone Rd |
| 22+59 | 40' LT | Milestone Rd |
| 22+72 | 41' LT | Milestone Rd |
| 27+22 | 43' RT | Milestone Rd |
| 30+68 | 36' LT | Milestone Rd |
| 30+93 | 36' LT | Milestone Rd |
| 31+61 | 38' LT | Milestone Rd |
| 33+91 | 39' LT | Milestone Rd |

Additional quantities may be required at the discretion of the Engineer.

ITEM 102.521 TREE AND PLANT PROTECTION FENCE

| <u>Station</u> | <u>Offset</u> | <u>Baseline</u> |
|----------------|---------------|-----------------|
| 18+75 | 37' LT | Milestone Rd |
| 26+25 | 68' LT | Milestone Rd |
| 101+00 | 32' LT | Polpis Rd |

ITEM 146. DRAINAGE STRUCTURE REMOVED

| <u>Station</u> | <u>Side</u> | <u>Baseline</u> | <u>Structure</u> |
|----------------|-------------|-----------------|------------------|
| 26+29 | LT | Milestone Road | CB |
| 100+43 | LT | Polpis Road | DMH |
| 100+43 | LT | Polpis Road | CB |
| 100+48 | RT | Polpis Road | CB |
| 100+50 | LT | Polpis Road | CB |

ITEM 156. CRUSHED STONE

For drainage pipes and structures bedding if unsuitable material is encountered as determined by the Engineer, as well as for Modified Rockfill.

ITEM 184.1 DISPOSAL OF TREATED WOOD PRODUCTS

To be used for the removal of traffic sign wood posts within the project limits.

ITEM 220. DRAINAGE STRUCTURE ADJUSTED

For use with all proposed drainage structures to be set to final grade.

| <u>Station</u> | <u>Side</u> | <u>Baseline</u> | <u>Structure</u> |
|-----------------------|--------------------|------------------------|-------------------------|
| 23+70 | RT | MILESTONE ROAD | CB-100 |
| 23+67 | LT | MILESTONE ROAD | CB-101 |
| 23+86 | RT | MILESTONE ROAD | DMH-102 |
| 25+51 | RT | MILESTONE ROAD | DMH-121 |
| 25+93 | RT | MILESTONE ROAD | DMH-105 |
| 25+96 | LT | MILESTONE ROAD | CB-103 |
| 25+96 | RT | MILESTONE ROAD | CB-104 |
| 26+19 | RT | MILESTONE ROAD | DMH-120 |
| 26+21 | LT | MILESTONE ROAD | CB-118 |
| 26+21 | RT | MILESTONE ROAD | CB-119 |
| 26+78 | RT | MILESTONE ROAD | DMH-117 |
| 29+30 | LT | MILESTONE ROAD | CB-106 |
| 29+09 | RT | MILESTONE ROAD | CB-107 |
| 100+49 | RT | POLPIS ROAD | CB-114 |
| 100+50 | LT | POLPIS ROAD | CB-115 |
| 102+09 | LT | POLPIS ROAD | DMH-112 |
| 102+14 | LT | POLPIS ROAD | CB-111 |
| 102+18 | RT | POLPIS ROAD | CB-110 |

ITEM 221. FRAME AND COVER

For use with all new manholes.

| <u>Station</u> | <u>Side</u> | <u>Baseline</u> | <u>Structure</u> |
|-----------------------|--------------------|------------------------|-------------------------|
| 23+86 | RT | MILESTONE ROAD | DMH-102 |
| 25+51 | RT | MILESTONE ROAD | DMH-121 |
| 25+93 | RT | MILESTONE ROAD | DMH-105 |
| 26+19 | RT | MILESTONE ROAD | DMH-120 |
| 26+78 | RT | MILESTONE ROAD | DMH-117 |
| 29+00 | RT | MILESTONE ROAD | DMH-108 |
| 100+41 | LT | POLPIS ROAD | DMH-116 |
| 100+96 | LT | POLPIS ROAD | DMH-113 |
| 102+09 | LT | POLPIS ROAD | DMH-112 |

ITEM 222.1 FRAME AND GRATE – MASSDOT CASCADE TYPE

For use with all new catch basins.

| <u>Station</u> | <u>Side</u> | <u>Baseline</u> | <u>Structure</u> |
|-----------------------|--------------------|------------------------|-------------------------|
| 23+70 | RT | MILESTONE ROAD | CB-100 |
| 23+67 | LT | MILESTONE ROAD | CB-101 |
| 25+96 | LT | MILESTONE ROAD | CB-103 |
| 25+96 | RT | MILESTONE ROAD | CB-104 |
| 26+21 | LT | MILESTONE ROAD | CB-118 |
| 26+21 | RT | MILESTONE ROAD | CB-119 |
| 29+30 | LT | MILESTONE ROAD | CB-106 |
| 29+09 | RT | MILESTONE ROAD | CB-107 |
| 100+49 | RT | POLPIS ROAD | CB-114 |
| 100+50 | LT | POLPIS ROAD | CB-115 |
| 102+14 | LT | POLPIS ROAD | CB-111 |
| 102+18 | RT | POLPIS ROAD | CB-110 |

ITEM 223.2 FRAME AND GRATE (OR COVER) REMOVED AND DISCARDED

For use with all existing drainage structures to be removed.

| <u>Station</u> | <u>Side</u> | <u>Baseline</u> | <u>Structure</u> |
|-----------------------|--------------------|------------------------|-------------------------|
| 26+29 | LT | MILESTONE ROAD | CB |
| 100+43 | LT | POLPIS ROAD | DMH |
| 100+43 | LT | POLPIS ROAD | CB |
| 100+48 | RT | POLPIS ROAD | CB |
| 100+50 | LT | POLPIS ROAD | CB |

ITEM 227.4 **MASONRY PLUG**

Masonry plugs are used with pipes from/to abandoned or removed structures, and where abandoned pipes interfere with proposed work.

ITEM 238.10 **10 INCH DUCTILE IRON PIPE**

For locations as required by the Engineer.

ITEM 242.18 **18 INCH REINFORCED CONCRETE PIPE FLARED END**

| <u>Station</u> | <u>Side</u> | <u>Baseline</u> |
|----------------|-------------|-----------------|
| 26+09 | RT | Milestone Road |

ITEM 272.12 **12 INCH AND UNDER PIPE REMOVED AND DISCARDED**

| <u>Station</u> | <u>Side</u> | <u>To Station</u> | <u>Side</u> | <u>Baseline</u> | <u>Type</u> |
|----------------|-------------|-------------------|-------------|-----------------|-------------|
| 26+14 | RT | 26+14 | RT | Milestone Road | 12" RCP |
| 100+43 | LT | 100+47 | RT | Polpis Road | 12" RCP |

ITEM 303.06 **6 INCH DUCTILE IRON WATER PIPE (MECHANICAL JOINT)**

| <u>Station</u> | <u>Side</u> | <u>Station</u> | <u>Baseline</u> |
|----------------|-------------|----------------|-----------------|
| 21+41 | LT | 21+41 | Milestone Road |
| 34+28 | LT | 34+28 | Milestone Road |

ITEM 303.10 **10 INCH DUCTILE IRON WATER PIPE (MECHANICAL JOINT)**

| <u>Station</u> | <u>Side</u> | <u>To Station</u> | <u>Side</u> | <u>Baseline</u> |
|----------------|-------------|-------------------|-------------|-----------------|
| 102+08 | RT | 102+26 | RT | Polpis Rd |

ITEM 303.12 **12 INCH DUCTILE IRON WATER PIPE (MECHANICAL JOINT)**

| <u>Station</u> | <u>Side</u> | <u>To Station</u> | <u>Side</u> | <u>Baseline</u> |
|----------------|-------------|-------------------|-------------|-----------------|
| 100+64 | LT | 100+66 | RT | Polpis Rd |

ITEM 309. **DUCTILE IRON FITTINGS FOR WATER PIPE**

| <u>Station</u> | <u>Side</u> | <u>Baseline</u> | <u>Type</u> |
|----------------|-------------|-----------------|-------------|
| 100+64 | RT | Polpis Rd | 45° BEND |
| 102+08 | RT | Polpis Rd | 45° BEND |

ITEM 350.06 **6 INCH GATE AND GATE BOX**

For locations as required by the Engineer.

ITEM 358. **GATE BOX ADJUSTED**

| <u>Station</u> | <u>Side</u> | <u>Baseline</u> |
|----------------|-------------|-----------------|
| 34+28 | LT | Milestone Road |
| 100+69 | RT | Polpis Road |

ITEM 371.06 **6 INCH COUPLING**

| <u>Station</u> | <u>Side</u> | <u>Baseline</u> |
|----------------|-------------|-----------------|
| 21+41 | LT | Milestone Road |
| 34+28 | LT | Milestone Road |

ITEM 376.2 **HYDRANT – REMOVED AND RESET**

| <u>Station</u> | <u>Side</u> | <u>Baseline</u> |
|----------------|-------------|-----------------|
| 21+41 | LT | Milestone Road |
| 34+28 | LT | Milestone Road |

ITEM 381.3 **SERVICE BOX ADJUSTED**

| <u>Station</u> | <u>Side</u> | <u>Baseline</u> |
|----------------|-------------|-----------------|
| 102+86 | LT | Polpis Road |

ITEM 382.3 **METER BOX ADJUSTED**

| <u>Station</u> | <u>Side</u> | <u>Baseline</u> |
|----------------|-------------|-----------------|
| 101+62 | LT | Polpis Road |
| 102+86 | LT | Polpis Road |

ITEM 451. **HMA FOR PATCHING**

For utility trenches and conduit trenches in roadway to be milled.

ITEM 452. **ASPHALT EMULSION FOR TACK COAT**

For use at a rate of 0.08 Gal/SY for new pavement and 0.09 Gal/SY for overlay of milled pavement.

ITEM 453. HMA JOINT ADHESIVE

For use between pavement mats at Surface Course Paving passes, limits of work and driveways.

| <u>From Station</u> | <u>To Station</u> | <u>Baseline</u> | <u>Side</u> | <u># Passes</u> | <u>Application</u> | |
|----------------------------|--------------------------|------------------------|--------------------|------------------------|---------------------------|---------------|
| 22+70 | 22+70 | Milestone Rd | | 1 | 1 | Limit of work |
| 22+70 | 24+54 | Milestone Rd | | 2 | 3 | Mainline |
| 24+54 | 28+23 | Milestone Rd | | 4 | 5 | Mainline |
| 28+23 | 29+80 | Milestone Rd | | 2 | 3 | Mainline |
| 29+80 | 29+80 | Milestone Rd | | 1 | 1 | Limit of work |
| 100+18 | 101+26 | Polpis Rd | | 4 | 5 | Side Street |
| 101+26 | 102+90 | Polpis Rd | | 3 | 4 | Side Street |
| 102+90 | 102+90 | Polpis Rd | | 1 | 1 | Limit of work |
| 20+97 | 21+41 | Milestone Rd | LT | 1 | 1 | Gutter Line |
| 21+09 | 21+29 | Milestone Rd | LT | 1 | 1 | Driveway |
| 23+90 | 24+02 | Milestone Rd | LT | 1 | 1 | Driveway |
| 24+69 | 24+82 | Milestone Rd | LT | 1 | 1 | Driveway |
| 100+77 | 100+82 | Milestone Rd | LT | 1 | 1 | Driveway |
| 101+18 | 101+27 | Polpis Rd | LT | 1 | 1 | Driveway |
| 101+29 | 102+63 | Polpis Rd | RT | 1 | 1 | Driveway |
| 101+47 | 101+60 | Polpis Rd | LT | 1 | 1 | Driveway |

ITEM 470.2 HOT MIX ASPHALT BERM, TYPE A – MODIFIED

| <u>From Station</u> | <u>Side</u> | <u>Baseline</u> | <u>To Station</u> | <u>Side</u> | <u>Baseline</u> |
|----------------------------|--------------------|------------------------|--------------------------|--------------------|------------------------|
| 18+70 | LT | Milestone Rd | 18+71 | LT | Milestone Rd |
| 18+80 | LT | Milestone Rd | 18+83 | LT | Milestone Rd |
| 22+70 | RT | Milestone Rd | 29+80 | RT | Milestone Rd |
| 22+70 | LT | Milestone Rd | 23+74 | LT | Milestone Rd |
| 24+15 | LT | Milestone Rd | 24+54 | LT | Milestone Rd |
| 24+94 | LT | Milestone Rd | 26+65 | LT | Milestone Rd |
| 27+52 | LT | Milestone Rd | 29+80 | LT | Milestone Rd |
| 100+37 | LT | Polpis Rd | 100+61 | LT | Polpis Rd |
| 100+37 | RT | Polpis Rd | 101+13 | RT | Polpis Rd |
| 100+88 | LT | Polpis Rd | 101+11 | LT | Polpis Rd |
| 101+72 | LT | Polpis Rd | 102+90 | LT | Polpis Rd |

ITEM 472. TEMPORARY ASPHALT PATCHING

For utility trenches, conduit trenches, and test pits in roadway areas of full depth, as well as for use with temporary driveways.

ITEM 482.5 SAWCUTTING ASPHALT PAVEMENT FOR BOX WIDENING

| <u>From Station</u> | <u>Side</u> | <u>Baseline</u> | <u>To Station</u> | <u>Side</u> | <u>Baseline</u> |
|---------------------|-------------|-----------------|-------------------|-------------|-----------------|
| 22+70 | LT | Milestone Rd | 102+90 | LT | Polpis Rd |
| 22+78 | RT | Milestone Rd | 29+80 | RT | Milestone Rd |
| 29+80 | LT | Milestone Rd | 102+90 | RT | Polpis Rd |

ITEM 504. GRANITE CURB TYPE VA4 - STRAIGHT

| <u>Station</u> | <u>Side</u> | <u>Baseline</u> | <u>To Station</u> | <u>Side</u> | <u>Baseline</u> |
|----------------|-------------|-----------------|-------------------|-------------|-----------------|
| 100+21 | CTR | Polpis Rd | 100+26 | RT | Polpis Rd |
| 100+39 | CTR | Polpis Rd | 100+58 | LT | Polpis Rd |

ITEM 504.1 GRANITE CURB TYPE VA4 - CURVED

| <u>Station</u> | <u>Side</u> | <u>Baseline</u> | <u>To Station</u> | <u>Side</u> | <u>Baseline</u> |
|----------------|-------------|-----------------|-------------------|-------------|-----------------|
| 100+21 | CTR | Polpis Rd | 100+21 | RT | Polpis Rd |
| 100+58 | CTR | Polpis Rd | 100+58 | RT | Polpis Rd |

ITEM 670. FENCE REMOVED AND RESET

| <u>Station</u> | <u>Side</u> | <u>Station</u> | <u>Baseline</u> |
|----------------|-------------|----------------|-----------------|
| 34+84 | LT | 35+05 | Milestone Road |

ITEM 697.1 SILT SACK

To be used with all proposed catch basins, and all catch basins and gutter inlets to remain within project areas.

ITEM 711. BOUND REMOVED AND RESET

| <u>Station</u> | <u>Offset</u> | <u>Baseline</u> |
|----------------|---------------|-----------------|
| 20+36 | 32' LT | Milestone Rd |
| 27+70 | 32' LT | Milestone Rd |
| 30+37 | 32' LT | Milestone Rd |

ITEM 715. RURAL MAIL BOX REMOVED AND RESET

| <u>Station</u> | <u>Offset</u> | <u>Baseline</u> |
|----------------|---------------|-----------------|
| 101+09 | 27' LT | Polpis Rd |
| 101+64 | 24' LT | Polpis Rd |

ITEM 751.8 TILLING

For use with preparing the soil within planting beds that are coincidental with construction staging areas.

ITEM 765.554 WETLAND SEED – SEASONALLY FLOODED MIX

For use with the proposed Infiltration Basin.

ITEM 765.635 NATIVE SEEDING AND ESTABLISHMENT

For use with the proposed Infiltration Basin.

ITEM 767.121 SEDIMENT CONTROL BARRIER

| <u>From Station</u> | <u>Side</u> | <u>To Station</u> | <u>Baseline</u> |
|---------------------|-------------|-------------------|-----------------|
| 23+83 | RT | 28+55 | Milestone Road |

ITEM 767.9 JUTE MESH

To be installed on all side slopes at the proposed Infiltration Basin.

ITEM 801.502 5 INCH ELECTRICAL CONDUIT–TYPE NM (DOUBLE)

| <u>From Station</u> | <u>Side</u> | <u>To Station</u> | <u>Baseline</u> |
|---------------------|-------------|-------------------|-----------------|
| 23+71 | RT | 33+37 | Milestone Road |

ITEM 802.402 4 INCH TELEPHONE CONDUIT – TYPE NM (DOUBLE)

| <u>Station</u> | <u>Baseline</u> | <u>Side</u> | <u>To Station</u> | <u>Baseline</u> | <u>Side</u> |
|----------------|-----------------|-------------|-------------------|-----------------|-------------|
| 24+60 | Milestone Rd | RT | 25+52 | Milestone Rd | LT |
| 24+76 | Milestone Rd | RT | 26+24 | Milestone Rd | RT |
| 100+88 | Polpis Rd | LT | 102+70 | Polpis Rd | LT |

ITEM 803.401 4 INCH CATV CONDUITTYPE–NM (SINGLE)

| | | | |
|-----------------------|--------------------|--------------------------|------------------------|
| <u>From</u> | | | |
| <u>Station</u> | <u>Side</u> | <u>To Station</u> | <u>Baseline</u> |
| 24+76 | RT | 29+05 | Milestone Road |

ITEM 806.5 5 INCH ELECTRICAL CONDUIT TYPE RM – GALVANIZED STEEL

| | | | |
|-----------------------|--------------------|------------------------|------------------------|
| <u>From</u> | | | |
| <u>Station</u> | <u>Side</u> | <u># Risers</u> | <u>Baseline</u> |
| 23+71 | RT | 2 | Milestone Road |

ITEM 840.1 PRESSURE TREATED SIGN POST

To be used with Items 832. and 874.2.

ITEM 854.016 TEMPORARY PAVING MARKINGS - 6 INCH (PAINTED)

To be used for center line on binder/milled surface for the length of the project, lane lines at intersections and lines on base course.

ITEM 854.036 TEMPORARY PAVING MARKINGS - 6 INCH (TAPE)

To be used on the final pavement surface as a temporary measure in the event where permanent pavement markings cannot be installed prior to opening to traffic.

ITEM 864.04 PAVEMENT ARROW AND LEGENDS REFLECTORIZED WHITE (THERMOPLASTIC)

For use with turn arrows and only symbols, which use reflectORIZED white thermoplastic.

ITEM 864.31 SLOTTED PAVEMENT MARKER ONE-WAY WHITE

| | | | | |
|-----------------------|------------------------|--------------------------|------------------------|-----------------------|
| <u>Station</u> | <u>Baseline</u> | <u>To Station</u> | <u>Baseline</u> | <u>Spacing</u> |
| 25+48 | Milestone Rd | 26+68 | Milestone Rd | @ 40' |

ITEM 864.32 **SLOTTED PAVEMENT MARKER ONE-WAY YELLOW**

| <u>Station</u> | <u>Baseline</u> | <u>Side</u> | <u>To</u> <u>Station</u> | <u>Baseline</u> | <u>Spacing</u> |
|----------------|-----------------|-------------|-----------------------------|-----------------|----------------|
| 27+65 | Milestone Rd | RT | 28+85 | Milestone Rd | @ 40' |
| 27+65 | Milestone Rd | LT | 28+85 | Milestone Rd | @ 40' |

ITEM 864.35 **SLOTTED PAVEMENT MARKER TWO-WAY YELLOW/YELLOW**

| <u>Station</u> | <u>Baseline</u> | <u>Side</u> | <u>To</u> <u>Station</u> | <u>Baseline</u> | <u>Spacing</u> |
|----------------|-----------------|-------------|-----------------------------|-----------------|----------------|
| 23+08 | Milestone Rd | RT | 26+68 | Milestone Rd | @ 40' |
| 23+08 | Milestone Rd | LT | 26+68 | Milestone Rd | @ 40' |
| 29+25 | Milestone Rd | RT | 29+65 | Milestone Rd | @ 40' |
| 29+25 | Milestone Rd | LT | 29+65 | Milestone Rd | @ 40' |

ITEM 874.2 **TRAFFIC SIGN REMOVED AND RESET**

| <u>Station</u> | <u>Baseline</u> | <u>Side</u> | <u>Supports</u> | <u>Description</u> |
|----------------|-----------------|-------------|-----------------|------------------------------|
| 21+51 | Milestone Rd | LT | 1 4x4 Post(s) | SPEED REDUCTION |
| 22+25 | Milestone Rd | LT | 1 4x4 Post(s) | BIKE & PED XING |
| 26+33 | Milestone Rd | LT | 2 4x4 Post(s) | "POLPIS-WAUWIENT QUIDNET" |
| 26+91 | Milestone Rd | RT | 1 4x4 Post(s) | "MILESTONE ROAD" |
| 101+04 | Polpis Rd | LT | 1 4x4 Post(s) | HOSPITAL SYMBOL |

ITEM 874.4 **TRAFFIC SIGN REMOVED AND STACKED**

| <u>Station</u> | <u>Baseline</u> | <u>Side</u> | <u>Description</u> |
|----------------|-----------------|-------------|----------------------|
| 25+71 | Milestone Rd | RT | "MILESTONE RD" |
| 25+80 | Milestone Rd | LT | "STOP" |
| 26+75 | Milestone Rd | LT | "STOP" |
| 100+89 | Polpis Rd | RT | "YIELD" |
| 101+05 | Polpis Rd | LT | DIAGONAL RIGHT ARROW |

ITEM 903. **3000 PSI, 1.5 INCH, 470 CEMENT CONCRETE**

To be used for thrust blocks with hydrants and proposed water pipe bends.

ITEM 986. **MODIFIED ROCKFILL**

To be used for the installation of weirs associated with the proposed infiltration basin.

ITEM 998.01 **SEDIMENT FOREBAY PAVERS**

To be used for the bottom of the sediment forebay associated with the proposed Infiltration Basin.

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DOCUMENT A00804

MUNICIPAL LANDSCAPE MAINTENANCE LETTER

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Town of Nantucket *Department of Public Works*

Municipal Office Building • 188 Madaket Road • Nantucket, MA 02554 • Ph (508) 228-7244
Andrew B. Patnode • Director
apatnode@nantucket-ma.gov

May 21, 2024

Ms. Mary-Joe Perry
District Highway Director
MassDOT Highway Division
District 5
1000 County Street
Taunton, MA 02780

Re: Project File No.: 613129
Milestone Road at Polpis Road
Nantucket, Massachusetts

Dear Ms. Perry:

This letter acknowledges the general expectation for plant care for planting and seeding following the one-year MassDOT contract plant warranty for the Milestone Road at Polpis Road Project. The Town of Nantucket agrees to perform maintenance as required, and as outlined in the attached MassDOT guides for Basic Plant Care and Native Seeding, where shown on the associated Landscape Maintenance Plans.

Please feel free to call me at 508-228-7200 ext. 7512 with any questions or comments.

Sincerely,

Andrew B. Patnode
Director
Department of Public Works
188 Madaket Road
Nantucket, MA 02554

Cc: Carrie Lavalley, P.E., Deputy Administrator/Chief Engineer
Adam Kiel, P.E. MassDOT Project Manager
Sean McIntyre, P.E., Greenman-Pedersen, Inc.
Tara Mitchell, MassDOT Landscape Section
File

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DOCUMENT A00808

PROJECT UTILITY COORDINATION FORM

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Project Utilities Coordination (PUC) Form

CONTACTS AND GENERAL UTILITY INFORMATION

4/5/2024
Revision
Date:

4/5/2024
PRINTED

| | | |
|----------------------------------------|----------------------------------------|--------------------------------------------|
| City/Town: Nantucket | Project File #: 613129 | Utility Pole Set: NGRID-Electric |
| Route/Street: Milestone Road | Resident Engineer: Adam Kiel | Scheduled Ad Date: 6/22/2024 |
| PUC Completed by: jh | | Total Poles Relocated: 2 |
| Mass DOT PM: Adam Kiel | | |

| Utility Company | Contact | Office # | Cell # | Email | Office # | 978.570.2987 | Scops, Budget, Duration Submitted | | Reimbursement | | Potential for District Initiated Early Relocation * | | Utilities On Bridge/Structure | | Utilities Underground (UG) /Aerial (OH) | |
|------------------------|--------------|--------------|--------|------------------------------|----------|--------------|-----------------------------------|----|---------------|--------------|-----------------------------------------------------|--------|-------------------------------|-----|-----------------------------------------|-----|
| | | | | | | | Yes | No | Agreement | Non-Reimbile | Notes | Cell # | Email | YES | NO | YES |
| National Grid Electric | Noah Skole | | | Noah.Skole@nationalgrid.com | | | x | | | | | | | | | |
| Verizon | Karen Mealey | 774-409-3160 | | karen.m.mealey@verizon.com | | | x | | | | | | | | | |
| Comcast | Wendy Brown | 978-888-5163 | | wendy_brown@comcast.com | | | x | | | | | | | | | |
| Crown Castle | Mark Bonnano | 508-616-7818 | | mark.bonanno@crowncastle.com | | | x | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |

Utility Relocation Notes for MassDOT Contractor
 Unless otherwise noted by Contract, the MassDOT Contractor is to provide the District Construction Office with 7 Calendar Days advance notification in order to validate the current progress and provide the required 30 Days advance notice-to-proceed for the first Utility - and each subsequent Utility. These advance notifications are to be identified in the Contractor's Schedules (Pre-Con preparation, Baseline, Subnets, and Updated/Monthly Schedules) as specified in Subsection 8.02 (for DBB Contracts) and/or Section 9 (of DB Contracts). Note: The durations included below do not include these lead-times. See Additional Important Basis notes for Contractor - on last PUC Form page.

Additional notes:

Suggested Sequence of Relocation (Based on Consultant proposed construction staging)
 The sequence as detailed on the following pages is based on the consultants proposed staging plan. This information was compiled through meetings that included all of the utilities listed below along with the designer and the Town of Nantucket. The information provided is the best available information prior to project advertisement.

PUC FORM - CONTINUED

| | | |
|------------------------------------------------------------------------------------------------------------------------|-----|----|
| Is 'enabling' (prep) work, by the Contractor, necessary prior to the start of the first series of utility relocations: | Yes | No |
| | X | |
| Has any of the Utility work been identified to work concurrently | Yes | No |
| | | X |

4/5/2024
PRINTED



| RESPONSIBLE PARTY | DESCRIPTION - Utility Relocation Phases, Tasks and Activities | Estimated Duration (Work Days) by Utilities (Lead time not included) | Concurrent / Exclusive Utility Work | | | | Access Restraint & Limitations of Operations Notes |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|-------------------------------------|----------------------|---------------------|-----------------------|----------------------------------------------------|
| | | | Exclusive Utility on site | Concurrent Utilities | Contractor Off-Site | Contractor Concurrent | |
| C = Contractor | >Contractor to notify the Utilities 30 days prior to the start of any work. >Contractor to perform clearing & grubbing, tree trimming, and required slope work. | | | | | | |
| | UTILITY OPERATIONS- Overhead | | | | | | |
| Task 1 | National Grid Electric | | | | | | |
| | u Site Readiness: Dig-safe, pre-checks, etc. | 10 | | | | | |
| | u POLES: REPLACE/RELOCATE POLES (1 & 3), ANCHOR/DOWN GUYS: INSTALL ANCHOR / DOWN GUYS - POLES (1 & 3) | 5 | X | | | | |
| | u OH PRI WIRES: REPLACE PRIMARY OVERHEAD FROM POLES (65 TO 2) | 5 | X | | | | |
| | u OH SEC WIRES: REPLACE/REMOVE @ (P65, 2&3) | 5 | X | | | | |
| | Sub-Total | 25 | | | | | |
| Task 2 | Crown Castle | | | | | | |
| | u TRANSFER OVERHEAD CABLE | 1 | X | | | | |
| | Sub-Total | 1 | | | | | |
| Task 3 | Comcast | | | | | | |
| | u Aerial Construction | 2 | X | | | | |
| | Sub-Total | 2 | | | | | |
| Task 4 | Verizon | | | | | | |
| | u Verizon Line to place new aerial fiber cable | 4 | X | | | | |
| | u Verizon Line to transfer cable where applicable | 32 | X | | | | |
| | u Verizon Splice to join all new copper cable placed and trim off old | 4 | X | | | | |
| | u Verizon Splice to join all new fiber cable placed and trim off old | 20 | X | | | | |
| | u Verizon Line old copper & fiber cabling | 30 | X | | | | |
| | u Verizon Line to remove 2 poles | 1 | X | | | | |
| | Sub-Total | 91 | | | | | |
| C | >Contractor to notify the Utilities 30 days prior to the start of any work. >Contractor to install electric and telephone conduits. | | | | | | |
| | UTILITY OPERATIONS- Underground | | | | | | |
| Task 1 | National Grid Electric | | | | | | |
| | u UNDERGROUND: SPLICE/WIRE PULLING FROM POLE (65) TO MANHOLE (0-1) *Must be done at non-peak load season* | 10 | X | | | | |
| | u Outage Coordination & Scheduling | 30 | X | | | | |
| | Sub-Total | 40 | | | | | |
| Task 2 | Verizon | | | | | | |
| | u Verizon CWI to intercept existing buried, MH breakout and place stubs to connect to MassDOT GC placed ducts | 24 | X | | | | |
| | u Verizon Line to place new copper cables in ducts | 17 | X | | | | |
| | Sub-Total | 41 | | | | | |
| Task 3 | Comcast | | | | | | |
| | u Underground Construction | 1 | X | | | | |
| | Sub-Total | 1 | | | | | |

IMPORTANT BASIS NOTES - FOR CONTRACTOR

- 1 Unless otherwise specified in the MassDOT Construction Contract, or unless specifically noted within this PUC Form, these durations (herein) are based upon the Contractor providing *unimpeded access* to the Utility company to perform Utility relocations (see Note 5 - Access).
- 2 "Concurrent Utilities" operations noted herein, are to signify those Utility Company operations that can be worked concurrently (e.g. Utility A and Utility B work on-site together) - MassDOT and the Contractor are to prepare NTPs to Utilities accordingly.
- 3 "Potential Access Restraints" noted within this PUC Form are for planning purposes. See MassDOT Contract for Contractual Access Restraints (refer to Subsections 8.02, 8.03, and/or 8.06 for Design Bid Build Contracts and Volume II Section 9 for Design Build Contracts).
- 4 Utility non-work periods - For planning purposes, the durations above contain some non work days (contingency) for New England conditions (precipitation, high temperatures, low temperatures, snow, ice). Gas line work however, typically has a seasonal restriction and can NOT be installed from 15-November to 15-March. Municipally Owned Electric and Gas Utilities are also restricted from proceeding from 15-November to 15-March. The Contractor shall (and the CTD plan) reflect this calendar restriction within the schedule (unless otherwise note).
- 5 Access - Unless otherwise noted in the Contract, and in addition to the 'enabling' notes above, the Contractor must provide safe and unimpeded access (for trucks, lifts, cranes, etc.) to the Utilities, to allow for the proposed relocation(s) - including but not limited to snow removal, clearing and grubbing, guard rail removal, barrier removal, tree removal, and grading.
- 6 For all MassDOT construction contracts issued after January 2014, the new Utility Coordination/documentation specification is required. This is Section 8.14 in Design-Bid-Build Contracts (see Design-Build index reference for applicable section #).

| Access Restraint & Limitations of Operations Notes | Concurrent / Exclusive Utility Work | | | | Potential Access Restraint | Reason/Note (optional) |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| Should an AR be considered for the Contractor? | <p>Contractor note: In planning and executing the work, the Access Restraints listed in the Special Provisions, takes precedence over the checklist in these 4 columns.</p> | | | | (Yes/No) | |
| Utilities (Lead time not included) | | | | | | |
| Estimated Duration (Work Days) by | | | | | | |
| Exclusive Utility on site | Concurrent Utilities | Contractor Off-site | Contractor Concurrent | | | |
| Utility working with no other utilities in vicinity | Utility working with other utilities on site | No Contractor physical construction operations on-site (while Utility Contractor and Utility are working on-site but NOT in the same vicinity) | Contractor and Utility are working on-site | | | |
| C = Contractor | <p align="center">DESCRIPTION - Utility Relocation Phases, Tasks and Activities</p> | U = Utility Co. | RESPONSIBLE PARTY | 7 | Prior to starting any and all enabling work for Utilities, the Contractor is to plan in advance with submittals and approved durations. | |
| 8 | | | | | * Potential District Initiated Early Utility Relocation - if noted herein, the District reserves the right to initiate early utility relocation in advance of the Contract NTP. In submitting a bid price and in the development/basis of the Baseline Schedule, the Contractor shall not plan the Work with the potential benefit of any form of 'early utility relocation.' As a requirement of the Baseline submission, unless otherwise noted in this Specification, the earliest that the first Utility company is to receive the 30 days advance notification to mobilize to the site, will be 7 calendar days after the pre-construction meeting and never sooner than 7 days after the Contract NTP. | |
| 9 | | | | | ** Assumed Duration, Not Provided By Utility Company. | |

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MassDOT Herbicide Use Report

Date Submitted:

MassDOT Herbicide Use Report

Use multiple sheets for multiple application techniques or sites as needed.

| | | | |
|-------------------------|----------------------|--------------------------------|----------------------|
| Contractor | <input type="text"/> | Project or Contract No: | <input type="text"/> |
| Performing Work: | <input type="text"/> | | |
| Town/s: | <input type="text"/> | Associated Route: | <input type="text"/> |

Project Description:

| | | | | | |
|-------------------------------|----------------------|-------------------------------------|-----------------------------|------------------------------|-----------------------------|
| Treatment Description: | <input type="text"/> | Area Treated (as applicable) | Acres: <input type="text"/> | Sq Yds: <input type="text"/> | Miles: <input type="text"/> |
| Weeds Targeted: | <input type="text"/> | Gallons Formula Used: | <input type="text"/> | | |
| Application Method: | <input type="text"/> | Date/Time Began: | <input type="text"/> | | |
| | | Date/Time End: | <input type="text"/> | | |

Product Used:

| | | |
|-------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Name: _____ EPA Reg. No: _____ % Active Ingredient Dry: _____ Liquid: _____ Formulation (dilution rate): _____ | Name: _____ EPA Reg. No: _____ % Active Ingredient Dry: _____ Liquid: _____ Formulation (dilution rate): _____ | Name: _____ EPA Reg. No: _____ % Active Ingredient Dry: _____ Liquid: _____ Formulation (dilution rate): _____ |
|-------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|

Additional products used (surfactants, etc.) or other information:

| | |
|---------------------|-------------------------|
| Applicators: | License Numbers: |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |

Upon completion, please submit form to MassDOT District Engineer and Landscape Design Section in Boston office.
11-16-2017



WORK ZONE SAFETY

Temporary Traffic Control

*Typical Details and
Massachusetts Guidelines
for MassDOT, Municipalities,
Utilities, and Contractors*

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INTRODUCTION

This guide has been prepared to assist in the planning and installing of temporary traffic controls in maintenance, utility, or short-term construction work areas (work lasting 10 hours or less). This guide serves to assist with the many decisions that must be made for each work site. Special planning for traffic control is necessary on a case by case basis because conditions can vary widely among work locations. **Since this guide cannot cover every situation, representative illustrations covering typical short-term construction, maintenance, and utility operations are presented.**

All typical traffic control device setups illustrated should be considered as guides. The traffic control devices that are shown, the arrangement or position of the devices, and the distances prescribed in the tables are based on the Federal Highway Administration's (FHWA) Manual on Uniform Traffic Control Devices (MUTCD) and the Massachusetts Amendments to the MUTCD (MA Amendments), but these illustrations only present minimum standards. The provision of safe work zones for all roadway users and roadway workers affected by these activities is paramount. Traffic controls may be expanded or improved upon whenever deemed necessary. Traffic movement through the work site all traffic control devices shall be periodically observed and inspected at all locations.

If necessary, Part 6 of the MUTCD and the MA Amendments, Chapter 17 (Work Zone Management) of MassDOT's Project Development & Design Guide, and the "Traffic Engineering and Safety Section" of the MassDOT web site: (<https://www.massdot.state.ma.us/highway/Departments/TrafficandSafetyEngineering.aspx>), as well as MassDOT District offices can provide additional guidance, information, and suggestions for work zone setups.

RESPONSIBILITIES FOR TRAFFIC CONTROL

Short-term construction, maintenance, and utility work on or near the roadway creates a potentially hazardous situation, typically requiring the use of temporary traffic controls. These controls are important to protect both work crews and the road users. It is the responsibility of each maintenance foreman to establish and maintain safe and effective controls.

Usually the supervisor, working with the crew, plans the traffic control procedures for proposed work sites. The foreman is responsible for re-requesting, storing, and maintaining all traffic control devices necessary for their crews.

The foreman is responsible for placing the devices according to these guidelines. They must inspect each installation and observe traffic flow through the area. The foreman is generally authorized to make adjustments to the original installations that, in their judgment, are necessary to improve the control of traffic and establish greater safety.

All necessary traffic control devices must be installed before work begins and properly maintained during the work period. They must also be removed as soon as they are no longer relevant to the roadway conditions.

PAGE 2

In situations such as night time road or lane closures, detours, or other unusual conditions on state highways, the District Traffic Maintenance Engineer (DTME) should be advised. If the DTME is absent, the section foreman shall follow the instructions of the District Maintenance Engineer.

TRAFFIC CONTROL DEVICES

Traffic control devices regulate the movement of road users, warn of unexpected or unusual roadway conditions, and inform them how to maneuver safely through or around the work area. All signs, channelizing devices, barricades, and other miscellaneous traffic control devices should work together to guide traffic safely and efficiently. Common temporary traffic control devices are outlined and described below.

Signs

Temporary traffic control zone (TTCZ) signs are the primary means of providing information and directions to roadway users. All signs must be retroreflective per MassDOT's latest standard.

Warning signs call attention to unexpected conditions and to situations that might not be readily apparent to road users on or adjacent to a roadway. Warning signs alert road users to conditions that might call for a reduction of speed or an action in the interest of safety and efficient traffic operations. Nearly all warning signs for construction and work areas have black legends and borders on a fluorescent orange background.

Regulatory signs shall be used to inform road users of selected traffic laws or regulations and indicate the applicability of the legal requirements. Regulatory signs typically have black legends and borders on a white background.

Channelizing Devices

When used properly, traffic cones, reflectorized plastic drums, and barricades guide traffic through the work area along an appropriate travel path. It takes roadway users a certain distance along the roadway to safely move away from the upcoming active work site. These transition distances are based on the following taper length (L) formulas:

$L = WS^2/60$ for speeds of 40 mph or less; or

$L = WS$ for speeds of 45 mph or more; where

- L = minimum length of taper in feet,
- S = posted speed limit or typical travel speed in miles per hour prior to the work, and
- W = width of lane closure in feet.

The spacing of channelizing devices (in feet) is approximately equal to the existing speed of traffic (in mph).

Warning Lights

Rotating beacons and other flashing lights mounted on work vehicles, signs, or channelizing devices help alert roadway users to the work area. They may also be used to warn roadway users of hazards within the work area. The first 10 drums in any taper shall be equipped with sequential flashing lights.

Arrow Boards

Arrow boards are a special type of sign that are highly visible work zone warning devices. They are particularly effective on highways, where both speed and volume are high. Arrow boards in the non-directional, CAUTION, mode (four corner flashing) may be used to indicate that a shoulder is closed. Arrow boards in the arrow mode shall only be used when a travel lane is dropped on a multi-lane road and one lane of traffic must merge with another. All arrow boards should be located at the beginning of each lane or shoulder closure taper without extending outside of it. Arrow boards shall flash at a rate of 25 to 40 flashes per minute. Arrow boards shall not be used to indicate a lane shift.

BASIC REQUIREMENTS

In every work situation, the temporary traffic control setup must: Give roadway users sufficient advance warning of the work area; advise roadway users of the proper actions to take and travel paths to follow; and provide protection to roadway users, workers, and the work area. These three general requirements can be met as outlined below.

Provide Advance Warning

Warning devices along the approaches to a work area alert roadway Users to changes to road and operating conditions. Roadway users are usually alerted to these dangers via a sign or series of signs installed in the same order as the roadway user generally would expect to see them on long-term construction projects.

The initial project limit sign is usually a general warning such as "ROAD WORK 1500 FT". Other operational warning signs then provide the roadway user with more specific information about the situation. A minimum of three advance warning signs (the initial project limit sign and two operational warning signs) is recommended when work is located on the traveled way. Warning lights and flags can be used to attract attention to the signs. A highly visible work area helps reinforce the advance warnings.

Advise and Direct Travelers

Operational warning signs provide information to the road-way user such as the type of work being performed, special conditions to watch for, or actions to take. These include signs such as, SHOULDER WORK, RIGHT LANE CLOSED, DETOUR 500 FT, ROAD CLOSED to THRU TRAFFIC, POLICE OFFICER AHEAD, etc. All of these signs must be located far enough in advance of the work area that the roadway user has sufficient time to react to them appropriately. For projects in Urban Areas, see detail: Typical Device Spacing for minimum sign spacing.

Protect Travelers, Workers, and the Work Area

The primary protection of any work area is its own visibility. Traffic cones, reflectorized plastic drums, portable breakaway barricades, etc. are used to make the work area visible and separate workers from traffic.

PAGE 4

Other devices, such as flashing lights, flags, delineators, temporary lighting, and portable changeable message signs (PCMS) can be used to provide additional emphasis and visibility.

Workers must protect themselves by being alert to their work situation, wearing safety vests and hard hats, and by facing traffic whenever possible.

Work vehicles can also add protection when they are equipped with truck mounted attenuators, rotating beacons, flashing lights, flashing arrow boards, etc. and are parked between workers and oncoming traffic. However, workers should not position themselves between two closely parked vehicles. No private personal vehicles are allowed within the work site.

PLANNING GUIDELINES

Decisions regarding selection of work area traffic control devices require a knowledge and understanding of the specifics of each work zone. As there may be vast differences between situations, three main variables need to be considered prior to determining the need for, or the selection of, traffic control devices: 1) location of work, 2) type of roadway, and 3) speed of traffic.

Compiling information about these variables will help with planning a safe work area control. Each of these variables is explained below.

Location of Work

The choice of traffic controls needed for a short-term construction, maintenance, or utility operation depends upon the work zone's location. As a general rule, the closer the active work site is to the roadway, the more control devices are needed. Work can take place:

- Away from the shoulder or edge of pavement. No special devices are needed if work is confined to an area 15 or more feet from the edge of the shoulder. A general warning sign, such as ROAD WORK AHEAD, should be used if workers and equipment must occasionally move closer to the roadway.
- On or near the shoulder/ edge of pavement. This area should be signed as if work were on the road itself, since it is part of the roadway users' recovery area. Advance warning and operational signs are needed, as well as channelization devices to direct traffic and keep the work area visible to roadway users.
- On the median of a divided highway. Work in this location may require traffic control in both directions of traffic. Advance warning and channelization devices should be used if the median is narrow.
- On the roadway. This condition requires detailed protection for workers and sufficient warning to roadway users. Advance warning must provide a general message that work is taking place as well as information about specific hazards and specific actions the roadway user must take.

TYPE OF ROADWAY

The characteristics of the roadway also have an important influence on the selection of work area traffic control. The roadway, itself, may present special hazards. You should plan for maximum protection, using the worst hazard present as your guide to signing the work area. Some general considerations are described below for road conditions.

One-way roads: A one-way road requires signage on both sides of the road if it carries two or more lanes in one direction, ensuring roadway users in all lanes are alerted and informed.

Two-way roads:

- **Undivided:** Two-way, undivided roads will usually require controls for both directions of traffic. When the active work site is well off the roadway, controls for the opposite lane may be eliminated.
- **Divided:** Work on divided multi-lane roadways can often be handled as work along a one-way road (i.e. signs are provided along both sides of the roadway along the direction affected). If the work is in the median, both directions of traffic must be controlled, and both approaches should be double signed (i.e. have all 3 advance warning signs on both sides of each direction).

EFFECTS OF SPEED ON WORK ZONES

Speed is an important consideration in the use of work area traffic control devices. As a general rule, the greater the speed of traffic approaching a work area, the greater the size, number, and spacing of control devices.

Size. The standard size for most warning signs is 36 x 36 inches on conventional roadways and 48 x 48 inches on freeways and expressways. Signs larger than the standard 36 x 36 inches may be desirable on high-speed conventional roads.

Position. Install signs far enough in advance of the work area so the roadway users have time to react to them (see charts associated with diagrams for spacing).

OTHER FACTORS

Sight Obstructions. To ensure safety, work areas must be visible. Assess the placement of the temporary traffic control devices by driving through the area, and determine if the devices can be easily seen and provide sufficient time for roadway users to react in a safe manner. Extra precaution should be enacted in areas where horizontal or vertical curves may obstruct a roadway user's clear view of road activities ahead.

Police/Flaggers. It should be noted that the MUTCD does not require police/flaggers for stationary setups. If police/flaggers are used, a police/flagger ahead sign should be used in advance of any point where the police/flagger is stationed to control road users.

PROCEDURES FOR WORK AREA TRAFFIC CONTROL

1. PLAN YOUR WORK

Inspect location of work area and its surroundings.

Analyze:

- Location of work in relation to the traveled way, intersecting road-ways, driveways, and sight distances;
- Type of roadway and traffic involved; and
- Volume and speed of traffic.

Meet and discuss the work and necessary traffic control with the crew.

Study representative illustrations in this guide to develop a temporary traffic control plan (TTCP).

Other Considerations:

- Base your traffic control plan on the premise that all roadway users are unfamiliar with the area.
- The closer the work area location is to traffic, the more controls are needed.
- Plan for maximum protection.
- Select and inspect the temporary control devices needed (including all warning signs), if they are not in good condition, REPLACE THEM!
- Then collect and transport them to the work site.
- Determine their proper placement.
- Install signs and other traffic control devices prior to allowing personnel or equipment onto the roadway.
- Make sure signs are reflective, accurate, clean, and meet specifications. Completely cover any existing permanent signs that will conflict with the messages of the new work area control signs.

2. INSTALLING/REMOVING TEMP. TRAFFIC CONTROL DEVICES

Care must be exercised when installing and removing temporary traffic control (TTC) devices. The traffic control needed to perform the operation safely is dictated by the location on the roadway the operation will occur: in a shoulder or a lane, in the left lane or right, etc. In all cases, installing TTC begins and ends as a mobile operation.

A shadow vehicle with a truck mounted attenuator (TMA) shall be used to protect workers installing and removing TTC devices on all roadways with a posted speed limit of 45 MPH or greater as directed by the engineer. TTC devices shall not be installed or removed from a shadow vehicle with a TMA. TTC devices shall be installed or removed from a work operation vehicle only and a shadow vehicle with a TMA shall be used to protect the workers installing or removing the devices.

PROCEDURES FOR WORK AREA TRAFFIC CONTROL (CONT.)

3. INSTALL TRAFFIC CONTROL DEVICES AT WORK SITE

FOR LOWER SPEED (≤ 40 MPH) ROADWAYS:

- 1) All devices shall be installed in order with the flow of traffic.
- 2) Where one direction of traffic is being affected, the first sign installed should be the sign farthest from the work site, and on the same side as the work.
- 3) Where two directions of traffic are affected, install signs for opposing traffic first, starting with the sign farthest from the work area. When signs for opposing traffic have been installed, install signs on the same side as the work area, again beginning with the sign farthest from the active work site.
- 4) Once signs are in place, other traffic control devices shall be installed in the same manner as the signs.

FOR HIGHER SPEED (≥ 45 MPH) ROADWAYS:

- 1) All devices shall be installed in order with the flow of traffic.
- 2) Install all advance warning signs, beginning with the ROAD WORK XXX (W20-1) sign and ending with the END ROAD WORK/DOUBLE FINES END (MA-R2-10E) sign.
- 3) Install all signs beginning with the opposite side which will be closed (for a right lane closure; first, install all signs on the left side (shoulder) and then install all signs on the right side (shoulder). No signs shall be erected on the roadway unless delineated by traffic control devices.
- 4) If required, install shoulder taper as the mobile operation advances.
- 5) Install arrow board on the shoulder prior to the merging taper or as close to the beginning of the merging taper as possible.
- 6) Install channelizing devices to form a merging taper. Use of a shadow vehicle with a TMA during installation is required on roads with speed limits of 45 MPH or greater or as directed by the Engineer.
- 7) Install traffic control devices along the buffer space at the appropriate spacing.
- 8) Continue placing devices along the work space at the appropriate spacing.
- 9) Install devices for the termination area as necessary.
- 10) Place the shadow vehicle with a TMA in advance of the first work crew or hazard approached by motorists. Multiple shadow vehicles may be required based on the number of lane and shoulder closures implemented.

4. INSPECT WORK AREA SIGNING AND CONTROL DEVICES

- 1) Assess the placement of the temporary traffic control devices by driving through the work area. All approaches to the work zone should be checked.
- 2) Ensure roadway users will have sufficient time to read signs and react in a safe manner.

PROCEDURES FOR WORK AREA TRAFFIC CONTROL (CONT.)

- 3) Check visibility of entire work area. If approaching roadway users can't see the work area well, or if they can't see ahead to traffic that may already be queued on the approach because of the work, additional traffic control devices should be deployed.
- 4) Check to ensure the proper temporary traffic control devices are positioned to protect workers from traffic (where possible).
- 5) Ensure all workers wear safety vests, hard hats, and all other necessary safety equipment. All worker safety gear should be in good condition. All reflective gear should be clean and highly visible in the dark.
- 6) Record in the log book the number and location of all signs and devices.

Considerations:

- Work area signs should never be blocked from view or obscured by vegetation, existing signs, or other obstructions.
- Flags, flashing lights, and edge line traffic cones can be used to improve visibility.

5. REMOVE TRAFFIC CONTROL DEVICES AT WORK SITE

All workers and equipment should be clear from work site BEFORE removing signs and other devices.

FOR LOWER SPEED (≤ 40 MPH) ROADWAYS:

- 1) Remove signs and other devices within the delineated area when work is complete.
- 2) Remove other traffic control devices in the reverse order in which they were installed
- 3) Remove signs in the reverse order in which they were installed (i.e. sign closest to the work area to be removed first).
- 4) When the operation is complete, uncover any existing permanent signs covered in Step 2.
- 5) Record in the log book the time at which the signs were removed.

FOR HIGHER SPEED (≥ 45 MPH) ROADWAYS:

All TTC devices for a stationary lane closure on a multi-lane roadway, except advance warning signs, should be removed against the flow of traffic in the following sequence:

- 1) Remove the channelizing devices starting from the end of the activity area working back to the widest part of the merging taper.
- 2) A shadow vehicle with TMA shall be positioned to protect workers removing devices and work backwards as the setup is removed from the roadway.

PROCEDURES FOR WORK AREA TRAFFIC CONTROL (CONT.)

- 3) Place the removal vehicle on the shoulder, and remove the channelizing devices from the merging taper by hand onto the work vehicle.
- 4) Remove the arrow board once traffic is clear and it is safe to do so.
- 5) Circle back and moving with the flow of traffic, remove the advance warning signs starting with the opposite side from previous lane closure first.
- 6) At no time shall workers run across the multilane roadway to remove signs on both sides of the road simultaneously.
- 7) Record in the log book the time at which the signs were removed

RAMP FACILITIES

At all times it is necessary to control the on and off-ramp traffic during the installation and breakdown of traffic control devices. Use of temporary traffic slow-downs or rolling roadblocks is recommended to allow for the safety of workers handing temporary traffic control devices on ramp facilities. A shadow vehicle with a TMA shall be used to protect the workers installing or removing the devices. At no time shall the work operation vehicle be used as the shadow vehicle with the TMA.

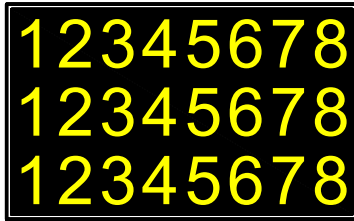
USE OF THIS GUIDE

Illustrations showing minimum standards for short-term construction, maintenance, and utility operations are arranged in this guide by type of operation. The users of this guide should compare all illustrated examples and examine their differences. After gathering information about the work zones using the general guidelines as outlined, proceed as follows:

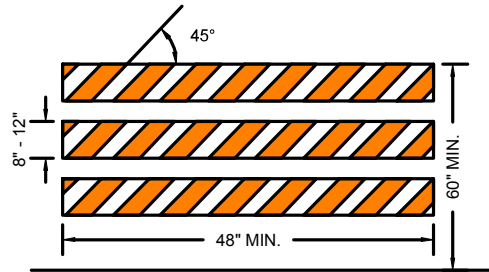
- 1) Turn to the Index. Consider the type of operations and the type of roadway upon which work will occur.
- 2) Select the figure that most closely matches the conditions where you plan to work. Remember that all diagrams represent minimum standards.
- 3) Read the title of the illustration to ensure that it is appropriate to your location. Study the layout of traffic control devices and read all notes.
- 4) Consult the appropriate tables, as directed on each illustration to determine taper length and proper spacing of signs. Notice that distances change when speeds change. Also note that these are guidelines, only, and they must be adapted to your specific work area.
- 5) Use the **“PROCEDURES FOR WORK AREA TRAFFIC CONTROL”** for assistance in completing all necessary steps to provide effective and safe work area traffic control.



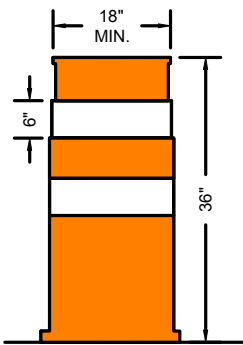
SIGN



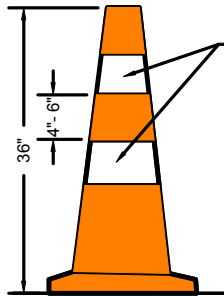
PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)



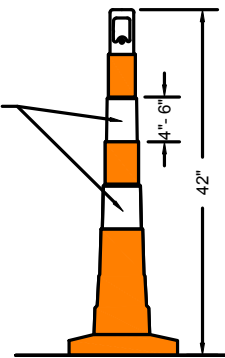
TYPE III BARRICADE



DRUM

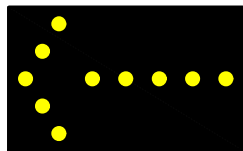


RETROFLECTIVE BANDS

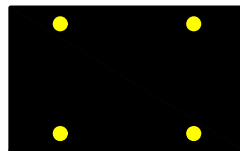


CONES

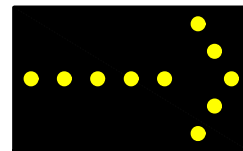
Cones may be used for all daytime operations. For night work, drums should be used to form the taper(s) and cones can be used along the tangent section of the work setup.



LEFT

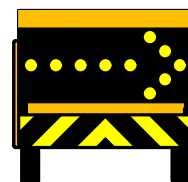


CAUTION



RIGHT

ARROW BOARD (WITH MODE)



TRUCK MOUNTED ATTENUATORS

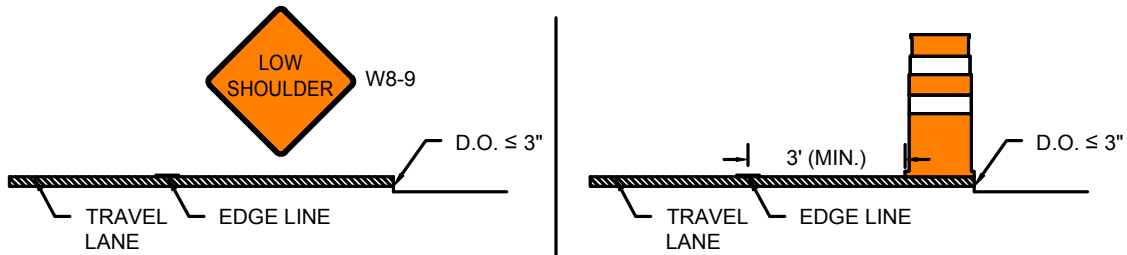
Truck Mounted Attenuators (TMA) shall be positioned between the start of the work area and the end of the designated buffer zone. The TMAs are to be positioned in each temporarily closed lane. This includes shoulders (≥ 8 feet) whether combined with a travel lane closure or being closed alone. These TMA conditions are required on roadways with speeds of 45 MPH or greater. TMAs can be used on other roadways at the discretion of the engineer. TMAs shall be used for the deployment and removal of all traffic control devices, including all advance warning signs.

SHORT-TERM PAVEMENT EDGE DROP-OFFS

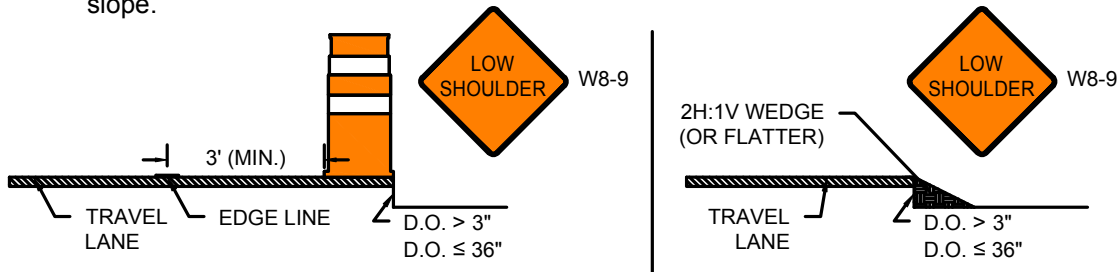
Note that this guidance is adopted from the Roadside Design Guide, 4th Edition.

Pavement drop-offs may occur during paving, excavation, and other construction activities. Drop-offs create hazards for vehicles if not properly mitigated. The following applies for all roads with speed limits greater than 30 mph; for roads with speed limits of 30 mph or less, treatments for pavement edge drop-offs are at the discretion of the Engineer. Drop-offs between adjacent, open travel lanes should not exceed 2", and any drop-off in excess of 3" should not be left unattended without one of these mitigation measures applied.

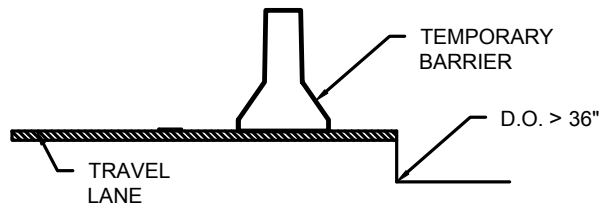
- Shoulder drop-offs 3" or less adjacent to a shoulder or active travel lane should be mitigated by:
 - ✓ A W8-9 (LOW SHOULDER) sign in advance of and at regular intervals throughout the treatment; or
 - ✓ The placement of drums on the traffic side of the drop-off.



- Shoulder drop-offs greater than 3" but less than or equal to 36" should be mitigated by:
 - ✓ A W8-9 (LOW SHOULDER) sign in advance of and at regular intervals throughout the treatment and the placement of drums on the traffic side off the drop-off, offset at least 3' from the travel lane; or
 - ✓ A W8-9 (LOW SHOULDER) sign in advance of and at regular intervals throughout the treatment and the placement of a temporary wedge of material along the face of the drop-off. The wedge should consist of stable material placed on a 2H:1V or flatter slope.



- Shoulder drop-offs greater than 36" must be protected by temporary barrier.





| POSTED SPEED LIMIT (MPH) | SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C) | CHANNELIZATION DEVICES (DRUMS OR CONES) | | | |
|--------------------------|------------------------------------------------|-----------------------------------------|-------------------------|---------------------|-------------------|
| | | TRAVEL LANE CLOSURE LENGTH (L) (FT) | BUFFER ZONE LENGTH (FT) | DEVICE SPACING (FT) | MIN # OF DEVICES* |
| 25-40 | 500 / 500 / 500 | 320 | 305 | 20 | 55 |
| 45-55 | 500 / 1000 / 1000 | 660 | 495 | 40 | 40 |
| 60-65 | 1000 / 1600 / 2600 | 780 | 645 | 40 | 50 |










* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

| MINIMUM SPACING OF ADVANCE WARNING SIGNS FOR URBAN ROADWAYS | |
|-------------------------------------------------------------|------------------------|
| ROAD TYPE | DISTANCE BETWEEN SIGNS |
| URBAN (LOW SPEED) | 100 FT |
| URBAN (HIGH SPEED) | 350 FT |

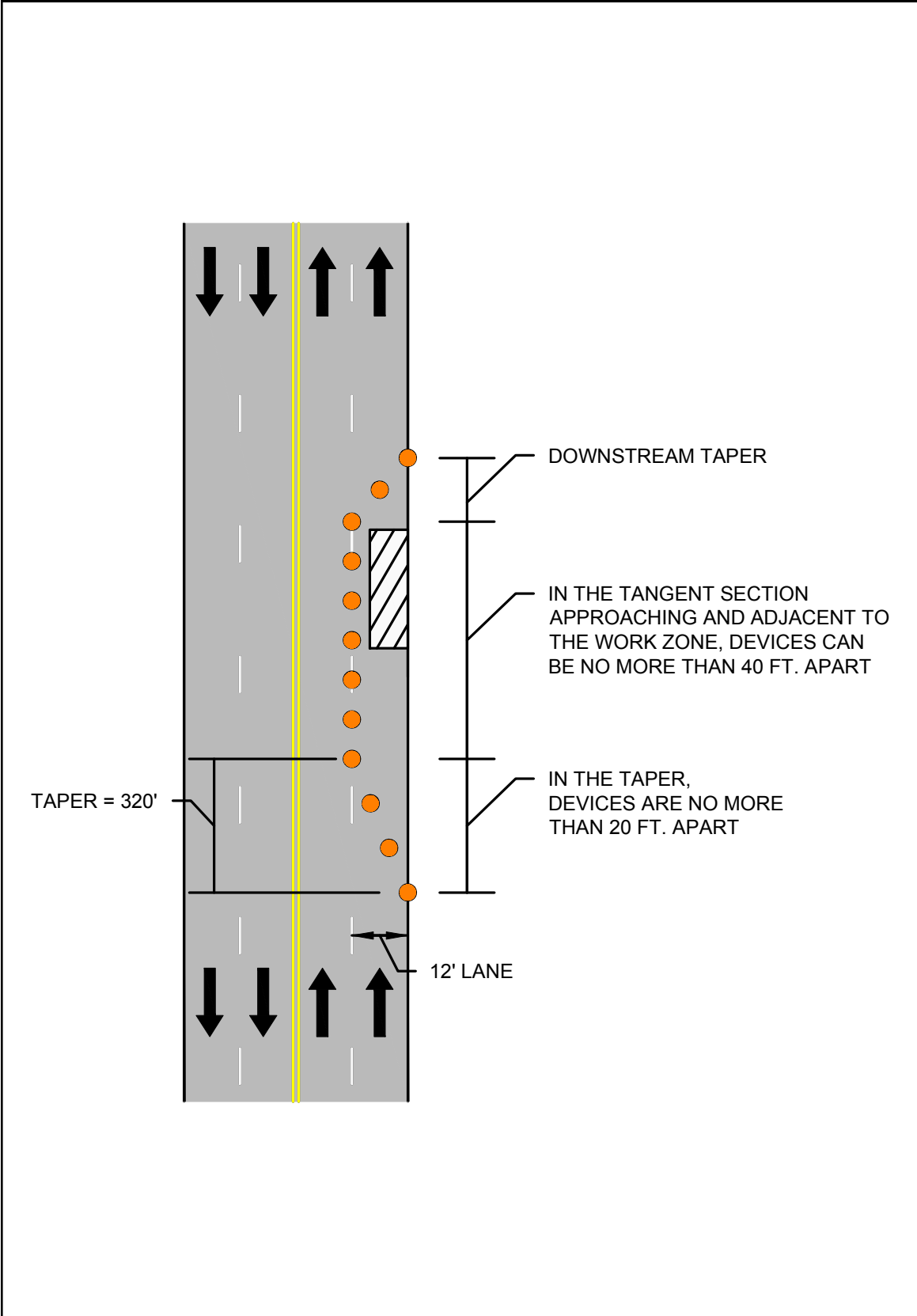
NOTES


1. 40 FT = 10 FT PAVEMENT MARKING + 30 FT SKIP

LEGEND

-  WORK ZONE
-  CHANNELIZATION DEVICE
-  FLASHING ARROW BOARD
-  PORTABLE CHANGEABLE MESSAGE SIGN
-  TRUCK MOUNTED ATTENUATOR
-  RADAR SPEED FEEDBACK BOARD
-  POLICE DETAIL OR UNIFORMED FLAGGER
-  TEMPORARY PORTABLE RUMBLE STRIP
-  TYPE III BARRICADE

NOT TO SCALE



| | | |
|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------|--------------------------|
|  <p>PAGE 14</p> | <p>Work Zone Safety Standard Details and Drawings</p> | <p>FLAGGING GUIDANCE</p> |
|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------|--------------------------|

Guidance for Flagging Operations

NOTE:

A flagger shall always be aware of their surroundings and have a good escape route. A flagger shall never be positioned directly beside or against construction equipment. When a flagger is required to direct traffic in an area where the escape route is partially blocked by a traversable obstruction such as a guardrail, the flagger shall be physically capable of traversing that obstruction. Prior to commencing a project, the supervisor in charge shall review the project, including guardrail areas, for safe flagging stations. The supervisor in charge shall clearly communicate with the flagger(s), indicating any locations where they cannot safely perform their duties.

Each flagger shall be equipped with the following high visibility clothing, signaling, and safety devices:

- 1) A white protective hard hat with a minimum level of reflectivity per the requirements of ANSI, Type I, Class E&G;
- 2) A clean, unfaded, untorn lime/yellow reflective safety vest and pants meeting the requirements of ANSI 107 Class 3 with the words "Traffic Control" on the front and rear panels in minimum two (2) inch (50 millimeter) high letters;
- 3) A 24 inch "STOP/SLOW" traffic paddle conforming to the requirements of Part 6E.03 of the Manual on Uniform Traffic Control Devices (MUTCD), a weighted, reflectorized red flag, flagger station advance warning signage, and two-way radios capable of providing clear communication within the work zone between flaggers, the Contractor, and the Engineer. The traffic paddle shall be mounted on a pole of sufficient length to be seven feet above the ground as measured from the bottom of the paddle;
- 4) A working flashlight with a minimum of 15,000 candlepower and a six inch red attachable wand, a whistle with a working lanyard, and a First Aid kit that complies with the requirements of ANSI Z308.1; and
- 5) An industrial/safety type portable air horn that complies with the requirements of the U.S. Coast Guard.

A "STOP/SLOW" paddle should be the primary hand-signaling device. It shall have an octagonal shape on a rigid handle. Flag use should be limited to emergency situations.

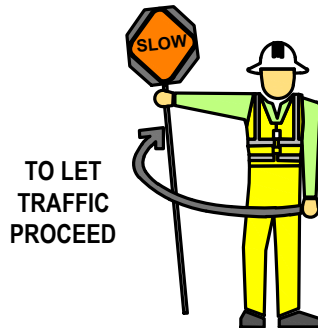


Properly Trained Flaggers

- Give clear messages to drivers.
- Allow distance for drivers to react.
- Coordinate with other flaggers.
- Use standard signaling methods.

Properly Equipped Flaggers

- Use approved stop/slow paddles.
- Use approved safety apparel.
- Use retroreflective equipment.
- Use hand held radios, as needed.
- All flaggers shall wear safety apparel that meets ANSI Class 3 requirements. The combination of vest and pants is required.




Proper Flagging Stations

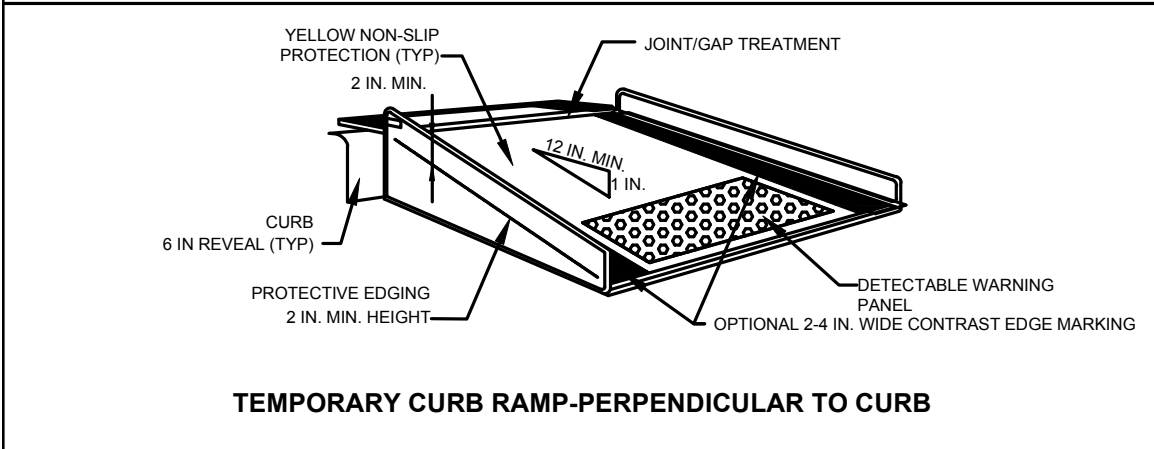
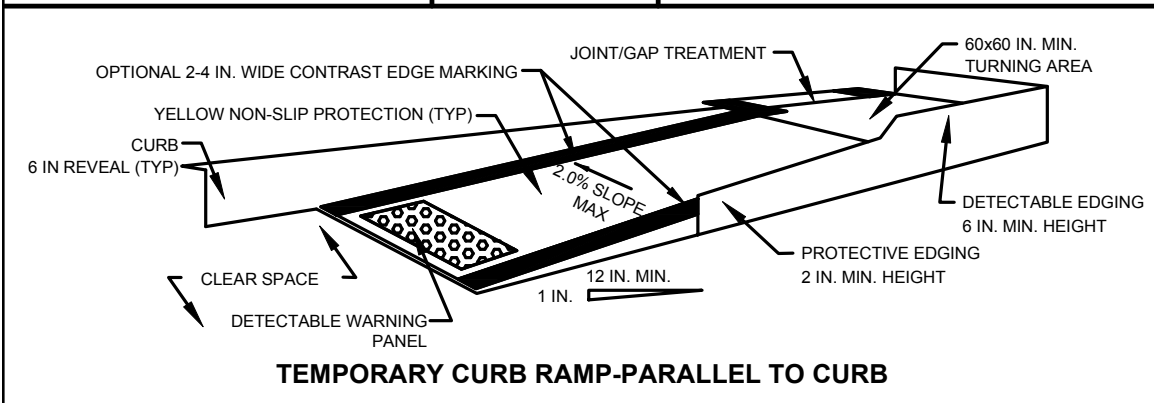
- Good approach sight distance.
- Highly visible to traffic.
- Stand alone away from other machinery and people.
- Stand on right edge of pavement or shoulder- proceed to centerline only when first vehicle has come to stop.
- Have a good escape route.



Proper Advance Warning Signs

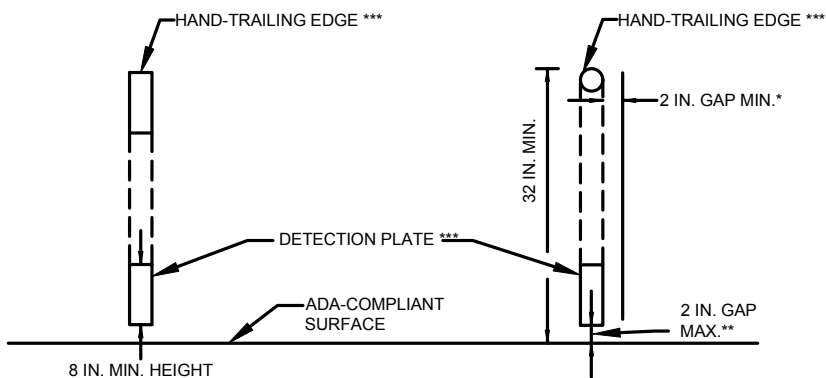
- Always use warning signs.
- Allow for reaction distance from signs.
- Remove signs if no longer necessary or not flagging.
- Use free hand in up-and-down motion to help slow traffic.

| | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
|  <p>Massachusetts Department of Transportation Highway Division</p> <p>PAGE 16</p> | <p>Work Zone Safety Standard Details and Drawings</p> | <p>FIGURE 4 TYPICAL PEDESTRIAN DEVICES (1 OF 2) NOT TO SCALE</p> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|



NOTES:

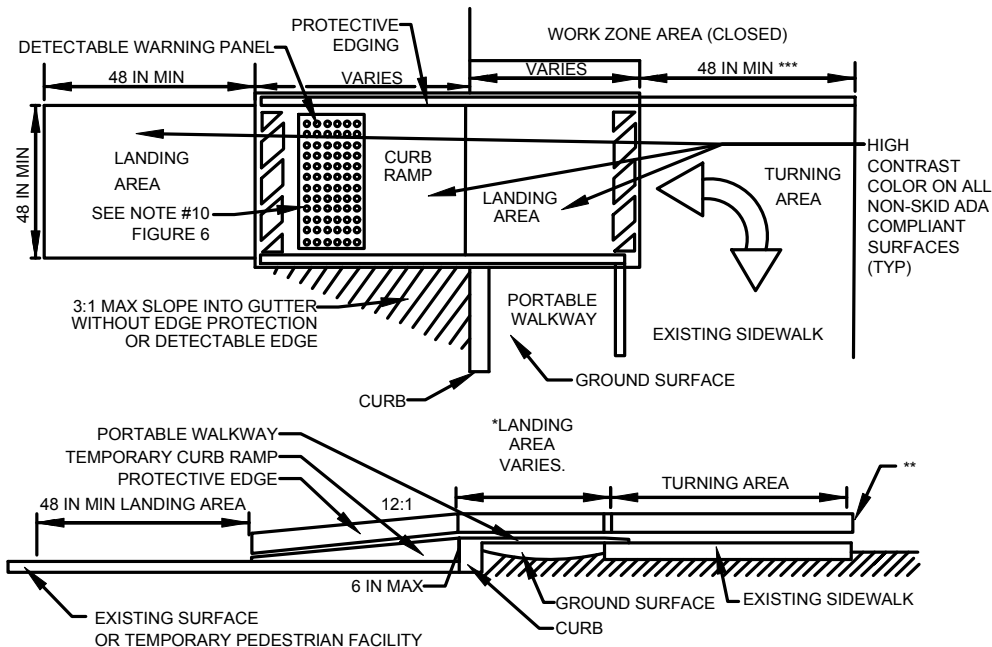
1. CURB RAMPS SHALL BE 60 IN. MINIMUM WIDTH WITH A FIRM, STABLE, AND NON-SLIP SURFACE.
2. PROTECTIVE EDGING WITH A 2 IN. MINIMUM HEIGHT SHALL BE INSTALLED WHEN THE CURB RAMP OR LANDING PLATFORM HAS A VERTICAL DROP OF 6 IN. OR GREATER OR HAS A SIDE APRON SLOPE STEEPER THAN 1:3 (33%). PROTECTIVE EDGING SHOULD BE CONSIDERED WHEN THE CURB RAMPS OR LANDING PLATFORMS HAVE A VERTICAL DROP OF 3 IN. OR MORE.
3. PROTECTABLE EDGING WITH 6 IN. MINIMUM HEIGHT AND CONTRASTING COLOR SHALL BE INSTALLED ON ALL CURB RAMP LANDINGS WHERE THE WALKWAY CHANGES DIRECTION (TURNS).
4. THE CURB RAMP WALKWAY AND LANDING AREA SURFACE SHALL BE OF A SOLID CONTINUOUS CONTRASTING COLOR ABUTTING UP TO THE EXISTING SIDEWALK.
5. CURB RAMPS AND LANDINGS SHOULD HAVE A 1:50 (2%) MAX CROSS-SLOPE.
6. CLEAR SPACE OF 48x48 IN. MINIMUM SHALL BE PROVIDED ABOVE AND BELOW THE CURB RAMP.
7. WATER FLOW IN THE GUTTER SYSTEM SHALL HAVE MINIMAL RESTRICTION.
8. LATERAL JOINTS OR GAPS BETWEEN SURFACES SHALL BE LESS THAN 0.5 IN. WIDTH.
9. CHANGES BETWEEN SURFACE HEIGHTS SHOULD NOT EXCEED 0.5 IN. LATERAL EDGES SHOULD BE VERTICAL UP TO 0.25 IN. HIGH, AND BEVELED AT 1:2 BETWEEN 0.25 IN. AND 0.5 IN. HEIGHT.
10. IF A TEMPORARY PEDESTRIAN RAMP LEADS TO A CROSSWALK, THEN A DETECTABLE WARNING PAD MUST BE ADHERED TO THE BASE OF THE RAMP. IF IT LEADS TO A PROTECTED PEDESTRIAN BYPASS THAT DOES NOT CONFLICT WITH VEHICULAR TRAFFIC, THEN A PAD SHALL NOT BE INSTALLED ON THE RAMP.



CROSS SECTION VIEW

PEDESTRIAN CHANNELIZING DEVICE

- * THERE SHALL BE A 2 INCH GAP BETWEEN THE HAND-TRAILING EDGE AND ITS SUPPORT.
- ** A MAXIMUM 2 INCH GAP BETWEEN THE BOTTOM OF THE BOTTOM RAIL AND THE SURFACE MAY BE USED TO PROVIDE DRAINAGE.
- *** THE HAND-TRAILING EDGE AND DETECTION PLATE SHALL BE CONTINUOUS THROUGHOUT THE LENGTH OF THE PATH SUCH THAT A PEDESTRIAN USER WITH A LONG CANE CAN FOLLOW IT.



TEMPORARY CURB RAMP

- * LANDING AREA USED TO OVERLAP NON-ADA COMPLIANT SURFACES.
- ** DETECTABLE EDGE REMOVED IF A CONTINUOUS SIDEWALK.
- *** 60 IN. IF AN OBSTRUCTION IS AT BACK OF SIDEWALK.





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Work Zone Safety
Standard Details
and Drawings

STATIONARY OPERATIONS
TWO LANE UNDIVIDED ROADWAY
HALF OF ROADWAY CLOSED
WORK NEAR CURVE










| POSTED SPEED LIMIT (MPH) | SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C) | CHANNELIZATION DEVICES (DRUMS OR CONES) | | | |
|--------------------------|------------------------------------------------|-----------------------------------------|-------------------------|---------------------|-------------------|
| | | TRAVEL LANE CLOSURE LENGTH (L) (FT) | BUFFER ZONE LENGTH (FT) | DEVICE SPACING (FT) | MIN # OF DEVICES* |
| 25-40 | 500 / 500 / 500 | 50 | 100 | 20 | 30 |
| 45-55 | 500 / 1000 / 1000 | 100 | 150 | 40 | 20 |

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

NOTES

1. IF POLICE DETAIL/UNIFORMED FLAGGER SUPPORT IS REQUIRED, PROVIDE TWO UNITS.
2. MA-R2-10a LOCATED AT C/2.
3. ** = EXTEND ENOUGH SO TAPER IS BEFORE CURVE

LEGEND

-  WORK ZONE
-  CHANNELIZATION DEVICE
-  FLASHING ARROW BOARD
-  PORTABLE CHANGEABLE MESSAGE SIGN
-  TRUCK MOUNTED ATTENUATOR
-  RADAR SPEED FEEDBACK BOARD
-  POLICE DETAIL OR UNIFORMED FLAGGER
-  TEMPORARY PORTABLE RUMBLE STRIP
-  TYPE III BARRICADE

NOT TO SCALE



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Work Zone Safety
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and Drawings

STATIONARY OPERATIONS
TWO LANE UNDIVIDED ROADWAY
HALF OF ROADWAY CLOSED

| POSTED SPEED LIMIT (MPH) | SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C) | CHANNELIZATION DEVICES (DRUMS OR CONES) | | | |
|--------------------------|------------------------------------------------|-----------------------------------------|-------------------------|---------------------|-------------------|
| | | TRAVEL LANE CLOSURE LENGTH (L) (FT) | BUFFER ZONE LENGTH (FT) | DEVICE SPACING (FT) | MIN # OF DEVICES* |
| 25-40 | 500 / 500 / 500 | 50 | 100 | 20 | 30 |
| 45-55 | 500 / 1000 / 1000 | 100 | 150 | 40 | 20 |










* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

| POSTED REGULATORY OR WORK ZONE SPEED | SEPARATION BETWEEN RUMBLE STRIPS |
|--------------------------------------|----------------------------------|
| 36-mph to 55-mph | 15-feet |
| 35-mph and under | 10-feet |

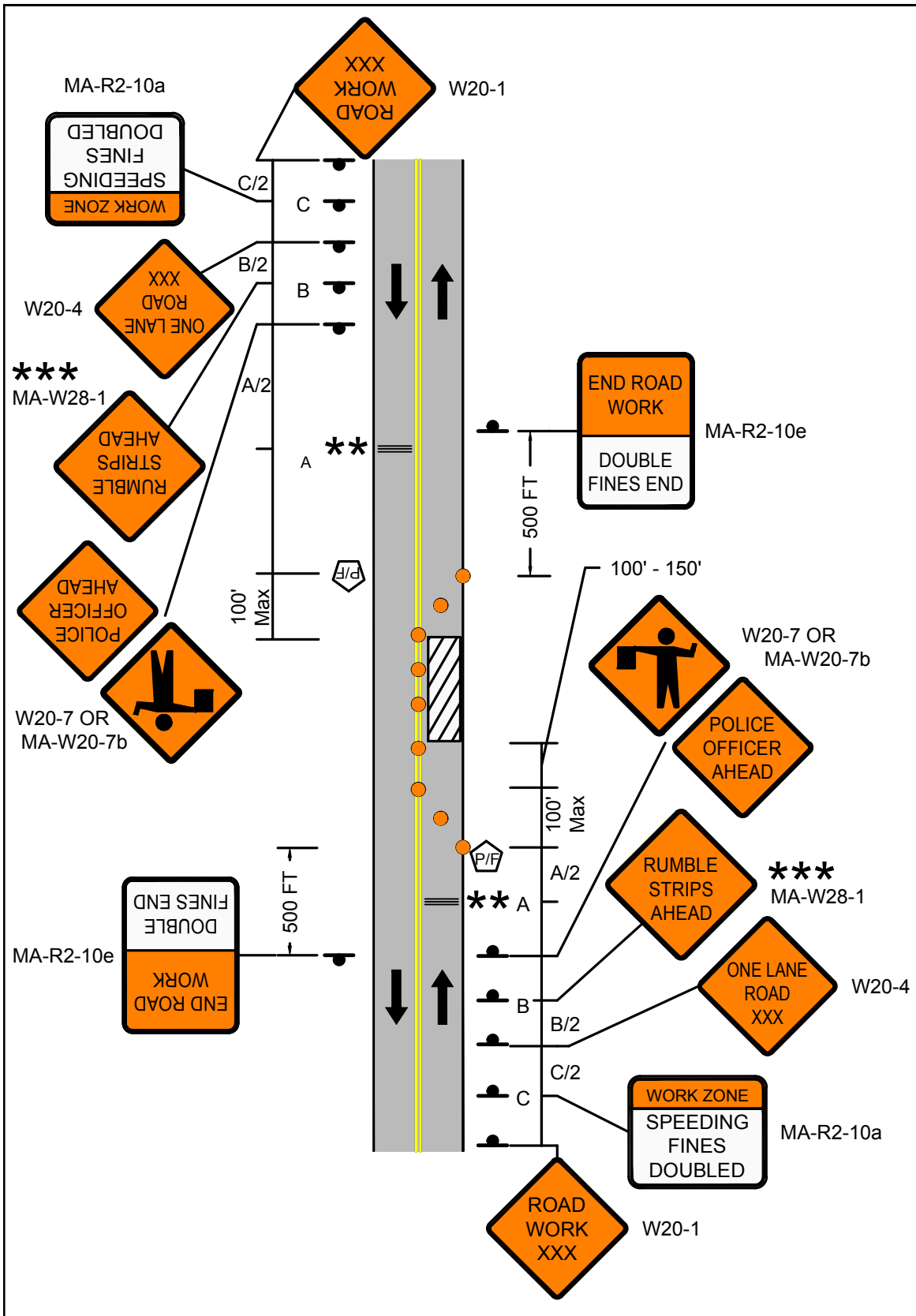
NOTES


1. IF POLICE DETAIL/UNIFORMED FLAGGER SUPPORT IS REQUIRED, PROVIDE TWO UNITS.
2. MA-R2-10a LOCATED AT C/2.
3. ** OPTIONAL AT THE ENGINEER'S DISCRETION.
4. *** SHALL BE DEPLOYED IF RUMBLE STRIPS ARE PRESENT.

LEGEND

-  WORK ZONE
-  CHANNELIZATION DEVICE
-  FLASHING ARROW BOARD
-  PORTABLE CHANGEABLE MESSAGE SIGN
-  TRUCK MOUNTED ATTENUATOR
-  RADAR SPEED FEEDBACK BOARD
-  POLICE DETAIL OR UNIFORMED FLAGGER
-  TEMPORARY PORTABLE RUMBLE STRIP
-  TYPE III BARRICADE

NOT TO SCALE



| | | |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
|  <p>PAGE 21</p> | <p>Work Zone Safety Standard Details and Drawings</p> | <p>FIGURE 7 STATIONARY OPERATIONS TWO LANE UNDIVIDED ROADWAY HALF OF ROADWAY CLOSED</p> |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------|



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Work Zone Safety
Standard Details
and Drawings

STATIONARY OPERATIONS
TWO LANE UNDIVIDED ROADWAY
SHOULDER CLOSED










| POSTED SPEED LIMIT (MPH) | SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C) | CHANNELIZATION DEVICES (DRUMS OR CONES) | | | |
|--------------------------|------------------------------------------------|-----------------------------------------|-------------------------|---------------------|-------------------|
| | | SHOULDER TAPER LENGTH (L/3) (FT) | BUFFER ZONE LENGTH (FT) | DEVICE SPACING (FT) | MIN # OF DEVICES* |
| 25-40 | 500 / 500 / 500 | 110 | 305 | 20 | 45 |
| 45-55 | 500 / 1000 / 1000 | 220 | 495 | 40 | 30 |
| 60-65 | 1000 / 1600 / 2600 | 260 | 645 | 40 | 35 |

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

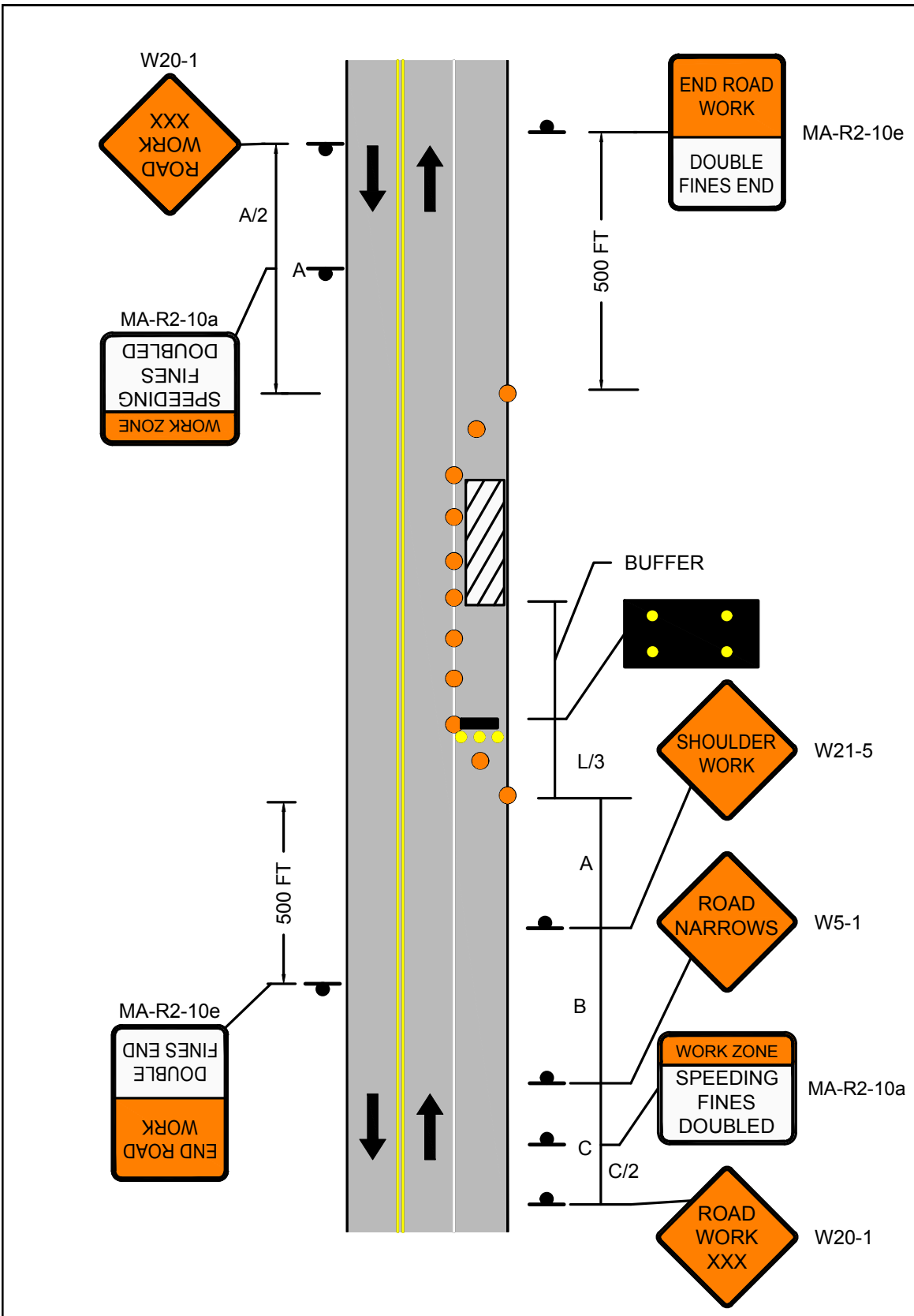
NOTES


1. MA-R2-10a at C/2 and A/2.

LEGEND

-  WORK ZONE
-  CHANNELIZATION DEVICE
-  FLASHING ARROW BOARD
-  PORTABLE CHANGEABLE MESSAGE SIGN
-  TRUCK MOUNTED ATTENUATOR
-  RADAR SPEED FEEDBACK BOARD
-  POLICE DETAIL OR UNIFORMED FLAGGER
-  TEMPORARY PORTABLE RUMBLE STRIP
-  TYPE III BARRICADE

NOT TO SCALE



| | | |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------|----------------------------------------------------------------------------------------------|
|  <p>PAGE 23</p> | <p>Work Zone Safety Standard Details and Drawings</p> | <p>FIGURE 8 STATIONARY OPERATIONS TWO LANE UNDIVIDED ROADWAY SHOULDER CLOSED</p> |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------|----------------------------------------------------------------------------------------------|



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Work Zone Safety
Standard Details
and Drawings

STATIONARY OPERATIONS
TWO LANE UNDIVIDED ROADWAY
WITH TRAVERSABLE SHOULDER
HALF OF ROADWAY CLOSED
MAINTAIN TWO-WAY TRAFFIC

| POSTED SPEED LIMIT (MPH) | CHANNELIZATION DEVICES (DRUMS OR CONES) | | | | |
|-----------------------------------|-------------------------------------------|-------------------------------------------------|----------------------------------|---------------------------|-------------------------|
| | SHOULDER TAPER LENGTH (L/3) (FT) | TRAVEL LANE SHIFT LENGTH (L/2) (FT) | BUFFER ZONE LENGTH (FT) | DEVICE SPACING (FT) | MIN # OF DEVICES* |
| 25-40 | 110 | 160 | 305 | 20 | 125 |
| 45-55 | 220 | 330 | 495 | 40 | 100 |
| 60-65 | 260 | 390 | 645 | 40 | 115 |










* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

| POSTED SPEED LIMIT (MPH) | SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C) |
|-----------------------------------|---------------------------------------------------------|
| 25-40 | 500 / 500 / 500 |
| 45-55 | 500 / 1000 / 1000 |
| 60-65 | 1000 / 1600 / 2600 |

NOTES

1. MA-R2-10a LOCATED AT C/2.

LEGEND

-  WORK ZONE
-  CHANNELIZATION DEVICE
-  FLASHING ARROW BOARD
-  PORTABLE CHANGEABLE MESSAGE SIGN
-  TRUCK MOUNTED ATTENUATOR
-  RADAR SPEED FEEDBACK BOARD
-  POLICE DETAIL OR UNIFORMED FLAGGER
-  TEMPORARY PORTABLE RUMBLE STRIP
-  TYPE III BARRICADE

NOT TO SCALE

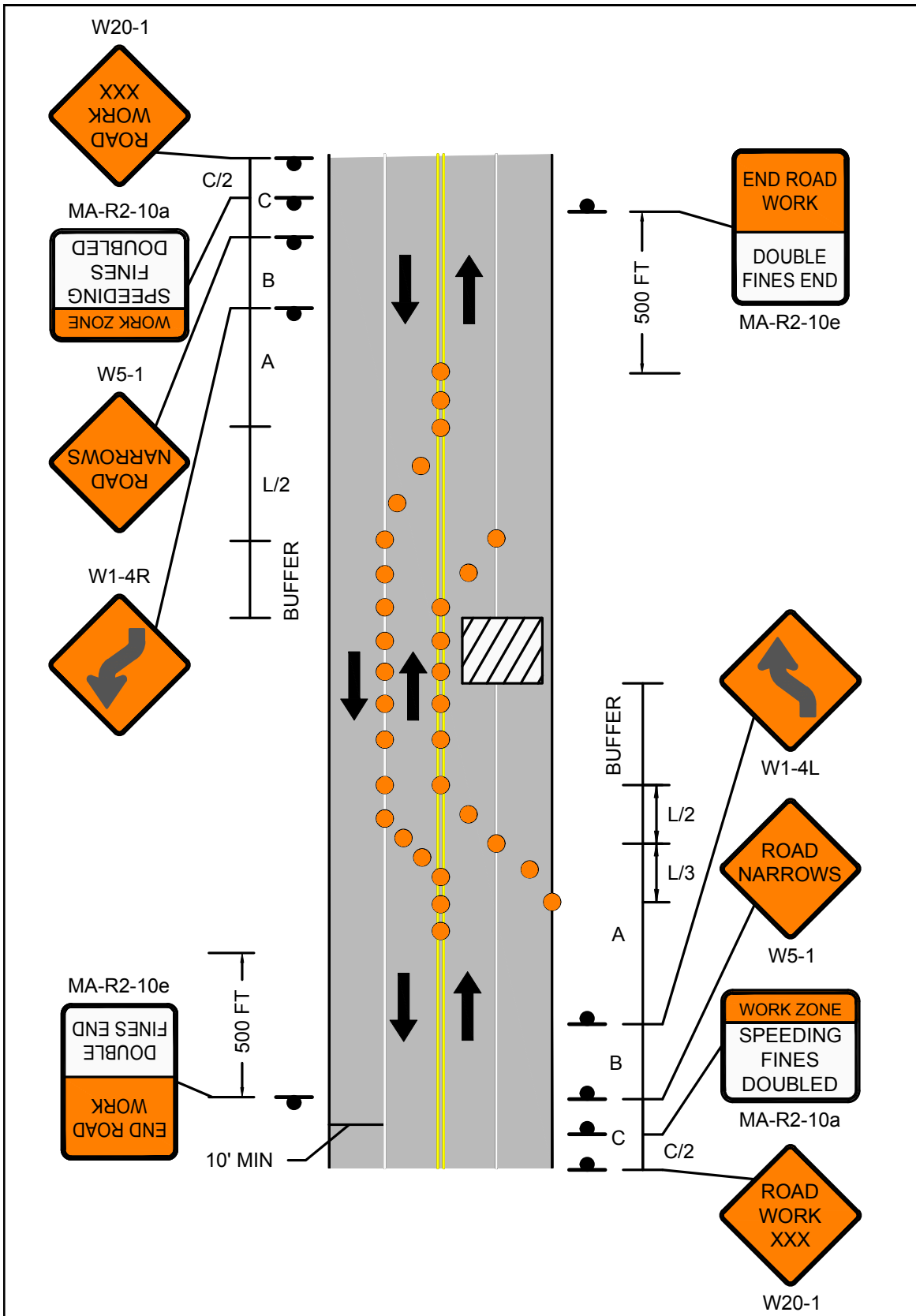


FIGURE 9
 STATIONARY OPERATIONS
 TWO LANE UNDIVIDED ROADWAY
 WITH TRAVERSABLE SHOULDER
 HALF OF ROADWAY CLOSED
 MAINTAIN TWO-WAY TRAFFIC





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Work Zone Safety
Standard Details
and Drawings

STATIONARY OPERATIONS
FOUR LANE UNDIVIDED ROADWAY
RIGHT LANE CLOSED

| POSTED SPEED LIMIT (MPH) | CHANNELATION DEVICES (DRUMS OR CONES) | | | | |
|--------------------------|---------------------------------------|-------------------------------------|-------------------------|---------------------|-------------------|
| | SHOULDER TAPER LENGTH (L/3) (FT) | TRAVEL LANE CLOSURE LENGTH (L) (FT) | BUFFER ZONE LENGTH (FT) | DEVICE SPACING (FT) | MIN # OF DEVICES* |
| 25-40 | 110 | 320 | 305 | 20 | 60 |
| 45-55 | 220 | 660 | 495 | 40 | 50 |
| 60-65 | 260 | 780 | 645 | 40 | 55 |










* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

| POSTED SPEED LIMIT (MPH) | SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C) |
|--------------------------|------------------------------------------------|
| 25-40 | 500 / 500 / 500 |
| 45-55 | 500 / 1000 / 1000 |
| 60-65 | 1000 / 1600 / 2600 |

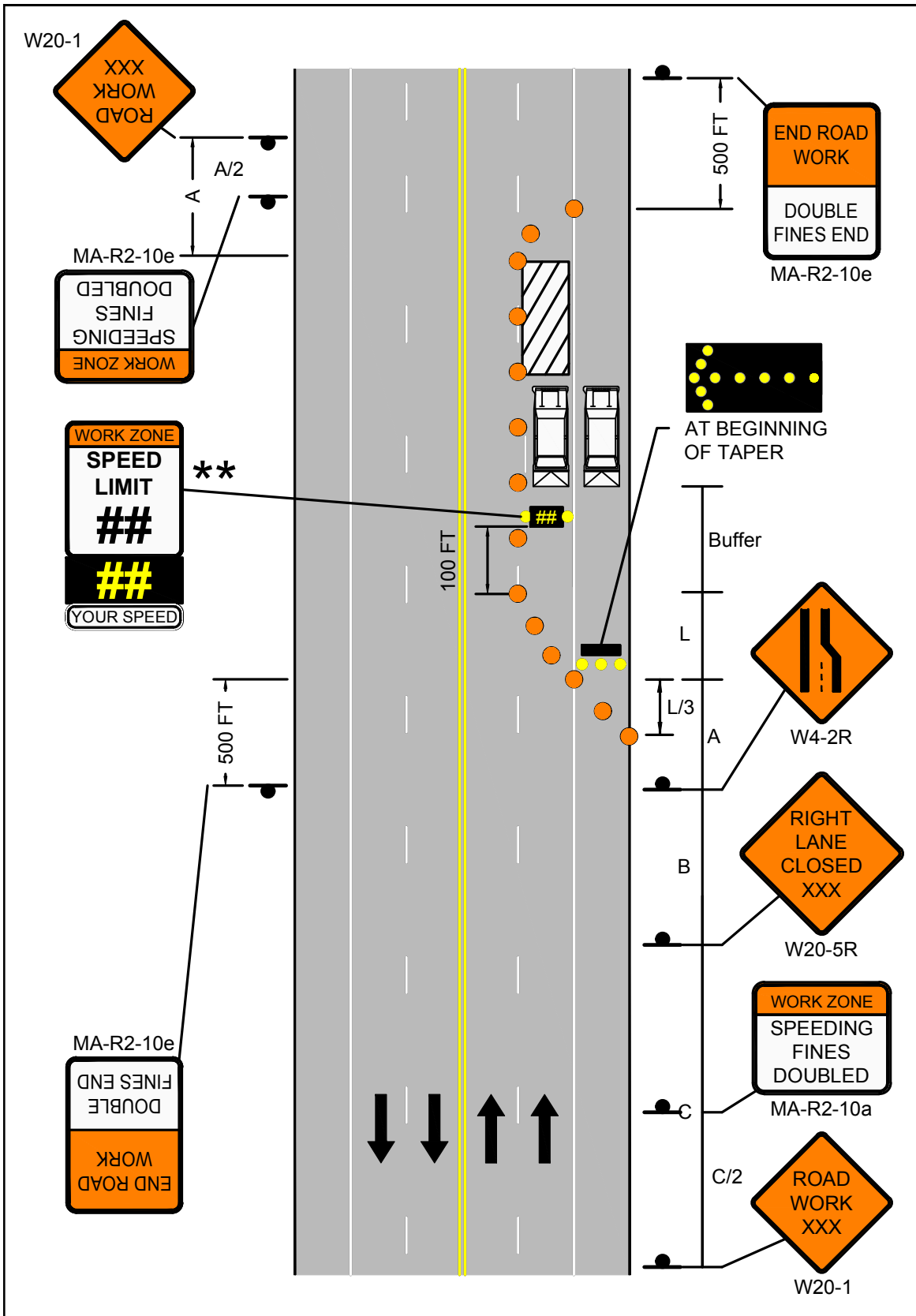
NOTES


1. MA-R2-10a LOCATED AT A/2 AND C/2.
2. **OPTIONAL AT THE ENGINEER'S DISCRETION.

LEGEND

-  WORK ZONE
-  CHANNELIZATION DEVICE
-  FLASHING ARROW BOARD
-  PORTABLE CHANGEABLE MESSAGE SIGN
-  TRUCK MOUNTED ATTENUATOR
-  RADAR SPEED FEEDBACK BOARD
-  POLICE DETAIL OR UNIFORMED FLAGGER
-  TEMPORARY PORTABLE RUMBLE STRIP
-  TYPE III BARRICADE

NOT TO SCALE



| | | |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------|--------------------------------------------------------------------------------------------------|
|  <p>PAGE 27</p> | <p>Work Zone Safety Standard Details and Drawings</p> | <p>FIGURE 10 STATIONARY OPERATIONS FOUR LANE UNDIVIDED ROADWAY RIGHT LANE CLOSED</p> |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------|--------------------------------------------------------------------------------------------------|



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Work Zone Safety
Standard Details
and Drawings

STATIONARY OPERATIONS
FOUR LANE UNDIVIDED ROADWAY
LEFT LANE CLOSED










| POSTED SPEED LIMIT (MPH) | SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C) | CHANNELIZATION DEVICES (DRUMS OR CONES) | | | |
|--------------------------|------------------------------------------------|-----------------------------------------|-------------------------|---------------------|-------------------|
| | | TRAVEL LANE CLOSURE LENGTH (L) (FT) | BUFFER ZONE LENGTH (FT) | DEVICE SPACING (FT) | MIN # OF DEVICES* |
| 25-40 | 500 / 500 / 500 | 320 | 305 | 20 | 105 |
| 45-55 | 500 / 1000 / 1000 | 660 | 495 | 40 | 80 |
| 60-65 | 1000 / 1600 / 2600 | 780 | 645 | 40 | 100 |

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

NOTES

1. MA-R2-10a LOCATED AT A/2 AND C/2.
2. **OPTIONAL AT THE ENGINEER'S DISCRETION. 2' OFFSET FROM EDGE OF TRAVEL LANE TO RADAR SPEED FEEDBACK BOARD IS REQUIRED. BOARD MAY BE MOVED FULLY OR PARTIALLY OFF PAVED SHOULDER, IF REQUIRED.

LEGEND

-  WORK ZONE
-  CHANNELIZATION DEVICE
-  FLASHING ARROW BOARD
-  PORTABLE CHANGEABLE MESSAGE SIGN
-  TRUCK MOUNTED ATTENUATOR
-  RADAR SPEED FEEDBACK BOARD
-  POLICE DETAIL OR UNIFORMED FLAGGER
-  TEMPORARY PORTABLE RUMBLE STRIP
-  TYPE III BARRICADE

NOT TO SCALE

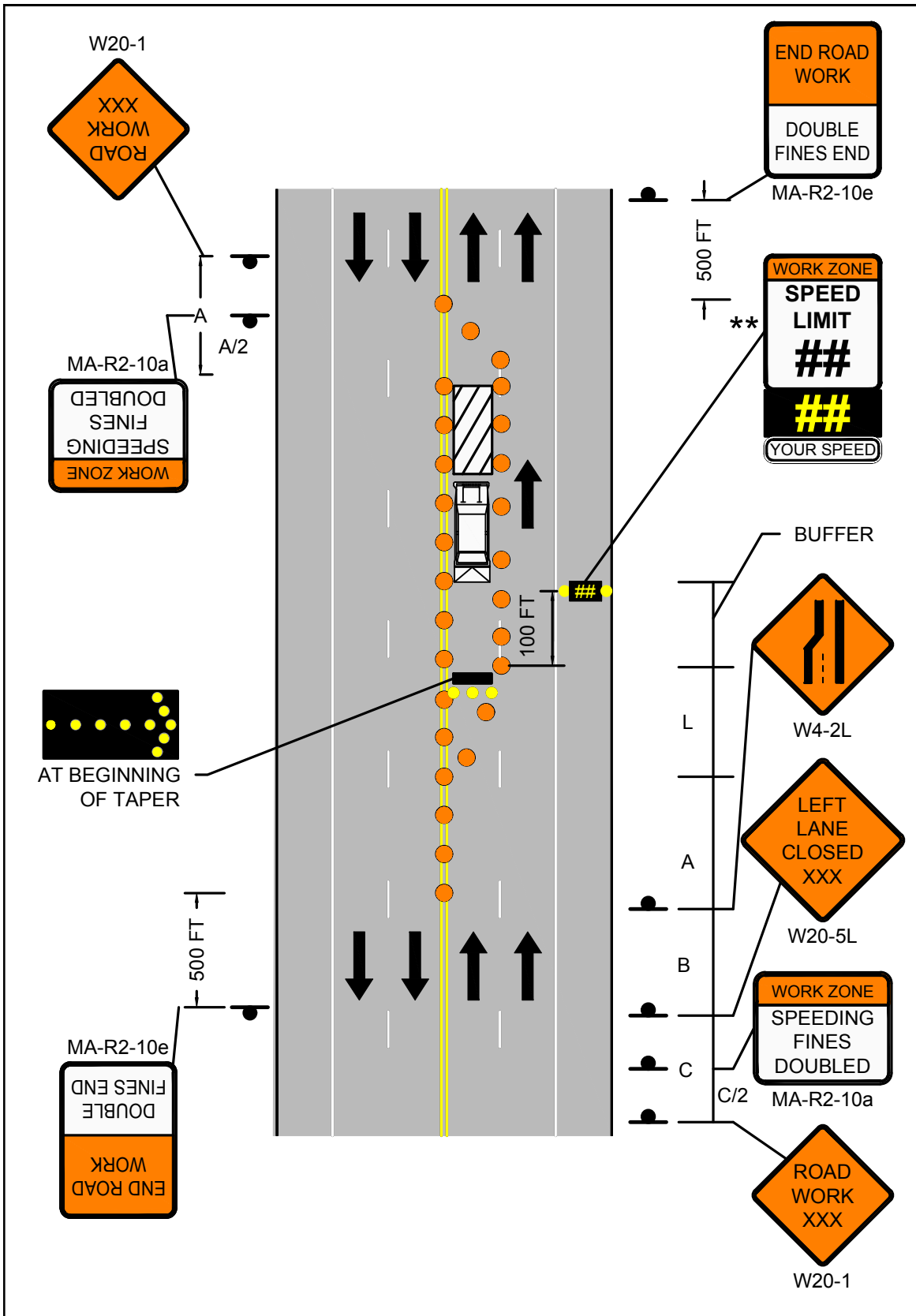



FIGURE 11
STATIONARY OPERATIONS
FOUR LANE UNDIVIDED ROADWAY
LEFT LANE CLOSED

| | | |
|----------------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------------------|
|  PAGE 30 | Work Zone Safety Standard Details and Drawings | STATIONARY OPERATIONS FOUR LANE UNDIVIDED ROADWAY HALF OF ROADWAY CLOSED |
|----------------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------------------|

| POSTED SPEED LIMIT (MPH) | CHANNELIZATION DEVICES (DRUMS OR CONES) | | | | | |
|--------------------------|-----------------------------------------|-------------------------------------|-------------------------------------|-------------------------|---------------------|-------------------|
| | SHOULDER TAPER LENGTH (L/3) (FT) | TRAVEL LANE CLOSURE LENGTH (L) (FT) | TRAVEL LANE SHIFT LENGTH (L/2) (FT) | BUFFER ZONE LENGTH (FT) | DEVICE SPACING (FT) | MIN # OF DEVICES* |
| 25-40 | 110 | 320 | 160 | 305 | 20 | 140 |
| 45-55 | 220 | 660 | 330 | 495 | 40 | 120 |
| 60-65 | 260 | 780 | 390 | 645 | 40 | 140 |










* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

| POSTED SPEED LIMIT (MPH) | SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C) |
|--------------------------|------------------------------------------------|
| 25-40 | 500 / 500 / 500 |
| 45-55 | 500 / 1000 / 1000 |
| 60-65 | 1000 / 1600 / 2600 |

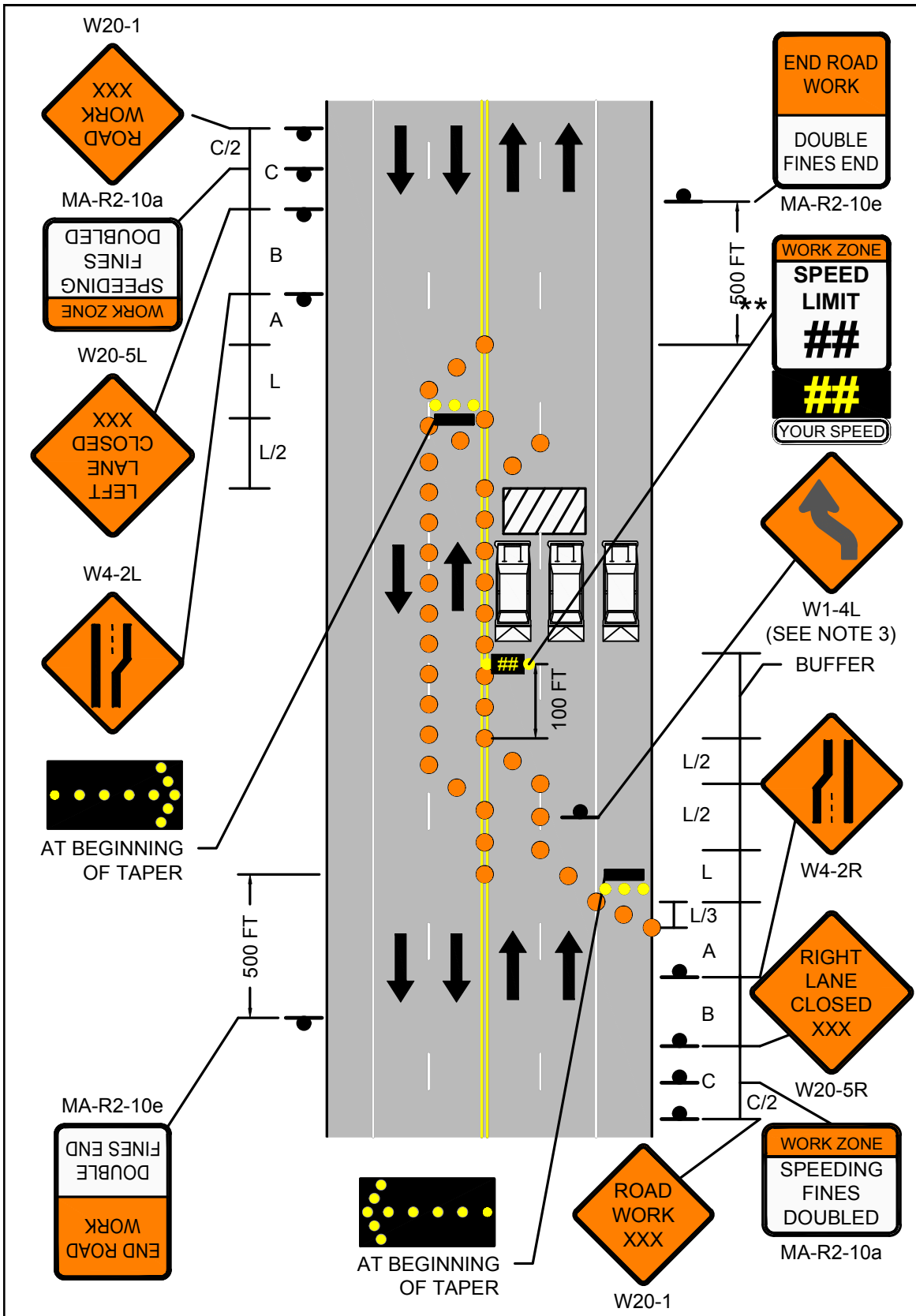
NOTES


1. MA-R2-10a LOCATED AT C/2.
2. **OPTIONAL AT THE ENGINEER'S DISCRETION.
3. W1-4L SHALL BE PLACED AT THE MIDDLE OF THE TANGENT.

LEGEND

-  WORK ZONE
-  CHANNELIZATION DEVICE
-  FLASHING ARROW BOARD
-  PORTABLE CHANGEABLE MESSAGE SIGN
-  TRUCK MOUNTED ATTENUATOR
-  RADAR SPEED FEEDBACK BOARD
-  POLICE DETAIL OR UNIFORMED FLAGGER
-  TEMPORARY PORTABLE RUMBLE STRIP
-  TYPE III BARRICADE

NOT TO SCALE



| | | |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
|  <p>PAGE 31</p> | <p>Work Zone Safety Standard Details and Drawings</p> | <p>FIGURE 12 STATIONARY OPERATIONS FOUR LANE UNDIVIDED ROADWAY HALF OF ROADWAY CLOSED</p> |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------|



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Work Zone Safety
Standard Details
and Drawings

STATIONARY OPERATIONS
MULTILANE DIVIDED ROADWAY
RIGHT LANE CLOSED

| POSTED SPEED LIMIT (MPH) | CHANNELIZATION DEVICES (DRUMS OR CONES) | | | | |
|--------------------------|-----------------------------------------|-------------------------------------|-------------------------|---------------------|-------------------|
| | SHOULDER TAPER LENGTH (L/3) (FT) | TRAVEL LANE CLOSURE LENGTH (L) (FT) | BUFFER ZONE LENGTH (FT) | DEVICE SPACING (FT) | MIN # OF DEVICES* |
| 25-40 | 110 | 320 | 305 | 20 | 60 |
| 45-55 | 220 | 660 | 495 | 40 | 50 |
| 60-65 | 260 | 780 | 645 | 40 | 55 |










* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

| POSTED SPEED LIMIT (MPH) | SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C) |
|--------------------------|------------------------------------------------|
| 25-40 | 500 / 500 / 500 |
| 45-55 | 500 / 1000 / 1000 |
| 60-65 | 1000 / 1600 / 2600 |

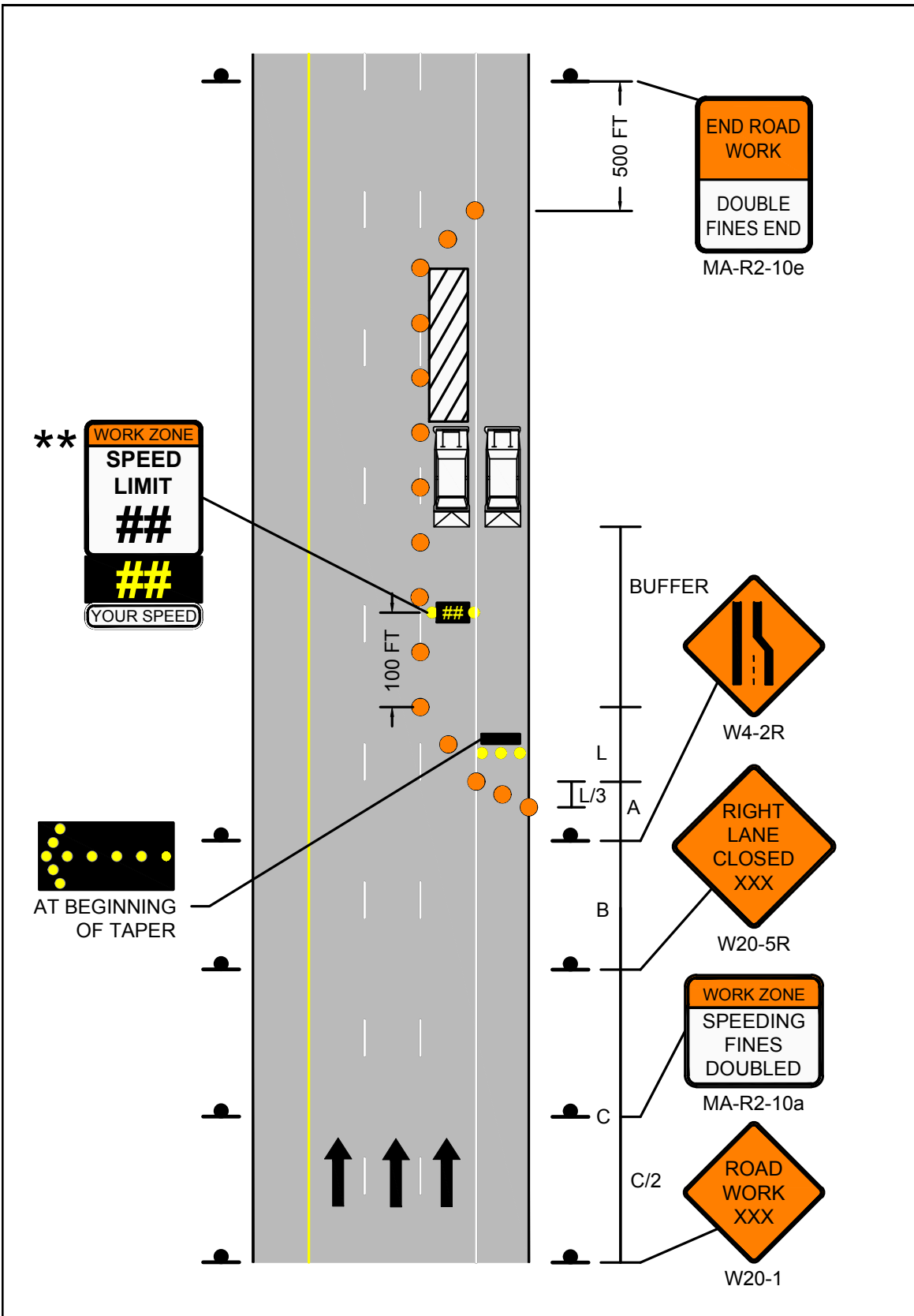
NOTES


1. MA-R2-10a LOCATED AT C/2.
2. **OPTIONAL AT THE ENGINEER'S DISCRETION.

LEGEND

-  WORK ZONE
-  CHANNELIZATION DEVICE
-  FLASHING ARROW BOARD
-  PORTABLE CHANGEABLE MESSAGE SIGN
-  TRUCK MOUNTED ATTENUATOR
-  RADAR SPEED FEEDBACK BOARD
-  POLICE DETAIL OR UNIFORMED FLAGGER
-  TEMPORARY PORTABLE RUMBLE STRIP
-  TYPE III BARRICADE

NOT TO SCALE



| | | |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------|------------------------------------------------------------------------------------------------|
|  <p>PAGE 33</p> | <p>Work Zone Safety Standard Details and Drawings</p> | <p>FIGURE 13 STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY RIGHT LANE CLOSED</p> |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------|------------------------------------------------------------------------------------------------|



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Work Zone Safety
Standard Details
and Drawings

STATIONARY OPERATIONS
MULTILANE DIVIDED ROADWAY
LEFT LANE CLOSED

| POSTED SPEED LIMIT (MPH) | CHANNELIZATION DEVICES (DRUMS OR CONES) | | | | |
|--------------------------|-----------------------------------------|-------------------------------------|-------------------------|---------------------|-------------------|
| | SHOULDER TAPER LENGTH (L/3) (FT) | TRAVEL LANE CLOSURE LENGTH (L) (FT) | BUFFER ZONE LENGTH (FT) | DEVICE SPACING (FT) | MIN # OF DEVICES* |
| 25-40 | 110 | 320 | 305 | 20 | 60 |
| 45-55 | 220 | 660 | 495 | 40 | 50 |
| 60-65 | 260 | 780 | 645 | 40 | 55 |










* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

| POSTED SPEED LIMIT (MPH) | SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C) |
|--------------------------|------------------------------------------------|
| 25-40 | 500 / 500 / 500 |
| 45-55 | 500 / 1000 / 1000 |
| 60-65 | 1000 / 1600 / 2600 |

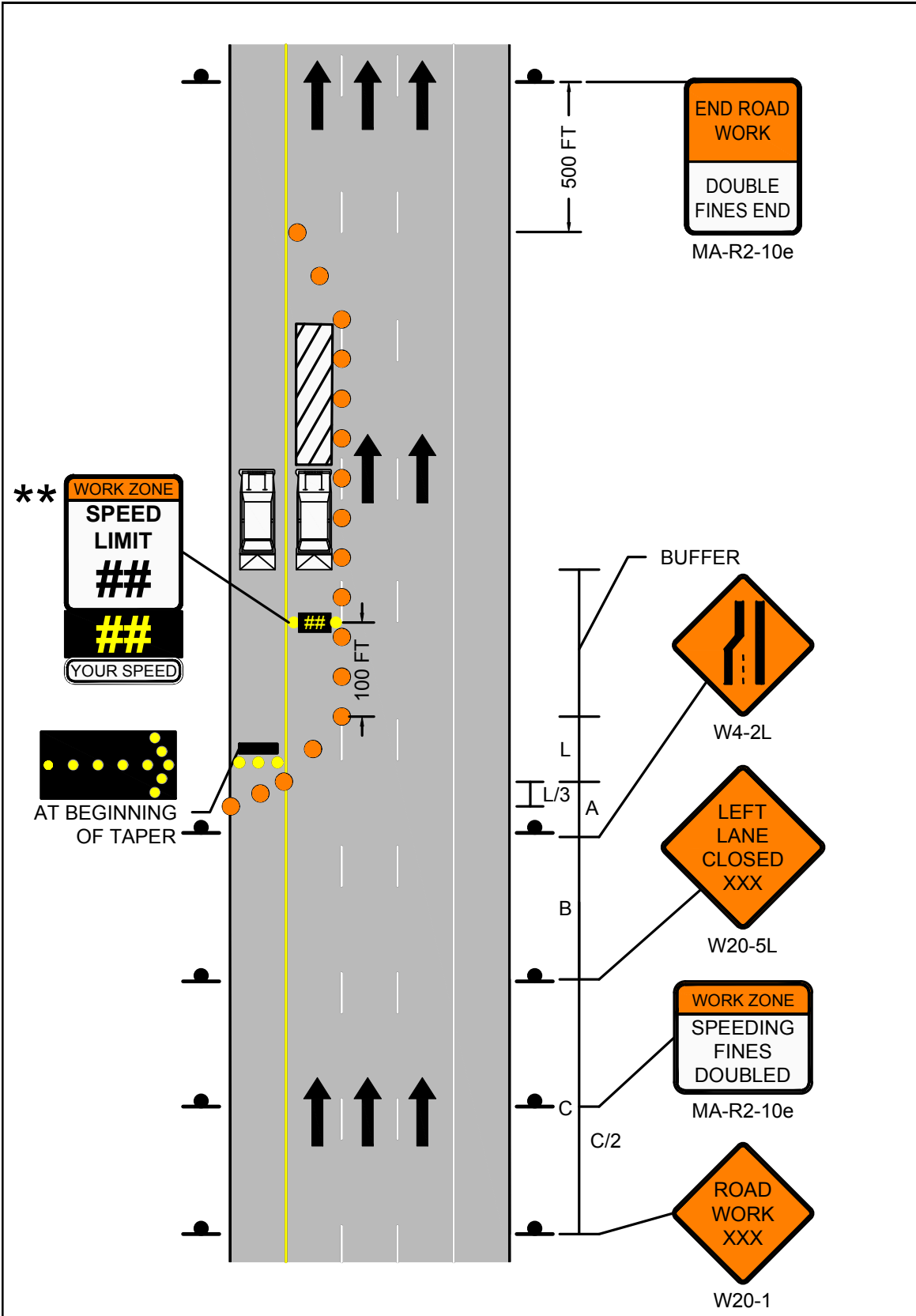
NOTES


1. MA-R2-10a LOCATED AT C/2.
2. **OPTIONAL AT THE ENGINEER'S DISCRETION.

LEGEND

-  WORK ZONE
-  CHANNELIZATION DEVICE
-  FLASHING ARROW BOARD
-  PORTABLE CHANGEABLE MESSAGE SIGN
-  TRUCK MOUNTED ATTENUATOR
-  RADAR SPEED FEEDBACK BOARD
-  POLICE DETAIL OR UNIFORMED FLAGGER
-  TEMPORARY PORTABLE RUMBLE STRIP
-  TYPE III BARRICADE

NOT TO SCALE



| | | |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------------------|
|  <p>PAGE 35</p> | <p>Work Zone Safety Standard Details and Drawings</p> | <p>FIGURE 14 STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY LEFT LANE CLOSED</p> |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------------------|



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Work Zone Safety
Standard Details
and Drawings

STATIONARY OPERATIONS
MULTILANE DIVIDED ROADWAY
CENTER LANE OR RIGHT/CENTER
LANES CLOSED

| POSTED SPEED LIMIT (MPH) | CHANNELIZATION DEVICES (DRUMS OR CONES) | | | | | |
|--------------------------|-----------------------------------------|-------------------------------------|--------------------------------------|-------------------------|---------------------|-------------------|
| | SHOULDER TAPER LENGTH (L/3) (FT) | TRAVEL LANE CLOSURE LENGTH (L) (FT) | TANGENT LENGTH BETWEEN TAPERS T (FT) | BUFFER ZONE LENGTH (FT) | DEVICE SPACING (FT) | MIN # OF DEVICES* |
| 25-40 | 110 | 320 | 640 | 305 | 20 | 110 |
| 45-55 | 220 | 660 | 1320 | 495 | 40 | 100 |
| 60-65 | 260 | 780 | 1560 | 645 | 40 | 115 |










* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

| POSTED SPEED LIMIT (MPH) | SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C) |
|--------------------------|------------------------------------------------|
| 25-40 | 500 / 500 / 500 |
| 45-55 | 500 / 1000 / 1000 |
| 60-65 | 1000 / 1600 / 2600 |

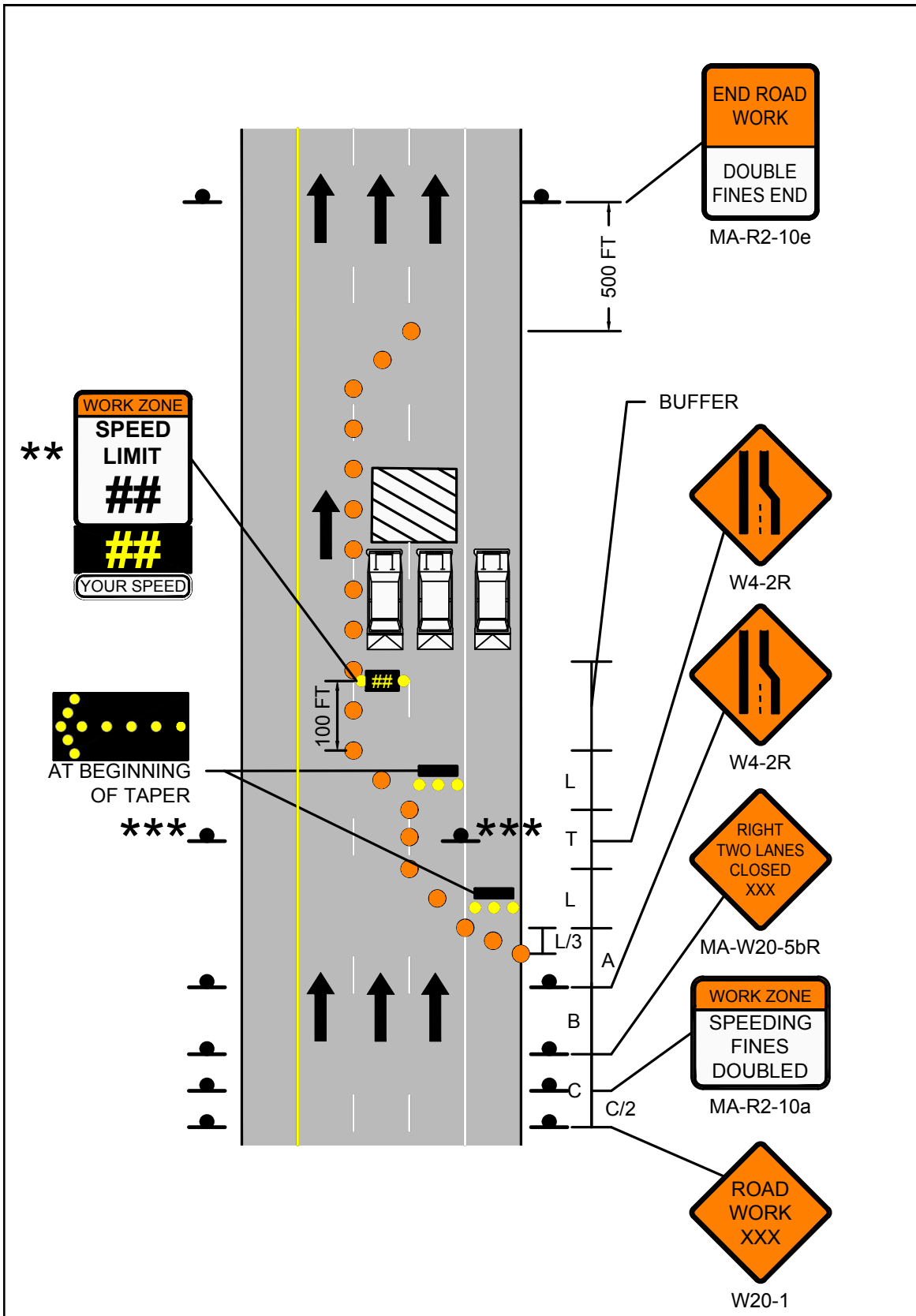
NOTES


1. MA-R2-10a LOCATED AT C/2.
2. ******OPTIONAL AT THE ENGINEER'S DISCRETION.
3. *******THIS SET OF SIGNS SHALL BE LOCATED AT T/2.


LEGEND

-  WORK ZONE
-  CHANNELIZATION DEVICE
-  FLASHING ARROW BOARD
-  PORTABLE CHANGEABLE MESSAGE SIGN
-  TRUCK MOUNTED ATTENUATOR
-  RADAR SPEED FEEDBACK BOARD
-  POLICE DETAIL OR UNIFORMED FLAGGER
-  TEMPORARY PORTABLE RUMBLE STRIP
-  TYPE III BARRICADE

NOT TO SCALE



| | | |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
|  <p>PAGE 37</p> | <p>Work Zone Safety Standard Details and Drawings</p> | <p>FIGURE 15 STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY CENTER LANE OR RIGHT/CENTER LANES CLOSED</p> |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|

| | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
|  <p>Massachusetts Department of Transportation Highway Division</p> <p>PAGE 38</p> | <p>Work Zone Safety Standard Details and Drawings</p> | <p>STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY CENTER LANE OR LEFT/CENTER LANES CLOSED</p> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|

| POSTED SPEED LIMIT (MPH) | CHANNELIZATION DEVICES (DRUMS OR CONES) | | | | | |
|-----------------------------------|-------------------------------------------|-------------------------------------------------|--------------------------------------------------|----------------------------------|---------------------------|-------------------------|
| | SHOULDER TAPER LENGTH (L/3) (FT) | TRAVEL LANE CLOSURE LENGTH (L) (FT) | TANGENT LENGTH BETWEEN TAPERS T (FT) | BUFFER ZONE LENGTH (FT) | DEVICE SPACING (FT) | MIN # OF DEVICES* |
| 25-40 | 110 | 320 | 640 | 305 | 20 | 110 |
| 45-55 | 220 | 660 | 1320 | 495 | 40 | 100 |
| 60-65 | 260 | 780 | 1560 | 645 | 40 | 115 |










* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

| POSTED SPEED LIMIT (MPH) | SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C) |
|-----------------------------------|---------------------------------------------------------|
| 25-40 | 500 / 500 / 500 |
| 45-55 | 500 / 1000 / 1000 |
| 60-65 | 1000 / 1600 / 2600 |

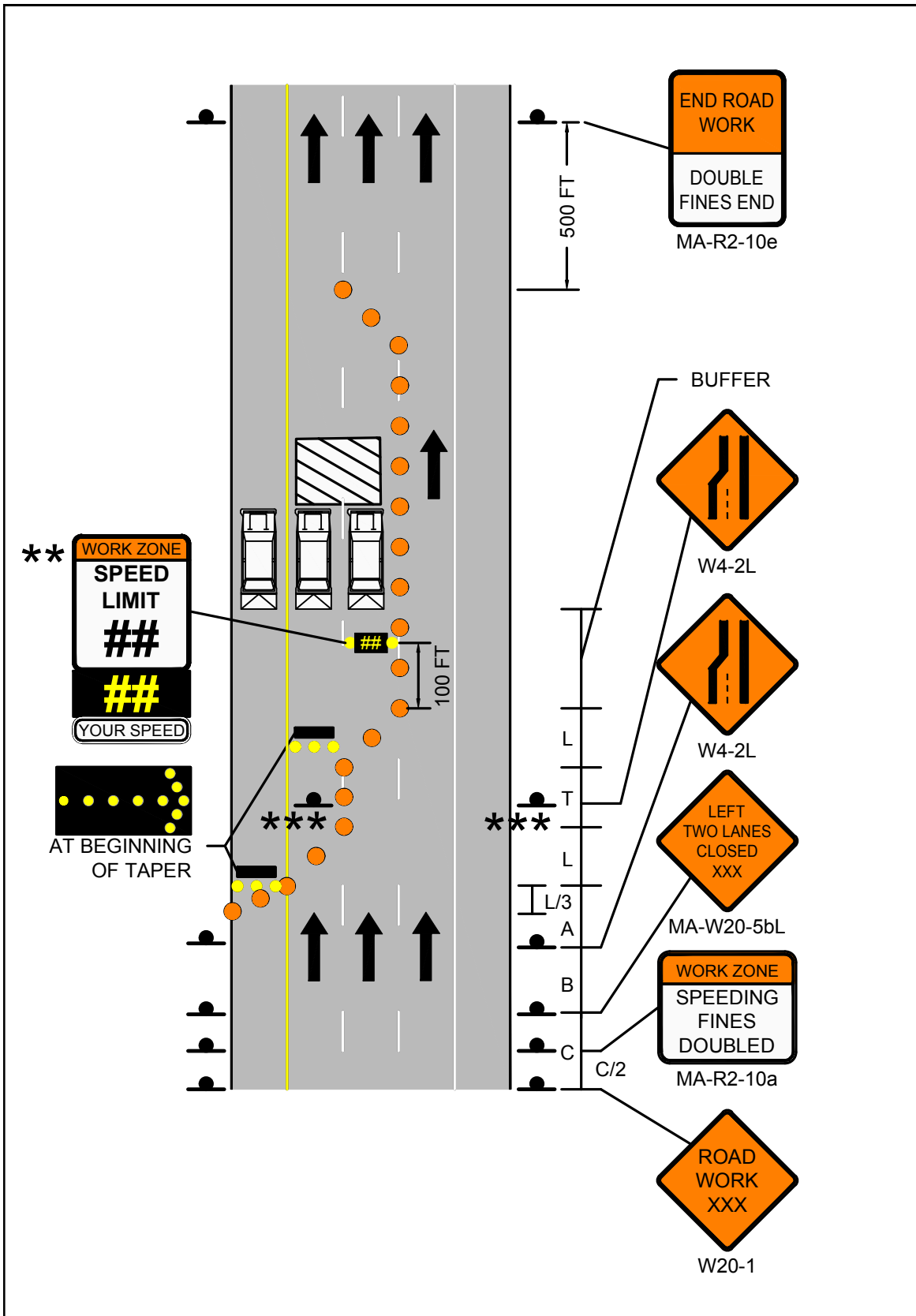
NOTES


1. MA-R2-10a LOCATED AT C/2.
2. ***OPTIONAL AT THE ENGINEER'S DISCRETION.
3. ***THIS SET OF SIGNS SHALL BE LOCATED AT T/2.

LEGEND

-  WORK ZONE
-  CHANNELIZATION DEVICE
-  FLASHING ARROW BOARD
-  PORTABLE CHANGEABLE MESSAGE SIGN
-  TRUCK MOUNTED ATTENUATOR
-  RADAR SPEED FEEDBACK BOARD
-  POLICE DETAIL OR UNIFORMED FLAGGER
-  TEMPORARY PORTABLE RUMBLE STRIP
-  TYPE III BARRICADE

NOT TO SCALE



| | | |
|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
|  <p>PAGE 39</p> | <p>Work Zone Safety Standard Details and Drawings</p> | <p>FIGURE 16 STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY CENTER LANE OR LEFT/CENTER LANES CLOSED</p> |
|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|



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Work Zone Safety
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STATIONARY OPERATIONS
MULTILANE DIVIDED ROADWAY
RIGHT SIDE OF OFF RAMP CLOSED










| POSTED SPEED LIMIT (MPH) | SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C) | CHANNELIZATION DEVICES (DRUMS OR CONES) | | | |
|--------------------------|------------------------------------------------|-----------------------------------------|-------------------------|---------------------|-------------------|
| | | TRAVEL LANE SHIFT LENGTH (L/2) (FT) | BUFFER ZONE LENGTH (FT) | DEVICE SPACING (FT) | MIN # OF DEVICES* |
| 25-40 | 500 / 500 / 500 | 160 | 305 | 20 | 45 |
| 45-55 | 500 / 1000 / 1000 | 330 | 495 | 40 | 35 |

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

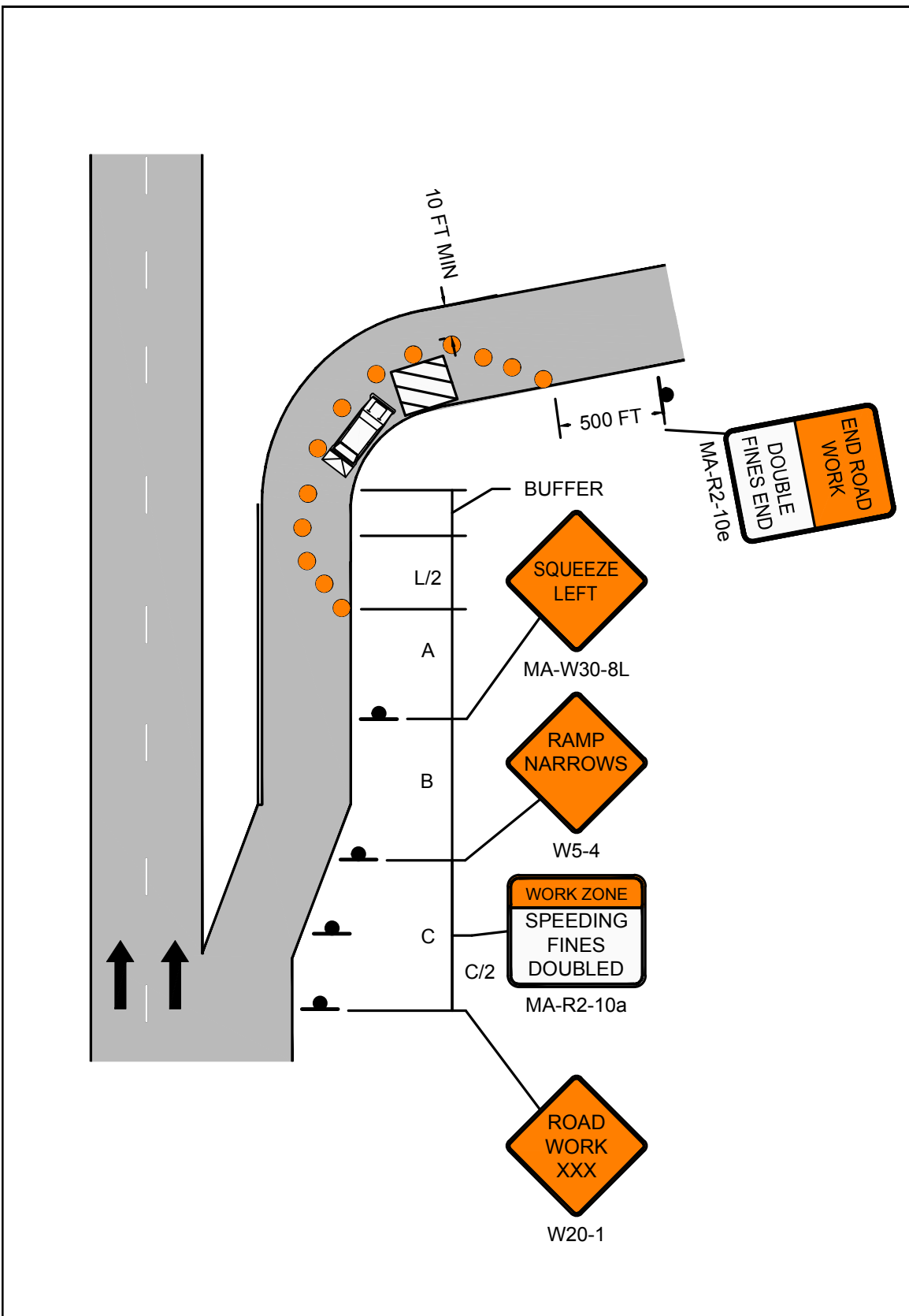
NOTES


1. MA-R2-10a LOCATED AT C/2.

LEGEND

-  WORK ZONE
-  CHANNELIZATION DEVICE
-  FLASHING ARROW BOARD
-  PORTABLE CHANGEABLE MESSAGE SIGN
-  TRUCK MOUNTED ATTENUATOR
-  RADAR SPEED FEEDBACK BOARD
-  POLICE DETAIL OR UNIFORMED FLAGGER
-  TEMPORARY PORTABLE RUMBLE STRIP
-  TYPE III BARRICADE

NOT TO SCALE



| | | |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
|  <p>PAGE 41</p> | <p>Work Zone Safety Standard Details and Drawings</p> | <p>FIGURE 17 STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY RIGHT SIDE OF OFF RAMP CLOSED</p> |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|



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Work Zone Safety
Standard Details
and Drawings

STATIONARY OPERATIONS
MULTILANE DIVIDED ROADWAY
LEFT SIDE OF OFF RAMP CLOSED










| POSTED SPEED LIMIT (MPH) | SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C) | CHANNELIZATION DEVICES (DRUMS OR CONES) | | | |
|-----------------------------------|---------------------------------------------------------|-------------------------------------------------|----------------------------------|---------------------------|-------------------------|
| | | TRAVEL LANE SHIFT LENGTH (L/2) (FT) | BUFFER ZONE LENGTH (FT) | DEVICE SPACING (FT) | MIN # OF DEVICES* |
| 25-40 | 500 / 500 / 500 | 160 | 305 | 20 | 45 |
| 45-55 | 500 / 1000 / 1000 | 330 | 495 | 40 | 35 |

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

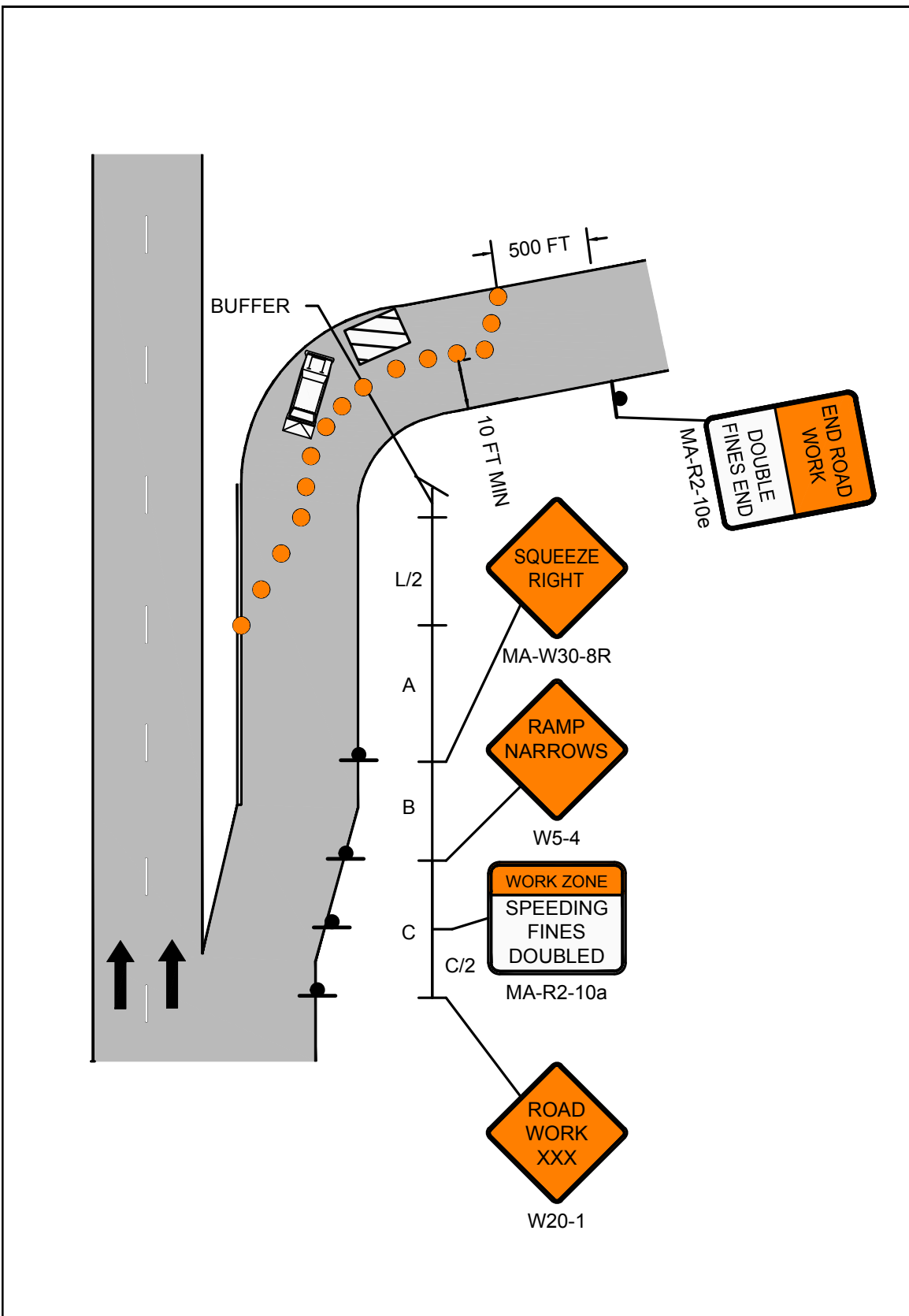
NOTES

1. MA-R2-10a LOCATED AT C/2.

LEGEND

-  WORK ZONE
-  CHANNELIZATION DEVICE
-  FLASHING ARROW BOARD
-  PORTABLE CHANGEABLE MESSAGE SIGN
-  TRUCK MOUNTED ATTENUATOR
-  RADAR SPEED FEEDBACK BOARD
-  POLICE DETAIL OR UNIFORMED FLAGGER
-  TEMPORARY PORTABLE RUMBLE STRIP
-  TYPE III BARRICADE

NOT TO SCALE



| | | |
|--|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| | <p>Work Zone Safety Standard Details and Drawings</p> | <p>FIGURE 18 STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY LEFT SIDE OF OFF RAMP CLOSED PAGE 43</p> |
|--|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|



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Work Zone Safety
Standard Details
and Drawings

STATIONARY OPERATIONS
MULTILANE DIVIDED ROADWAY
ROADWORK BEYOND ON RAMP

| POSTED SPEED LIMIT (MPH) | CHANNELIZATION DEVICES (DRUMS OR CONES) | | | | |
|--------------------------|-----------------------------------------|-------------------------------------|-------------------------|---------------------|-------------------|
| | SHOULDER TAPER LENGTH (L/3) (FT) | TRAVEL LANE CLOSURE LENGTH (L) (FT) | BUFFER ZONE LENGTH (FT) | DEVICE SPACING (FT) | MIN # OF DEVICES* |
| 25-40 | 110 | 320 | 305 | 20 | 175 |
| 45-55 | 220 | 660 | 495 | 40 | 135 |
| 60-65 | 260 | 780 | 645 | 40 | 155 |










* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

| POSTED SPEED LIMIT (MPH) | SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C) |
|--------------------------|------------------------------------------------|
| 25-40 | 500 / 500 / 500 |
| 45-55 | 500 / 1000 / 1000 |
| 60-65 | 1000 / 1600 / 2600 |

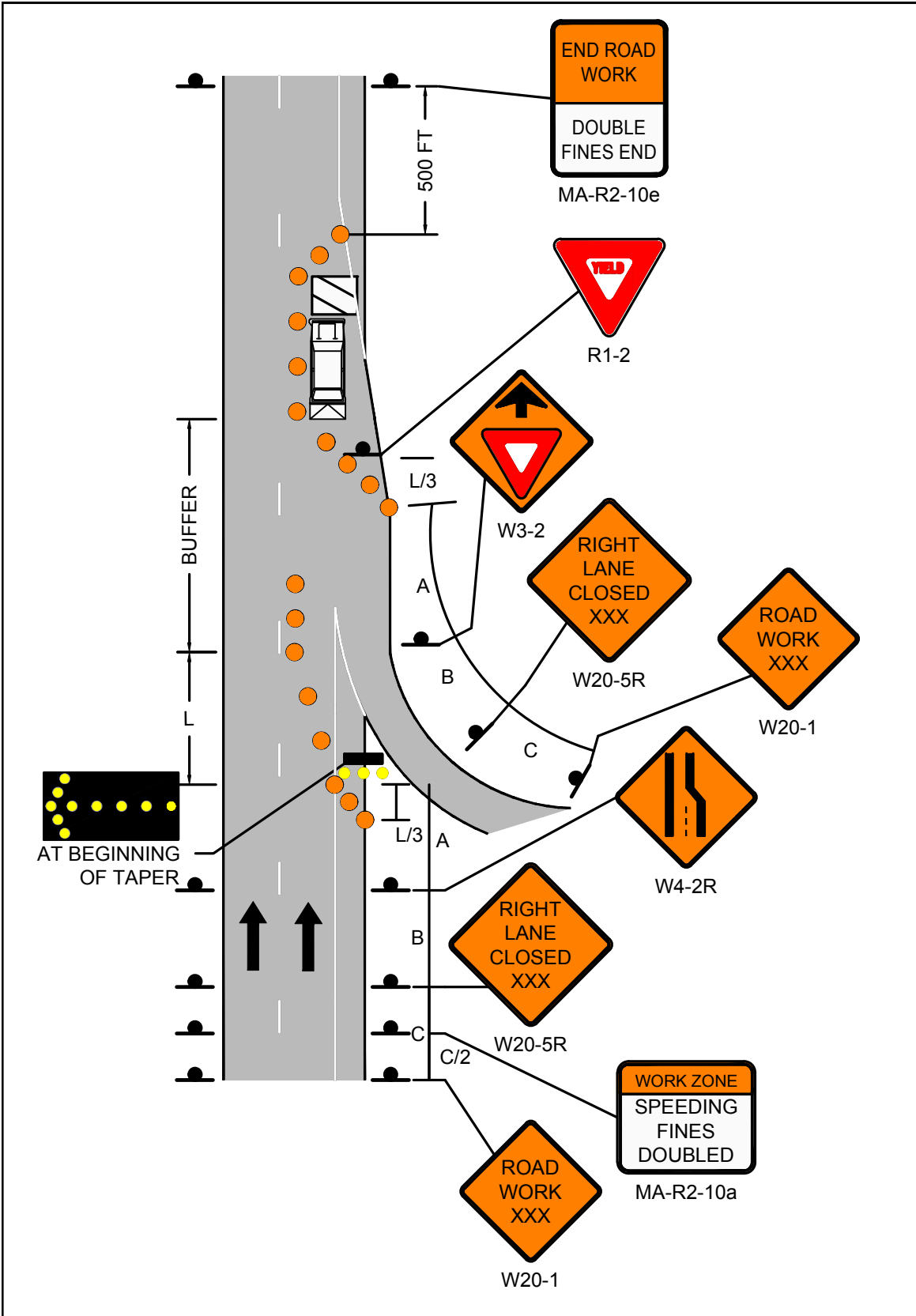
NOTES


1. MA-R2-10a LOCATED AT C/2.


LEGEND

-  WORK ZONE
-  CHANNELIZATION DEVICE
-  FLASHING ARROW BOARD
-  PORTABLE CHANGEABLE MESSAGE SIGN
-  TRUCK MOUNTED ATTENUATOR
-  RADAR SPEED FEEDBACK BOARD
-  POLICE DETAIL OR UNIFORMED FLAGGER
-  TEMPORARY PORTABLE RUMBLE STRIP
-  TYPE III BARRICADE

NOT TO SCALE



| | | |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------|------------------------------------------------------------------------------------------------------|
|  <p>PAGE 45</p> | <p>Work Zone Safety Standard Details and Drawings</p> | <p>FIGURE 19 STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY ROADWORK BEYOND ON RAMP</p> |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------|------------------------------------------------------------------------------------------------------|

| | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------------------|
|  <p>Massachusetts Department of Transportation Highway Division</p> <p>PAGE 46</p> | Work Zone Safety Standard Details and Drawings | STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY ROADWORK BEYOND OFF RAMP |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------------------|

| POSTED SPEED LIMIT (MPH) | CHANNELIZATION DEVICES (DRUMS OR CONES) | | | | | |
|--------------------------|-----------------------------------------|-------------------------------------|-------------------------------------|-------------------------|---------------------|-------------------|
| | SHOULDER TAPER LENGTH (L/3) (FT) | TRAVEL LANE CLOSURE LENGTH (L) (FT) | TRAVEL LANE SHIFT LENGTH (L/2) (FT) | BUFFER ZONE LENGTH (FT) | DEVICE SPACING (FT) | MIN # OF DEVICES* |
| 25-40 | 110 | 320 | 160 | 305 | 20 | 70 |
| 45-55 | 220 | 660 | 330 | 495 | 40 | 55 |
| 60-65 | 260 | 780 | 390 | 645 | 40 | 65 |










* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

| POSTED SPEED LIMIT (MPH) | SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C) |
|--------------------------|------------------------------------------------|
| 25-40 | 500 / 500 / 500 |
| 45-55 | 500 / 1000 / 1000 |
| 60-65 | 1000 / 1600 / 2600 |

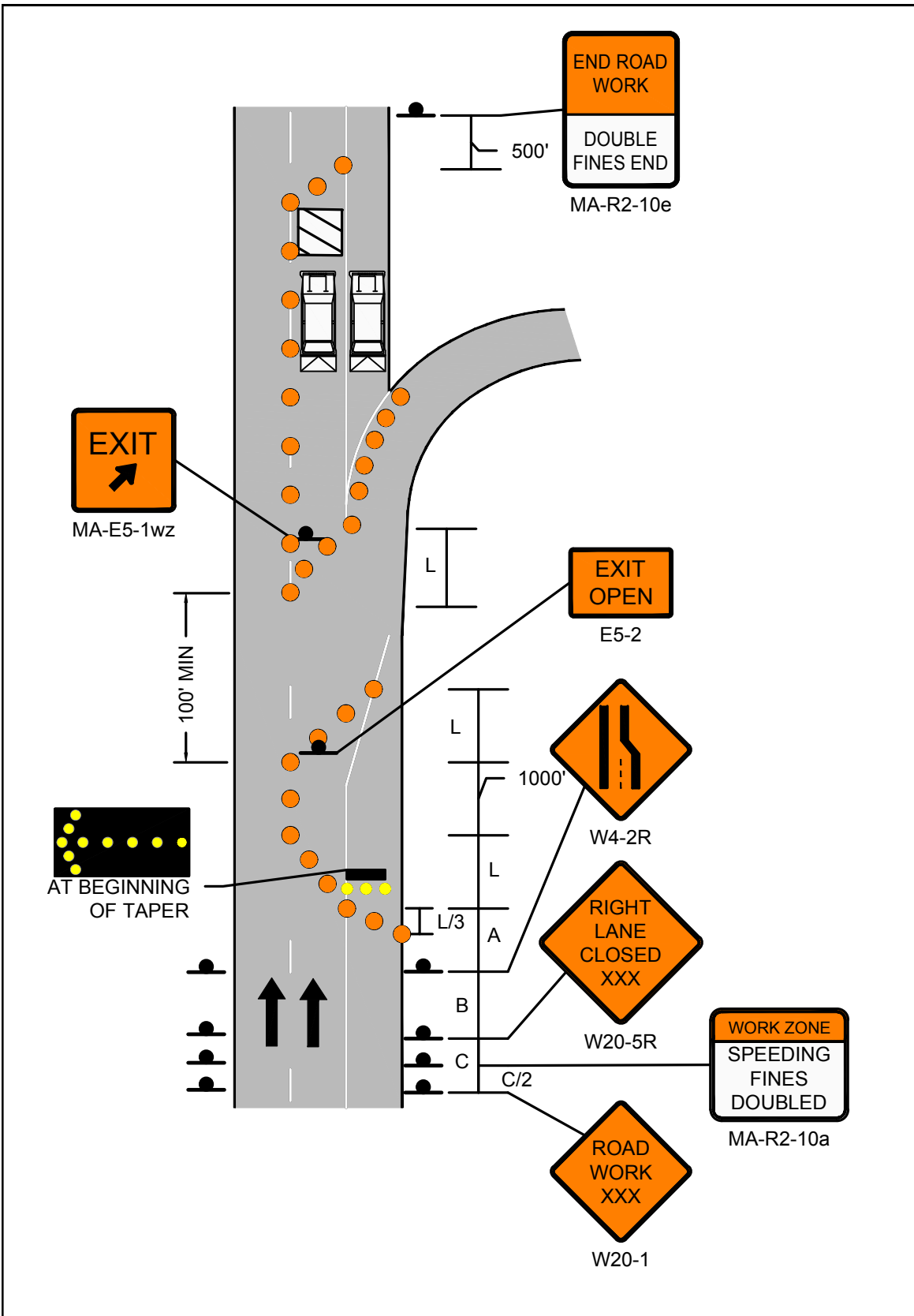
NOTES


1. MA-R2-10a LOCATED AT C/2.

LEGEND

-  WORK ZONE
-  CHANNELIZATION DEVICE
-  FLASHING ARROW BOARD
-  PORTABLE CHANGEABLE MESSAGE SIGN
-  TRUCK MOUNTED ATTENUATOR
-  RADAR SPEED FEEDBACK BOARD
-  POLICE DETAIL OR UNIFORMED FLAGGER
-  TEMPORARY PORTABLE RUMBLE STRIP
-  TYPE III BARRICADE

NOT TO SCALE



| | | |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
|  <p>PAGE 47</p> | <p>Work Zone Safety Standard Details and Drawings</p> | <p>FIGURE 20 STATIONARY OPERATIONS MULTILANE DIVIDED ROADWAY ROADWORK BEYOND OFF RAMP</p> |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------|



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Work Zone Safety
Standard Details
and Drawings










MULTILANE DIVIDED ROADWAY
TYPICAL RAMP CLOSURE

| POSTED SPEED LIMIT (MPH) | SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C) | CHANNELIZATION DEVICES (DRUMS OR CONES) | | | |
|--------------------------|------------------------------------------------|-----------------------------------------|-------------------------|---------------------|------------------|
| | | SHOULDER TAPER LENGTH (L/3) (FT) | BUFFER ZONE LENGTH (FT) | DEVICE SPACING (FT) | MIN # OF DEVICES |
| 25-40 | 500 / 500 / 500 | 110 | 305 | 20 | 45 |
| 45-55 | 500 / 1000 / 1000 | 220 | 495 | 40 | 30 |
| 60-65 | 1000 / 1600 / 2600 | 260 | 645 | 40 | 35 |

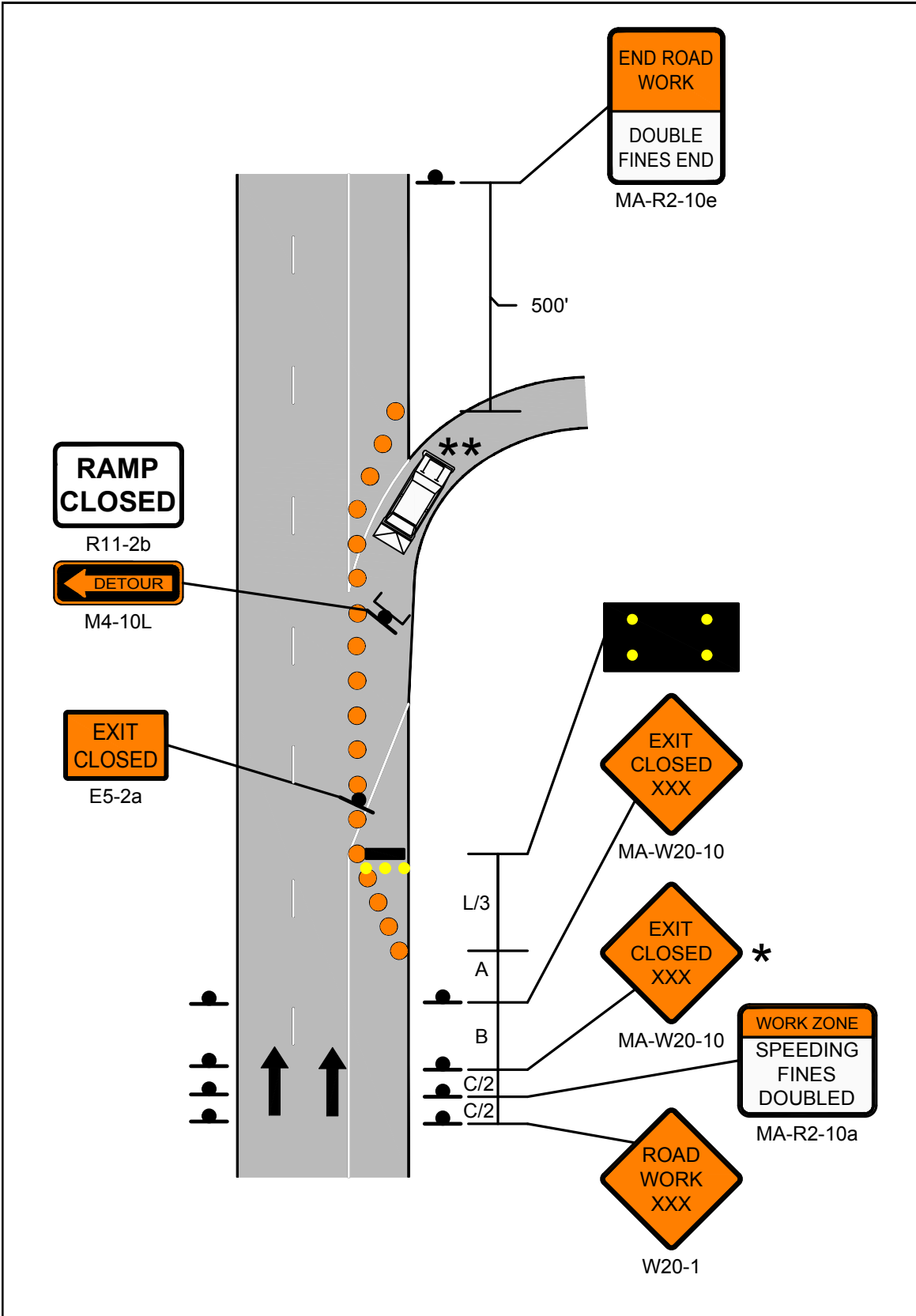
NOTES

1. MA-R2-10a LOCATED AT C/2.
2. * NOT REQUIRED IF RIGHT LANE IS CLOSED IN ADVANCE OF EXIT.
3. ** OPTIONAL AT ENGINEER'S DISCRETION.

LEGEND

-  WORK ZONE
-  CHANNELIZATION DEVICE
-  FLASHING ARROW BOARD
-  PORTABLE CHANGEABLE MESSAGE SIGN
-  TRUCK MOUNTED ATTENUATOR
-  RADAR SPEED FEEDBACK BOARD
-  POLICE DETAIL OR UNIFORMED FLAGGER
-  TEMPORARY PORTABLE RUMBLE STRIP
-  TYPE III BARRICADE

NOT TO SCALE





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Work Zone Safety
Standard Details
and Drawings










MULTILANE DIVIDED ROADWAY
TYPICAL CLOVERLEAF RAMP CLOSURE

| POSTED SPEED LIMIT (MPH) | SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C) | CHANNELIZATION DEVICES (DRUMS OR CONES) | | | |
|--------------------------|------------------------------------------------|-----------------------------------------|-------------------------|---------------------|------------------|
| | | SHOULDER TAPER LENGTH (L/3) (FT) | BUFFER ZONE LENGTH (FT) | DEVICE SPACING (FT) | MIN # OF DEVICES |
| 25-40 | 500 / 500 / 500 | 110 | 305 | 20 | 45 |
| 45-55 | 500 / 1000 / 1000 | 220 | 495 | 40 | 30 |
| 60-65 | 1000 / 1600 / 2600 | 260 | 645 | 40 | 35 |

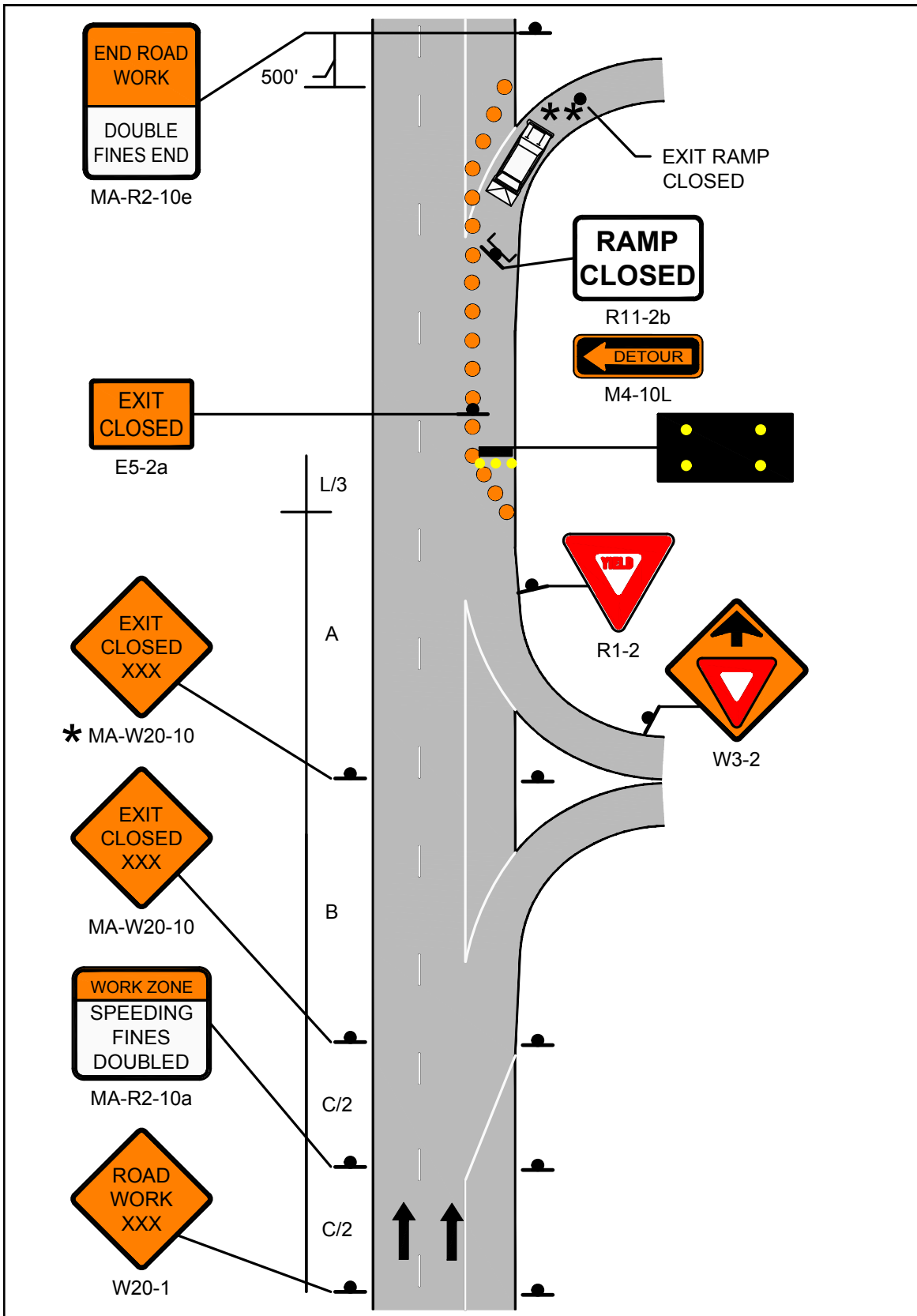
NOTES


1. MA-R2-10a LOCATED AT C/2.
2. * NOT REQUIRED IF RIGHT LANE IS CLOSED IN ADVANCE OF EXIT.
3. ** OPTIONAL AT ENGINEER'S DISCRETION.

LEGEND

-  WORK ZONE
-  CHANNELIZATION DEVICE
-  FLASHING ARROW BOARD
-  PORTABLE CHANGEABLE MESSAGE SIGN
-  TRUCK MOUNTED ATTENUATOR
-  RADAR SPEED FEEDBACK BOARD
-  POLICE DETAIL OR UNIFORMED FLAGGER
-  TEMPORARY PORTABLE RUMBLE STRIP
-  TYPE III BARRICADE

NOT TO SCALE



| | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------------------------------|
|  <p>Massachusetts Department of Transportation Highway Division</p> <p>PAGE 51</p> | <p>Work Zone Safety Standard Details and Drawings</p> | <p>FIGURE 22 MULTILANE DIVIDED ROADWAY TYPICAL CLOVERLEAF RAMP CLOSURE</p> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------------------------------|



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Work Zone Safety
Standard Details
and Drawings

MULTILANE DIVIDED ROADWAY
TYPICAL RAMP CLOSURE
ADVANCE SIGNING

NOTES

1. IF THE CLOSED RAMP IS LOCATED DOWNSTREAM FROM THE PROPOSED DETOUR ROUTE/RAMP, A PCMS SHALL BE POSITIONED AT A SUFFICIENT DISTANCE IN ADVANCE OF THE DETOUR ROUTE/RAMP AND SHOULD STATE WHICH RAMP IS CLOSED AND WHICH SHALL BE USED FOR THE DETOUR.
2. IF THE CLOSED RAMP IS LOCATED UPSTREAM FROM THE PROPOSED DETOUR ROUTE/RAMP, A PCMS SHALL BE POSITIONED PRIOR TO THE CLOSED RAMP AND SHOULD STATE WHICH RAMP IS CLOSED AND WHICH SHALL BE USED FOR THE DETOUR.
3. A SUFFICIENT NUMBER OF DETOUR SIGNS (M4-9 SERIES) SHOULD BE DEPLOYED TO PROPERLY DIRECT DETOURED TRAFFIC. SIGN SPACING SHALL BE AT THE DIRECTION OF THE ENGINEER.

LEGEND

-  WORK ZONE
-  CHANNELIZATION DEVICE
-  FLASHING ARROW BOARD
-  PORTABLE CHANGEABLE MESSAGE SIGN
-  TRUCK MOUNTED ATTENUATOR
-  RADAR SPEED FEEDBACK BOARD
-  POLICE DETAIL OR UNIFORMED FLAGGER
-  TEMPORARY PORTABLE RUMBLE STRIP
-  TYPE III BARRICADE

NOT TO SCALE

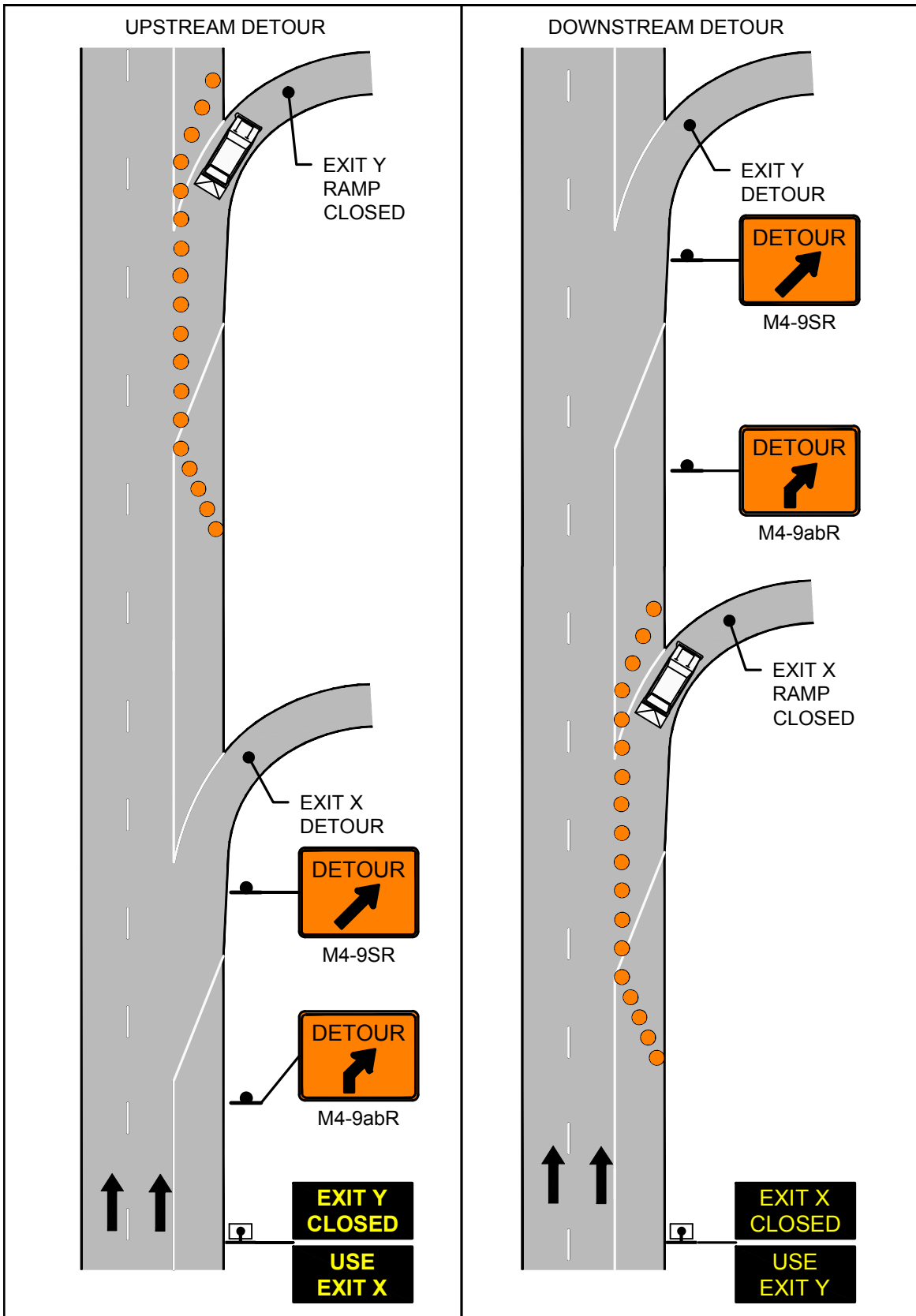


FIGURE 23
MULTILANE DIVIDED ROADWAY
TYPICAL RAMP CLOSURE
ADVANCE SIGNING



FIGURE 24-1
MULTILANE DIVIDED ROADWAY
PLACEMENT OF TEMPORARY
PORTABLE RUMBLE STRIPS
SHEET 1 OF 2




| POSTED REGULATORY OR WORK ZONE SPEED | SEPARATION BETWEEN RUMBLE STRIPS |
|--------------------------------------|----------------------------------|
| Above 55-mph | 20-feet |
| 36-mph to 55-mph | 15-feet |
| 35-mph and under | 10-feet |

| POSTED SPEED LIMIT (MPH) | SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C) | TANGENT LENGTH BETWEEN TAPERS (T) (FT) |
|--------------------------|------------------------------------------------|----------------------------------------|
| 25-40 | 500 / 500 / 500 | 640 |
| 45-55 | 500 / 1000 / 1000 | 1320 |
| 60-65 | 1000 / 1600 / 2600 | 1560 |

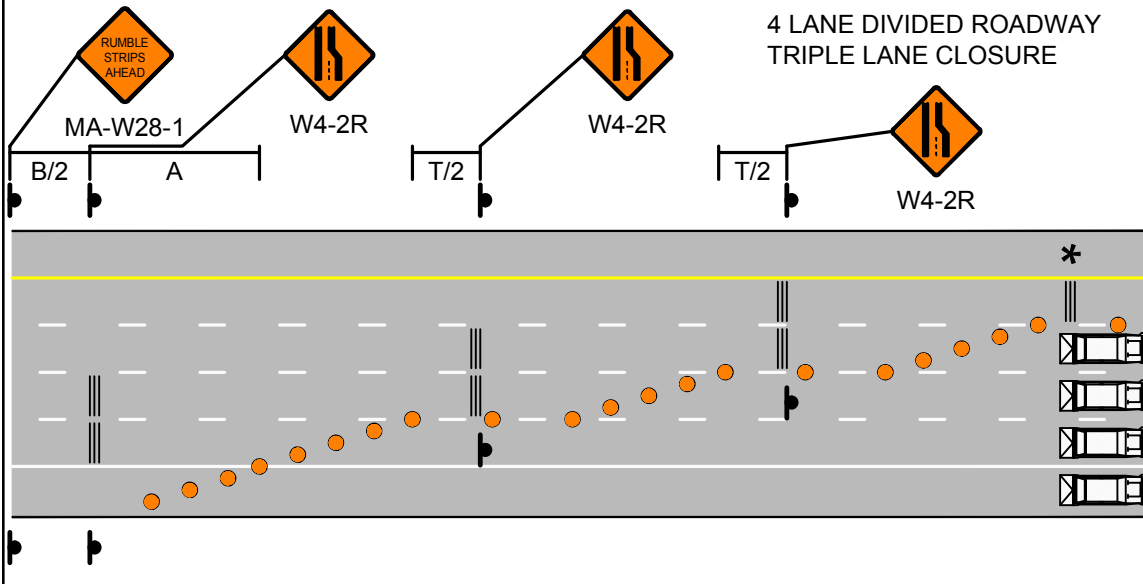
NOTES

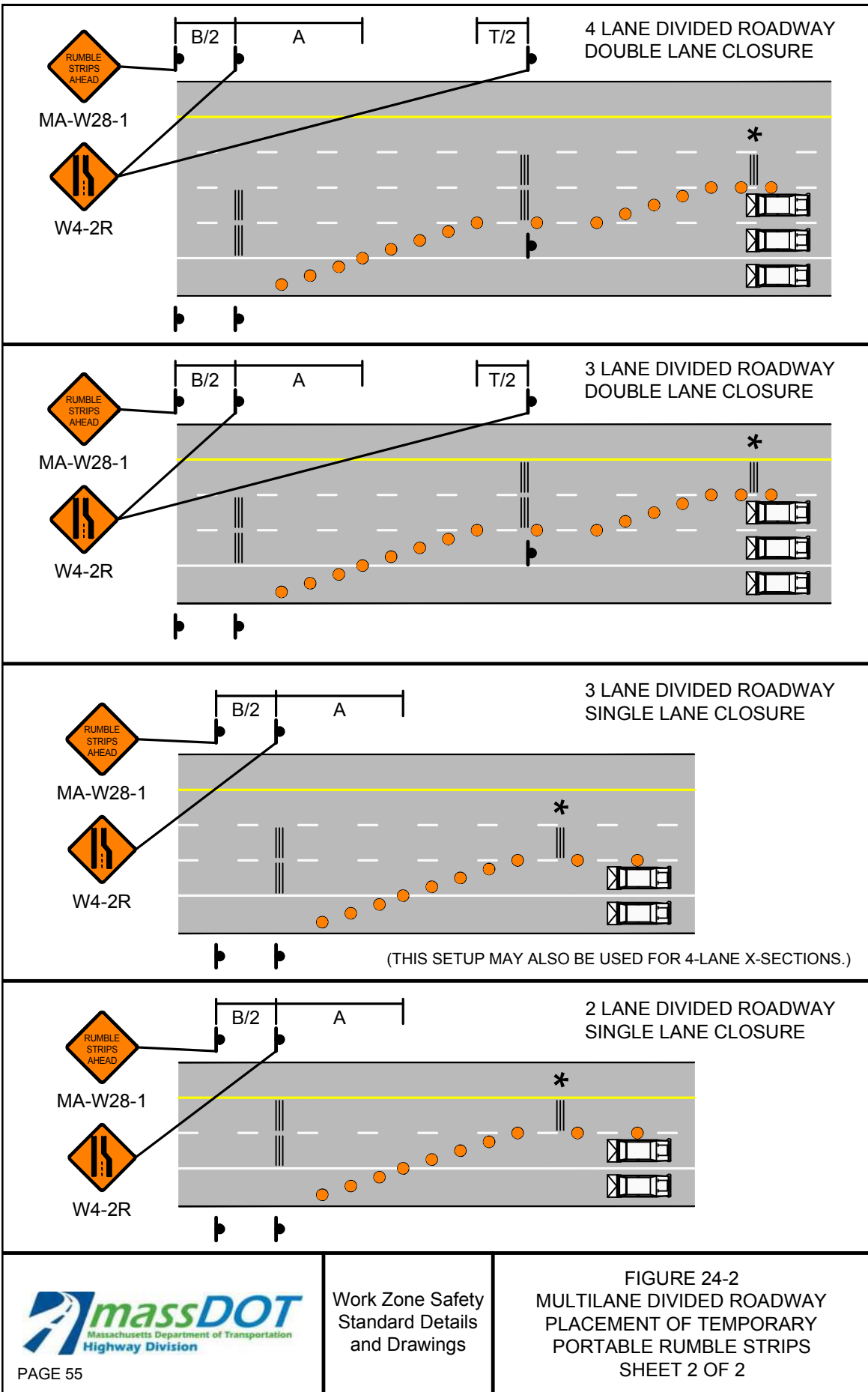
1. THE INTENTION OF THESE DETAILS IS ONLY TO DEPICT THE PLACEMENT OF TEMPORARY PORTABLE RUMBLE STRIPS (TPRS) IN RELATIONSHIP TO THE TAPER AND THE BUFFER OF A SINGLE- OR MULTI-LANE CLOSURE. THE DEPICTION OF THE NUMBER AND SPACING OF ALL OTHER TRAFFIC CONTROL DEVICES IS NOT TO SCALE. REFER TO OTHER DETAILS FOR LANE CLOSURES FOR THE PLACEMENT AND NUMBER OF ALL OTHER TRAFFIC CONTROL DEVICES.
2. THESE DETAILS ONLY DEPICT RIGHT LANE CLOSURES. LEFT LANE CLOSURES SHOULD UTILIZE A MIRROR IMAGE OF THESE SETUPS, STARTING WITH CLOSURE OF THE LEFTMOST LANE.
3. * THIS TPRS ARRAY IS OPTIONAL AT THE ENGINEER'S DISCRETION. IF USED, IT SHOULD BE PLACED ADJACENT TO THE BUFFER.
4. DETAILS SHOW THE MINIMUM NUMBER OF TPRS REQUIRED. ADDITIONAL MAY BE USED IF CONDITIONS WARRANT.


LEGEND

-  CHANNELIZATION DEVICE
-  TRUCK MOUNTED ATTENUATOR
-  TEMPORARY PORTABLE RUMBLE STRIP

NOT TO SCALE

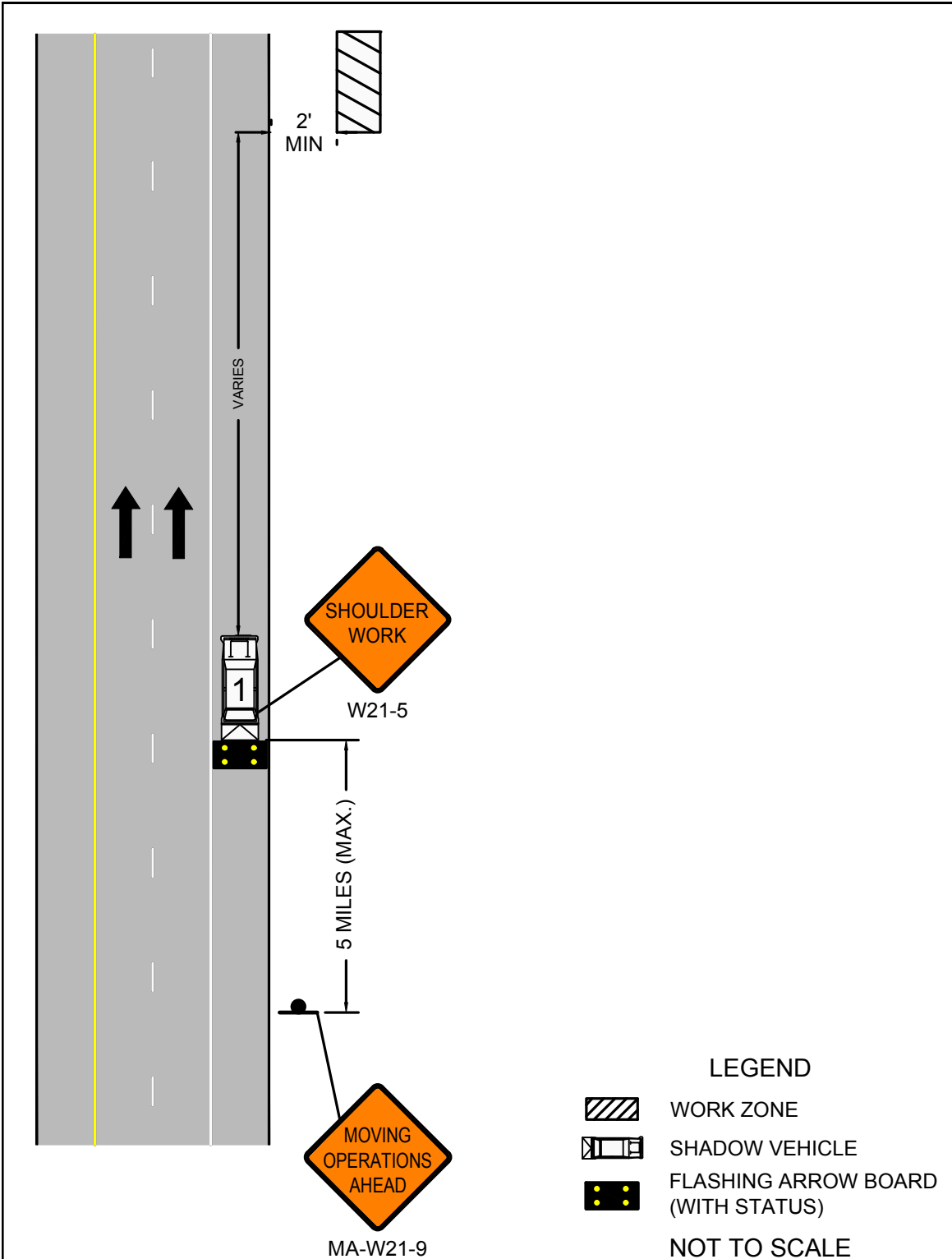




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|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------|------------------------------------|
|  <p>PAGE 56</p> | <p>Work Zone Safety Standard Details and Drawings</p> | <p>NOTES FOR MOBILE OPERATIONS</p> |
|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------|------------------------------------|


Notes for Mobile Operations

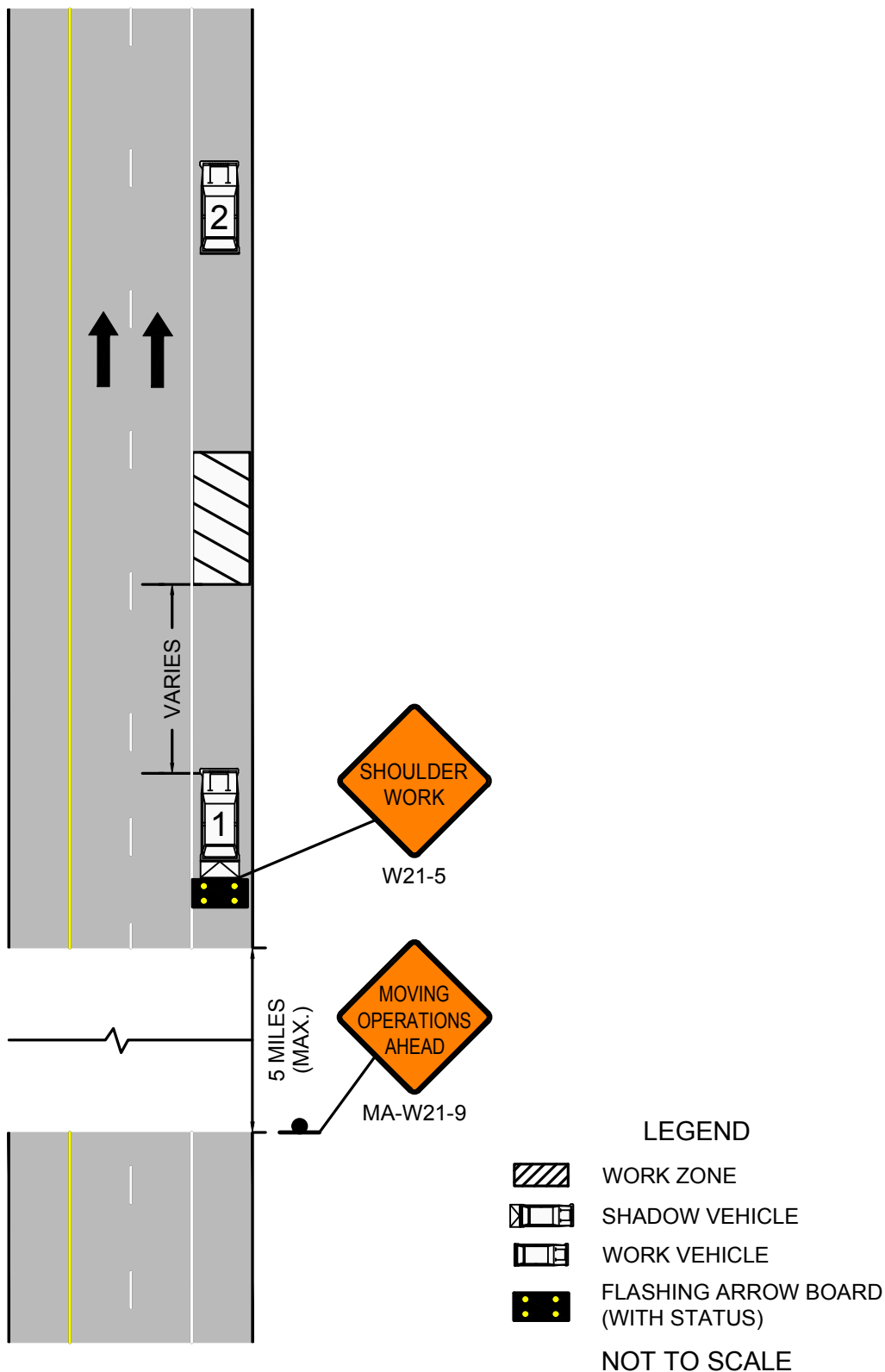
- Unless otherwise stated, these notes shall apply to all Mobile Operation setups.
 - Additional, setup-specific notes may be found on individual sheets.
1. The Supervisor shall travel the designated roadway prior to scheduling the work to ensure that sufficient and appropriate traffic control devices will be available. Special consideration shall be exercised to ensure that appropriate traffic controls be placed in areas that will have limited visibility of the work areas or any associated traffic queues.
 2. Vehicles used for these operations shall be made highly visible with appropriate equipment such as flashing lights, rotating beacons, flags, signs, flashing arrow boards, and/or portable changeable message signs. Any signs mounted to these vehicles shall not obscure the visibility of other devices.
 3. All vehicles shown may not be required based upon roadway conditions. However, when needed and practical, additional shadow vehicles and equipment to warn and protect motorists and workers should be used. Based upon roadway conditions, the addition of a police detail with cruiser may be used for additional protection or warning for the traveling public.
 4. The distance between the work and shadow vehicle(s) may vary according to the terrain and other factors. Shadow vehicles are used to warn traffic of the operations ahead. Whenever adequate sight distance exists, the shadow vehicle(s) should maintain the minimum appropriate distance and maintain the same speed to prevent non-work related vehicles from entering the work convoy. If this formation cannot be maintained then additional traffic control devices should be deployed in advance of any vertical or horizontal curves that may restrict the sight distance of an oncoming vehicle to either the work vehicle or associated traffic queue.
 5. All shadow vehicles shall be equipped with a truck or trailer mounted attenuator (TMA) and a flashing arrow board.
 6. Signs should be covered or turned from view when work is not in progress.
 7. Portable changeable message signs may be used in lieu of MA-W21-9 signs and any signs mounted directly to a shadow vehicle.



NOTES

1. IF THE WORK AREA IS SUFFICIENTLY AWAY FROM THE EDGE OF ROADWAY (20' MINIMUM) THEN SIGNS AND VEHICLES MAY NOT BE REQUIRED.

| | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------------------------------|
|  <p>Massachusetts Department of Transportation Highway Division</p> <p>PAGE 57</p> | <p>Work Zone Safety Standard Details and Drawings</p> | <p>FIGURE 25 MOBILE OPERATIONS ANY ROADWAY BEYOND RIGHT SHOULDER</p> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------------------------------|



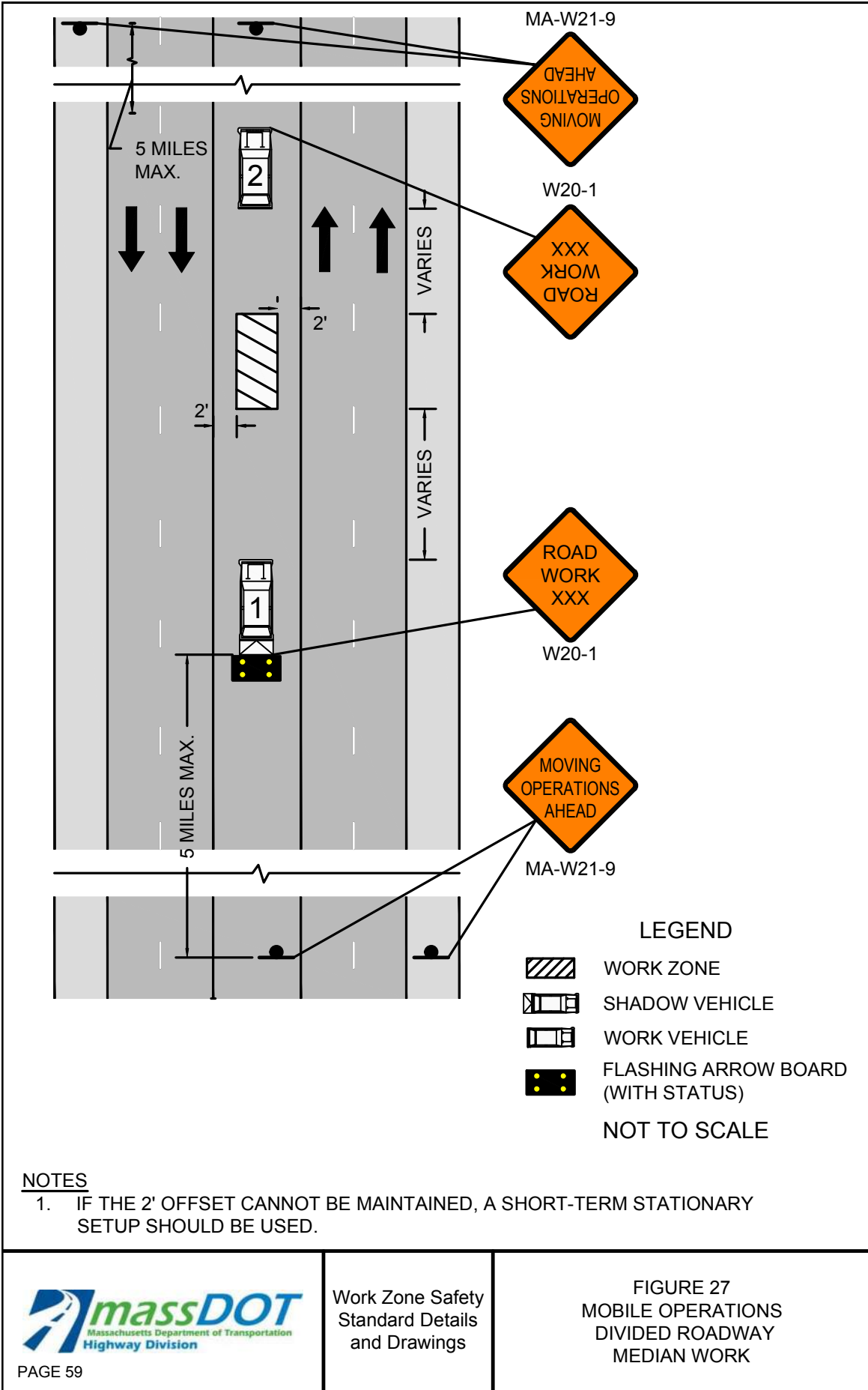
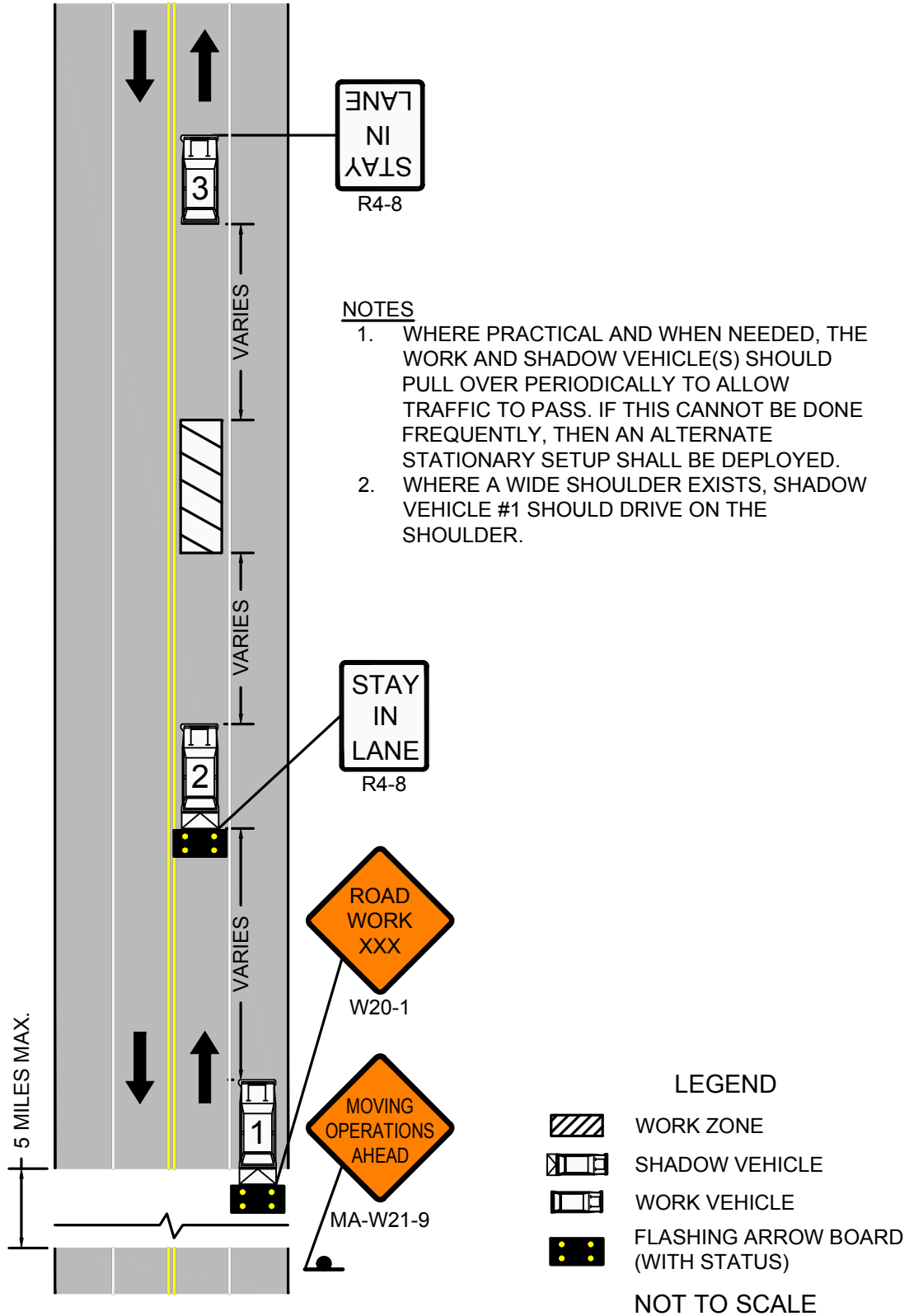




FIGURE 28
MOBILE OPERATIONS
UNDIVIDED TWO LANE ROADWAY
HALF OF ROADWAY CLOSED



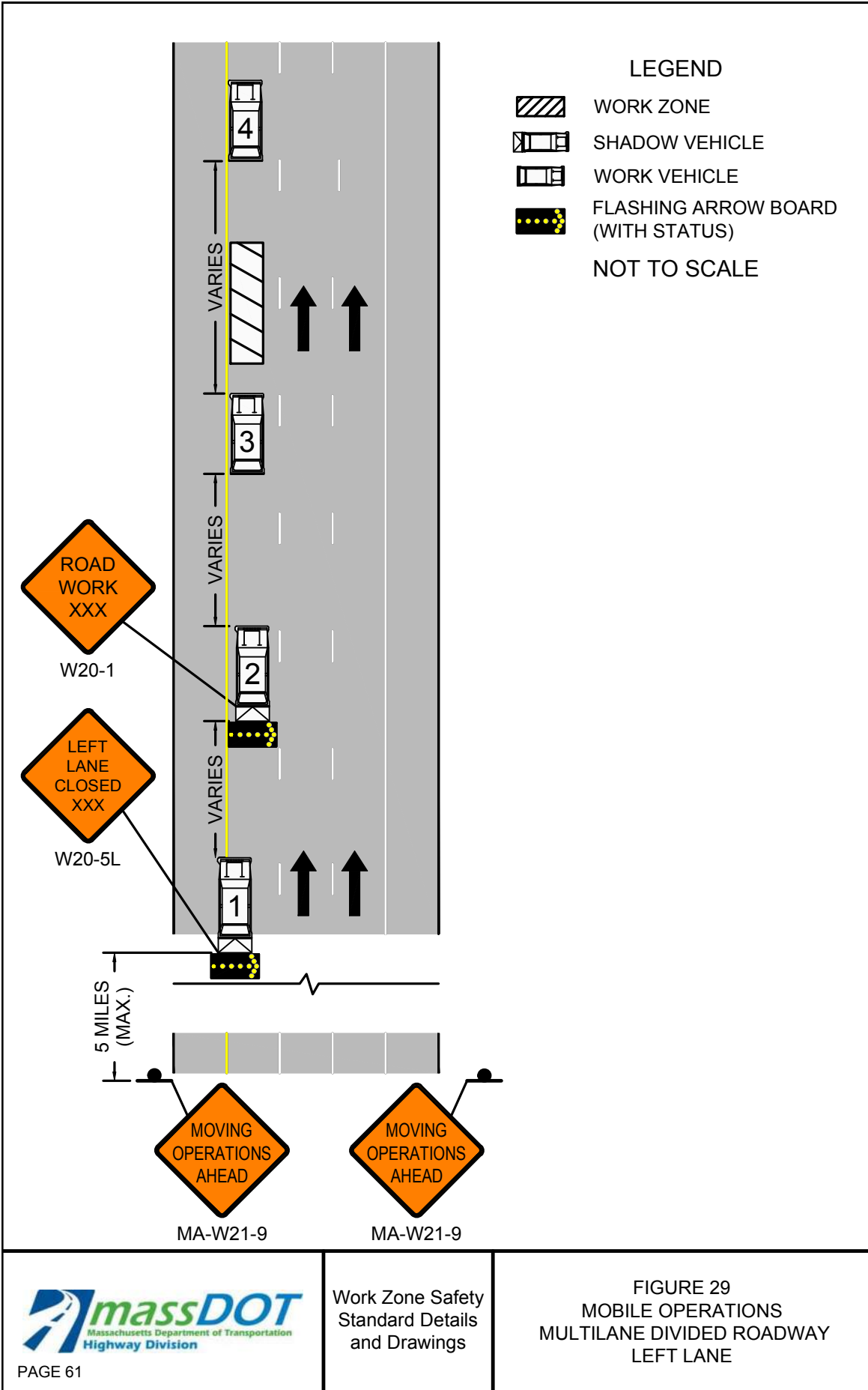
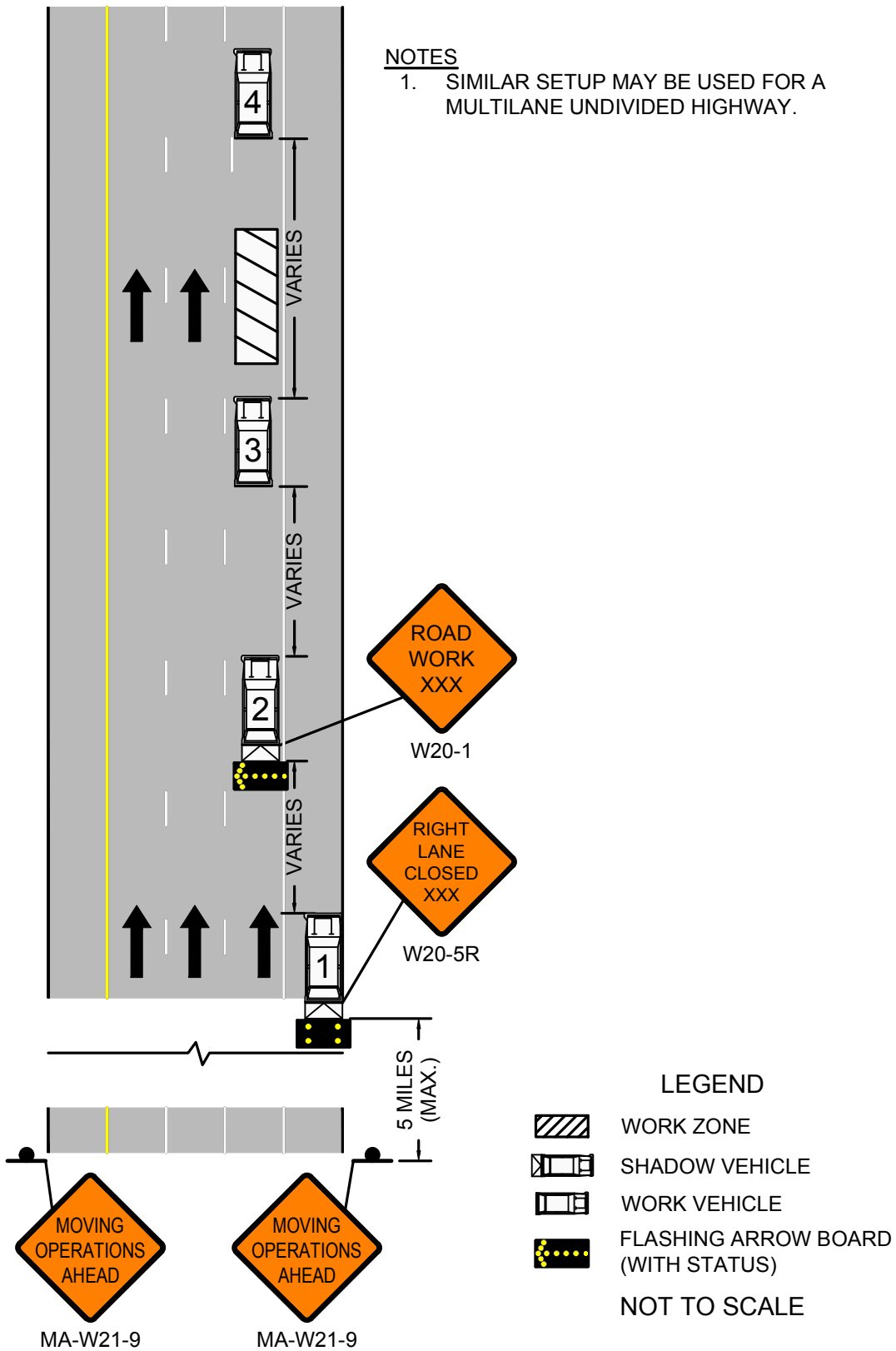
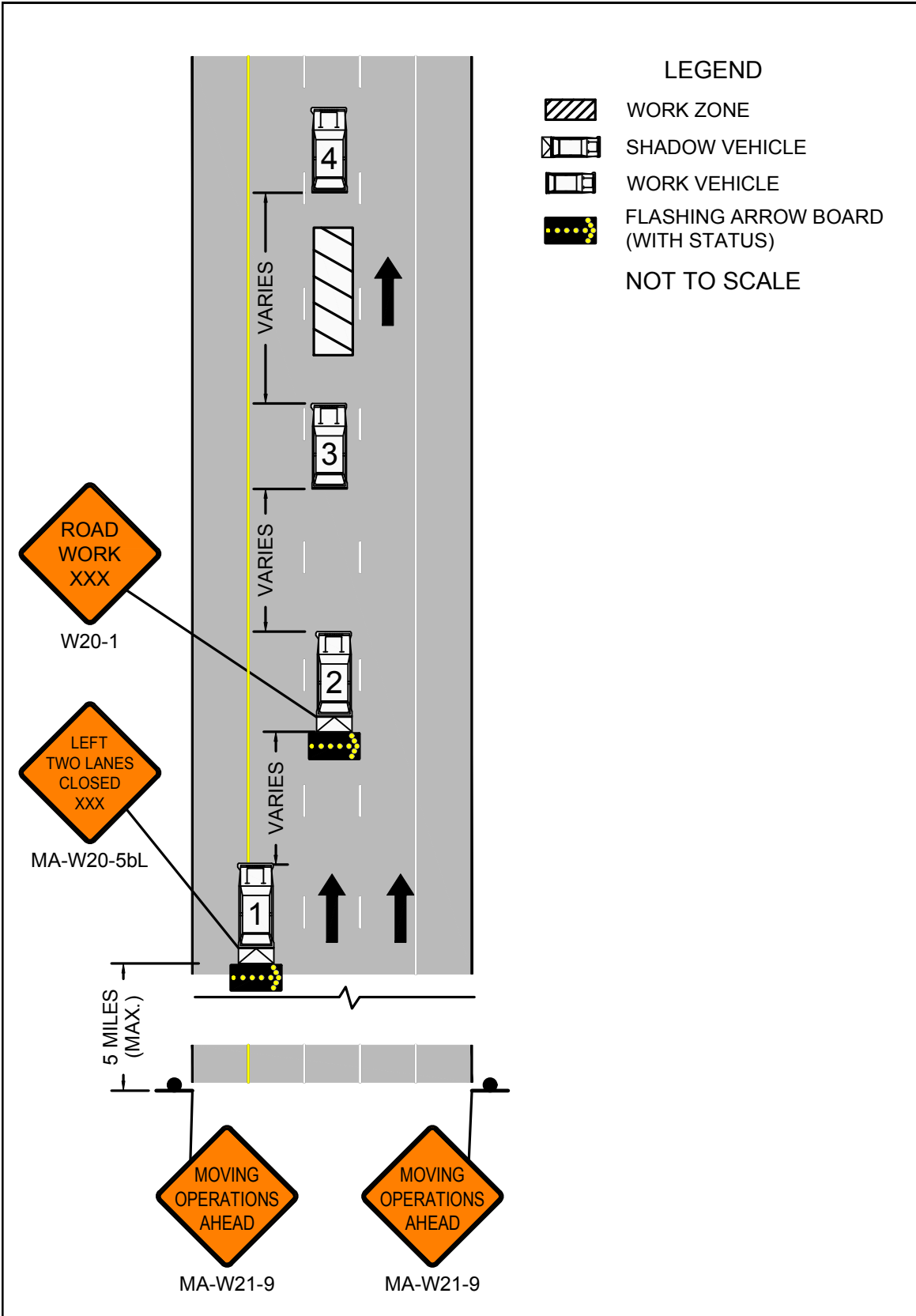



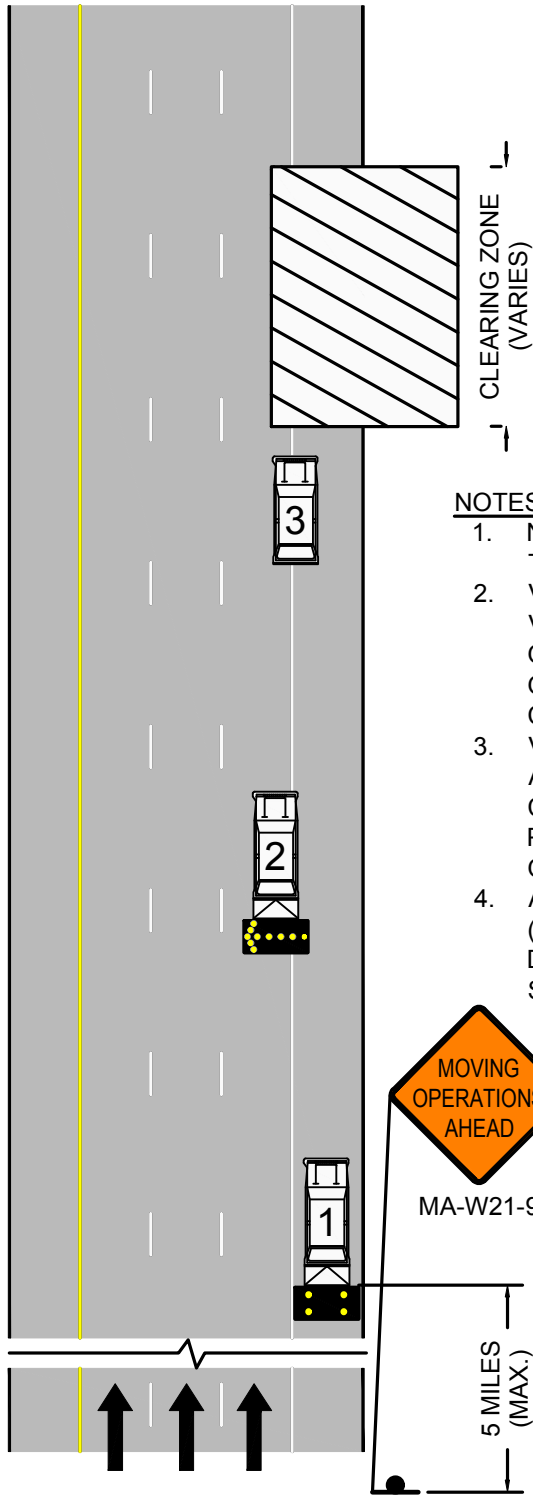


FIGURE 30
MOBILE OPERATIONS
MULTILANE DIVIDED ROADWAY
RIGHT LANE





| | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|--------------------------------------------------------------------------------------|
|  <p>Massachusetts Department of Transportation Highway Division</p> <p>PAGE 63</p> | <p>Work Zone Safety Standard Details and Drawings</p> | <p>FIGURE 31 MOBILE OPERATIONS MULTILANE DIVIDED ROADWAY CENTER LANE</p> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|--------------------------------------------------------------------------------------|



NOTES

1. NO OTHER NOTES ARE APPLICABLE TO THIS DETAIL.
2. VEHICLE #3 IS A SNOW/DEBRIS REMOVAL VEHICLE AND SHALL ALWAYS BE AWARE OF THE SURROUNDINGS. MORE THAN ONE VEHICLE MAY BE USED IN THE CLEARING ZONE.
3. VEHICLE #1 SHOULD BE EQUIPPED WITH A PCMS, A TMA, AND STAY IN VISUAL CONTACT WITH VEHICLE #3 WHILE PROVIDING AMPLE WARNING TO ONCOMING TRAFFIC.
4. A POLICE DETAIL WITH BLUE LIGHTS (OPTIONAL) SHALL REMAIN DOWNSTREAM OF VEHICLE #1 IN THE SHOULDER.

LEGEND

- WORK ZONE
- SHADOW VEHICLE
- WORK VEHICLE
- FLASHING ARROW BOARD (WITH STATUS)

NOT TO SCALE

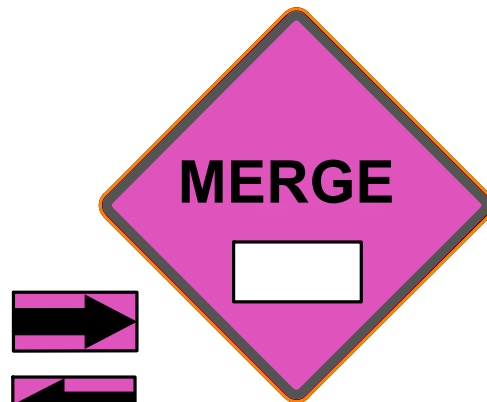
Notes for Traffic Emergency or Incident Operations

- The goal is to increase awareness of during traffic emergencies or incidents.
- These signs are to be used to differentiate from the traditional construction work zone and an emergency or incident.
- Upon arrival MassDOT First Responders shall assess the magnitude of the scene to determine if the incident is likely to last an hour or more in duration which would trigger the requirement to use these signs.
- Place the “Emergency Ahead” sign on the same side of the road as the incident, if possible, for up to an hour. Emergency response signs should be put up for all incidents and emergencies as soon as possible.
- Place the emergency sign 500 to 1000 feet before the first channelization devices.
- As an incident evolves this sign would be used as a secondary sign with all other emergency controls put in place.
- Only use “MERGE” signs where applicable (Not on 2 lane roads).
- Use MERGE signs on Multi-lane Roads to move traffic away from the incident and keep them in a safe lane.
- Place the MERGE sign about 500 feet before the closure.
- If additional signs are available, they should be placed accordingly as a sign informing people coming in the other direction or on the opposite side of the roadway.
- Use 12 emergency cones spaced 40 to 80 feet apart to form a taper and protect the scene.
- Sequential flashing lights/flares may be used in lieu of or to supplement cones.
- During a major incident that will last for a long duration, the EMERGENCY AHEAD sign should be moved back before an intersecting road or ramp to alert travelers and give them an option of using an alternate route. (Be sure all other devices are in place before moving this sign).

Standard Emergency Signs (36"x36" or 48"x48")



MA-W20-9






MA-W4-2aR/L



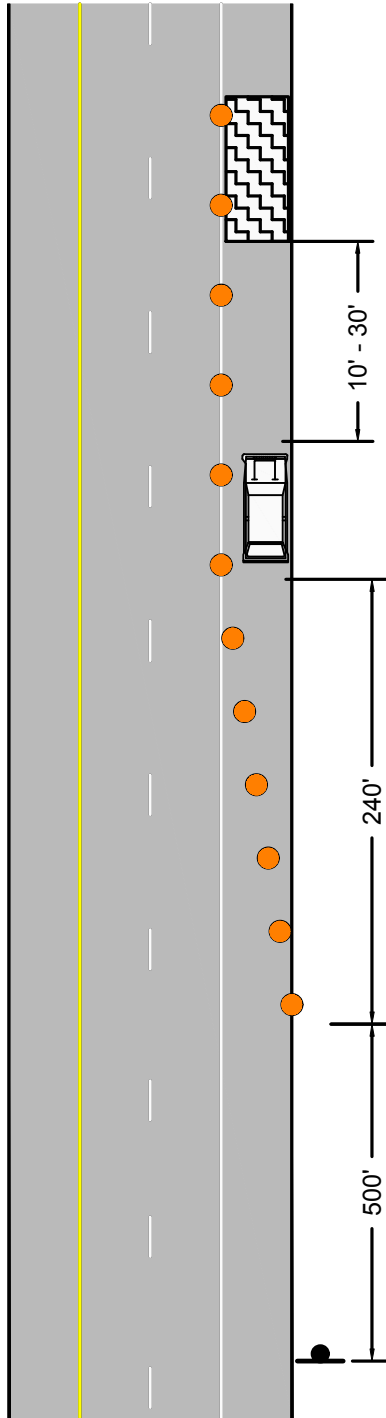


FIGURE 33
EMERGENCY RESPONSE
ANY ROADWAY
SHOULDER ENCROACHMENT

LEGEND

-  EMERGENCY AREA
-  CHANNELIZATION DEVICE
-  EMERGENCY RESPONSE VEHICLE

NOT TO SCALE



ORDER OF RESPONSE ACTIVITIES

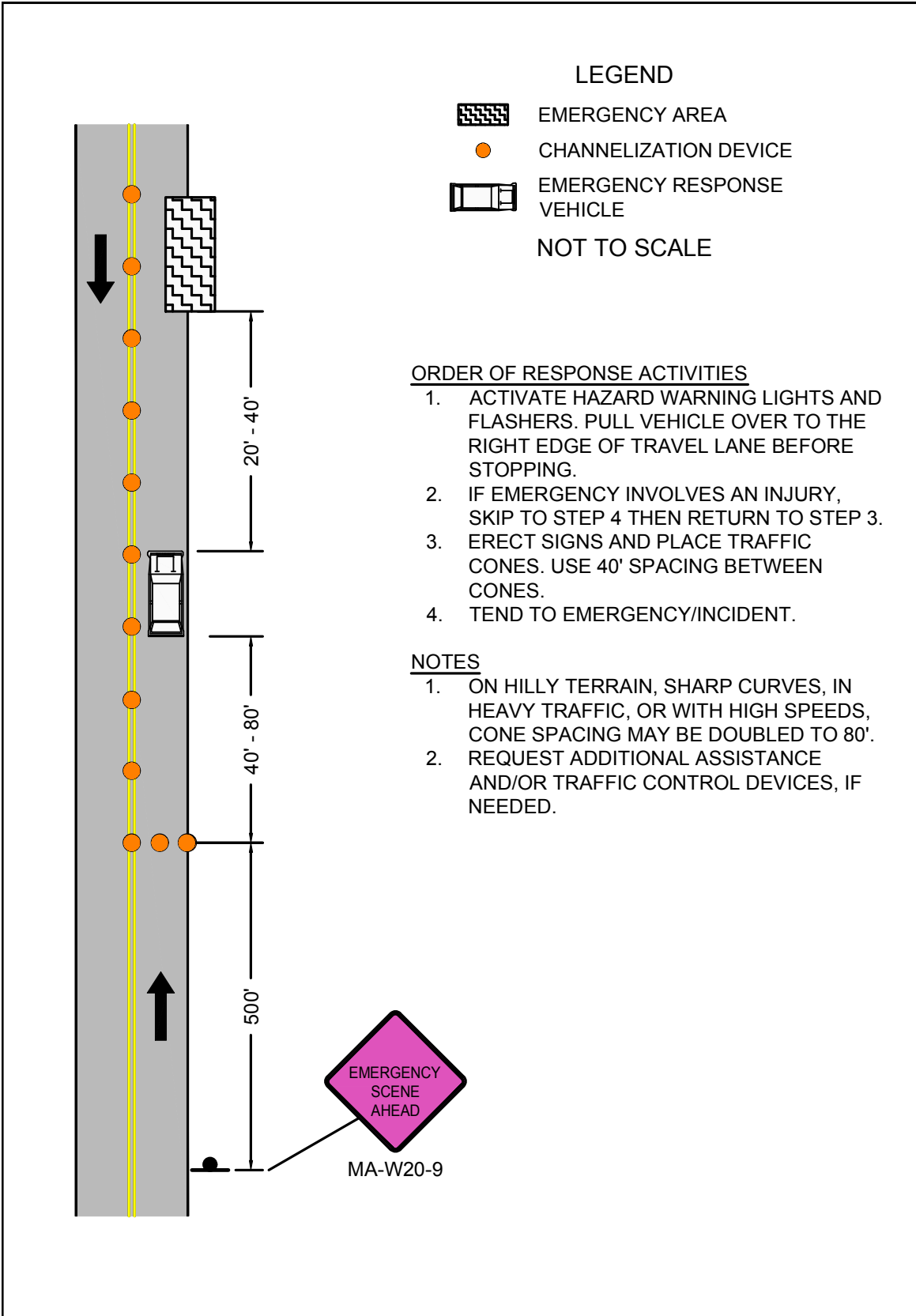
1. ACTIVATE HAZARD WARNING LIGHTS AND FLASHERS. PULL VEHICLE OVER TO THE RIGHT EDGE OF TRAVEL LANE BEFORE STOPPING.
2. IF EMERGENCY INVOLVES AN INJURY, SKIP TO STEP 4 THEN RETURN TO STEP 3.
3. ERECT SIGNS AND PLACE TRAFFIC CONES. USE 40' SPACING BETWEEN CONES.
4. TEND TO EMERGENCY/INCIDENT.

NOTES




1. ON HILLY TERRAIN, SHARP CURVES, IN HEAVY TRAFFIC, OR WITH HIGH SPEEDS, CONE SPACING MAY BE DOUBLED TO 80'.
2. REQUEST ADDITIONAL ASSISTANCE AND/OR TRAFFIC CONTROL DEVICES, IF NEEDED.



MA-W20-9



LEGEND

-  EMERGENCY AREA
-  CHANNELIZATION DEVICE
-  EMERGENCY RESPONSE VEHICLE

NOT TO SCALE

ORDER OF RESPONSE ACTIVITIES

1. ACTIVATE HAZARD WARNING LIGHTS AND FLASHERS. PULL VEHICLE OVER TO THE RIGHT EDGE OF TRAVEL LANE BEFORE STOPPING.
2. IF EMERGENCY INVOLVES AN INJURY, SKIP TO STEP 4 THEN RETURN TO STEP 3.
3. ERECT SIGNS AND PLACE TRAFFIC CONES. USE 40' SPACING BETWEEN CONES.
4. TEND TO EMERGENCY/INCIDENT.

NOTES

1. ON HILLY TERRAIN, SHARP CURVES, IN HEAVY TRAFFIC, OR WITH HIGH SPEEDS, CONE SPACING MAY BE DOUBLED TO 80'.
2. REQUEST ADDITIONAL ASSISTANCE AND/OR TRAFFIC CONTROL DEVICES, IF NEEDED.





| | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
|  <p>Massachusetts Department of Transportation Highway Division</p> <p>PAGE 67</p> | <p>Work Zone Safety Standard Details and Drawings</p> | <p>FIGURE 34 EMERGENCY RESPONSE TWO LANE ROADWAY NO SHOULDER TRAVEL LANE ENCROACHMENT</p> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|

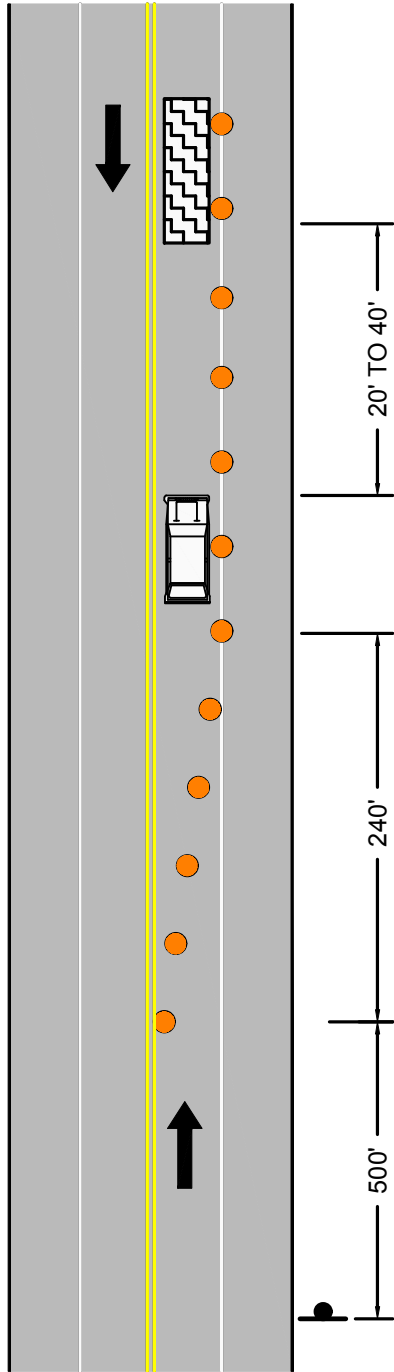


FIGURE 35
EMERGENCY RESPONSE
TWO LANE ROADWAY
TRAVERSABLE SHOULDER
SINGLE LANE ENCROACHMENT

LEGEND

-  EMERGENCY AREA
-  CHANNELIZATION DEVICE
-  EMERGENCY RESPONSE VEHICLE

NOT TO SCALE



ORDER OF RESPONSE ACTIVITIES

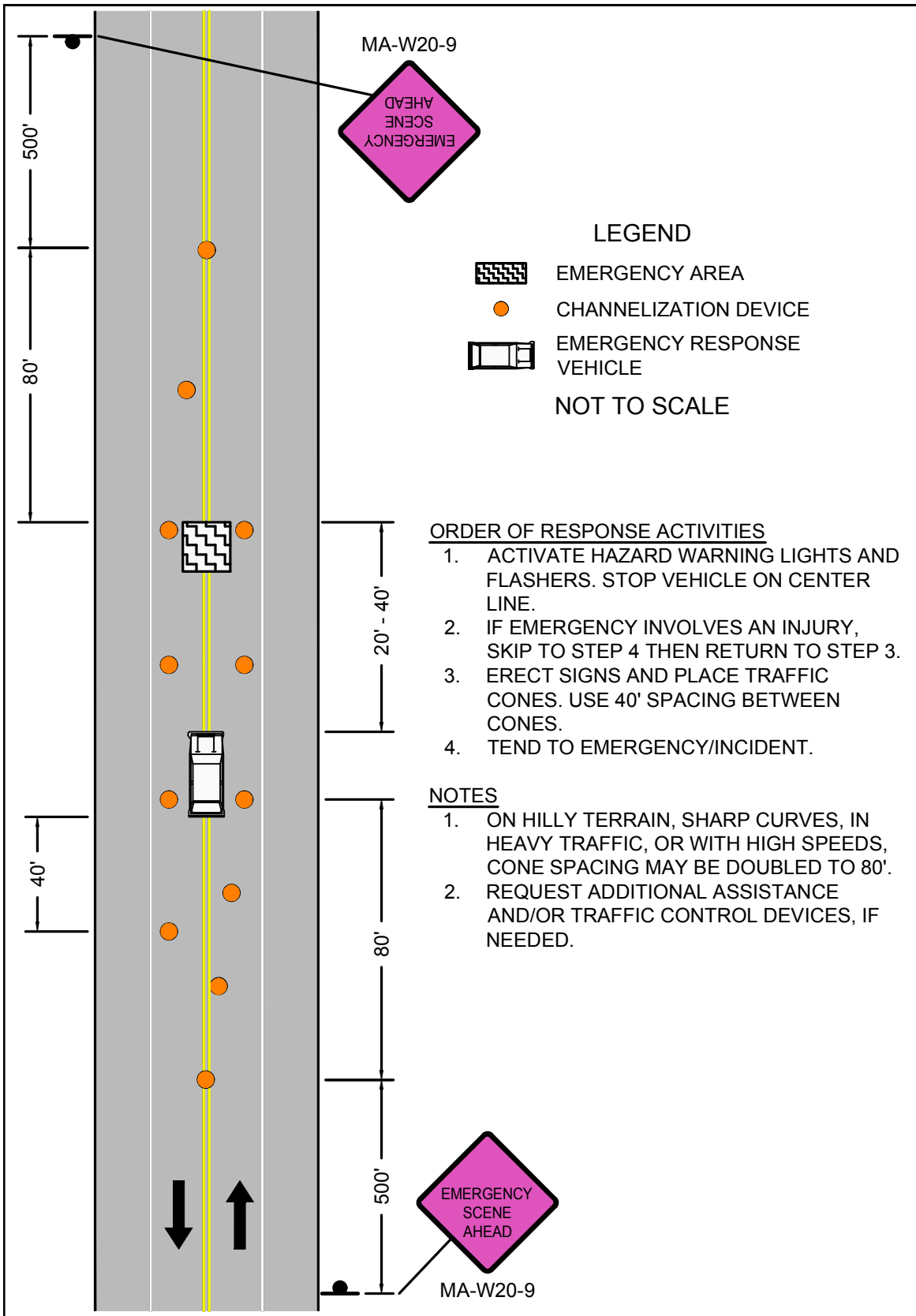
1. ACTIVATE HAZARD WARNING LIGHTS AND FLASHERS. PULL VEHICLE OVER TO THE LEFT EDGE OF TRAVEL LANE BEFORE STOPPING.
2. IF EMERGENCY INVOLVES AN INJURY, SKIP TO STEP 4 THEN RETURN TO STEP 3.
3. ERECT SIGNS AND PLACE TRAFFIC CONES. USE 40' SPACING BETWEEN CONES.
4. TEND TO EMERGENCY/INCIDENT.

NOTES

1. ON HILLY TERRAIN, SHARP CURVES, IN HEAVY TRAFFIC, OR WITH HIGH SPEEDS, CONE SPACING MAY BE DOUBLED TO 80'.
2. REQUEST ADDITIONAL ASSISTANCE AND/OR TRAFFIC CONTROL DEVICES, IF NEEDED.



MA-W20-9




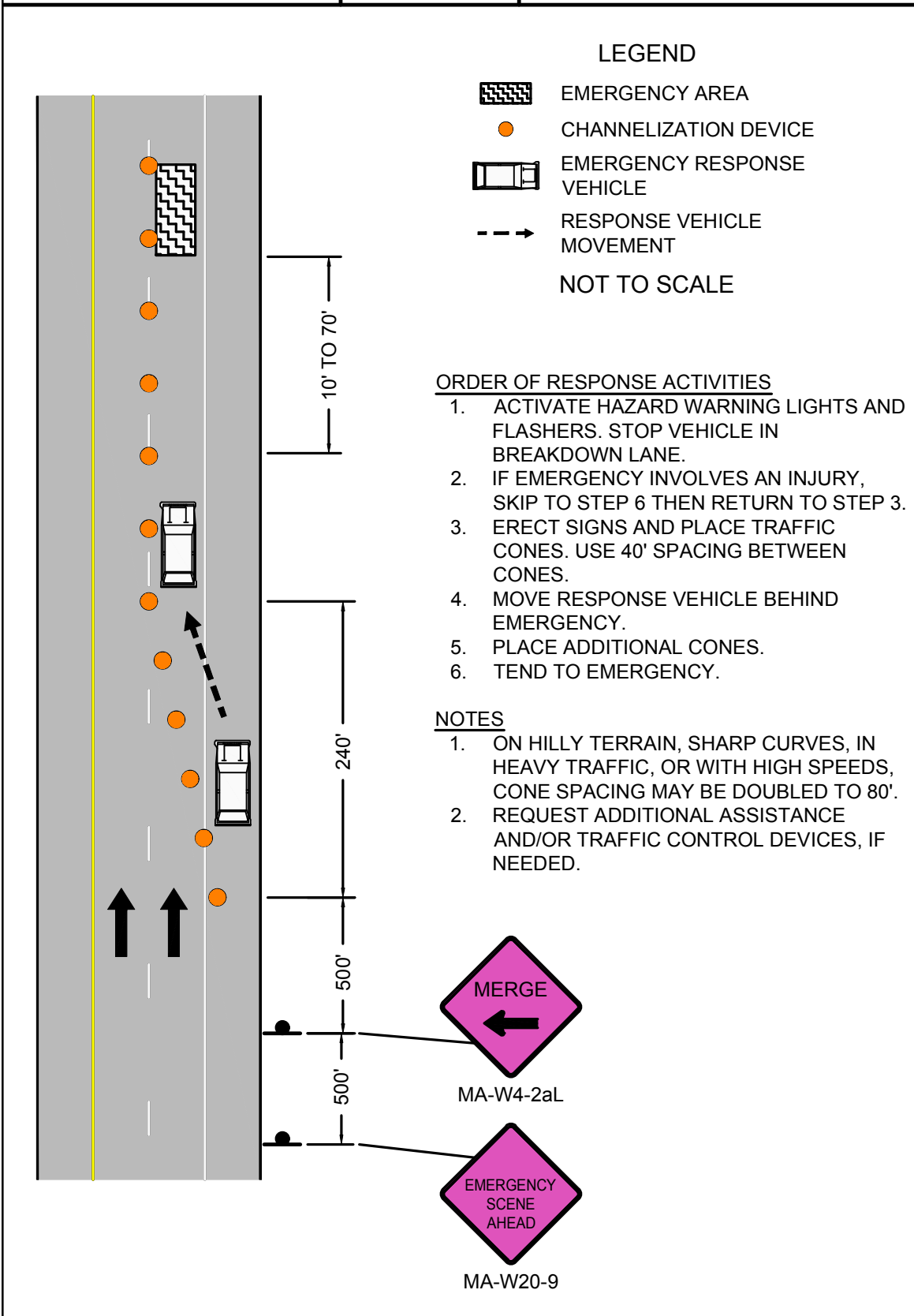
| | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
|  <p>Massachusetts Department of Transportation Highway Division</p> <p>PAGE 69</p> | <p>Work Zone Safety Standard Details and Drawings</p> | <p>FIGURE 36 EMERGENCY RESPONSE TWO LANE ROADWAY TRAVERSABLE SHOULDER CENTER OF ROADWAY</p> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|



FIGURE 37
EMERGENCY RESPONSE
MULTILANE DIVIDED ROADWAY
RIGHT LANE



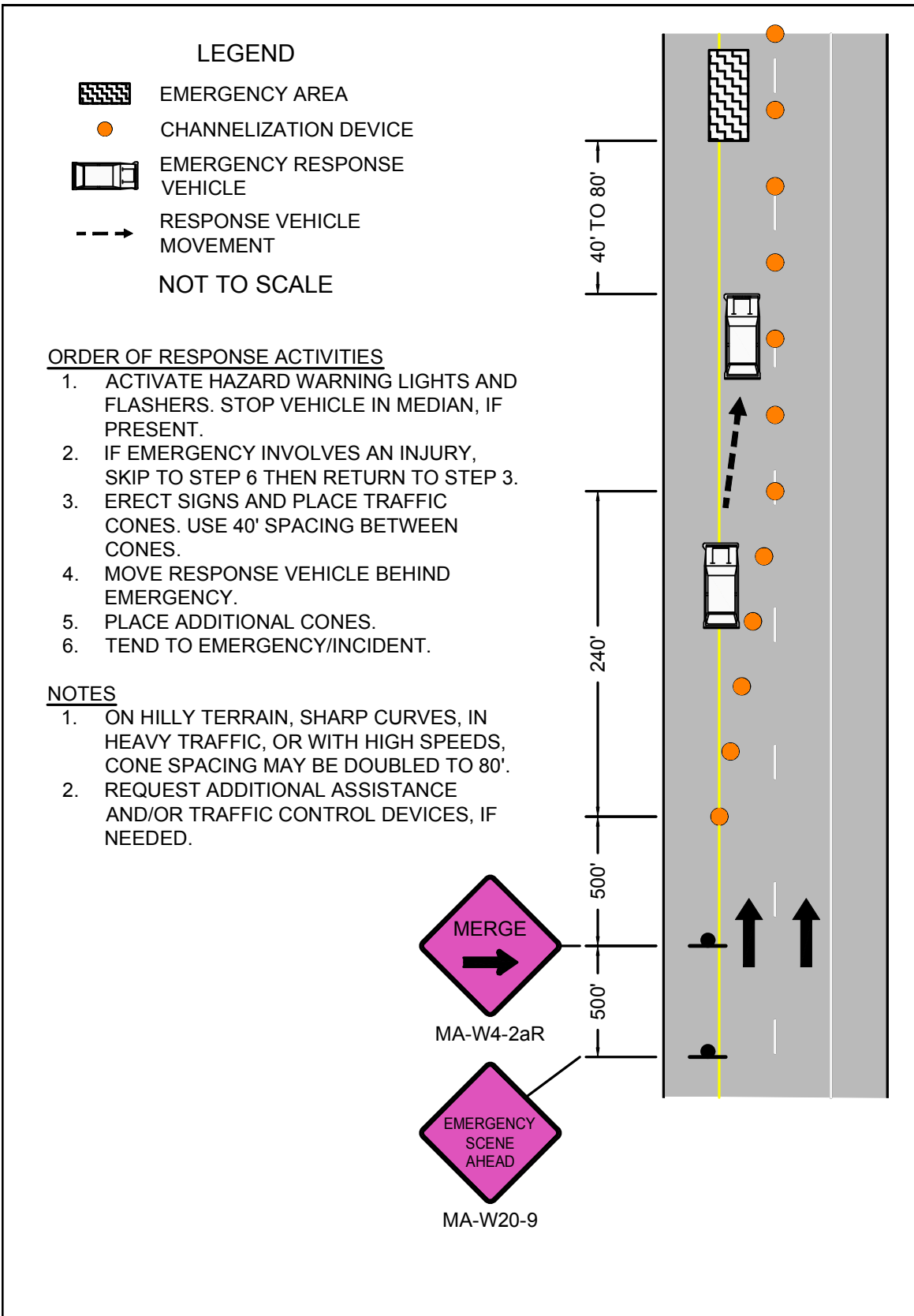
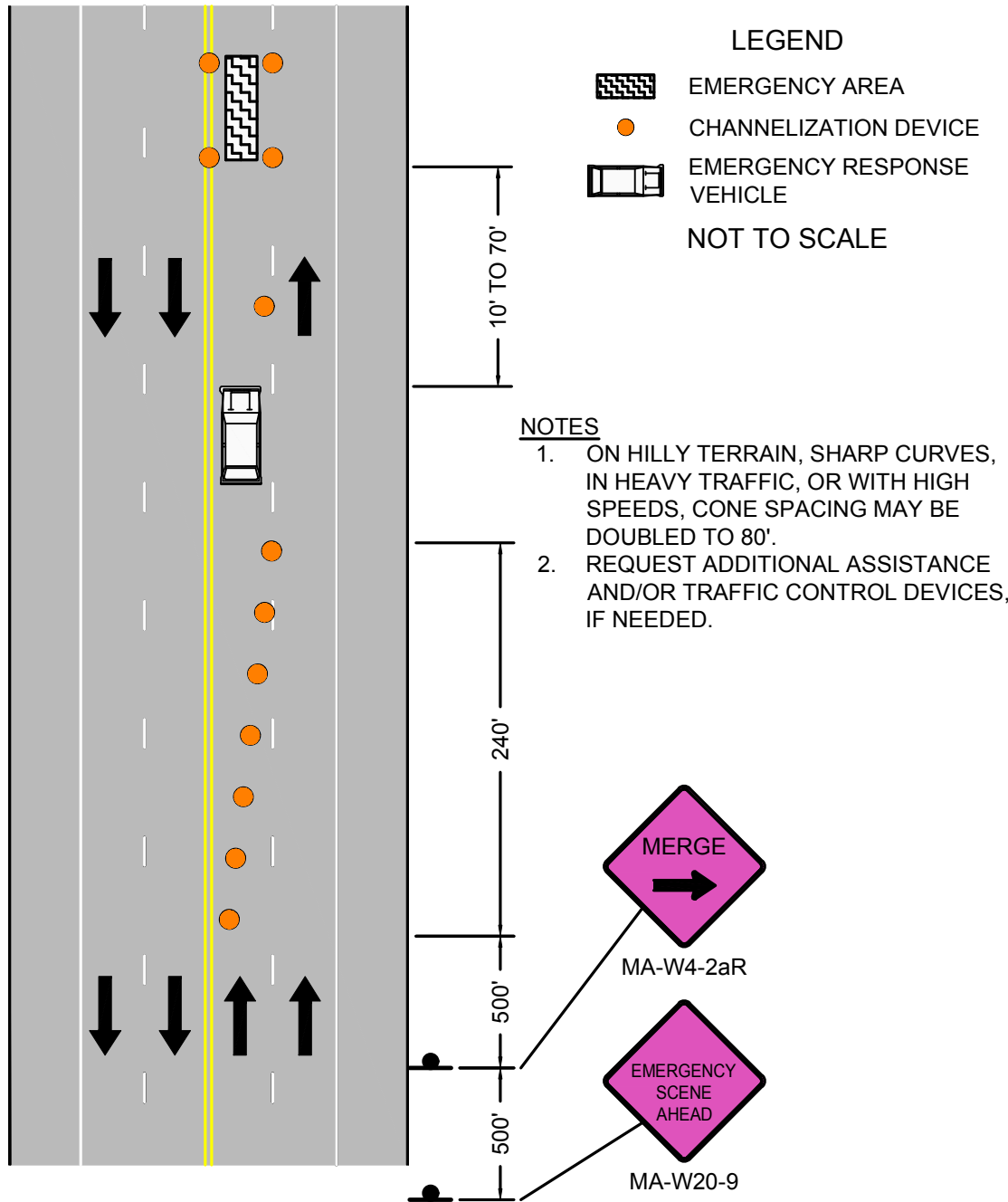


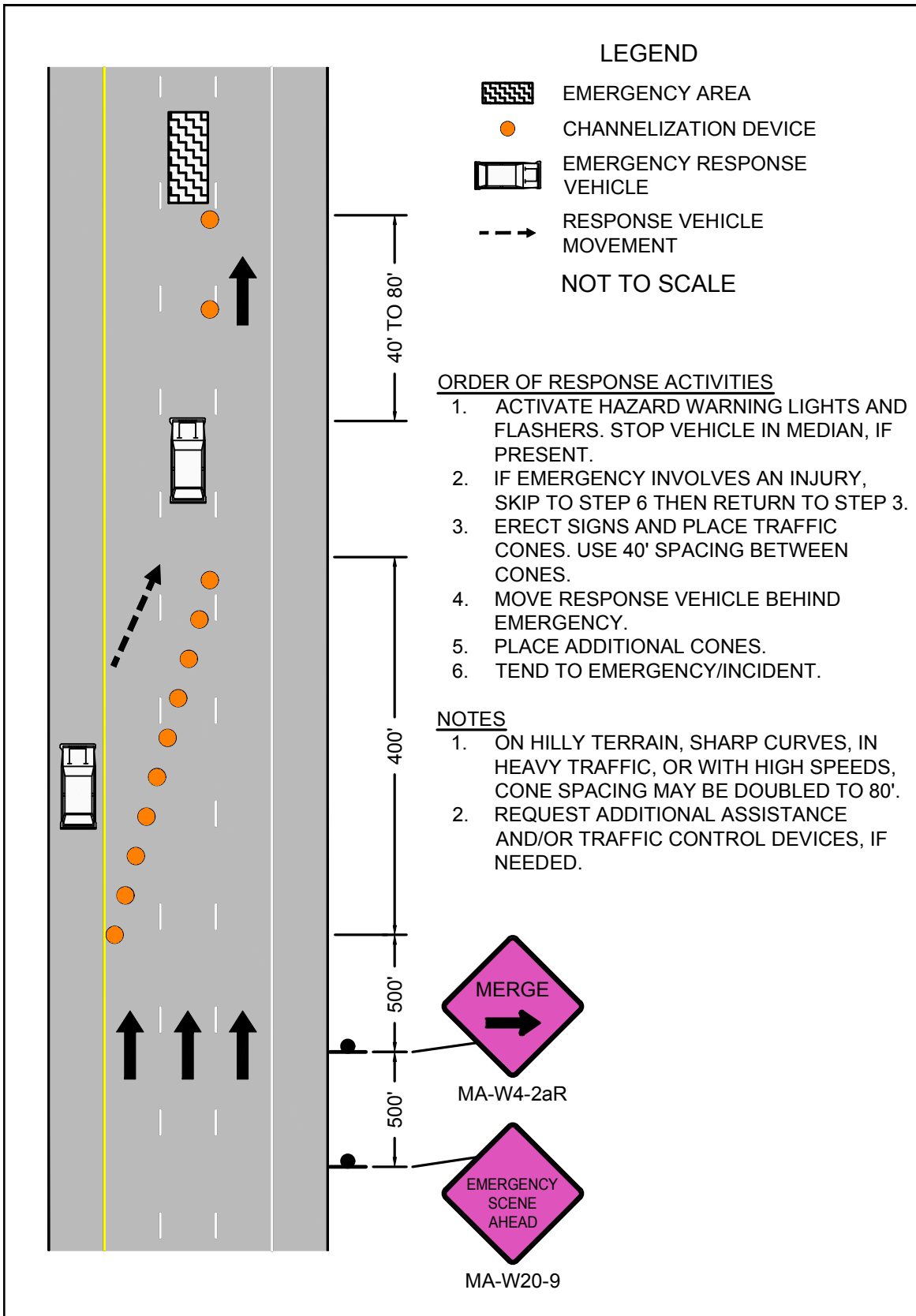


FIGURE 39
EMERGENCY RESPONSE
MULTILANE UNDIVIDED
ROADWAY
LEFT LANE



ORDER OF RESPONSE ACTIVITIES

1. ACTIVATE HAZARD WARNING LIGHTS AND FLASHERS. PULL VEHICLE OVER TO THE RIGHT EDGE OF BREAKDOWN LANE OR SHOULDER OR, IF NOT PRESENT, RIGHT EDGE OF TRAVEL LANE BEFORE STOPPING.
2. IF EMERGENCY INVOLVES AN INJURY, SKIP TO STEP 4 THEN RETURN TO STEP 3.
3. ERECT SIGNS AND PLACE TRAFFIC CONES. USE 40' SPACING BETWEEN CONES.
4. TEND TO EMERGENCY/INCIDENT.




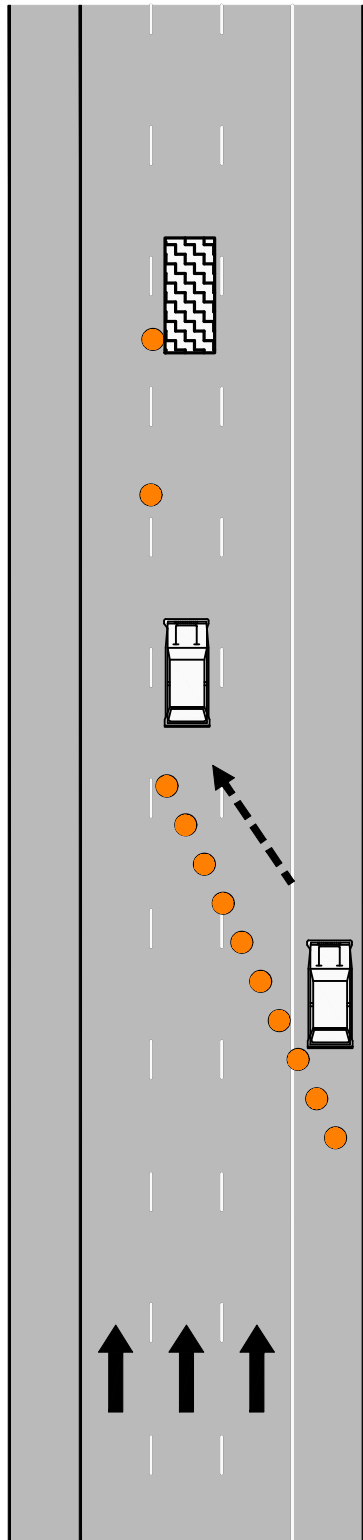




| | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
|  <p>Massachusetts Department of Transportation Highway Division</p> | <p>Work Zone Safety Standard Details and Drawings</p> | <p>FIGURE 40 EMERGENCY RESPONSE MULTILANE DIVIDED ROADWAY MIDDLE LANE APPROACH FROM LEFT</p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|



FIGURE 41
EMERGENCY RESPONSE
MULTILANE DIVIDED ROADWAY
MIDDLE LANE
APPROACH FROM RIGHT



LEGEND

-  EMERGENCY AREA
-  CHANNELIZATION DEVICE
-  EMERGENCY RESPONSE VEHICLE
-  RESPONSE VEHICLE MOVEMENT

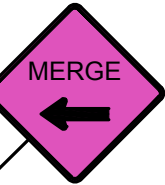
NOT TO SCALE

ORDER OF RESPONSE ACTIVITIES

1. ACTIVATE HAZARD WARNING LIGHTS AND FLASHERS. STOP VEHICLE IN BREAKDOWN LANE.
2. IF EMERGENCY INVOLVES AN INJURY, SKIP TO STEP 6 THEN RETURN TO STEP 3.
3. ERECT SIGNS AND PLACE TRAFFIC CONES. USE 40' SPACING BETWEEN CONES.
4. MOVE RESPONSE VEHICLE BEHIND EMERGENCY.
5. PLACE ADDITIONAL CONES.
6. TEND TO EMERGENCY.

NOTES

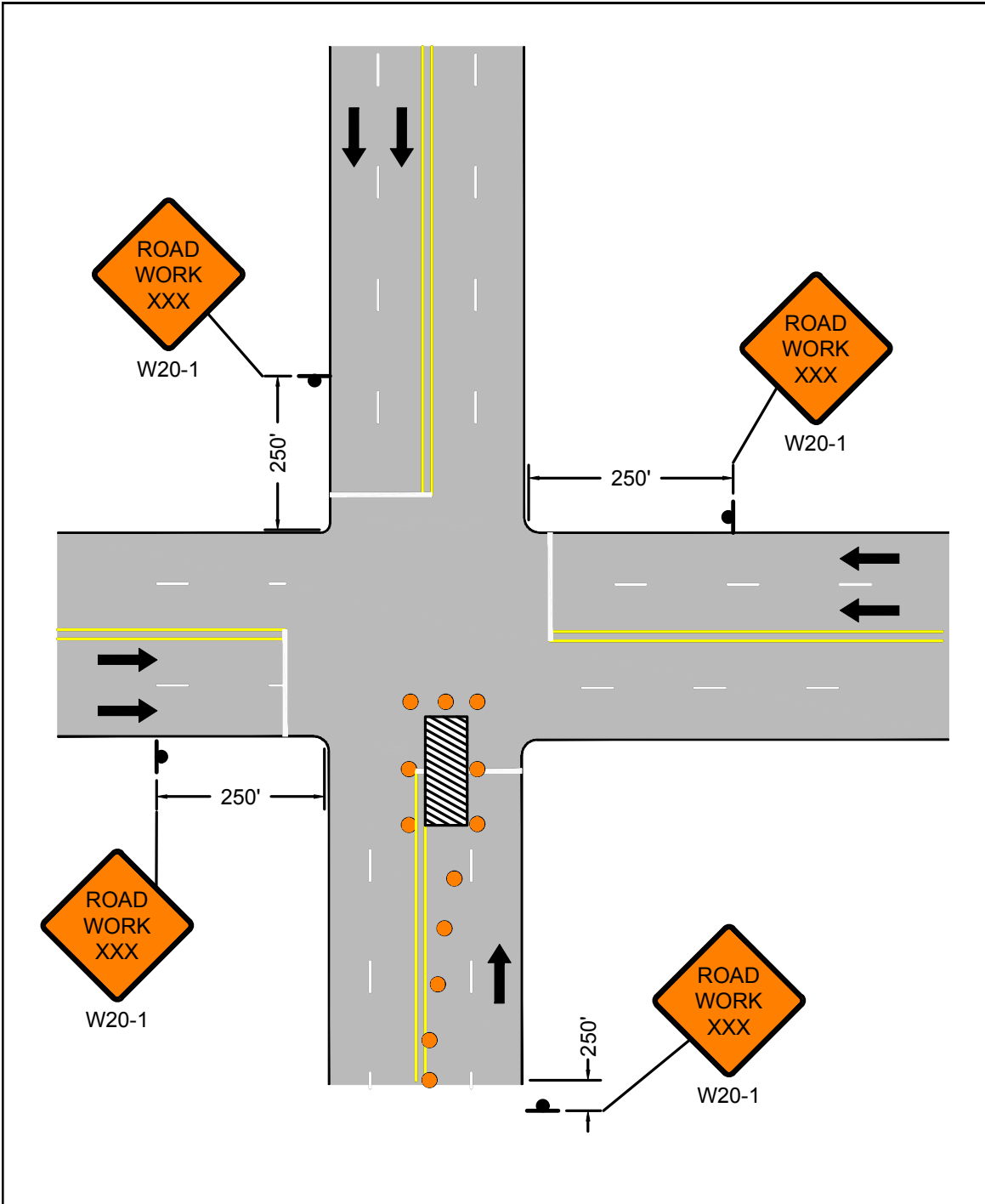
1. ON HILLY TERRAIN, SHARP CURVES, IN HEAVY TRAFFIC, OR WITH HIGH SPEEDS, CONE SPACING MAY BE DOUBLED TO 80'.
2. REQUEST ADDITIONAL ASSISTANCE AND/OR TRAFFIC CONTROL DEVICES, IF NEEDED.





MA-W4-2aL



MA-W20-9



LEGEND

-  WORK ZONE
-  CHANNELIZATION DEVICE

NOT TO SCALE

NOTES

1. DURATION OF WORK = 20 MINUTES OR LESS.
2. EQUIPMENT: 12 CONES + 4 PORTABLE SIGNS.
3. CONE SPACING IS 20 FEET.
4. SINGLE WORK VEHICLE PARKED/STOPPED.
5. POLICE DETAIL REQUIRED.

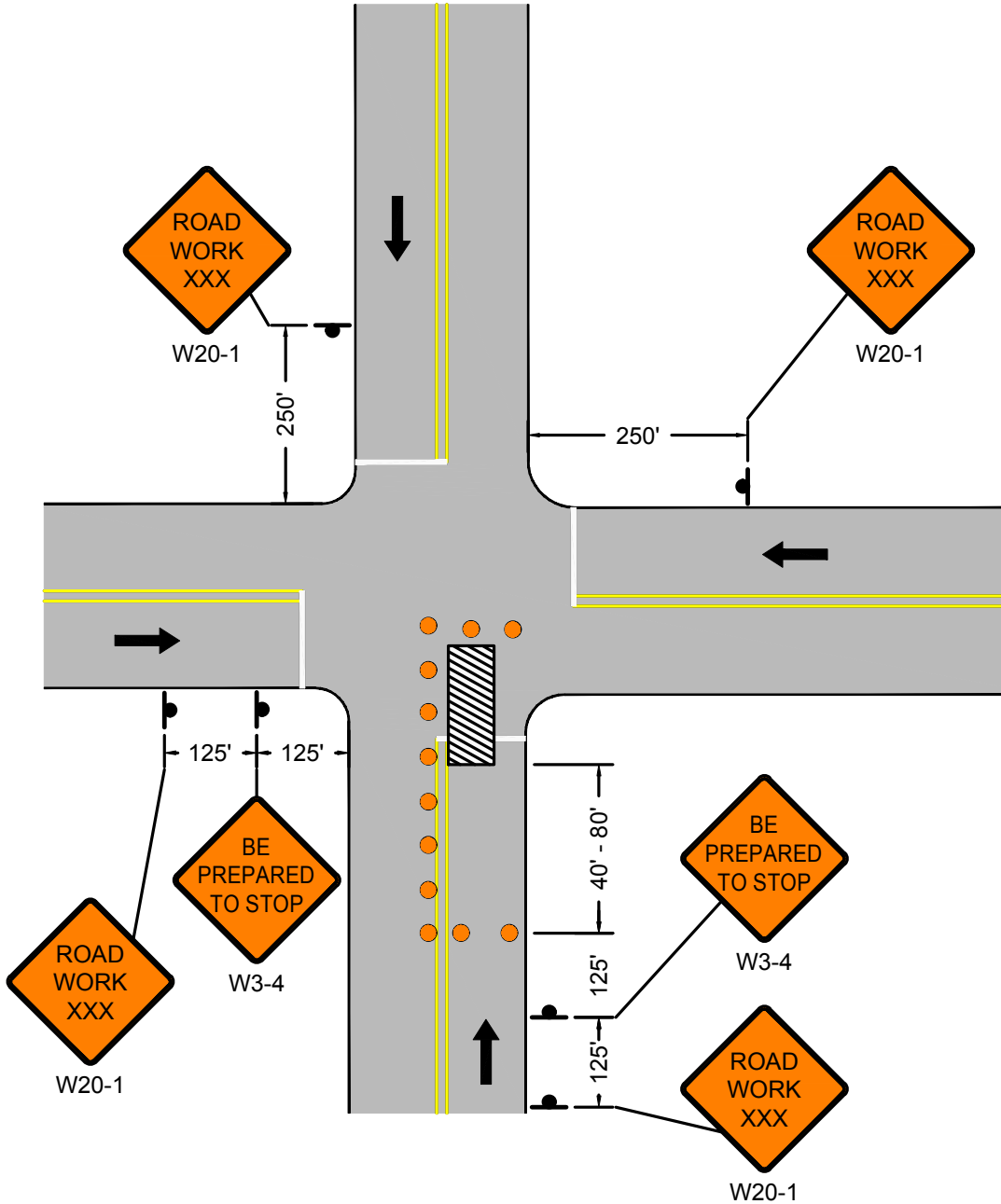






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FIGURE 43
TRAFFIC SIGNAL REPAIR WORK
TWO LANE UNDIVIDED ROADWAY
ONE LEG OF INTERSECTION

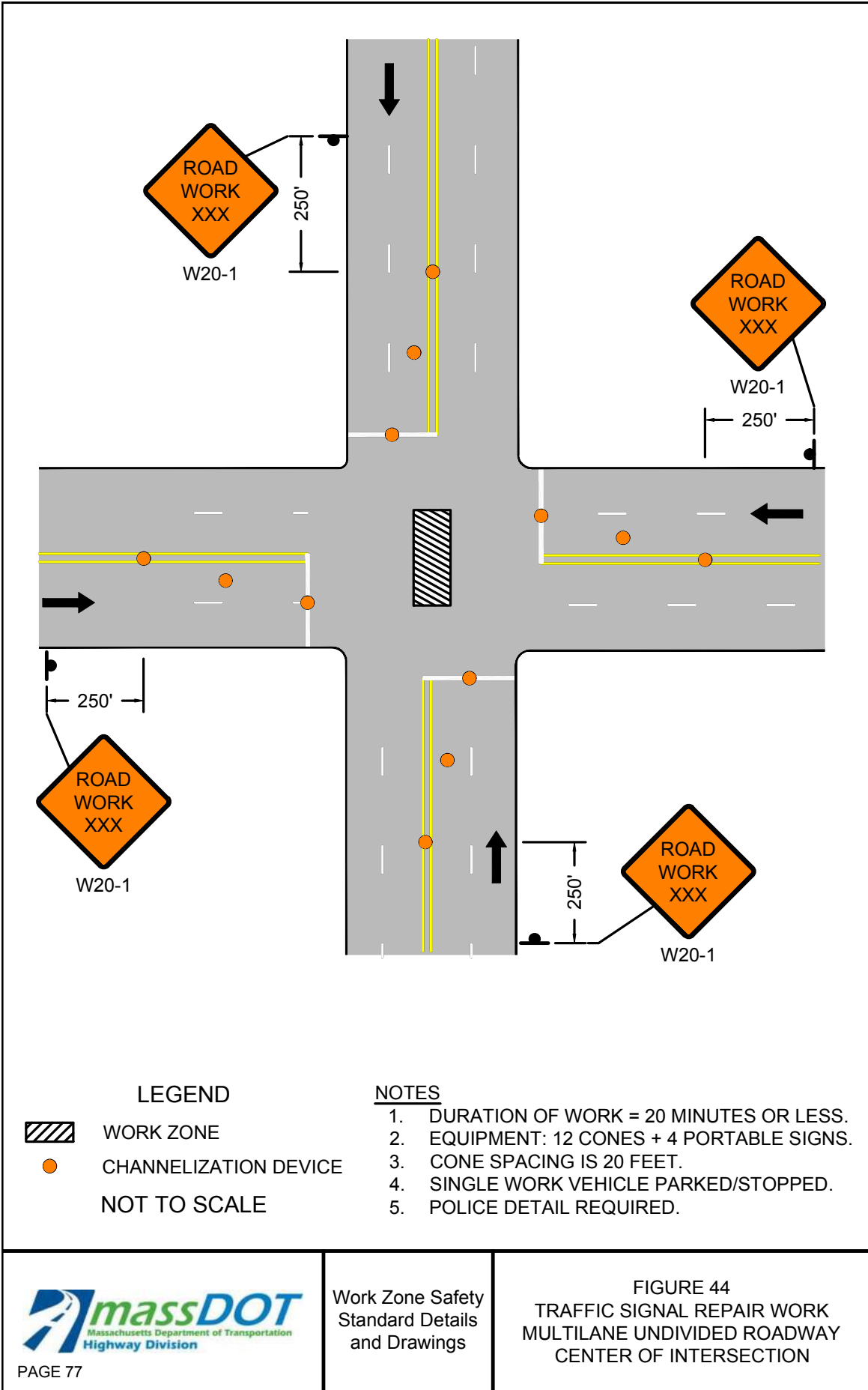


LEGEND

-  WORK ZONE
-  CHANNELIZATION DEVICE
- NOT TO SCALE

NOTES

1. DURATION OF WORK = 20 MINUTES OR LESS.
2. EQUIPMENT: 12 CONES + 6 PORTABLE SIGNS.
3. CONE SPACING IS 20 FEET.
4. SINGLE WORK VEHICLE PARKED/STOPPED.
5. POLICE DETAIL REQUIRED.

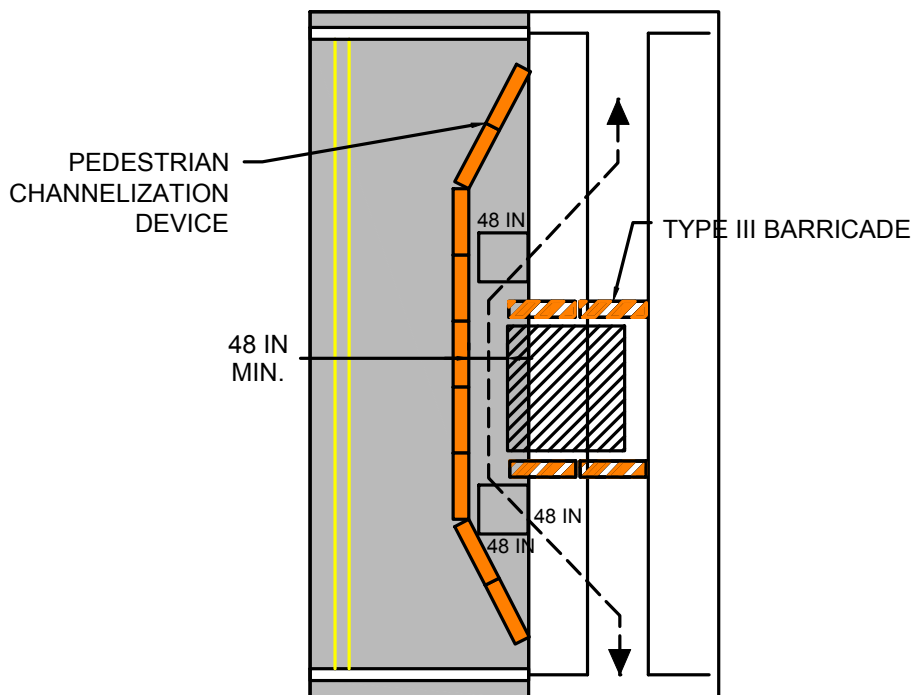




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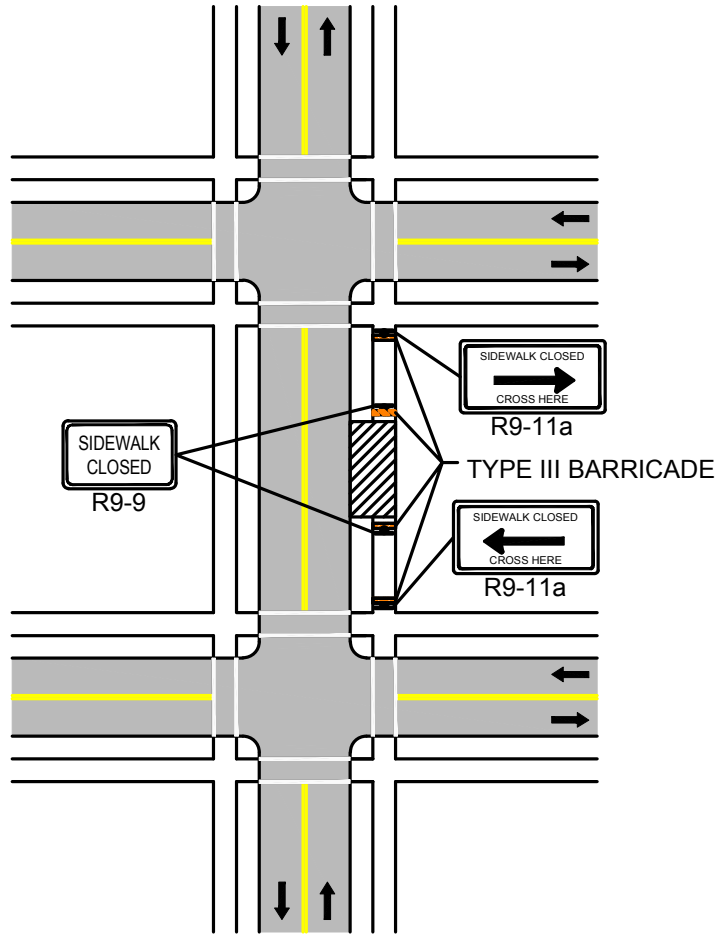
Work Zone Safety
Standard Details
and Drawings

FIGURE 45
PEDESTRIAN BYPASS



NOTES:

1. WHEN EXISTING PEDESTRIAN FACILITIES ARE DISRUPTED, CLOSED, OR RELOCATED IN A TTC ZONE, TEMPORARY FACILITIES SHALL BE PROVIDED AND THEY SHALL BE DETECTABLE AND INCLUDE ACCESSIBILITY FEATURES CONSISTENT WITH THE FEATURES PRESENT IN THE EXISTING PEDESTRIAN FACILITY.
2. A PEDESTRIAN CHANNELIZATION DEVICE THAT IS DETECTABLE BY A PERSON WITH A VISUAL DISABILITY TRAVELING WITH THE AID OF A LONG CANE SHALL BE PLACED ALONG THE FULL LENGTH OF THE TEMPORARY PEDESTRIAN ROUTE.
3. WHEN USED, TEMPORARY RAMPS SHALL COMPLY WITH AMERICANS WITH DISABILITIES ACT.
4. THE ALTERNATE PATHWAY SHOULD HAVE A SMOOTH CONTINUOUS HARD SURFACE FOR THE ENTIRE LENGTH OF THE TEMPORARY PEDESTRIAN FACILITY.
5. THE TEMPORARY SIDEWALK SHOULD BE A MINIMUM OF 4 FEET WIDE. IF THE SIDEWALK EXCEEDS 200 FEET THEN A 5 FOOT BY 5 FOOT PASSING ZONE SHALL BE PROVIDED NEAR THE MID-POINT OF THE CLOSURE.
6. THE PROTECTIVE REQUIREMENTS OF A TTC WORK ZONE MAY HAVE AN IMPACT IN DETERMINING THE NEED FOR TEMPORARY TRAFFIC BARRIERS AND THEIR USE IN PROVIDING PEDESTRIAN DELINEATION SHOULD BE BASED ON ENGINEERING JUDGMENT.
7. ON-DEMAND PEDESTRIAN ASSISTANCE PERSONNEL TO ASSIST WITH NAVIGATION AROUND THE CLOSURE/WORK AREA MAY BE CONSIDERED AS AN OPTION IN PLACE OF PROVIDING ADA/AAB DEVICES FOR WORK FOR CLOSURES LASTING 4 HOURS OR LESS.
8. CONTROLS ONLY FOR PEDESTRIAN TRAFFIC ARE SHOWN; VEHICULAR TRAFFIC SHOULD BE HANDLED AS SHOWN ELSEWHERE. THESE DETAILS ARE USED IN CONJUNCTION WITH THE PROPOSED LANE CLOSURE DETAILS AND DURING CONSTRUCTION STAGING, AS DETERMINED BY THE ENGINEER.



NOTES:

1. CLOSURE OF A SIDEWALK FACILITY SHALL CONSTITUTE THE PROVISION FOR MANAGING PEDESTRIAN TRAFFIC AND ACCOMMODATING ALL USERS. IF THE EXISTING PEDESTRIAN ACCESS ROUTE(S) CAN BE TEMPORARILY RELOCATED ALONG THE EXISTING SIDEWALK , AND SAID FACILITY PROVIDES A MINIMUM WIDTH OF 48-INCHES OF SOLID, SMOOTH UNOBSTRUCTED SURFACE, THEN NO DETOURING OF THE ROUTE SHALL BE REQUIRED. DELINEATION OF THE WORK AREA IS STILL REQUIRED.
2. IF IT IS NECESSARY TO DIVERT PEDESTRIAN TRAFFIC TO AN ALTERNATE ROUTE ACROSS THE ROADWAY FROM THE EXISTING FACILITY, THE FIGURE ABOVE SHALL BE FOLLOWED TO PROVIDE ADEQUATE DIRECTION TO PEDESTRIANS. ALTERNATE ROUTE SHALL PROVIDE THE SAME LEVEL OF ACCOMMODATION AS THE FACILITY THAT IS BEING DETOURED AND RETAIN ADA COMPLIANCE IN ITS ENTIRETY.
3. FOR EMERGENCY OR SHORT-DURATION SIDEWALK CLOSURES OF 4-HOURS OR LESS, IT IS OPTIONAL TO HAVE ON-DEMAND PEDESTRIAN ASSISTANCE PERSONNEL AVAILABLE AT ALL TIMES DURING THE CLOSURE TO ASSIST THOSE MOBILITY CHALLENGED PERSONS WHO REQUIRE ADDITIONAL ASSISTANCE TO SAFELY NAVIGATE AROUND THE WORK AREA IN LIEU OF A FULL DETOUR.





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Work Zone Safety
Standard Details
and Drawings

STATIONARY OPERATIONS
BIKE LANE CLOSURE










| POSTED SPEED LIMIT (MPH) | SPACING FOR BIKE ADVANCE WARNING SIGNS (FT) (A,B)) | CHANNELIZATION DEVICES (DRUMS OR CONES) | | | |
|--------------------------|----------------------------------------------------|-----------------------------------------|-------------------------|---------------------|-------------------|
| | | TRANSITION LENGTH (L/3) | BUFFER ZONE LENGTH (FT) | DEVICE SPACING (FT) | MIN # OF DEVICES* |
| 25-40 | 150 / 150 | 100 | 305 | 20 | 45 |
| 45-55 | 150 / 150 | 220 | 495 | 40 | 35 |
| 60-65 | 150 / 150 | 260 | 645 | 40 | 40 |

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

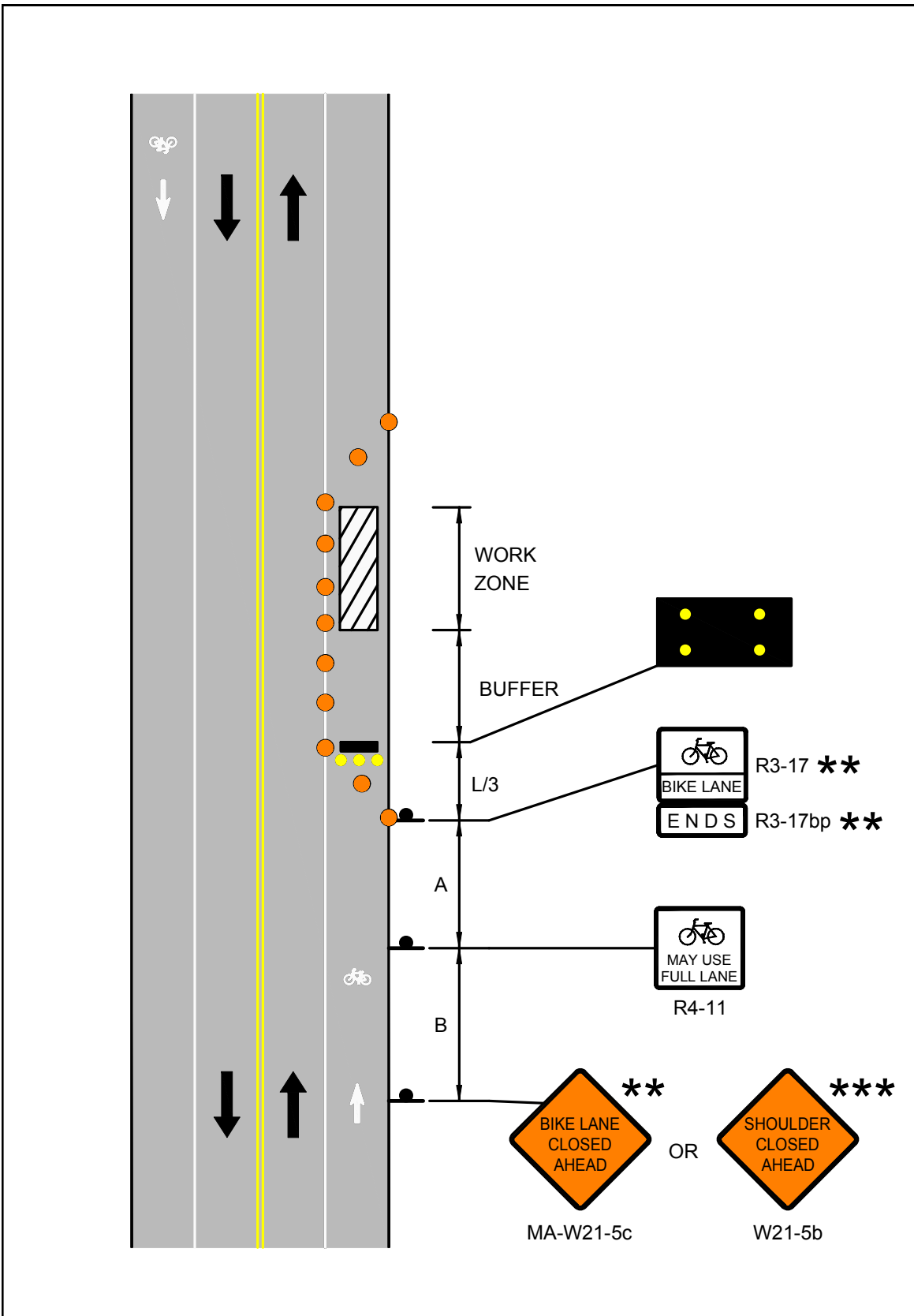
NOTES


1. DETAIL SHALL BE USED IN CONJUNCTION WITH THE PROPOSED LANE CLOSURE DETAILS. SIGNING SHOWN ONLY FOR BIKE TRAFFIC. FOLLOW ALL OTHER RELEVANT DETAILS FOR TTC DEVICES FOR VEHICULAR TRAFFIC.
2. ****** SIGN SHALL BE USED ONLY IF THERE IS A MARKED BIKE LANE.
3. ******* SIGN SHALL BE USED ONLY IF THERE IS NO MARKED BIKE LANE.

LEGEND

-  WORK ZONE
-  CHANNELIZATION DEVICE
-  FLASHING ARROW BOARD
-  PORTABLE CHANGEABLE MESSAGE SIGN
-  TRUCK MOUNTED ATTENUATOR
-  RADAR SPEED FEEDBACK BOARD
-  POLICE DETAIL OR UNIFORMED FLAGGER
-  TEMPORARY PORTABLE RUMBLE STRIP
-  TYPE III BARRICADE

NOT TO SCALE



| | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------------|
|  <p>Massachusetts Department of Transportation Highway Division</p> <p>PAGE 81</p> | <p>Work Zone Safety Standard Details and Drawings</p> | <p>FIGURE 48 STATIONARY OPERATIONS BIKE LANE CLOSURE</p> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------------|



Safety is everyone's business

Rev. June, 2017

DOCUMENT A00820

**Massachusetts Department of Transportation
Conditions of Custody**

REQUEST FOR RELEASE OF MASSDOT AUTOCAD FILES FORM

(Only to be used following award of contract)

City/Town: NANTUCKET Project File Number: 613129

Contract Number: 126584

Project Description: Intersection Improvements at Milestone Road and Polpis Road and Extension of 'Sconset Bike Path

All AutoCAD files are provided solely as a courtesy to facilitate public access to information. MassDOT attempts to provide current and accurate information but cannot guarantee so. MassDOT provides such documents, files or other data "as is" without any warranty of any kind, either expressed or implied, including but not limited to, accuracy, reliability, omissions, completeness and currentness. The Commonwealth of Massachusetts and its Consultants shall not be liable for any claim for damages, including lost profits or other consequential, exemplary, incidental, indirect or special damages, relating in any way to the documents, files or other data accessible from this file, including, but not limited to, claims arising out of or related to electronic access or transmission of data or viruses. Because data stored on electronic media can deteriorate undetected or be modified without our knowledge, MassDOT cannot be held liable for its completeness or correctness. MassDOT makes no representation as to the compatibility of these files beyond the version of the stated CAD software.

By signing this form, I agree that it shall be my responsibility to reconcile this electronic data with the conformed contract documents, and that only the conformed contract documents shall be regarded as legal documents for this Project. I understand that this authorization does not give me the right to distribute the files. I agree to the terms above and wish to receive the AutoCAD files.

This signed form shall be emailed to the Highway Design Engineer at the MassDOT -Highway Division at the following email address:

DOTHighwayDesign@dot.state.ma.us

Attn: AutoCAD Files

Name of person requesting AutoCAD files: _____

Affiliation/Company: _____

Address: _____

Telephone number: _____

Email address: _____

Signature/Date: _____

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DOCUMENT A00855

UNITED STATES DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE

CONCURRENCE VERIFICATION LETTER

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United States Department of the Interior



FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104

In Reply Refer To:

December 05, 2023

Project code: 2024-0023091

Project Name: 613129 NANTUCKET- INTERSECTION IMPROVEMENTS AT MILESTONE RD AND POLPIS RD

Subject: Concurrence verification letter for the '613129 NANTUCKET- INTERSECTION IMPROVEMENTS AT MILESTONE RD AND POLPIS RD' project under the amended February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion (dated March 23, 2023) for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (NLEB).

To whom it may concern:

The U.S. Fish and Wildlife Service (Service) has received your request dated December 05, 2023 to verify that the **613129 NANTUCKET- INTERSECTION IMPROVEMENTS AT MILESTONE RD AND POLPIS RD** (Proposed Action) may rely on the concurrence provided in the amended February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion (dated March 23, 2023) for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO) to satisfy requirements under Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 *et seq.*).

Based on the information you provided (Project Description shown below), you have determined that the Proposed Action is within the scope and adheres to the criteria of the PBO, including the adoption of applicable avoidance and minimization measures. **At least one of the qualification interview questions indicated an activity or portion of your project is consistent with a not likely to adversely affect determination therefore, the overall determination for your project is, may affect, and is not likely to adversely affect (NLAA) the endangered Indiana bat (*Myotis sodalis*) and/or the endangered northern long-eared bat (*Myotis septentrionalis*).** Consultation with the Service pursuant to section 7(a)(2) of ESA (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) is required.

The Service has 14 calendar days to notify the lead Federal action agency or designated non-federal representative if we determine that the Proposed Action does not meet the criteria for a NLAA determination under the PBO. If we do not notify the lead Federal action agency or designated non-federal representative within that timeframe, you may proceed with the Proposed

Action under the terms of the NLAA concurrence provided in the PBO. This verification period allows Service Field Offices to apply local knowledge to implementation of the PBO, as we may identify a small subset of actions having impacts that were unanticipated. In such instances, Service Field Offices may request additional information that is necessary to verify inclusion of the proposed action under the PBO.

For Proposed Actions that include bridge/culvert or structure removal, replacement, and/or maintenance activities: If your initial bridge/culvert or structure assessment documented signs of bat use or occupancy, or an assessment failed to detect Indiana bats and/or NLEBs, yet are later detected prior to, or during construction, please submit the Post Assessment Discovery of Bats at Bridge/Culvert or Structure Form (User Guide Appendix E) to this Service Office within 2 working days of any potential take. In these instances, potential incidental take of Indiana bats and/or NLEBs is covered under the Incidental Take Statement in the 2018 FHWA, FRA, FTA PBO (provided that the take is reported to the Service).

If the Proposed Action is modified, or new information reveals that it may affect the Indiana bat and/or northern long-eared bat in a manner or to an extent not considered in the PBO, further review to conclude the requirements of ESA Section 7(a)(2) may be required.

For Proposed Actions that include bridge/culvert or structure removal, replacement, and/or maintenance activities:

If your initial bridge/culvert or structure assessments failed to detect Indiana bats and/or NLEB use or occupancy, yet bats are later detected prior to, or during construction, please submit the Post Assessment Discovery of Bats at Bridge/Culvert or Structure Form (User Guide Appendix E) to this Service Office within 2 working days of the incident. In these instances, potential incidental take of Indiana bats and/or NLEBs may be exempted provided that the take is reported to the Service.

If the Proposed Action may affect any other federally-listed or proposed species, and/or any designated critical habitat, additional consultation between the lead Federal action agency and this Service Office is required. If the proposed action has the potential to take bald or golden eagles, additional coordination with the Service under the Bald and Golden Eagle Protection Act may also be required. In either of these circumstances, please contact this Service Office.

The following species may occur in your project area and **are not** covered by this determination:

- American Burying Beetle *Nicrophorus americanus* Threatened
- Monarch Butterfly *Danaus plexippus* Candidate

PROJECT DESCRIPTION

The following project name and description was collected in IPaC as part of the endangered species review process.

NAME

613129 NANTUCKET- INTERSECTION IMPROVEMENTS AT MILESTONE RD AND POLPIS RD

DESCRIPTION

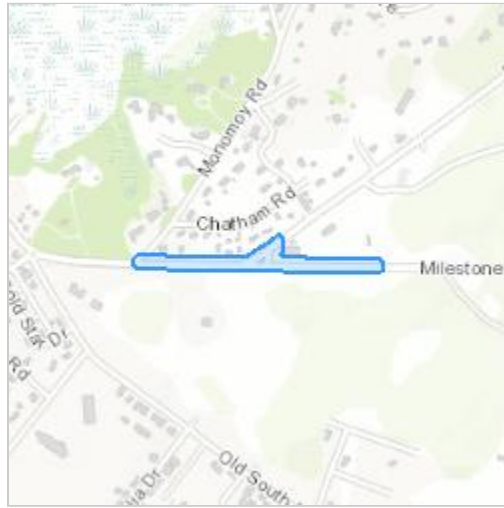
613129 NANTUCKET- INTERSECTION IMPROVEMENTS AT MILESTONE ROAD AND POLPIS ROAD AND EXTENSION OF 'SCONSET BIKEPATH

The purpose of this project is to improve intersection operations and safety at Milestone Road at Polpis Road in Nantucket, MA, through the design and construction of a new intersection configuration. The project will also include the construction of a shared-use-path on the north side of Milestone Road between Monomoy Road and the existing Polpis Bike Path for a distance of approximately 1600 feet. The project will make geometric changes to the Polpis Road approach to improve safety and accessibility for all users while providing an extension of the shared use path through the intersection on the north side of Milestone Road.

American Burying Beetle: After consulting with the Massachusetts Natural Heritage and Endangered Species Program (NHESP), it was determined that there is no data to suggest the presence of habitat and/or individuals at this project location

Monarch Butterfly: Candidate Species only, no conservation measures at this time.

The approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@41.271308649999995,-70.08216573815216,14z>



DETERMINATION KEY RESULT

Based on your answers provided, this project(s) may affect, but is not likely to adversely affect the endangered Indiana bat and/or the endangered northern long-eared bat, therefore, consultation with the U.S. Fish and Wildlife Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended 16 U.S.C. 1531 *et seq.*) is required. However, also based on your answers provided, this project may rely on the concurrence provided in the amended February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion (dated March 23, 2023) for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat.

QUALIFICATION INTERVIEW

1. Is the project within the range of the Indiana bat^[1]?

[1] See [Indiana bat species profile](#)

Automatically answered

No

2. Is the project within the range of the northern long-eared bat^[1]?

[1] See [northern long-eared bat species profile](#)

Automatically answered

Yes

3. Which Federal Agency is the lead for the action?

A) *Federal Highway Administration (FHWA)*

4. Are *all* project activities limited to non-construction^[1] activities only? (examples of non-construction activities include: bridge/abandoned structure assessments, surveys, planning and technical studies, property inspections, and property sales)

[1] Construction refers to activities involving ground disturbance, percussive noise, and/or lighting.

No

5. Does the project include *any* activities that are **greater than** 300 feet from existing road/rail surfaces^[1]?

[1] Road surface is defined as the actively used [e.g. motorized vehicles] driving surface and shoulders [may be pavement, gravel, etc.] and rail surface is defined as the edge of the actively used rail ballast.

No

6. Does the project include *any* activities **within** 0.5 miles of a known Indiana bat and/or NLEB hibernaculum^[1]?

[1] For the purpose of this consultation, a hibernaculum is a site, most often a cave or mine, where bats hibernate during the winter (see suitable habitat), but could also include bridges and structures if bats are found to be hibernating there during the winter.

No

7. Is the project located **within** a karst area?

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](#).

Yes

9. Will the project remove *any* suitable summer habitat^[1] and/or remove/trim any existing trees **within** suitable summer habitat?

[1] See the Service's [summer survey guidance](#) for our current definitions of suitable habitat.

Yes

10. Will the project clear more than 20 acres of suitable habitat per 5-mile section of road/rail?

No

11. Have presence/probable absence (P/A) summer surveys^{[1][2]} been conducted^{[3][4]} **within** the suitable habitat located within your project action area?

[1] See the Service's [summer survey guidance](#) for our current definitions of suitable habitat.

[2] Presence/probable absence summer surveys conducted within the fall swarming/spring emergence home range of a documented Indiana bat hibernaculum (contact local Service Field Office for appropriate distance from hibernacula) that result in a negative finding requires additional consultation with the local Service Field Office to determine if clearing of forested habitat is appropriate and/or if seasonal clearing restrictions are needed to avoid and minimize potential adverse effects on fall swarming and spring emerging Indiana bats.

[3] For projects within the range of either the Indiana bat or NLEB in which suitable habitat is present, and no bat surveys have been conducted, the transportation agency will assume presence of the appropriate species. This assumption of presence should be based upon the presence of suitable habitat and the capability of bats to occupy it because of their mobility.

[4] Negative presence/probable absence survey results obtained using the [summer survey guidance](#) are valid for a minimum of two years from the completion of the survey unless new information (e.g., other nearby surveys) suggest otherwise.

Yes

SUBMITTED DOCUMENTS

- [613129_Nantucket Acoustic Report_613129_final binder_reduced.pdf https://ipac.ecosphere.fws.gov/project/KHVVBFXQZHNDGOF7HFXYJ4C7U/projectDocuments/135487075](https://ipac.ecosphere.fws.gov/project/KHVVBFXQZHNDGOF7HFXYJ4C7U/projectDocuments/135487075)

12. Did the presence/probable absence (P/A) summer surveys detect Indiana bats and/or NLEB^[1]?

[1] P/A summer surveys conducted within the fall swarming/spring emergence home range of a documented Indiana bat hibernaculum (contact local Service Field Office for appropriate home range) that result in a negative finding requires additional consultation with the local Service Field Office to determine if clearing of forested habitat is appropriate and/or if seasonal clearing restrictions are needed to avoid and minimize potential adverse effects on fall swarming and spring emerging Indiana bats.

No

13. Were the P/A summer surveys conducted **within** the fall swarming/spring emergence range of a documented Indiana bat hibernaculum^[1]?

[1] Contact the local Service Field Office for appropriate distance from hibernacula.

No

14. Does the project include activities **within documented NLEB habitat**^{[1][2]}?

[1] Documented roosting or foraging habitat – for the purposes of this consultation, we are considering documented habitat as that where Indiana bats and/or NLEB have actually been captured and tracked using (1) radio telemetry to roosts; (2) radio telemetry triangulation/triangulation to estimate foraging areas; or (3) foraging areas with repeated use documented using acoustics. Documented roosting habitat is also considered as suitable summer habitat within 0.25 miles of documented roosts.)

[2] For the purposes of this key, we are considering documented corridors as that where Indiana bats and/or NLEB have actually been captured and tracked to using (1) radio telemetry; or (2) treed corridors located directly between documented roosting and foraging habitat.

No

15. Will the removal or trimming of habitat or trees occur **within** suitable but **undocumented NLEB** roosting/foraging habitat or travel corridors?

Yes

16. What time of year will the removal or trimming of habitat or trees **within** suitable but **undocumented NLEB** roosting/foraging habitat or travel corridors occur?

B) During the inactive season

17. Will *any* tree trimming or removal occur **within** 100 feet of existing road/rail surfaces?

Yes

18. Will *any* tree trimming or removal occur **between** 100-300 feet of existing road/rail surfaces?

No

19. Are *all* trees that are being removed clearly demarcated?

Yes

20. Will the removal of habitat or the removal/trimming of trees include installing new or replacing existing **permanent** lighting?

No

21. Does the project include wetland or stream protection activities associated with compensatory wetland mitigation?
No
22. Does the project include slash pile burning?
No
23. Does the project include *any* bridge removal, replacement, and/or maintenance activities (e.g., any bridge repair, retrofit, maintenance, and/or rehabilitation work)?
No
24. 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
25. Will the project involve the use of **temporary** lighting *during* the active season?
Yes
26. Is there *any* suitable habitat **within** 1,000 feet of the location(s) where **temporary** lighting will be used?
Yes
27. Will the project install new or replace existing **permanent** lighting?
No
28. Does the project include percussives or other activities (**not including tree removal/trimming or bridge/structure work**) that will increase noise levels above existing traffic/background levels?
Yes
29. Will the activities that use percussives (**not including tree removal/trimming or bridge/structure work**) and/or increase noise levels above existing traffic/background levels be conducted *during* the active season^[1]?

[1] Coordinate with the local Service Field Office for appropriate dates.
Yes
30. Will *any* activities that use percussives (**not including tree removal/trimming or bridge/structure work**) and/or increase noise levels above existing traffic/background levels be conducted *during* the inactive season^[1]?

[1] Coordinate with the local Service Field Office for appropriate dates.
Yes

31. 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

32. Will the project raise the road profile **above the tree canopy**?

No

33. Are the project activities that use percussives (not including tree removal/trimming or bridge/structure work) consistent with a Not Likely to Adversely Affect determination in this key?

Automatically answered

Yes, because the activities are within 300 feet of the existing road/rail surface, greater than 0.5 miles from a hibernacula, and conducted during the active season within undocumented habitat.

34. Are the project activities that use percussives (not including tree removal/trimming or bridge/structure work) and/or increase noise levels above existing traffic/background levels consistent with a No Effect determination in this key?

Automatically answered

Yes, because the activities are within 300 feet of the existing road/rail surface, greater than 0.5 miles from a hibernacula, and conducted during the inactive season

35. Is the location of this project consistent with a Not Likely to Adversely Affect determination in this key?

Automatically answered

Yes, because no bats were detected during presence/probable absence surveys conducted during the summer survey season and outside of the fall swarming/spring emergence periods. Additionally, all activities were at least 0.5 miles from any hibernaculum.

36. **General AMM 1**

Will the project ensure *all* operators, employees, and contractors working in areas of known or presumed bat habitat are aware of *all* FHWA/FRA/FTA (Transportation Agencies) environmental commitments, including all applicable Avoidance and Minimization Measures?

Yes

PROJECT QUESTIONNAIRE

1. Have you made a No Effect determination for *all* other species indicated on the FWS IPaC generated species list?

Yes

2. Have you made a May Affect determination for *any* other species on the FWS IPaC generated species list?

No

3. How many acres^[1] of trees are proposed for removal between 0-100 feet of the existing road/rail surface?

[1] If described as number of trees, multiply by 0.09 to convert to acreage and enter that number.

0.75

AVOIDANCE AND MINIMIZATION MEASURES (AMMS)

This determination key result includes the commitment to implement the following Avoidance and Minimization Measures (AMMs):

GENERAL AMM 1

Ensure all operators, employees, and contractors working in areas of known or presumed bat habitat are aware of all FHWA/FRA/FTA (Transportation Agencies) environmental commitments, including all applicable AMMs.

DETERMINATION KEY DESCRIPTION: FHWA, FRA, FTA PROGRAMMATIC CONSULTATION FOR TRANSPORTATION PROJECTS AFFECTING NLEB OR INDIANA BAT

This key was last updated in IPaC on October 30, 2023. Keys are subject to periodic revision.

This decision key is intended for projects/activities funded or authorized by the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), and/or Federal Transit Administration (FTA), which may require consultation with the U.S. Fish and Wildlife Service (Service) under Section 7 of the Endangered Species Act (ESA) for the endangered **Indiana bat** (*Myotis sodalis*) and the endangered **northern long-eared bat** (NLEB) (*Myotis septentrionalis*).

This decision key should only be used to verify project applicability with the Service's [amended February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion \(dated March 23, 2023\) for Transportation Projects](#). The programmatic biological opinion covers limited transportation activities that may affect either bat species, and addresses situations that are both likely and not likely to adversely affect either bat species. This decision key will assist in identifying the effect of a specific project/activity and applicability of the programmatic consultation. The programmatic biological opinion is not intended to cover all types of transportation actions. Activities outside the scope of the programmatic biological opinion, or that may affect ESA-listed species other than the Indiana bat or NLEB, or any designated critical habitat, may require additional ESA Section 7 consultation.

IPAC USER CONTACT INFORMATION

Agency: Massachusetts Department of Transportation

Name: Trevor Burns

Address: 10 Park Plaza

City: Boston

State: MA

Zip: 02116

Email: trevor.b.burns@dot.state.ma.us

Phone: 8573010759

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Federal Highway Administration

From: [McGuire, Timothy \(FWE\)](#)
To: [Burns, Trevor B. \(DOT\)](#)
Cc: [Paulson, David J. \(DOT\)](#); [Hoogeboom, Julia A. \(DOT\)](#); [Kreisel, Sara \(DOT\)](#); [Isihara, Hana L. \(DOT\)](#)
Subject: RE: Project Review Request: MassDOT Project 613129
Date: Tuesday, December 5, 2023 2:47:06 PM

Hi Trevor,

Thank you for reaching out. The Division has reviewed the Locus and has no record (individuals or habitat) of NLEB, Monarch (candidate), and American Burying Beetle, individuals or habitat within the project limits. Please feel free to reach out with any questions or concerns.

Thank you,

Tim McGuire

Endangered Species Review Biologist
Massachusetts Division of Fisheries & Wildlife
1 Rabbit Hill Road, Westborough, MA 01581
Phone: (508) 389-6366 | Email: timothy.mcguire2@mass.gov
mass.gov/masswildlife | facebook.com/masswildlife

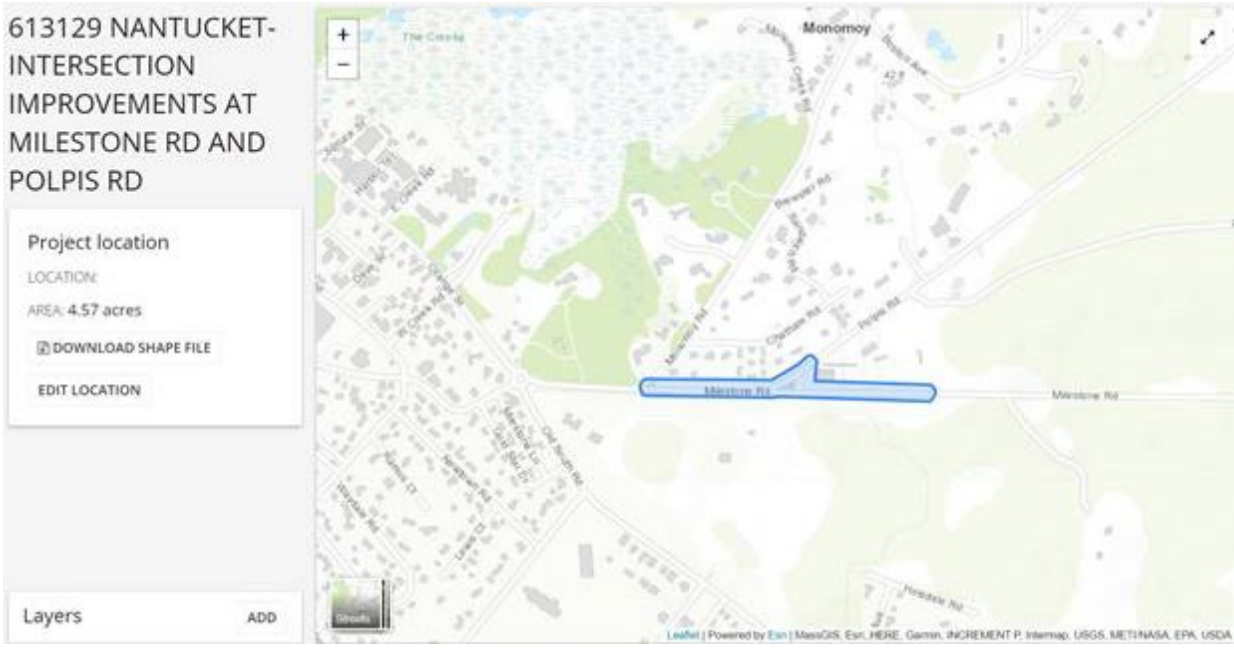
From: Burns, Trevor B. (DOT) <Trevor.B.Burns@dot.state.ma.us>
Sent: Tuesday, December 5, 2023 2:34 PM
To: McGuire, Timothy (FWE) <Timothy.McGuire2@mass.gov>
Cc: Paulson, David J. (DOT) <David.J.Paulson@dot.state.ma.us>; Hoogeboom, Julia A. (DOT) <Julia.A.Hoogeboom@dot.state.ma.us>; Kreisel, Sara (DOT) <Sara.Kreisel@dot.state.ma.us>; Isihara, Hana L. (DOT) <Hana.L.Isihara@dot.state.ma.us>
Subject: Project Review Request: MassDOT Project 613129

Hello,

This is reference to Project 613129 NANTUCKET- INTERSECTION IMPROVEMENTS AT MILESTONE ROAD AND POLPIS ROAD AND EXTENSION OF 'SCONSET BIKEPATH

According to IPaC, the project occurs within NLEB, Monarch (candidate), and American Burying Beetle habitat.

Could you advise if NHESP has any record of habitat or individuals for/of the above-mentioned species, at this project location?



Thanks,

Trevor Burns
Wildlife Biologist
Environmental Services
MassDOT Highway Division



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:

December 05, 2023

Project code: 2024-0023091

Project Name: 613129 NANTUCKET- INTERSECTION IMPROVEMENTS AT MILESTONE RD AND POLPIS RD

Subject: Consistency letter for '613129 NANTUCKET- INTERSECTION IMPROVEMENTS AT MILESTONE RD AND POLPIS RD' project for a No Effect determination for the American burying beetle

Dear Trevor Burns:

The U.S. Fish and Wildlife Service (Service) received on **December 05, 2023** your effect determination(s) for the '613129 NANTUCKET- INTERSECTION IMPROVEMENTS AT MILESTONE RD AND POLPIS RD' (the Action) using the American burying beetle (*Nicrophorus americanus*) determination key within the Information for Planning and Consultation (IPaC) system.

The Service developed this system in accordance with the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 et seq.)

Based on your consideration of the Action and the assistance in the Service's American burying beetle determination key, you have determined that your proposed action will have No Effect on the American burying beetle.

Your agency has met consultation requirements for these species by informing the Service of your "no effect" determination. No further consultation for this project is required for the American burying beetle. This consistency letter confirms you may rely on effect determinations you reached by considering the American burying beetle DKey to satisfy agency consultation requirements under Section 7(a) (2) of the Endangered Species Act of 1973 (87 Stat. 884, as amended 16 U.S.C. 1531 et seq.; ESA).

Coordination with your local Ecological Services Office is complete for the American burying beetle. If your project may affect additional listed species, please contact your local Ecological Services Field Office for assistance with those species. Thank you for considering Federally-listed species during your project planning.

This letter covers only the American burying beetle. It **does not** apply to the following ESA-protected species that also may occur in the Action area:

- Monarch Butterfly *Danaus plexippus* Candidate
- Northern Long-eared Bat *Myotis septentrionalis* Endangered

If your project may affect additional listed species, you must evaluate additional DKeys for other species, or submit a request for consultation for the additional species to your local Ecological Services Field Office.

The Service recommends that your agency contact the Service or re-evaluate the project in IPaC if: 1) the scope or location of the proposed project is changed significantly, 2) new information reveals that the action may affect listed species or designated critical habitat; 3) the action is modified in a manner that causes effects to listed species or designated critical habitat; or 4) a new species is listed or critical habitat designated. If any of the above conditions occurs, additional consultation should take place before project changes are final or resources committed.

Action Description

You provided to IPaC the following name and description for the subject Action.

1. Name

613129 NANTUCKET- INTERSECTION IMPROVEMENTS AT MILESTONE RD AND POLPIS RD

2. Description

The following description was provided for the project '613129 NANTUCKET- INTERSECTION IMPROVEMENTS AT MILESTONE RD AND POLPIS RD':

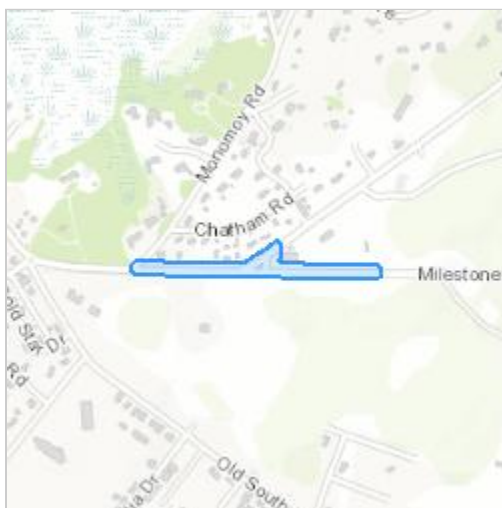
613129 NANTUCKET- INTERSECTION IMPROVEMENTS AT MILESTONE ROAD AND POLPIS ROAD AND EXTENSION OF 'SCONSET BIKEPATH

The purpose of this project is to improve intersection operations and safety at Milestone Road at Polpis Road in Nantucket, MA, through the design and construction of a new intersection configuration. The project will also include the construction of a shared-use-path on the north side of Milestone Road between Monomoy Road and the existing Polpis Bike Path for a distance of approximately 1600 feet. The project will make geometric changes to the Polpis Road approach to improve safety and accessibility for all users while providing an extension of the shared use path through the intersection on the north side of Milestone Road.

American Burying Beetle: After consulting with the Massachusetts Natural Heritage and Endangered Species Program (NHESP), it was determined that there is no data to suggest the presence of habitat and/or individuals at this project location

Monarch Butterfly: Candidate Species only, no conservation measures at this time.

The approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@41.271308649999995,-70.08216573815216,14z>



QUALIFICATION INTERVIEW

1. Is the action authorized, funded, or being carried out by a Federal agency?

Yes

2. Have you determined that the proposed action will have “no effect” on the American burying beetle? (If you are unsure select "No")

Yes

PROJECT QUESTIONNAIRE

Please select the activity that best matches your proposed action.

1. *Soil disturbance related to urban expansion or construction of structures*

If you chose 13 above, please describe below. If you did not choose 13 above, please type "0".

0

IPAC USER CONTACT INFORMATION

Agency: Massachusetts Department of Transportation

Name: Trevor Burns

Address: 10 Park Plaza

City: Boston

State: MA

Zip: 02116

Email: trevor.b.burns@dot.state.ma.us

Phone: 8573010759

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Federal Highway Administration

DOCUMENT A00856

**NORTHERN LONG-EARED BAT PRESENCE/ABSENCE
SURVEY**

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October 30 2023

Ref: 14394.10

Mr. Dave Paulson
 Wildlife and Endangered Species Program Supervisor
 Massachusetts Department of Transportation – Highway Division
 Ten Park Plaza, Room 7360
 Boston, MA 02116-3973
David.J.Paulson@dot.state.ma.us
 (857) 262-3378

| | |
|--------------------------|------------------------------------------------------------------------------------------------|
| Project | Northern Long-eared Bat (MYSE) Presence/Absence Acoustic Survey |
| MassDOT Project # | 613129 |
| MassDOT Project Title | Intersection Improvements at Milestone Road and Polpis Road and Extension of Sconset Bike Path |
| Town | Nantucket, Massachusetts |
| Surveyor Name/Firm | Kimberley Justham, Casey Bardier, Savannah McInvale, Chelsea Glinka/VHB |
| Detector Operation Dates | August 4-8, 2023 |
| Acoustic Survey Results | MYSE NOT DETECTED |
| Acoustic Survey Results | MYLE NOT DETECTED |
| Acoustic Survey Results | MYLU NOT DETECTED |
| Acoustic Survey Results | PESU NOT DETECTED |

Dear Mr. Paulson:

This report contains the results of the Massachusetts Department of Transportation (MassDOT) northern long-eared bat (*Myotis septentrionalis*, hereafter MYSE) summer presence/absence survey performed at the Intersection Improvements at Milestone Road and Polpis Road and Extension of Sconset Bike Path Project in Nantucket, Massachusetts (MassDOT #613129). Acoustic detectors deployed by VHB did not detect the presence of MYSE. There were no calls classified as the state endangered eastern small-footed bat (*Myotis leibei*; MYLE), little brown bat (*Myotis lucifugus*; MYLU) or the state endangered tri-colored bat (*Perimyotis subflavus*; PESU) and subsequent qualitative analysis of all high frequency calls did not detect any of these species.

Sincerely,

VHB

Chelsea O. Glinka
 Project Manager/Environmental Scientist
 cglinka@vhb.com

Attachments: Northern Long-eared Bat Survey Report for Nantucket, 613129
 Site Photographs

US FISH AND WILDLIFE SERVICE BAT ACOUSTIC SURVEY REPORT
MASSDOT PROJECT 613129

Intersection Improvements at Milestone Road and Polpis Road and Extension of Sconset Bike Path

Nantucket, Massachusetts

PREPARED FOR



Massachusetts Department of Transportation
10 Park Plaza
Boston, Massachusetts 02116
857.368.4636

PREPARED BY



101 Walnut Street
P.O. Box 9151
Watertown, Massachusetts 02471
617.924.1770

October 2023

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1

Introduction

This report summarizes the results of the Phase 2 Presence/Probable Absence Acoustic Monitoring Surveys (acoustic surveys) targeting the northern long-eared bat (*Myotis septentrionalis* or MYSE) performed by VHB on behalf of the Massachusetts Department of Transportation (MassDOT) for the proposed new intersection configuration at Milestone and Polpis Roads in Nantucket, Massachusetts (MassDOT Project # 613129, **Figure 1** in **Appendix A**). The MYSE is state-endangered in Massachusetts and has recently been reclassified from federally threatened to federally endangered under the Endangered Species Act (ESA; 16 U.S.C. § 1531 et seq.). The final rule to reclassify MYSE as federally endangered was published in the Federal Register on November 30, 2022, and took effect March 31, 2023 (Federal Register, Vol. 87 No. 229). This survey was performed as a due diligence effort because the Project is within the habitat range of MYSE and contains potentially suitable summer bat habitat. The survey was conducted in accordance with the MYSE Study Plan for the Project which was approved by USFWS in June 2023.

The acoustic surveys targeted the following Massachusetts state-endangered species in addition to MYSE: tricolored bat (*Perimyotis subflavus*; PESU), little brown bat (*Myotis lucifugus*, MYLU), and eastern small-footed bat (*Myotis leibii*, MYLE). Two of these species are under consideration for federal protections: on September 14, 2022, the USFWS published their proposal to list the PESU as endangered under the ESA (Federal Register, Vol. 87, No. 177) and they are conducting a discretionary review on the status of MYLU (USFWS, 2021) expected to be completed in 2023. In 2013 the USFWS issued a 12-Month Finding on a petition to list the MYLE as endangered or threatened under the ESA and determined that listing MYLE was not warranted (Federal Register, Vol. 78, No. 191).

1.1 Project Overview

The Project proposes intersection improvements at Milestone Road and Polpis Road and an extension of the Sconset Bike Path in Nantucket. The Project will make geometric changes to the Polpis Road approach to improve safety and accessibility for all users while providing an extension of the shared-use path through the intersection on the north side of Milestone Road, between Monomoy Road and the existing Polpis Bike Path. The total length of the Project is approximately 0.5 km; however, the Project limits were extended to reach a Project length of one km in anticipation that additional MassDOT-planned work will occur in the adjacent suitable summer habitat in the near future. This approach is consistent with the

MassDOT NLEB Survey Protocol for Small Projects and Bridges which was reviewed and approved by the USFWS New England Field Office and was submitted as an attachment to the Phase 2 Study Plan. The Project will require approximately 0.5 acres of tree clearing and trimming.

1.2 Existing Conditions

The land use surrounding the Milestone and Polpis Road intersection improvements and Sconset Bike Path extension project is predominantly mixed upland forest and low-density residential and commercial development. Suitable summer bat habitat is present along the entire length of the Project.

2

Methods

VHB biologists with bat acoustic survey experience conducted the acoustic survey in accordance with the Phase 2 Study Plan submitted to and approved by the USFWS in June 2023. The Study Plan was developed in accordance with the *USFWS 2023 Range-wide Indiana Bat and Northern Long-Eared Bat Survey Guidelines (Guidelines)*.

2.1 Habitat Assessment and Site Selection

Per the USFWS guidelines, sites were selected through a desktop analysis (i.e., aerial photo interpretation) during the development of the Study Plan by VHB biologists to ensure sufficient coverage of the linear Project. Because the Project length is less than one km, the limits of the Project were extended to capture a continuous one km segment that encompasses the proposed project and adjacent suitable summer habitat that may be evaluated for near future projects, such as additional improvements along Milestone Road. The survey was therefore planned for two detector locations over two calendar nights to target four detector nights, the minimum survey effort for a 1 km linear project. Weather and logistical considerations resulted in the deployment of three detectors over four calendar nights each, totaling 12 detector nights. Each detector location was micro-sited in the field to ensure that suitable site conditions were present, and that optimal microphone placement was achieved. Each detector was spaced at least the recommended 200 meters apart.

The detector at Site 1 was deployed on the southern shoulder of Milestone Road and the Sconset Bike Path, parallel to the road and path and oriented east with the flow of traffic. The edge of the adjacent upland forest was characterized by Norway maple (*Acer platanoides*), pitch pine (*Pinus rigida*), Asiatic bittersweet (*Celastrus orbiculatus*), and Morrow's honeysuckle (*Lonicera morrowii*). The Site 2 detector was set up on the southern shoulder of Milestone Road and the Sconset Bike Path, parallel to the road and path and oriented east with the flow of traffic. Dominant vegetation at the edge of the adjacent upland forest included big-tooth aspen (*Populus grandidentata*), scrub oak (*Quercus ilicifolia*), muscadine grape (*Vitis rotundifolia*), and bayberry (*Morella pensylvanica*). The detector at Site 3 was deployed on the southern shoulder of Milestone Road and the Sconset Bike Path, perpendicular to the road and oriented to the southwest into an opening in the canopy. The mixed upland forest was characterized by pitch pine, scrub oak, muscadine grape, bayberry, and winged sumac (*Rhus copallinum*).

2.2 Detector and Microphone Deployment and Placement

Three Pettersson D500x ultrasonic full spectrum detectors (detector) with Pettersson external, directional microphones were deployed within the Project Area (**Figure 1**) for four consecutive calendar nights from August 4-8, 2023. Photographs of the survey sites and field data forms are included in **Appendix B**. A concise summary of the survey effort for this project is detailed in **Tables 1** and **2** provided in **Appendix C**. A total of twelve detector nights were recorded during the survey effort and analysis of the recordings is presented in **Table 3** of **Appendix C**.

Detector locations were micro-sited in the field to meet the USFWS survey protocols for detector and microphone placement, as described in the approved Study Plan. This includes raising the microphone to a height of at least three meters above the ground level vegetation and orienting the microphone toward potential flight corridors such as forest canopy openings, near water sources, parallel to woodland edges, or other suitable survey locations with minimal to no vegetation obstruction in front of the microphone within the detection cone (which is 100 feet in front of highly directional microphones). Due to the nature of the Project Area, it was not always possible to find a location where the cone of detection was absent of vegetation within 100 feet in front of the microphone. However, detectors were placed in vegetative clearings parallel to woodland edges in areas that were either clear of vegetation or contained minimal distant vegetation (i.e., overhanging branches) in the detection cones; these areas were determined suitable for the acoustic survey based on VHB's professional judgement and past survey experience, as applicable. When practical and within reach, any overhanging branches within the 100-foot detection cones were broken and removed to further reduce clutter. The detectors were set up at a minimum of 10 feet away from the mature forest vegetation line to the extent practical based on the site constraints. Site descriptions are included on the field data forms provided in **Appendix B**. Detector equipment function was verified prior to deployment and at retrieval with a clap and/or finger rub test at the microphone, along with verification of the detector settings and review of the event logs. Refer to **Table 1** provided in **Appendix C** for additional equipment details. Specific information for each detector by site is listed in **Table 2**, also provided in **Appendix C**.

2.3 Weather Criteria

The survey included four calendar nights that met the following survey weather criteria per the USFWS *Guidelines*: temperatures did not fall below 50°F during the first five hours of the survey period; no precipitation (rain and/or fog) that exceeded 30 minutes continuously or continued intermittently during the first five hours of the survey period; and no sustained wind speeds greater than nine miles per hour for 30 minutes continuously during the first five hours of the survey period. Hourly weather conditions were monitored from the nearest active Weather Underground Station: WY1G Station (KMANANTU102). Refer to **Table 1** provided in **Appendix C** for an abbreviated weather summary for each calendar night.

2.4 Call Analysis

VHB biologists trained in conducting acoustic analyses (principally Chelsea Glinka and Kim Justham resumes provided in **Appendix D**) were responsible for automated call analysis and the qualitative review of call files. Sound files were processed through SonoBat Data Wizard Version 4.4.5 to attribute metadata to each file and then calls were scrubbed with the SonoBat Data Wizard Batch File Scrubber to remove sound files that registered below 20 kilohertz (kHz). This step removes obvious non-bat files to reduce the file processing time. Full spectrum files were auto classified with Kaleidoscope Pro Version 5.4.7. Total call counts by species and the MLE ("maximum likelihood estimator" or p-values) assigned by Kaleidoscope Pro are included in **Table 3** provided in **Appendix C**. Species that have been qualitatively reviewed are also denoted in **Table 3**. The bat species abbreviations are listed in **Table 4** in **Appendix C**.

Qualitative analysis (manual vetting) was conducted by VHB (principally by Chelsea Glinka) for all calls that were auto-identified as high frequency (i.e., *Myotis* sp., PESU, and eastern red bat (*Lasiurus borealis* or LABO) regardless of MLE value) and any unknown calls which have a characteristic frequency (Fc) of 35 kilohertz (kHz) or greater. The suite of species evaluated in the manual vetting process includes the federally and state endangered MYSE and the state endangered MYLU, MYLE, and PESU. Select calls that were auto classified as low frequency species were also manually reviewed to confirm presence. VHB conducted qualitative analysis in full spectrum format using SonoBat Version 4.4.5.

All qualitatively reviewed calls were provided to Janet Tyburec of Bat Survey Solutions for secondary qualitative review as part of the QA/QC process. Ms. Tyburec provides over 30 years of acoustic surveying experience including field deployment, teaching, and qualitative call analysis using zero cross and full spectrum files. Her resume is provided in **Appendix D**. Secondary qualitative analysis by Ms. Tyburec was performed on all calls that were identified by the Kaleidoscope software as MYSE, UNKN, MYLU, LABO, PESU and select low frequency species calls; refer to **Table 5** provided in **Appendix C** for a summary of these results. Manually confirmed species have been incorporated into the overall call counts in **Table 3** with an asterisk (*) indicating when all or a portion of the call count was qualitatively reviewed.

Decisions on manual identification of calls are made based on a variety of call characteristics, including characteristic slope (Fs), Fc, the length of the sequence, frequency modulation, the type of call (search phase, attack phase, feeding buzz, etc.), the presence of harmonics, among other factors. References consulted during the qualitative analysis process are based on in-person workshops on manual vetting, Echolocation Call Characteristics of Eastern U.S. Bats, and the USGS Guide to Processing Bat Acoustic Data for the North American Bat Program (NA Bat). These sources are included in the **References** section below.

3

Survey Results

This survey resulted in a probable absence determination for the federally endangered and state endangered MYSE, and the state endangered PESU, MYLE, and MYLU. Automated and qualitative analysis of calls resulted in the detection of the following species: LABO, silver-haired bat (*Lasionycteris noctivagans* or LANO), hoary bat (*Lasiurus cinereus* or LACI), and three calls were manually confirmed within the EFP/LANO guild, meaning that the call characteristics could not be distinguished between these two species. Results of the data analysis efforts are detailed in **Tables 3** through **5** provided in **Appendix C**. Spectrograms of select calls are provided in **Appendix E**. The event logs for each detector night are provided in **Appendix F**.

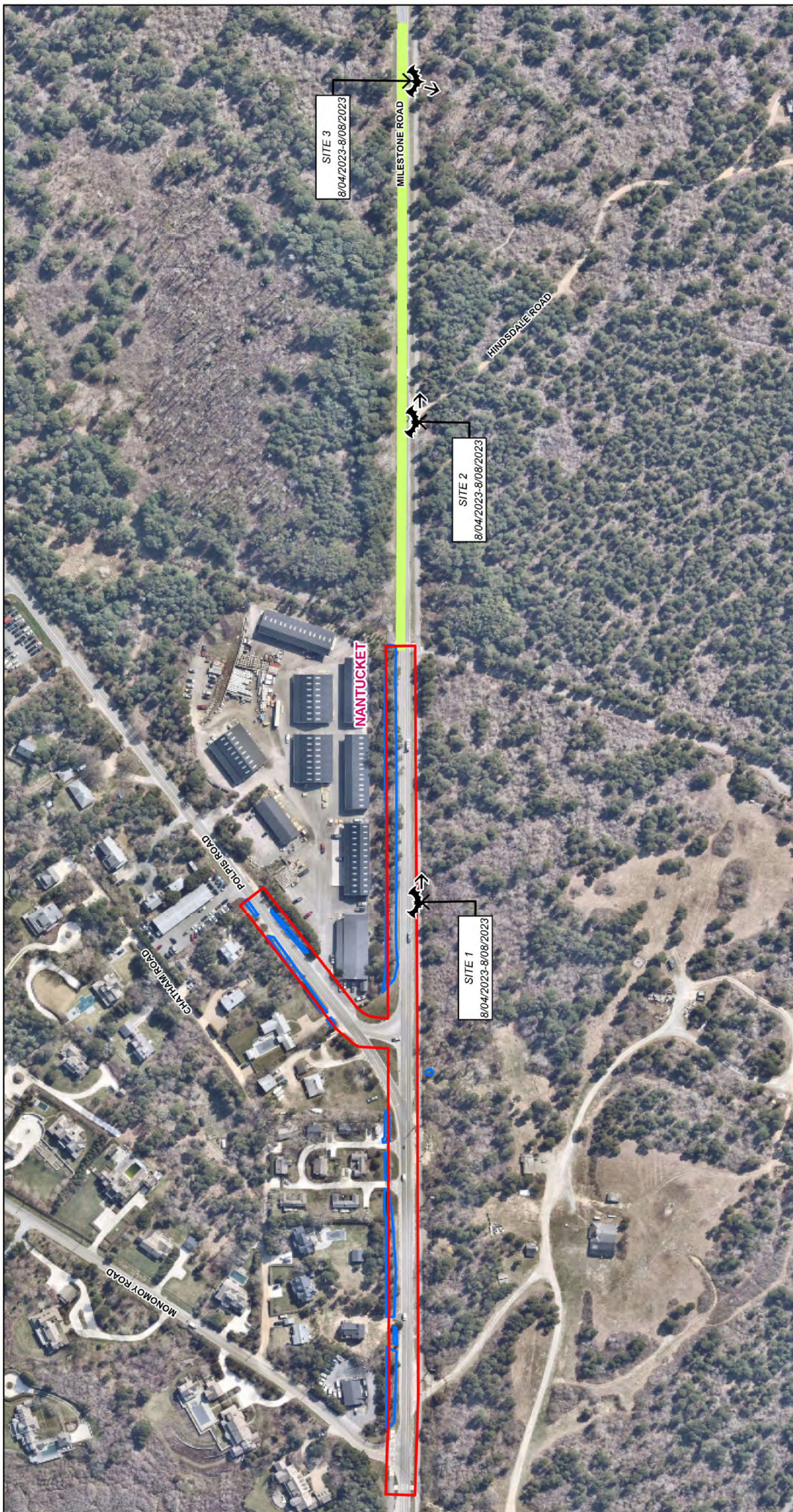
The completed USFWS Northeast 2023 Reporting Form for Acoustic Surveys will be submitted to USFWS as an electronic Excel spreadsheet after this report.

4

References

- Corben, Christopher. Bat Sense. July 2020. Examples of calls from Bats of the Midwest and Eastern U.S. Manual ID Workshop.
- Federal Register, Vol. 87, No. 177, September 14, 2022. 50 CFR Part 17. Docket No. FWS–R5–ES–2021–0163; FF09E21000 FXES1111090FEDR 223] RIN 1018–BG15 Endangered and Threatened Wildlife and Plants; Endangered Species Status for Tricolored Bat. Available at: FR-2022-09-14.pdf (govinfo.gov)
- Reichert, B., and Lausen, C., Loeb, S., Weller, T., Allen, R., Britzke, E., Hohoff, T., Siemers, J., Burkholder, B., Herzog, C., and Verant, M., 2018, A Guide to processing bat acoustic data for the North American Bat Monitoring Program (NABat): U.S. Geological Survey Open-File Report 2018–1068, 33 p., <https://doi.org/10.3133/ofr20181068>.
- Szewczak, J.M., A. Corcoran, J.P. Kennedy, T.J. Weller, P.C. Ormsbee. Echolocation Calls of Eastern U.S. Bats. Humboldt State University Bat Lab, USFS Redwood Science Lab, USFS Pacific Northwest Research Station.
- Tyburec, Janet. Bat Survey Solutions. December 15-17, 2021. Acoustic Survey Methods – Custom In-Person Training Course for VHB.
- U.S. Fish and Wildlife Service. April 2021. North Atlantic-Appalachian Region Endangered Species Act Update. Item 15: Three Bat Species: Tri-colored bat, Little Brown Bat, Northern Long-eared Bat – SSA to Inform Status Reviews.
- U.S. Fish and Wildlife Service. 2022. Federal Register Vol. 87, No. 177/ Wednesday, September 14, 2022. Endangered and Threatened Wildlife and Plants; Endangered Species Status for Tricolored Bat.
- U.S. Fish and Wildlife Service. March 2022. Range Wide Indiana Bat and Northern Long Eared Bat Survey Guidelines.
- U.S. Fish and Wildlife Service. 2020. Instructions for Electronic Submittal of Bat Survey Data for U.S. Fish and Wildlife Service 2020.
- U.S. Fish and Wildlife Service. 2013. Federal Register Vol. 78, No. 191/Wednesday October 2, 2013. 12-Month Finding on a Petition To List the Eastern Small-Footed Bat and the Northern LongEared Bat as Endangered or Threatened Species; Listing the Northern Long-Eared Bat as an Endangered Species; Proposed Rule.

Appendix A: Site Figure



- Legend**
- Project Limit of Disturbance
 - Extended Project Survey Area
 - Tree / Shrub Removal Area
 - Bat Acoustic Survey Location
 - Microphone Orientation


Note:
 Project Length: 1 KM
 MassDOT Project: 613129
 Detector Nights Surveyed: 12

Figure 1
 Northern Long-eared Bat Acoustic Survey
 Intersection Improvements at Milestone Road and Polpis Road and
 Extension of Sconset Bikepath
 Nantucket, MA
 October 2023

Appendix B: Field Data Forms and Site Photos



Bat Acoustic Monitoring Data Form & Photo Log

| | | | | | | |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|------------------------------------|------------------------------|-----------------------------------------|
| Project: | Milestone Road and Sconset Bike Path - 613129 | | Site#: | 1 | Site Name: | Lumber Store |
| Municipality: | Nantucket | County: | Nantucket | State: | MA | Survey Contact: kjustham@vhb.com |
| Latitude: | 41.27089375 | Longitude: | -70.08128194 | Datum: | WGS84 | |
| Surveyed By: | K. Justham, C. Bardier | | | | | |
| Land Use: | Residential, Transport / Utilities, Mixed Herbaceous Shrub and Brush, Mixed Deciduous and Evergreen | | | | | |
| BD # | Trigger Sensitivity | Mic | Mic Orientation | HT¹ | Clutter | Gain |
| 52199 | Medium | External / High Frequency / Directional Horned | SE | 4.88 | EDGE | 45 |
| Site Description / Additional Notes | |  <p>Detector 52199 set up on south side of Milestone Road adjacent to southern shoulder of bike path facing southeast. Microphone oriented along tree line and with flow of traffic. Approximately 5 feet from edge shrub vegetation and 15 from trees along edge. Vegetation includes Asiatic bittersweet, Morrow's honeysuckle, Norway maple, and pitch pine.</p> | | | | |
| | | Battery Capacity (V) | Setup Retrieval | Setup Retrieval | CF Card Capacity (GB) | Setup Retrieval |
| | | 5.8 | 4.9 | 4.9 | 44.73 | 41.93 |
| | | Setup: 08/04/2023 14:57 | | Retrieval: 08/08/2023 13:04 | | |

¹ Height of microphone above ground level (in meters)

MassDOT Project #613129
Milestone Road and Sconset Bike Path
Nantucket, MA



Bat Acoustic Monitoring Data Form & Photo Log

Photo 1: Site 1 - Lumber Store

Date Taken:

August 4, 2023

Orientation:

SE

Description:

View of detector set up along the southern side of Milestone Road and adjacent to the Sconset Bike Path showing the roadway, bike path, and adjacent tree line.



Photo 2: Site 1 - Lumber Store – Cone of Detection

Date Taken:

August 4, 2023

Orientation:

SE

Description:

Detector is positioned on the southern side of Milestone Road and adjacent to the Sconset Bike Path.



MassDOT Project #613129
Milestone Road and Sconset Bike Path
Nantucket, MA

Bat Acoustic Monitoring Data Form & Photo Log

Photo 3: Site 1 - Lumber Store

Date Taken:

August 4, 2023

Orientation:

NW

Description:

View of detector set up along the southern side of Milestone Road and adjacent to the Sconset Bike Path; showing the intersection with Polpis Road, the bike path, and adjacent tree line.



Photo 4: Site 1 - Lumber Store

Date Taken:

August 4, 2023

Orientation:

SW

Description:

View of detector set up along the southern side of Milestone Road and adjacent to the Sconset Bike Path showing the bike path and adjacent tree line.





Bat Acoustic Monitoring Data Form & Photo Log

| | | | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------------------|-------------------|-----------------------------|
| Project: | Milestone Road and Sconset Bike Path - 613129 | Site#: | 2 | Site Name: | #11 Milestone Road |
| Municipality: | Nantucket | County: | Nantucket | State: | MA |
| Latitude: | 41.270864 | Longitude: | -70.07770447 | Datum: | WGS84 |
| Surveyed By: | C. Bardier, K. Justham | | | | |
| Land Use: | Residential, Transport / Utilities, Shrub and Brush, Mixed Herbaceous Shrub and Brush, Mixed Deciduous and Evergreen, Forested | | | | |
| BD # | Trigger Sensitivity | Mic Orientation | HT¹ | Clutter | Gain |
| 52220 | Medium | SE | 4.88 | EDGE | 45 |
| | | | | | Interval |
| | | | | | 0 |
| | | | | | Trigger |
| | | | | | 160 |
| | | | | | Recording Start Time |
| | | | | | 19:24 |
| | | | | | Recording End Time |
| | | | | | 06:09 |
| Site Description / Additional Notes | | <p>Site sketch</p> | | | |
| <p>Detector 52220 set up on south side of Milestone Road adjacent to southern shoulder of bike path, facing southeast. Microphone oriented along tree line and with flow of traffic. Approximately 10 feet from edge vegetation. Vegetation includes bayberry, muscadine grape, scrub oak, and big-tooth aspen.</p> | | | | | |

¹ Height of microphone above ground level (in meters)

MassDOT Project #613129
Milestone Road and Sconset Bike Path
Nantucket, MA

Bat Acoustic Monitoring Data Form & Photo Log

Photo 1: Site 2 - #11 Milestone Road

Date Taken:

August 4, 2023

Orientation:

SE

Description:

View of detector set up along the southern side of Milestone Road and adjacent to the Sconset Bike Path showing the roadway, bike path, adjacent tree line, and driveway off of Milestone Road.



Photo 2: Site 2 - #11 Milestone Road – Cone of Detection

Date Taken:

August 4, 2023

Orientation:

SE

Description:

Detector is positioned on the southern side of Milestone Stone Road and adjacent to the Sconset Bike Path.



MassDOT Project #613129
Milestone Road and Sconset Bike Path
Nantucket, MA

Bat Acoustic Monitoring Data Form & Photo Log

Photo 3: Site 2 - #11 Milestone Road

Date Taken:

August 4, 2023

Orientation:

NW

Description:

View of detector set up along the southern side of Milestone Road and adjacent to the Sconset Bike Path showing the roadway, bike path, and adjacent tree line.



Photo 4: Site 2 - #11 Milestone Road

Date Taken:

August 4, 2023

Orientation:

SW

Description:

View of detector set up along the southern side of Milestone Road and adjacent to the Sconset Bike Path showing the bike path and adjacent tree line.



| | | | | | | | | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|------------------------------------------------|------------------------|------------------------|-------------------|----------------------------------------|----------------|-----------------|-----------------------------|---------------------------|
| Project: | Milestone Road and Sconset Bike Path - 613129 | | Site#: | 3 | Site Name: | Fire hydrant | | | | |
| Municipality: | Nantucket | County: | Nantucket | State: | Massachusetts | Survey Contact: kjustham@vhb.co | | | | |
| Latitude: | 41.2708254 | Longitude: | -70.07516427 | Datum: | WGS84 | | | | | |
| Surveyed By: | K. Justham, C. Bardier | | | | | | | | | |
| Land Use: | Transport / Utilities, Mixed Herbaceous Shrub and Brush, Mixed Deciduous and Evergreen, Forested | | | Setup Retrieval | 5.9 4.9 | CF Card Capacity (GB) | 44.72 43.74 | | | |
| BD # | Trigger Sensitivity | Mic | Mic Orientation | HT¹ | Clutter | Gain | Trigger | Interval | Recording Start Time | Recording End Time |
| 52505 | Medium | External / High Frequency / Directional Horned | SW | 4.88 | EDGE | 45 | 160 | 0 | 19:24 | 06:09 |
| Site Description / Additional Notes | | | | | | | | | | |
| <p>Detector 52505 set up along southern shoulder of Milestone Road and Sconset Bike Path, facing southwest. Microphone oriented approximately perpendicular to road into opening in canopy and back edge of bike path tree line. Vegetation is approximately 15 feet from BD set up. Surrounding vegetation includes scrub oak, muscadine grape, bayberry, pitch pine, and winged sumac.</p> | | | | | | | | | | |
| <p style="text-align: right;">Site sketch</p> | | | | | | | | | | |

¹ Height of microphone above ground level (in meters)

Photo 1: Site 3 - Fire Hydrant

Date Taken:

August 4, 2023

Orientation:

W

Description:

View of detector set up along the southern side of Milestone Road and adjacent to the Sconset Bike Path showing the roadway, bike path, and adjacent tree line.



Photo 2: Site 3 - Fire Hydrant

Date Taken:

August 4, 2023

Orientation:

SE

Description:

View of detector set up along the southern side of Milestone Road and adjacent to the Sconset Bike Path showing the roadway, bike path, and adjacent tree line.



Photo 3: Site 3 - Fire Hydrant

Date Taken:

August 4, 2023

Orientation:

SW

Description:

View of detector set up along the southern side of Milestone Road and adjacent to the Sconset Bike Path showing the bike path and adjacent tree line.



Photo 4: Site 3 - Fire Hydrant - Cone of Detection

Date Taken:

August 4, 2023

Orientation:

SW

Description:

Detector is positioned on the southern side of Milestone Road and adjacent to the Sconset Bike Path facing a break in the vegetation adjacent to the bike path.



Appendix C: Data Tables

Table 1: Project and Equipment Overview

| | |
|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Project Name | Intersection Improvements at Milestone Road |
| MassDOT Project # | 613129 |
| Project Location | Nantucket, Massachusetts |
| Weather Summary | 8/04/2023-8/05/2023: High Temp: 71.4°F, Low Temp: 70.00°F, Avg Temp: 70.77°F, Avg Wind Speed: 1.85 mph, Precipitation: No 8/05/2023-8/06/2023: High Temp: 74.60°F, Low Temp: 67.60°F, Avg Temp: 70.58°F, Avg Wind Speed: 0.16 mph, Precipitation: No 8/06/2023-8/07/2023: High Temp: 72.40°F, Low Temp: 66.60°F, Avg Temp: 69.49°F, Avg Wind Speed: 1.61 mph, Precipitation: No 8/07/2023-8/08/2023: High Temp: 71.80°F, Low Temp: 69.60°F, Avg Temp: 70.31°F, Avg Wind Speed: 3.55 mph, Precipitation: No Weather Underground Station: WY1G (KMANANTU102) |
| Principal Equipment | Pettersson D500x; D500x external, high frequency, full spectrum microphone with a directional horn and PVC tube |
| VHB Personnel | Chelsea Glinka, Kimberley Justham, Casey Bardier. Refer to resumes in Appendix D . |
| Bat Survey Solutions Personnel | Janet Tyburec (provided second opinion on qualitative analysis of high frequency calls). Refer to resume in Appendix D . |
| Standard Pettersson D500x Settings | Sampling Frequency = 500 PreTrig = Off Recording Length = 5 seconds HP-Filter = Yes Auto-Record = Yes Input Gain = 45 Trigger Level = 160 Interval = 0 Height above ground = 4.88 meters Vertical orientation = 0 degrees (assuming 0 degrees is parallel with the horizon). Clap sound test performed at deployment and retrieval to determine proper functioning, along with review of event log. |
| Standard Mic Setup | Program: Kaleidoscope Pro 5.4.6 for automated analysis; SonoBat, V 4.4.5 for qualitative analysis Filters or Parameters: Files were scrubbed and attributed using SonoBat Data Wizard V 4.4.5, set to medium: accepts all but poor-quality calls; accepts some noise with tonal content, include signals from 20 kHz and above. |
| Acoustic Analysis Software | Program Settings Signal detection parameters (default parameters) Minimum and Maximum Frequency Range: 8-120 kHz Minimum and Maximum Length of Detected Pulses: 2-500 ms Maximum inter-syllable gap: 500 ms Min. # of pulses for species ID = 2 Other relevant settings affecting ID = Kaleidoscope Pro set to Massachusetts species setting Suite of species/groups included in program analysis: EPFU, LANO, LABO, LACI, MYLE, MYLU, MYSE, PESU |

Table 2: Detector Details

| Site | Detector # | Detector Night Start Dates | Latitude ¹ | Longitude ¹ | Start Time | End Time | Mic Orientation | Clutter | Distance to Nearest Vegetation or Obstruction | Habitat Type ² |
|------|------------|----------------------------|-----------------------|------------------------|------------|----------|-----------------|---------|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | 52199 | 8/4/2023 | 41.27089375 | -70.08128194 | 19:24 | 06:09 | SE | Edge | 5 feet | Detector set up on south side of Milestone Road adjacent to southern shoulder of bike path facing southeast. Microphone oriented along tree line and with flow of traffic. Approximately 5 feet from edge shrub vegetation and 15 feet trees along edge. |
| | | 8/5/2023 | | | | | | | | |
| | | 8/6/2023 | | | | | | | | |
| | | 8/7/2023 | | | | | | | | |
| 2 | 52220 | 8/4/2023 | 41.270864 | -70.07770447 | 19:24 | 06:09 | SE | Edge | 10 feet | Detector set up on south side of Milestone Road adjacent to southern shoulder of bike path, facing southeast. Microphone oriented along tree line and with flow of traffic. Approximately 10 feet from edge vegetation. |
| | | 8/5/2023 | | | | | | | | |
| | | 8/6/2023 | | | | | | | | |
| | | 8/7/2023 | | | | | | | | |
| 3 | 52505 | 8/4/2023 | 41.2708254 | -70.07516427 | 19:24 | 06:09 | SW | Edge | 15 feet | Detector set up along southern shoulder of Milestone Road and Sconset Bike Path, facing southwest. Microphone oriented approximately perpendicular to road into opening in canopy and back edge of bike path tree line. Vegetation is approximately 15 feet from BD set up. |
| | | 8/5/2023 | | | | | | | | |
| | | 8/6/2023 | | | | | | | | |
| | | 8/7/2023 | | | | | | | | |

1 Sub-meter accuracy.

2 Refer to the Field Data Forms in Appendix B for more detailed site information.

Table 3: Recorded Bat Calls

| Site # & Detector Night | Species Identification ¹ | | | | | | | | | | | Total # of Significant ³ Calls | Total # of Calls |
|----------------------------------------------------------|-------------------------------------|------|-------------|------|-----------|------|------|------|------|------|------------|-------------------------------------------|------------------|
| | EPFU | LABO | LACI | LANO | EPFU/LANO | MYLE | MYLU | MYSE | PESU | MYsp | UNKN | | |
| Site 1 8/4/2023 – 8/5/2023 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 4 |
| | | | <i>0</i> | | | | | | | | | | |
| Site 1 8/5/2023 – 8/6/2023 | 0 | 0 | 7* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 7 |
| | | | <i>0</i> | | | | | | | | | | |
| Site 1 8/6/2023 – 8/7/2023 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| | | | <i>0.01</i> | | | | | | | | | | |
| Site 1 8/7/2023 – 8/8/2023 | 0 | 0 | 4* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 4 |
| | | | <i>0</i> | | | | | | | | | | |
| Site 2 8/4/2023 – 8/5/2023 | 0 | 0 | 23 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 24 |
| | | | <i>0.06</i> | | | | | | | | | | |
| Site 2 8/5/2023 – 8/6/2023 | 0 | 2* | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 18 |
| | | | <i>0</i> | | | | | | | | | | |
| Site 2 8/6/2023 – 8/7/2023 | 0 | 5* | 8* | 1 | 1* | 0 | 0 | 0 | 0 | 0 | 1 | 14 | 16 |
| | | | <i>0</i> | | | | | | | | | | |
| Site 2 8/7/2023 – 8/8/2023 | 0 | 0 | 31 | 0 | 1* | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 32 |
| | | | <i>0</i> | | | | | | | | | | |
| Site 3 8/4/2023 – 8/5/2023 | 0 | 13* | 13* | 0 | 1* | 0 | 0 | 0 | 0 | 0 | 3 | 27 | 30 |
| | | | <i>0</i> | | | | | | | | | | |
| Site 3 8/5/2023 – 8/6/2023 | 0 | 7* | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 10 |
| | | | <i>0.06</i> | | | | | | | | | | |
| Site 3 8/6/2023 – 8/7/2023 | 0 | 5* | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 8 |
| | | | <i>0</i> | | | | | | | | | | |
| Site 3 8/7/2023 – 8/8/2023 | 0 | 5* | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 24 | 25 |
| | | | <i>0</i> | | | | | | | | | | |
| TOTAL CALLS FOR ALL SITES | | | | | | | | | | | - | 180 | |
| TOTAL SIGNIFICANT CALLS FOR ALL SITES³ | | | | | | | | | | | 150 | - | |

1 Refer to species key in Table 4
 2 MLE (p) values ≤0.05 are considered to be significant and suggest presence.
 3 Significant calls (italicized) include those with an MLE value ≤0.05 and those calls which have been manually vetted; this does not include any calls classified as MYsp, or UNKN.
 * All or a portion of the calls were qualitatively reviewed to confirm species presence.
 ** Note that if an MLE value is missing it's because it was classified via manual vetting and does not include a software generated MLE value

Table 4: Bat Species Key¹

| Species Abbreviation | Scientific Name | Common Name |
|----------------------|----------------------------------------------------------|---------------------------------------------------------------------------------------|
| EPFU | <i>Eptesicus fuscus</i> | Big Brown Bat |
| LABO | <i>Lasiurus borealis</i> | Eastern Red Bat |
| LACI | <i>Lasiurus cinereus</i> | Hoary Bat |
| LANO | <i>Lasionycteris noctivagans</i> | Silver-haired Bat |
| MYLE | <i>Myotis leibii</i> | Eastern Small-footed Bat |
| MYLU | <i>Myotis lucifugus</i> | Little Brown Bat |
| MYSE | <i>Myotis septentrionalis</i> | Northern Long-eared Bat |
| PESU | <i>Perimyotis subflavus</i> | Tri-colored Bat |
| MYsp | <i>Myotis sp.</i> | Unknown Myotis |
| LAsp | <i>Lasiurus sp.</i> | Unknown Lasiurine |
| UNKN | Unknown | Assigned to calls that are too fragmented or poor quality to be classified to species |
| EPFU/LANO | <i>Eptesicus fuscus/ Lasionycteris noctivagans Guild</i> | Big Brown Bat/Silver-haired Bat Guild |

1 The Massachusetts Natural Heritage Program indicates that the Indiana bat (*Myotis sodalis*) (<https://www.mass.gov/doc/indiana-bat/download>) is extirpated in Massachusetts. Therefore, this species is not included in the analysis.

Table 5: Qualitative Analysis Summary

| Site | Detector Night Start Date | Auto-ID by KPro 5.4.6 | QA-QC ID by VHB/BSS | Comments |
|--------|---------------------------|-----------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Site 1 | 8/4/2023 | LACI | LACI | Despite both diffuse and reflective echo, pulse shape and characteristics that are discernable are most consistent with a LASCIN sequence. |
| Site 1 | 8/7/2023 | LACI | LACI | Despite both diffuse and reflective echo, pulse shape and characteristics that are discernable are most consistent with a LASCIN sequence. |
| Site 2 | 8/4/2023 | LABO | HighF | A single HiF ¹ call pulse. |
| Site 2 | 8/5/2023 | LABO | LABO | File contains 9 clear call pulses without noise or echo that are archetypical for LASBOR (view in real-time or turn on Full Spectrum only and turn off ZC). |
| Site 2 | 8/6/2023 | LACI | EPFU/LANO | Too much diffuse echo, low bandwidth and overlapping LoF ² noise to determine call metrics or characteristics for confident disambiguation between EPTFUS / LASNOC. |
| Site 2 | 8/6/2023 | LABO | LABO | Despite just 4 call pulses, archetypical for LASBOR. |
| Site 2 | 8/6/2023 | Noise | LABO | Archetypical for LASBOR approach-phase call types (which mimic MYOsp).) |
| Site 2 | 8/6/2023 | LABO | LABO & LABO | Two bats in file, both with archetypical characteristics for LASBOR. |
| Site 2 | 8/6/2023 | LACI | LACI | Likely LASCIN, although unusually high in Fc ³ , but call shape and sequence characteristics are more typical for LASCIN than EPTFUS / LASNOC. |
| Site 2 | 8/6/2023 | EPFU | LowF | Much overlapping LoF non-bat noise interfering with confident disambiguation between EPTFUS / LASNOC / LASCIN. |
| Site 2 | 8/7/2023 | EPFU | EPFU/LANO | Out-of-range, low-bandwidth pulses with echo and overlapping LoF ² noise; difficult to disambiguate between EPTFUS / LASNOC. |
| Site 3 | 8/4/2022 | LACI | EPFU/LANO | Too faint, out-of-range and obscured by noise floor to determine between EPTFUS / LASNOC. |
| Site 3 | 8/4/2022 | LABO | HighF | Too faint, out-of-range and obscured by noise floor to determine species. |
| Site 3 | 8/4/2022 | LABO | LABO | Archetypical for LASBOR approach-phase sequence. |
| Site 3 | 8/4/2022 | LABO | LABO | Archetypical for LASBOR sequence, but Low in Fc ³ . |

| Site | Detector Night Start Date | Auto-ID by KPro 5.4.6 | QA-QC ID by VHB/BSS | Comments |
|--------|---------------------------|-----------------------|---------------------|----------------------------------------------------------------------------------------------------------------------|
| Site 3 | 8/4/2022 | LABO | LABO | Characteristics are archetypical for LASBOR despite few call pulses and much diffuse echo. |
| Site 3 | 8/4/2022 | EPFU | LABO | Characteristics are archetypical for LASBOR despite much diffuse echo. |
| Site 3 | 8/4/2022 | LACI | LACI | Characteristics are more like LASCIN than EPTFUS / LASNO, despite few call pulses and much diffuse echo. |
| Site 3 | 8/4/2022 | LACI | LACI | Archetypical for LASCIN approach-phase sequence. |
| Site 3 | 8/4/2022 | LACI | LACI | Begins with extreme approach-phase sequence but settles down into typical LASCIN search-phase sequence. |
| Site 3 | 8/4/2022 | LACI | LACI & LowF | Two bats in sequence, definitely one LASCIN and possibly a second LASCIN, but could be any LoF ² species. |
| Site 3 | 8/4/2022 | EPFU | LowF | Too faint, out-of-range and obscured by noise floor to determine species. |
| Site 3 | 8/5/2022 | LABO | LABO | Although mostly out-of-range, sequence characteristics are archetypical for LASBOR. |
| Site 3 | 8/6/2022 | LABO | LABO | Archetypical for LASBOR approach-phase sequence. |
| Site 3 | 8/6/2022 | LABO | LABO | Although mostly out-of-range, sequence characteristics are archetypical for LASBOR. |
| Site 3 | 8/7/2022 | LABO | LABO | Although mostly out-of-range and with much diffuse echo, sequence characteristics are archetypical for LASBOR. |
| Site 3 | 8/7/2022 | LABO | LABO | Archetypical for LASBOR sequence, despite Low Fc ³ . |
| Site 3 | 8/7/2022 | LABO | HighF | Call pulses barely rise above background noise floor, impossible to disambiguate to species. |

¹HiF = high frequency.

²LoF = low frequency.

³Fc= characteristic frequency; the frequency of a call pulse at its flattest point, where the slope is closest to horizontal.

Appendix D: Resumes of Qualified Individuals

Chelsea Glinka

Senior Environmental Scientist



Chelsea Glinka is a Senior Environmental Scientist in VHB's Providence, Rhode Island office. Her experience includes assessing permitting needs and developing environmental permit applications for small and large-scale projects within the private and public sectors. She supports project by leading rare, threatened, and endangered species surveys and facilitating Section 7 consultations under the Endangered Species Act through U.S. Fish and Wildlife Service and NOAA Fisheries.

13 years of professional experience

Education

MS, Natural Resources,
University of Connecticut, 2013

BS, Environmental Sciences,
University of Rhode Island, 2010

Ct, Bat Acoustic Qualitative
Analysis Training (Tittley
Scientific), 2020

Ct, Acoustic Survey Methods
(Bat Survey Solutions) 2021

Presentations

Co-Panelist; Meghan Lout
(VTrans), Timothy Dexter
(MassDOT), David Paulson
(MassDOT); "Transportation
Panel Discussion about Bat
Surveys" Northeast Bat Working
Group Conference; Burlington,
VT; Jan. 2023

MassDOT Environmental Services Master Services Agreement

Chelsea Glinka is the Project Manager for bat survey efforts conducted on behalf of the Massachusetts Department of Transportation (MassDOT). Since 2015, Chelsea has conducted passive acoustic surveys targeting the northern long-eared bat (*Myotis septentrionalis*; MYSE) for MassDOT. Her responsibilities include assessing survey effort in accordance with the most recently issued survey guidelines by the U.S. Fish and Wildlife Service (USFWS), developing Phase II Acoustic Study Plan for review and approval by USFWS, conducting acoustic surveys and visual bridge assessments and training VHB staff in survey techniques and equipment operation, acoustic analysis using auto-classification software and manual vetting of high frequency calls, report review and finalization and completion of the USFWS Northeastern US Bat Reporting Spreadsheet for Acoustic Surveys. Chelsea also prepares files for submission to the North American Bat Monitoring Project (NABat) on behalf of MassDOT. Chelsea recently worked with MassDOT to provide a Project Review Package under the Section 7 consultation process for a project location where NLEB presence was detected via acoustic surveys. The package included the description of the action area, potential impacts to MYSE, and proposed conservation measures to mitigate and minimize Project impacts to MYSE. The USFWS issued their concurrence for a determination of "may affect, not likely to adversely affect".

RIDOT Master Price Agreement Visual Bridge Assessments for Bat Presence

Chelsea managed the visual bridge assessment effort of 34 bridges throughout Rhode Island for evidence of bat roosting. The inspections were performed during the active bat season in 2022. VHB confirmed probable absence of roosting bats at most bridge locations slated for the 2023 construction season and detected potential presence of roosting bats based on guano and staining. Chelsea coordinated with RIDOT environmental staff, project management, and RIDOT Construction Supervisors for the design and implementation of traffic control set ups for bridge inspections occurring on Interstate 95 and other high-traffic volume roadways; performed work site hazard assessments and safety tailboard meetings; prepared inspection reports using the USFWS reporting form and consulted with USFWS Endangered Species Biologists at the New England Field Office.

CTDOT Environmental Services Task Orders

Chelsea conducted an acoustic bat survey along the proposed linear route of the I-95 Interchange 74 Improvements at Route 161 and Replacement of Bridge No. 250 in East



Lyme Connecticut in 2022. The survey effort included the development of a Phase II Acoustic Study Plan with proposed survey locations for submission to USFWS, conducting the acoustic survey at five survey locations within the Project limits to target a range of potentially suitable summer habitat, training VHB staff in survey techniques, acoustic analysis, and report development.

NHDOT, Exit 4A Interstate 93 Interchange & Keene-Swanzey Floodplain Compensatory Storage

Chelsea led the acoustic bat survey effort for two NHDOT projects targeting the NLEB in 2021 and 2022. Survey tasks included development and review of the Phase II Acoustic Study Plan, conducting the survey in accordance with USFWS survey guidelines, acoustic analysis, and report development. Chelsea trained VHB team members in survey techniques and worked closely with the client to ensure that all reporting requirements were met for these surveys.

Confidential Solar Project, VT

Chelsea assisted in the natural resource assessment in support of a 20 MW solar development in central Vermont by leading the acoustic bat survey effort to detect the probable absence or presence of Indiana bat (*Myotis sodalis*) and MYSE. Chelsea assisted in the development of the Phase II Acoustic Study Plan and coordinated with Vermont Fish and Wildlife Department for plan approval. Chelsea conducted the acoustic survey and trained VHB staff in survey techniques and performed acoustic analysis and determined the presence of six species. The findings of this work will be incorporated into project reporting, permitting, and design to ensure compliance with state and federal regulations.

NJDMAVA, NABat Acoustic Survey Reporting, RI

Chelsea is the Project Manager of an acoustic data management project with the New Jersey Department of Military and Veterans Affairs (NJDMAVA). Chelsea is leading efforts to analyze acoustic bat data collected during surveys at various NJDMAVA facilities from 2009 through 2021 and standardize the metadata and call files for upload to the North American Bat Monitoring Program (NABat). The Project has compiled and formatted the metadata to NABat standards for survey efforts dating back to 2009 and analyzed files via auto-classification software approved by USFWS. VHB has also collaborated with NABat to develop a methodology to manually vet a subset of data from each survey due to the large volume of data. VHB is working with a subconsultant to complete the manual vetting and verify the presence or probable absence of bat species recorded during the survey efforts. VHB has also consolidated NABat protocols and tailored them to the specificities of the NJDAMVA datasets to develop a standard operating procedure that can be used for future data analysis and upload efforts. This project will consolidate several years of bat survey data and make it more readily usable as a reference source by the New Jersey Army National Guard when new activities must consider potential impacts on state and federally-listed bat species.



Kimberley M. Justham

Ecologist



Kimberley is an Ecologist in the Environmental Permitting and Natural Sciences Group in VHB's Worcester, Massachusetts, office. Her background includes environmental compliance monitoring, wetland delineation and restoration oversight, federally and state-listed rare species surveys and monitoring (bats, turtles, birds, plants), invasive species management, and habitat restoration.

16 years of professional experience

Education

MS, Environmental Science,
University of Rhode Island, 2016

BS, Conservation Biology,
University of Rhode Island, 2005

MassDOT Acoustic Bat Surveys and Visual Bridge Surveys, Massachusetts

Kim has led the VHB field team conducting northern long-eared bat acoustic surveys and visual bridge assessments over multiple locations in a variety of habitat types for the Massachusetts Department of Transportation (MassDOT). Her responsibilities have included assisting with the development of Phase II Acoustic Study Plans for review and approval by USFWS, conducting habitat assessments, acoustic surveys and visual bridge assessments, training VHB staff in these survey techniques and equipment operation, acoustic analysis using auto-classification software, compiling and reviewing year-end reporting, and completion of the USFWS Northeastern US Bat Reporting Spreadsheet for Acoustic Surveys. Kim also prepares files for submission to the North American Bat Monitoring Project (NABat) on behalf of MassDOT.

Interstate 93 Exit 4A Interchange Project Bat Acoustic Monitoring – Londonderry and Derry, NH (2021)

As a consultant for the NHDOT, Kim assisted with the field work for the Phase 2 Presence/Probable Absence Acoustic Monitoring Surveys targeting the northern long-eared bat (*Myotis septentrionalis* or NLEB) and other NH state-listed bat species in accordance with the procedures and standards outlined in the United States Fish and Wildlife Service (USFWS) *Range-Wide Indiana Bat Survey Guidelines* (dated March 2020) and USFWS-approved Study Plan for the project.

New Jersey Department of Military and Veterans Affairs, North American Bat Monitoring Program Acoustic Survey Results Reporting, NJ

VHB provided acoustic call and metadata processing and file upload services to NJDMAVA. Kim assisted in creating a process to extract, organize, process, and post over ten years' of bat monitoring data to the North American Bat Monitoring Program data clearinghouse site. Her responsibilities have included extraction of data from acoustic survey and mistnet survey reports, compilation of metadata for bulk upload processing in NABat, and processing bat call files for AutoID using SonoBat and Kaleidoscope Pro. Kim has compiled the metadata documents into the NABat bulk metadata template and uploaded the processed metadata and ZC (call) files to the NABat website.

CTDOT Environmental Services Task Orders

VHB conducted an acoustic bat survey along the proposed linear route of the the I-95 Interchange 74 Improvements at Route 161 and Replacement of Bridge No. 250 in East Lyme Connecticut in 2022. The survey effort included the development of a Phase II Acoustic Study Plan with proposed survey locations for submission to USFWS, conducting the acoustic survey at five survey locations within the Project limits to target a range of potentially suitable summer habitat, training VHB staff in survey techniques, acoustic analysis, and report development. Kim assisted in the preparation of the final report submitted to USFWS.

MA Division of Fisheries and Wildlife, Westborough, MA

Prior to joining VHB, Kim was a Conservation Biologist for the Natural Heritage and Endangered Species Program. She wrote habitat management plans and secured wetland permits for rare plant species habitat restoration projects and monitored several federally listed plant species annually. Kim designed sampling protocols and conducted and supervised vegetation sampling, data entry and data clean-up for a sandplain grassland restoration monitoring project and led a large-scale, multi-year habitat restoration project on a remote, 75-acre island in Buzzards Bay. Restoration activities included a prescribed burn of the entire island, herbicide applications to control for invasive and woody plants, and site prep and seeding with locally sourced warm season grasses. She interpreted aerial photographs, topographic maps, and site plans to accurately map rare species observations. Kim used ArcGIS Desktop to delineate regulated and non-regulated habitat areas for state and federally listed bats, mammals, and vernal pool invertebrates. She worked with the database team to input, manage, and distribute rare species data. She conducted control of invasive and aggressive vegetation through application of herbicides and mechanical removal. Kim monitored and mapped Natural Communities over 4 years; managed habitat for terns and censused and banded terns over 8 years; conducted avian monitoring, including nightjar, marsh bird, and shorebird surveys over 5 years; and conducted salamander surveys and trapping, mussel surveys, and vernal pool surveys over 4 years. She also conducted active searches by foot, nesting surveys, trapping surveys and radio-telemetry surveys of MESA-listed turtle species, including the federally listed bog turtle over 5 years.

RI Department of Environmental Management, Providence, RI

Prior to joining VHB, Kim was an Environmental Scientist on the Wetlands Enforcement team where she performed DEM Wetland Permit and RIPDES compliance inspections, identified wetland violations, supervised the installation and maintenance of ESC measures, and supervised wetland restorations. ACOE methodology included identification of wetland plant communities, hydric soils, and other hydrologic indicators. Kim interpreted aerial photographs, topographic maps, and site plans to help determine the extent of wetlands violations and areas to be restored. She coordinated with Rhode Island state and town officials, farmers, landowners, contractors, and consultants to resolve wetland violations. She supervised restorations and served as the point of contact for landowners throughout the inspection and restoration process.

Savannah McInvale

Environmental Scientist

Savannah is an Environmental Scientist in VHB's Providence, Rhode Island office. Her experience includes environmental compliance monitoring, wetland delineation and restoration oversight, vernal pool surveys, federally and state-listed rare species surveys and monitoring (bats, turtles, birds, plants) and habitat restoration.

Education

MS, Conservation Biology
Antioch University, 2020

BS, Animal Science, University of
Vermont, 2011

Ct, Acoustic Survey Methods
(Bat Survey Solutions) 2021

9 years of professional experience

MassDOT Acoustic Bat Surveys and Visual Bridge Surveys, Massachusetts

Savannah is a part of the VHB field team conducting northern long-eared bat acoustic surveys and visual bridge assessments over multiple locations in a variety of habitat types for the Massachusetts Department of Transportation (MassDOT). Her responsibilities have included acoustic surveys and visual bridge assessments, acoustic analysis using auto-classification software, and compiling and reviewing year-end reporting.

CTDOT Route 7/15 Interchange Improvement Project, Norwalk, Connecticut

Savannah assisted and led the field work for the Acoustic Monitoring Surveys targeting the northern long-eared bat (*Myotis septentrionalis* or NLEB) and other CT state-listed bat species in accordance with the procedures and standards outlined in the United States Fish and Wildlife Service (USFWS) *Range-Wide Indiana Bat Survey Guidelines* (dated March 2020) and USFWS-approved Study Plan for the project.

Gravel Pit Solar Project: American Kestrel Monitoring and Implementation of the Migratory Bird Treaty Act, East Windsor, CT

Savannah leads the American Kestrel (*Falco sparverius*) nest monitoring program in support of a 120 MW solar development on several parcels in East Windsor, CT. Savannah helped develop a weekly monitoring plan that is implemented during the active American Kestrel nesting season. Throughout the season, Savannah provides expertise and insight on the movements and activities of state and federally listed avian species within the Project Area. At the culmination of the nesting season, Savannah compiles an annual report on the success and failures of listed species at the Project Site.

CT Solar Projects: Breeding Bird and Vernal Pool Surveys

Savannah assists with the planning and implantation of Breeding Bird and Vernal Pool surveys at multiple solar project sites in Connecticut. During the early spring, Savannah assists in identifying potential vernal pools and utilizing the definition and guidelines for vernal pool surveys provided by Klemens and Calhoun 2022¹, to confirm vernal

¹ Calhoun, A. J. K. and M. W. Klemens. 2002. Best development practices: Conserving pool-breeding amphibians in residential and commercial developments in the northeastern United States. MCA Technical Paper No. 5, Metropolitan Conservation Alliance, Wildlife Conservation Society, Bronx, New York.



pool resource areas. Between late April and early June, Savannah leads breeding bird surveys at potential solar project parcels to identify the presence or absence of state and federally listed avian species. At the culmination of the vernal pool breeding and avian migration periods, Savannah assists in compilation of reports on the findings.

Conservation Field Inspector: Town of North Andover, Massachusetts

Prior to joining VHB, Savannah was a Conservation Field Inspector for the Town of North Andover, Massachusetts. She conducted environmental reviews for building projects near wetlands, including wetland delineations, site surveys, vegetation surveys, and endangered species habitat assessments. Savannah enforced regulations imposed by the MA Wetlands Protection Act and the Town of North Andover Conservation by-laws and assisted in running Conservation Commission meetings. She used GIS and mapping resources to help establish management restoration projects related to the North Region gas pipe explosions in 2018.

Conservation Biologist II: Department of Conservation and Recreation

Prior to joining VHB, Savannah was a Conservation Biologist II for the Department of Conservation and Recreation in Massachusetts. Savannah's responsibilities included coordinating schedules and creating training materials for the crew of three Conservation Biologists. She also created and implemented educational activities for schools, the general public and for state department staff. Her primary duties included monitoring endangered shorebird species of Massachusetts, including Piping Plovers (*Charadrius melodus*) and Least Tern (*Sternula antillarum*). She conducted and reviewed biological data on the population trends and impacts of various environmental factors and compiled end of the season reports, including Habitat Conservation Plan, and submitted them to Massachusetts Wildlife Coastal Waterbird Division.

Casey Bardier

Environmental Scientist



Casey is an Environmental Scientist in the Environmental Permitting and Natural Sciences Group in VHB's Watertown, Massachusetts, office. Her background includes federally and state-listed rare species surveys and monitoring (bats, turtles, birds, plants), environmental compliance monitoring, wetland delineation, and environmental permitting.

2 years of professional experience

Education

BS, Fisheries, Wildlife & Conservation Biology, North Carolina State University, 2021

MassDOT Acoustic Bat Surveys and Visual Bridge Surveys, MA

Casey has assisted the VHB team conducting northern long-eared bat acoustic surveys and visual bridge assessments over multiple locations in a variety of habitat types for the Massachusetts Department of Transportation (MassDOT). Her responsibilities have included acoustic surveys and visual bridge assessments, data compilation for reporting, and assisting with compilation of year-end reporting.

Confidential Client, Biological Inventories, Southeastern, US

VHB was contracted by a private land holding company to conduct natural resource inventories and prepare detailed reports for a total of 53 properties throughout the southeastern United States. As a Natural Resource Investigator, Casey conducted seasonal amphibian, reptile, and bird surveys on site, processed all collected data, and assisted with the production of the natural resources inventory reports for all of the projects.

NCDOT Endangered Species Surveys, NC

VHB was contracted by the North Carolina Department of Transportation (NCDOT) to conduct a variety of endangered species surveys throughout the state of North Carolina. Casey assisted with multiple plant (Schweinitz's sunflower, dwarf-flower heartleaf, and Michaux's sumac) and visual bat assessments in bridges and culverts. Her responsibilities included conducting surveys in the field, reporting the presence or absence of species of interest, and coordinating with state officials for reporting.

National Development, The District Burlington Modified Master Plan, Burlington, MA

In her role as an Environmental Scientist, Casey helped the environmental permitting for a redevelopment project to create two new life science/laboratory buildings, a new parking garage, and utility and stormwater management improvements for National Development. She contributed to the preparation and submittal of the Notice of Intent (NOI) and an additional amendment for submittal to the Burlington Conservation Commission and the Massachusetts Department of Environmental Protection.

National Grid, Footer Inspection Delineation, Southern NH & Northern MA

In her role as an Environmental Scientist, Casey assisted with the delineation of an extensive study area covering hundreds of acres in contract with Southfield Redevelopment Authority. In addition to her field work duties, she also helped with the field data processing and submittals of Abbreviated Notices of Resource Area Delineations (ANRADs) for the four towns in which the project lies.

Eversource, Kingston Reliability Project, Carver/Plympton/Kingston, MA

In her role as an Environmental Scientist, Casey conducted Stormwater Pollution Prevention Plan (SWPPP) inspections, generated the weekly reports, and coordinated with the client team. Additionally, Casey also assisted with telemetry surveys of a large population of over 40 eastern box turtles located in areas of priority habitat as established by the MassWildlife's Natural Heritage and Endangered Species Program (NHESP) within the limits of the 8-mile long project area.

North Carolina State University, Raleigh, NC

Prior to joining VHB, Casey was an Aquatic Plant Management Technician for the North Carolina State University Extension Office. Within her role, she worked alongside laboratory staff and graduate students to establish and maintain numerous research projects involving the management of invasive aquatic plants in reservoirs, lakes, and rivers across the state of North Carolina. The research projects involved the effects of herbicide treatments in controlled greenhouse and field trials. She also contributed to the revegetation of native aquatic plants in various lakes across the state in partnership with the North Carolina Wildlife Resources Commission.

North Carolina Wildlife Resources Commission, Raleigh, NC

Prior to joining VHB, Casey was an intern with the North Carolian Wildlife Resources Commission working on the Box Turtle Connection Project. As part of her duties, Casey conducted mark-recapture surveys of Eastern Box Turtles over a 105-acre study area. She also operated radio telemetry equipment to track a population of turtles, their movements, and perform weekly health assessments.

JANET DEBELAK TYBUREC

PROFESSIONAL PROFILE

Experienced author, educator, photographer, presenter, and wildlife biologist specializing in environmental and nature studies, especially addressing bat conservation and research. Works in various settings: lecture halls, classrooms, and outdoor field locations. Professional development, coordination, and management of multi-day trainings, workshops, and field surveys. Since 1992 has organized, conducted, and instructed at over 175 workshop venues, personally training over 2,500 students on research skills, including bat capture, handling, identification, and echolocation call recording and analysis. Has been the primary investigator on projects for studying and managing bat populations and conducting field research across North America.

RELEVANT EXPERIENCE

Author; Educator; Photographer; Wildlife Biologist (September 2012 to present)

Bat Survey Solutions, LLC owned by Janet Tyburec Consulting, Tucson AZ

Duties: Provide training and instruction on bat research, inventory, and monitoring, including physical capture techniques, radio-tracking, and acoustic surveys for private, federal and state agencies, including the USDA Forest Service, USDI Bureau of Land Management, National Park Service, Fish and Wildlife Service, and the Department of Defense and Army Corps of Engineers. Perform professional bat surveys for agency directors, staff, wildlife biologists, resource managers, seasonal employees, and volunteers.

Contract Instructor (September 2002 to September 2012)

Bat Conservation International (BCI), Austin TX

Job Duties: Design and teach summer field workshops for BCI and its partner agencies and organizations about bat research and conservation, advanced capture techniques, acoustic monitoring, *Myotis sodalis* survey techniques, and inventory and management techniques; using field study techniques including mist netting, harp trapping, acoustic monitoring equipment and software; radio-tracking, banding, light-tagging, species identification, habitat assessment and management, status determination, and data management tools.

Director of Education Programs (June 1996-September 2002); Assistant Dir. (September 1989-June 1996)

Bat Conservation International (BCI), Austin TX

Administrative Duties: Prepare annual departmental budget for three program activities; contribute to semi-annual departmental reports and provide organizational and donor annual reports.

Job Duties: Organize, schedule, promote, and instruct at BCI's educational workshops. Develop and edit educational materials, posters, books, audio/visual programs.

EDUCATION

Trinity University, San Antonio TX. May 1989

B.A., Biology and English: Undergraduate Science Studies: Botany, Plant Physiology, Vertebrate Zoology, Ecology, Oceanography, Genetics, General Biology, Chemistry, Physics, Statistics
Undergraduate English Studies: Elizabethan Playwrights, Complete Works of Shakespeare, American Novelists, Complete Works of Faulkner, Language Arts, Magazine Writing

University of Colorado, Boulder CO. August 1988

Course work in Comparative Ecology of Alpine and Desert Ecosystems

Pima Community College, Tucson AZ. August 1984 - May 1985

Course work in Creative Writing

JANET DEBELAK TYBUREC

SELECT PUBLICATIONS

- Tyburec, J.D. 1998. Memoirs from bat camp. *BATS* 16(3): 8-9.
- Tyburec, J.D. 1998. (Ed.) *Discover Bats!* Bat Conservation International, Austin. 228 pages.
- Tyburec, J.D. 1999. Vacation bat watching in the tropics. *BATS* 17(4): 10-13.
- Tyburec, J.D. 2003. "A Gallery of Workshop Wildlife" (photo essay) *BATS* 21(3): 10.
- Tyburec, J.D., C. Weise, A. McIntire, and S. Richardson. 2011. Bat Conservation: Priorities and Initiatives in the Sonoran Desert Region. *Sonorensis* 31 (1): 20-25.
- Tyburec, J.D. 2014. "Bats." In: *Cave Creek Canyon: Revealing the Heart of Arizona's Chiricabua Mountains*. ECO Wear & Publishing, Rodeo NM 274 pages.
- Tyburec, J.D. 2015 (2nd Ed.). "Bats." In: *A Natural History of the Sonoran Desert*. S.J. Phillips and P.W. Comus (Eds.) University of California Press, Berkeley. Pages 401-410.
- Robbins, L.W., J.D. Tyburec, J.C. Timpone, and V. Brack, Jr. 2021. *Bats of Oklahoma*, Center for Bat Research, Outreach, and Conservation, Indiana State University, Terre Haute. 100 pages.

SELECT PRESENTATIONS

- Tyburec, J.D. 2012. *Acoustic Monitoring: A Silver-bullet or a Sticky-wicket?* Presentation at the Northeast Bat Working Group Meeting, Carlisle PA, January 2012.
- Tyburec, J.D. 2012. *Harp trap effectiveness for the Capture of Myotis leibii, small-footed myotis*. Presentation at the Northeast Bat Working Group Meeting, Carlisle PA, January 2012
- Tyburec, J.D. and J.D. Chengler. 2013. *Using Auto-classifiers for Acoustic Surveys: Do Results Reflect Reality?* Presentation at the Northeast Bat Working Group Meeting, Albany NY, January 2013.
- Tyburec, J.D. and J.D. Chengler. 2013. *Auto-classifiers for Acoustic Surveys: A Bat in the Hand is Worth how Many Detectors in the Bush?* Presentation at the Southeast Bat Diversity Network Meeting, Pikeville TN. February 2013.
- Chengler, J.D. and J.D. Tyburec. 2014. Comparing bat detector deployments at different heights, in different orientations, and using different microphone types. Presentation (poster) at the Southeast Bat Diversity Network Meeting, Nacogdoches TX. February 2014.
- Tyburec, J.D., J.D Chengler and J.M. Szewczak. 2014. Comparing four acoustic analysis software packages and the accuracies of their auto-classification results for determining bat occupancy in a habitat. Presentation at the Southeast Bat Diversity Network Meeting, Nacogdoches TX. February 2014.
- Tyburec, J.D., and J.D. Chengler. 2019. Improving Bat Survey Efficiency and Probable Presence Results by Combining Physical Capture and Acoustic Recording Methods. Oral presentation at the American Fisheries Society and The Wildlife Society's 2019 Joint Conference in Reno NV. October 2019.
- Tyburec, J.D., and J.D. Chengler. 2021. Stationary Point (Passive) Acoustic Surveys for Bats: Using Auto-classification Software Results to Infer Relative Bat Activity - The Problem of Multiple Bat Passes in a Recording. Oral presentation at the Northeast Bat Working Group 2021 Virtual Meeting, 10-11 March.

SELECT BAT-SURVEY & ACOUSTIC-MONITORING PROJECTS

- 2009 - Acoustic Identification Summary for 2005-2008 Bat Surveys conducted by the **USDA-Forest Service, Region 1** (Idaho/Montana), involving reviewing, vetting and reporting results for over 6,500 full-spectrum echolocation recordings.
- 2009 - Acoustic Identification Summary for a 2009 Bat Survey conducted by **Sanders Environmental**, involving reviewing, vetting and reporting results for over 33,000 full-spectrum echolocation call recordings from the Northeastern U.S. to identify federally listed T&E species and state-sensitive species.

JANET DEBELAK TYBUREC

- 2010 - Acoustic Identification Summary for a 2010 Bat Survey conducted by **Sanders Environmental**, involving reviewing, vetting and reporting results for over 380,000 full-spectrum echolocation call recordings from the Northeastern U.S.
- 2011 - Acoustic Analysis provided for a 2011 Bat Survey conducted by **Sanders Environmental**, involving reviewing, vetting and reporting results from over 60,000 full-spectrum echolocation call recordings from the Northeastern U.S. using SonoBat software.
- 2012 - Capture and Acoustic Field Survey for the **US Army Corps of Engineers** (Illinois/Missouri), involving site selection for capture and concurrent acoustic surveys designed to assess management needs for T&E bats, data collection, and reviewing, vetting and reporting results from over 120 bats captured and 12,000 full-spectrum echolocation call recordings collected, with 100% manual vetting of the acoustic files.
- 2014 - Acoustic Field survey for **URS Corporation** to assess *Myotis leibii* habitat along a proposed Pennsylvania Power and Light, right-of-way development in the Pocono Mountains (Wilkes-Barre PA), deploying over 190 bat-detectors, collecting and analyzing over 90,000 recordings from nearly 6,000 hours of full-spectrum monitoring, with 100% of the acoustic files manually vetted.
- 2016 - Acoustic Analysis of nearly 600 full-spectrum echolocation call recordings from 17 passive monitoring deployments and 2 mobile transects for the **Environmental Research Group, LLC** of Bainbridge GA. The analysis included auto-classification outputs from SonoBat4 (NE) and KaliedoscopePRO with manual vetting of both results to document 6 eastern U.S. bat species according to current USF&WS Indiana Bat Summer Survey Guidelines.
- 2016 - Manual Vetting to provide a second opinion on nearly 1,000 full-spectrum echolocation call recordings, representing nearly 1,200 distinct bat passes, from select locations monitoring from the years of 2011 thru 2016 for the **U.S. Fish and Wildlife Service, Sheldon-Hart Mountain National Wildlife Refuge Complex**, in Lakeview OR. Analysis included auto-classification outputs from SonoBat4 (NW) with manual vetting to confirm the presence of 13 bat species, including 5 northwestern *Myotis* species.
- 2016 - Capture and Acoustic Survey, Morphological Identification, Manual Acoustic Vetting, and Acoustic Survey Report Comparing and Summarizing a 2-week Survey Effort in each of 3 locations: in Southeastern Arizona, Northern California and Western Kentucky, which together comprised over 1,000 capture records, 20,000 acoustic recordings, and documented 12 - 20 bat species per location. (100% of the acoustic files were manually vetted with results presented in Tyburec et al. Poster Presentation at the 2016 North American Symposium on Bat Research in San Antonio TX.)
- 2017 - Capture and Acoustic Field Survey for the **Sky Island Alliance** and Appleton-Whitell Audubon Research Ranch to survey bat occurrence at managed wetlands designed for mitigation to aid recovery of the Chiricahua Leopard Frog (Santa Cruz County, Arizona); site selection for capture and acoustic inventories of a 4-site; 7-night period with over 12 capture survey hours and 272 acoustic survey hours, where 12 individual bats of three species were captured and nearly 4,000 individual bat passes were recorded and almost 2,800 were confidently identified to 14 different species.
- 2017 - Manual Vetting of nearly 400 full-spectrum echolocation call recordings, representing almost 500 individual bat passes, from select monitoring locations during the years of 2014 thru 2016 for the **Canadian Wildlife Service, Northern Conservation Division, Whitehorse YT**. Analysis included auto-classification outputs from SonoBat4 (WY) with manual vetting to confirm the presence of four (4) bat species including 3 common northwestern *Myotis* species.
- 2018 - Passive Acoustic Survey, Manual Vetting, and Acoustic Survey Report for a 17-night passive acoustic survey conducted at a southern Arizona grassland community near Elgin, summarizing 5 detector locations, totaling over 19,000 recordings (60GB), from 614 acoustic survey hours, and 66 detector-survey nights, that yielded almost 29,000 bat-passes (that were 100% manually vetted) and confirmed the presence of 19 southwestern bat species: *Antrozous pallidus*, *Choeronycteris mexicana*, *Eptesicus fuscus*, *Lasiurus noctivagans*, *Lasiurus blossevillii*, *Lasiurus cinereus*, *Lasiurus xanthinus*, *Leptonycteris yerbabuena*, *Myotis auriculus*, *Myotis californicus*, *Myotis ciliolabrum*, *Myotis occultus*, *Myotis thysanodes*, *Myotis velifer*, *Myotis volans*, *Myotis yumanensis*, *Nyctinomops* spp. *Pipistrellus hesperus*, and *Tadarida brasiliensis*.

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- 2018 - Manual Vetting to provide a second opinion of over 100 full-spectrum echolocation call recordings, representing 130 distinct bat passes, from select monitoring stations deployed in 2017 by the **Maryland Department of Natural Resources**. Analysis included auto-classification outputs from SonoBat4 (NE, NNE, and PA-VA-NY) with manual vetting to confirm the presence of nearly 50 confidently identified passes from 5 bat species, including *Myotis lucifugus*.
- 2016-2018 - Passive and Mobile Acoustic Surveys, Manual Vetting, and Acoustic Survey Report summarizing 3 years of acoustic survey work conducted near Punta Gorda FL in association with the Bat Survey Solutions, LLC, Acoustic Survey Methods trainings, summarizing efforts at 35 detector locations, totaling 12,000 recordings (45GB) that were 100% manually vetted, and confirmed the presence of 8 southeastern bat species: *Eptesicus fuscus*, *Eumops floridanus*, *Lasiurus borealis/seminolus*, *Lasiurus intermedius*, *Nycticeius humeralis*, *Pipistrellus subflavus*, and *Tadarida brasiliensis*.
- 2019 - Bat Survey Efforts (including physical captures with single-high mist nets, triple-high mist nets, twin-bank harp traps, and triple-bank harp traps; and full-spectrum active and passive acoustic recording using full-spectrum Wildlife Acoustics SongMeter detectors, Pettersson M500 microphones, and SonoBat LIVE recorders) for **Merlin Tuttle's Bat Conservation** "Experience Texas Bats" Natural History Tour in Big Bend National Park, TX during April 2019. Presented a bat survey summary presentation at the end of the week analyzing over 4,000 acoustic records and over 200 capture records, documenting 18 of the 24 suspected species found in the park, with breakdown of species only captured physically, only acoustically, and both via capture and acoustic methods, with 100% of the acoustic collection manually vetted to species or species-guild.
- 2019 - Manual Vetting to provide a second opinion/species identification confirmation of 1,200 zero-cross recordings collected during an **Office of Surface Mining** acoustic survey in Pennsylvania. Analysis and manual vetting performed with KaleidoscopePRO software, using USF&WS Indiana Bat Summer Survey Guidelines.
- 2019 - Manual Vetting to provide a second opinion/species identification confirmation of 50 suspected *Myotis* species recordings collected in Pennsylvania by **Bat Conservation and Management**. Analysis performed with Kaleidoscope PRO software and manual vetting performed with SonoBat software.
- 2019 - Manual Vetting to provide species occupancy report on 350 zero-cross recordings collected from 10 survey locations in Alaska for the **Alaska Center for Conservation Science**. Analysis and manual vetting performed using KaleidoscopePRO software.
- 2020 - Manual Vetting to provide a second opinion and species identification confirmation of 100 recordings suspected to be of *Myotis* species bats collected by the **Maryland Department of Conservation**.
- 2020 - Manual Vetting to provide species occupancy report on 7,000 full-spectrum files collected by **Sanders Environmental** to identify T&E species (*M. septentrionalis* and *M. sodalis*) in Pennsylvania using current USF&WS Indiana Bat Summer Survey Guidelines. Analysis and vetting performed using MLE results from KaleidoscopePRO software and full-spectrum qualitative analysis using the SonoBat viewer.
- 2020 - Manual Vetting to provide a second opinion/species identification confirmation on 4,000 full-spectrum recordings collected in Pennsylvania by **Sanders Environmental** to provide species occupancy report from fall swarming habitats near mine features, using current USF&WS Indiana Bat Summer Survey Guidelines.
- 2021 - Manual Vetting to provide second opinions and species identification confirmation on 300 full-spectrum recordings for **Bat Conservation and Management** from a proposed development in Pennsylvania to determine *Myotis sodalis* and/or *M. septentrionalis* presence at the site, using current USF&WS Indiana Bat Summer Survey Guidelines.
- 2021 - Acoustic survey report to identify true-positive, false-positive, and false-negative auto-classifier decisions to provide a site-level species occupancy report at a four-site, three-night survey in southern Arizona performed by **Copperhead Consulting**. Analysis and manual vetting of over 8,000 zero-cross recordings using KaleidoscopePRO software.

JANET DEBELAK TYBUREC

BAT SURVEY TRAINING CLASSES DEVELOPED & TAUGHT

From 1992-2012 Janet Debelak Tyburec worked for Bat Conservation International (Austin TX) to develop their “Bat Conservation and Management” workshops, “Educator” workshops and “Decision Makers” workshops which were conducted at venues in Arizona, California, Kentucky, Montana, Pennsylvania, Texas, Virginia and Toronto, Ontario CANADA, working with founder Merlin D. Tuttle and Director of Education, Patricia A. Morton to manage and direct all training efforts. In 2001 BCI began offering “Acoustic Monitoring for Bats” workshops at the “flagship” venues in the Chiricahua Mountains of Arizona (May/June), Lava Beds National Monument in California (July), Mammoth Cave National Park in Kentucky (July/August), and at Canoe Creek State Park in Central Pennsylvania (August/September). Beginning in 2008 Janet became a private contractor and federal agency contractor, and worked with Bat Conservation and Management (BCM, Carlisle PA) to offer “Bat Study and Survey Techniques” workshops at venues in Arizona, California, Indiana, Kentucky, Maryland, New Jersey, New York, Pennsylvania, Tennessee, Texas and West Virginia. In 2012 she formed her own company to take over all bat-survey training after BCM and BCI dropped educational outreach from their respective missions. Below is a select list of notable training courses.

- 2008 “Forest Bat Conservation and Inventory Techniques” workshop for the United States Forest Service, Coronado National Forest in Tucson AZ, 18-19 September.
- 2009 “Acoustic Monitoring as a Non-contact Bat Survey Method” workshop for Cleveland MetroParks in Akron OH, 25 August.
- 2009 “Bat Survey Techniques for Caves, Mines, Buildings, and Bridges” workshop for the United States Forest Service, Doublehead Ranger District, in Dillon MT, 14-17 September.
- 2009 “Forest Bat Conservation and Inventory Techniques” workshop for the United States Forest Service, Coronado National Forest and local partner agencies, in Tucson AZ, 12-13 November.
- 2010 “Introduction to Bat Conservation, Survey Methods, and Management” workshop for the United States Forest Service, Guadalupe National Forest, Carlsbad Ranger District, in Carlsbad NM, 6-8 July.
- 2010 “Forest Bat Conservation: Water, Mines, and Man-made Structures” workshop for the United States Forest Service, Lincoln National Forest, Smokey Bear Ranger District in Ruidoso NM, 15-17 July.
- 2010 “AnaBat Acoustic Survey Training” workshop for the Department of Defense, Nellis Air Force Base in Las Vegas NV, 22-24 October.
- 2011 “Bat Inventory and Monitoring” workshop for the United States Forest Service, Guadalupe National Forest and the Bureau of Land Management, in Carlsbad NM, 10-13 August.
- 2011 “White-nose Syndrome in Bats, History, Prevention, and Prognosis” class for the Department of Defense, in Sierra Vista AZ, 30 August-1 September.
- 2012 “Bat Capture and Acoustic Survey Techniques” class for the United States Forest Service, North Central Research Station, in Portal AZ, 19-21 May.
- 2012 “Bat Inventory and Monitoring” workshop for the Utah Bat Conservation Cooperative, joint agency: Bureau of Land Management, National Park Service and United States Forest Service in Escalante UT, 30 July-2 August.
- 2012 “AnaBat Acoustic Inventory Methods” workshop for the United States Fish and Wildlife Service, in McBee SC, 23-24 April.
- 2013 “SonoBat Acoustic Analysis Techniques” class for Pima County Parks Department, Tucson AZ, 22 April.
- 2013 “Acoustic Survey Field Techniques for Bat Studies” workshop for the United States Fish and Wildlife Service, in State College PA, 20-21 October
- 2014 “Pettersson Detector and SonoBat Software Acoustic Survey Techniques” workshop for Sanders Environmental Clients and Sub-contractors, in Somerset PA, 7-9 April.
- 2014 “Bat Detectors and Acoustic Survey Protocols” workshop for the United States Fish and Wildlife Service, in Dixon IA, 3-5 June.
- 2015 “Acoustic Data Management” training workshops in Alton, IL (7-9 March); Hollidaysburg PA (28-29 April); Harrisburg, PA (12-14 October); and Fairfield ME (14-16 June).

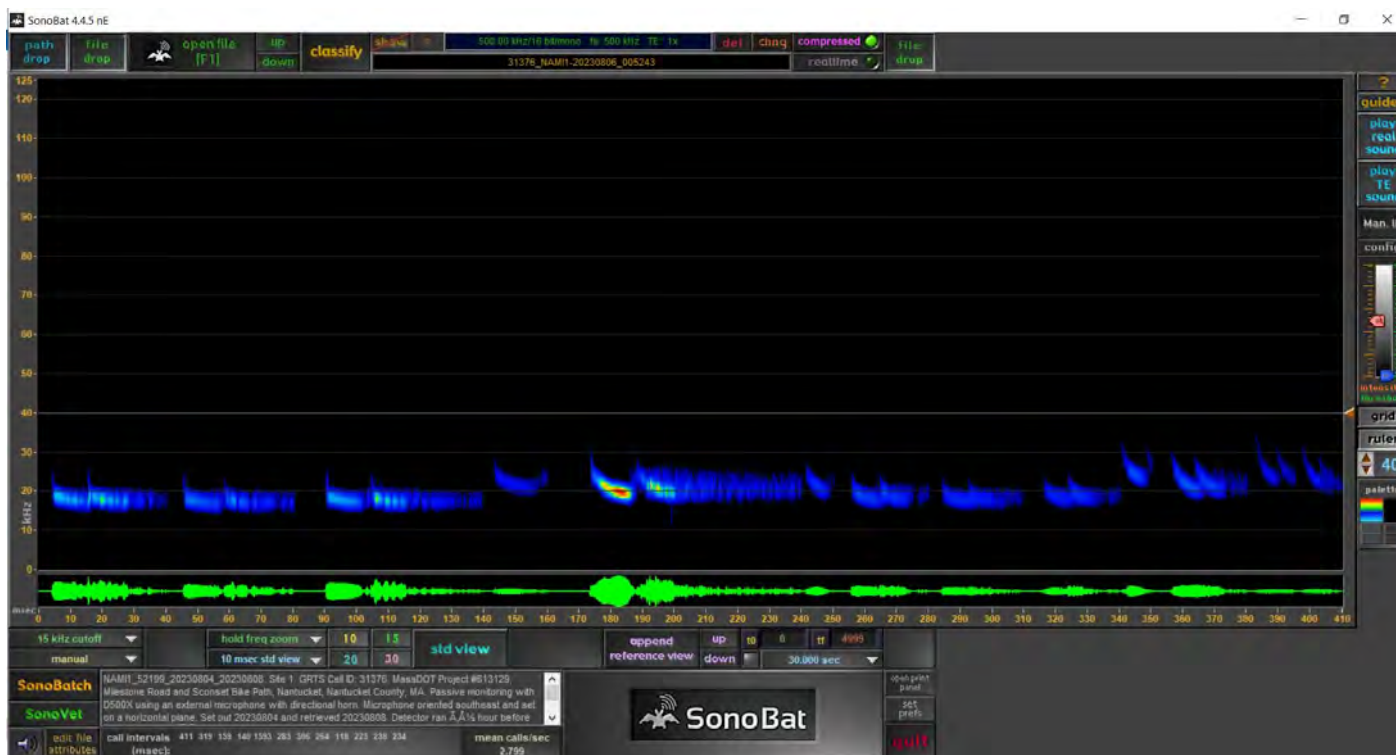
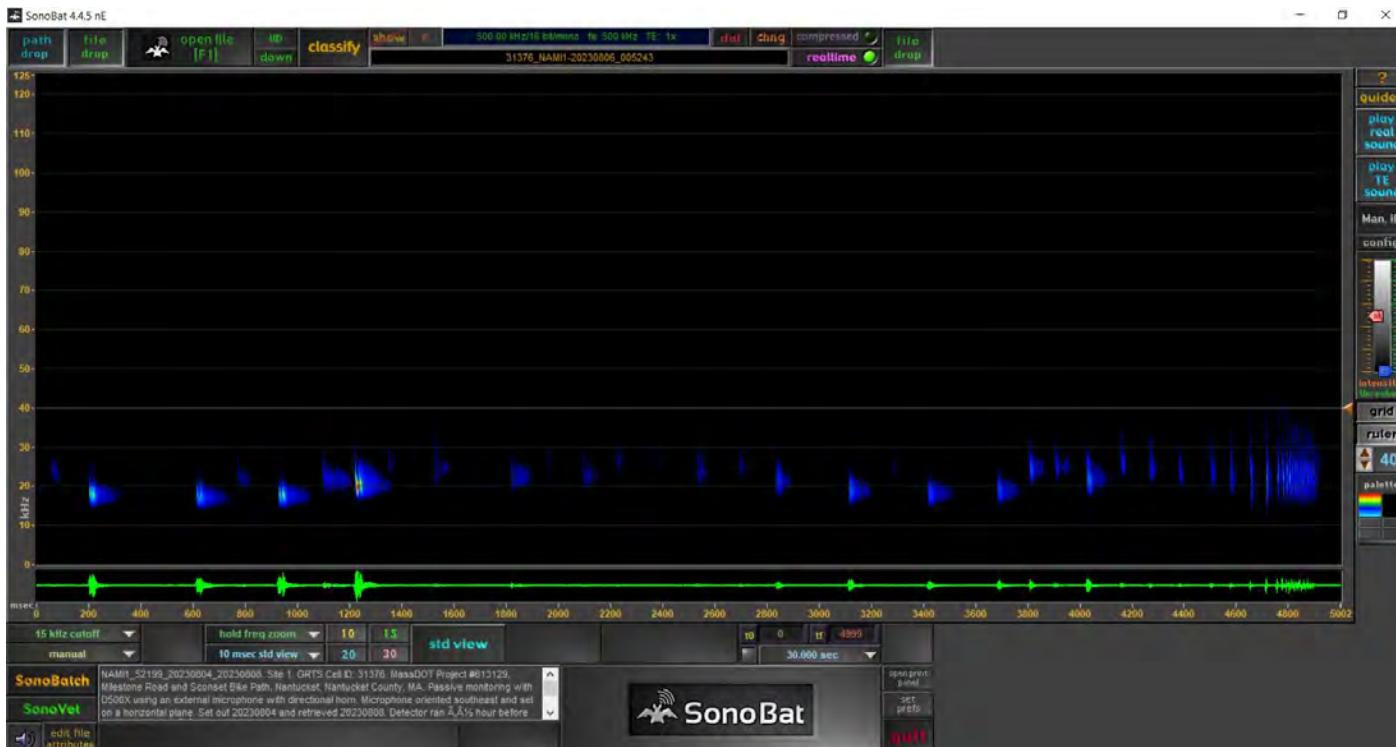
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- 2015 “Combined Field Survey Techniques” training workshops in Portal AZ (20-26 May); Tulelake CA (10-17 July); and Mammoth Cave, KY (19-25 September).
- 2015 “Field Survey Techniques” training for National Park Service, Mammoth Cave, KY, 14-17 September.
- 2016 “Acoustic Data Management” training workshops in Duluth MN (7-9 March), Wells ME (7-9 April), and Harrisburg PA (17-19 October).
- 2016 “Acoustic Survey Methods” training workshop in Punta Gorda FL, 1-5 February.
- 2016 “Combined Field Survey Techniques for Bats” training workshops in Portal AZ (22-29 May), Tulelake CA (10-17 July), and Mammoth Cave KY (28 August - 4 September).
- 2016 “Field Survey Techniques for Bats” training workshop for California Department of Fish and Game, Tulelake CA, 18-22 July.
- 2017 “Acoustic Survey Methods” training course in Punta Gorda FL (23-27 January) and Tucson AZ (3-7 April)
- 2017 “Combined Field Survey Techniques” training workshops in Portal AZ (13-20 May), Tulelake CA (14-21 July), and Mammoth Cave KY (22-30 August).
- 2017 “Field Survey Techniques” training workshop for National Park Service staff in Tulelake CA, 24-28 July.
- 2017 “Acoustic Data Management” training class in Harrisburg PA, 11-13 October.
- 2018 “Acoustic Survey Methods” training course in Punta Gorda FL, 21-26 January.
- 2018 “Combined Field Survey Techniques for Bats” training workshop in Portal AZ (8-15 May), Tulelake CA (29 July - 5 August), and Mammoth Cave KY (4-12 September).
- 2018 “Combined Field Survey Techniques for Bats” training workshop for National Park Service staff at Santa Monica Mountains National Recreation Area, Los Angeles County CA, 18-20 September.
- 2018 “Acoustic Data Management” training class in Harrisburg PA, 16-18 October.
- 2019 “Acoustic Survey Methods” training course in Punta Gorda FL, 8-13 January.
- 2019 “Acoustic Survey Methods” training course for the Seminole Tribe in Big Cypress FL, 11-13 March.
- 2019 Bat Survey for Merlin Tuttle’s Bat Conservation “Discover Texas Bats,” Big Bend TX, 27 March - 4 April.
- 2019 “Acoustic Survey Methods” training course in Tucson AZ, 8-13 April.
- 2019 “Acoustic Data Management” training class in Tulsa OK, 26-28 April.
- 2019 “Cave Conservation and Management for Bats” field training workshop in San Marcos TX, 7-9 May
- 2019 “Combined Field Survey Techniques for Bats” field training workshop in Portal AZ, 20-27 May.
- 2019 “Acoustic Data Management using KaleidoscopePRO Software” custom training class for Environmental Science Associates consultants in Tampa FL, 24-25 July.
- 2019 “Bat Survey Techniques for Agency Biologists” training workshop in Great Basin (Baker) NV, 15-19 July.
- 2019 “Combined Field Survey Techniques for Bats” training workshop in Great Basin (Baker) NV, 21-28 July.
- 2019 “Combined Field Survey Techniques for Bats” training workshop in Mammoth Cave KY, 4-12 September.
- 2019 “Acoustic Data Management” training class in Harrisburg PA, 22-24 October.
- 2020 “Acoustic Survey Methods” training course in Punta Gorda FL, 10-16 January.
- 2020 “Acoustic Survey Methods for Conducting North American Bat Conservation Program Surveys” for the Southwest Bat HUB, on-line training workshop, 14-18 September.
- 2020 “Acoustic Survey Methods for Conducting Florida Bonneted Bat Surveys using KaleidoscopePRO” for KCA Environmental Consultants (Tampa FL), on-line training workshop (24-26 August) and follow-up mock-survey consultation (29 September - 1 October).
- 2021 “Acoustic Survey Methods/NABat Survey Methods” field training course in Tucson AZ, 21-25 June.
- 2021 “Acoustic Survey Methods/NABat Survey Methods” field training course in Elgin AZ, 5-9 July.

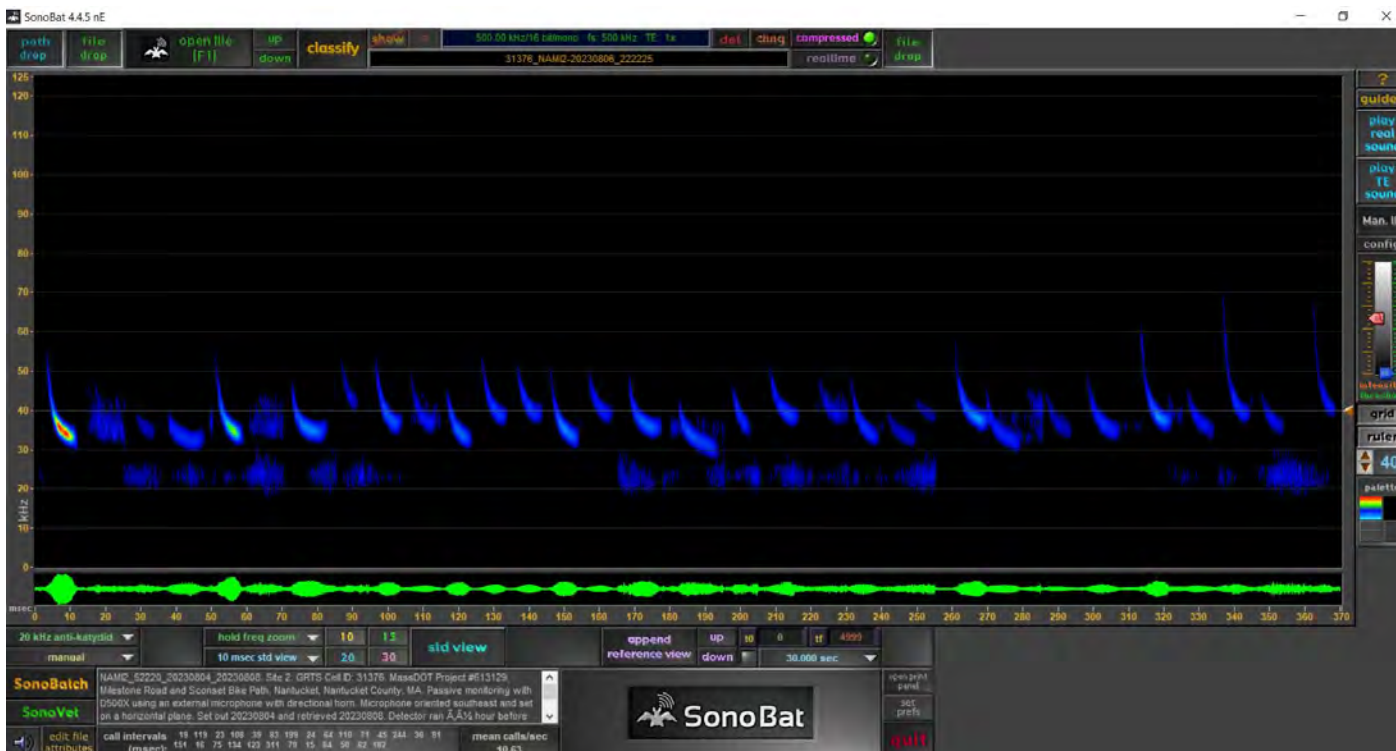
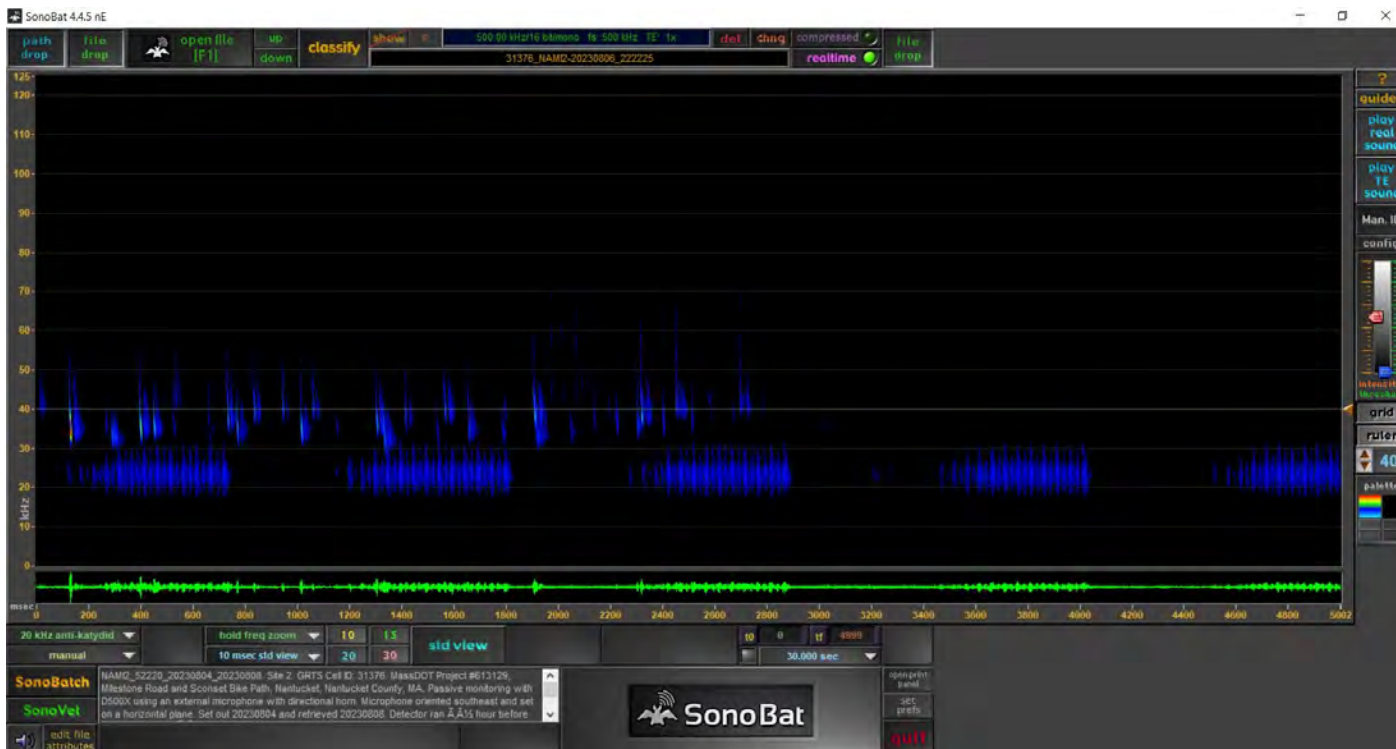
SKILLS

Writing (non-fiction, fiction, and creative), Photography (outdoor and nature; digital and film), Design/Layout (computer assisted), Drawing, drafting, painting, Cycling (recreational road biking; racing), Sea Kayaking, Running Exercise/Health/Nutrition/Fitness, Hiking, Nature Study and Travel

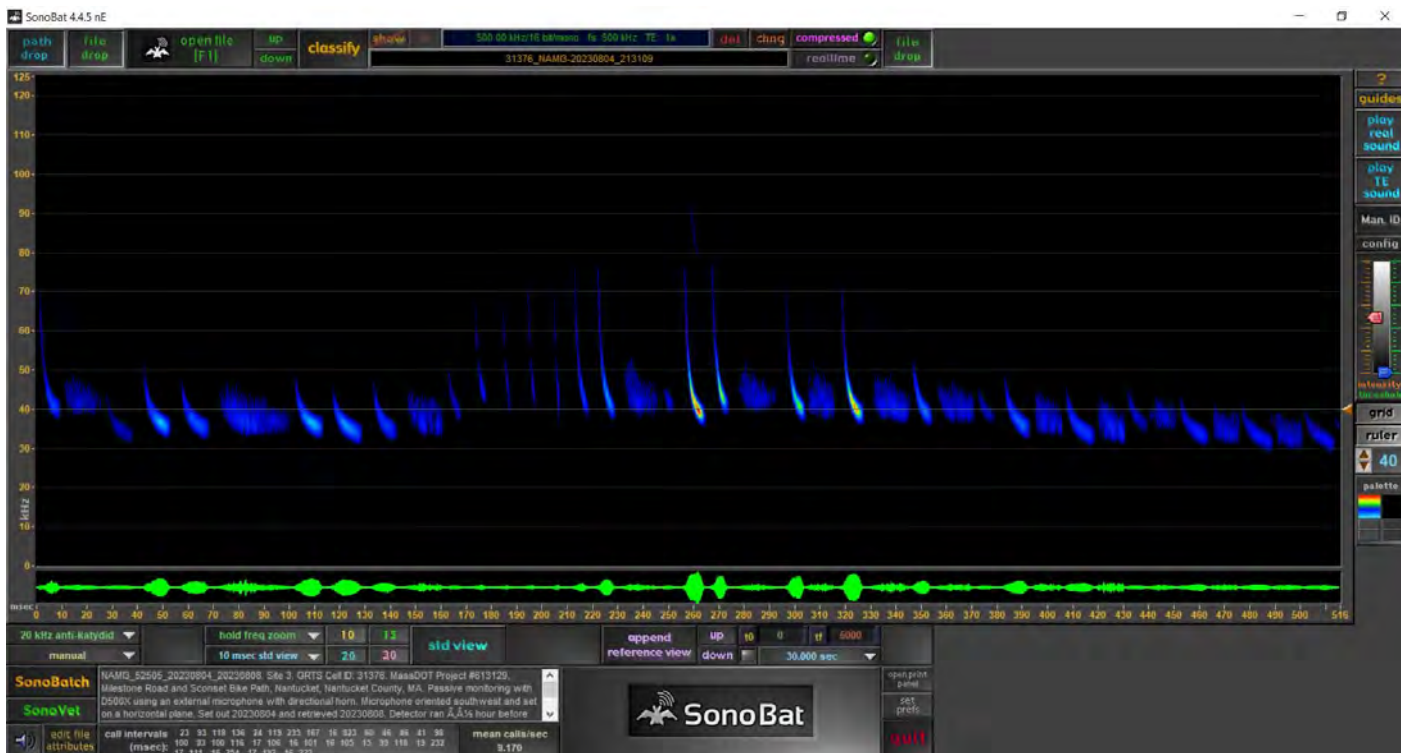
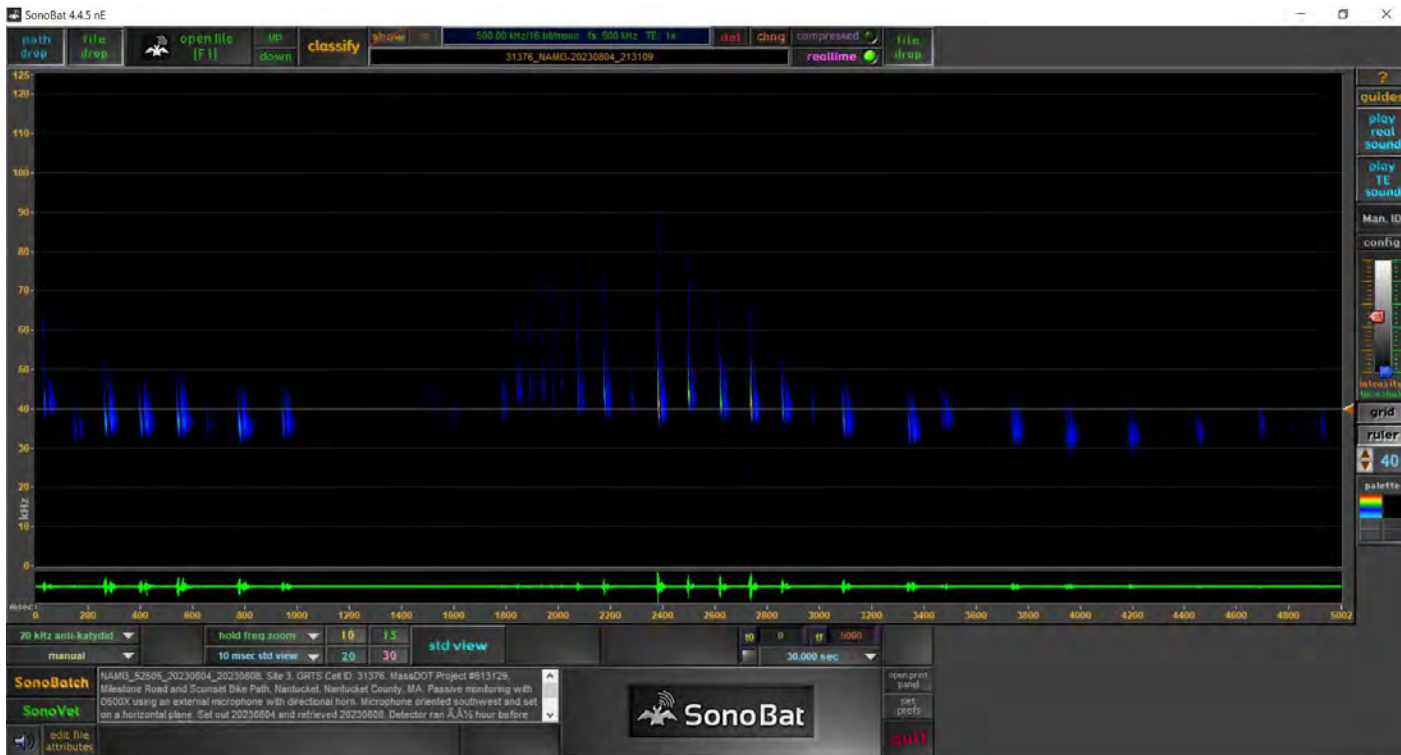
Appendix E: Representative Spectrograms



Spectrogram 1: A confirmed hoary bat (*Lasiurus cinereus*; LACI) recorded at Site 1 on the night of August 5, 2023, as shown in full-spectrum via SonoBat 4.4.5 in true-time format (top) and compressed format (bottom).



Spectrogram 2: A confirmed eastern red bat (*Lasiurus borealis*; LABO) recorded at Site 2 on the night of August 6, 2023, as shown in full-spectrum via SonoBat 4.4.5 in true-time format (top) and compressed format (bottom).



Spectrogram 3: A confirmed eastern red bat (*Lasiurus borealis*; LABO) recorded at Site 3 on the night of August 4, 2023, as shown in full-spectrum via SonoBat 4.4.5 in true-time format (top) and compressed format (bottom).

Appendix F: Event Logs

| Detector 52199_20230804_20230808_Event Log |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MODEL NO: SDCFXS-032G |
| FW REV: HDX10.04 |
| SERIAL: D ZA903081511271 |
| LABEL: D500X |
| 2023-08-04 14:26:51 \$\$SYSTEM START, FW VERSION: D500X V2.3.8 201211, 12:06:07, S/N: 52199, TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.8V, FILE: -, TOTAL FREE: 44.73G |
| 2023-08-04 15:00:30 \$\$TIMER SLEEP ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.7V, FILE: -, TOTAL FREE: 44.73G |
| 2023-08-04 16:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.7V, FILE: -, TOTAL FREE: 44.73G |
| 2023-08-04 17:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.7V, FILE: -, TOTAL FREE: 44.73G |
| 2023-08-04 18:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.7V, FILE: -, TOTAL FREE: 44.73G |
| 2023-08-04 19:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.7V, FILE: -, TOTAL FREE: 44.73G |
| 2023-08-04 19:24:01 \$\$TIMER WAKEUP ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.7V, FILE: -, TOTAL FREE: 44.73G |
| 2023-08-04 20:00:03 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.5V, FILE: M000022.WAV, TOTAL FREE: 44.63G |
| 2023-08-04 21:00:04 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.4V, FILE: M000047.WAV, TOTAL FREE: 44.51G |
| 2023-08-04 22:00:01 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.3V, FILE: M000067.WAV, TOTAL FREE: 44.41G |
| 2023-08-04 23:00:05 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.3V, FILE: M000098.WAV, TOTAL FREE: 44.27G |
| 2023-08-05 00:00:02 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.2V, FILE: M000116.WAV, TOTAL FREE: 44.18G |
| 2023-08-05 01:00:02 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.2V, FILE: M000126.WAV, TOTAL FREE: 44.14G |
| 2023-08-05 02:00:04 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.2V, FILE: M000134.WAV, TOTAL FREE: 44.10G |
| 2023-08-05 03:00:00 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.1V, FILE: M000177.WAV, TOTAL FREE: 43.90G |
| 2023-08-05 04:00:02 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.1V, FILE: M000182.WAV, TOTAL FREE: 43.87G |
| 2023-08-05 05:00:01 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.1V, FILE: M000196.WAV, TOTAL FREE: 43.81G |
| 2023-08-05 06:00:10 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.0V, FILE: M000238.WAV, TOTAL FREE: 43.61G |
| 2023-08-05 06:09:30 \$\$TIMER SLEEP ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.1V, FILE: M000241.WAV, TOTAL FREE: 43.60G |
| 2023-08-05 07:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.1V, FILE: M000241.WAV, TOTAL FREE: 43.60G |

| |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2023-08-08 04:00:04 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/---, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 4.7V, FILE: M000556.WAV, TOTAL FREE: 42.12G |
| 2023-08-08 05:00:07 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/---, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 4.6V, FILE: M000565.WAV, TOTAL FREE: 42.07G |
| 2023-08-08 06:00:12 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/---, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 4.6V, FILE: M000589.WAV, TOTAL FREE: 41.96G |
| 2023-08-08 06:09:30 \$\$TIMER SLEEP ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/---, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 4.7V, FILE: M000597.WAV, TOTAL FREE: 41.92G |
| 2023-08-08 07:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/---, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 4.7V, FILE: M000597.WAV, TOTAL FREE: 41.92G |
| 2023-08-08 08:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/---, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 4.7V, FILE: M000597.WAV, TOTAL FREE: 41.92G |
| 2023-08-08 09:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/---, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 4.8V, FILE: M000597.WAV, TOTAL FREE: 41.92G |
| 2023-08-08 10:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/---, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 4.8V, FILE: M000597.WAV, TOTAL FREE: 41.92G |
| 2023-08-08 11:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/---, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 4.9V, FILE: M000597.WAV, TOTAL FREE: 41.92G |
| 2023-08-08 12:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/---, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 4.9V, FILE: M000597.WAV, TOTAL FREE: 41.92G |
| 2023-08-08 13:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/---, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.0V, FILE: M000597.WAV, TOTAL FREE: 41.92G |
| 2023-08-08 13:04:21 \$\$KEYBOARD WAKEUP --- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/---, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.0V, FILE: M000597.WAV, TOTAL FREE: 41.92G |
| 2023-08-08 13:05:20 \$\$KEYBOARD SLEEP ---- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/---, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 4.9V, FILE: M000597.WAV, TOTAL FREE: 41.92G |

| Detector 52220_20230804_20230808_Event Log |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MODEL NO: SDCFXS-032G |
| FW REV: HDX16.01 |
| SERIAL: H ZA210112115373 |
| LABEL: D500X |
| 2023-08-04 14:29:57 \$\$SYSTEM START, FW VERSION: D500X V2.3.8 201211, 12:06:07, S/N: 52220, TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.9V, FILE: -, TOTAL FREE: 59.63G |
| 2023-08-04 15:21:30 \$\$TIMER SLEEP ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.7V, FILE: -, TOTAL FREE: 59.63G |
| 2023-08-04 16:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.7V, FILE: -, TOTAL FREE: 59.63G |
| 2023-08-04 17:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.7V, FILE: -, TOTAL FREE: 59.63G |
| 2023-08-04 18:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.7V, FILE: -, TOTAL FREE: 59.63G |
| 2023-08-04 19:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.7V, FILE: -, TOTAL FREE: 59.63G |
| 2023-08-04 19:24:02 \$\$TIMER WAKEUP ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.8V, FILE: -, TOTAL FREE: 59.63G |
| 2023-08-04 20:00:00 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.6V, FILE: M000002.WAV, TOTAL FREE: 59.62G |
| 2023-08-04 21:00:00 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.5V, FILE: M000003.WAV, TOTAL FREE: 59.61G |
| 2023-08-04 22:00:04 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.4V, FILE: M000008.WAV, TOTAL FREE: 59.59G |
| 2023-08-04 23:00:04 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.4V, FILE: M000015.WAV, TOTAL FREE: 59.55G |
| 2023-08-05 00:00:01 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.3V, FILE: M000018.WAV, TOTAL FREE: 59.54G |
| 2023-08-05 01:00:04 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.3V, FILE: M000031.WAV, TOTAL FREE: 59.48G |
| 2023-08-05 02:00:02 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.3V, FILE: M000035.WAV, TOTAL FREE: 59.46G |
| 2023-08-05 03:00:03 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.2V, FILE: M000045.WAV, TOTAL FREE: 59.41G |
| 2023-08-05 04:00:01 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.2V, FILE: M000045.WAV, TOTAL FREE: 59.41G |
| 2023-08-05 05:00:00 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.2V, FILE: M000046.WAV, TOTAL FREE: 59.41G |
| 2023-08-05 06:00:00 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.2V, FILE: M000050.WAV, TOTAL FREE: 59.39G |
| 2023-08-05 06:09:30 \$\$TIMER SLEEP ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.2V, FILE: M000050.WAV, TOTAL FREE: 59.39G |
| 2023-08-05 07:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:--, SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.2V, FILE: M000050.WAV, TOTAL FREE: 59.39G |

| |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2023-08-08 04:00:03 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 14:09/02:02, DST=DIS, BATTERY: 4.7V, FILE: M000190.WAV, TOTAL FREE: 58.73G |
| 2023-08-08 05:00:04 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 14:09/02:02, DST=DIS, BATTERY: 4.7V, FILE: M000190.WAV, TOTAL FREE: 58.73G |
| 2023-08-08 06:00:02 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 14:09/02:02, DST=DIS, BATTERY: 4.7V, FILE: M000195.WAV, TOTAL FREE: 58.71G |
| 2023-08-08 06:09:30 \$\$TIMER SLEEP ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 14:09/02:02, DST=DIS, BATTERY: 4.7V, FILE: M000195.WAV, TOTAL FREE: 58.71G |
| 2023-08-08 07:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 14:09/02:02, DST=DIS, BATTERY: 4.8V, FILE: M000195.WAV, TOTAL FREE: 58.71G |
| 2023-08-08 08:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 14:09/02:02, DST=DIS, BATTERY: 4.8V, FILE: M000195.WAV, TOTAL FREE: 58.71G |
| 2023-08-08 09:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 14:09/02:02, DST=DIS, BATTERY: 4.9V, FILE: M000195.WAV, TOTAL FREE: 58.71G |
| 2023-08-08 10:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 14:09/02:02, DST=DIS, BATTERY: 4.9V, FILE: M000195.WAV, TOTAL FREE: 58.71G |
| 2023-08-08 11:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 14:09/02:02, DST=DIS, BATTERY: 4.9V, FILE: M000195.WAV, TOTAL FREE: 58.71G |
| 2023-08-08 12:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.0V, FILE: M000195.WAV, TOTAL FREE: 58.71G |
| 2023-08-08 13:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.0V, FILE: M000195.WAV, TOTAL FREE: 58.71G |
| 2023-08-08 13:11:16 \$\$KEYBOARD WAKEUP --- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.1V, FILE: M000195.WAV, TOTAL FREE: 58.71G |
| 2023-08-08 13:12:14 \$\$KEYBOARD SLEEP ---- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 14:09/02:02, DST=DIS, BATTERY: 5.0V, FILE: M000195.WAV, TOTAL FREE: 58.71G |

| Detector 52505_20230804_20230808_Event Log |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MODEL NO: TS32GCF133 |
| FW REV: 20171204 |
| SERIAL: 9G17975020351AE00002 |
| LABEL: D500X |
| 2023-08-04 15:28:55 \$\$SYSTEM START, FW VERSION: D500X V2.4.5 201211, 12:06:56, S/N: 52505, TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 5.9V, FILE: -, TOTAL FREE: 44.73G |
| 2023-08-04 15:29:52 \$\$KEYBOARD SLEEP ---- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 5.9V, FILE: -, TOTAL FREE: 44.73G |
| 2023-08-04 15:31:21 \$\$KEYBOARD WAKEUP --- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 5.9V, FILE: -, TOTAL FREE: 44.73G |
| 2023-08-04 15:32:00 \$\$TIMER SLEEP ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 5.9V, FILE: -, TOTAL FREE: 44.73G |
| 2023-08-04 15:47:37 \$\$KEYBOARD WAKEUP --- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 5.9V, FILE: -, TOTAL FREE: 44.73G |
| 2023-08-04 16:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 5.9V, FILE: -, TOTAL FREE: 44.73G |
| 2023-08-04 17:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 5.9V, FILE: -, TOTAL FREE: 44.73G |
| 2023-08-04 18:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 5.9V, FILE: -, TOTAL FREE: 44.73G |
| 2023-08-04 19:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 5.9V, FILE: -, TOTAL FREE: 44.73G |
| 2023-08-04 19:24:02 \$\$TIMER WAKEUP ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 5.9V, FILE: -, TOTAL FREE: 44.73G |
| 2023-08-04 20:00:01 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 5.6V, FILE: M000005.WAV, TOTAL FREE: 44.71G |
| 2023-08-04 21:00:03 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 5.5V, FILE: M000008.WAV, TOTAL FREE: 44.70G |
| 2023-08-04 22:00:01 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 5.4V, FILE: M000027.WAV, TOTAL FREE: 44.60G |
| 2023-08-04 23:00:03 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 5.3V, FILE: M000031.WAV, TOTAL FREE: 44.59G |
| 2023-08-05 00:00:02 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 5.3V, FILE: M000034.WAV, TOTAL FREE: 44.57G |
| 2023-08-05 01:00:00 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 5.3V, FILE: M000047.WAV, TOTAL FREE: 44.51G |
| 2023-08-05 02:00:01 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 5.2V, FILE: M000051.WAV, TOTAL FREE: 44.49G |
| 2023-08-05 03:00:04 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 5.2V, FILE: M000063.WAV, TOTAL FREE: 44.43G |
| 2023-08-05 04:00:01 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 5.2V, FILE: M000065.WAV, TOTAL FREE: 44.42G |
| 2023-08-05 05:00:01 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 5.1V, FILE: M000068.WAV, TOTAL FREE: 44.41G |

| |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2023-08-08 01:00:04 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 4.6V, FILE: M000201.WAV, TOTAL FREE: 43.86G |
| 2023-08-08 02:00:03 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 4.6V, FILE: M000210.WAV, TOTAL FREE: 43.81G |
| 2023-08-08 03:00:04 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 4.6V, FILE: M000213.WAV, TOTAL FREE: 43.80G |
| 2023-08-08 04:00:00 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 4.6V, FILE: M000215.WAV, TOTAL FREE: 43.79G |
| 2023-08-08 05:00:00 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 4.6V, FILE: M000216.WAV, TOTAL FREE: 43.79G |
| 2023-08-08 06:00:02 \$\$HOUR LOG ----- TIMER ON, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 4.5V, FILE: M000225.WAV, TOTAL FREE: 43.74G |
| 2023-08-08 06:09:30 \$\$TIMER SLEEP ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 4.6V, FILE: M000226.WAV, TOTAL FREE: 43.74G |
| 2023-08-08 07:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 4.6V, FILE: M000226.WAV, TOTAL FREE: 43.74G |
| 2023-08-08 08:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 4.7V, FILE: M000226.WAV, TOTAL FREE: 43.74G |
| 2023-08-08 09:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 4.7V, FILE: M000226.WAV, TOTAL FREE: 43.74G |
| 2023-08-08 10:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 4.8V, FILE: M000226.WAV, TOTAL FREE: 43.74G |
| 2023-08-08 11:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 4.9V, FILE: M000226.WAV, TOTAL FREE: 43.74G |
| 2023-08-08 12:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 4.9V, FILE: M000226.WAV, TOTAL FREE: 43.74G |
| 2023-08-08 13:00:00 \$\$HOUR LOG ----- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 5.0V, FILE: M000226.WAV, TOTAL FREE: 43.74G |
| 2023-08-08 13:18:08 \$\$KEYBOARD WAKEUP --- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 5.0V, FILE: M000226.WAV, TOTAL FREE: 43.74G |
| 2023-08-08 13:19:26 \$\$KEYBOARD SLEEP ---- TIMER OFF, INPUT GAIN=45, TRIG LEV=160, INTERVAL=0, RTIMER ON/OFF: ---/--:-- , SET/RISE 20:06/05:46, DST=DIS, BATTERY: 4.9V, FILE: M000226.WAV, TOTAL FREE: 43.74G |

DOCUMENT A00870

**MASSACHUSETTS
DIVISION OF FISHERIES AND WILDLIFE**

**NATURAL HERITAGE AND
ENDANGERED SPECIES
PROGRAM**

MESA Checklist

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MESA REVIEW CHECKLIST FOR MASSDOT- HIGHWAY DIVISION PROJECTS

Massachusetts Endangered Species Act M.G.L. c. 131A and Regulations (321 CMR 10.00)
 Massachusetts Division of Fisheries & Wildlife
 Natural Heritage & Endangered Species Program

For additional information or to schedule a pre-filing consultation, contact Timothy McGuire, Environmental Review Biologist, at: *timothy.mcguire2@mass.gov; (508) 389-6366*

~~~~ CONTACT INFORMATION ~~~~

If you already completed your Notice of Intent- Form 3, you can send page 1 of the NOI in place of questions 1 through 3 in this section

1. Project Location:

|                                                                                                      |                    |          |
|------------------------------------------------------------------------------------------------------|--------------------|----------|
| Intersection improvements at Milestone road and Polpis road and extension of 'sconset bikepath 02554 |                    |          |
| Street Address/Location                                                                              | City/Town          | Zip Code |
| N/A                                                                                                  |                    |          |
| Assessors Map/Plat Number                                                                            | Parcel /Lot Number |          |

2. MassDOT contact:

|                          |                |                                 |
|--------------------------|----------------|---------------------------------|
| David                    | Paulson        | MassDOT Highway Division        |
| First Name               | Last Name      | Company                         |
| 10 Park Plaza, Room 7360 |                |                                 |
| Mailing Address          |                |                                 |
| Boston                   | MA             | 02116                           |
| City/Town                | State          | Zip Code                        |
| (857) 262-3378           | (857) 368-0609 | david.j.paulson@dot.state.ma.us |
| Phone Number             | Fax Number     | Email address                   |

3. Engineer or other Representative:

|                           |                          |                                 |
|---------------------------|--------------------------|---------------------------------|
| MassDOT                   |                          |                                 |
| Company                   |                          |                                 |
| Ian                       | Battles                  |                                 |
| Contact Person First Name | Contact Person Last Name |                                 |
| 10 Park Plaza             |                          |                                 |
| Mailing Address           |                          |                                 |
| Boston                    | MA                       | 02116                           |
| City/Town                 | State                    | Zip Code                        |
| (857) 262-3378            | (857) 368-0609           | david.j.paulson@dot.state.ma.us |
| Phone Number              | Fax Number               | Email address                   |

~~~~ ADDITIONAL INFORMATION ~~~~

- Will this project meet any threshold for a MA Environmental Policy Act (MEPA) filing (excluding rare species, 301 CMR 11.03 (2))?
 No Yes- ENF
- Has this project been issued a NHESP Tracking Number? If Yes, Tracking No.: _____
 No Yes

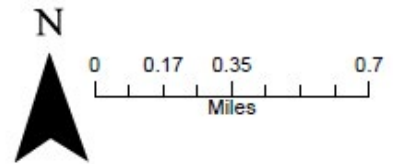
Please note: certain projects or activities are exempt from review (see 321 CMR 10.14). The MESA does not allow project segmentation. Your filing must reflect all anticipated work associated with the proposed project (CMR 321 10.16).

~~~~ PROJECT DESCRIPTION (Please attach separate description) ~~~~






613129 - NANTUCKET-  
INTERSECTION  
IMPROVEMENTS AT  
MILESTONE ROAD AND  
POLPIS ROAD AND  
EXTENSION OF 'SCONSET  
BIKEPATH



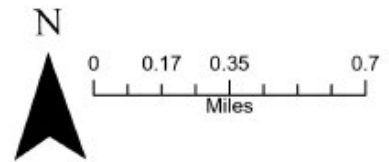




 NHESP Priority Habitats of Rare Species



613129 - NANTUCKET-  
INTERSECTION  
IMPROVEMENTS AT  
MILESTONE ROAD AND  
POLPIS ROAD AND  
EXTENSION OF 'SCONSET  
BIKEPATH



## 613129 - NANTUCKET- INTERSECTION IMPROVEMENTS AT MILESTONE ROAD AND POLPIS ROAD AND EXTENSION OF 'SCONSET BIKEPATH

### Project Description

#### **Background**

The purpose of this project is to improve intersection operations and safety at Milestone Road at Polpis Road in Nantucket, MA, through the design and construction of a new intersection configuration. The project will also include the construction of a shared-use-path on the north side of Milestone Road between Monomoy Road and the existing Polpis Bike Path for a distance of approximately 1600 feet. The project will make geometric changes to the Polpis Road approach to improve safety and accessibility for all users while providing an extension of the shared use path through the intersection on the north side of Milestone Road.

#### **Impacts**

The project potentially impacts 69965 square feet of NHESP priority habitat, or 0.0025 square miles. However, the areas impacted are entirely roadway, lawn, and forested areas. The project does not impact any wetland. 162 trees are to be removed from the forested areas bordering the roadway.





*Westernmost edge of project bounds, facing East. Intersection between Milestone Road and Monomoy Road*



*Roadway, lawn, and forested areas on Milestone Road between Monomoy Road and Polpis Road*





*Facing South on Milestone Road, looking down Polpis Bike path*



*Facing East, intersection between Milestone Road and Polpis Bikepath*



*Intersection between Milestone Road and Polpis Road, facing Northeast*



*Limit of work on Polpis Road, facing Southwest towards the the intersection between Milestone Road and Polpis Road*



# MASSACHUSETTS DEPARTMENT OF TRANSPORTATION HIGHWAY DIVISION

## PLAN AND PROFILE OF MILESTONE ROAD AT POLPIS ROAD

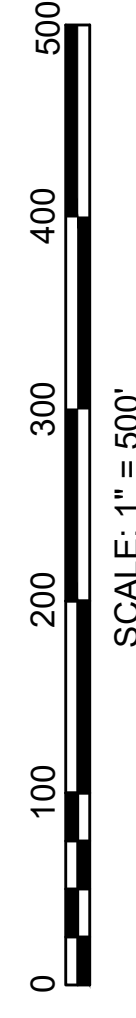
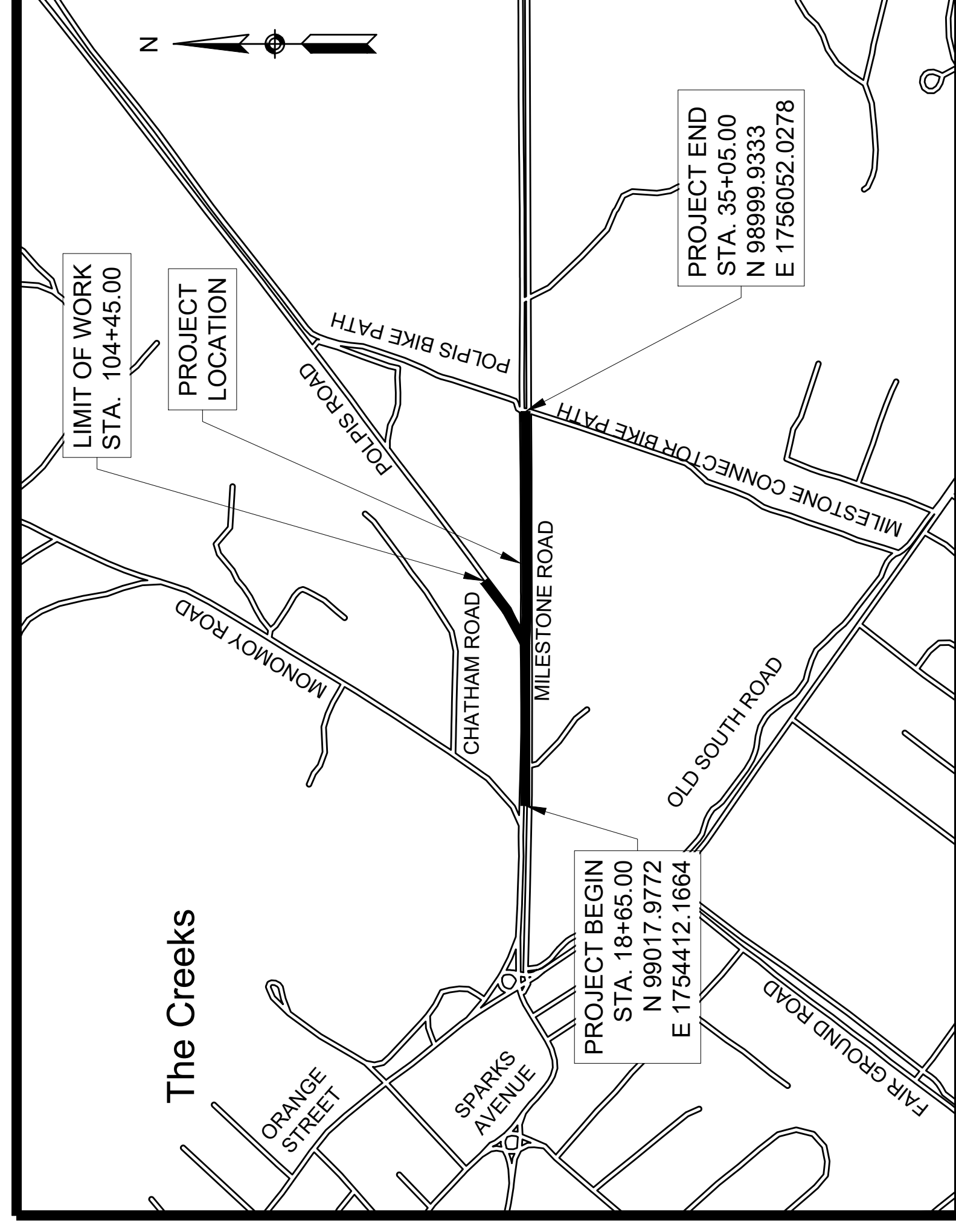
IN THE TOWN OF  
**NANTUCKET**  
NANTUCKET COUNTY

# 100% SUBMISSION

| SHEET NO. | DESCRIPTION                             |
|-----------|-----------------------------------------|
| 1         | TITLE SHEET & INDEX                     |
| 2         | LEGEND & ABBREVIATIONS                  |
| 3         | KEY PLAN                                |
| 4         | TYPICAL SECTIONS                        |
| 5 - 7     | CONSTRUCTION BASELINE TIES              |
| 8 - 10    | CONSTRUCTION PLANS                      |
| 11 - 13   | CONSTRUCTION PROFILES                   |
| 14 - 16   | CURB TIE & GRADING PLANS                |
| 17 - 19   | DRAINAGE & UTILITY PLANS                |
| 20        | DRAINAGE DETAILS                        |
| 21 - 23   | TRAFFIC SIGN & PAVEMENT MARKING PLANS   |
| 24        | TRAFFIC SIGN SUMMARY SHEET              |
| 25        | TRAFFIC LEGEND ABBREVIATIONS & NOTES    |
| 26 - 29   | TEMPORARY TRAFFIC CONTROL PLANS         |
| 30 - 32   | CONSTRUCTION DETAILS                    |
| 33        | PEDESTRIAN CURB RAMP & DRIVEWAY DETAILS |
| 34 - 50   | CROSS SECTIONS                          |

### INDEX

| SHEET NO. | DESCRIPTION                             |
|-----------|-----------------------------------------|
| 1         | TITLE SHEET & INDEX                     |
| 2         | LEGEND & ABBREVIATIONS                  |
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| 30 - 32   | CONSTRUCTION DETAILS                    |
| 33        | PEDESTRIAN CURB RAMP & DRIVEWAY DETAILS |
| 34 - 50   | CROSS SECTIONS                          |



LENGTH OF PROJECT = 2,055.00 FEET = 0.39 MILES

| DESIGN SPEED    | 30 MPH |
|-----------------|--------|
| ADT (2023)      | 7,100  |
| ADT (2043)      | 7,500  |
| K               | 8.7%   |
| D               | 50%    |
| T (PEAK HOUR)   | 4.7%   |
| T (AVERAGE DAY) | 3.8%   |
| DHV             | 620    |
| DDHV            | 310    |

### DESIGN DESIGNATION

| MILESTONE ROAD       | POLPIS ROAD          |
|----------------------|----------------------|
| 35 MPH               | 30 MPH               |
| 15,600               | 7,100                |
| 16,400               | 7,500                |
| 8.6%                 | 8.7%                 |
| 54% EB               | 50%                  |
| 5.4%                 | 4.7%                 |
| 4.8%                 | 3.8%                 |
| 1,350                | 620                  |
| 730                  | 310                  |
| URBAN MINOR ARTERIAL | URBAN MINOR ARTERIAL |

FUNCTIONAL CLASSIFICATION

| STATE | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
|-------|--------------------|-----------|--------------|
| MA    | -                  | 1         | 50           |

PROJECT FILE NO. 613129

TITLE SHEET & INDEX

THESE PLANS ARE SUPPLEMENTED BY THE OCTOBER 2017 CONSTRUCTION STANDARD DETAILS, THE 2015 OVERHEAD SIGNAL STRUCTURE AND FOUNDATION STANDARD DRAWINGS, MASSDOT TRAFFIC MANAGEMENT PLANS AND DETAIL DRAWINGS, THE 1980 STANDARD DRAWINGS FOR SIGNS AND SUPPORTS, THE 1968 STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING, AND THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK.

FEBRUARY 2024

| DATE      | DESCRIPTION          | REV # |
|-----------|----------------------|-------|
| 2/23/2024 | 100% SUBMISSION      | 1     |
| 5/30/2023 | 25% / 75% SUBMISSION | 0     |



APPROVED

CHIEF ENGINEER, P.E.

DATE

**GPI** Engineering  
Design  
Planning  
Construction Management  
875.572.2888 [GPI.NET.COM](http://GPI.NET.COM)  
Greenman-Pedersen, Inc.  
181 Balfordvale Street, Suite 202  
Wilmington, MA 01887

**GENERAL NOTES**

TOPOGRAPHICAL INFORMATION WAS PROVIDED BY MASSDOT, AUGUST 2017 (508-824-6633).  
 SUPPLEMENTAL SURVEY WAS PROVIDED BY GREENMAN-PEDERSEN, INC. JANUARY 2018, MARCH 2021, APRIL 2023, & OCTOBER 2023.  
 VERTICAL DATUM IS BASED ON NAVD88. HORIZONTAL DATUM IS BASED ON MA ISLAND ZONE NAD83 (2011).

THE LOCATIONS AND SIZES OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO LOCATE EXACTLY AND TO PRESERVE ANY AND ALL UNDERGROUND UTILITIES. CALL "DIG-SAFE" 1-888-DIGSAFE (344-7233) AT LEAST 72 HOURS BEFORE COMMENCING CONSTRUCTION.

WHERE AN EXISTING UNDERGROUND UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR, AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.

THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY COMPANIES.

AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE.

THE TERM "PROPOSED" (PROP.) MEANS WORK TO BE CONSTRUCTED USING NEW MATERIALS, OR, WHERE APPLICABLE, RE-USING EXISTING MATERIALS IDENTIFIED AS "REMOVE & RESET" (R&R).

ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RETAINED UNLESS NOTED OTHERWISE.

ALL PROPOSED PAVEMENT MARKINGS SHALL BE THERMOPLASTIC.

ALL EXISTING (STATE, COUNTY, CITY AND TOWN) LOCATION LINES HAVE BEEN ESTABLISHED BY CADASTRAL SURVEY AND FOUND MONUMENTATION. PRIVATE PROPERTY LINES HAVE BEEN ESTABLISHED FROM AVAILABLE INFORMATION AND THEIR EXACT LOCATIONS ARE NOT GUARANTEED.

ALL TRANSVERSE JOINTS, AND ALL LONGITUDINAL JOINTS BETWEEN NEW SURFACE PAVEMENT AND EXISTING SURFACE PAVEMENT TO REMAIN SHALL BE COATED WITH A HOT POURED RUBBERIZED ASPHALT ADHESIVE MEETING THE REQUIREMENTS OF ITEM 453.

ALL DISTURBED AREAS NOT DESIGNATED TO BE PAVED SHALL HAVE LOAM BORROW PLACED AND SEEDED. THE LOAM BORROW SHALL HAVE A MINIMUM DEPTH OF 4 INCHES AND SHALL BE PLACED FLUSH WITH THE TOP OF THE ADJACENT CURB, EDGING, BERM OR PAVEMENT SURFACE.

THE LIMIT OF WORK AREA SHALL BE THE STREET RIGHT OF WAY UNLESS SHOWN OTHERWISE.

PRIOR TO THE START OF ANY NEW UTILITY WORK, ALL ELEVATIONS OF EXISTING UTILITIES IN THOSE AREAS ARE TO BE VERIFIED. THE ENGINEER IS TO BE NOTIFIED IMMEDIATELY SHOULD ANY DISCREPANCIES OCCUR.

ALL CASTINGS SHALL BE SET FLUSH WITH FINISHED GRADE.

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**GENERAL SYMBOLS**

| EXISTING | PROPOSED | DESCRIPTION                                               |
|----------|----------|-----------------------------------------------------------|
|          | JB       | JERSEY BARRIER                                            |
|          | CB       | CATCH BASIN                                               |
|          | FP       | FLAG POLE                                                 |
|          | GP       | GAS PUMP                                                  |
|          | MB       | MAIL BOX                                                  |
|          |          | POST SQUARE                                               |
|          |          | POST CIRCULAR                                             |
|          | WELL     | WELL                                                      |
|          | EHH      | ELECTRIC HANDHOLE                                         |
|          |          | FENCE GATE POST                                           |
|          | GG       | GAS GATE                                                  |
|          | BHL #    | BORING HOLE                                               |
|          | MW #     | MONITORING WELL                                           |
|          | TP #     | TEST PIT                                                  |
|          |          | HYDRANT                                                   |
|          |          | LIGHT POLE                                                |
|          | CO.BD.   | COUNTY BOUND                                              |
|          |          | GPS POINT                                                 |
|          |          | CABLE MANHOLE                                             |
|          |          | DRAINAGE MANHOLE                                          |
|          |          | ELECTRIC MANHOLE                                          |
|          |          | GAS MANHOLE                                               |
|          |          | MISC MANHOLE                                              |
|          |          | SEWER MANHOLE                                             |
|          |          | TELEPHONE MANHOLE                                         |
|          |          | WATER MANHOLE                                             |
|          | MHB      | MASSACHUSETTS HIGHWAY BOUND MONUMENT                      |
|          | SB       | STONE BOUND                                               |
|          | TB       | TOWN OR CITY BOUND                                        |
|          |          | TRAVERSE OR TRIANGULATION STATION                         |
|          |          | TROLLEY POLE OR GUY POLE                                  |
|          |          | TRANSMISSION POLE                                         |
|          | UFB      | UTILITY POLE W/ FIREBOX                                   |
|          | UPDL     | UTILITY POLE WITH DOUBLE LIGHT                            |
|          | ULT      | UTILITY POLE W/ 1 LIGHT                                   |
|          | UPL      | UTILITY POLE                                              |
|          |          | BUSH                                                      |
|          |          | TREE                                                      |
|          |          | STUMP                                                     |
|          | WG       | SWAMP / MARSH                                             |
|          | WG       | WATER GATE                                                |
|          | PM       | PARKING METER                                             |
|          |          | OVERHEAD CABLE/WIRE                                       |
|          |          | CURBING                                                   |
|          |          | CONTOURS (ON-THE-GROUND SURVEY DATA)                      |
|          |          | CONTOURS (PHOTOGRAMMETRIC DATA)                           |
|          |          | UNDERGROUND DRAIN PIPE (DOUBLE LINE 24 INCH AND OVER)     |
|          |          | UNDERGROUND ELECTRIC DUCT (DOUBLE LINE 24 INCH AND OVER)  |
|          |          | UNDERGROUND GAS MAIN (DOUBLE LINE 24 INCH AND OVER)       |
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|          |          | UNDERGROUND WATER MAIN (DOUBLE LINE 24 INCH AND OVER)     |
|          |          | BALANCED STONE WALL                                       |
|          |          | GUARD RAIL - STEEL POSTS                                  |
|          |          | GUARD RAIL - WOOD POSTS                                   |
|          |          | CHAIN LINK OR METAL FENCE                                 |
|          |          | WOOD FENCE                                                |
|          |          | HAY BALES/SILT FENCE/COMPOST FILTER TUBES                 |
|          |          | TREE LINE                                                 |
|          |          | SAWCUT LINE                                               |
|          |          | TOP OR BOTTOM OF SLOPE                                    |
|          |          | LIMIT OF EDGE OF PAVEMENT OR COLD PLANE AND OVERLAY       |
|          |          | BANK OF RIVER OR STREAM                                   |
|          |          | BORDER OF WETLAND                                         |
|          |          | 100 FT WETLAND BUFFER                                     |
|          |          | 200 FT RIVERFRONT BUFFER                                  |
|          |          | STATE HIGHWAY LAYOUT                                      |
|          |          | TOWN OR CITY LAYOUT                                       |
|          |          | COUNTY LAYOUT                                             |
|          |          | RAILROAD SIDELINE                                         |
|          |          | TOWN OR CITY BOUNDARY LINE                                |
|          |          | PROPERTY LINE OR APPROXIMATE PROPERTY LINE                |
|          |          | EASEMENT                                                  |

**GENERAL NOTES**

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ALL DISTURBED AREAS NOT DESIGNATED TO BE PAVED SHALL HAVE LOAM BORROW PLACED AND SEEDED. THE LOAM BORROW SHALL HAVE A MINIMUM DEPTH OF 4 INCHES AND SHALL BE PLACED FLUSH WITH THE TOP OF THE ADJACENT CURB, EDGING, BERM OR PAVEMENT SURFACE.

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|          | FP       | FLAG POLE                                                 |
|          | GP       | GAS PUMP                                                  |
|          | MB       | MAIL BOX                                                  |
|          |          | POST SQUARE                                               |
|          |          | POST CIRCULAR                                             |
|          | WELL     | WELL                                                      |
|          | EHH      | ELECTRIC HANDHOLE                                         |
|          |          | FENCE GATE POST                                           |
|          | GG       | GAS GATE                                                  |
|          | BHL #    | BORING HOLE                                               |
|          | MW #     | MONITORING WELL                                           |
|          | TP #     | TEST PIT                                                  |
|          |          | HYDRANT                                                   |
|          |          | LIGHT POLE                                                |
|          | CO.BD.   | COUNTY BOUND                                              |
|          |          | GPS POINT                                                 |
|          |          | CABLE MANHOLE                                             |
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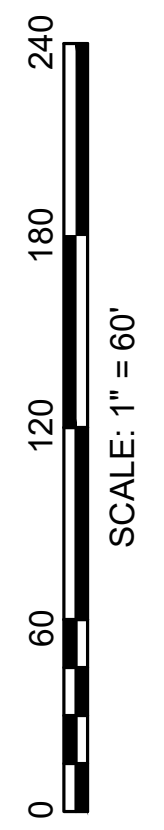
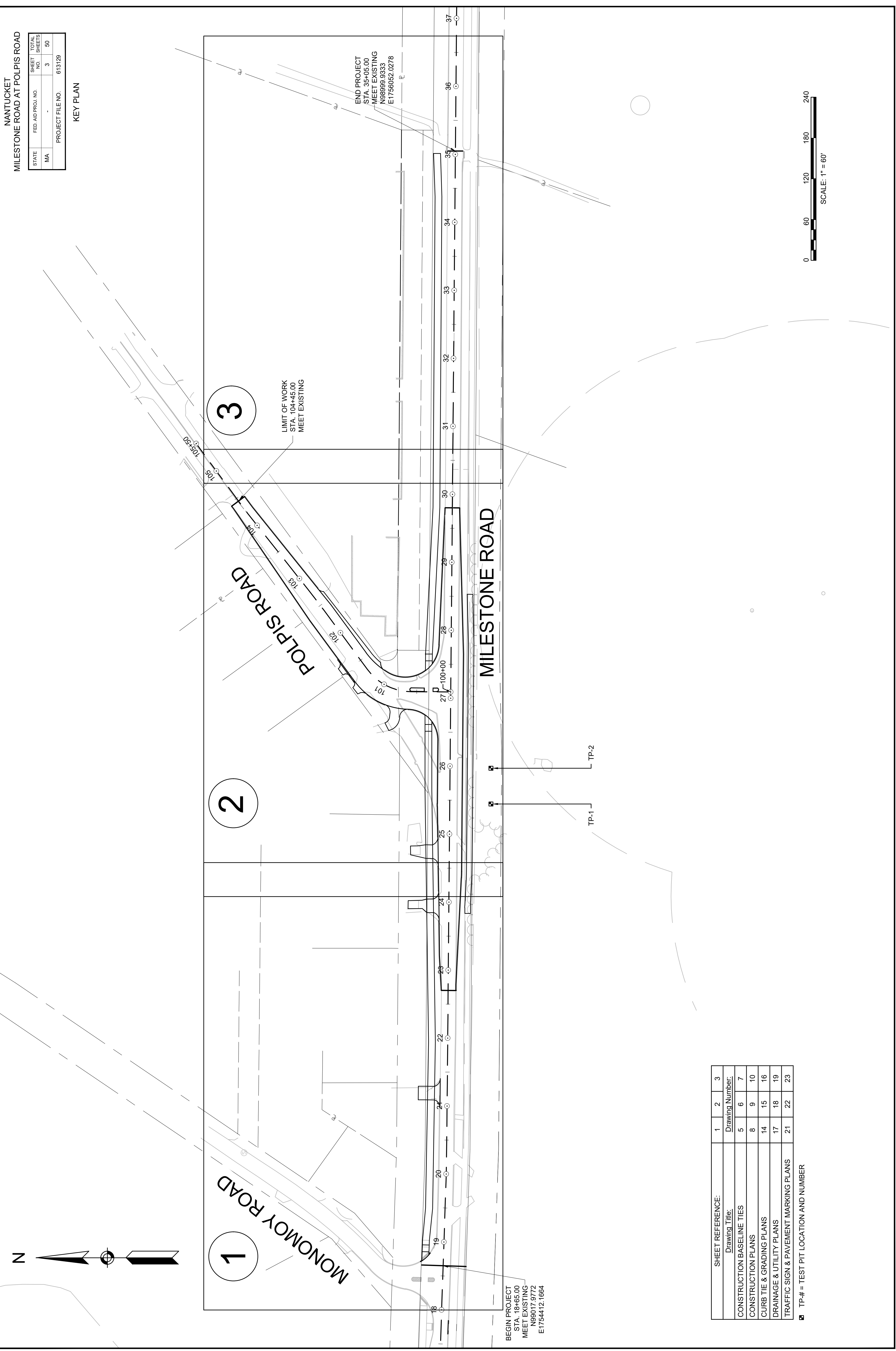
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|          |          | GUARD RAIL - STEEL POSTS                                  |
|          |          |                                                           |

NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

|                  |                    |           |              |
|------------------|--------------------|-----------|--------------|
| STATE            | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA               | -                  | 3         | 50           |
| PROJECT FILE NO. |                    | 613129    |              |

KEY PLAN



SHEET REFERENCE:

| Drawing Title:                        | 1  | 2  | 3  |
|---------------------------------------|----|----|----|
| CONSTRUCTION BASELINE TIES            | 5  | 6  | 7  |
| CONSTRUCTION PLANS                    | 8  | 9  | 10 |
| CURB TIE & GRADING PLANS              | 14 | 15 | 16 |
| DRAINAGE & UTILITY PLANS              | 17 | 18 | 19 |
| TRAFFIC SIGN & PAVEMENT MARKING PLANS | 21 | 22 | 23 |

TP-# = TEST PIT LOCATION AND NUMBER

BEGIN PROJECT  
STA. 18+65.00  
MEET EXISTING  
N99017.9772  
E1754412.1664

END PROJECT  
STA. 35+05.00  
MEET EXISTING  
N98999.9333  
E1756052.0278

LIMIT OF WORK  
STA. 104+45.00  
MEET EXISTING

1

2

3



NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

|                         |                   |           |              |
|-------------------------|-------------------|-----------|--------------|
| STATE                   | FED AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA                      | -                 | 4         | 50           |
| PROJECT FILE NO. 613129 |                   |           |              |

**PAVEMENT NOTES**

**TYPICAL SECTIONS**

**FULL DEPTH HMA CONSTRUCTION**  
SURFACE COURSE: 1 1/2" SUPERPAVE SURFACE COURSE - 9.5 POLYMER (SSC-9.5-P) OVER ASPHALT EMULSION FOR TACK COAT (RS-1h)  
2 1/2" SUPERPAVE INTERMEDIATE COURSE - 19.0 (SIC-19.0) OVER ASPHALT EMULSION FOR TACK COAT (RS-1h)  
3 1/2" SUPERPAVE INTERMEDIATE COURSE - 19.0 (SIC-19.0) OVER  
SUBBASE: 12" GRAVEL BORROW TYPE B (OR SUITABLE EXISTING MATERIAL)

**PAVEMENT STANDARD MILLING & STRUCTURAL HMA OVERLAY**  
PROPOSED RESURFACING: 1 1/2" SUPERPAVE SURFACE COURSE - 9.5 POLYMER (SSC-9.5-P) OVER ASPHALT EMULSION FOR TACK COAT (RS-1h)  
2 1/2" SUPERPAVE INTERMEDIATE COURSE - 19.0 (SIC-19.0) OVER ASPHALT EMULSION FOR TACK COAT (RS-1h)  
SURFACE MILLING: 2" MIN. TO 4" MAX PAVEMENT MILLING (TO MEET LINES AND GRADES AND HMA QUALITY ASSURANCE)

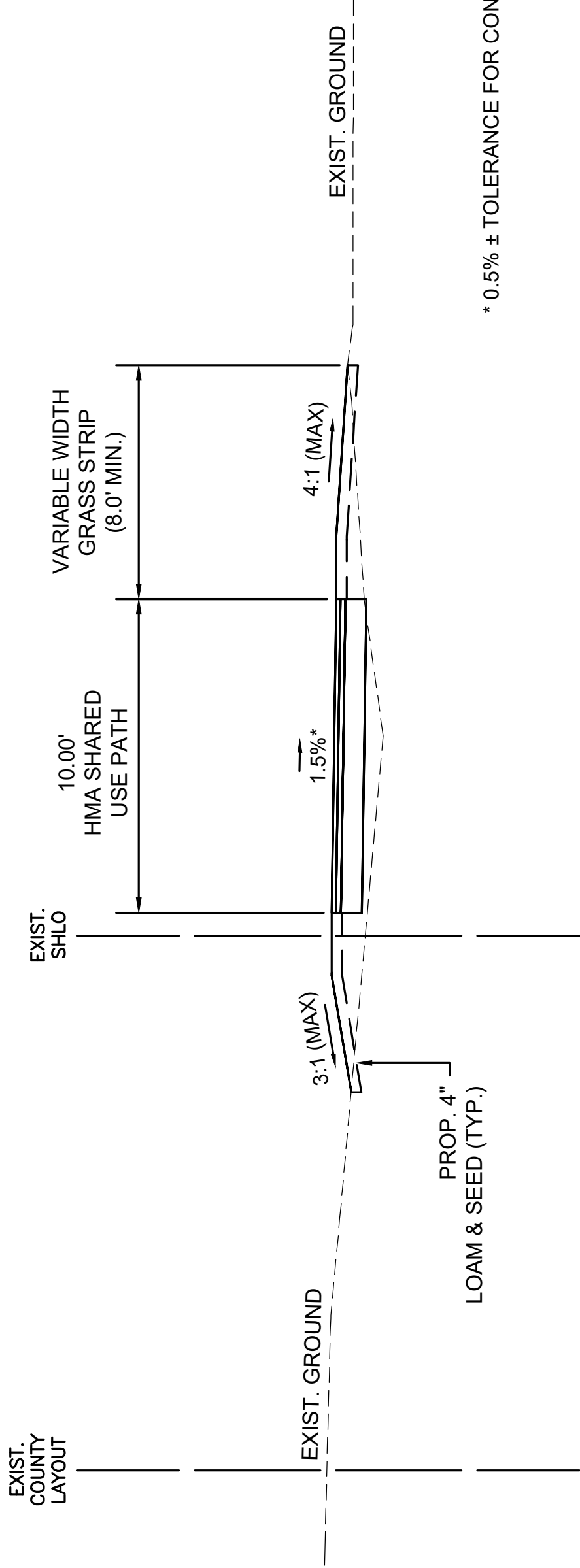
**FULL DEPTH HMA CONSTRUCTION LESS THAN 4 FEET**  
SURFACE COURSE: 1 1/2" SUPERPAVE SURFACE COURSE - 9.5 POLYMER (SSC-9.5-P) OVER ASPHALT EMULSION FOR TACK COAT (RS-1h)  
2 1/2" SUPERPAVE INTERMEDIATE COURSE - 19.0 (SIC-19.0) OVER ASPHALT EMULSION FOR TACK COAT (RS-1h)  
BASE: 6" HIGH EARLY STRENGTH CEMENT CONCRETE BASE COURSE OVER  
SUBBASE: 8" GRAVEL BORROW TYPE B (OR SUITABLE EXISTING MATERIAL)

**CEMENT CONCRETE PEDESTRIAN CURB RAMPS**  
SURFACE COURSE: 4" CEMENT CONCRETE (AIR ENTRAINED 4000 PSI, 3/4", 610) OVER  
SUBBASE: 8" GRAVEL BORROW TYPE B

**HMA DRIVEWAYS AND SHARED USE PATH**  
SURFACE COURSE: 1 1/2" SUPERPAVE SURFACE COURSE - 9.5 (SSC-9.5) OVER  
2 1/2" SUPERPAVE SURFACE COURSE - 12.5 (SSC-12.5) OVER  
SUBBASE: 8" GRAVEL BORROW TYPE B

**GENERAL NOTES**

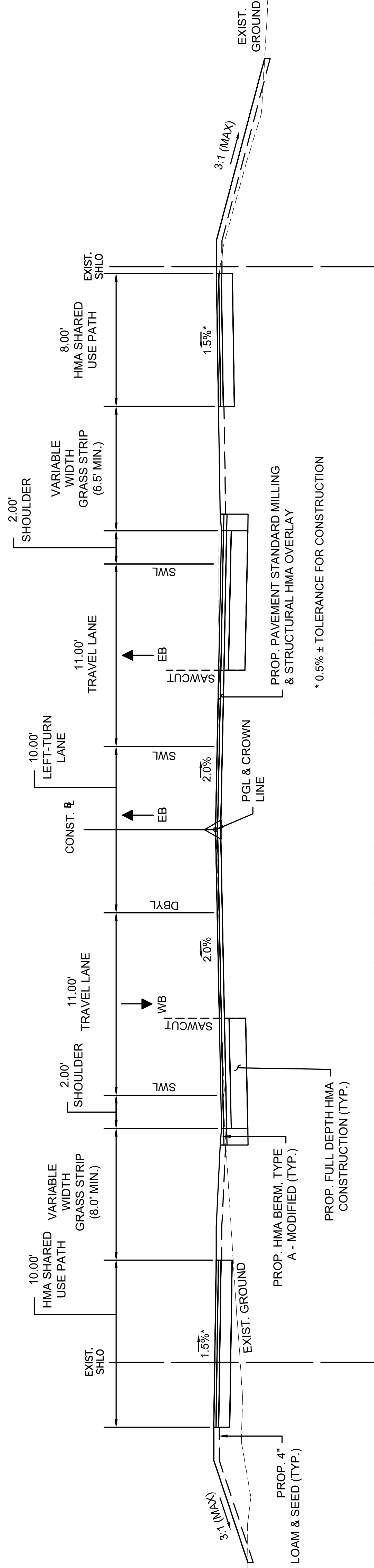
- HMA, HMA FOR PATCHING, ASPHALT EMULSION FOR TACK COAT AND HMA JOINT ADHESIVE AND PAVEMENT MILLING SHALL BE IN ACCORDANCE WITH SECTION 450 HMA PAVEMENT AND M3 ASPHALTIC MATERIALS SPECIFICATION.
- THE PROPOSED HMA RESURFACING, BOTH SURFACE AND INTERMEDIATE COURSES, SHALL EXTEND ACROSS THE FULL DEPTH CONSTRUCTION TO MEET SECTION 450 AND PAVING OPERATIONS.
- THE SECTIONS OF PROPOSED ROADWAY NOT COVERED IN THE RANGE OF STATIONS ASSOCIATED WITH THE TYPICAL SECTIONS ARE EITHER AT INTERSECTIONS OR ARE IN AREAS OF TRANSITION AND THEREFORE HAVE NOT BEEN SHOWN. THESE SECTIONS ARE:  
STA. 22+70 TO STA. 24+75 MILESTONE ROAD  
STA. 27+50 TO STA. 29+80 MILESTONE ROAD  
STA. 100+00 TO STA. 100+45 POLPIS ROAD  
STA. 102+75 TO STA. 104+45 POLPIS ROAD
- ASPHALT EMULSION FOR TACK COAT (RS-1h) SHALL BE APPLIED AT THE RATE OF 0.08 TO 0.08 GALLONS PER SQUARE YARD OVER NEW HMA SURFACES NOT OPENED TO TRAFFIC AS WELL AS OVER EXISTING TIGHT SMOOTH PAVEMENT. ON MILLED SURFACES, THE EMULSION APPLICATION RATE SHALL EQUAL 0.07 TO 0.09 GALLONS PER SQUARE YARD. ON NEW HMA PATCHES, THE EMULSION APPLICATION RATE SHALL EQUAL 0.08 TO 0.09 GALLONS PER SQUARE YARD.



\* 0.5% ± TOLERANCE FOR CONSTRUCTION

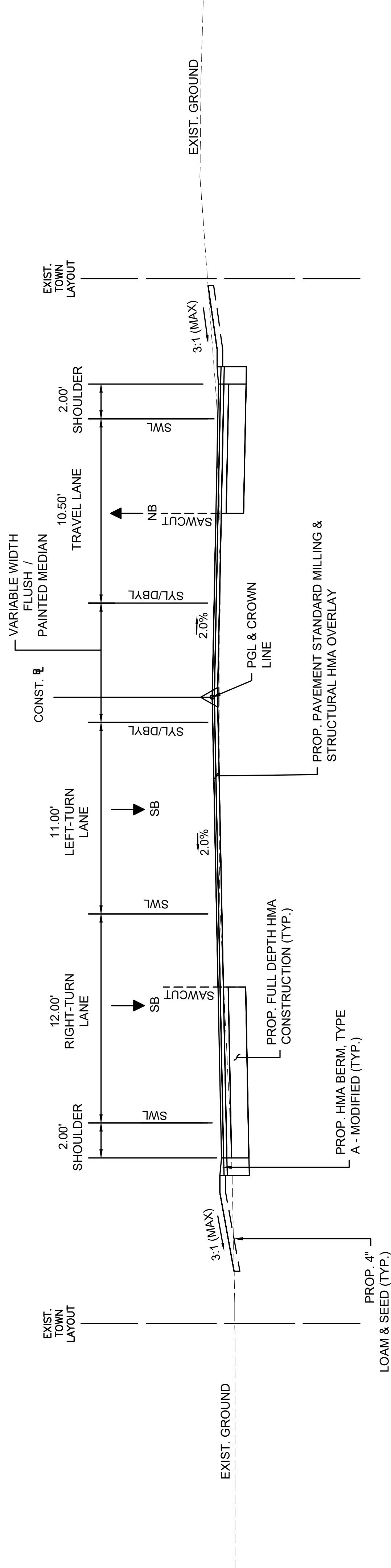
**TYPICAL SECTION - SHARED USE PATH**

STA. 18+65 TO STA. 26+75  
STA. 27+45 TO STA. 35+05



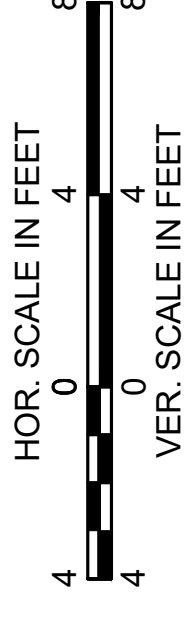
**TYPICAL SECTION - MILESTONE ROAD**

STA. 24+75 TO STA. 27+50



**TYPICAL SECTION - POLPIS ROAD**

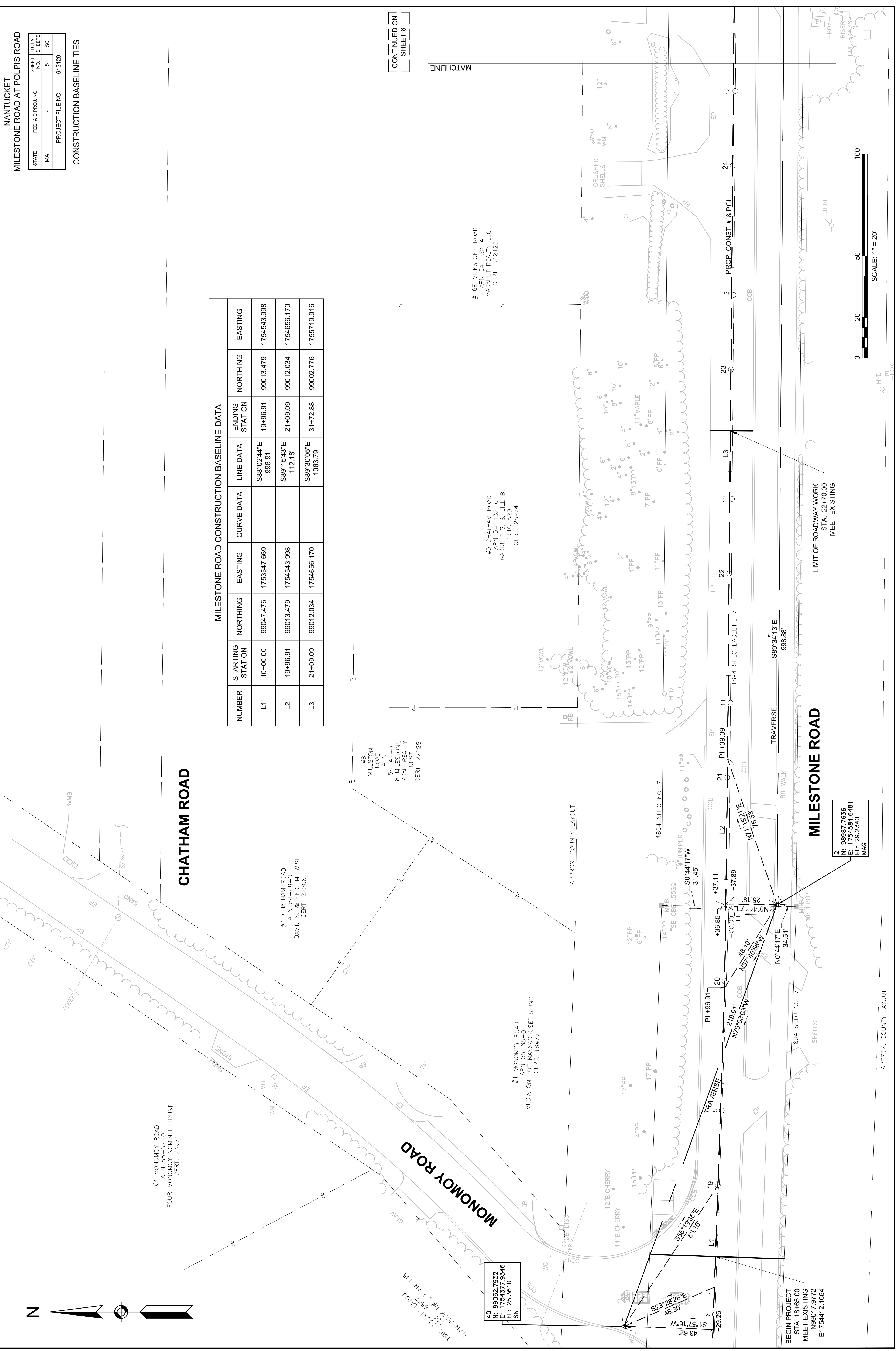
STA. 100+45 TO STA. 102+50



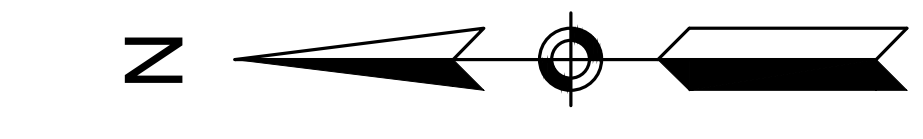
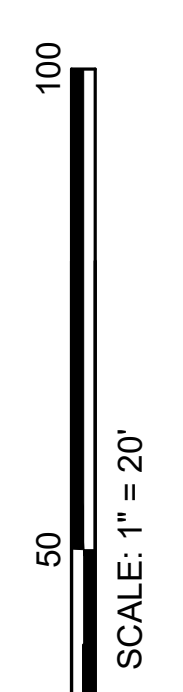
NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD  
CONSTRUCTION BASELINE TIES

| STATE            | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
|------------------|--------------------|-----------|--------------|
| MA               | -                  | 5         | 50           |
| PROJECT FILE NO. |                    | 613129    |              |

| MILESTONE ROAD CONSTRUCTION BASELINE DATA |                  |           |             |            |                         |                |           |             |
|-------------------------------------------|------------------|-----------|-------------|------------|-------------------------|----------------|-----------|-------------|
| NUMBER                                    | STARTING STATION | NORTHING  | EASTING     | CURVE DATA | LINE DATA               | ENDING STATION | NORTHING  | EASTING     |
| L1                                        | 10+00.00         | 99047.476 | 1753547.669 |            | S88°02'44"E<br>996.91'  | 19+96.91       | 99013.479 | 1754543.998 |
| L2                                        | 19+96.91         | 99013.479 | 1754543.998 |            | S89°15'43"E<br>112.18'  | 21+09.09       | 99012.034 | 1754656.170 |
| L3                                        | 21+09.09         | 99012.034 | 1754656.170 |            | S89°30'05"E<br>1063.79' | 31+72.88       | 99002.776 | 1755719.916 |



CONTINUED ON SHEET 6



PLAN BOOK SHEET PLAN 145  
#4 MONOWOY ROAD  
APN 54-47-0  
FOUR MONOWOY NOMINEE TRUST  
CERT. 23971

#1 CHATHAM ROAD  
APN 54-48-0  
DAVID S. & ENIC M. WISE  
CERT. 22208

#8 MILESTONE ROAD  
APN 54-47-0  
8 MILESTONE ROAD REALTY TRUST  
CERT. 22628

#5 CHATHAM ROAD  
APN 54-132-0  
GARRETT S. & JILL B. PRITCHARD  
CERT. 25974

#16 MILESTONE ROAD  
APN 54-130-4  
MADAKET REALTY LLC  
CERT. U42123

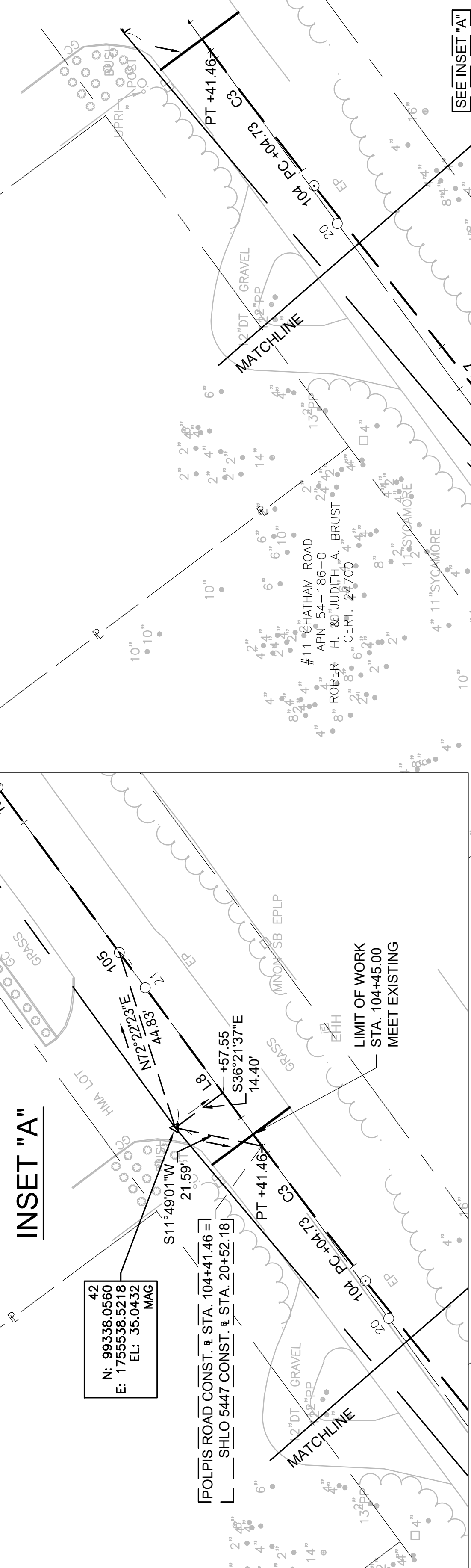
2  
N: 99097.7636  
E: 1754564.6481  
EL: 29.2340  
MAC

BEGIN PROJECT  
STA. 18+65.00  
MEET EXISTING  
N99017.9772  
E1754412.1664

NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

|                         |                   |           |              |
|-------------------------|-------------------|-----------|--------------|
| STATE                   | FED AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA                      |                   | 6         | 50           |
| PROJECT FILE NO. 613129 |                   |           |              |

CONSTRUCTION BASELINE TIES



POLPIS ROAD CONSTRUCTION BASELINE DATA

| NUMBER | STARTING STATION | NORTHING  | EASTING     | CURVE DATA                                    | LINE DATA              | ENDING STATION | NORTHING  | EASTING     |
|--------|------------------|-----------|-------------|-----------------------------------------------|------------------------|----------------|-----------|-------------|
| L5     | 100+00.00        | 99006.812 | 1755256.142 |                                               | N0°29'32"E<br>58.64'   | 100+58.64      | 99065.451 | 1755256.646 |
| C1     | 100+58.64        | 99065.451 | 1755256.646 | R - 80.00' Δ= 53°08'51"<br>L=74.21' T=40.02'  | N53°38'23"E<br>108.49' | 101+32.85      | 99129.189 | 1755289.214 |
| L6     | 101+32.85        | 99129.189 | 1755289.214 |                                               | N53°38'23"E<br>108.49' | 102+41.34      | 99193.509 | 1755376.582 |
| C2     | 102+41.34        | 99193.509 | 1755376.582 | R - 1000.00' Δ= 2°06'16"<br>L=36.73' T=18.37' | N51°32'07"E<br>126.66' | 102+78.07      | 99215.822 | 1755405.754 |
| L7     | 102+78.07        | 99215.822 | 1755405.754 |                                               | N51°32'07"E<br>126.66' | 104+04.73      | 99294.611 | 1755504.929 |
| C3     | 104+04.73        | 99294.611 | 1755504.929 | R - 1000.00' Δ= 2°06'16"<br>L=36.73' T=18.37' | N53°38'23"E<br>108.54' | 104+41.46      | 99316.924 | 1755534.101 |
| L8     | 104+41.46        | 99316.924 | 1755534.101 |                                               | N53°38'23"E<br>108.54' | 105+50.00      | 99381.273 | 1755621.508 |

MILESTONE ROAD CONSTRUCTION BASELINE DATA

| NUMBER | STARTING STATION | NORTHING  | EASTING     | CURVE DATA | LINE DATA               | ENDING STATION | NORTHING  | EASTING     |
|--------|------------------|-----------|-------------|------------|-------------------------|----------------|-----------|-------------|
| L3     | 21+09.09         | 99012.034 | 1754656.170 |            | S89°30'05"E<br>1063.79' | 31+72.88       | 99002.776 | 1755719.916 |

CONTINUED ON SHEET 7

CONTINUED ON SHEET 5

1 POLPIS ROAD  
APN 54-121  
N/F HOLDING COMPANY  
ISLAND LUMBER, INC.  
CERT. 569, L. PAGE 2011  
BOOK 1321, PAGE 211  
PLAN NO. 35 OF 2011

#4 POLPIS ROAD  
APN 54-187-0  
VON KAMPEN NOMINEE TRUST  
CERT. 22232

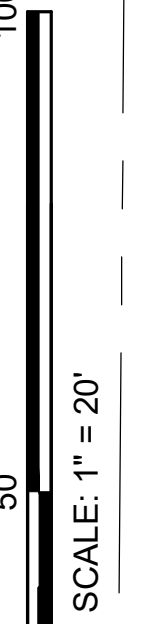
#12 POLPIS ROAD  
APN 54-128-0  
JUNE E. LIFE, JOHNSEN ESTATE  
CERT. 20086

MILESTONE ROAD CONST. STA. 25+67.48 =  
SHLO 5447 CONST. STA. 15+31.19

MILESTONE ROAD CONST. STA. 27+09.08 =  
POLPIS ROAD CONST. STA. 100+00.00

53 98971.0991  
E: 1755164.0544  
EL: 28.9023  
MAG

3 98980.2623  
E: 1755583.4998  
EL: 34.6191  
MAG





NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

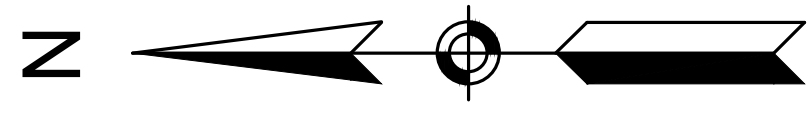
|                         |                   |           |              |
|-------------------------|-------------------|-----------|--------------|
| STATE                   | FED AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA                      | -                 | 7         | 50           |
| PROJECT FILE NO. 613129 |                   |           |              |

CONSTRUCTION BASELINE TIES

1. POLPIS ROAD  
APN 54-121  
N/F  
ISLAND LUMBER HOLDING  
COMPANY  
CERT. 5489, LCC 34603A  
BOOK 1321, PAGE 211  
PLAN NO. 35 OF 2011

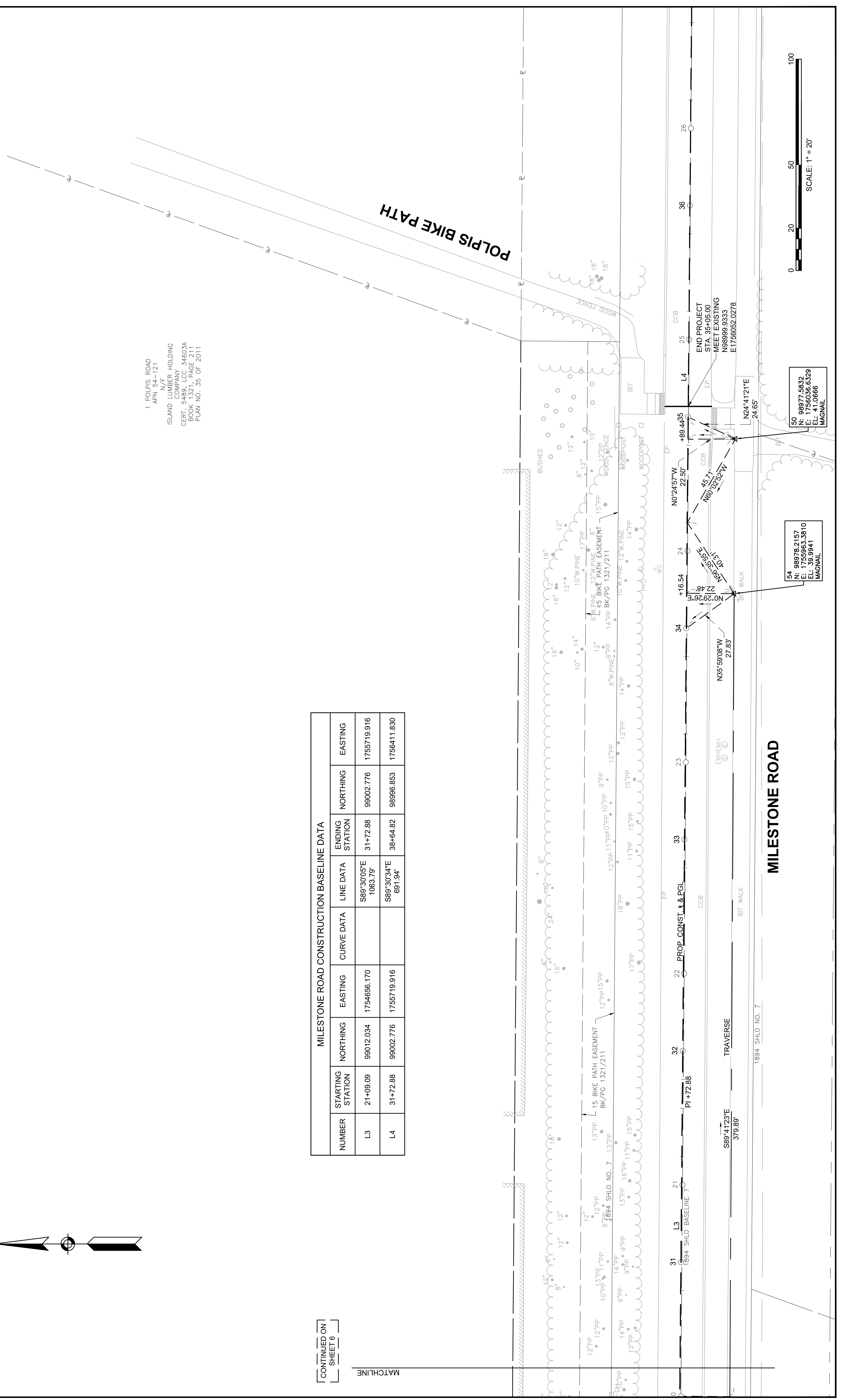
MILESTONE ROAD CONSTRUCTION BASELINE DATA

| NUMBER | STARTING STATION | NORTHING  | EASTING     | CURVE DATA | LINE DATA               | ENDING STATION | NORTHING  | EASTING     |
|--------|------------------|-----------|-------------|------------|-------------------------|----------------|-----------|-------------|
| L3     | 21+09.09         | 99012.034 | 1754656.170 |            | S89°30'05"E<br>1063.79' | 31+72.88       | 99002.776 | 1755719.916 |
| L4     | 31+72.88         | 99002.776 | 1755719.916 |            | S89°30'34"E<br>691.94'  | 38+64.82       | 98996.853 | 1756411.830 |



CONTINUED ON  
SHEET 6

MATCHLINE

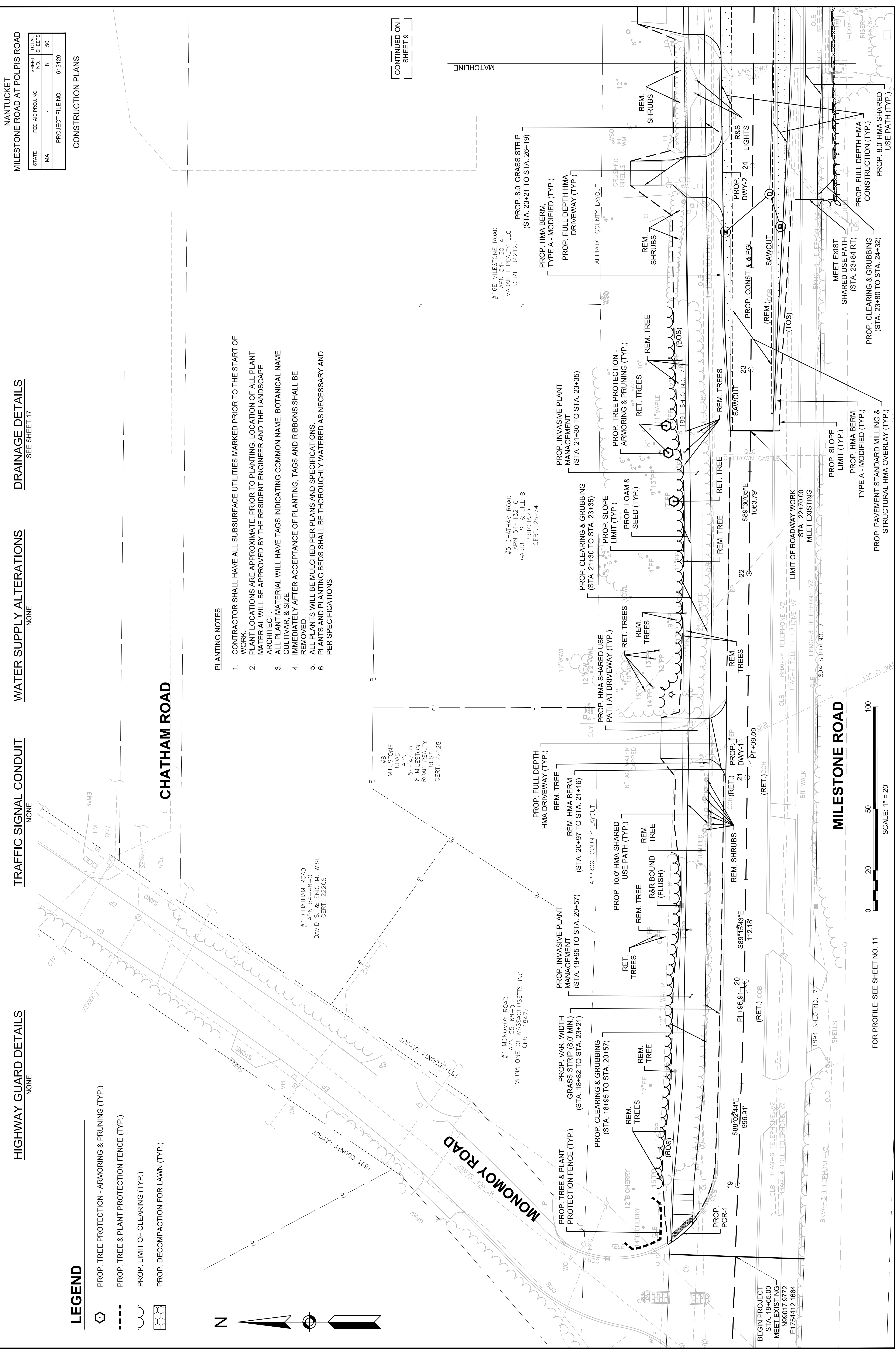


50  
N: 98977.5632  
E: 1756036.6329  
EL: 41.0666  
MAGNALL

54  
N: 98978.2157  
E: 1755963.3810  
EL: 39.9941  
MAGNALL

MILESTONE ROAD

1894 SHLO NO. 7



NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

|                         |                   |           |              |
|-------------------------|-------------------|-----------|--------------|
| STATE                   | FED AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA                      |                   | 8         | 50           |
| PROJECT FILE NO. 613129 |                   |           |              |

CONSTRUCTION PLANS

CONTINUED ON  
SHEET 9

TRAFFIC SIGNAL CONDUIT  
NONE

WATER SUPPLY ALTERATIONS  
NONE

WATER SUPPLY ALTERATIONS  
NONE

WATER SUPPLY ALTERATIONS  
NONE

WATER SUPPLY ALTERATIONS  
NONE

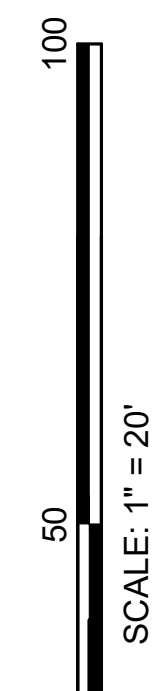
LEGEND

- PROP. TREE PROTECTION - ARMORING & PRUNING (TYP.)
- PROP. TREE & PLANT PROTECTION FENCE (TYP.)
- PROP. LIMIT OF CLEARING (TYP.)
- PROP. DECOMPACTION FOR LAWN (TYP.)

- PLANTING NOTES
1. CONTRACTOR SHALL HAVE ALL SUBSURFACE UTILITIES MARKED PRIOR TO THE START OF WORK.
  2. PLANT LOCATIONS ARE APPROXIMATE. PRIOR TO PLANTING, LOCATION OF ALL PLANT MATERIAL WILL BE APPROVED BY THE RESIDENT ENGINEER AND THE LANDSCAPE ARCHITECT.
  3. ALL PLANT MATERIAL WILL HAVE TAGS INDICATING COMMON NAME, BOTANICAL NAME, CULTIVAR, & SIZE.
  4. IMMEDIATELY AFTER ACCEPTANCE OF PLANTING, TAGS AND RIBBONS SHALL BE REMOVED.
  5. ALL PLANTS WILL BE MULCHED PER PLANS AND SPECIFICATIONS.
  6. ALL PLANTS AND PLANTING BEDS SHALL BE THOROUGHLY WATERED AS NECESSARY AND PER SPECIFICATIONS.

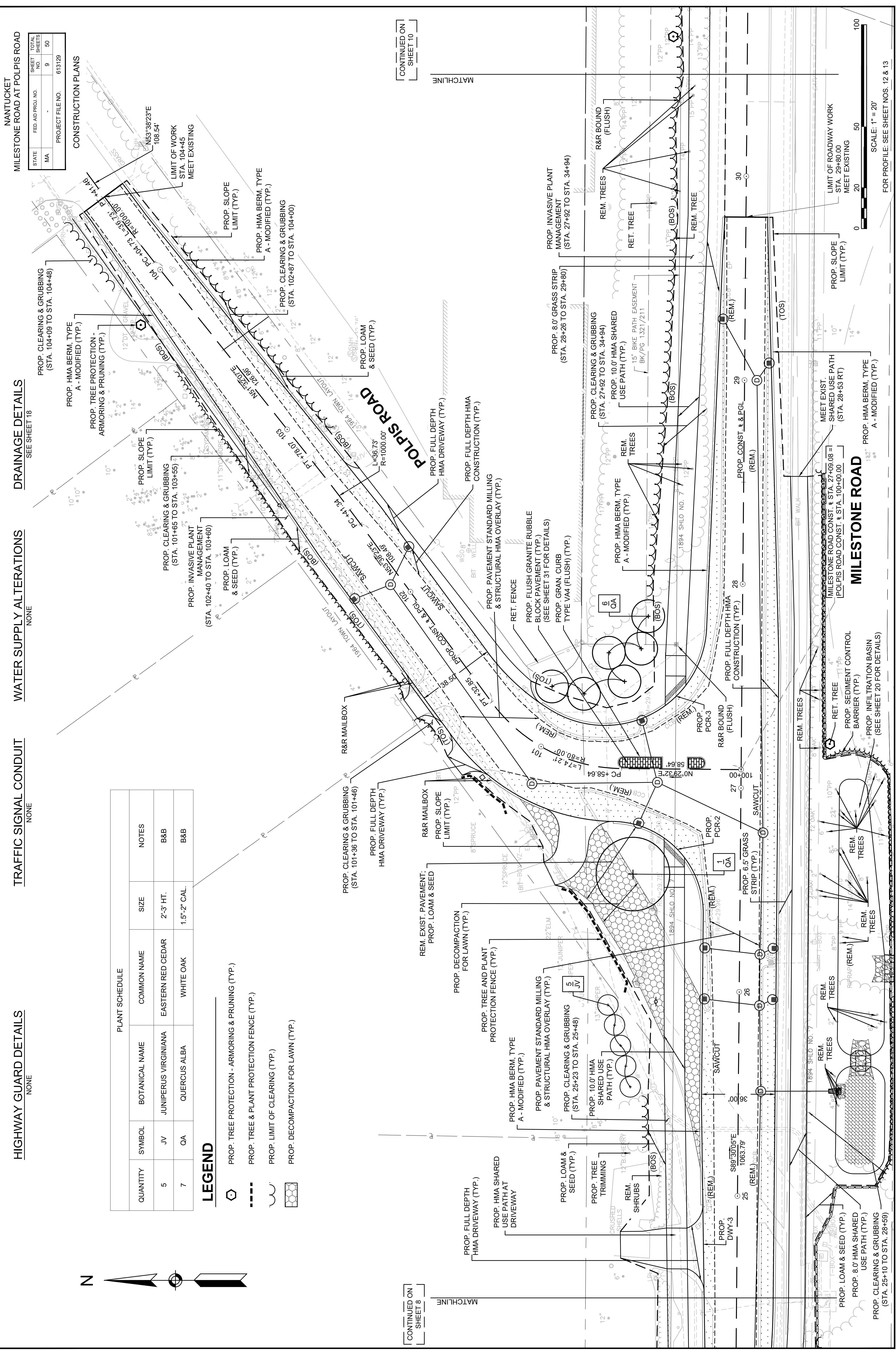
BEGIN PROJECT  
STA. 18+65.00  
MEET EXISTING  
N99017.8772  
E:1754412.1664

MILESTONE ROAD



FOR PROFILE: SEE SHEET NO. 11





**CONSTRUCTION PLANS**

| STATE | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
|-------|--------------------|-----------|--------------|
| MA    |                    | 9         | 50           |

PROJECT FILE NO. 613129

**TRAFFIC SIGNAL CONDUIT**  
NONE

**WATER SUPPLY ALTERATIONS**  
NONE

**HIGHWAY GUARD DETAILS**  
NONE

**DRAINAGE DETAILS**  
SEE SHEET 18

**MILESTONE ROAD AT POLPIS ROAD**  
NANTUCKET

**PLANT SCHEDULE**

| QUANTITY | SYMBOL | BOTANICAL NAME       | COMMON NAME       | SIZE         | NOTES |
|----------|--------|----------------------|-------------------|--------------|-------|
| 5        | JV     | JUNIPERUS VIRGINIANA | EASTERN RED CEDAR | 2'-3' HT.    | B&B   |
| 7        | QA     | QUERCUS ALBA         | WHITE OAK         | 1.5"-2" CAL. | B&B   |

**LEGEND**

- PROP. TREE PROTECTION - ARMORING & PRUNING (TYP.)
- PROP. TREE & PLANT PROTECTION FENCE (TYP.)
- PROP. LIMIT OF CLEARING (TYP.)
- PROP. DECOMPACTION FOR LAWN (TYP.)

CONTINUED ON SHEET 8

CONTINUED ON SHEET 10

**MILESTONE ROAD**

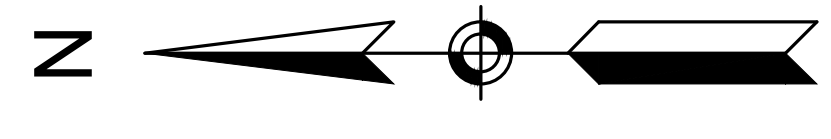
SCALE: 1" = 20'

FOR PROFILE: SEE SHEET NOS. 12 & 13

NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

|                         |                    |           |              |
|-------------------------|--------------------|-----------|--------------|
| STATE                   | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA                      | -                  | 10        | 50           |
| PROJECT FILE NO. 613129 |                    |           |              |

CONSTRUCTION PLANS



TRAFFIC SIGNAL CONDUIT  
NONE

WATER SUPPLY ALTERATIONS  
NONE

DRAINAGE DETAILS  
SEE SHEET 19

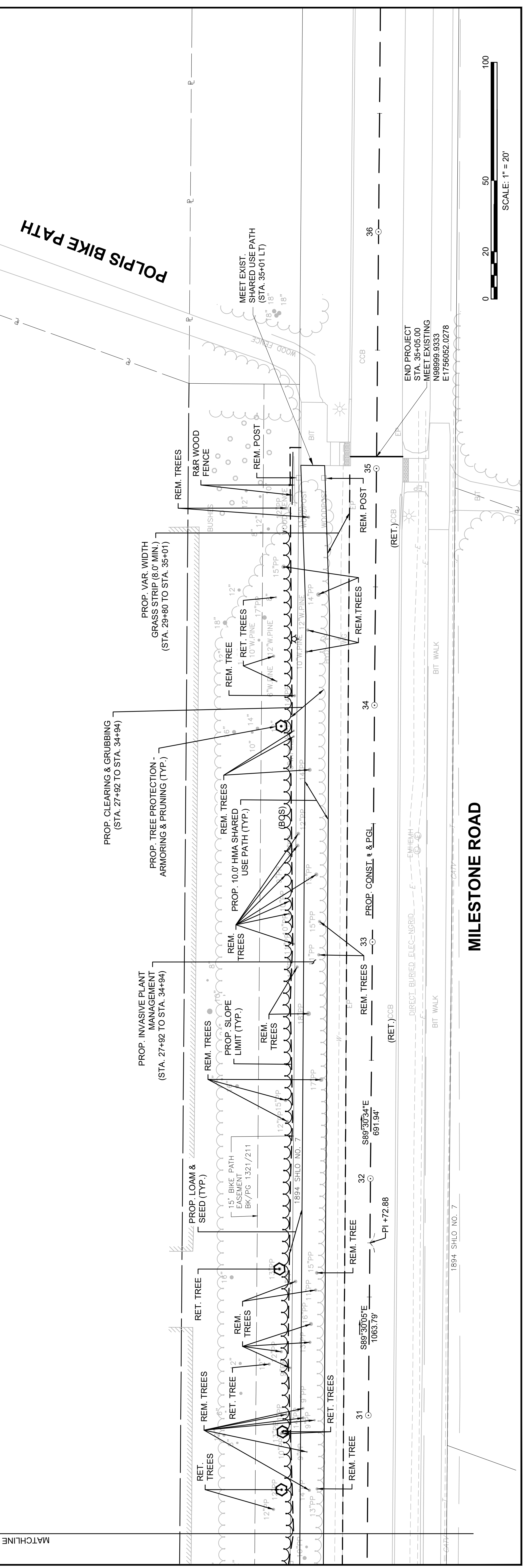
HIGHWAY GUARD DETAILS  
NONE

LEGEND

- PROP. TREE PROTECTION - ARMORING & PRUNING (TYP.)
- PROP. TREE & PLANT PROTECTION FENCE (TYP.)
- PROP. LIMIT OF CLEARING (TYP.)
- PROP. DECOMPACTION FOR LAWN (TYP.)

CONTINUED ON  
SHEET 9

MATCHLINE



MILESTONE ROAD

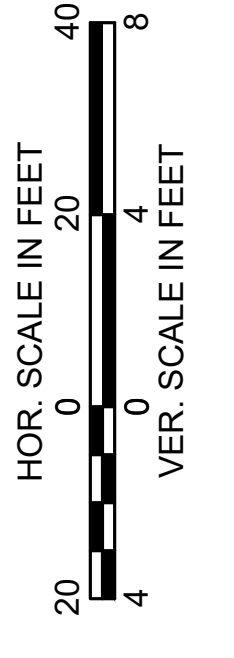
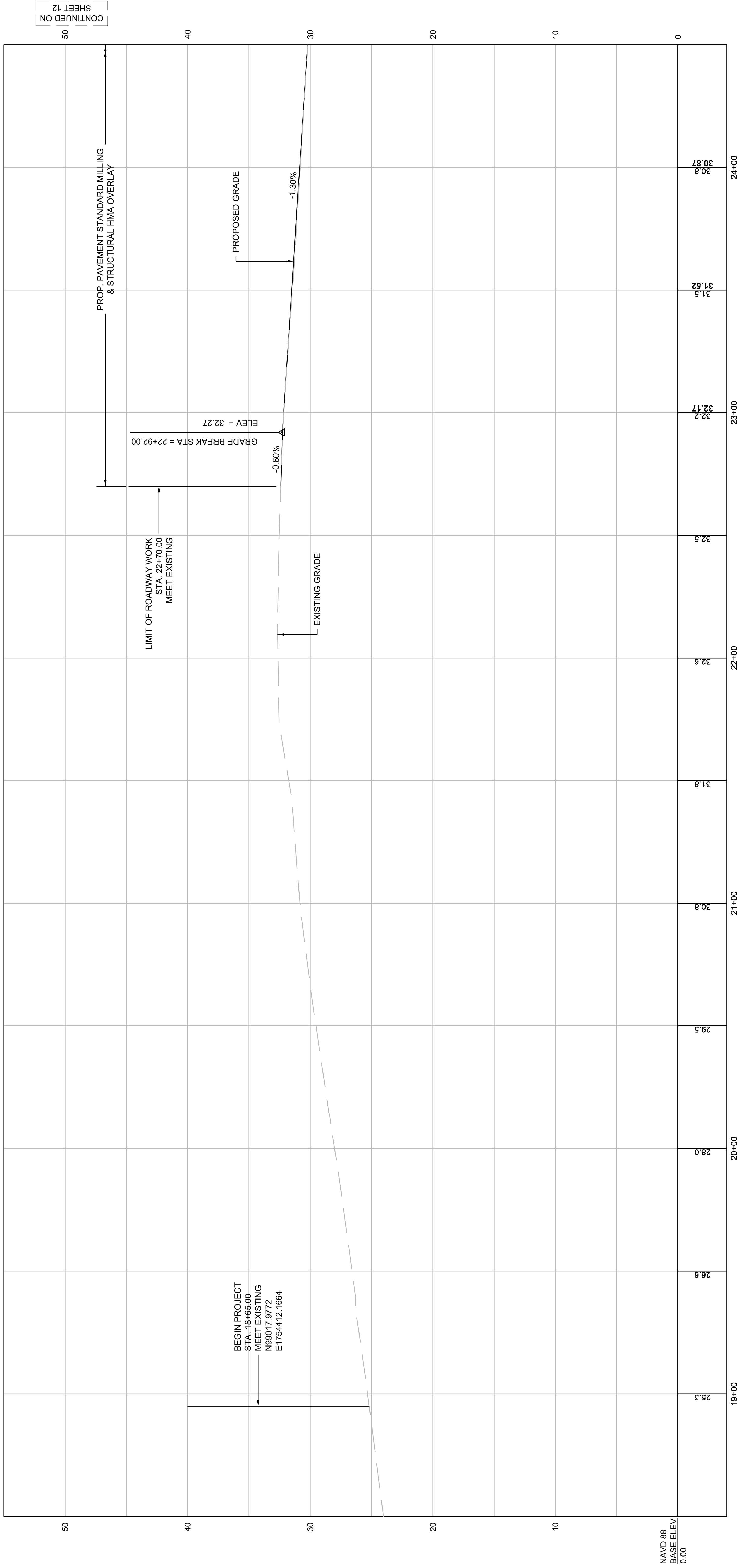


NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

|                         |                    |           |              |
|-------------------------|--------------------|-----------|--------------|
| STATE                   | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA                      | -                  | 11        | 50           |
| PROJECT FILE NO. 613129 |                    |           |              |

MILESTONE ROAD

CONSTRUCTION PROFILES



FOR CONSTRUCTION PLAN: SEE SHEET NO. 8

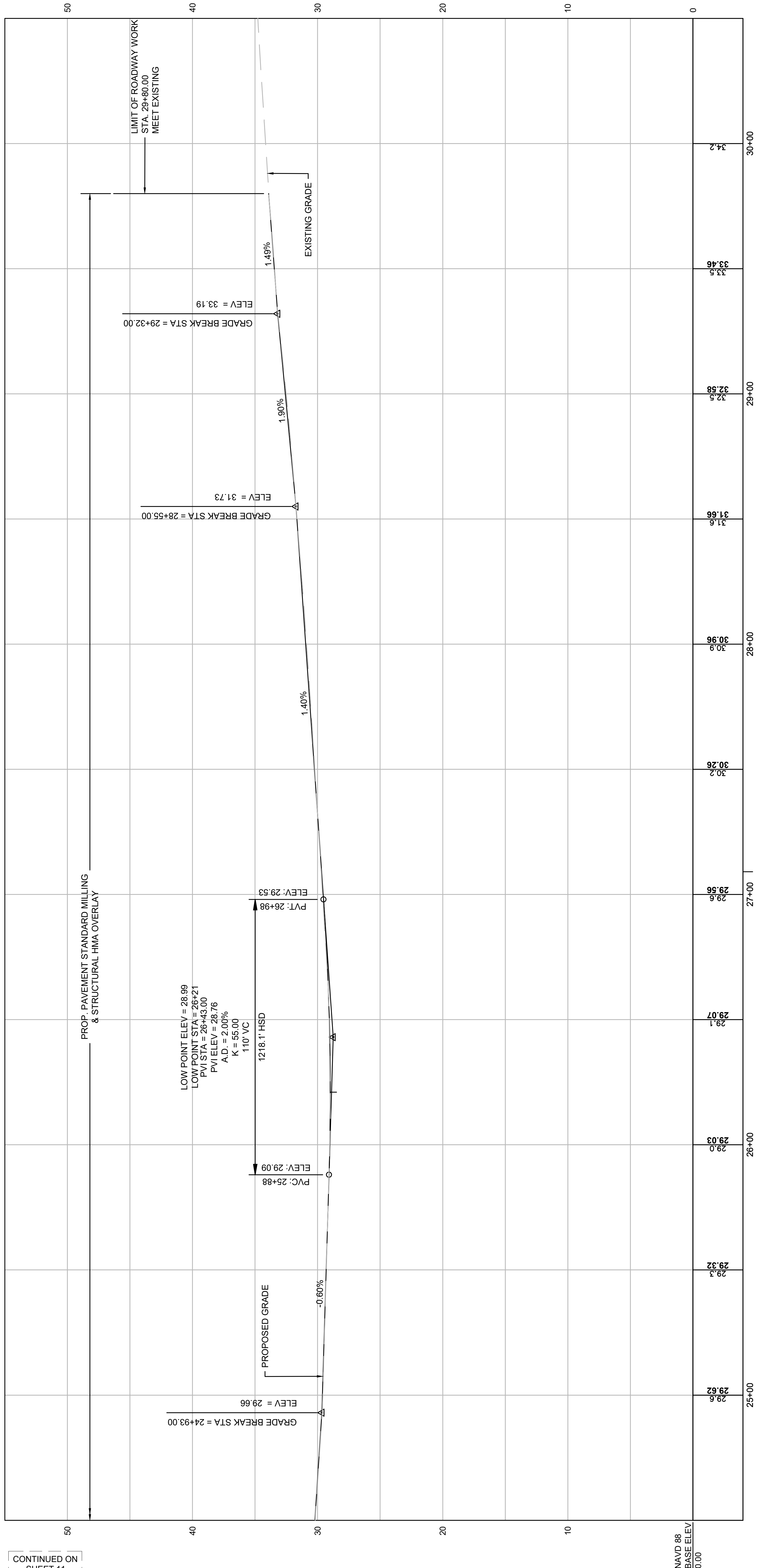
NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

| STATE | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
|-------|--------------------|-----------|--------------|
| MA    | -                  | 12        | 50           |

PROJECT FILE NO. 613129

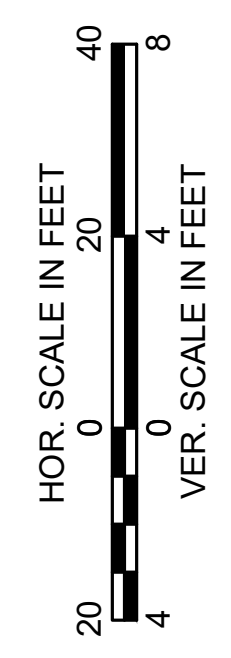
# MILESTONE ROAD

## CONSTRUCTION PROFILES



CONTINUED ON SHEET 11

NAVD 88  
BASE ELEV  
0.00



MILESTONE ROAD CONST. STA. 27+09.08  
POLPIS ROAD CONST. STA. 100+00.00

FOR CONSTRUCTION PLAN: SEE SHEET NO. 9

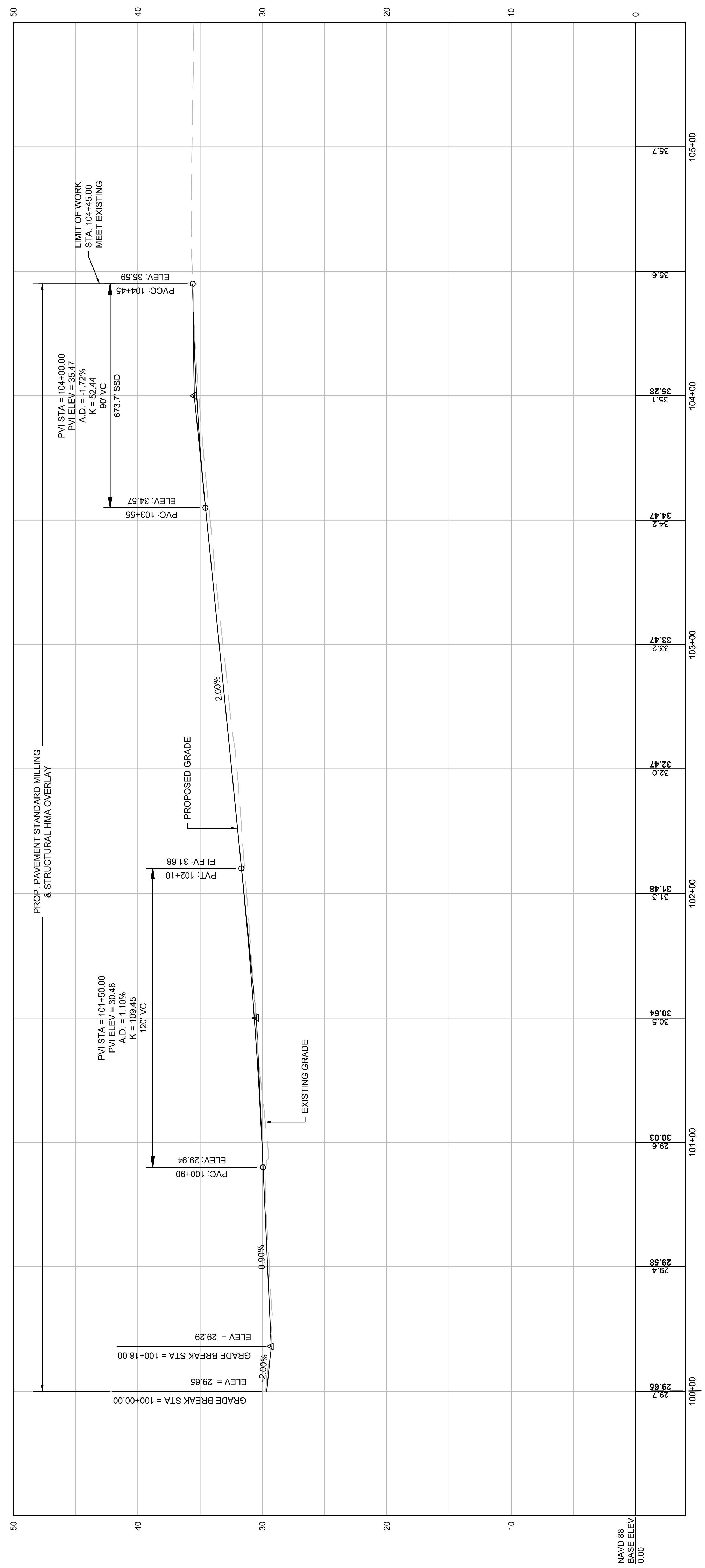


NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

|                  |                    |           |              |
|------------------|--------------------|-----------|--------------|
| STATE            | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA               | -                  | 13        | 50           |
| PROJECT FILE NO. |                    | 613129    |              |

CONSTRUCTION PROFILES

POLPIS ROAD

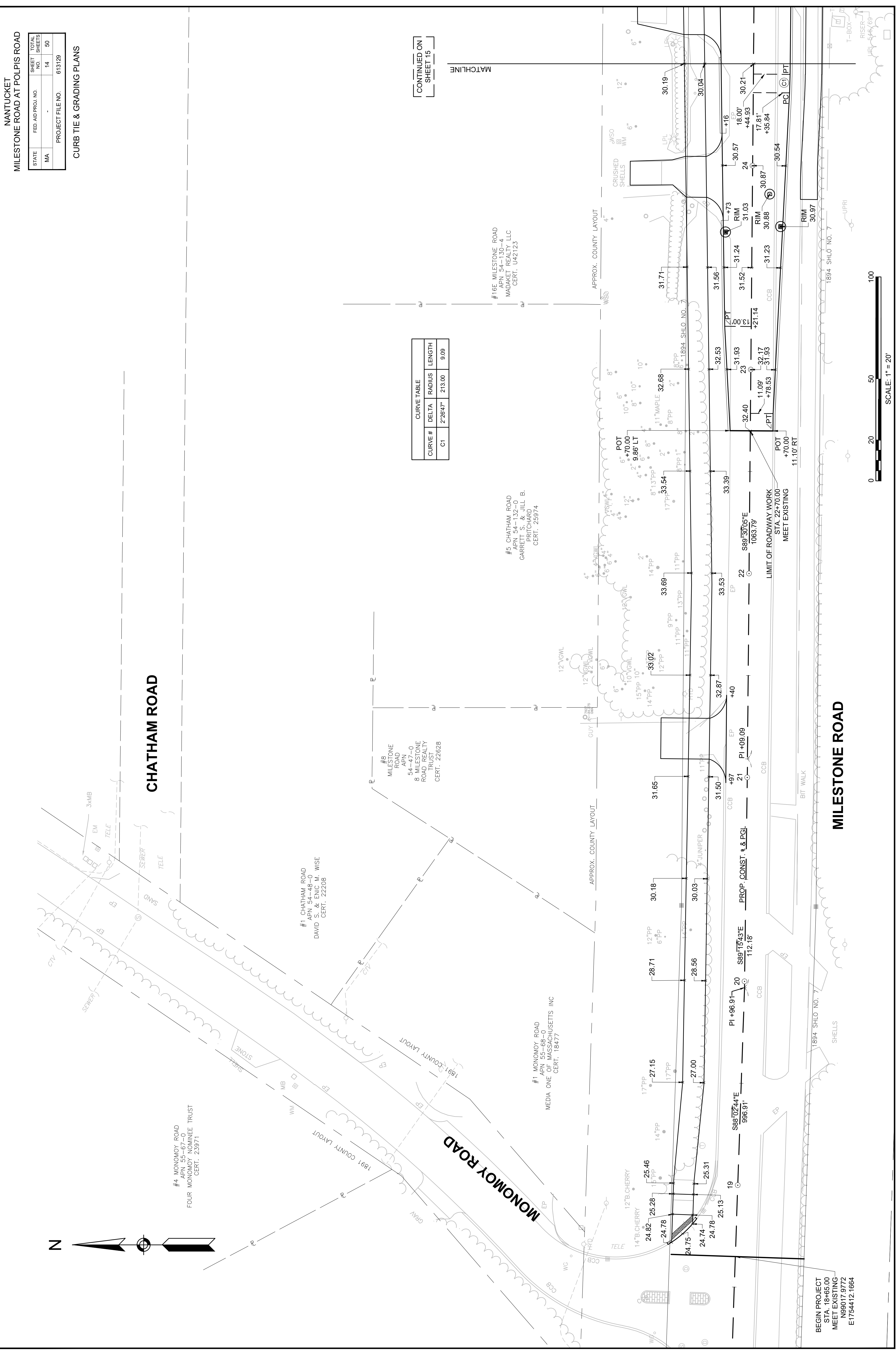


FOR CONSTRUCTION PLAN: SEE SHEET NO. 9

NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD  
CURB TIE & GRADING PLANS

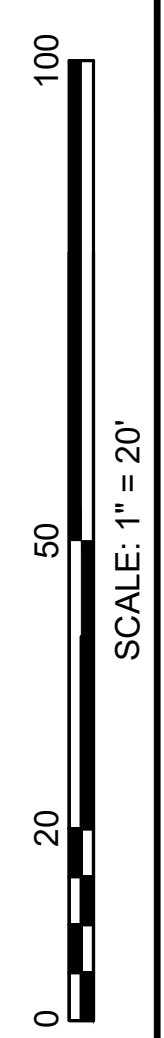
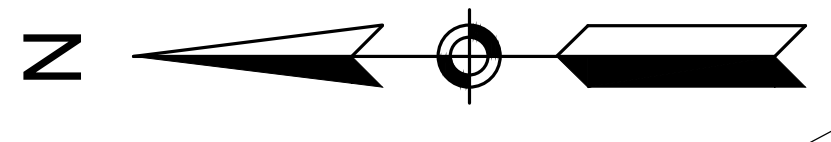
|                         |                   |           |              |
|-------------------------|-------------------|-----------|--------------|
| STATE                   | FED AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA                      | -                 | 14        | 50           |
| PROJECT FILE NO. 613129 |                   |           |              |

# CHATHAM ROAD



| CURVE # | DELTA    | RADIUS | LENGTH |
|---------|----------|--------|--------|
| C1      | 2°26'47" | 213.00 | 9.09   |

CONTINUED ON  
SHEET 15



BEGIN PROJECT  
STA. 18+65.00  
MEET EXISTING  
N98017.9772  
E1754412.1664





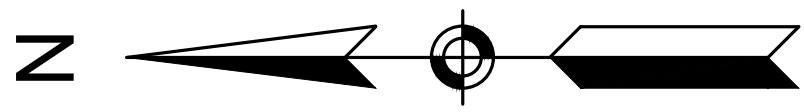
NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

| STATE | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
|-------|--------------------|-----------|--------------|
| MA    | -                  | 16        | 50           |

PROJECT FILE NO. 613129

CURB TIE & GRADING PLANS

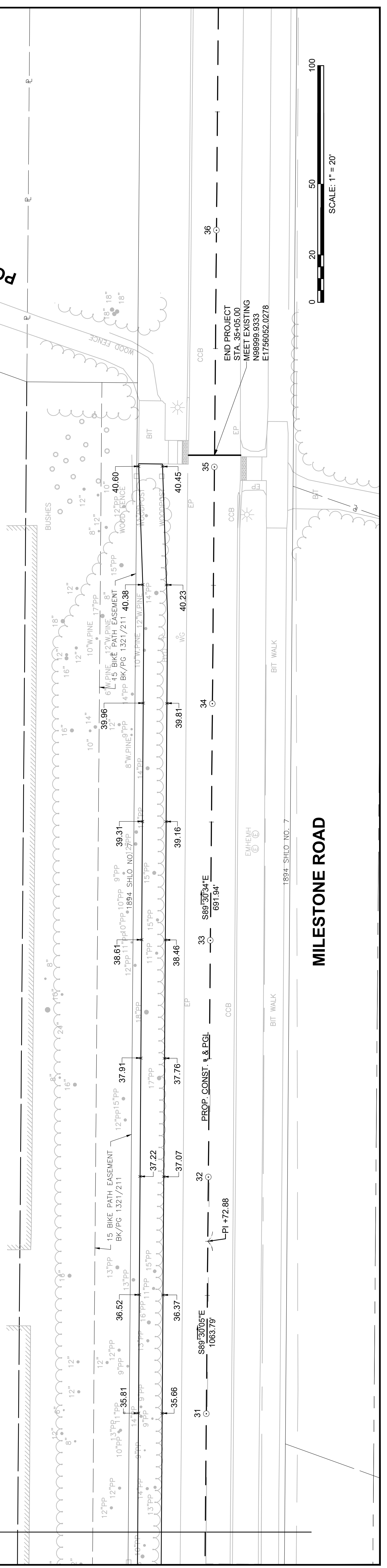
1. POLPIS ROAD  
APN 54-121  
N/F  
ISLAND LUMBER HOLDING  
COMPANY  
CERT. 5489, LCC 34603A  
BOOK 1321, PAGE 211  
PLAN NO. 35 OF 2011



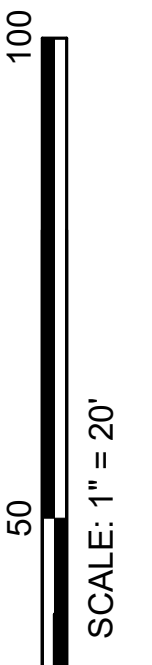
CONTINUED ON  
SHEET 15

MATCH LINE

POLPIS BIKE PATH



MILESTONE ROAD



1894 SHLC NO. 7

EMHEAH  
(E) (E)

END PROJECT  
STA. 35+05.00  
MEET EXISTING  
N88998.9333  
E17560652.0278

CCB

EP

BIT

WOOD FENCE

WOOD FENCE

WOOD FENCE

WOOD FENCE

WOOD FENCE

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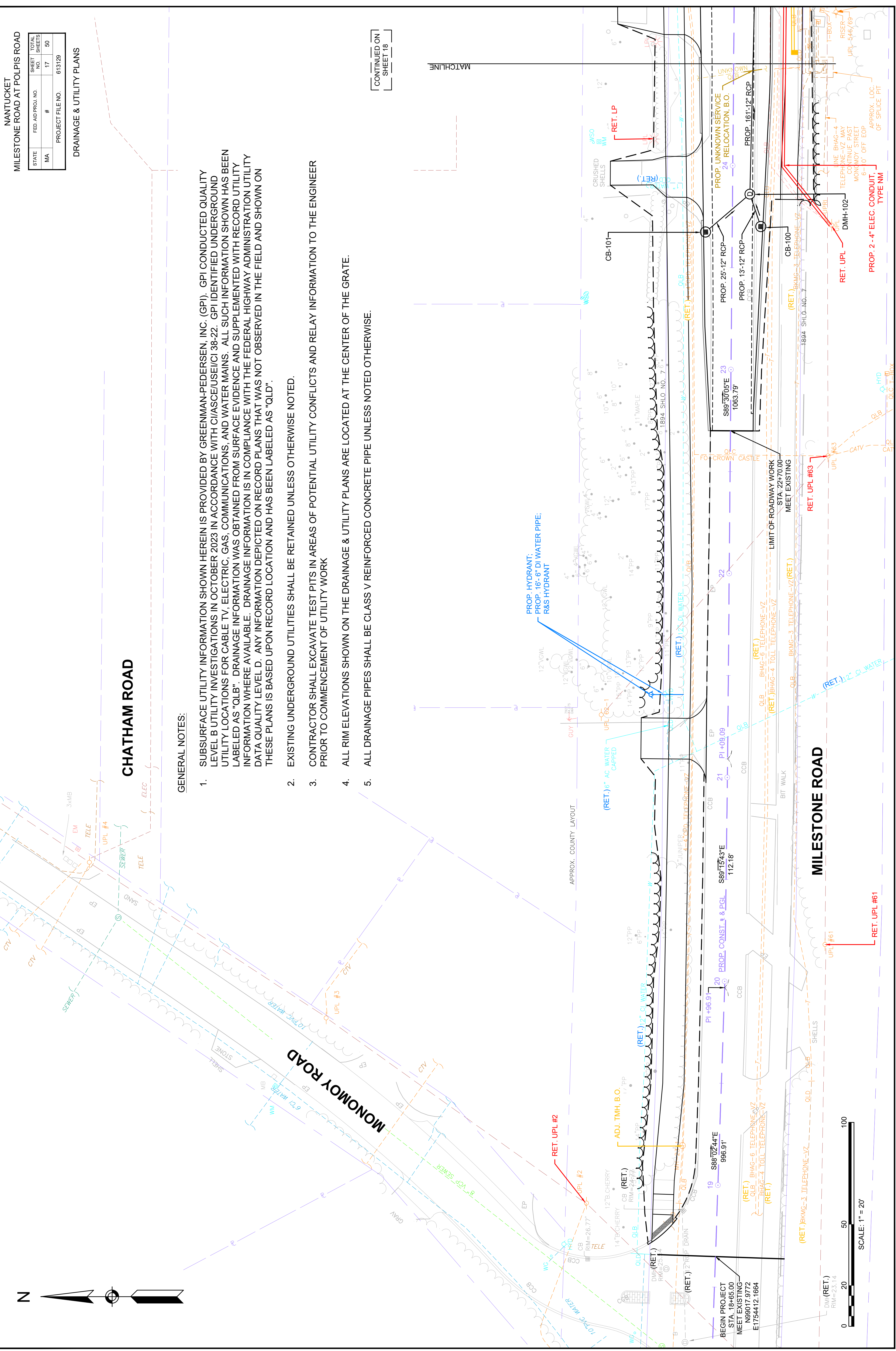
WOOD FENCE

WOOD FENCE

WOOD FENCE

WOOD FENCE





NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

| STATE | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
|-------|--------------------|-----------|--------------|
| MA    | #                  | 17        | 50           |

PROJECT FILE NO. 613129

DRAINAGE & UTILITY PLANS

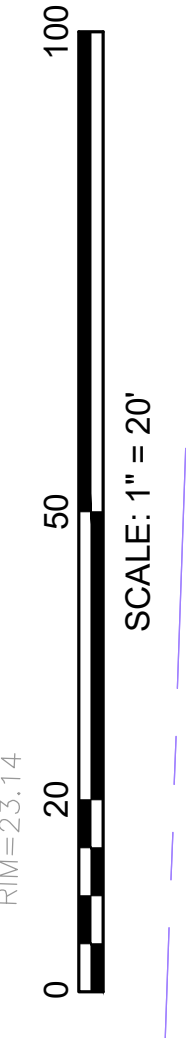
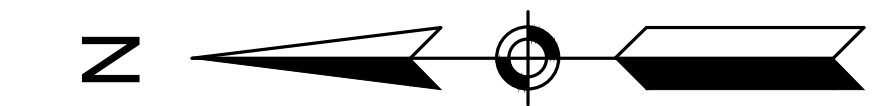
CHATHAM ROAD

MILESTONE ROAD

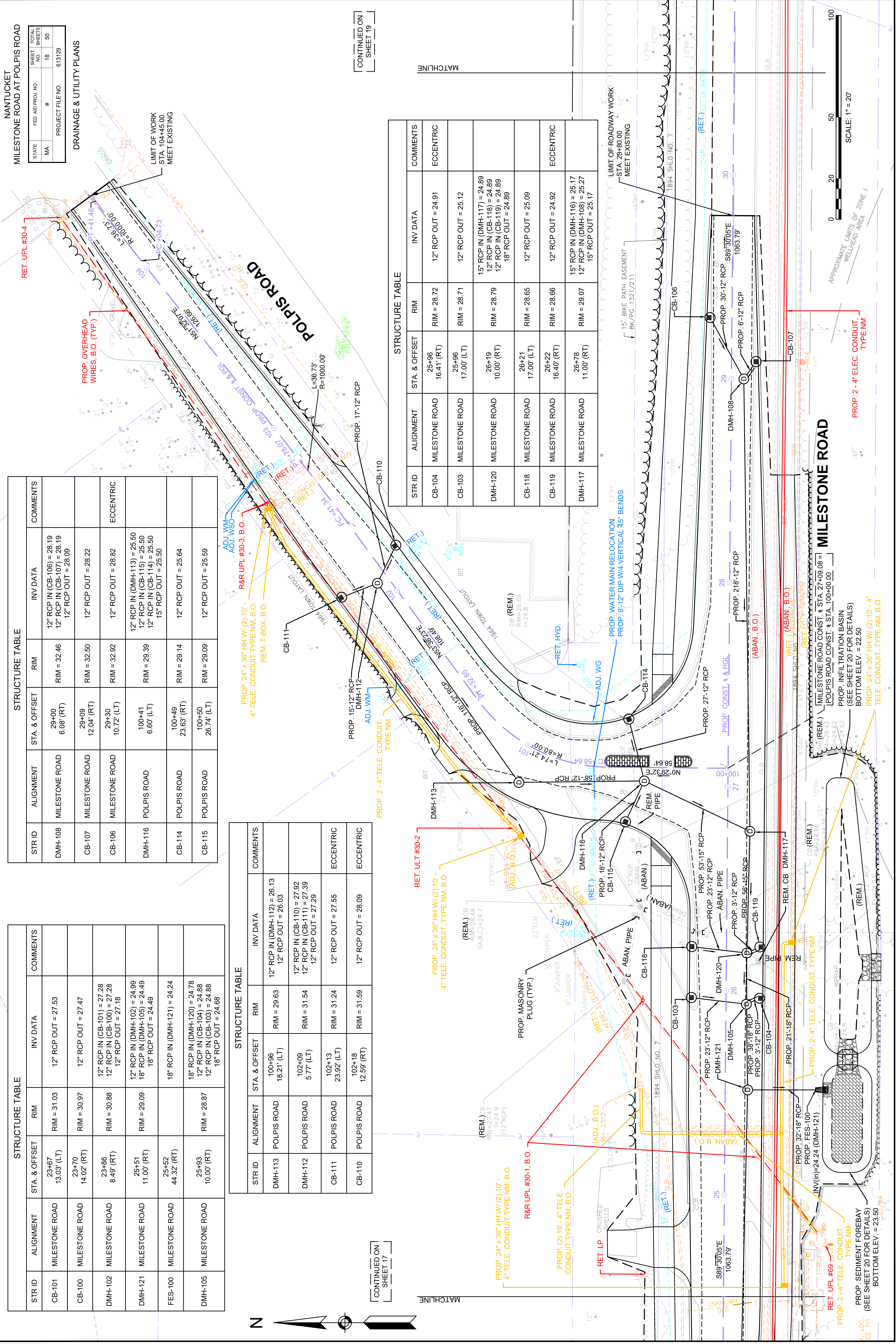
GENERAL NOTES:

- SUBSURFACE UTILITY INFORMATION SHOWN HEREIN IS PROVIDED BY GREENMAN-PEDERSEN, INC. (GPI). GPI CONDUCTED QUALITY LEVEL B UTILITY INVESTIGATIONS IN OCTOBER 2023 IN ACCORDANCE WITH C/ASCE/USE/CI 38-22. GPI IDENTIFIED UNDERGROUND UTILITY LOCATIONS FOR CABLE TV, ELECTRIC, GAS, COMMUNICATIONS, AND WATER MAINS. ALL SUCH INFORMATION SHOWN HAS BEEN LABELED AS "QLB". DRAINAGE INFORMATION WAS OBTAINED FROM SURFACE EVIDENCE AND SUPPLEMENTED WITH RECORD UTILITY INFORMATION WHERE AVAILABLE. DRAINAGE INFORMATION IS IN COMPLIANCE WITH THE FEDERAL HIGHWAY ADMINISTRATION UTILITY DATA QUALITY LEVEL D. ANY INFORMATION DEPICTED ON RECORD PLANS THAT WAS NOT OBSERVED IN THE FIELD AND SHOWN ON THESE PLANS IS BASED UPON RECORD LOCATION AND HAS BEEN LABELED AS "QLD".
- EXISTING UNDERGROUND UTILITIES SHALL BE RETAINED UNLESS OTHERWISE NOTED.
- CONTRACTOR SHALL EXCAVATE TEST PITS IN AREAS OF POTENTIAL UTILITY CONFLICTS AND RELAY INFORMATION TO THE ENGINEER PRIOR TO COMMENCEMENT OF UTILITY WORK
- ALL RIM ELEVATIONS SHOWN ON THE DRAINAGE & UTILITY PLANS ARE LOCATED AT THE CENTER OF THE GRATE.
- ALL DRAINAGE PIPES SHALL BE CLASS V REINFORCED CONCRETE PIPE UNLESS NOTED OTHERWISE.

CONTINUED ON SHEET 18







STRUCTURE TABLE

| STR ID  | ALIGNMENT      | STA. & OFFSET         | RIM         | INV DATA                                                                                                          | COMMENTS  |
|---------|----------------|-----------------------|-------------|-------------------------------------------------------------------------------------------------------------------|-----------|
| DMH-108 | MILESTONE ROAD | 29+00<br>6.08' (RT)   | RIM = 32.46 | 12" RCP IN (CB-106) = 28.19<br>12" RCP IN (CB-107) = 28.19<br>12" RCP OUT = 28.09                                 |           |
| CB-107  | MILESTONE ROAD | 29+09<br>12.04' (RT)  | RIM = 32.50 | 12" RCP OUT = 28.22                                                                                               |           |
| CB-106  | MILESTONE ROAD | 29+30<br>10.72' (LT)  | RIM = 32.92 | 12" RCP OUT = 28.82                                                                                               | ECCENTRIC |
| DMH-116 | POLPIS ROAD    | 100+41<br>6.60' (LT)  | RIM = 29.39 | 12" RCP IN (DMH-113) = 25.50<br>12" RCP IN (CB-115) = 25.50<br>12" RCP IN (CB-114) = 25.50<br>15" RCP OUT = 25.50 |           |
| CB-114  | POLPIS ROAD    | 100+49<br>23.63' (RT) | RIM = 29.14 | 12" RCP OUT = 25.64                                                                                               |           |
| CB-115  | POLPIS ROAD    | 100+50<br>26.74' (LT) | RIM = 29.09 | 12" RCP OUT = 25.59                                                                                               |           |

STRUCTURE TABLE

| STR ID  | ALIGNMENT      | STA. & OFFSET        | RIM         | INV DATA                                                                                                          | COMMENTS |
|---------|----------------|----------------------|-------------|-------------------------------------------------------------------------------------------------------------------|----------|
| CB-101  | MILESTONE ROAD | 23+67<br>13.03' (LT) | RIM = 31.03 | 12" RCP OUT = 27.53                                                                                               |          |
| CB-100  | MILESTONE ROAD | 23+70<br>14.02' (RT) | RIM = 30.97 | 12" RCP OUT = 27.47                                                                                               |          |
| DMH-102 | MILESTONE ROAD | 23+86<br>8.49' (RT)  | RIM = 30.88 | 12" RCP IN (CB-101) = 27.28<br>12" RCP IN (CB-100) = 27.28<br>12" RCP OUT = 27.16                                 |          |
| DMH-121 | MILESTONE ROAD | 25+51<br>11.00' (RT) | RIM = 29.09 | 12" RCP IN (DMH-102) = 24.99<br>18" RCP IN (DMH-105) = 24.49<br>18" RCP OUT = 24.49                               |          |
| FES-100 | MILESTONE ROAD | 25+52<br>44.32' (RT) |             | 18" RCP IN (DMH-121) = 24.24                                                                                      |          |
| DMH-105 | MILESTONE ROAD | 25+63<br>10.00' (RT) | RIM = 28.87 | 18" RCP IN (DMH-120) = 24.78<br>12" RCP IN (CB-104) = 24.88<br>12" RCP IN (CB-103) = 24.88<br>18" RCP OUT = 24.66 |          |

STRUCTURE TABLE

| STR ID  | ALIGNMENT   | STA. & OFFSET         | RIM         | INV DATA                                                                          | COMMENTS  |
|---------|-------------|-----------------------|-------------|-----------------------------------------------------------------------------------|-----------|
| DMH-113 | POLPIS ROAD | 100+96<br>18.21' (LT) | RIM = 29.63 | 12" RCP IN (DMH-112) = 26.13<br>12" RCP OUT = 26.03                               |           |
| DMH-112 | POLPIS ROAD | 102+09<br>5.77' (LT)  | RIM = 31.54 | 12" RCP IN (CB-110) = 27.92<br>12" RCP IN (CB-111) = 27.39<br>12" RCP OUT = 27.29 |           |
| CB-111  | POLPIS ROAD | 102+13<br>23.92' (LT) | RIM = 31.24 | 12" RCP OUT = 27.55                                                               | ECCENTRIC |
| CB-110  | POLPIS ROAD | 102+18<br>12.59' (RT) | RIM = 31.59 | 12" RCP OUT = 28.09                                                               | ECCENTRIC |

STRUCTURE TABLE

| STR ID  | ALIGNMENT      | STA. & OFFSET        | RIM         | INV DATA                                                                                                          | COMMENTS  |
|---------|----------------|----------------------|-------------|-------------------------------------------------------------------------------------------------------------------|-----------|
| CB-104  | MILESTONE ROAD | 25+96<br>16.41' (RT) | RIM = 28.72 | 12" RCP OUT = 24.91                                                                                               | ECCENTRIC |
| CB-103  | MILESTONE ROAD | 25+96<br>17.00' (LT) | RIM = 28.71 | 12" RCP OUT = 25.12                                                                                               |           |
| DMH-120 | MILESTONE ROAD | 26+19<br>10.00' (RT) | RIM = 28.79 | 15" RCP IN (DMH-117) = 24.89<br>12" RCP IN (CB-118) = 24.89<br>12" RCP IN (CB-119) = 24.89<br>18" RCP OUT = 24.89 |           |
| CB-118  | MILESTONE ROAD | 26+21<br>17.00' (LT) | RIM = 28.65 | 12" RCP OUT = 25.09                                                                                               |           |
| CB-119  | MILESTONE ROAD | 26+22<br>16.40' (RT) | RIM = 28.66 | 12" RCP OUT = 24.92                                                                                               | ECCENTRIC |
| DMH-117 | MILESTONE ROAD | 26+78<br>11.00' (RT) | RIM = 29.07 | 15" RCP IN (DMH-116) = 25.17<br>12" RCP IN (DMH-108) = 25.27<br>15" RCP OUT = 25.17                               |           |

NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

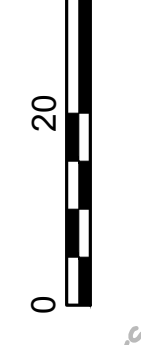
| STATE | FED AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
|-------|-------------------|-----------|--------------|
| MA    |                   | 18        | 50           |

PROJECT FILE NO. 613129

CONTINUED ON  
SHEET 19

CONTINUED ON  
SHEET 17

SCALE: 1" = 20'



APPROXIMATE LIMITS OF WELL-HEAD AREA

PROP. 2" - 4" ELEC. CONDUIT, TYPE NM

PROP. 24" x 36" HH W/ (2) 10" - 4" TELE. CONDUIT, TYPE NM, B.O.

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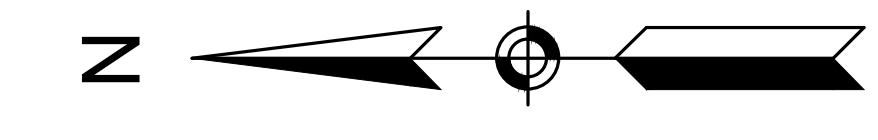
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NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

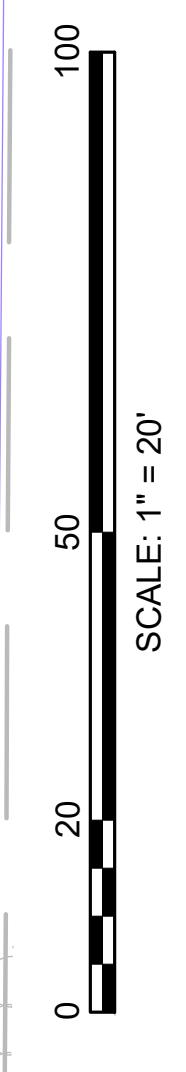
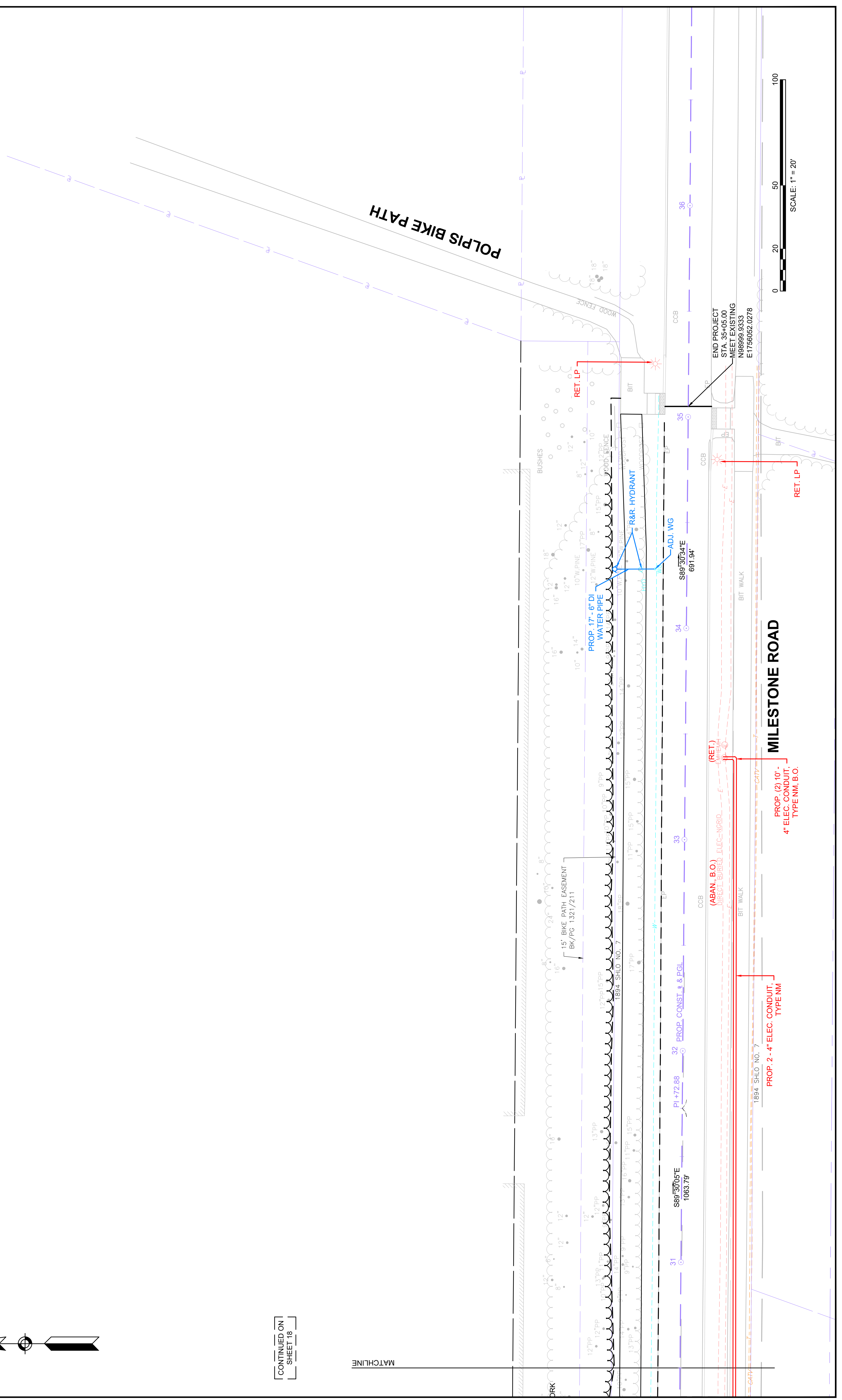
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|------------------|--------------------|-----------|--------------|
| STATE            | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA               | #                  | 19        | 50           |
| PROJECT FILE NO. |                    | 613129    |              |

DRAINAGE & UTILITY PLANS



CONTINUED ON SHEET 18

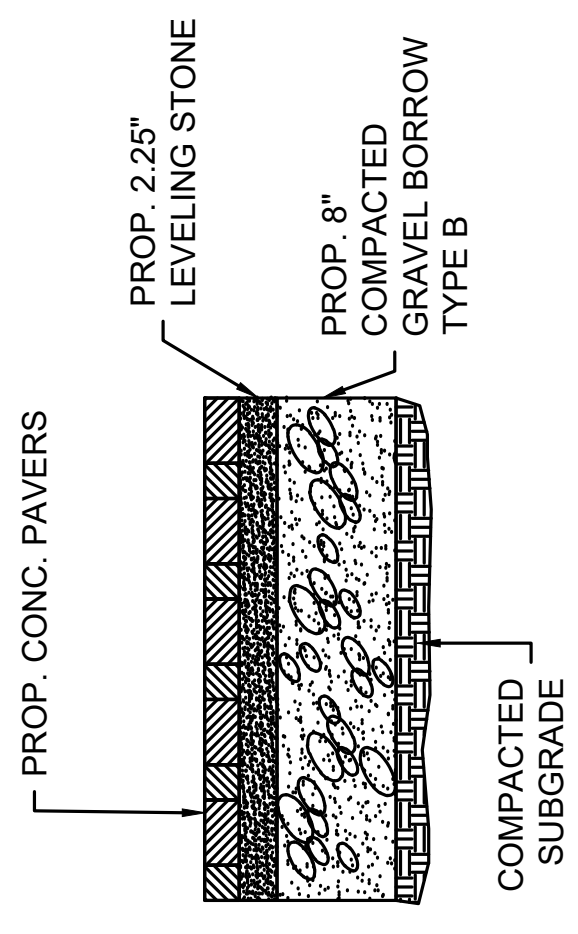
MATCHLINE



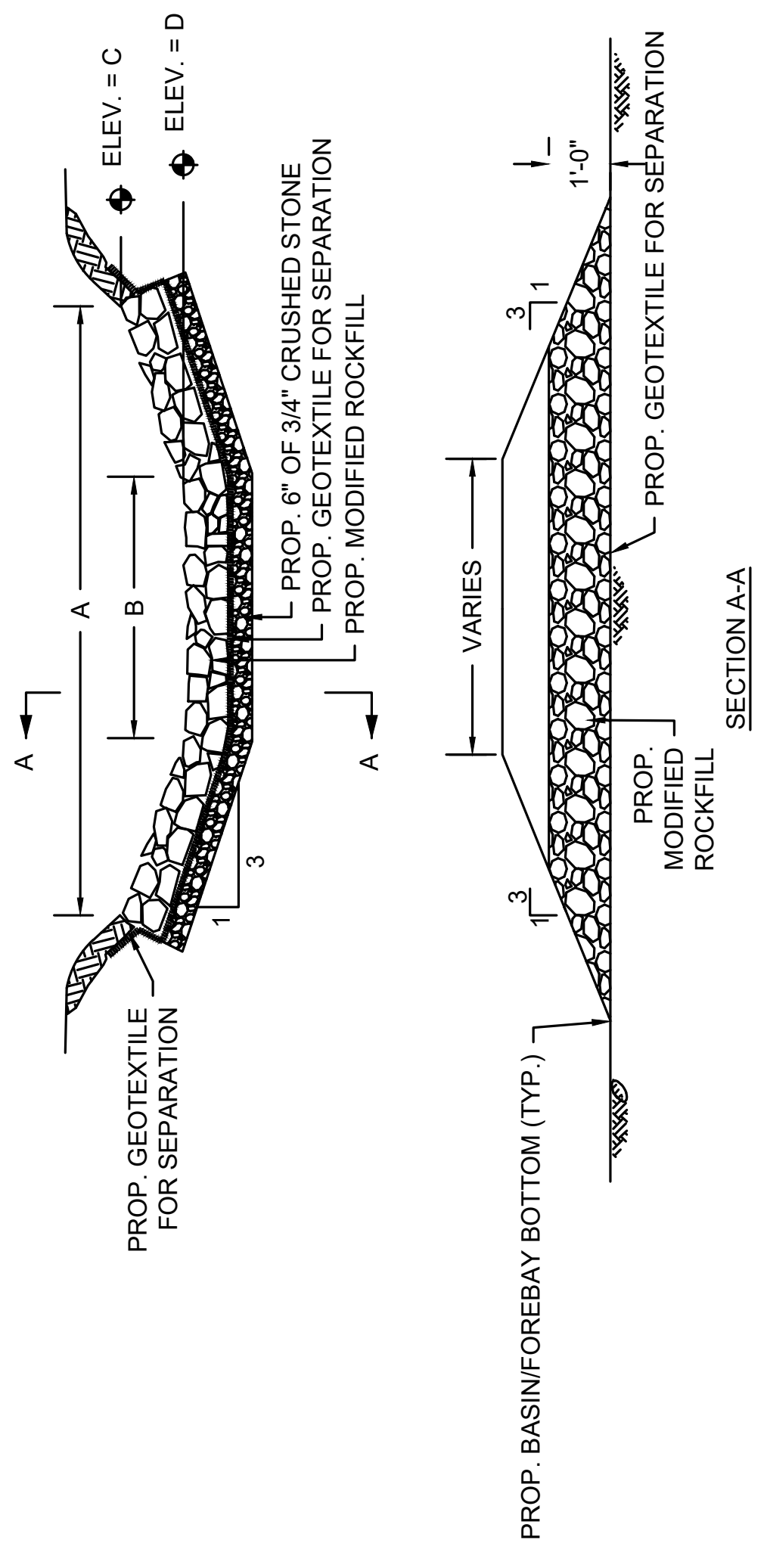
NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

|                         |                   |           |              |
|-------------------------|-------------------|-----------|--------------|
| STATE                   | FED AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA                      |                   | 20        | 50           |
| PROJECT FILE NO. 613129 |                   |           |              |

DRAINAGE DETAILS



BOTTOM OF SEDIMENT FOREBAY



WEIR DESIGN TABLE

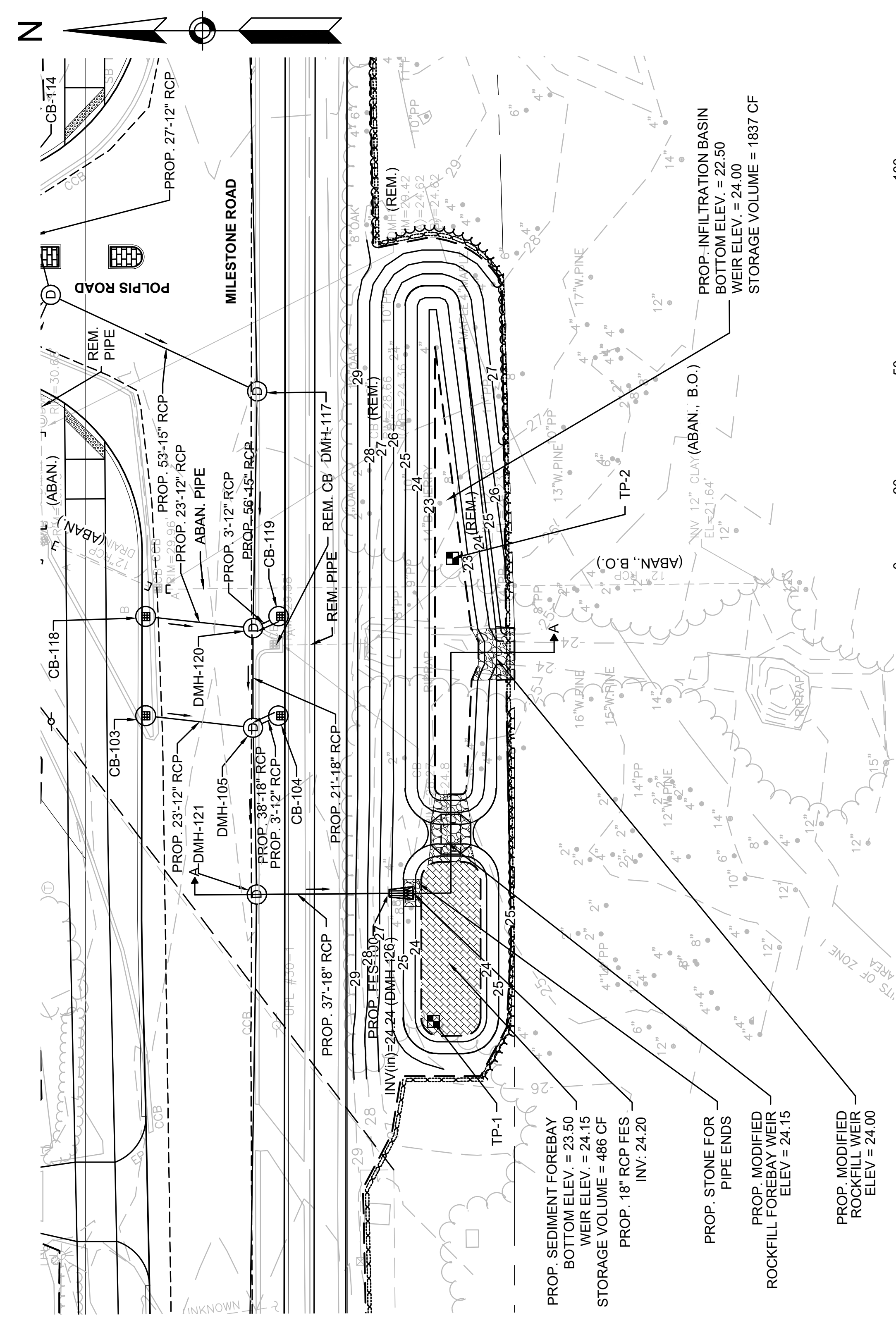
|                    | A      | B     | C     | D     |
|--------------------|--------|-------|-------|-------|
| FOREBAY            | 10'-0" | 5'-0" | 25.00 | 24.15 |
| INFILTRATION BASIN | 10'-0" | 5'-5" | 25.00 | 24.00 |

MODIFIED ROCKFILL FOREBAY WEIR  
NTS

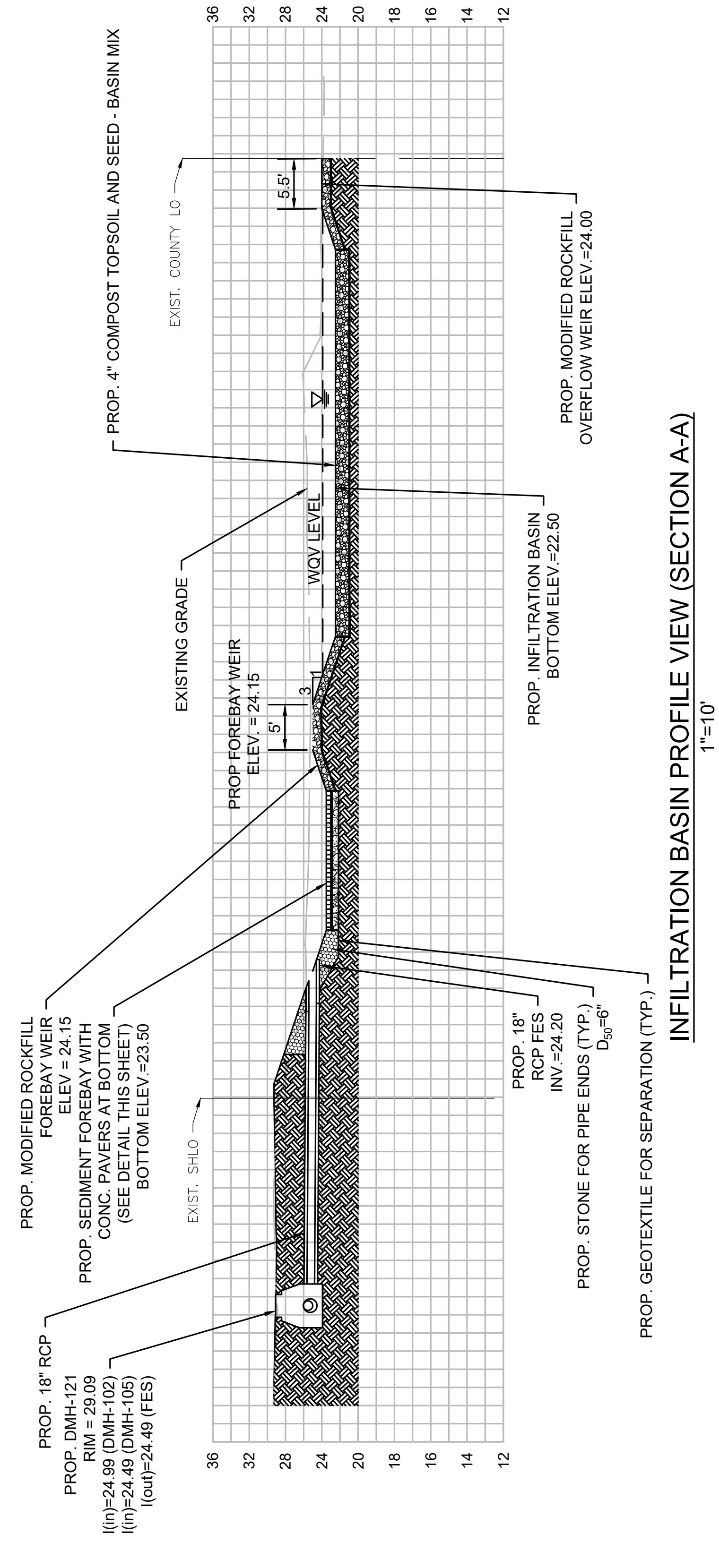
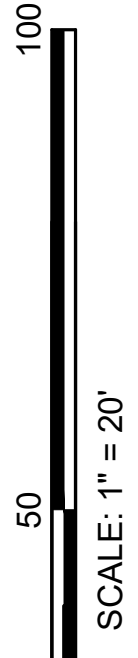
| AREAS                         |  | TOTAL AREA (SF) | IMPERVIOUS AREA (SF) | PERVIOUS AREA (SF) |
|-------------------------------|--|-----------------|----------------------|--------------------|
| POST-DEVELOPMENT              |  | 61,525          | 51,110               | 27,549             |
| PRE-DEVELOPMENT               |  | 43,457          | 31,609               | 11,848             |
| DIFFERENCE IN IMPERVIOUS AREA |  |                 | 19,501               |                    |

DESIGN DATA  
 WATER QUALITY VOLUME:  
 ADDED IMPERVIOUS AREA (A<sub>imp</sub>) = 19,501 SQUARE FEET  
 WATER QUALITY DEPTH = 1 INCH  
 WATER QUALITY VOLUME (WQV) = (19,501) \* (1/12) = 1,625 CUBIC FEET  
 SEDIMENT FOREBAY VOLUME:  
 SEDIMENT DEPTH = 0.1 INCH  
 SEDIMENT FOREBAY VOLUME = (51,110) \* (0.1/12) = 426 CUBIC FEET

| DESIGN STORAGE VOLUMES     |  | VOLUME REQUIRED (CF) | VOLUME PROVIDED (CF) | WEIR ELEVATION |
|----------------------------|--|----------------------|----------------------|----------------|
| WATER QUALITY VOLUME (WQV) |  | 1625                 | 1837                 | 24.00          |
| SEDIMENT FOREBAY VOLUME    |  | 426                  | 486                  | 24.15          |

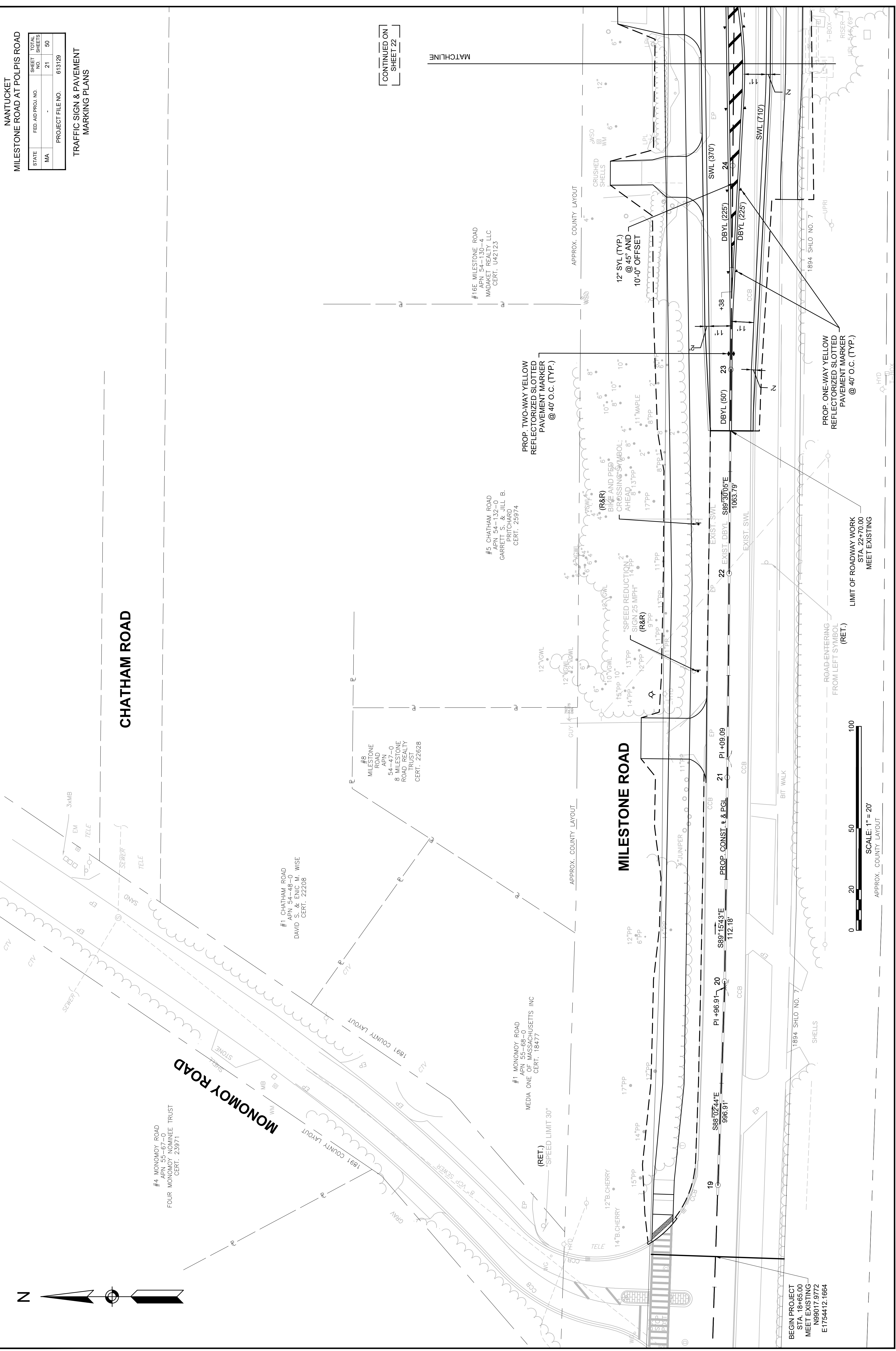


INFILTRATION BASIN PLAN VIEW  
1" = 20'



INFILTRATION BASIN PROFILE VIEW (SECTION A-A)  
1" = 10'





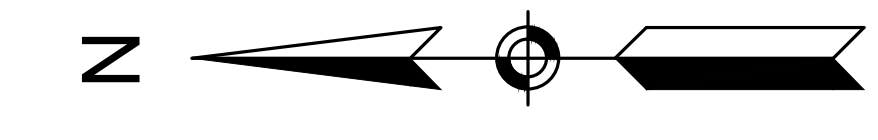
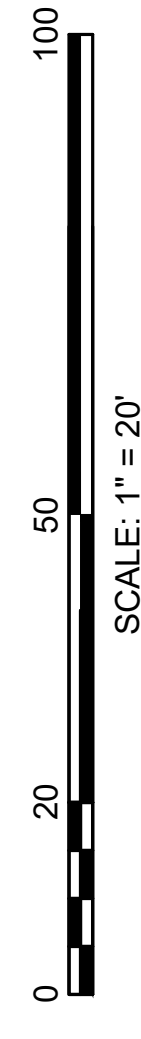
NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

| STATE | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
|-------|--------------------|-----------|--------------|
| MA    | -                  | 21        | 50           |

PROJECT FILE NO. 613129

TRAFFIC SIGN & PAVEMENT MARKING PLANS

CONTINUED ON SHEET 22









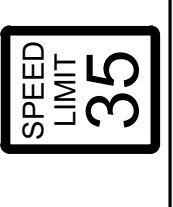

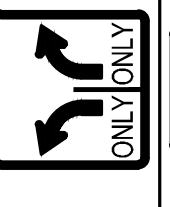
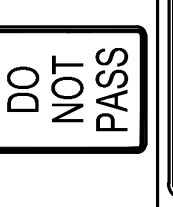
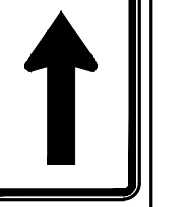
NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

|                  |                    |           |              |
|------------------|--------------------|-----------|--------------|
| STATE            | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA               | -                  | 24        | 50           |
| PROJECT FILE NO. |                    | 613129    |              |

TRAFFIC SIGN SUMMARY SHEET

NOTES:

1. ALL WARNING, REGULATORY AND ROUTE MARKERS SHALL BE FABRICATED WITH HIGH INTENSITY ENCAPSULATED LENS REFLECTIVE SHEETING (SEE SECTION M9.30.0) TYPE III OR IV.
2. ALL SIGNS NOTED AS "(R&R)" SHALL BE MOUNTED ON NEW 4"x4" WOOD POST PER THE TOWN OF NANTUCKET'S STANDARDS.
3. QUANTITIES OF SIGNS AND POSTS SHOWN ON THIS SHEET MAY DIFFER FROM THE TRAFFIC SIGN & PAVEMENT MARKING PLANS. WHERE DIFFERENCES OCCUR, THE TRAFFIC SIGN & PAVEMENT MARKING PLANS SHALL PREVAIL.

| IDENTIFI-<br>CATION<br>NUMBER | SIZE OF SIGN |        | TEXT                                                                                  | TEXT DIMENSIONS (INCHES) |                     | NUMBER<br>OF SIGNS<br>REQUIRED | COLOR           |        |        | 4X4 POST NUMBER<br>REQUIRED | UNIT<br>AREA IN<br>SQUARE<br>FEET | AREA IN<br>SQUARE<br>FEET |
|-------------------------------|--------------|--------|---------------------------------------------------------------------------------------|--------------------------|---------------------|--------------------------------|-----------------|--------|--------|-----------------------------|-----------------------------------|---------------------------|
|                               | WIDTH        | HEIGHT |                                                                                       | LETTER<br>HEIGHT         | VERTICAL<br>SPACING |                                | BACK-<br>GROUND | LEGEND | BORDER |                             |                                   |                           |
| R2-1(65)                      | 24"          | 30"    |   | MUTCD<br>STANDARD        |                     | 1                              | WHITE           | BLACK  | BLACK  | 1                           | 5.00                              | 5.00                      |
| R3-7L                         | 30"          | 30"    |  | MUTCD<br>STANDARD        |                     | 1                              | WHITE           | BLACK  | BLACK  | 1                           | 6.25                              | 6.25                      |
| R3-8c                         | 30"          | 30"    |  | MUTCD<br>STANDARD        |                     | 1                              | WHITE           | BLACK  | BLACK  | 1                           | 6.25                              | 6.25                      |
| R4-1                          | 18"          | 24"    |  | MUTCD<br>STANDARD        |                     | 1                              | WHITE           | BLACK  | BLACK  | 1                           | 3.00                              | 3.00                      |
| M6-1R                         | 21"          | 15"    |  | MUTCD<br>STANDARD        |                     | 1                              | BLUE            | WHITE  | WHITE  | MNT. w/ EXIST.<br>D9-2      | 2.19                              | 2.19                      |

NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

|                  |                    |           |              |
|------------------|--------------------|-----------|--------------|
| STATE            | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA               | -                  | 25        | 50           |
| PROJECT FILE NO. |                    | 613129    |              |

**TRAFFIC LEGEND ABBREVIATIONS & NOTES**

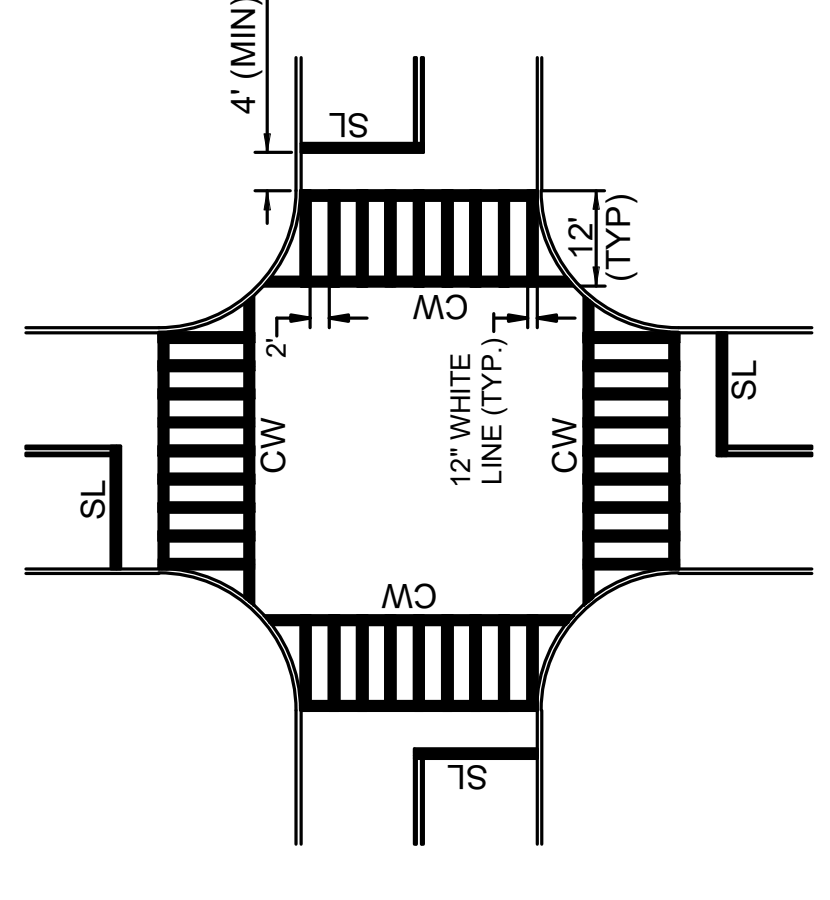
**PAVEMENT MARKINGS SYMBOLS**

| EXISTING | PROPOSED | DESCRIPTION                          |
|----------|----------|--------------------------------------|
|          |          | PAVEMENT ARROW - WHITE               |
|          |          | LEGEND "ONLY" - WHITE                |
|          |          | STOP LINE (12" WHITE)                |
|          |          | CROSSWALK (12" OR 24")               |
|          |          | SOLID WHITE LINE (6" OR 12")         |
|          |          | SOLID YELLOW LINE (6" OR 12")        |
|          |          | * BROKEN WHITE LINE (6")             |
|          |          | * BROKEN YELLOW LINE (6")            |
|          |          | *** DOTTED WHITE LINE (6")           |
|          |          | *** DOTTED YELLOW LINE (6")          |
|          |          | ** DOTTED WHITE LINE EXTENSION (6")  |
|          |          | ** DOTTED YELLOW LINE EXTENSION (6") |
|          |          | * DOUBLE WHITE LINE (6")             |
|          |          | * DOUBLE YELLOW LINE (6")            |

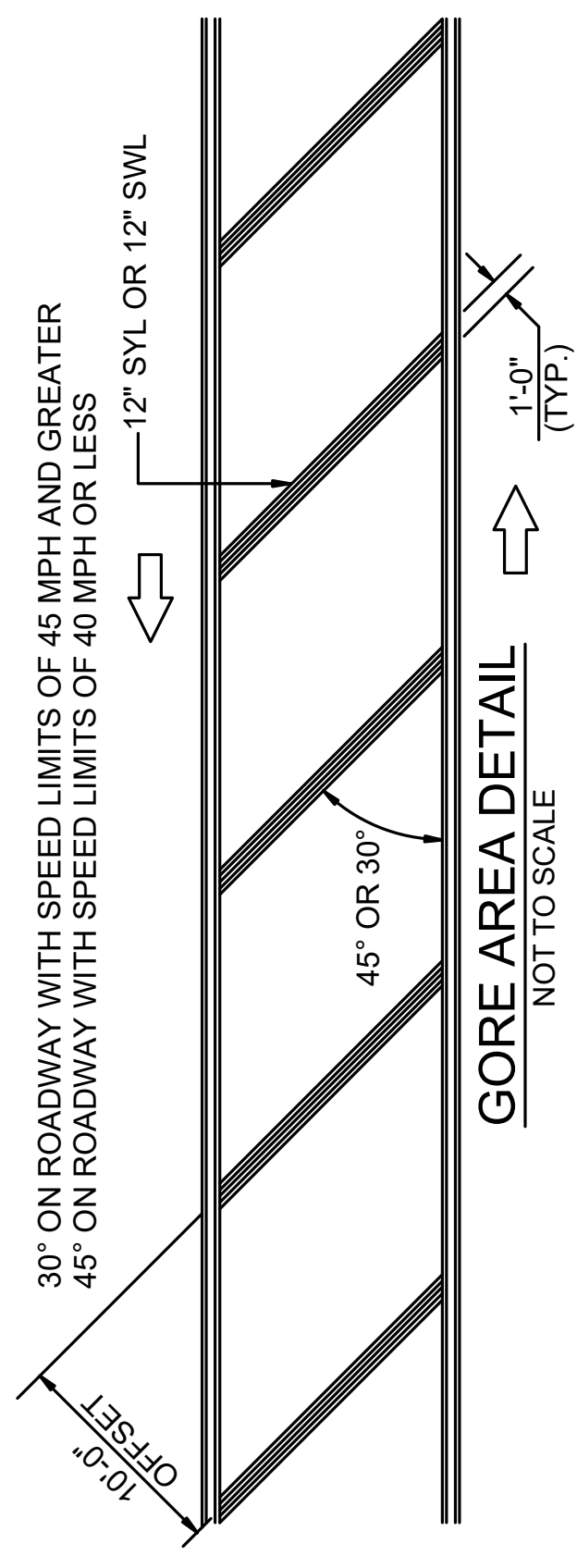
- \* BROKEN WHITE/YELLOW LINES TO BE 10' IN LENGTH WITH 30' GAP (TYP.) (BYL ON SHARED USE PATH TO BE 3' IN LENGTH WITH 9' GAP)
- \*\* DWLEX AND DYLEX LINES TO BE 2' IN LENGTH WITH 6' GAP (TYP.)
- \*\*\* DWL AND DYLL LINES TO BE 3' IN LENGTH WITH 9' GAP (TYP.) (IF WIDE LINE IS SPECIFIED, THE WIDTH SHALL BE 12")

**GENERAL NOTES**

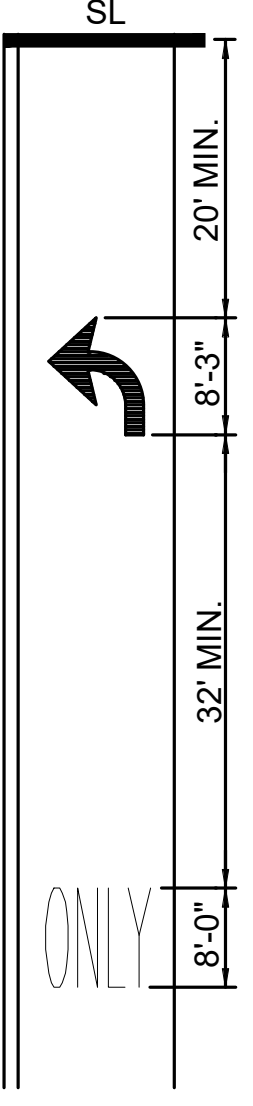
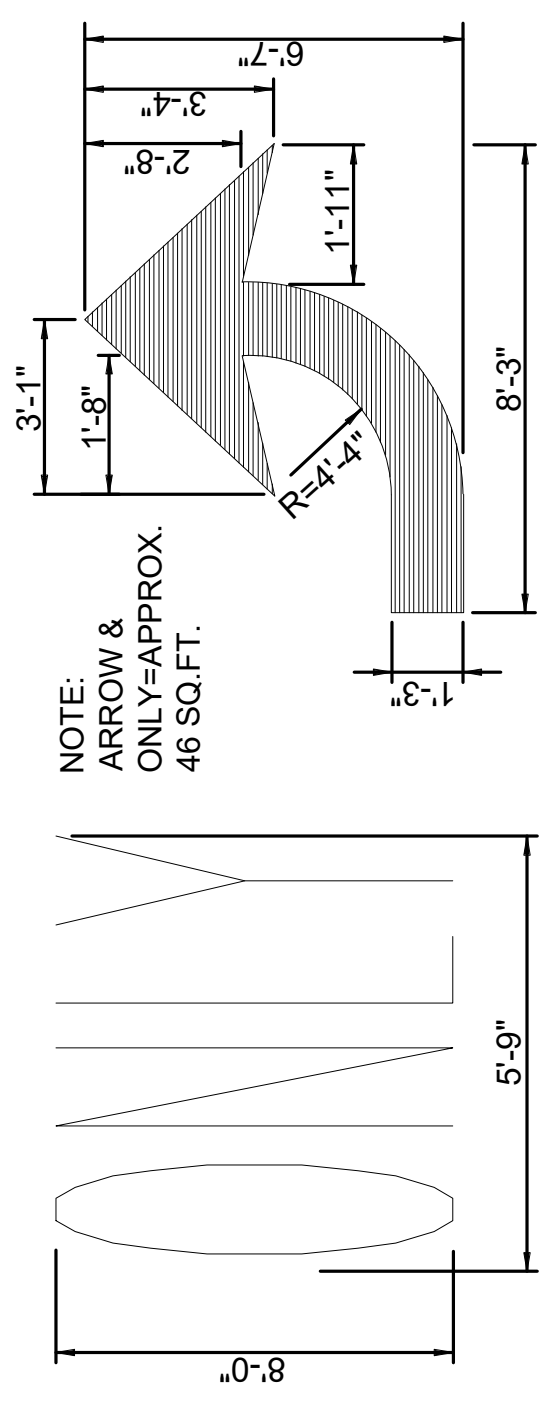
1. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RETAINED UNLESS NOTED OTHERWISE.
2. ALL PROPOSED PAVEMENT MARKINGS SHALL BE THERMOPLASTIC.



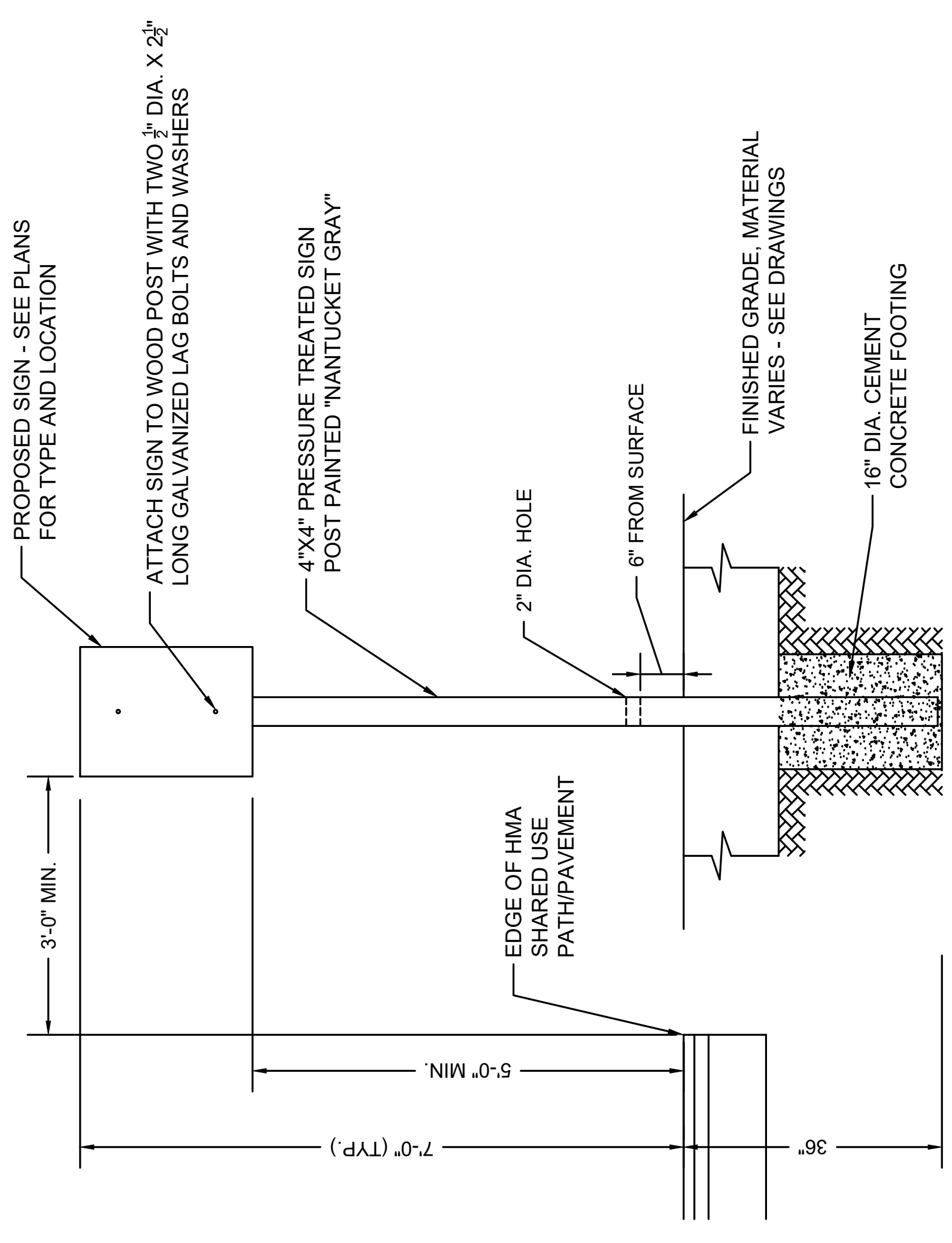
**TYPICAL CROSSWALK MARKINGS**  
NOT TO SCALE



**GORE AREA DETAIL**  
NOT TO SCALE



**ARROW & ONLY DETAIL**  
NOT TO SCALE



**NOTES:**

1. MAKE POSTS BREAKAWAY BY ADDING A 2" DIAMETER DRILL HOLE 6" ABOVE THE GROUND SURFACE IN THE BASE OF THE POST.

**TRAFFIC SIGN INSTALLATION**  
NOT TO SCALE

## TRAFFIC MANAGEMENT NOTES

### GENERAL

- ALL TRAFFIC MANAGEMENT AND WORK ZONE TRAFFIC CONTROL MEASURES SHALL CONFORM TO THE CURRENT MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (M.U.T.C.D.), MASSDOT - HIGHWAY DIVISION'S "STANDARD DETAILS AND DRAWINGS FOR THE DEVELOPMENT OF TRAFFIC MANAGEMENT PLANS", THE STANDARD SPECIFICATIONS, AND THE FOLLOWING NOTES.
- THE TEMPORARY TRAFFIC CONTROL PLANS CONTAINED HEREIN ARE GIVEN AS A GUIDE FOR TYPICAL WORK ZONE TRAFFIC CONTROL APPLICATIONS FOR THE TYPES OF WORK ANTICIPATED FOR THIS PROJECT. THEY ARE NOT INTENDED TO COVER ALL POSSIBLE CONSTRUCTION OPERATIONS WHICH THE CONTRACTOR MAY CHOOSE TO EMPLOY. WORK ZONE TRAFFIC CONTROL FOR OTHER CONSTRUCTION OPERATIONS OR OTHER TRAFFIC SITUATIONS IF APPLICABLE SHALL BE IN ACCORDANCE WITH THE REFERENCES LISTED IN NOTE NO. 1 AND AS APPROVED OR DIRECTED BY THE ENGINEER.
- WITH THE EXCEPTION OF THE PERMANENT LANE CLOSURES REQUIRED FOR STAGED CONSTRUCTION, LANE RESTRICTIONS MAY NOT REMAIN OVERNIGHT OR DURING NON-WORKING HOURS. AFTER EACH WORKING DAY, TRAFFIC CONTROL DEVICES THAT ARE NOT REQUIRED SHALL BE MOVED OFF THE ROADWAY OR FULL DEPTH CONSTRUCTION AREA AND PLACED SO AS NOT TO IMPEDE PEDESTRIAN AREAS, ABUTTER ACCESS OR CAUSE CONFUSION TO MOTORISTS. IN CERTAIN CIRCUMSTANCES, AND ONLY WITH THE APPROVAL OF MASSDOT AND THE ENGINEER, LANE RESTRICTIONS MAY REMAIN OVERNIGHT.
- CONTRACTOR SHALL PROVIDE A SAFE TEMPORARY PEDESTRIAN ACCESS WHERE EXISTING SIDEWALKS OR OTHER PEDESTRIAN AREAS ARE AFFECTED BY CONSTRUCTION WORK. CONTRACTOR SHALL PROVIDE RAMPS AND RAILINGS IN ACCORDANCE WITH ADA/AB ACCESSIBILITY REQUIREMENTS FROM THE LATEST MASSDOT TTCP TEMPLATES. CONTRACTOR SHALL NOTIFY EACH ABUTTER AT LEAST 24 HOURS IN ADVANCE OF THE START OF ANY WORK THAT WILL REQUIRE THE TEMPORARY CLOSURE OF ACCESS, SUCH AS CONDUIT INSTALLATION, EXISTING PAVEMENT EXCAVATION, TEMPORARY DRIVEWAY PAVEMENT PLACEMENT AND SIMILAR OPERATIONS.
- PLACE ALL CONSTRUCTION SIGNING, TRAFFIC CONTROL DEVICES AND TEMPORARY PAVEMENT MARKINGS FOR EACH PHASE PRIOR TO COMMENCEMENT OF CONSTRUCTION.
- ONE (1) THRU TRAVEL LANE HAVING A MINIMUM WIDTH OF 11'-0" MUST BE PROVIDED FOR BOTH DIRECTIONS (LANE MAY BE SHARED AND DIRECTION OF TRAVEL TO ALTERNATE UNDER POLICE OFFICER OR FLAGGER CONTROL) DURING ALL PHASES OF CONSTRUCTION AS SHOWN ON THE TEMPORARY TRAFFIC CONTROL PLANS, UNLESS OTHERWISE DIRECTED BY THE ENGINEER. MINIMUM LANE WIDTH IS MEASURED FROM THE EDGE OF DRUMS OR MEDIAN BARRIER.
- WHEN WORK INFRINGES UPON THE TRAVELED WAY, WORK SHALL BE RESTRICTED TO OFF-PEAK HOURS ONLY (NORMALLY 9:00am TO 3:00pm, MONDAY TO FRIDAY). THE CONTRACTOR SHALL NOTIFY EACH ABUTTER AT LEAST 24 HOURS IN ADVANCE OF ROAD CLOSURE.
- NO WORK IS TO BE PERFORMED BETWEEN MEMORIAL DAY AND LABOR DAY, WITHOUT PRIOR WRITTEN APPROVAL OF THE DISTRICT HIGHWAY DIRECTOR AND THE TOWN.
- TAPER LENGTH FORMULAE FOR CHANNELIZATION DEVICES: ENGLISH UNITS:  
 $L = W \times S$  FOR SPEED EQUAL TO OR GREATER THAN 45 M.P.H.  
 $L = W \times S^2 / 60$  FOR SPEED EQUAL TO OR LESS THAN 40 M.P.H.  
 WHERE: L = MIN. LENGTH OF TAPER, S = POSTED SPEED, W = OFFSET WIDTH.
- ADVISORY SPEED LIMIT, IF USED, SHALL BE SET IN THE FIELD BY THE ENGINEER. W13-1P PLATES SHALL BE USED WHERE APPROPRIATE.
- FLASHING ARROW PANEL SHALL BE SET IN "ARROW MODE" WHEN USED FOR ACTUAL LANE CLOSURES ONLY. FOR SHOULDER CLOSURES, BULBS TO BE ILLUMINATED IN A NON-DIRECTIONAL CAUTION CONFIGURATION TO AVOID UNNECESSARY LANE SHIFTS.
- DISTANCES SHOWN ON THE TEMPORARY TRAFFIC CONTROL PLANS ARE A GUIDE ONLY, AND MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER.
- THE FIRST TEN (10) REFLECTORIZED DRUMS OF A TAPER SHALL BE MOUNTED WITH SEQUENTIAL FLASHING WARNING LIGHTS.

### GRADE DIFFERENCES

- WHERE THERE IS A LONGITUDINAL DIFFERENCE IN ELEVATION BETWEEN EXISTING PAVEMENT AND ADJACENT TRAVEL SURFACE (UNDER REPAIR OR RECONSTRUCTION), THE CONTRACTOR SHALL PATCH A TEMPORARY HMA WEDGE WITH A 12:1 (OR FLATTER) SLOPE FOR SMOOTH TRANSITION. (SEE DETAIL, ON SHEET 27).
- CROSS-SECTIONAL GRADE DIFFERENCES IN EXCESS OF 2" DURING NON-WORKING HOURS WILL REQUIRE DELINEATION BY USE OF REFLECTORIZED DRUMS.
- CROSS-SECTIONAL GRADE DIFFERENCES IN EXCESS OF 4" DURING NON-WORKING HOURS SHALL BE PROTECTED BY BACKFILLING WITH A WEDGE OF EARTHWORK TO BE COMPACTED AT 4:1 SLOPE AND WILL ALSO REQUIRE DELINEATION BY USE OF DRUMS.
- A MINIMUM SLOPE OF 4:1 MUST BE MAINTAINED AFTER WORKING HOURS DURING SUBBASE AND BASE COURSE INSTALLATION ALONG EDGE OF THE TRAVELWAY (SEE DETAIL, ON SHEET 27). A MAXIMUM SLOPE OF 8:1 MUST BE MAINTAINED ON ALL ABUTTER ACCESS DRIVES AND A MAXIMUM SLOPE OF 12:1 MUST BE MAINTAINED ON ALL SIDEWALKS.

### CONSTRUCTION SIGNING

- ALL CONSTRUCTION SIGNS SHALL BE BLACK LEGEND ON A REFLECTORIZED FLUORESCENT ORANGE BACKGROUND UNLESS OTHERWISE NOTED.

- CONSTRUCTION SIGNING SHOWN ON THE ADVANCE WARNING SIGN PLAN SHALL ONLY BE USED WHEN WORK IS BEING DONE WHICH RESTRICTS TRAFFIC.
- STANDARD ORANGE OR FLUORESCENT RED-ORANGE FLAGS (16"x16" MIN.) MAY BE ATTACHED TWO (2) EACH ON ALL ADVANCE WARNING SIGNS. FLAGS SHALL NOT INTERFERE WITH A CLEAR VIEW OF THE SIGN FACE. IF USED, THE COST FOR THE FLAGS SHALL BE CONSIDERED INCIDENTAL TO THE COST OF THE SIGNS WITH NO ADDITIONAL PAYMENT.
- EXISTING GUIDE SIGNS SHALL BE TEMPORARILY RESET AS DIRECTED BY THE ENGINEER.
- ALL SIGNS, INCLUDING EXISTING, THAT ARE NOT REPRESENTATIVE OF ACTUAL WORK CONDITIONS SHALL BE EITHER COVERED OR REMOVED WHEN NOT APPLICABLE.
- IF USED, ALL W20-4 AND W20-5 SIGNS SHALL BE TAKEN DOWN OR COVERED AT THE CLOSE OF EACH DAY UNLESS LANE RESTRICTIONS ARE PERMITTED TO REMAIN OVERNIGHT IN ACCORDANCE WITH NOTE NO. 3 ABOVE.
- USE MA-W20-7b OR W20-7 SIGNS ONLY WHILE POLICE OR FLAGGERS ARE DIRECTING TRAFFIC. THEY SHALL BE TAKEN DOWN OR COVERED AT THE CLOSE OF EACH DAY OR WHEN NOT IN USE.
- ALL SIGNS SHALL BE MOUNTED ON THEIR OWN STANDARD MASH CRASH TESTED SUPPORT. THEY SHALL BE TAKEN DOWN OR COVERED AT THE CLOSE OF EACH DAY OR WHEN NOT IN USE.

### PAVEMENT MARKINGS

- PAVEMENT MARKINGS WHICH ARE NO LONGER APPLICABLE SHALL BE REMOVED. APPLY TEMPORARY MARKINGS WHERE SHOWN ON THE TEMPORARY TRAFFIC CONTROL PLANS.
- ON PROJECTS WHERE PAVEMENT OVERLAY IS NOT DESIGNATED, EXISTING PAVEMENT MARKINGS WHICH ARE IN CONFLICT WITH TEMPORARY TRAFFIC CONTROL'S SHOULD BE COVERED TEMPORARILY WITH BLACKOUT TAPE, AS DIRECTED BY THE ENGINEER, FOR THE FULL DURATION OF THE PHASE IN PROGRESS. TEMPORARY PAINTED OR REMOVABLE TAPE MARKINGS SHALL BE USED AS NECESSARY FOR ALL PHASES OF CONSTRUCTION.

### CHANNELIZATION

- THE MAXIMUM SPACING BETWEEN CHANNELIZATION DEVICES (DRUMS OR CONES) SHALL BE APPROXIMATELY EQUAL IN FEET TO THE POSTED SPEED LIMIT. THE FIRST TEN DRUMS OF A TAPER SHALL BE MOUNTED WITH SEQUENTIAL FLASHING LIGHTS.
- REFLECTORIZED CONES SHALL BE 36" HIGH.
- ALL TEMPORARY TRAFFIC CONTROL EQUIPMENT, INCLUDING BUT NOT NECESSARILY LIMITED TO, TEMPORARY IMPACT ATTENUATORS, PLASTIC DRUMS, AND SIGNS AND SIGN SUPPORTS (ON OR NEAR THE TRAVELED WAY) MUST PASS THE CRITERIA SET FORTH IN THE MANUAL FOR ASSESSING SAFETY HARDWARE (MASH), IF THEY DO NOT MEET THESE CRITERIA, THEY MUST BE REMOVED FROM THE PROJECT.

| ROAD TYPE                     | DISTANCE BETWEEN SIGNS** |       |       |
|-------------------------------|--------------------------|-------|-------|
|                               | A                        | B     | C     |
| LOCAL OR LOW VOLUME ROADWAYS* | 350                      | 350   | 350   |
| MOST OTHER ROADWAYS*          | 500                      | 500   | 500   |
| FREEWAYS AND EXPRESSWAYS*     | 1,000                    | 1,500 | 2,640 |

Based on: Table 6B-1 MUTCD latest edition

\*ROAD TYPE TO BE DETERMINED BY MASSDOT OFFICE OF TRANSPORTATION PLANNING.

\*\*DISTANCES ARE SHOWN IN FEET. THE COLUMN HEADINGS A, B AND C ARE THE DIMENSIONS SHOWN IN THE DETAIL/TYPICAL SETUP FIGURES. THE A DIMENSION IS THE DISTANCE FROM THE TRANSITION OR POINT OF RESTRICTION TO THE FIRST SIGN. THE B DIMENSION IS THE DISTANCE BETWEEN THE FIRST AND SECOND SIGNS. THE C DIMENSION IS THE DISTANCE BETWEEN THE SECOND AND THIRD SIGNS. (THE "THIRD" SIGN IS THE FIRST ONE TYPICALLY ENCOUNTERED BY A DRIVER APPROACHING A TEMPORARY TRAFFIC CONTROL (TTC) ZONE.)

THE "THIRD" SIGN ABOVE IS TYPICALLY REFERRED TO AS AN "ADVANCE WARNING" SIGN ON THE TTCP SETUPS. THESE ADVANCE WARNING SIGNS ARE LOCATED PRIOR TO THE PROJECT LIMITS ON ALL APPROACHES (i.e. THE W20-1 SERIES (ROAD WORK XX FT) SIGNS), AND USUALLY REMAIN FOR THE DURATION OF THE PROJECT.

THE FIRST AND SECOND WARNING SIGNS ABOVE ARE REFERRED TO AS THE OPERATIONAL (DAY-TO-DAY) WORK ZONE SIGNS AND MAY BE MOVED DEPENDING ON WHERE THE SPECIFIC ROADWAY WORK FOR THAT DAY IS LOCATED.

MA-R2-10a SIGNS SHALL BE PLACED BETWEEN THE SECOND AND THIRD SIGNS AS DESCRIBED ABOVE.

### TRAFFIC MANAGEMENT LEGEND

#### WORK AREA

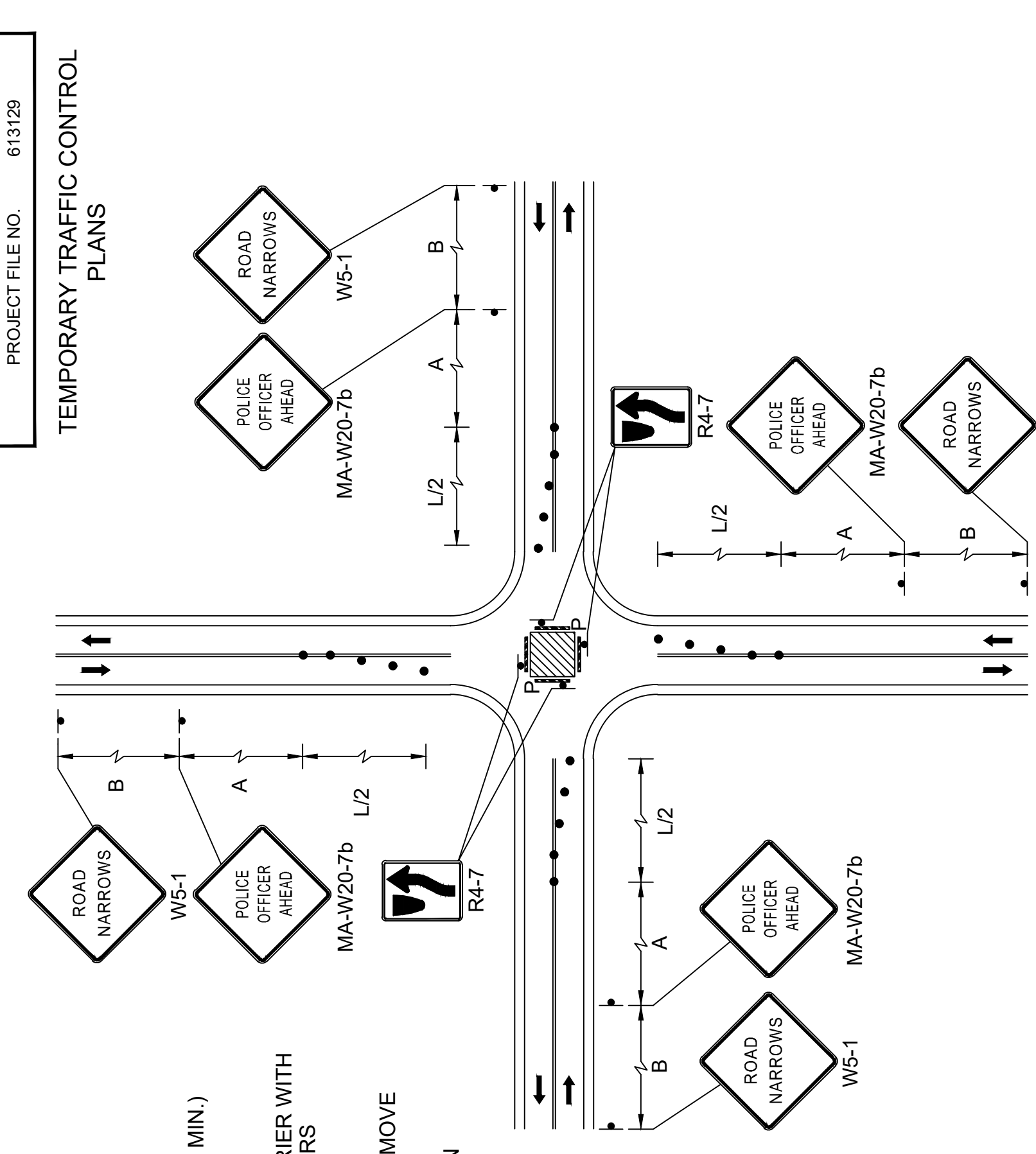
- SIGN**
- DIRECTION OF TRAVEL
  - REFLECTORIZED DRUM OR CONE
  - REFLECTORIZED DRUM WITH TYPE 'A' FLASHING WARNING LIGHT
  - POLICE OFFICER
  - PORTABLE TYPE III BARRICADE (4" WIDE, MIN.)
  - FLASHING ARROW BOARD (30"x60" STD. SIZE WITH 13 LAMPS, MIN.)
  - TEMPORARY PRECAST CONCRETE BARRIER WITH TEMPORARY FENCE & WHITE REFLECTORS
  - TEMPORARY IMPACT ATTENUATOR
  - PAVEMENT MARKINGS TO COVER OR REMOVE (SEE PAVEMENT MARKINGS NOTES)
  - PORTABLE CHANGEABLE MESSAGE SIGN
  - MOVABLE IMPACT ATTENUATOR

| BUFFER SPACING (MPH) | SPEED* DISTANCE (FT) |
|----------------------|----------------------|
| 20                   | 115                  |
| 25                   | 155                  |
| 30                   | 200                  |
| 35                   | 250                  |
| 40                   | 305                  |
| 45                   | 360                  |
| 50                   | 425                  |
| 55                   | 495                  |
| 60                   | 570                  |
| 65                   | 645                  |
| 70                   | 730                  |
| 75                   | 820                  |

\*POSTED SPEED, OFF-PEAK  
85TH-PERCENTILE SPEED PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED.

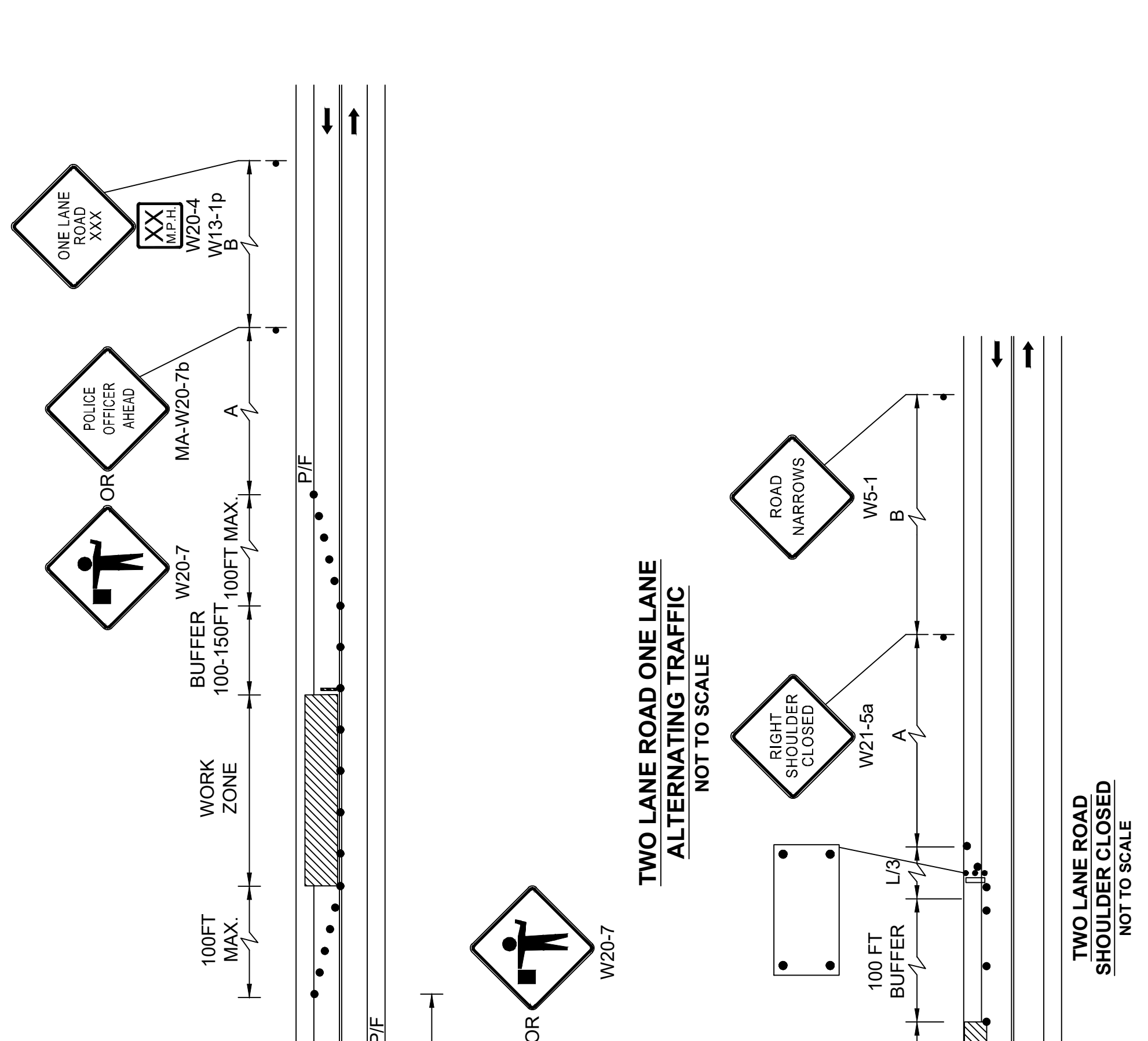
### SINGLE LANE APPROACH CENTER CLOSURE

NOT TO SCALE



### TWO LANE ROAD ONE LANE ALTERNATING TRAFFIC

NOT TO SCALE

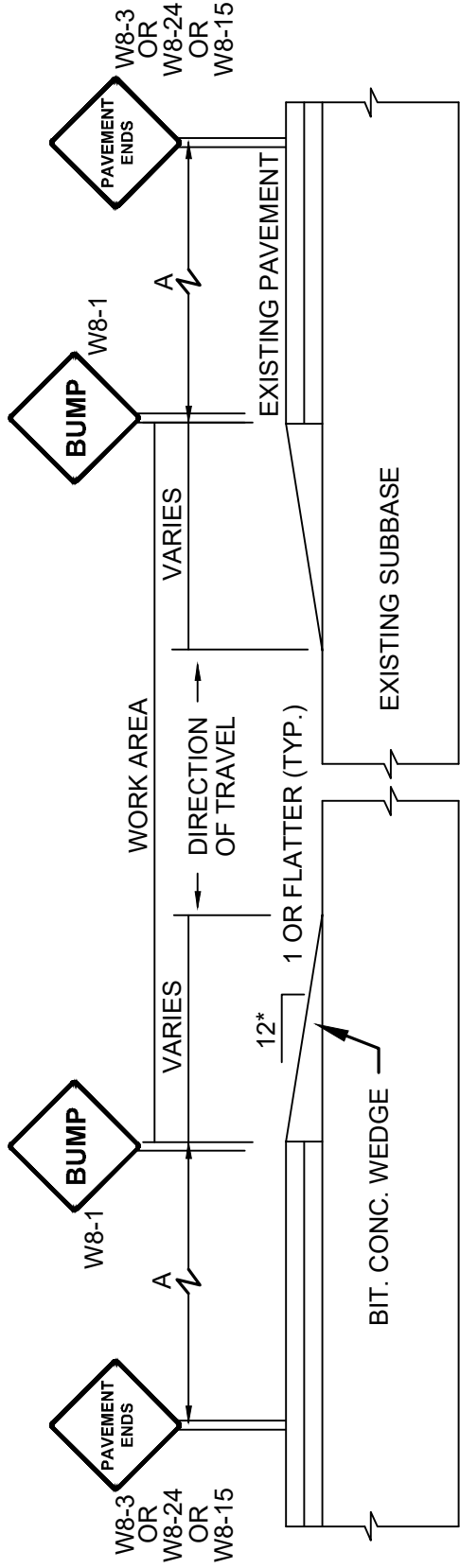


|                               |                   |              |
|-------------------------------|-------------------|--------------|
| NANTUCKET                     |                   |              |
| MILESTONE ROAD AT POLPIS ROAD |                   |              |
| STATE                         | FED AID PROJ. NO. | TOTAL SHEETS |
| MA                            | -                 | 26           |
| PROJECT FILE NO.              |                   | 613129       |

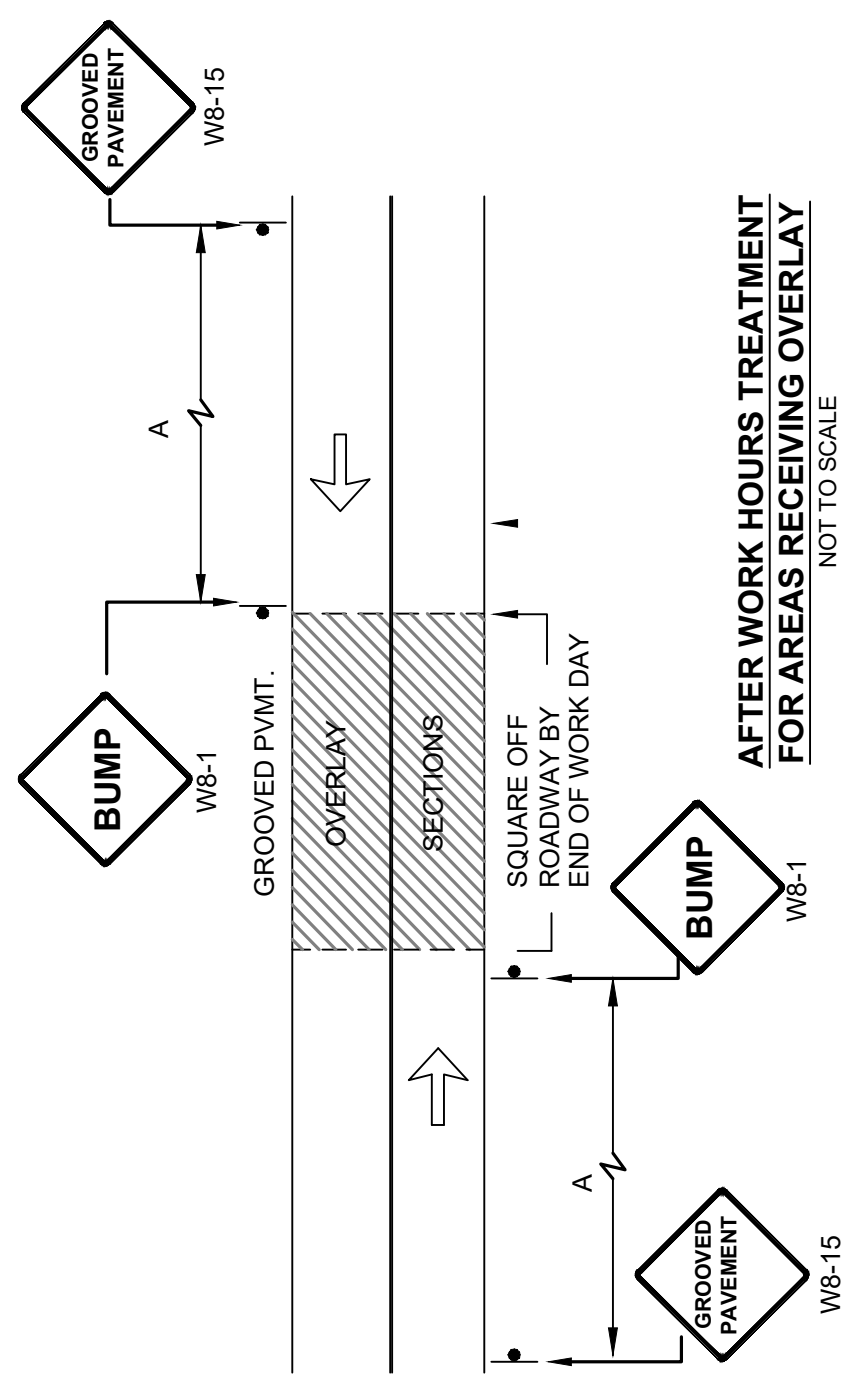
### TEMPORARY TRAFFIC CONTROL PLANS

NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD  
TEMPORARY TRAFFIC CONTROL PLANS

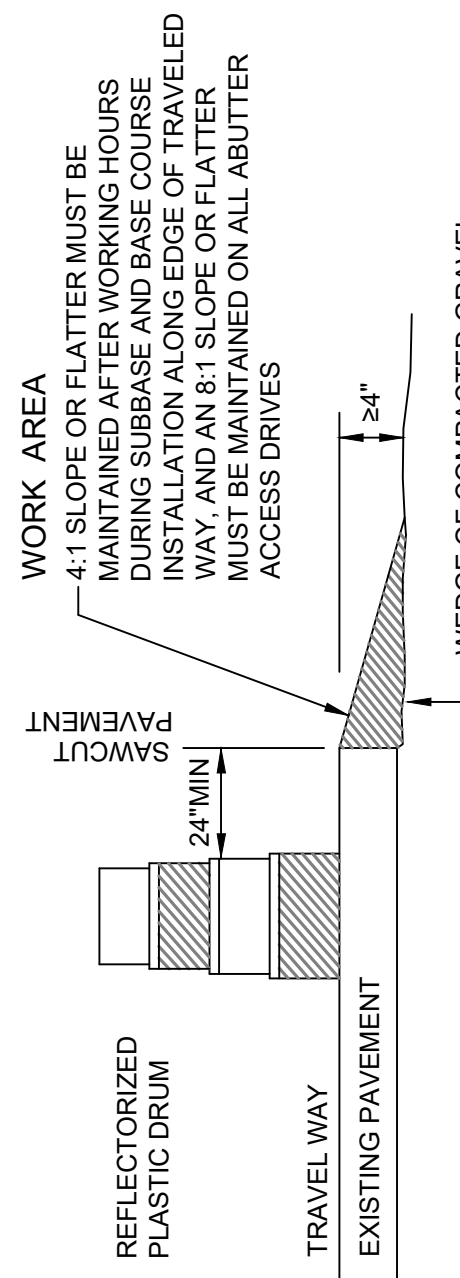
| STATE            | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
|------------------|--------------------|-----------|--------------|
| MA               | -                  | 27        | 50           |
| PROJECT FILE NO. |                    | 613129    |              |



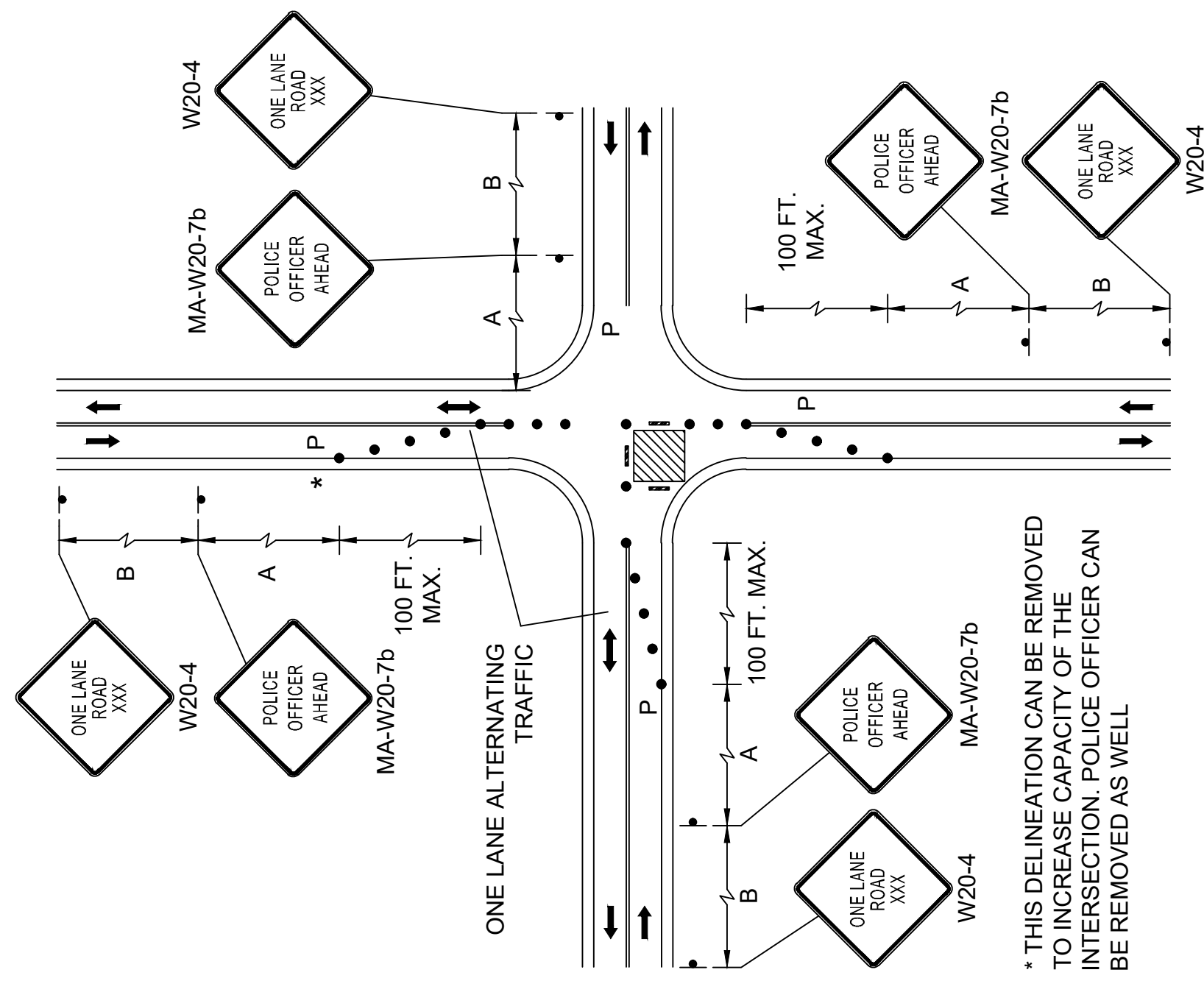
**TEMPORARY RAMP**  
NOT TO SCALE



**AFTER WORK HOURS TREATMENT FOR AREAS RECEIVING OVERLAY**  
NOT TO SCALE

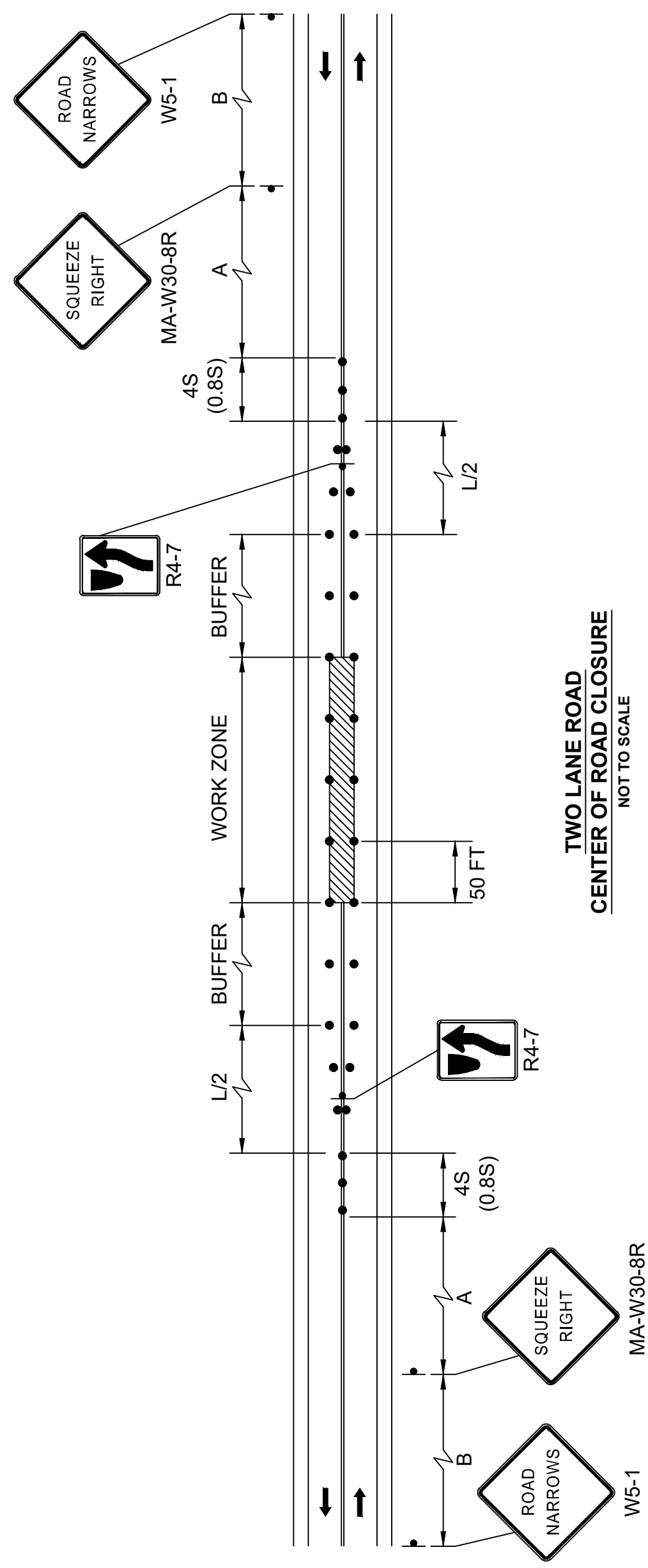


**AFTER WORK HOURS TREATMENT FOR LATERAL SLOPING**  
NOT TO SCALE



\* THIS DELINEATION CAN BE REMOVED TO INCREASE CAPACITY OF THE INTERSECTION. POLICE OFFICER CAN BE REMOVED AS WELL

**SINGLE LANE APPROACH ONE QUADRANT CLOSURE**  
NOT TO SCALE



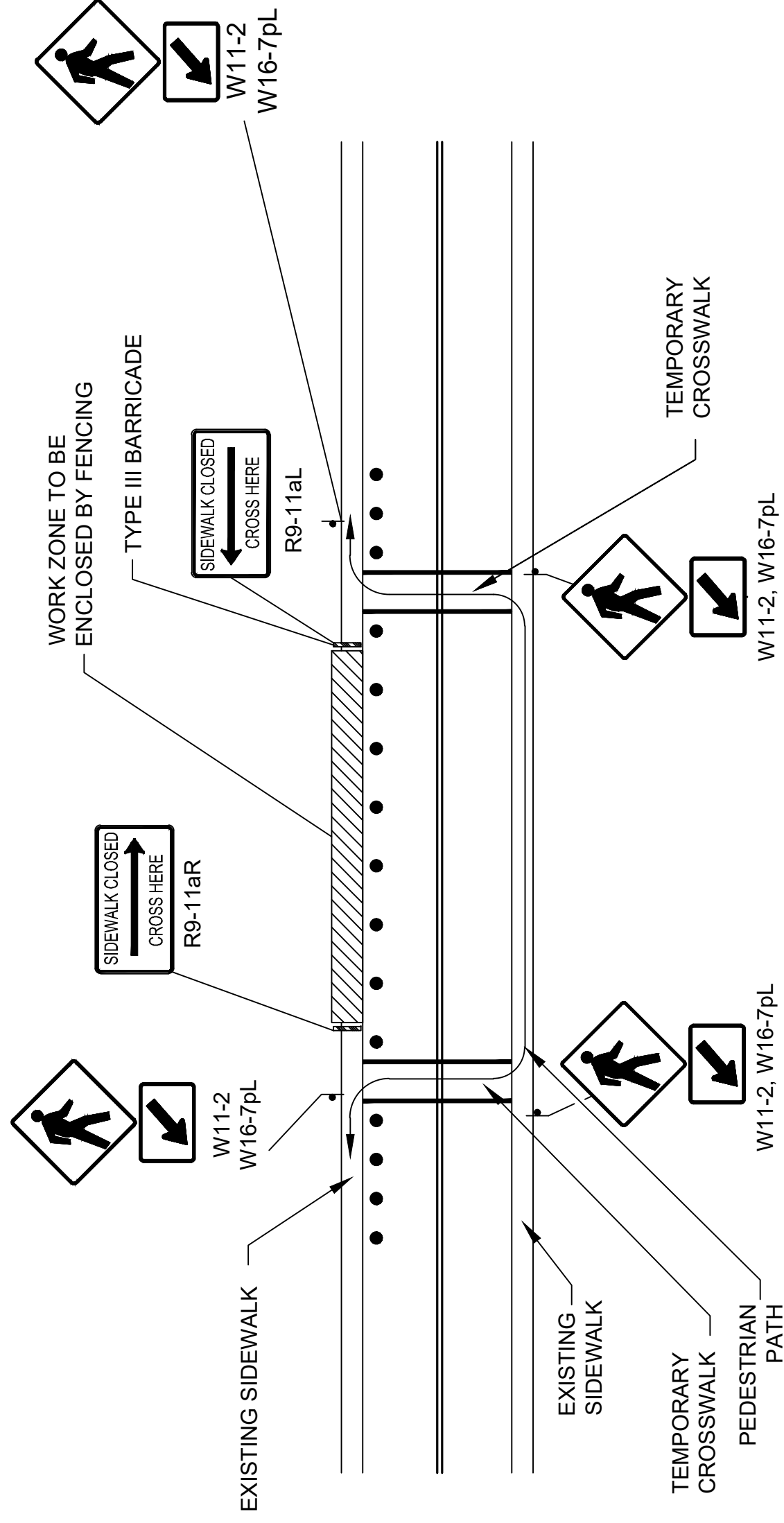
**TWO LANE ROAD CENTER OF ROAD CLOSURE**  
NOT TO SCALE



NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

|                         |                    |           |              |
|-------------------------|--------------------|-----------|--------------|
| STATE                   | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA                      | -                  | 28        | 50           |
| PROJECT FILE NO. 613129 |                    |           |              |

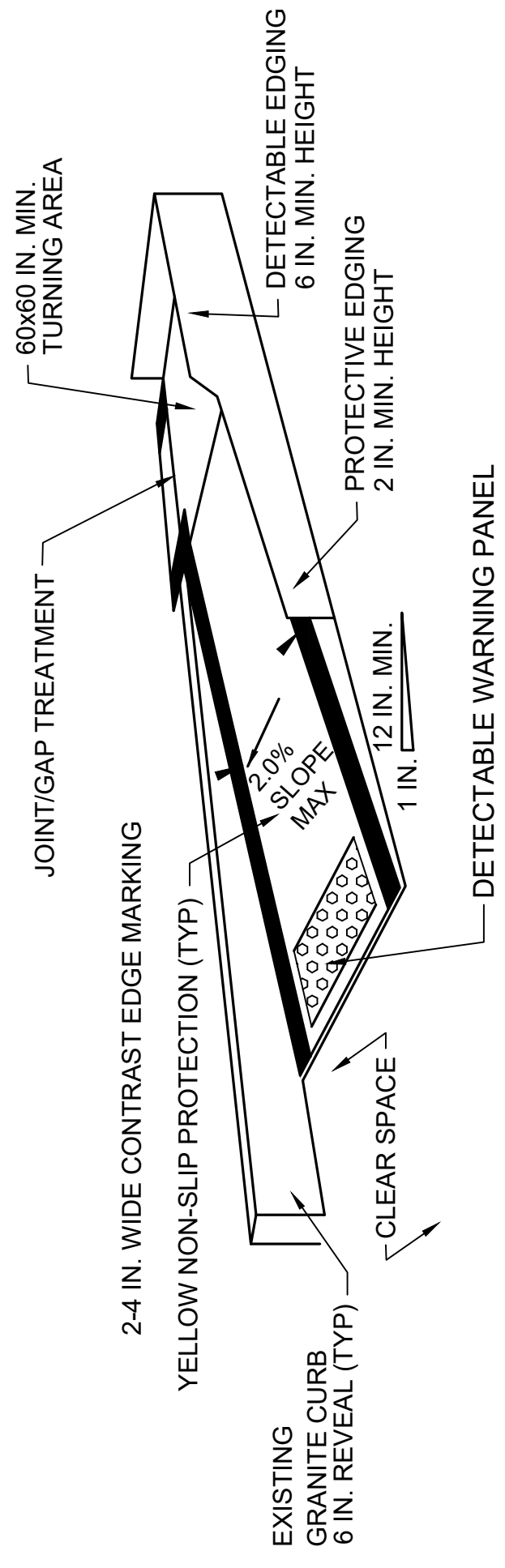
TEMPORARY TRAFFIC CONTROL PLANS



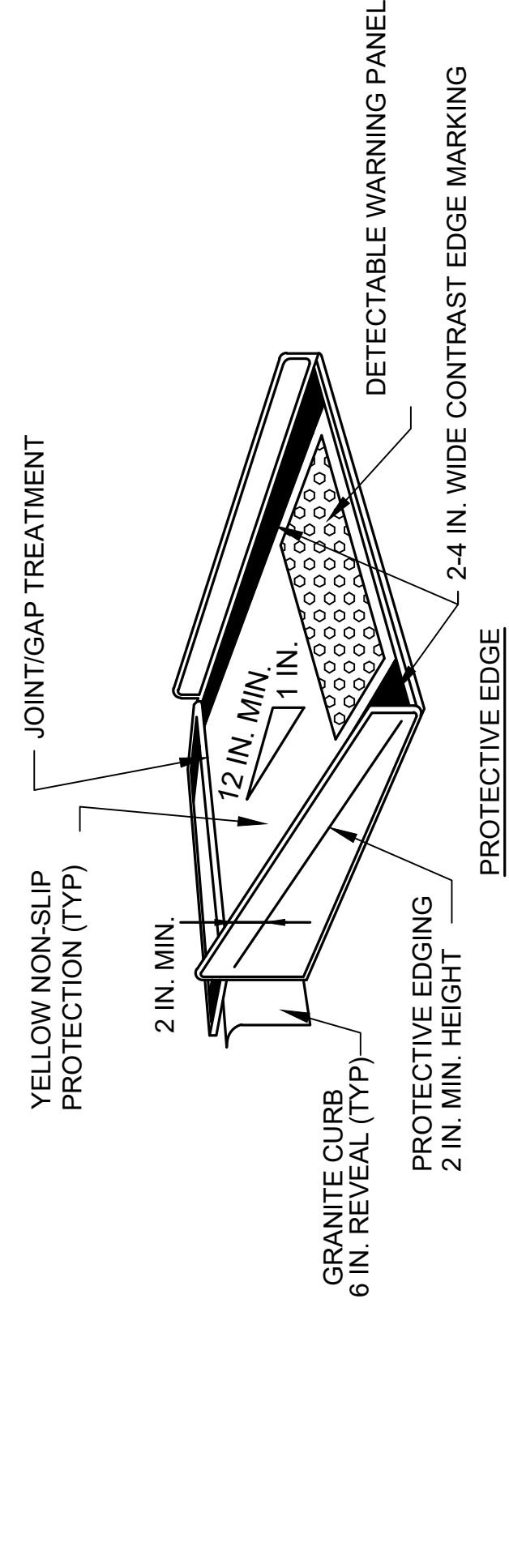
**NOTES**

- ADDITIONAL ADVANCE WARNING MAY BE NECESSARY.
- CONTROLS ONLY FOR PEDESTRIAN TRAFFIC ARE SHOWN. VEHICULAR TRAFFIC SHOULD BE HANDLED AS SHOWN ELSEWHERE.
- PROTECTIVE EDGING SHOULD BE CONSIDERED WHEN LOCATING SIGN CONTROLS ON CURBS.
- STRESS IS TO BE MAINTAINED THROUGHOUT THE PROJECT AND DURING CONSTRUCTION STAGING, AS DIRECTED BY THE ENGINEER.
- THE SIDEWALK SHOULD BE A MINIMUM OF 4 FEET WIDE. IF THIS WALKWAY EXCEEDS 200 FEET THEN A 5 FOOT X 5 FOOT PASSING ZONE IS REQUIRED.

**PEDESTRIAN BYPASS**  
NOT TO SCALE



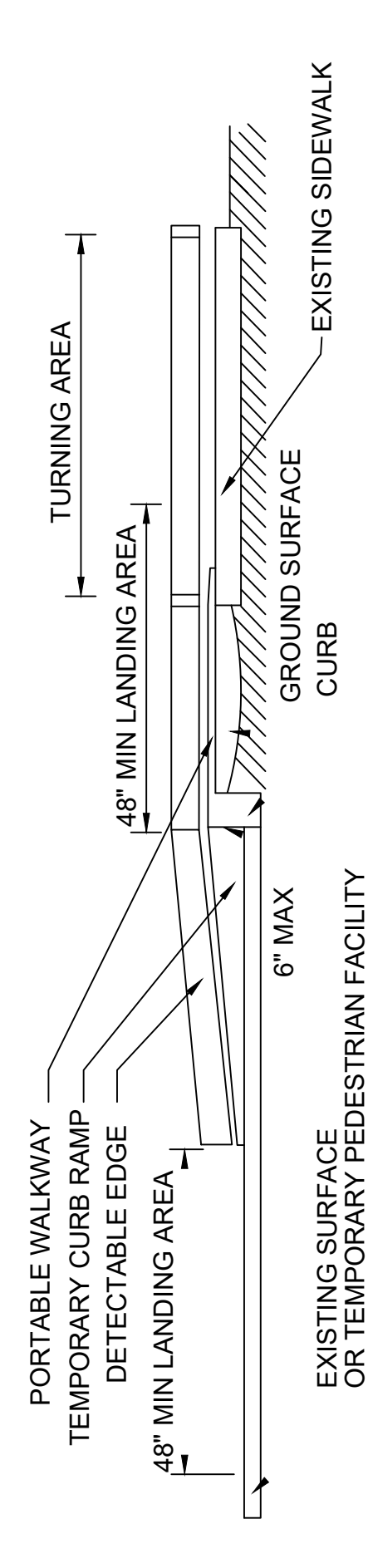
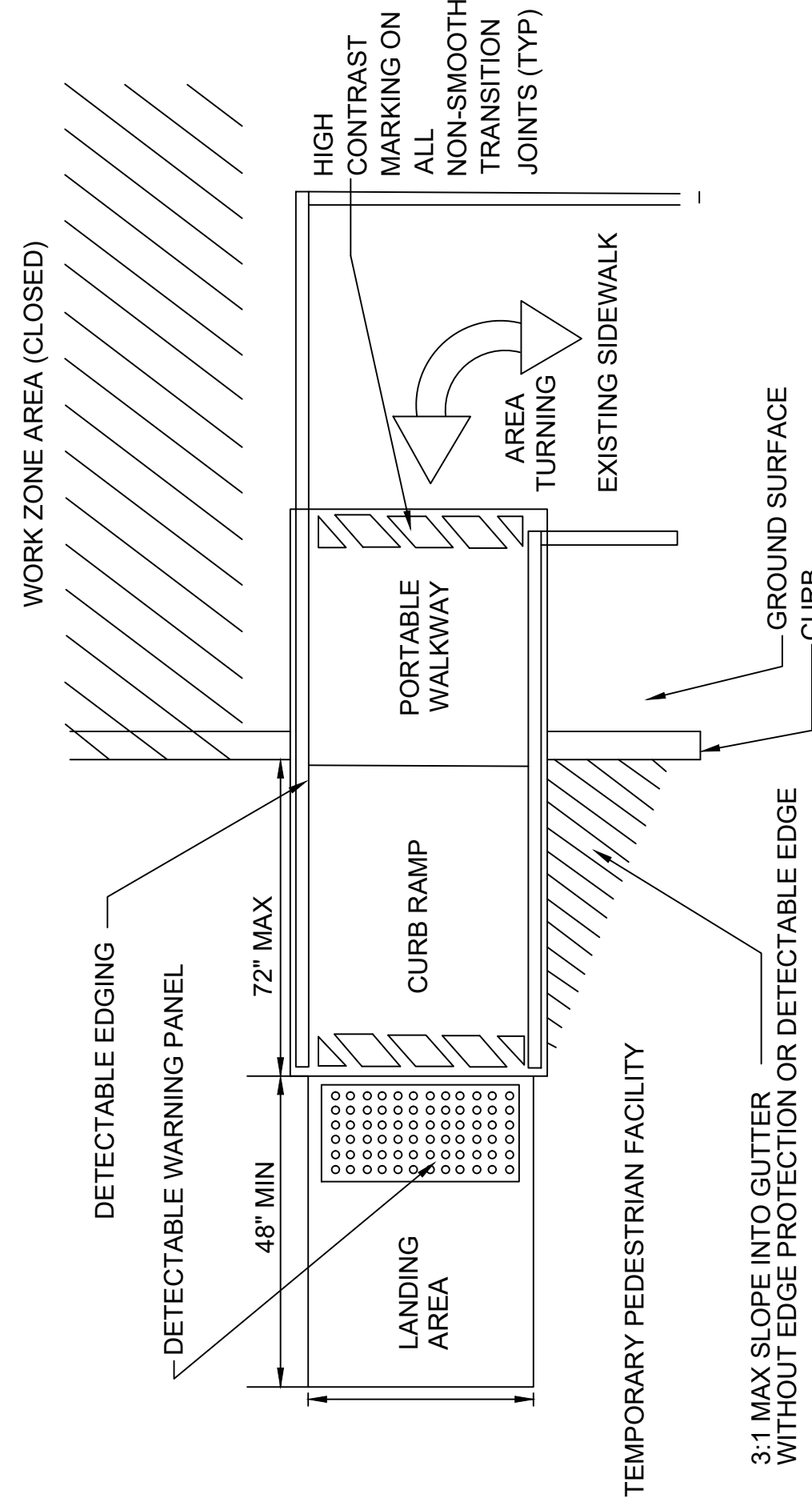
**TEMPORARY CURB RAMP-PARALLEL TO CURB**  
NOT TO SCALE



**TEMPORARY CURB RAMP-PERPENDICULAR TO CURB (PED-1)**  
NOT TO SCALE

**NOTES:**

- CURB RAMPS SHALL BE 60 IN. MINIMUM WIDTH WITH A FIRM, STABLE AND NON-SLIP SURFACE.
- PROTECTIVE EDGING WITH A 2 IN. MINIMUM HEIGHT SHALL BE INSTALLED WHEN THE CURB RAMP OR LANDING PLATFORM HAS A VERTICAL DROP OF 6 IN. OR GREATER OR HAS A SIDE APRON SLOP STEEPER THAN 1:3 (33%). PROTECTIVE EDGING SHOULD BE CONSIDERED WHEN THE CURB RAMPS OR LANDING PLATFORMS HAVE A VERTICAL DROP OF 3 IN. OR MORE.
- DETECTABLE EDGING WITH 6 IN. MINIMUM HEIGHT AND CONTRASTING COLOR SHALL BE INSTALLED ON ALL CURB RAMP LANDINGS WHERE THE WALKWAY CHANGES DIRECTION (TURNS).
- THE CURB RAMP WALKWAY AND LANDING AREA SURFACE SHALL BE OF A SOLID CONTINUOUS CONTRASTING COLOR ABUTTING UP TO THE EXISTING SIDEWALK.
- CURB RAMPS AND LANDINGS SHOULD HAVE A 1:50 (2%) MAX CROSS-SLOPE.
- CLEAR SPACE OF 48x48 IN. MINIMUM SHALL BE PROVIDED ABOVE AND BELOW THE CURB RAMP.
- WATER FLOW IN THE GUTTER SYSTEM SHALL HAVE MINIMAL RESTRICTION.
- LATERAL JOINTS OR GAPS BETWEEN SURFACES SHALL BE LESS THAN 0.5 IN. WIDTH.
- CHANGES BETWEEN SURFACE HEIGHTS SHOULD NOT EXCEED 0.5 IN. LATERAL EDGES SHOULD BE VERTICAL UP TO 0.25 IN. HIGH, AND BEVELED AT 1:2 BETWEEN 0.25 IN. AND 0.5 IN. HEIGHT.
- IF A TEMPORARY PEDESTRIAN RAMP LEADS TO A CROSSWALK, THEN A DETECTABLE WARNING PAD MUST BE ADHERED TO THE BASE OF THE RAMP. IF IT LEADS TO A PROTECTED PEDESTRIAN BYPASS THAT DOES NOT CONFLICT WITH VEHICULAR TRAFFIC, THEN A PAD SHALL NOT BE INSTALLED ON THE RAMP.



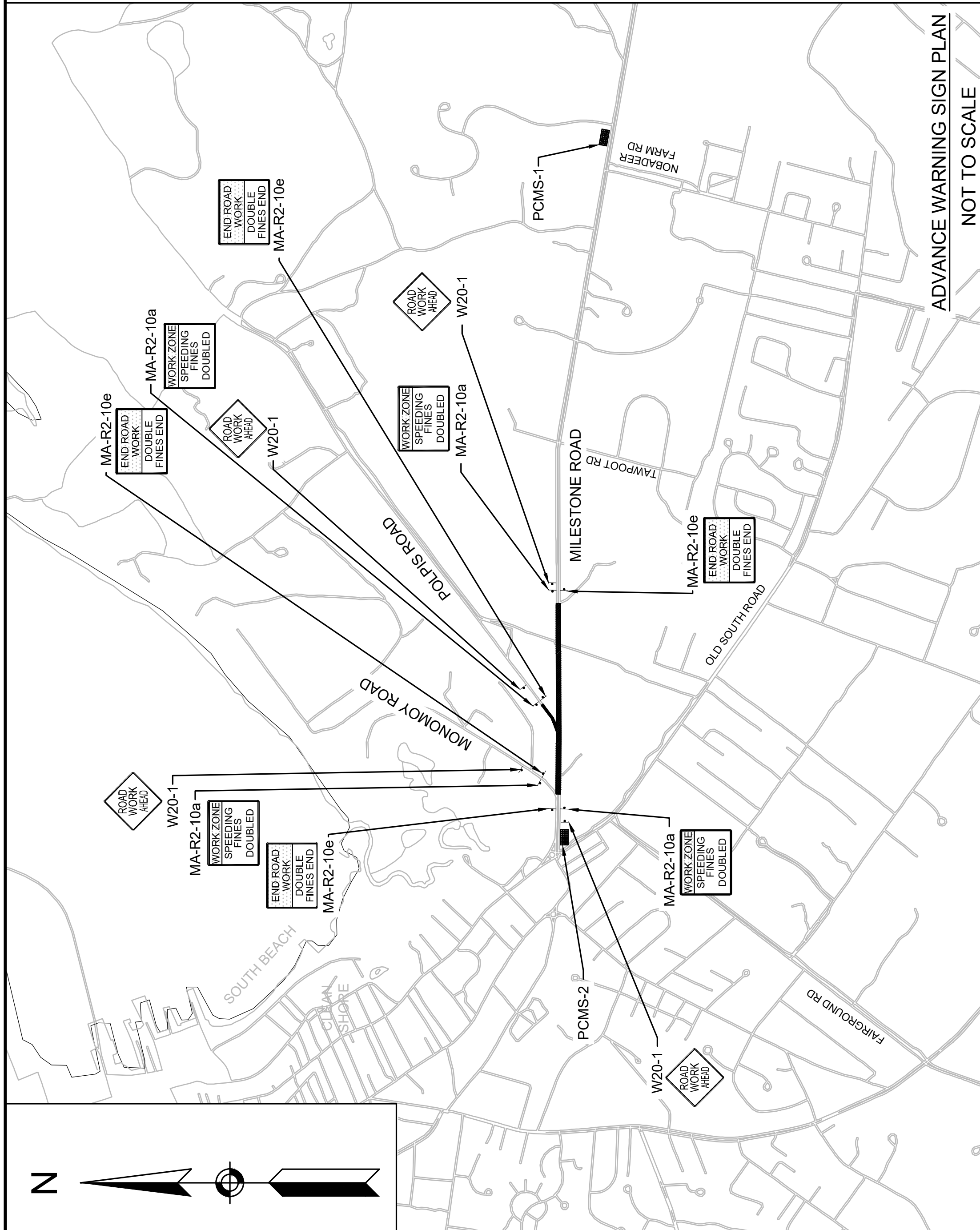
**TEMPORARY CURB RAMP-TYPE 2 (PED-2)**

**PEDESTRIAN DETAILS**  
NOT TO SCALE

NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD  
TEMPORARY TRAFFIC CONTROL  
PLANS

|                  |                    |           |              |
|------------------|--------------------|-----------|--------------|
| STATE            | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA               | -                  | 29        | 50           |
| PROJECT FILE NO. |                    | 613129    |              |

| IDENTIFICATION NUMBER | SIZE OF SIGN |        | TEXT                             | TEXT DIMENSIONS (INCHES) |                  | NUMBER OF SIGNS REQUIRED | COLOR                      |        |        | UNIT AREA IN SQUARE FEET | AREA IN SQUARE FEET |
|-----------------------|--------------|--------|----------------------------------|--------------------------|------------------|--------------------------|----------------------------|--------|--------|--------------------------|---------------------|
|                       | WIDTH        | HEIGHT |                                  | LETTER HEIGHT            | VERTICAL SPACING |                          | BACK-GROUND                | LEGEND | BORDER |                          |                     |
| MA-R2-10a             | 48"          | 36"    | WORK ZONE SPEEDING FINES DOUBLED | MASSDOT STANDARD         |                  | 4                        | FLUORESCENT ORANGE / WHITE | BLACK  | BLACK  | 12.00                    | 48.00               |
| MA-R2-10e             | 36"          | 48"    | END ROAD WORK DOUBLE FINES END   | MASSDOT STANDARD         |                  | 4                        | FLUORESCENT ORANGE / WHITE | BLACK  | BLACK  | 12.00                    | 48.00               |
| R4-7                  | 24"          | 30"    | RIGHT TURN                       |                          |                  | 3                        | WHITE                      | BLACK  | BLACK  | 5.00                     | 15.00               |
| W5-1                  | 36"          | 36"    | ROAD NARROWS                     |                          |                  | 3                        | FLUORESCENT ORANGE         | BLACK  | BLACK  | 9.00                     | 27.00               |
| W6-1                  | 30"          | 30"    | BUMP                             |                          |                  | 2                        | FLUORESCENT ORANGE         | BLACK  | BLACK  | 6.25                     | 12.50               |
| W6-3                  | 36"          | 36"    | PARKING ENDS                     |                          |                  | 2                        | FLUORESCENT ORANGE         | BLACK  | BLACK  | 9.00                     | 18.00               |
| W8-15                 | 30"          | 30"    | DEFOCUSED PAVEMENT               | MUTCD STANDARD           |                  | 2                        | FLUORESCENT ORANGE         | BLACK  | BLACK  | 6.25                     | 12.50               |
| W8-24                 | 36"          | 36"    | STEEL SHEET PILING               |                          |                  | 2                        | FLUORESCENT ORANGE         | BLACK  | BLACK  | 9.00                     | 18.00               |
| W13-1P                | 18"          | 18"    | XX M.P.H.                        |                          |                  | 2                        | FLUORESCENT ORANGE         | BLACK  | BLACK  | 2.25                     | 4.50                |
| W20-1                 | 36"          | 36"    | ROAD WORK AHEAD                  |                          |                  | 4                        | FLUORESCENT ORANGE         | BLACK  | BLACK  | 9.00                     | 36.00               |
| W20-4                 | 36"          | 36"    | ONE LANE ROAD AHEAD              |                          |                  | 4                        | FLUORESCENT ORANGE         | BLACK  | BLACK  | 9.00                     | 36.00               |
| W20-7                 | 36"          | 36"    | ROAD WORK AHEAD                  |                          |                  | 2                        | FLUORESCENT ORANGE         | BLACK  | BLACK  | 9.00                     | 18.00               |
| MA-W20-7b             | 36"          | 36"    | POLICE OFFICER AHEAD             | MASSDOT STANDARD         |                  | 3                        | FLUORESCENT ORANGE         | BLACK  | BLACK  | 9.00                     | 27.00               |
| W21-5a                | 36"          | 36"    | RIGHT SHOULDER CLOSED            | MUTCD STANDARD           |                  | 1                        | FLUORESCENT ORANGE         | BLACK  | BLACK  | 9.00                     | 9.00                |
| MA-W30-8R             | 36"          | 36"    | SQUEEZE RIGHT                    | MUTCD STANDARD           |                  | 2                        | FLUORESCENT ORANGE         | BLACK  | BLACK  | 9.00                     | 18.00               |



**PORTABLE CHANGEABLE MESSAGE SIGNS**

PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS) SHALL CONFORM TO THE 11TH EDITION OF THE MUTCD AS AMENDED AND SHOULD BE PLACED ON THE SHOULDER OF THE ROADWAY OR IF PRACTICAL SET WELL AWAY FROM THE TRAVEL LANE. MESSAGE SIGNS SHOULD BE PROTECTED WITH RETROREFLECTIVE TEMPORARY TRAFFIC CONTROL DEVICES WHEN PLACED WITHIN THE AVAILABLE CLEAR ZONE OR ELSE SHIELDED WITH A BARRIER OR CRASH CUSHION. THE LOCATION AND USE OF THE PCMS SHALL BE DETERMINED DURING THE PRE-CONSTRUCTION MEETING. ALTERNATIVE MESSAGES MAY BE DETERMINED BY THE ENGINEER IN THE FIELD.

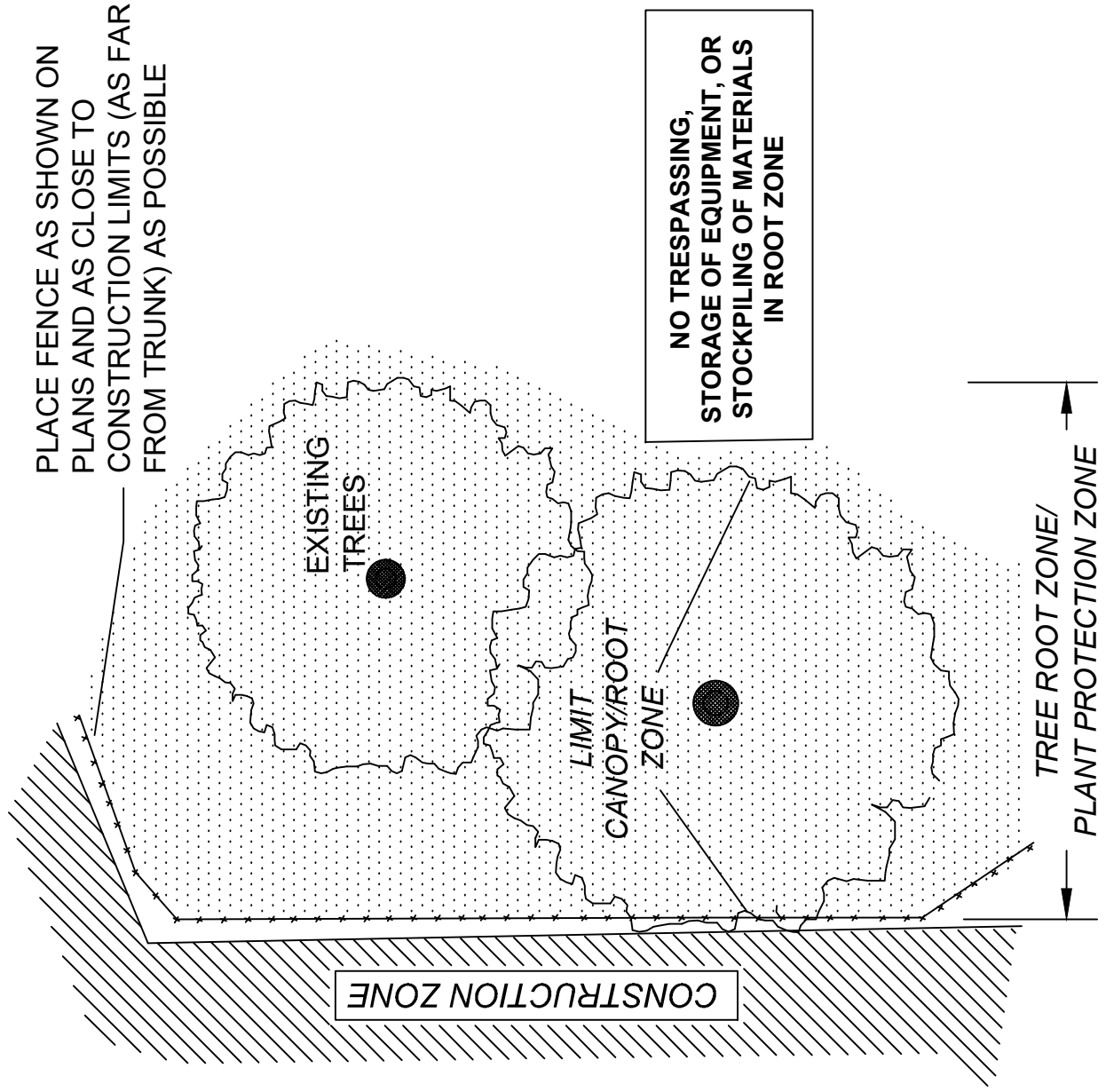
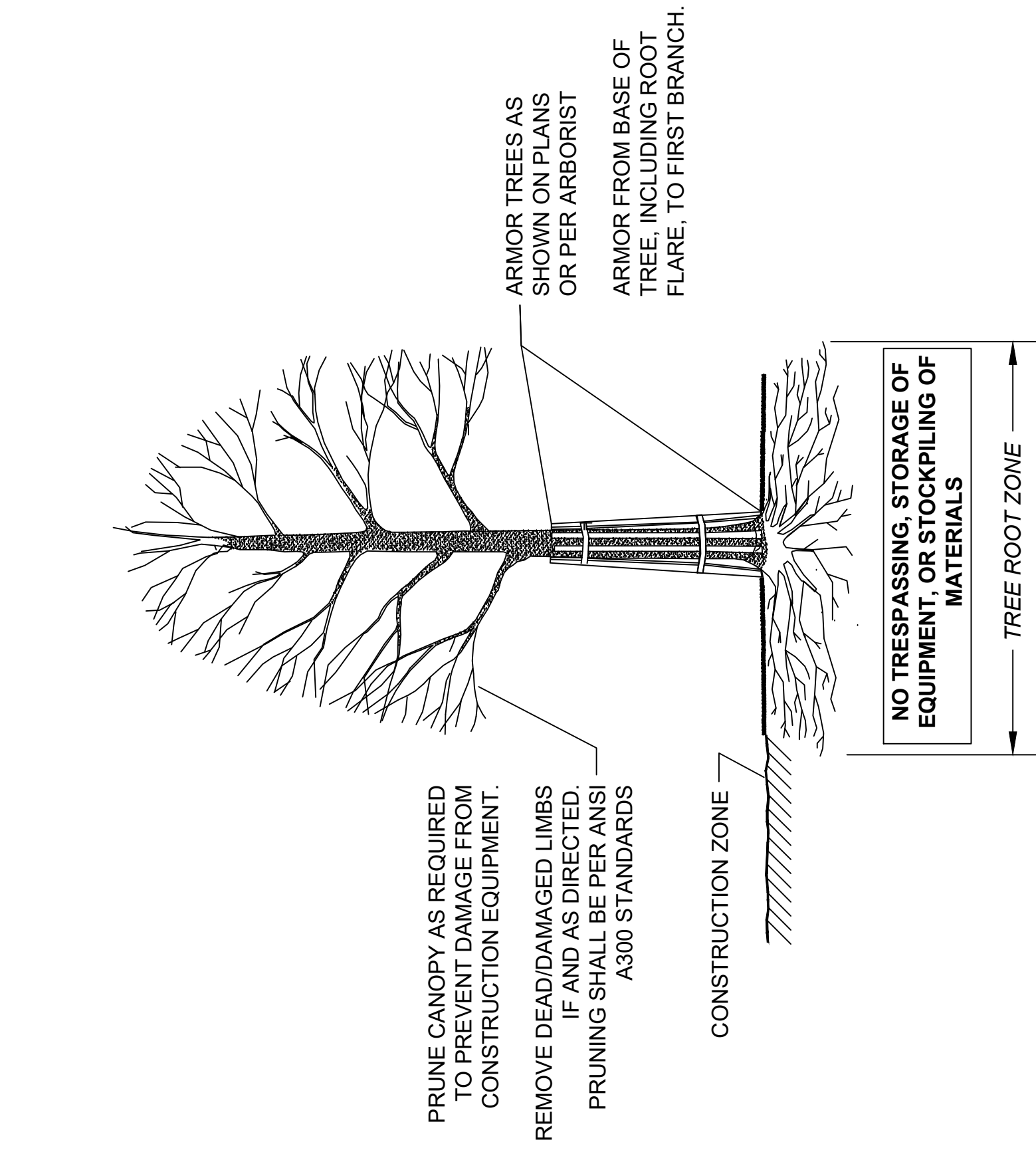
THE SUGGESTED MESSAGE TWO WEEKS IN ADVANCE AND DURING CONSTRUCTION SHOULD READ AS FOLLOWS:

|             |                 |                     |
|-------------|-----------------|---------------------|
| (MESSAGE 1) | TWO WEEKS PRIOR | DURING CONSTRUCTION |
|             | M I L L E R I E | M I L L E R I E     |
|             | S T O N E R D   | S T O N E R D       |
|             | R O A D W O R K | R O A D W O R K     |
| (MESSAGE 2) | B E G I N S     | S T E E K           |
|             | X X X X X       | A L T               |
|             | X X X X X       | R O U T E           |

NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

|                  |                    |           |              |
|------------------|--------------------|-----------|--------------|
| STATE            | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA               | -                  | 30        | 50           |
| PROJECT FILE NO. |                    | 613129    |              |

CONSTRUCTION DETAILS



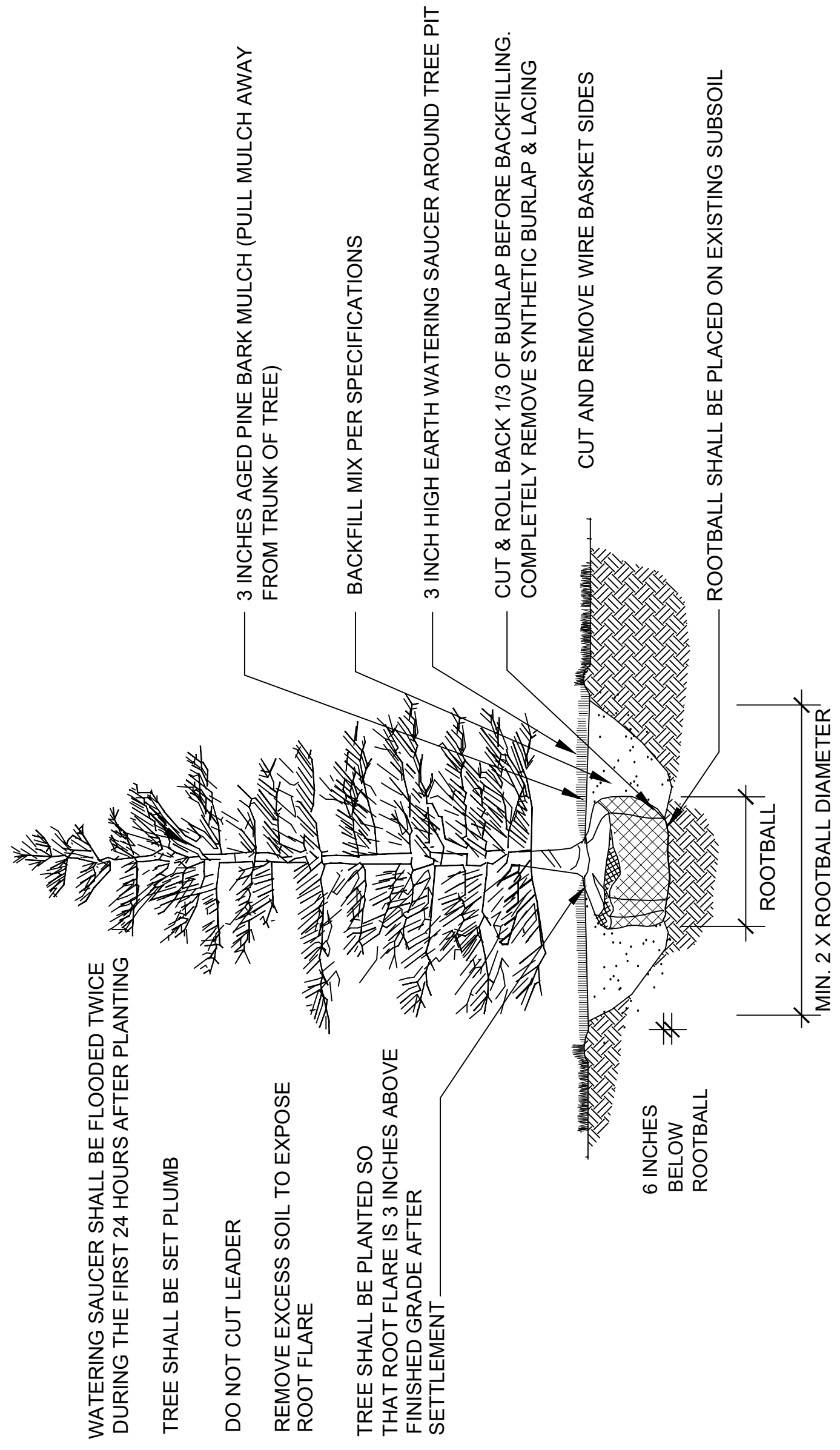
SECTION - FENCE PROTECTION OF ROOT ZONE

PLAN VIEW - FENCE PROTECTION OF ROOT ZONE

SECTION - TRUNK ARMORING & PRUNING

TREE PROTECTION - ROOT ZONE

NOT TO SCALE

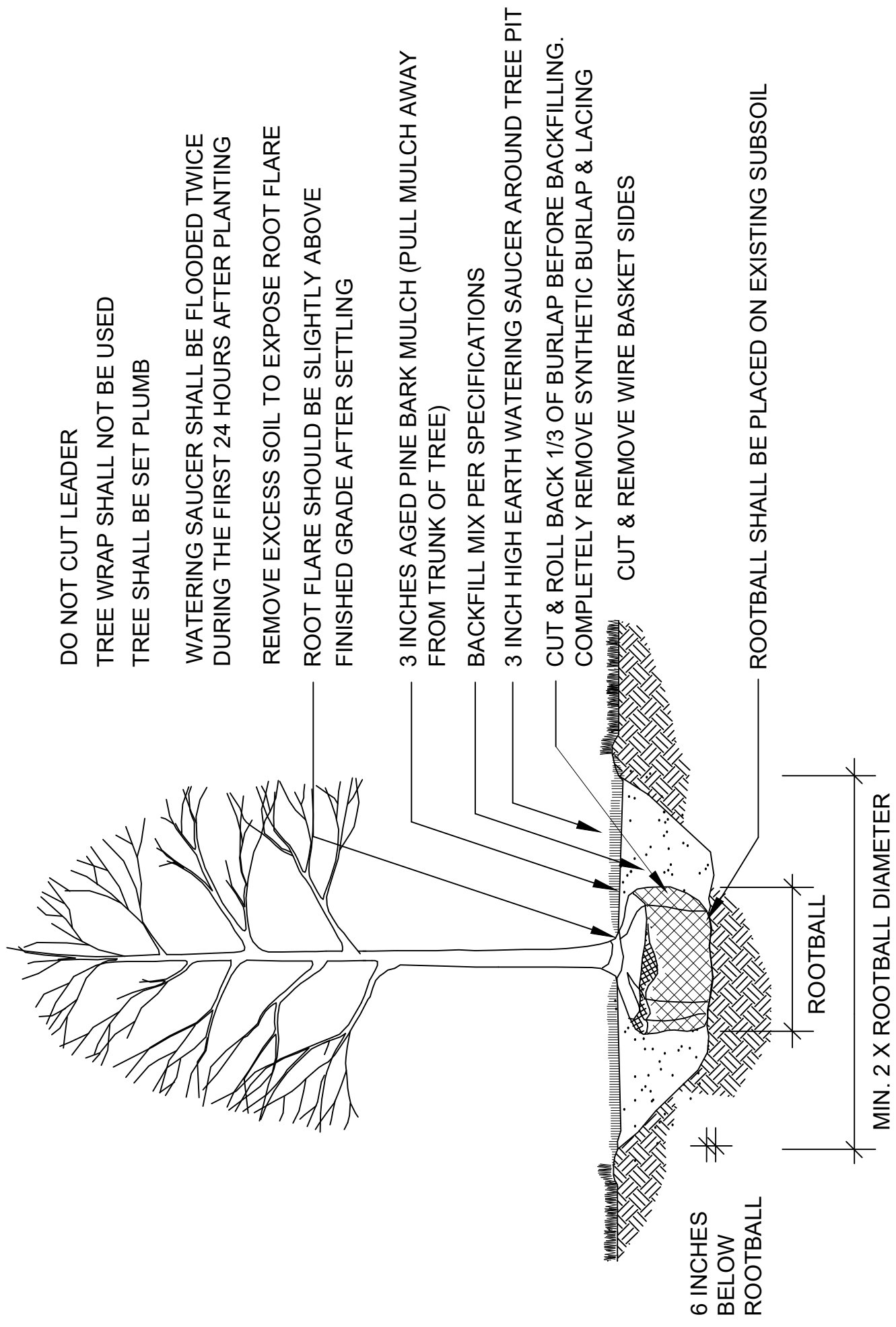


EVERGREEN TREE PLANTING

NOT TO SCALE

TREE PROTECTION - TRUNK

NOT TO SCALE



DECIDUOUS TREE PLANTING

NOT TO SCALE

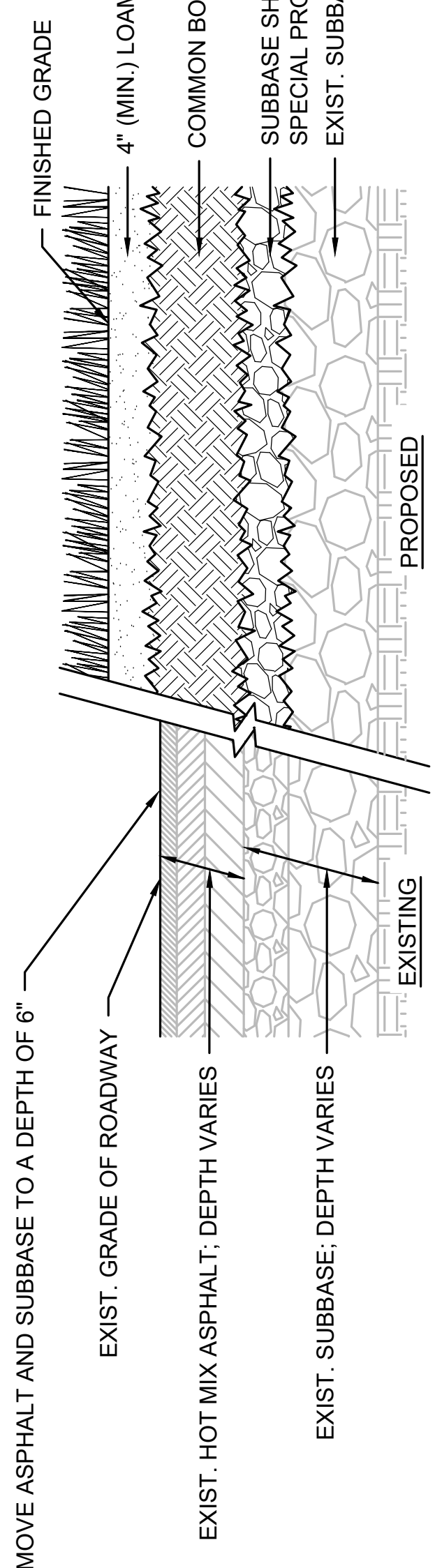


NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

|                         |                    |           |              |
|-------------------------|--------------------|-----------|--------------|
| STATE                   | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA                      |                    | 31        | 50           |
| PROJECT FILE NO. 613129 |                    |           |              |

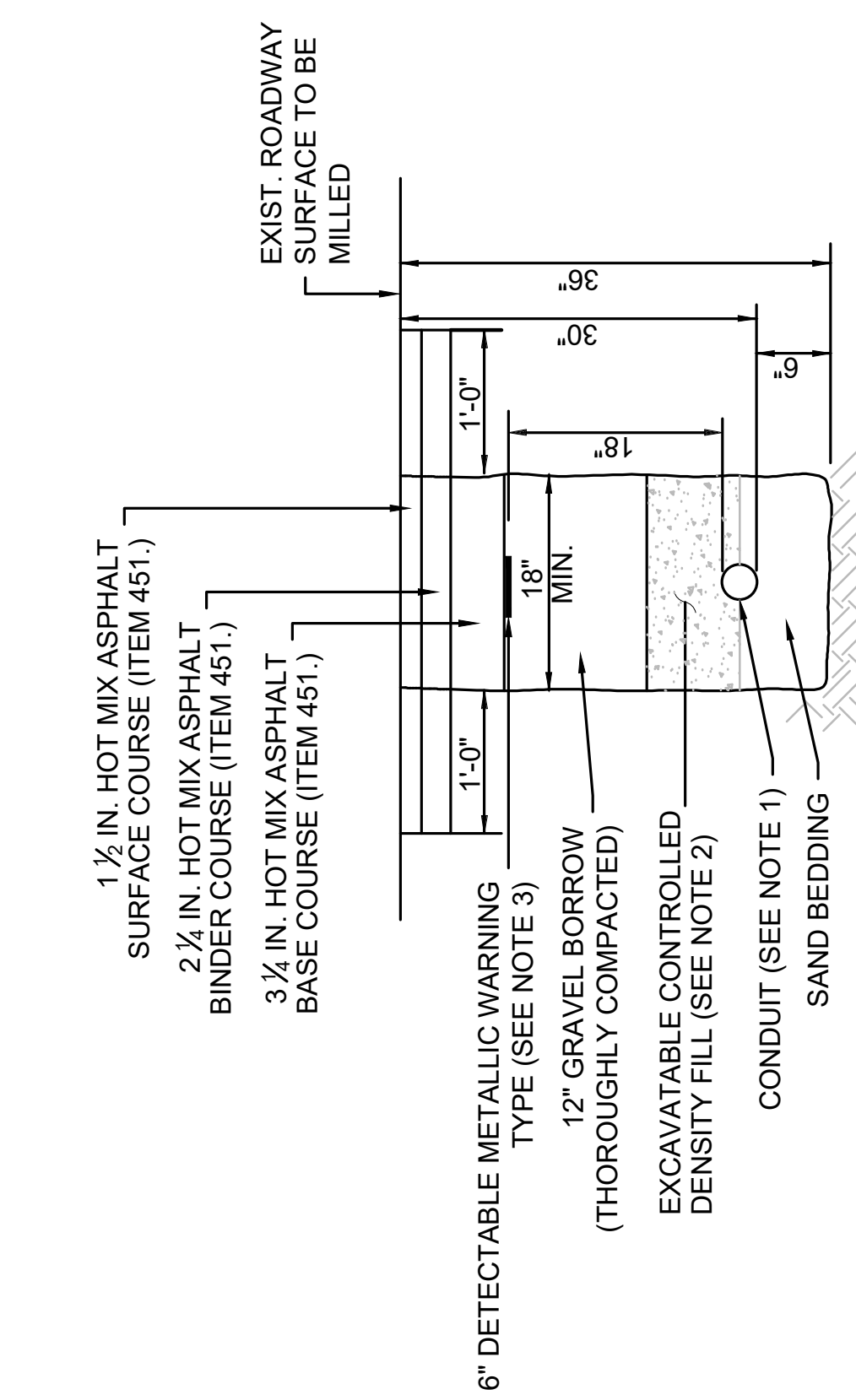
**CONSTRUCTION DETAILS**

4" (MIN.) LOAM & SEED PLACED OVER WELL DRAINED SOIL  
COMMON BORROW (WHERE FILL IS REQUIRED); DEPTH VARIES  
SUBBASE SHALL BE RIPPED (MIN.) 4" PRIOR TO PLACEMENT OF SOIL AS PER SPECIAL PROVISION ITEM 173.  
EXIST. SUBBASE



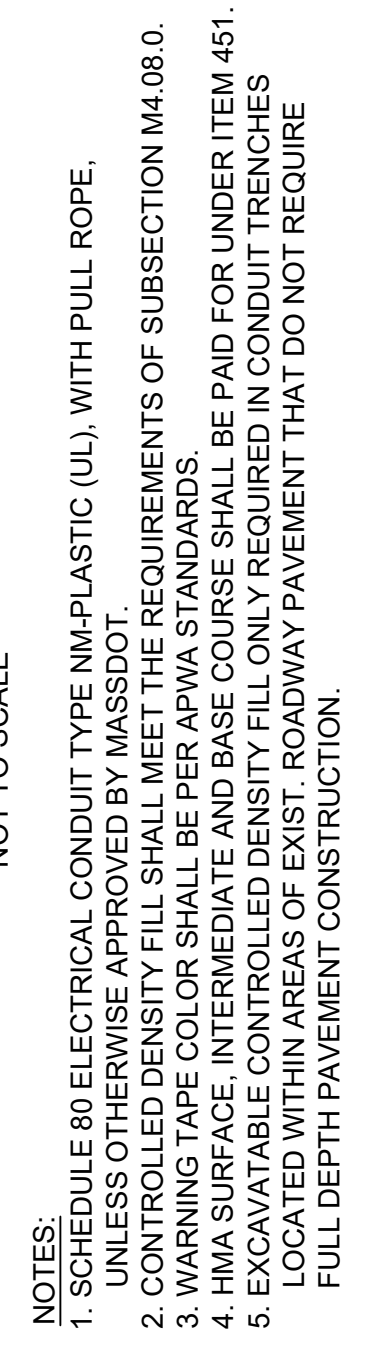
**DECOMPACTION FOR LAWN**

NOT TO SCALE



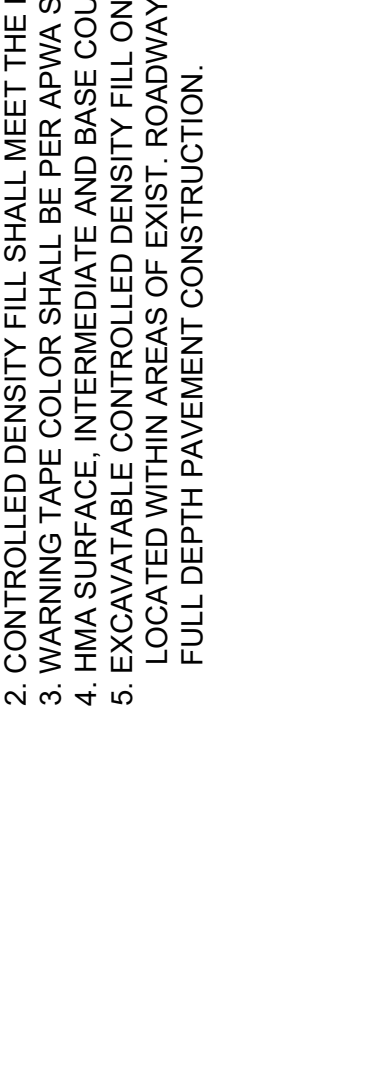
**CONDUIT TRENCH DETAIL (IN ROADWAY TO BE MILLED)**

NOT TO SCALE



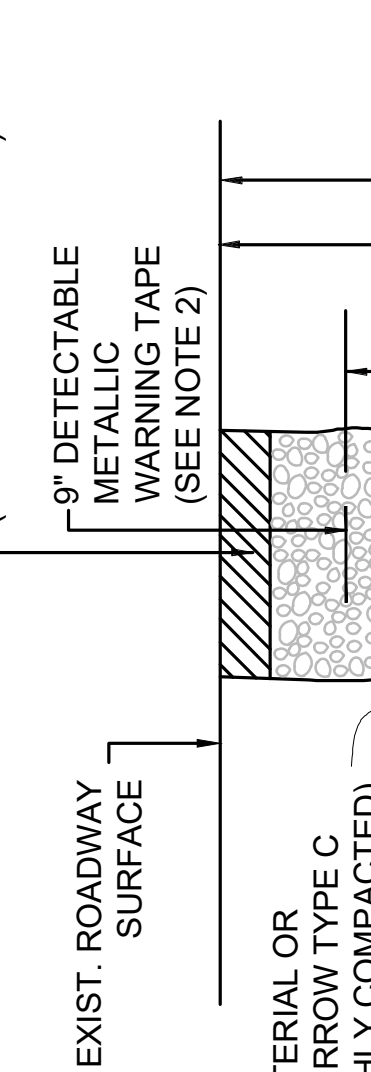
**CONDUIT TRENCH DETAIL (IN ROADWAY WITHIN FULL DEPTH AREA)**

NOT TO SCALE



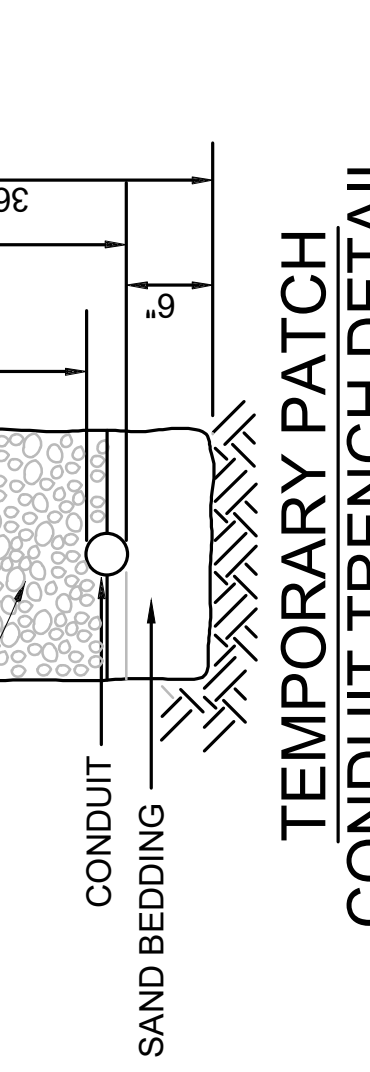
**TEMPORARY PATCH CONDUIT TRENCH DETAIL (IN ROADWAY WITHIN FULL DEPTH AREA)**

NOT TO SCALE



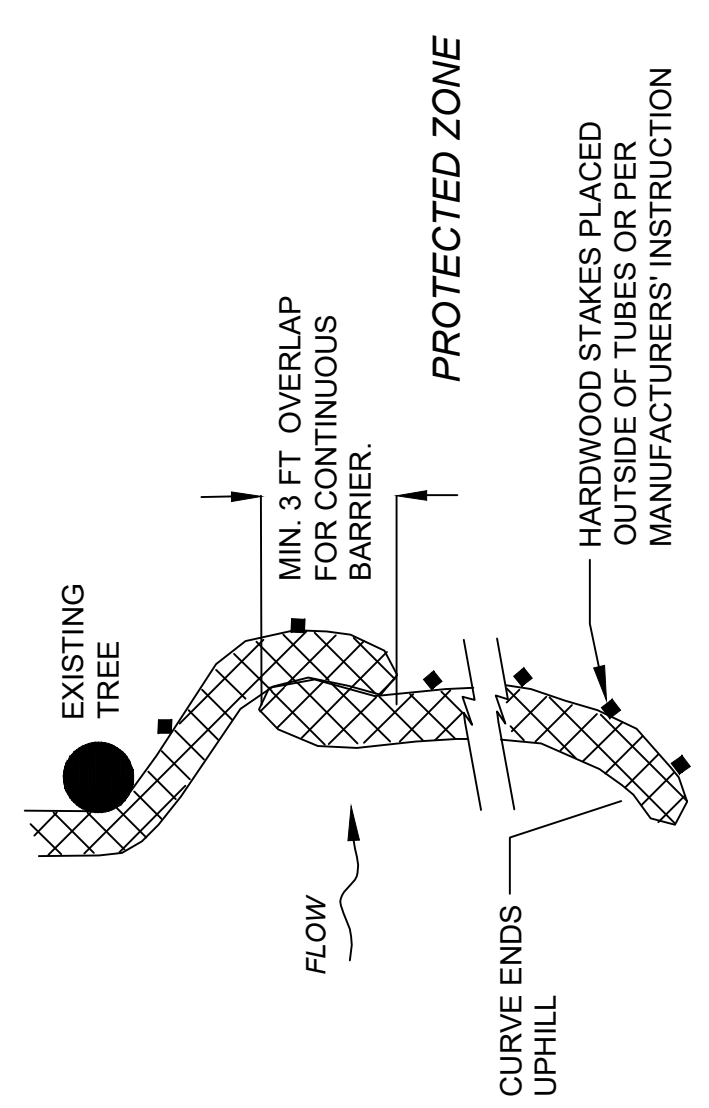
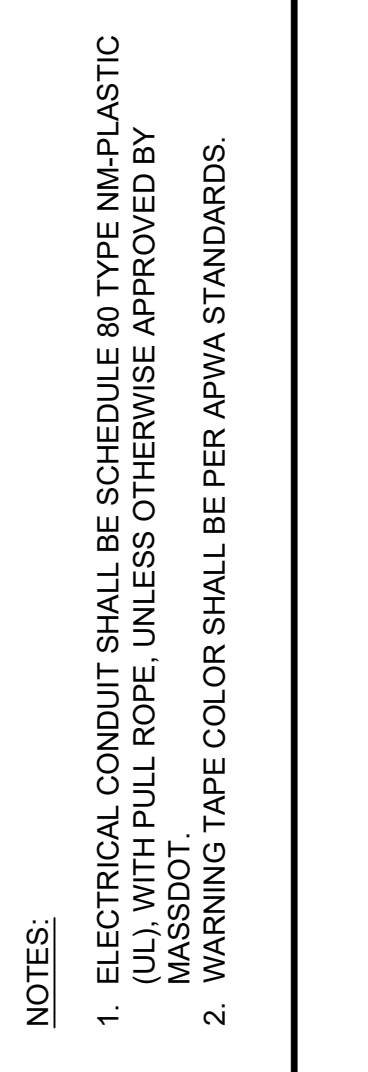
**INLET SEDIMENT CONTROL DEVICE**

NOT TO SCALE



**EXISTING HMA BERM REPLACEMENT**

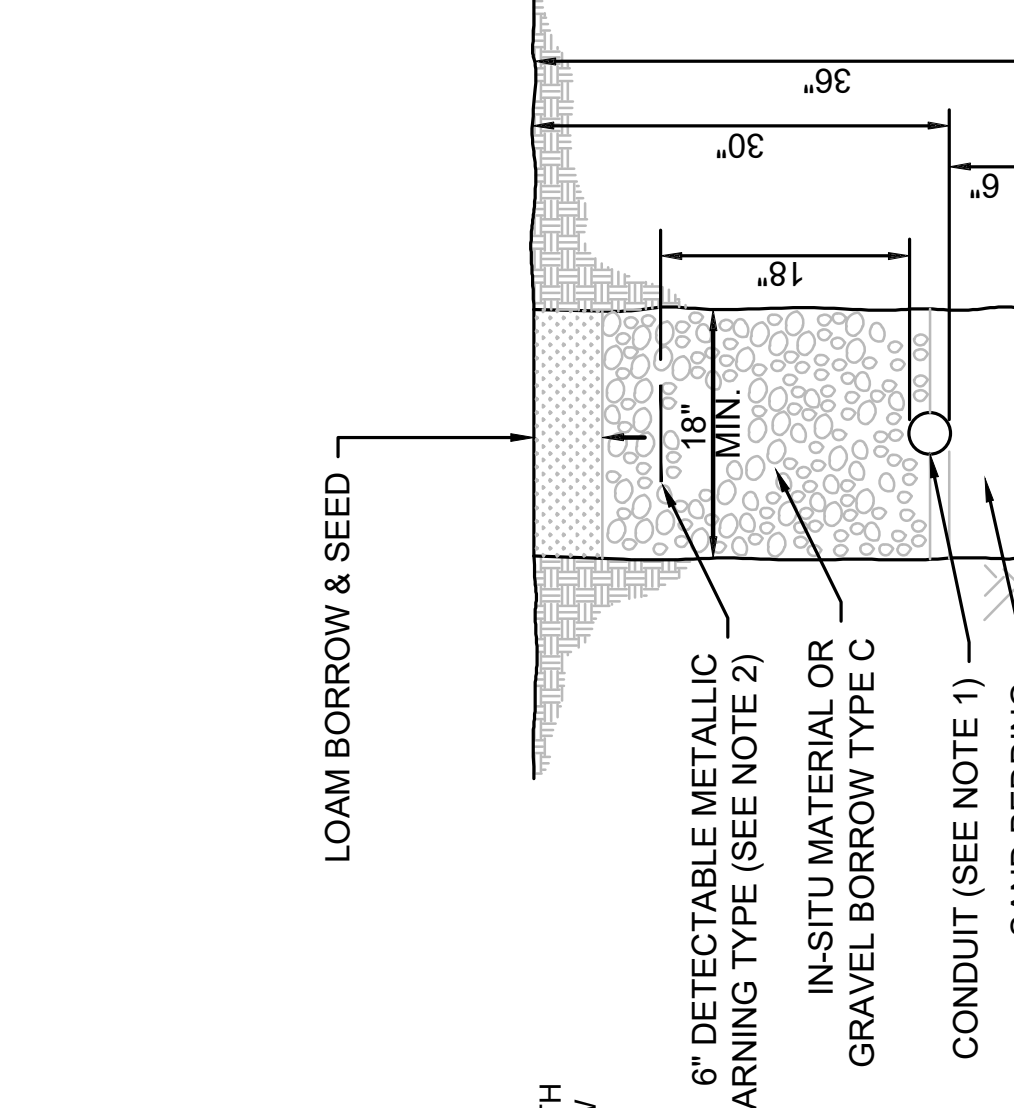
NOT TO SCALE



PLACE TUBE AS CLOSE TO LIMIT OF SOIL DISTURBANCE AS POSSIBLE, ALONG CONTOURS, AND PERPENDICULAR TO FLOW.  
ADJUST LOCATION AS REQUIRED FOR OPTIMUM EFFECTIVENESS; DO NOT INSTALL IN WATERWAYS.

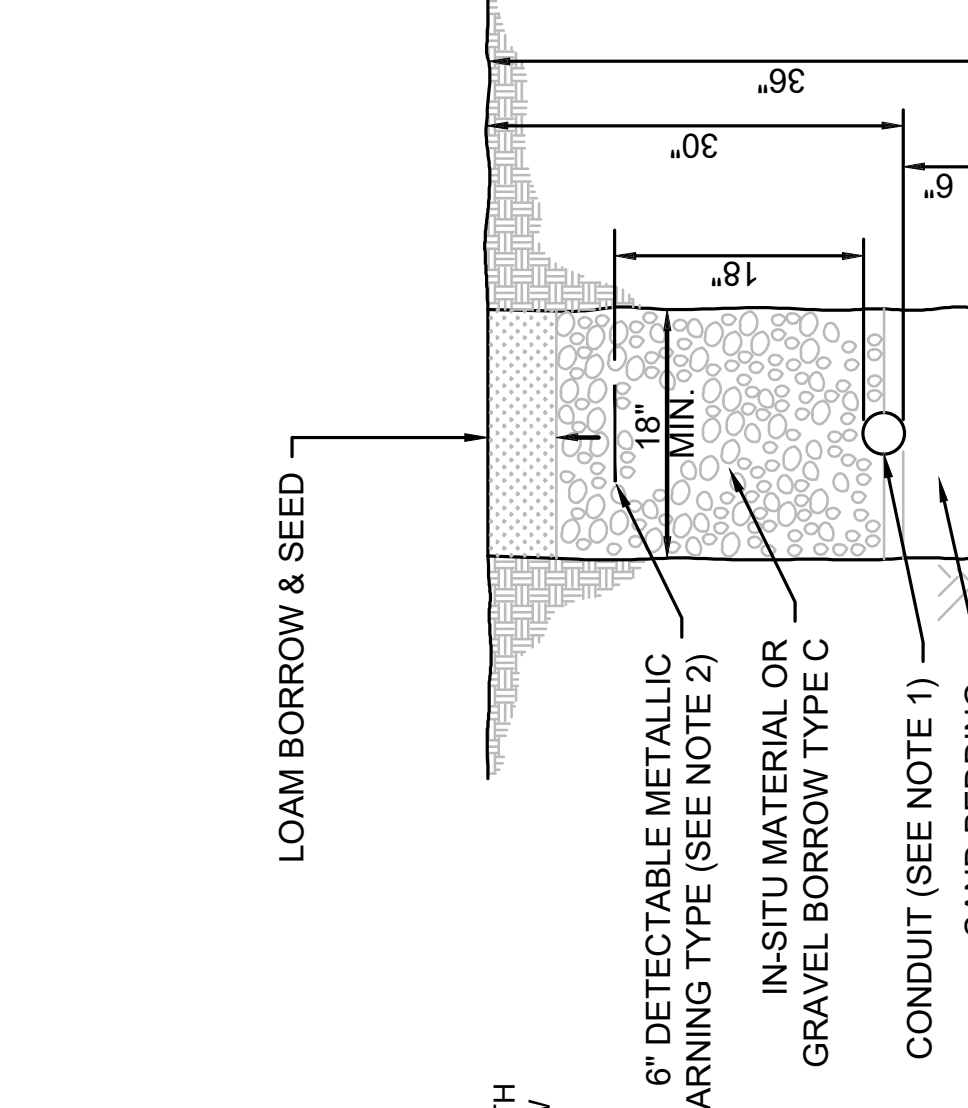
**PLAN VIEW**

NOT TO SCALE



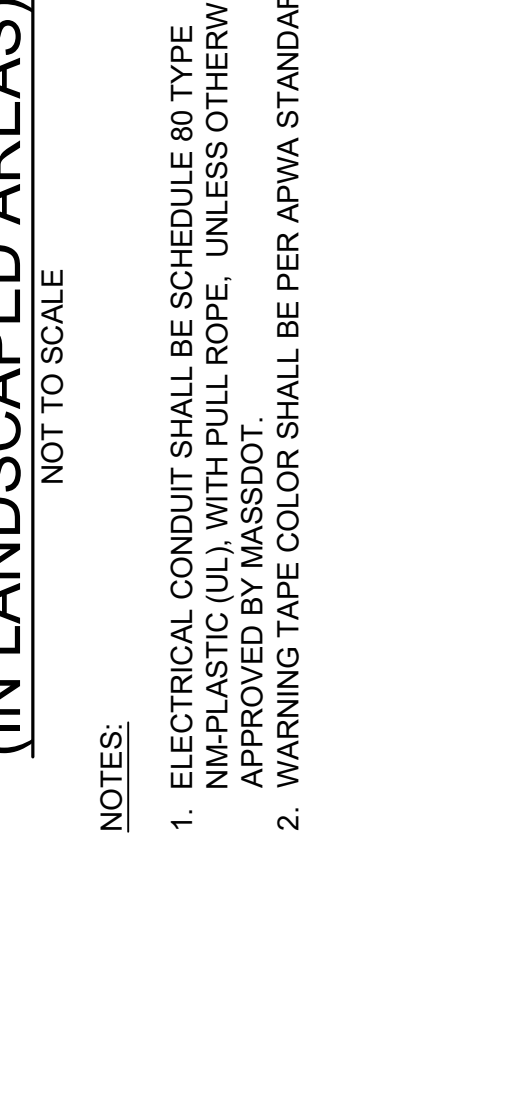
**TYPICAL SECTION: ROADWAY WIDENING <4 FEET**

NOT TO SCALE



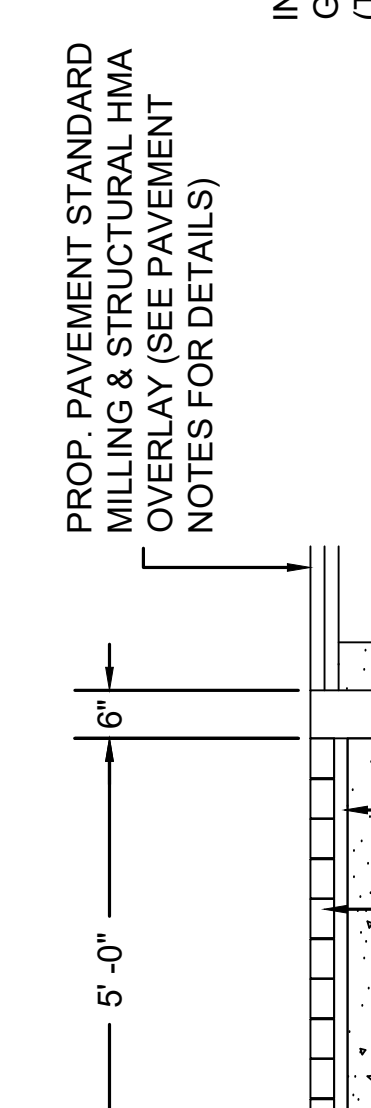
**SEDIMENT CONTROL BARRIER**

NOT TO SCALE



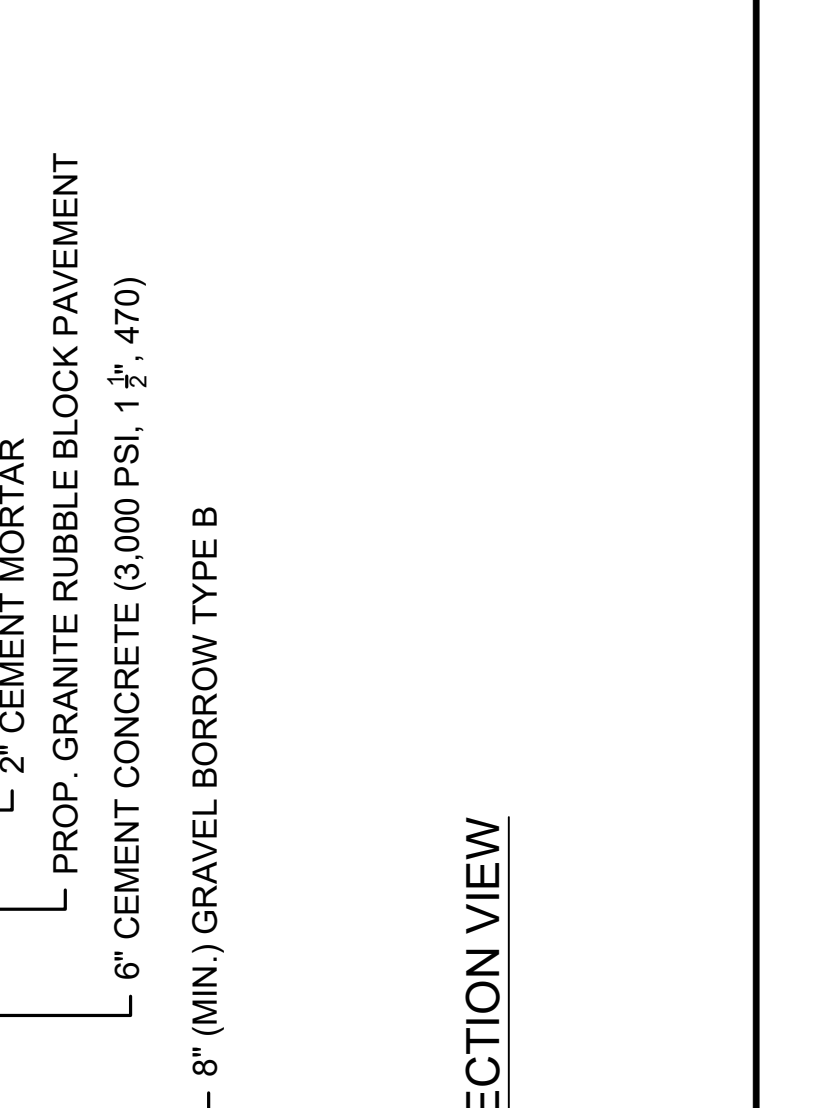
**GRANITE RUBBLE BLOCK PAVEMENT DETAIL**

NOT TO SCALE



**SECTION VIEW**

NOT TO SCALE



**PLAN VIEW**

NOT TO SCALE

NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

|                  |                   |           |              |
|------------------|-------------------|-----------|--------------|
| STATE            | FED AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA               |                   | 32        | 50           |
| PROJECT FILE NO. |                   | 613129    |              |

CONSTRUCTION DETAILS

THRUST BEARING REQUIREMENTS

| PIPE SIZE | MINIMUM BEARING AREA AGAINST UNDISTURBED SOIL (SQUARE FEET) |          |            |             |            | TEE  | CAP  |
|-----------|-------------------------------------------------------------|----------|------------|-------------|------------|------|------|
|           | 90° BEND                                                    | 45° BEND | 22.5° BEND | 11.25° BEND | 11/4" BEND |      |      |
| 6"        | 4.0                                                         | 3.0      | 2.0        | 1.0         | 3.0        | 3.0  | 3.0  |
| 8"        | 7.0                                                         | 4.0      | 2.0        | 1.0         | 5.0        | 5.0  | 5.0  |
| 12"       | 16.0                                                        | 10.0     | 5.0        | 3.0         | 11.0       | 11.0 | 11.0 |
| 14"       | 22.0                                                        | 12.0     | 5.0        | 3.0         | 16.0       | 16.0 | 16.0 |
| 16"       | 29.0                                                        | 17.0     | 8.0        | 5.0         | 21.0       | 21.0 | 21.0 |
| 18"       | 36.0                                                        | 20.0     | 10.0       | 5.0         | 26.0       | 26.0 | 26.0 |
| 20"       | 45.0                                                        | 24.0     | 13.0       | 7.0         | 32.0       | 32.0 | 32.0 |
| 24"       | 64.0                                                        | 35.0     | 18.0       | 9.0         | 46.0       | 46.0 | 46.0 |

NOTES:

- FIGURES SHOWN REPRESENT THE MINIMUM BEARING AREA REQUIRED IN SQUARE FEET.
- BEARING AREAS SHOWN ARE BASED ON SANDY SOILS AT 200 PSF AND MAX. HYDROSTATIC PRESSURE OF 200 PSI.
- ALL FITTINGS SHALL BE ANCHORED BY MECHANICAL MEANS AND BY CONCRETE THRUST BLOCKS, REQUIRED BY THE TOWN OR AS NOTED ON THE CONTRACT PLANS.
- THRUST BLOCKS SHALL BE BUILT AGAINST UNDISTURBED SOIL WITH ADEQUATE BACKING TO PREVENT MOVEMENT OF THE FITTING.
- ALL DI PIPE & FITTINGS SHALL BE WRAPPED IN POLYETHYLENE.
- THRUST BLOCKS SHALL BE 3000 PSI CONCRETE & SHALL HAVE A MINIMUM THICKNESS OF 12".
- NO JOINTS SHALL BE COVERED WITH CONCRETE.
- THRUST BLOCK DETAILS ARE SHOWN HERE FOR TYPICAL INSTALLATIONS. ADDITIONAL RESTRAINT MAY BE REQUIRED, AS DIRECTED BY THE ENGINEER.
- WHEN REQUIRED, THREADED RODS SHALL BE ANSI A242 F150 WITH NUTS TO MATCH AWWA C111. THREADED RODS TO BE FIELD COATED WITH PAINT.

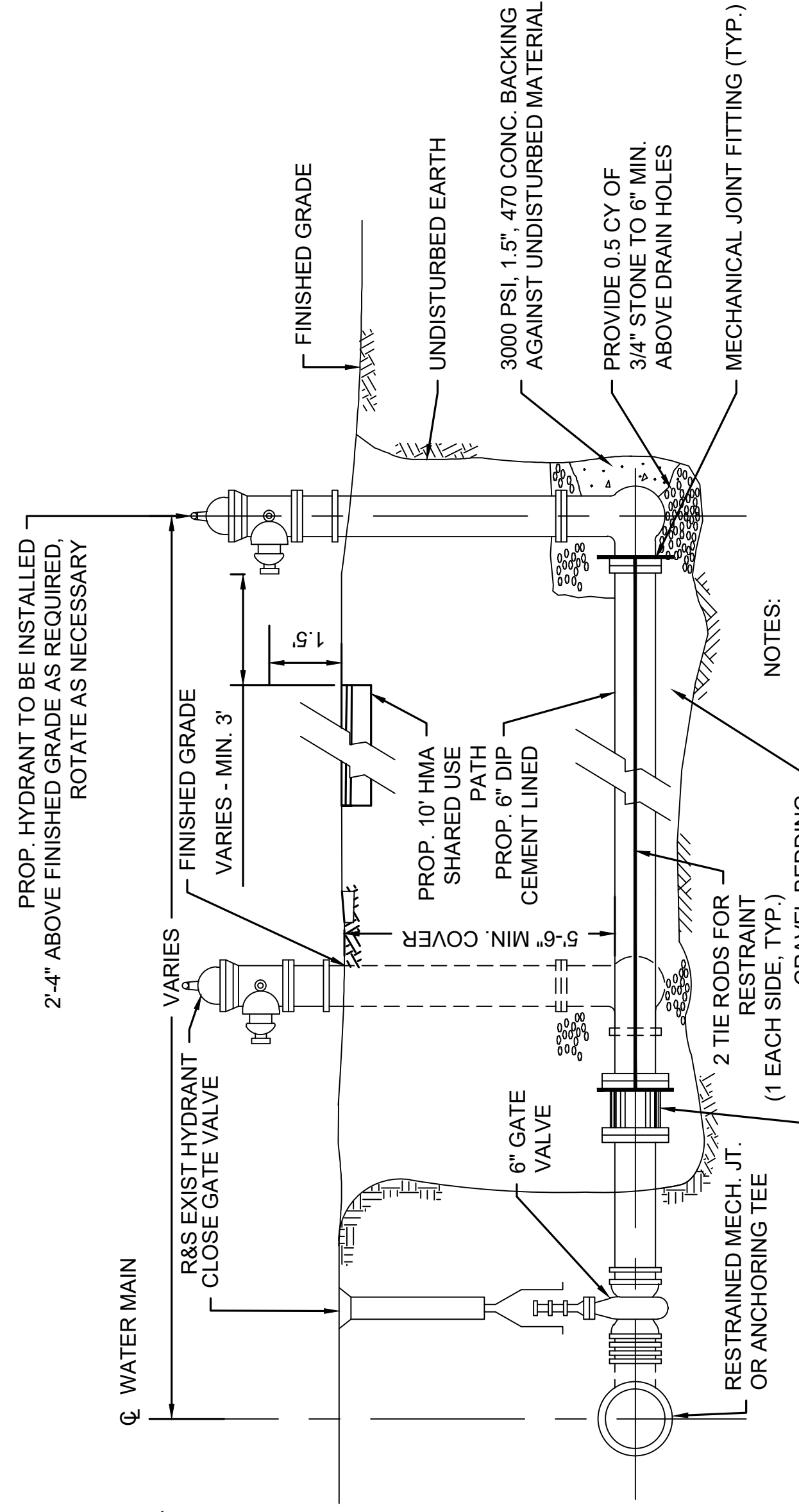
REQUIRED LENGTH OF RESTRAINED JOINTS FROM FITTINGS (FEET)

| PIPE SIZE | 90° BEND  | 45° BEND OR WYE BRANCH | 22 1/2° BEND | 11 1/4° BEND | PLUG OR CAP | TEE (BRANCH) |
|-----------|-----------|------------------------|--------------|--------------|-------------|--------------|
| 6"        | 25 (30.5) | 10.5 (12.5)            | 5 (6)        | 2.5 (3)      | 43 (64)     | 34 (51)      |
| 8"        | 33 (40)   | 13.5 (16.5)            | 6.5 (8)      | 3 (4)        | 55 (82)     | 47 (70)      |
| 10"       | 40 (48.5) | 16.5 (20)              | 8 (9.5)      | 4 (5)        | 67 (100)    | 58 (87)      |
| 12"       | 47 (56.5) | 19.5 (23.5)            | 9.5 (11.5)   | 4.5 (5.5)    | 79 (118)    | 70 (105)     |
| 16"       | 59.5 (72) | 24.5 (30)              | 12 (14.5)    | 6 (7)        | 101 (152)   | 92 (139)     |
| 20"       | 72 (86.5) | 30 (36)                | 14.5 (17)    | 7 (8.5)      | 123 (184)   | 114 (171)    |
| 24"       | 84 (100)  | 35 (41)                | 16.5 (20)    | 8 (10)       | 144 (216)   | 134 (202)    |
| 30"       | 100 (120) | 41 (50)                | 20 (24)      | 10 (12)      | 174 (261)   | 165 (247)    |

- NOTES:
- RESTRAINED LENGTHS LISTED IN PARENTHESES ARE FOR PIPE WRAPPED IN POLYETHYLENE. THE OTHER ASSOCIATED LENGTHS ARE FOR PLAIN UNWRAPPED DUCTILE IRON PIPE.
  - THE CONTRACTOR SHALL USE THIS TABLE IN CONJUNCTION WITH THE APPROPRIATE PIPE SPECIFICATION SECTION.

HYDRANT DETAIL

NOT TO SCALE

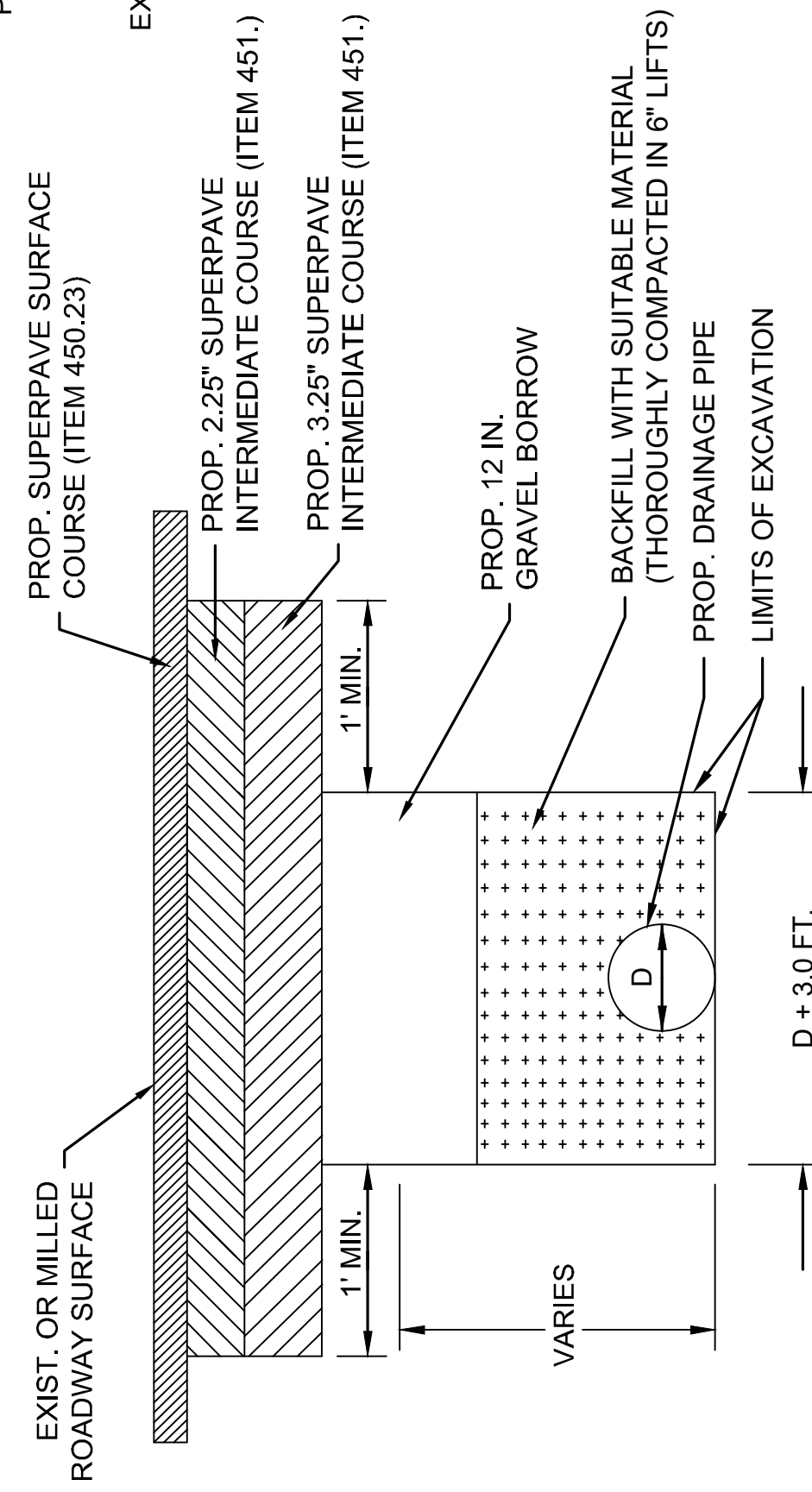


NOTES:

- ALL WATER GATES & HYDRANTS TO OPEN LEFT.
- ALL MECHANICAL RESTRAINT DEVICES, STONE, GRAVEL, ETC. NECESSARY TO INSTALL OR REMOVE AND RESET HYDRANTS ARE INCIDENTAL TO ITEM 376.2.

CATCH BASIN

NOT TO SCALE



PERMANENT PATCH

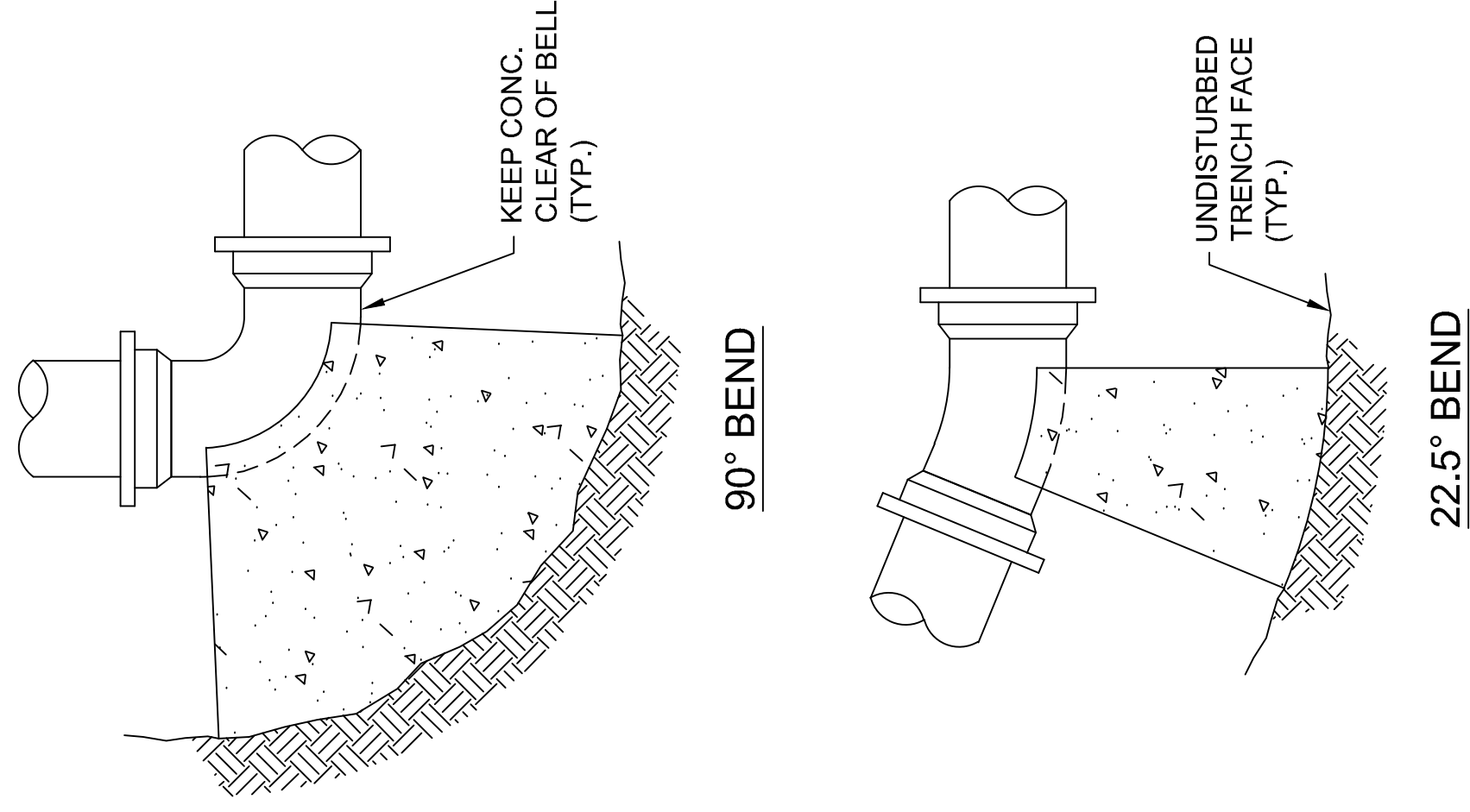
(IN AREAS OF MILLING AND PAVEMENT OVERLAY)

NOTES:

- PLACE TACK COAT BETWEEN ALL HMA COURSES AND SAWCUT SURFACES PRIOR TO PLACING HMA. SEE PAVEMENT NOTES-FULL DEPTH HMA CONSTRUCTION FOR DEPTH OF HMA.
- IF UNSUITABLE MATERIAL IS ENCOUNTERED AS DETERMINED BY THE ENGINEER, ADDITIONAL BEDDING SHALL BE PAID FOR UNDER ITEM 156.
- INTERMEDIATE COURSE SHALL BE PLACED UP TO EXISTING PAVEMENT SURFACE AND THEN MILLED AS PART OF OVERALL MILLING OPERATION.

DRAINAGE TRENCH DETAIL

NOT TO SCALE



THRUST BLOCK DETAIL

NOT TO SCALE

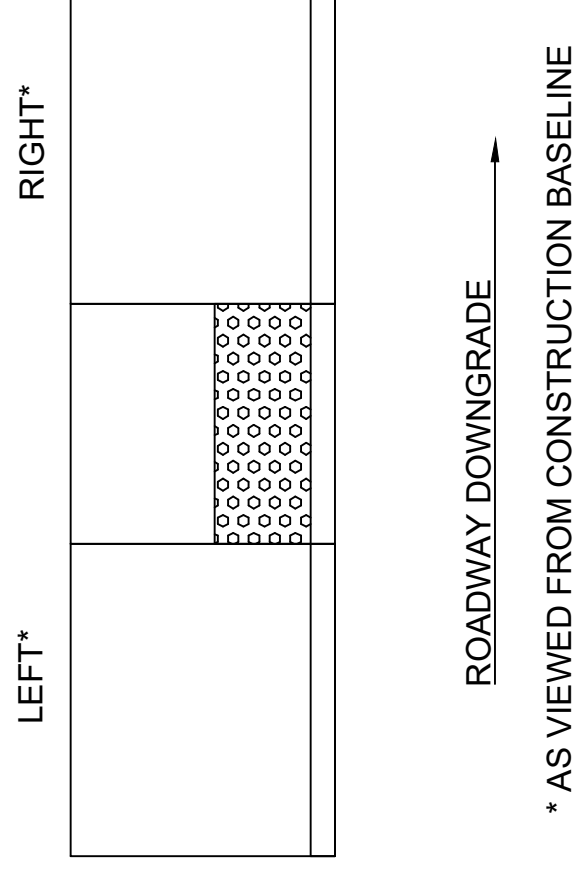
CAP

NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

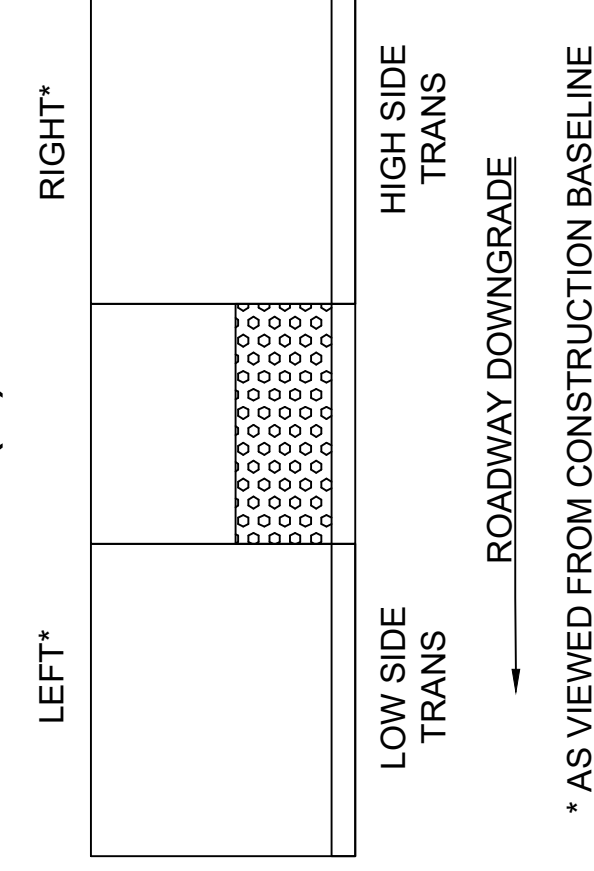
|                         |                    |           |              |
|-------------------------|--------------------|-----------|--------------|
| STATE                   | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA                      | -                  | 33        | 50           |
| PROJECT FILE NO. 613129 |                    |           |              |

PEDESTRIAN CURB RAMP & DRIVEWAY DETAILS

### NEGATIVE SLOPE (-)

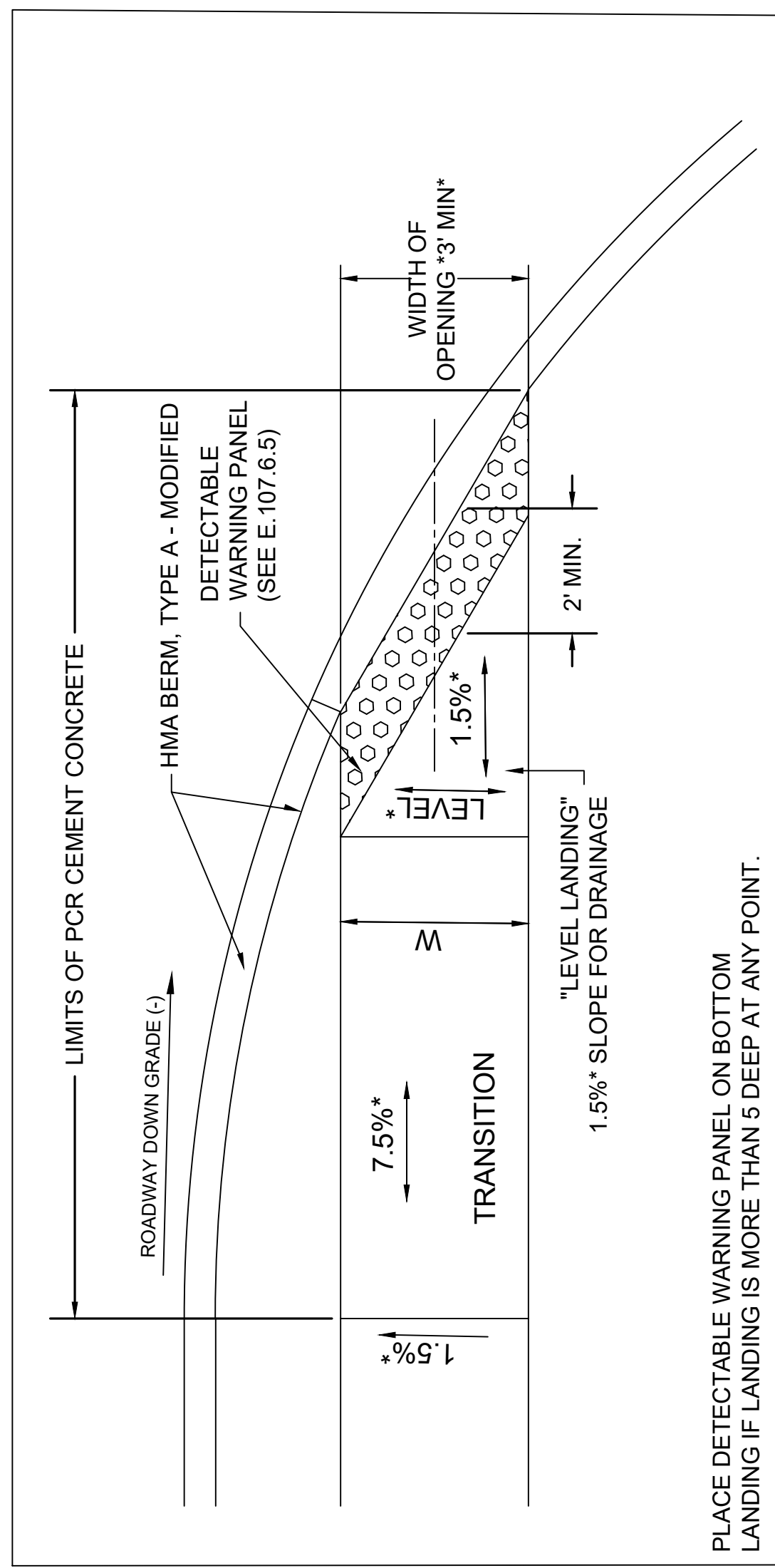


### POSITIVE SLOPE (+)



| ROADWAY PROFILE GRADE | * HIGH SIDE TRANSITION LENGTH | ENGLISH UNITS |
|-----------------------|-------------------------------|---------------|
| %                     |                               |               |
| =0%                   |                               | 6'-6"         |
| >0% TO 1%             |                               | 7'-8"         |
| >1% TO 2%             |                               | 9'-0"         |
| >2% TO 3%             |                               | 11'-0"        |
| >3% TO 4%             |                               | 14'-0"        |
| >4% TO 5%             |                               | 15'-0" Max    |

NOTE:  
\* BASED ON A DESIGN SLOPE OF 7.5% AND A REVEAL OF 6".



LEGEND

- W = SIDEWALK WIDTH
- \* = TOLERANCE FOR CONSTRUCTION ±0.5%
- HMA = HOT MIX ASPHALT

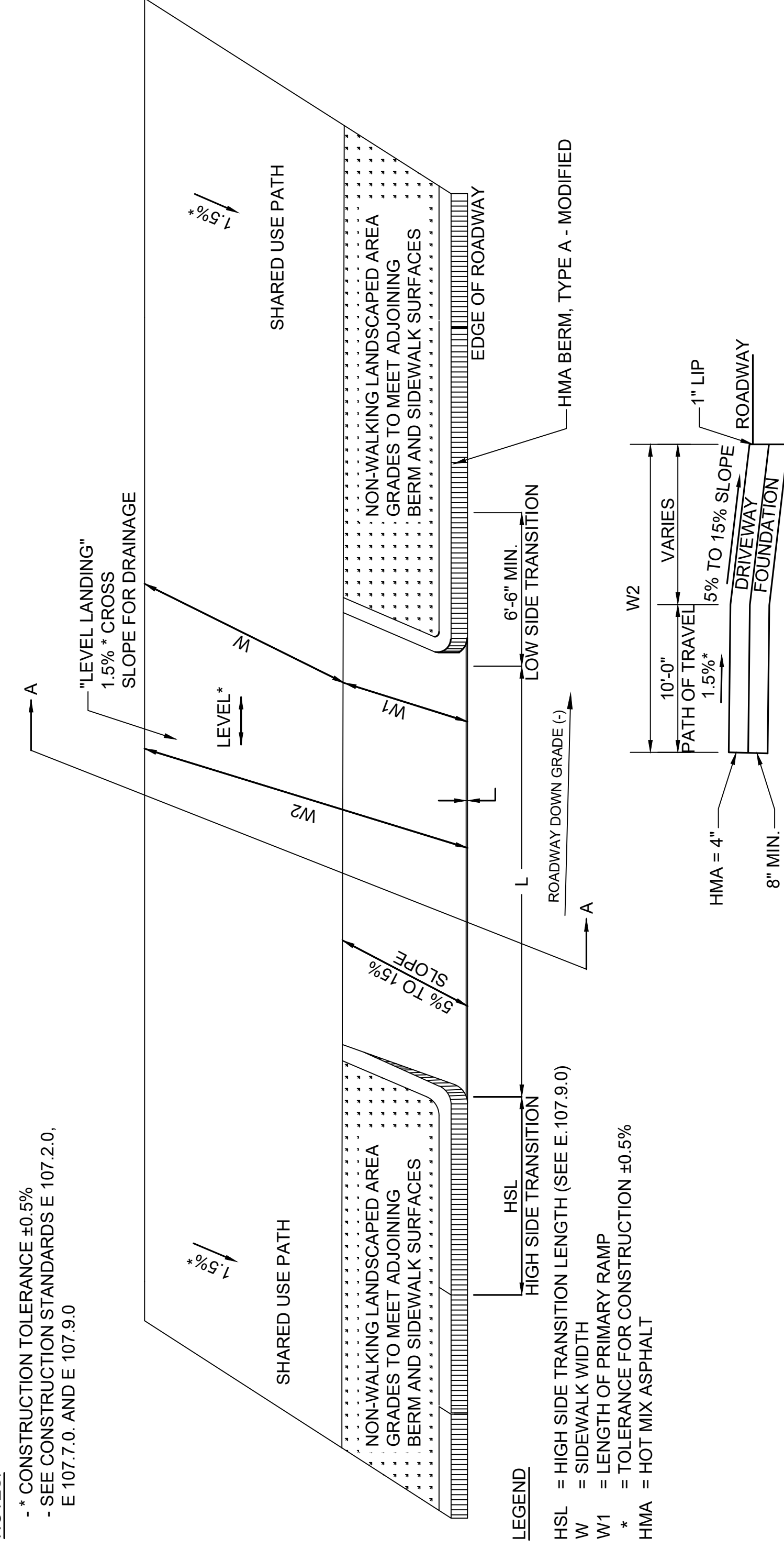
| PCR # | RAMP REFERENCE POINT | WIDTH OF SIDEWALK (W) | WIDTH OF OPENING | ROADWAY GUTTER SLOPE | TRANSITION LENGTH*** |
|-------|----------------------|-----------------------|------------------|----------------------|----------------------|
| 1     | MILESTONE ROAD 18+75 | 26.18' LT             | 10.00'           | 2.61%                | 10'-0"               |
| 2     | MILESTONE ROAD 26+70 | 32.21' LT             | 10.00'           | 0.87%                | 10'-0"               |
| 3     | MILESTONE ROAD 27+47 | 32.29' LT             | 10.00'           | 0.97%                | 10'-0"               |

\*\*\* AS VIEWED FROM PROPOSED CONSTRUCTION BASELINE

PEDESTRIAN AND BICYCLIST CROSSING FOR ONE CONTINUOUS DIRECTION OF TRAVEL

NOTES:

- \* CONSTRUCTION TOLERANCE ±0.5%
- SEE CONSTRUCTION STANDARDS E.107.2.0, E.107.7.0, AND E.107.9.0



SECTION A-A

| DWY # | RAMP REFERENCE POINT |         | LENGTH OF PRIMARY RAMP (W1) | WIDTH OF DRIVEWAY (L) | DEPTH OF TRAVEL PATH (W) | TRANSITION LENGTH*** |            |
|-------|----------------------|---------|-----------------------------|-----------------------|--------------------------|----------------------|------------|
|       | BASELINE             | STATION |                             |                       |                          | LEFT SIDE            | RIGHT SIDE |
| 1     | MILESTONE ROAD       | 21+19   | 10.49' LT                   | 20'-0"                | 10'-0"                   | 1.80%                | NA         |
| 2     | MILESTONE ROAD       | 23+96   | 12.70' LT                   | 20'-0"                | 10'-0"                   | -1.30%               | NA         |
| 3     | MILESTONE ROAD       | 24+76   | 14.50' LT                   | 20'-0"                | 10'-0"                   | -1.30%               | NA         |

\*\*\* AS VIEWED FROM PROPOSED CONSTRUCTION BASELINE

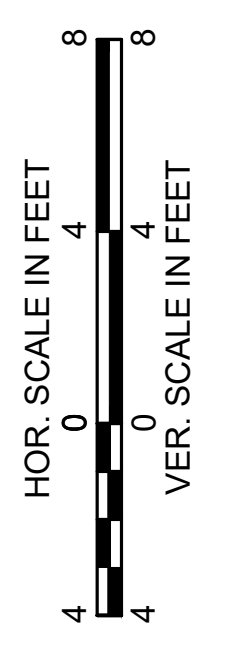
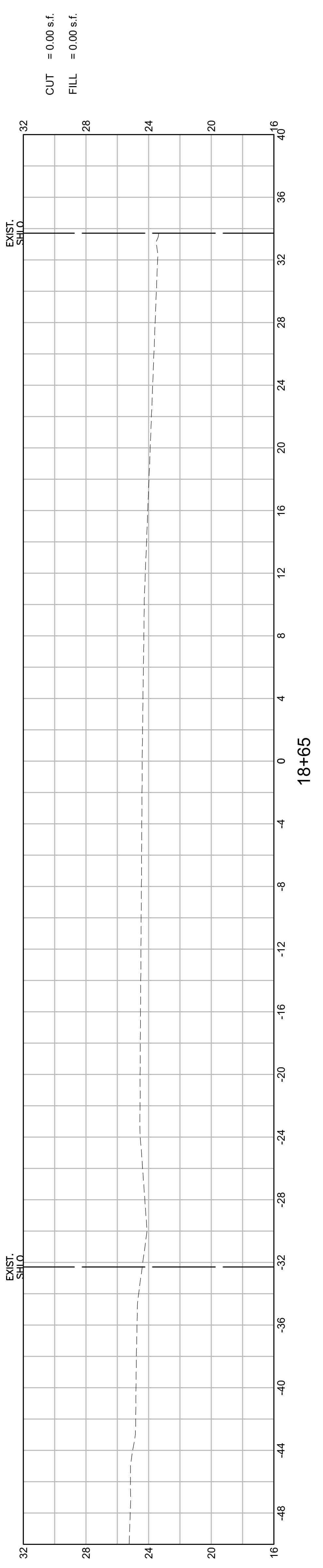
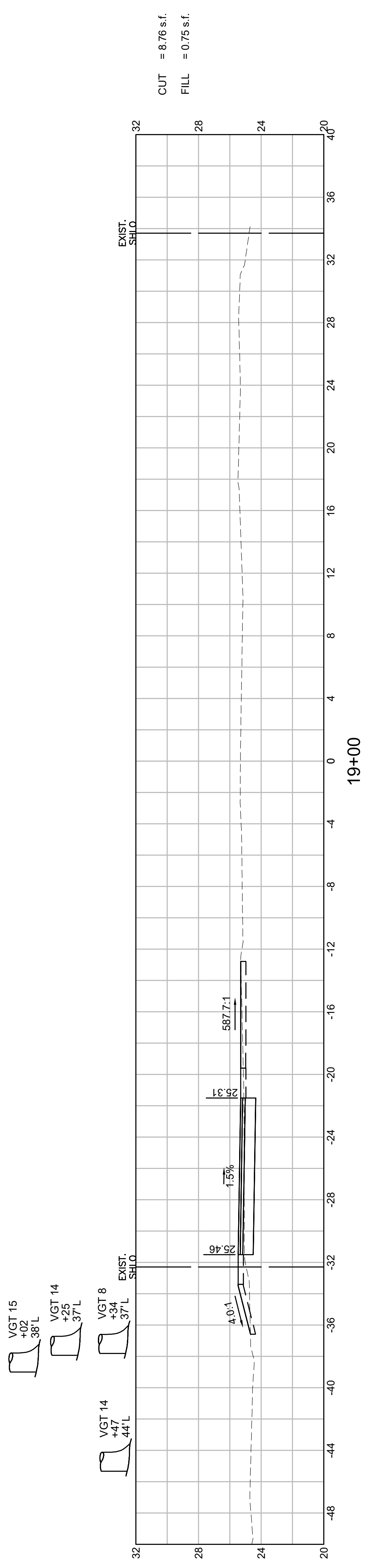
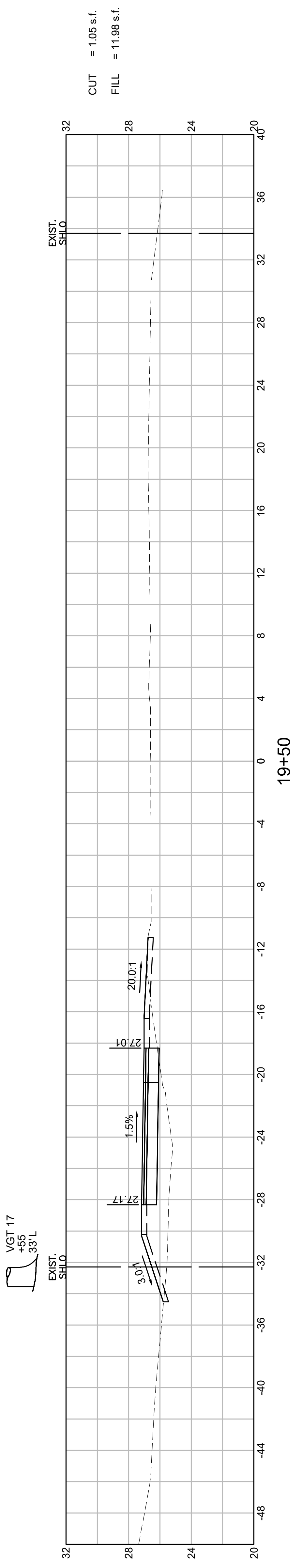
SHARED USE PATH AT DRIVEWAYS SEPARATED BY CURB RETURNS

NANTUCKET  
 MILESTONE ROAD AT POLPIS ROAD

|       |                    |           |              |
|-------|--------------------|-----------|--------------|
| STATE | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA    | -                  | 34        | 50           |

PROJECT FILE NO. 613129

CROSS SECTIONS  
 MILESTONE ROAD

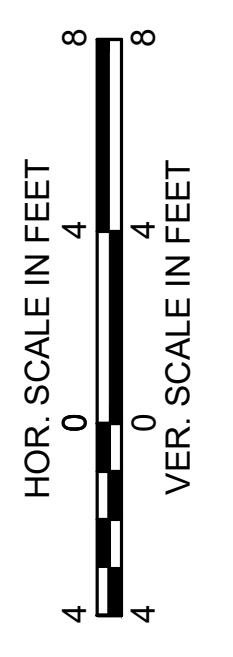
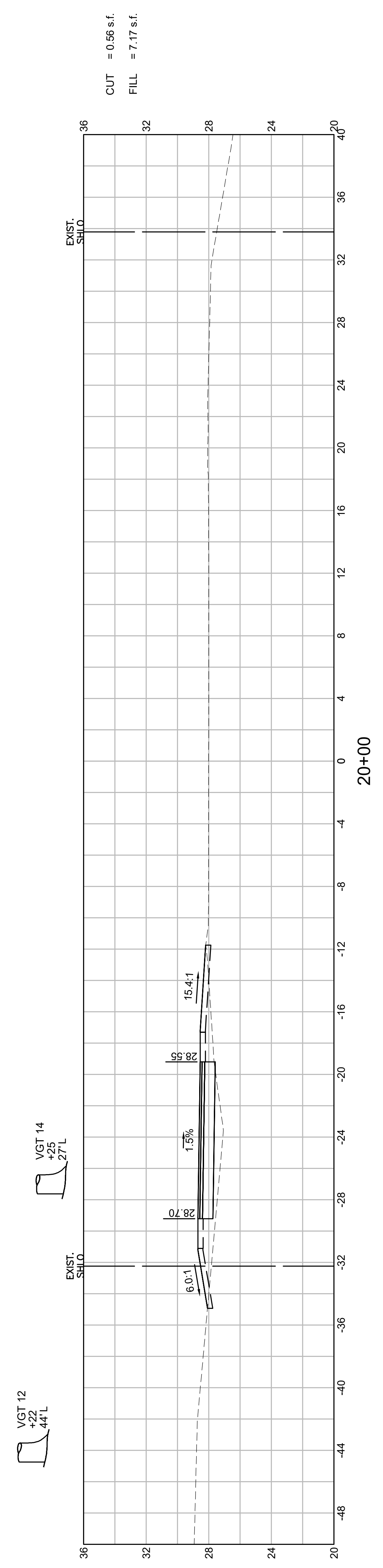
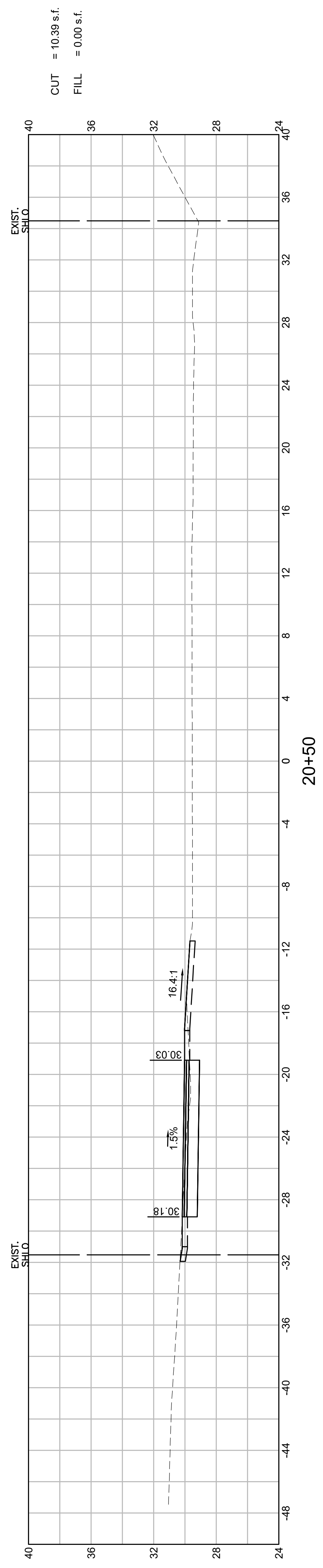
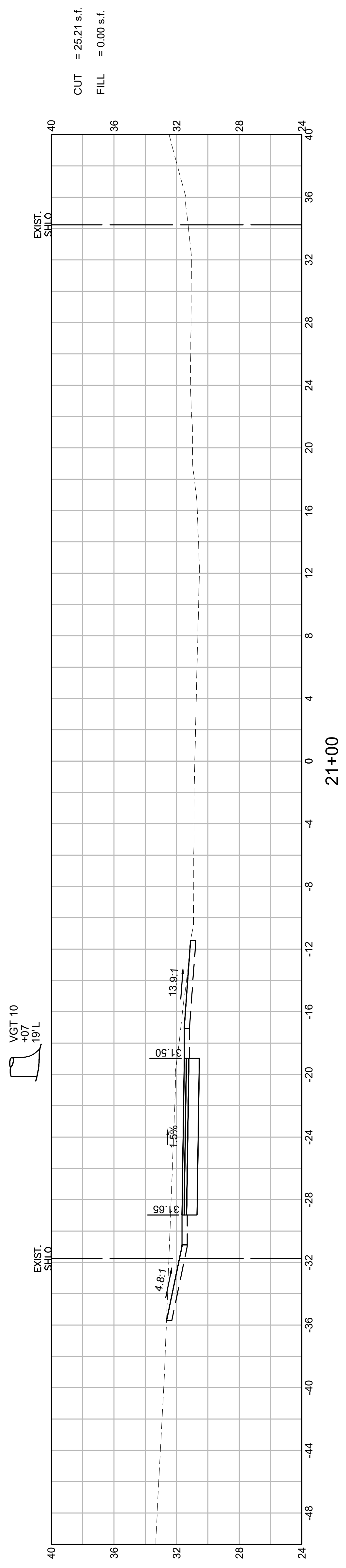




NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

|                         |                    |           |              |
|-------------------------|--------------------|-----------|--------------|
| STATE                   | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA                      | -                  | 35        | 50           |
| PROJECT FILE NO. 613129 |                    |           |              |

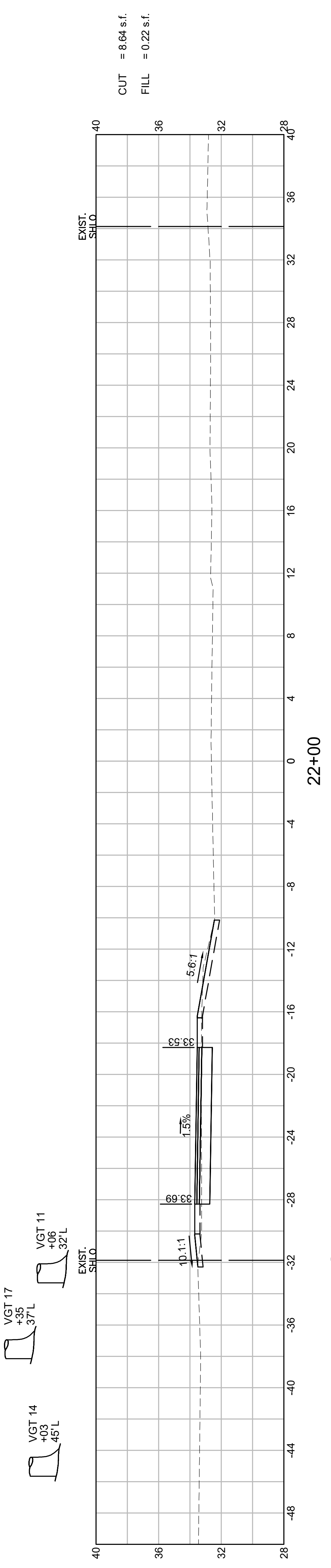
CROSS SECTIONS  
MILESTONE ROAD



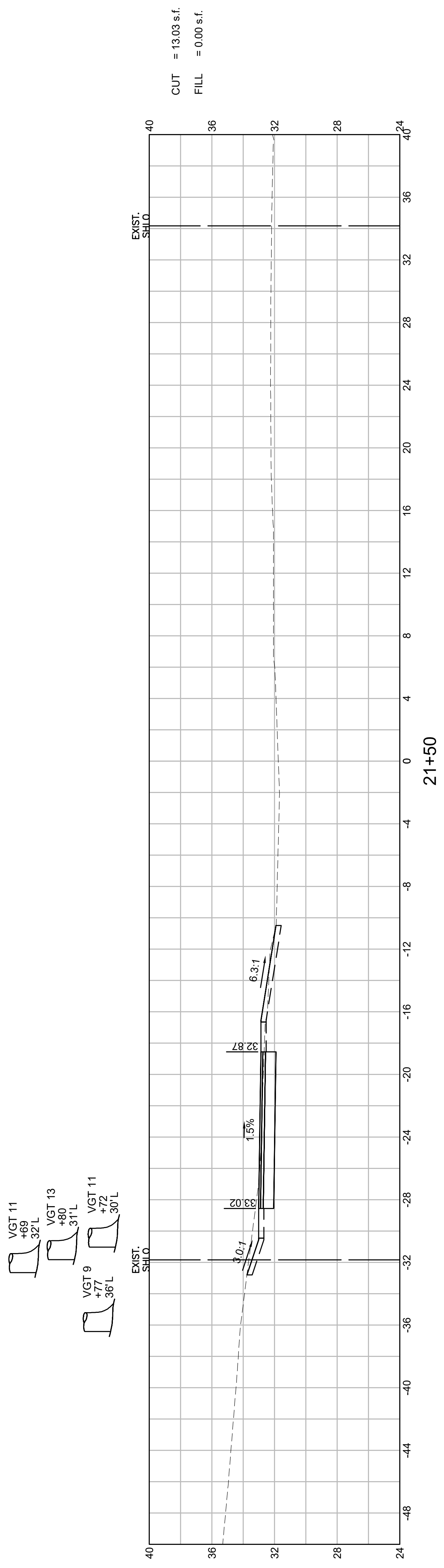
NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

|                  |                    |           |              |
|------------------|--------------------|-----------|--------------|
| STATE            | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA               | -                  | 36        | 50           |
| PROJECT FILE NO. |                    | 613129    |              |

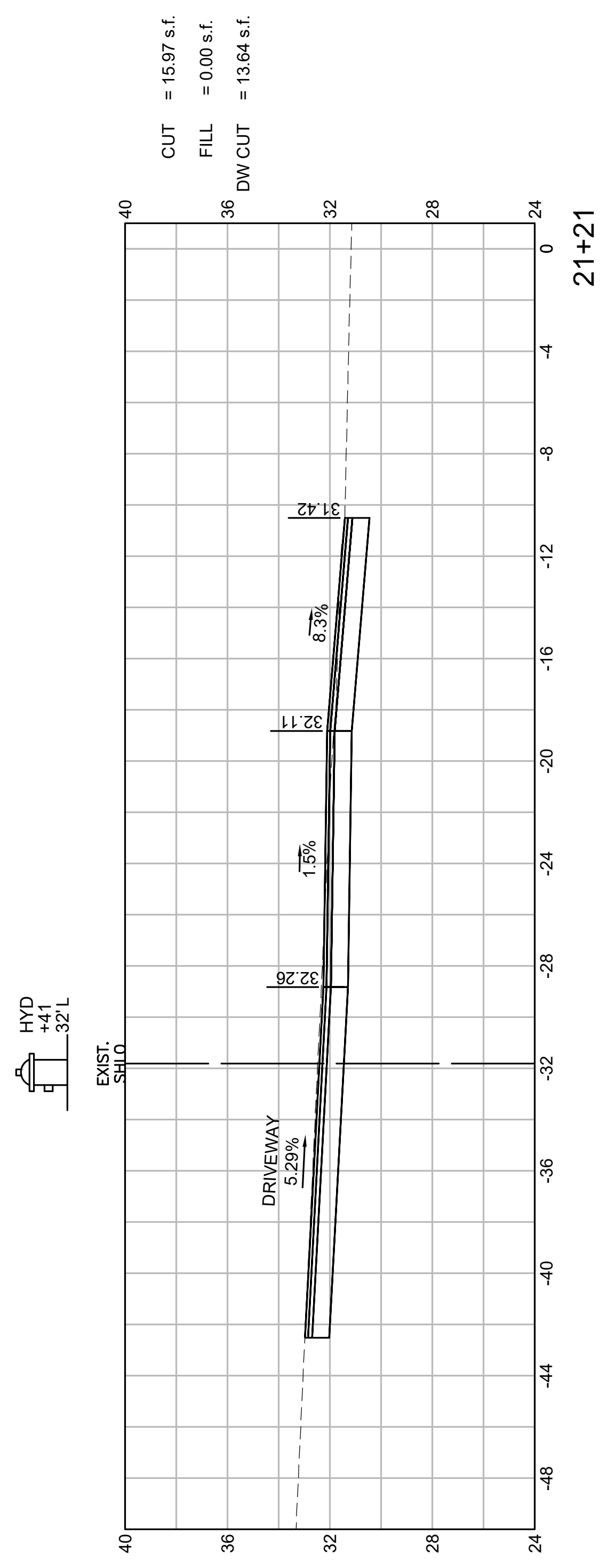
CROSS SECTIONS  
MILESTONE ROAD



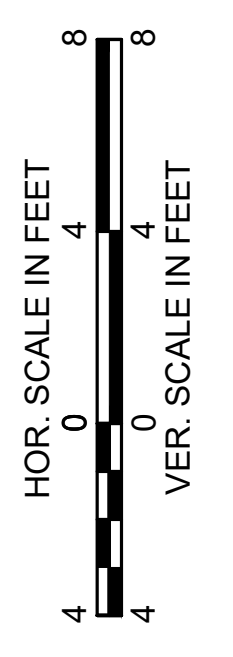
22+00



21+50



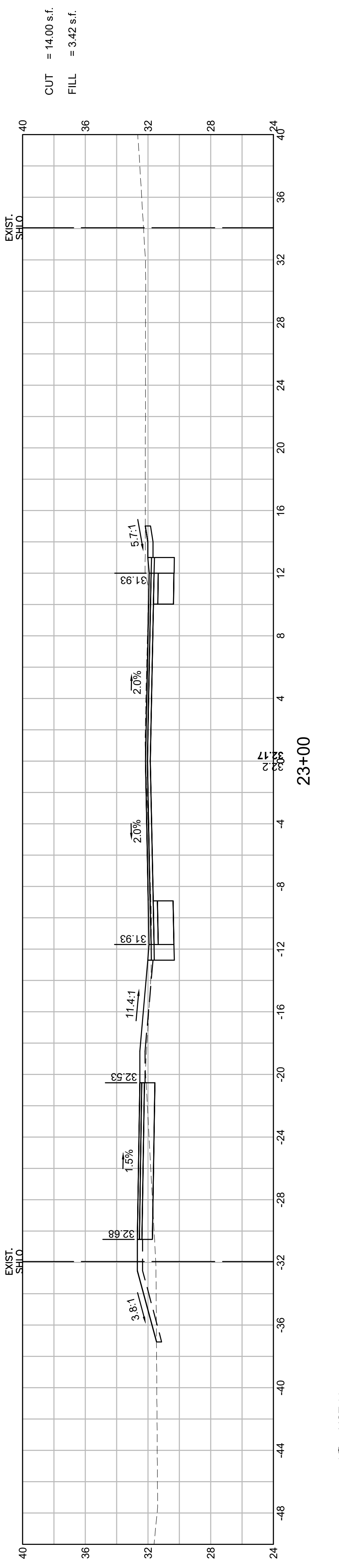
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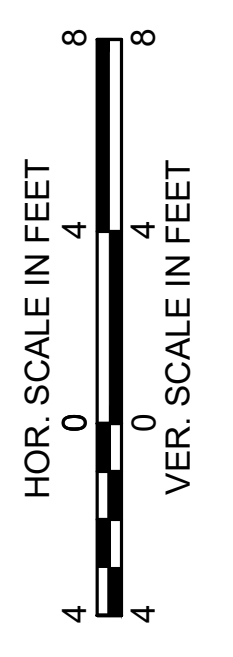
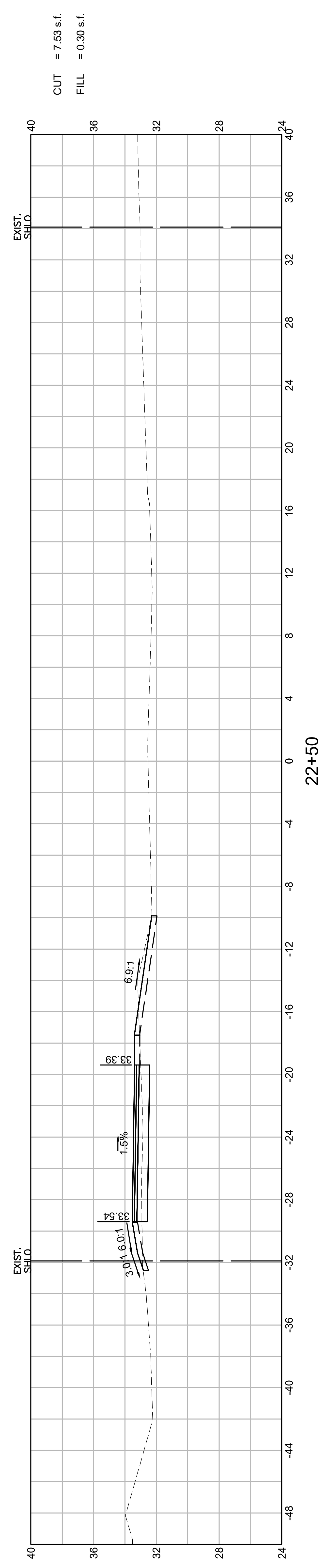
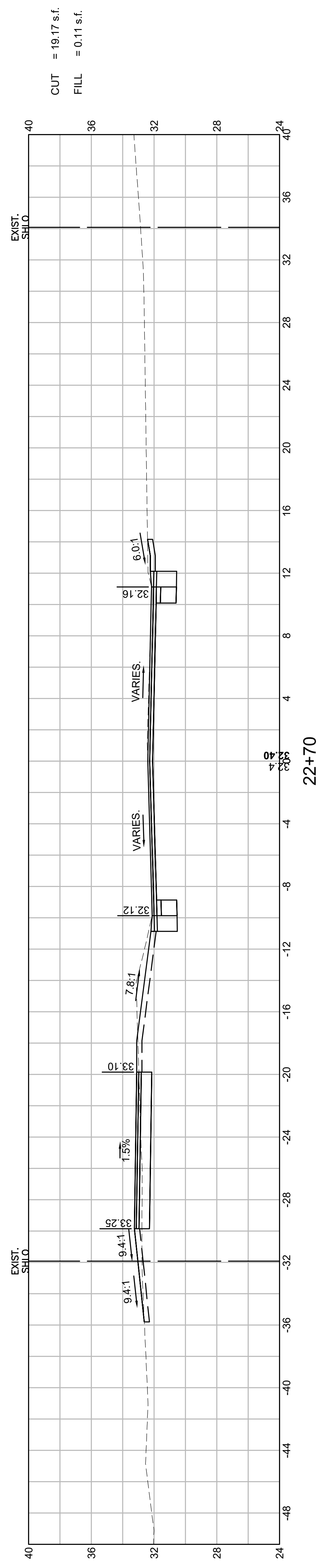
NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

|                         |                    |           |              |
|-------------------------|--------------------|-----------|--------------|
| STATE                   | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA                      | -                  | 37        | 50           |
| PROJECT FILE NO. 613129 |                    |           |              |

CROSS SECTIONS  
MILESTONE ROAD



VGT 11  
+73  
44'L



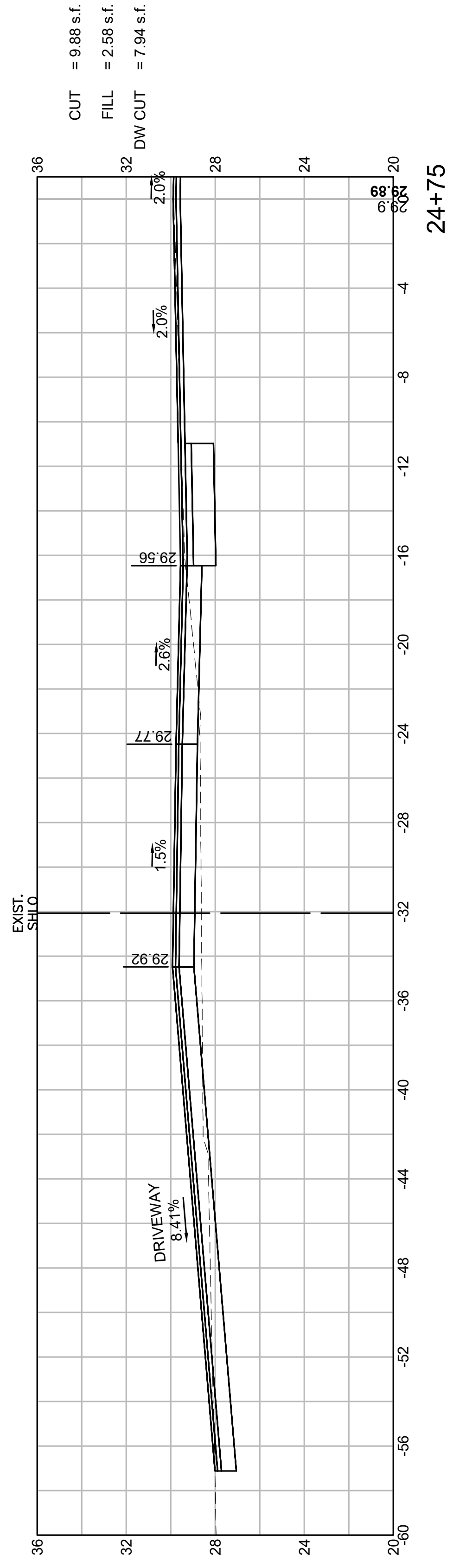
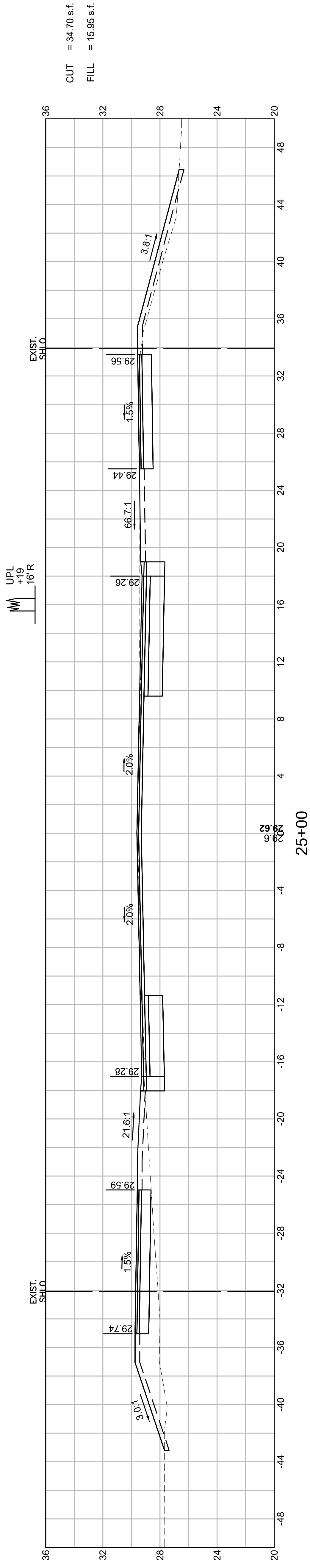




NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

|                  |                    |           |              |
|------------------|--------------------|-----------|--------------|
| STATE            | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA               | -                  | 39        | 50           |
| PROJECT FILE NO. |                    | 613129    |              |

CROSS SECTIONS  
MILESTONE ROAD

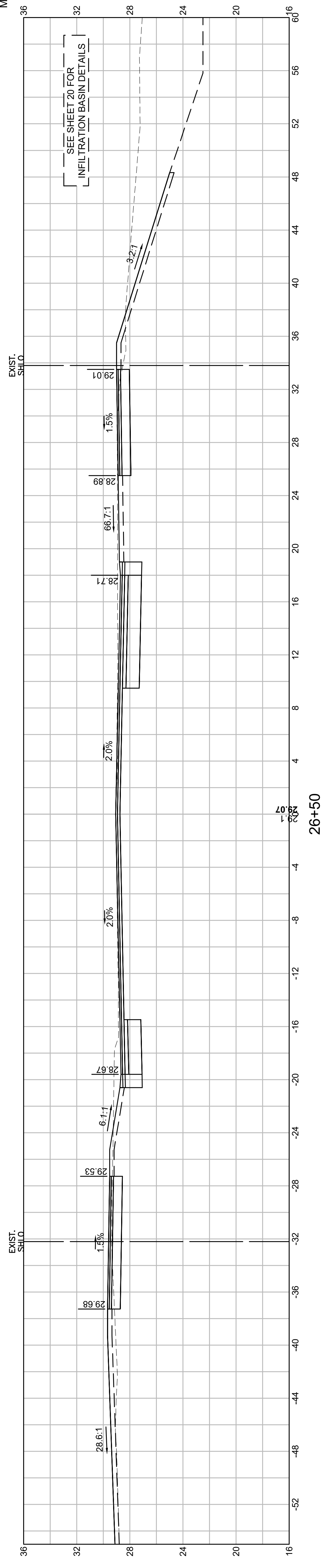


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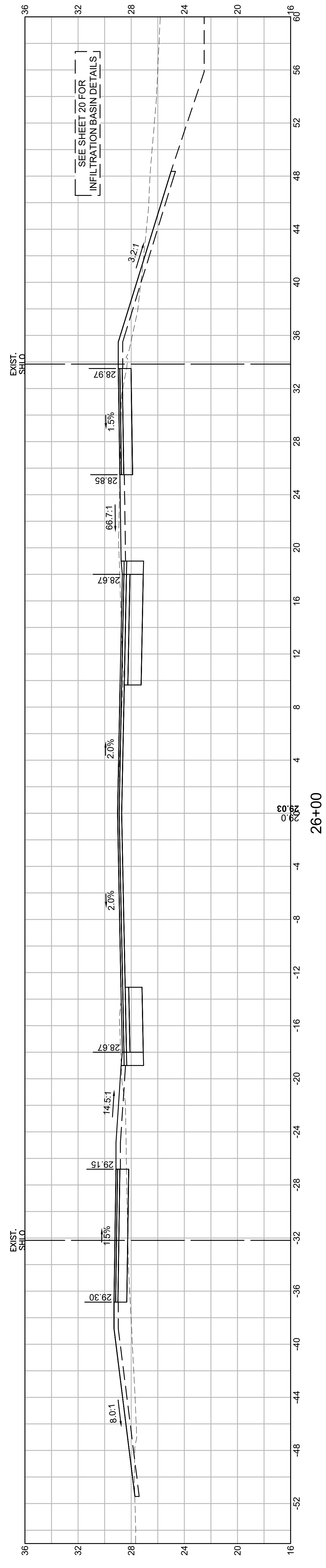
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|-------------------------|--------------------|-----------|--------------|
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| PROJECT FILE NO. 613129 |                    |           |              |

CROSS SECTIONS  
MILESTONE ROAD

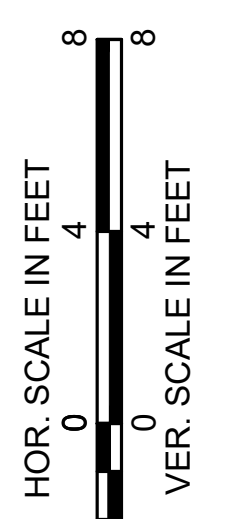
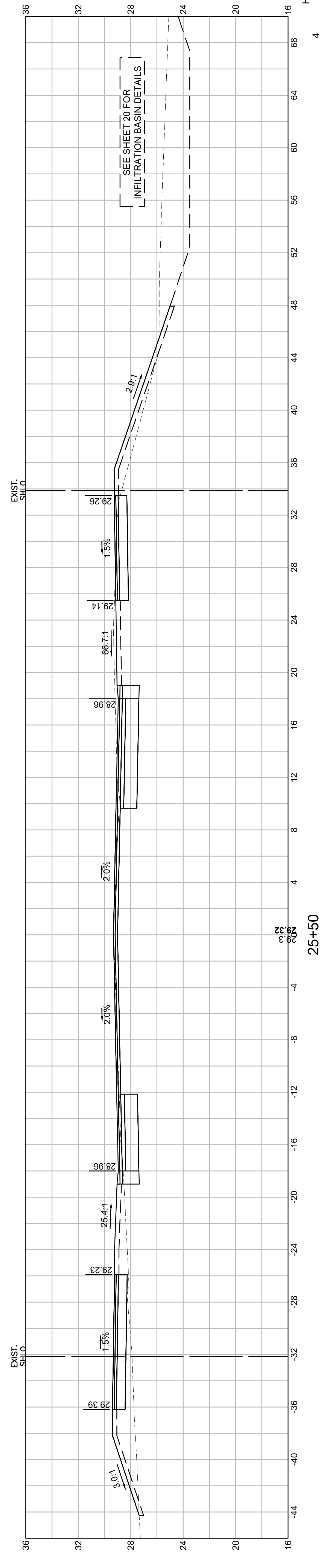
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FILL = 1.95 s.f.



CUT = 42.60 s.f.  
FILL = 12.68 s.f.

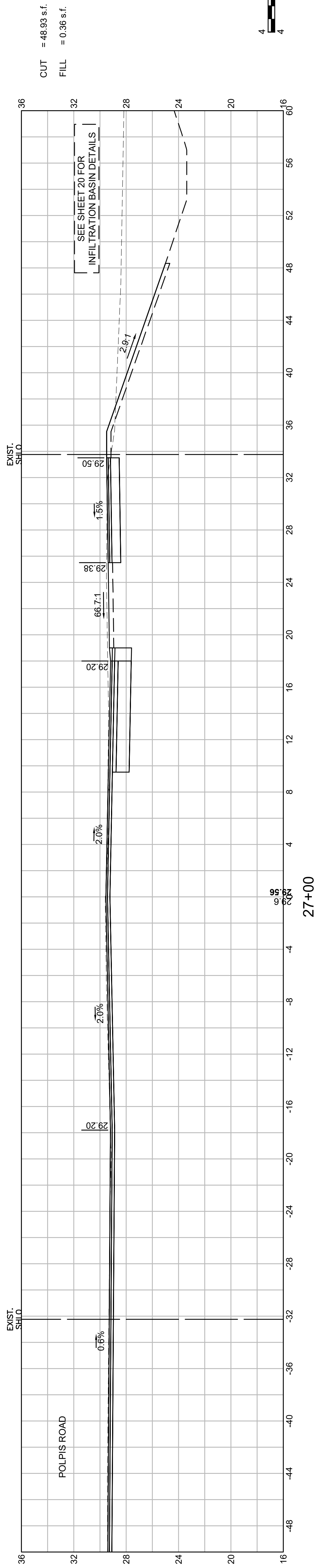
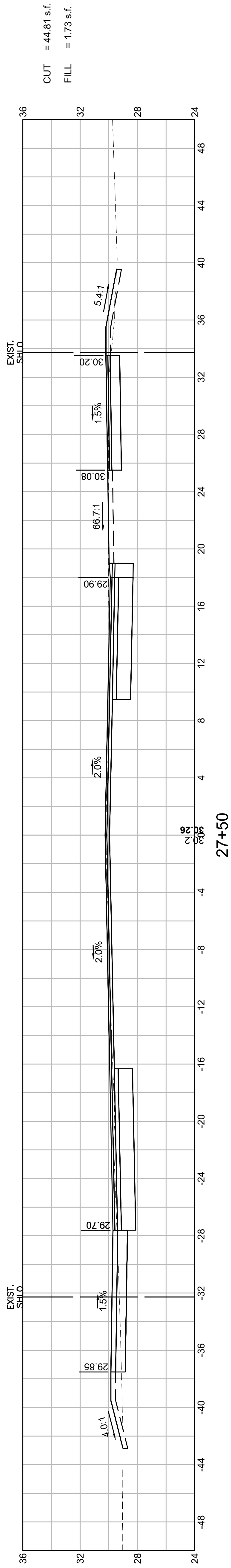
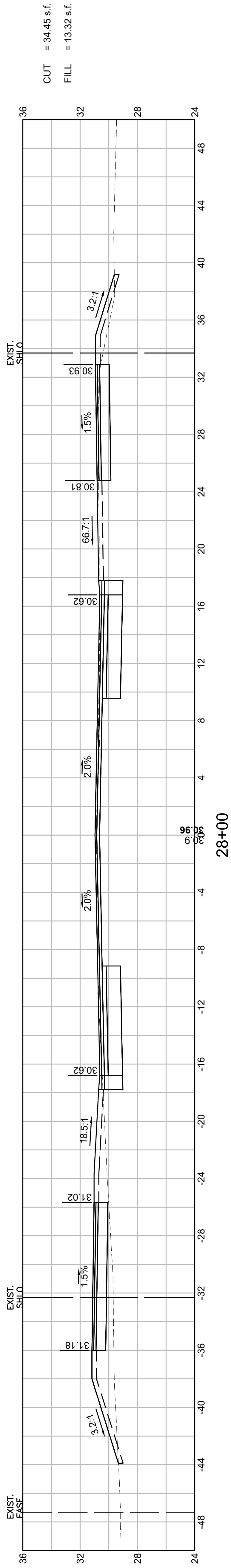
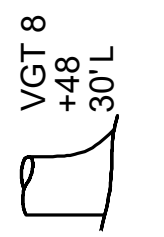


CUT = 36.44 s.f.  
FILL = 16.98 s.f.



NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD  
CROSS SECTIONS  
MILESTONE ROAD

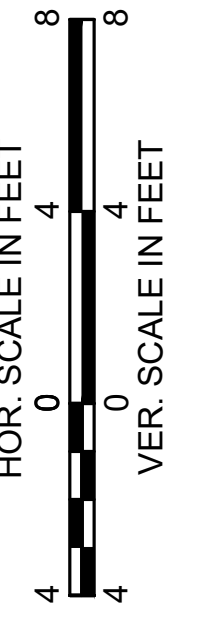
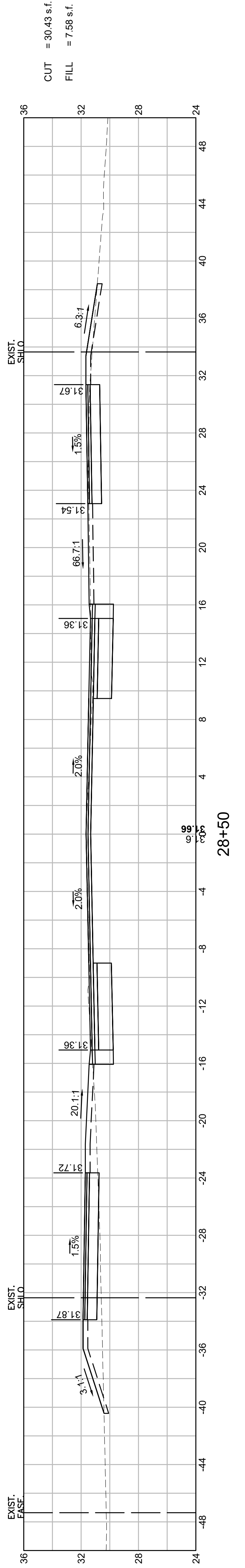
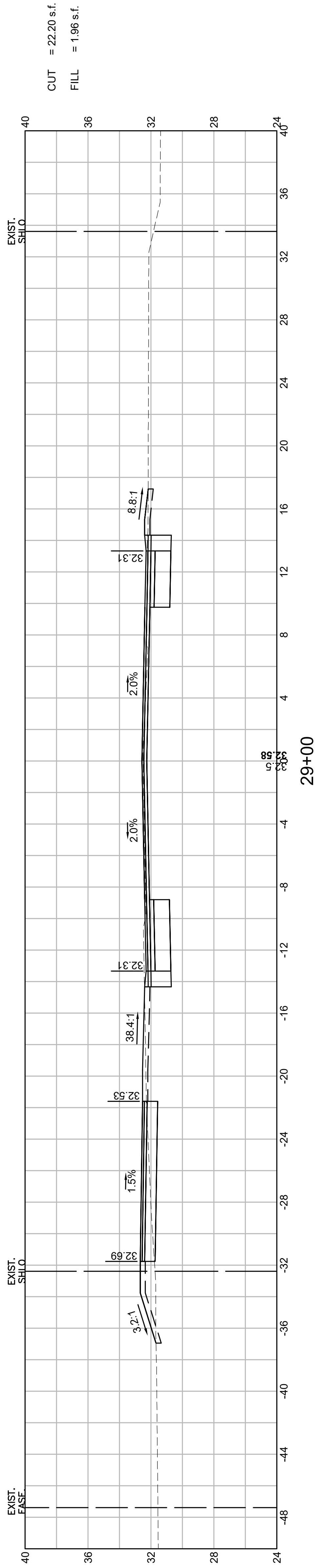
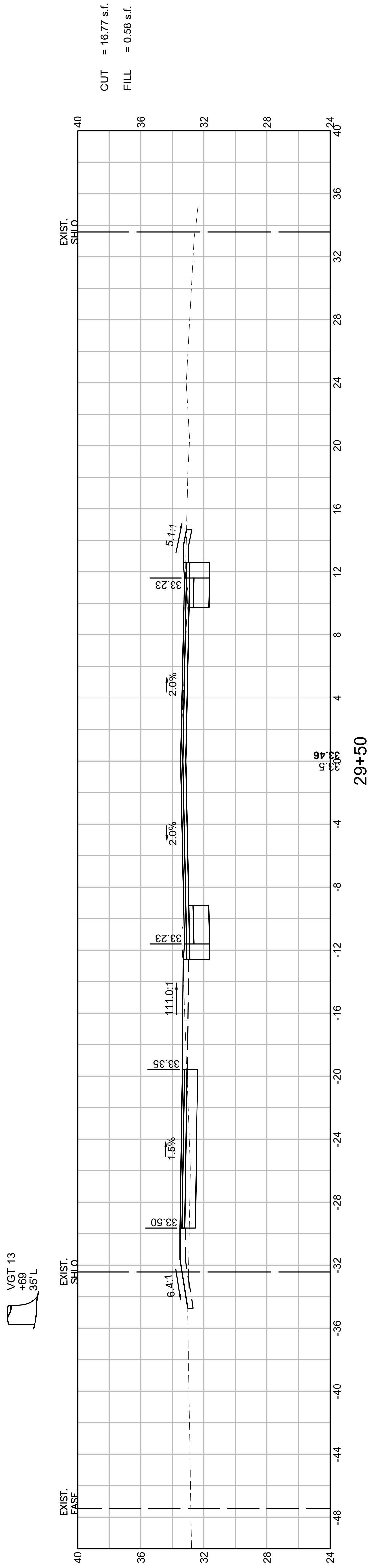
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|-------------------------|--------------------|-----------|--------------|
| STATE                   | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA                      | -                  | 41        | 50           |
| PROJECT FILE NO. 613129 |                    |           |              |



NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

|                         |                    |           |              |
|-------------------------|--------------------|-----------|--------------|
| STATE                   | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA                      | -                  | 42        | 50           |
| PROJECT FILE NO. 613129 |                    |           |              |

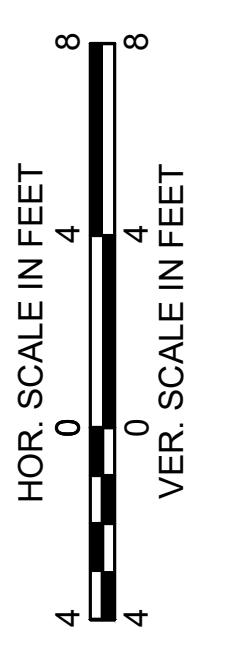
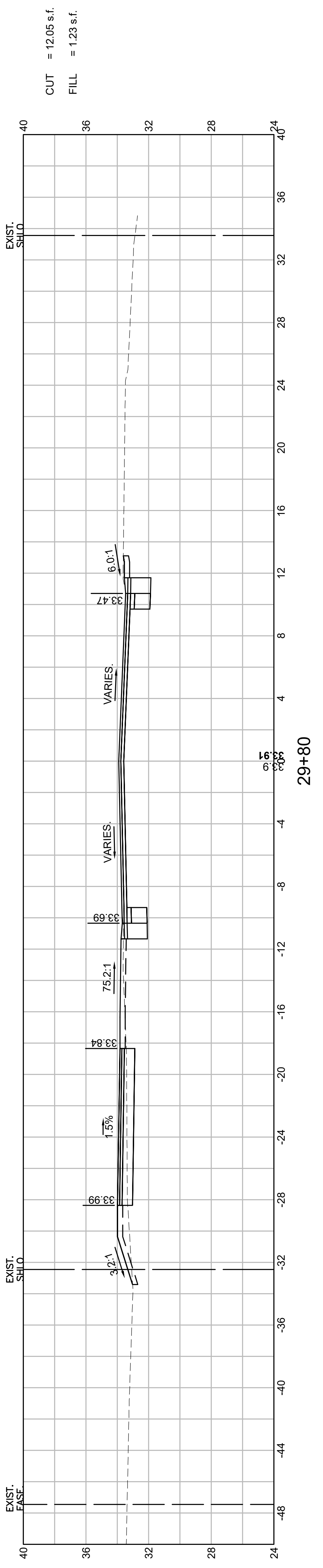
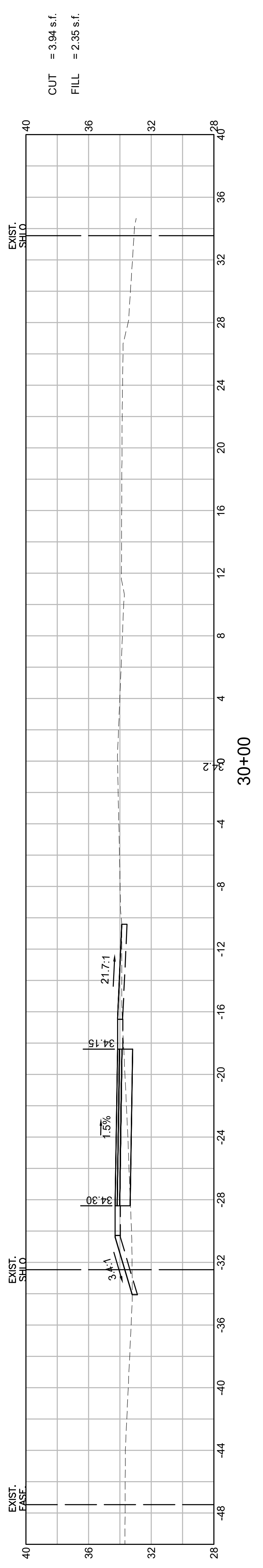
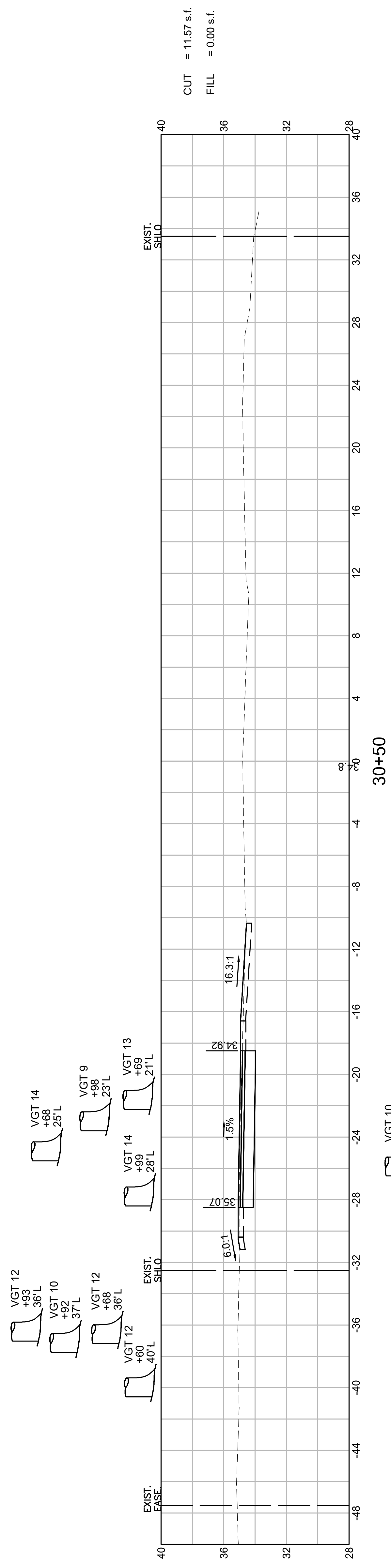
CROSS SECTIONS  
MILESTONE ROAD



NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

|                         |                    |           |              |
|-------------------------|--------------------|-----------|--------------|
| STATE                   | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA                      | -                  | 43        | 50           |
| PROJECT FILE NO. 613129 |                    |           |              |

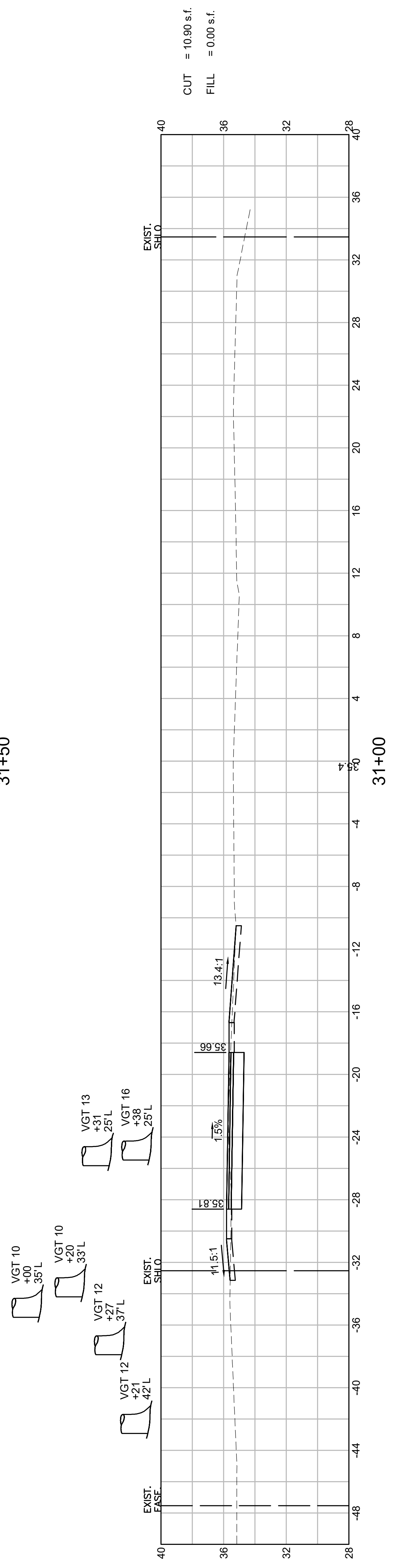
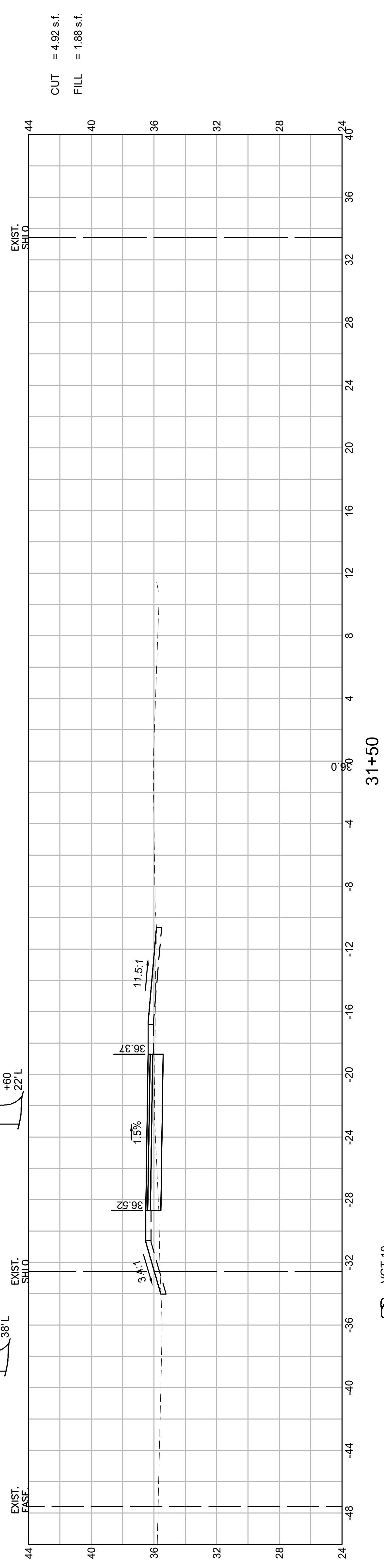
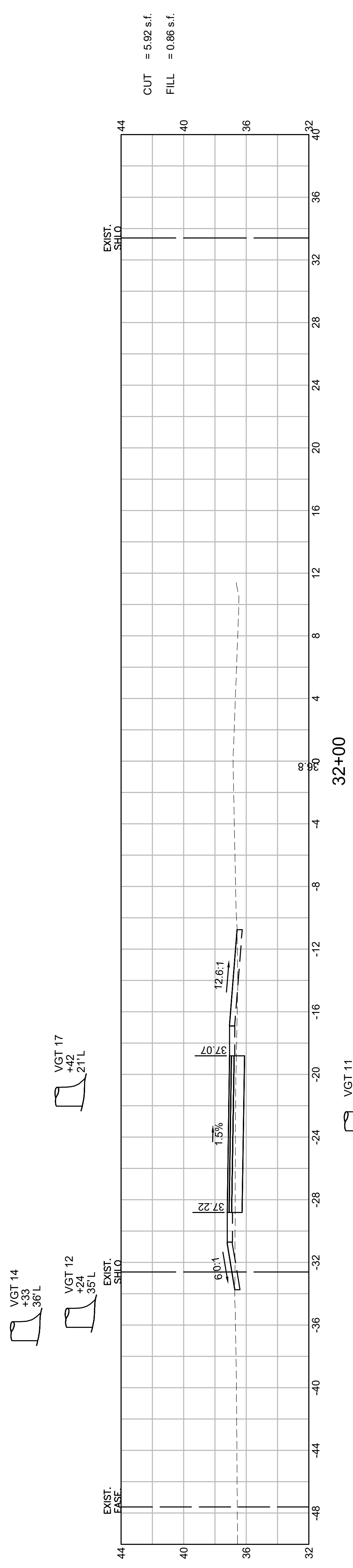
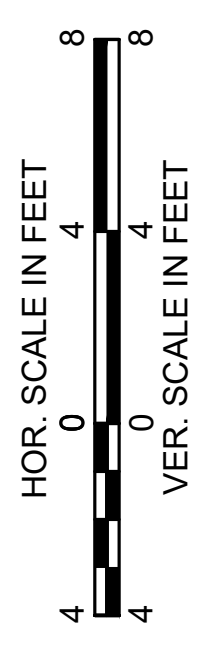
CROSS SECTIONS  
MILESTONE ROAD



NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

|                         |                    |           |              |
|-------------------------|--------------------|-----------|--------------|
| STATE                   | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA                      | -                  | 44        | 50           |
| PROJECT FILE NO. 613129 |                    |           |              |

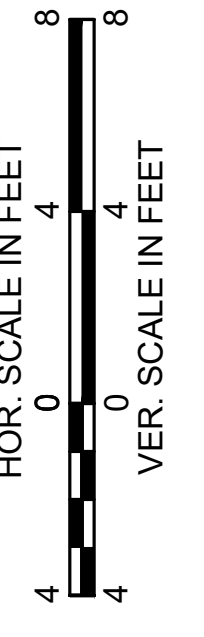
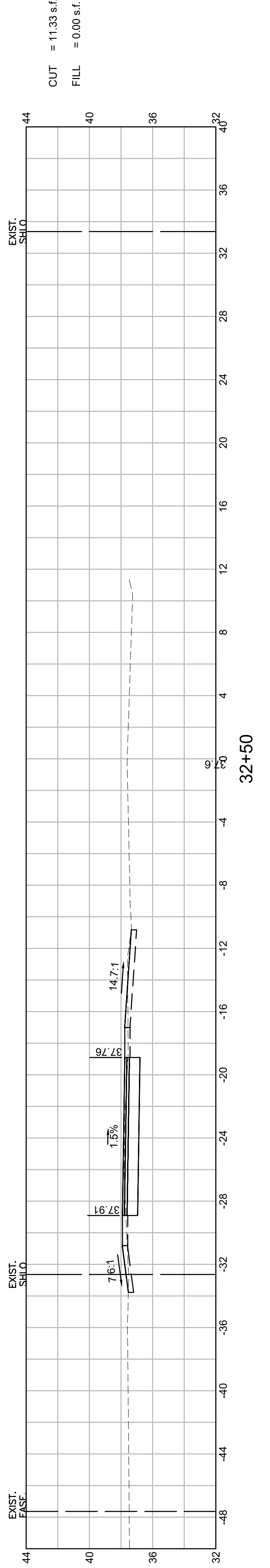
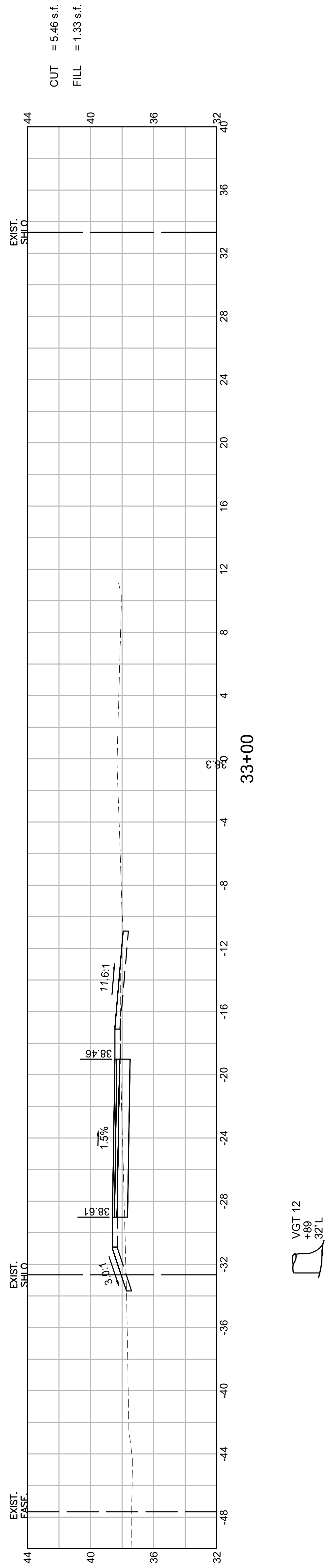
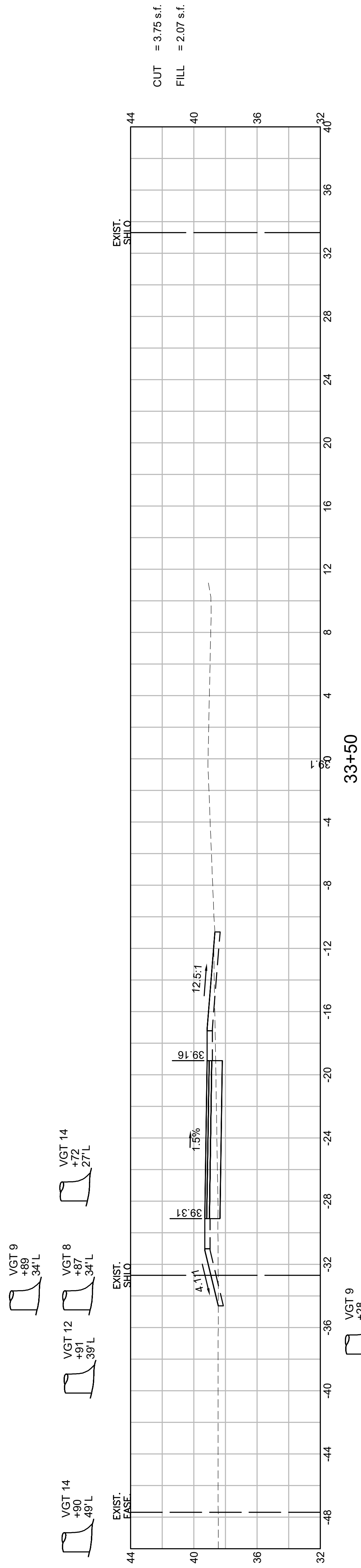
CROSS SECTIONS  
MILESTONE ROAD



NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

|                  |                    |           |              |
|------------------|--------------------|-----------|--------------|
| STATE            | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
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| PROJECT FILE NO. |                    | 613129    |              |

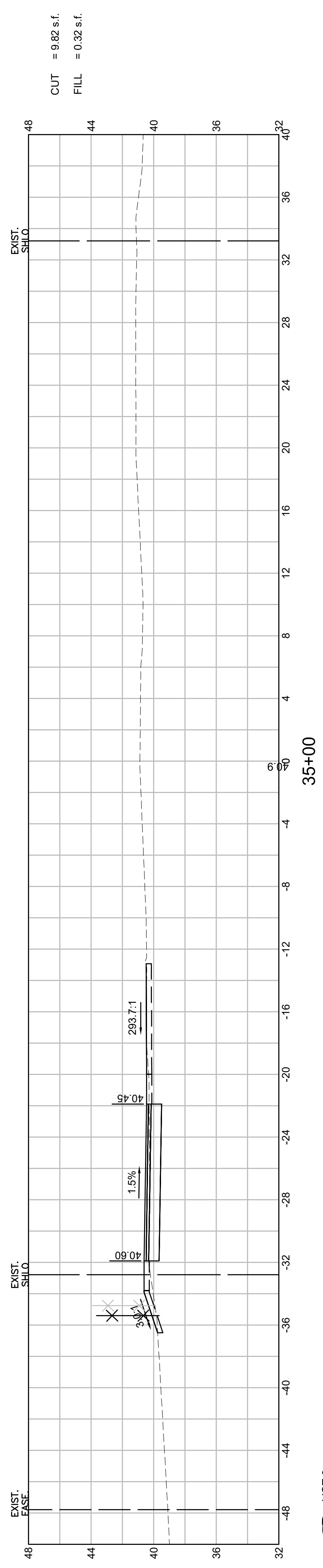
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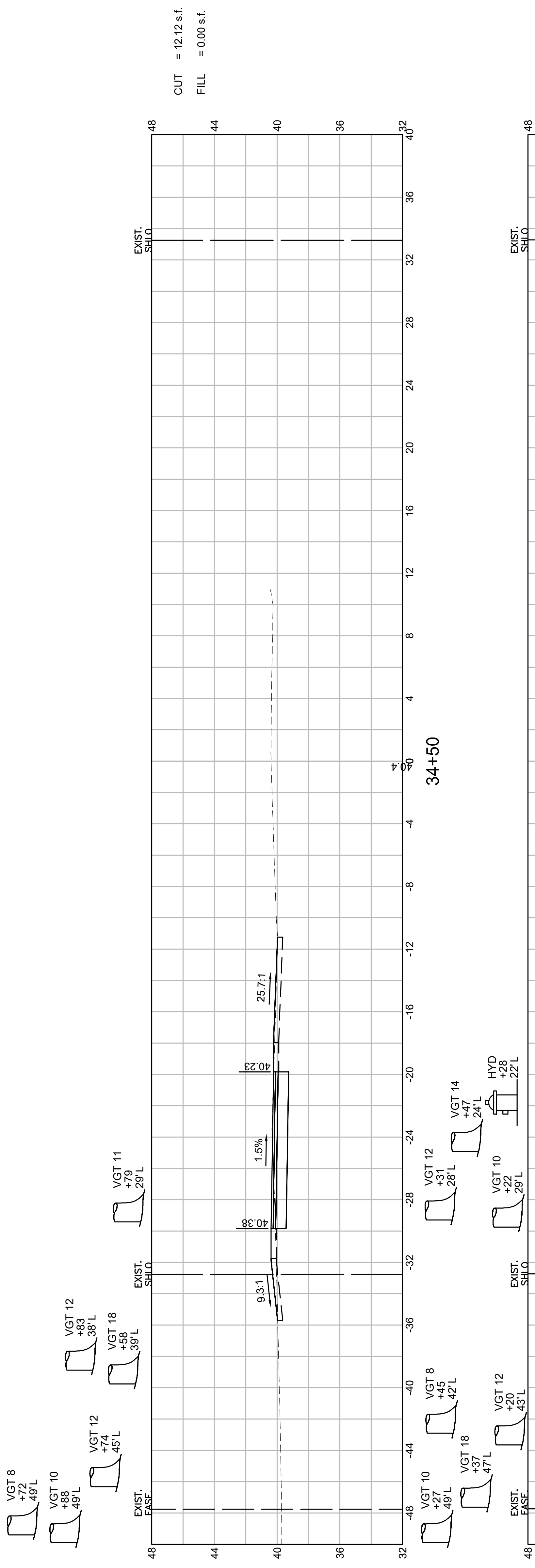
NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

|                         |                    |           |              |
|-------------------------|--------------------|-----------|--------------|
| STATE                   | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA                      | -                  | 46        | 50           |
| PROJECT FILE NO. 613129 |                    |           |              |

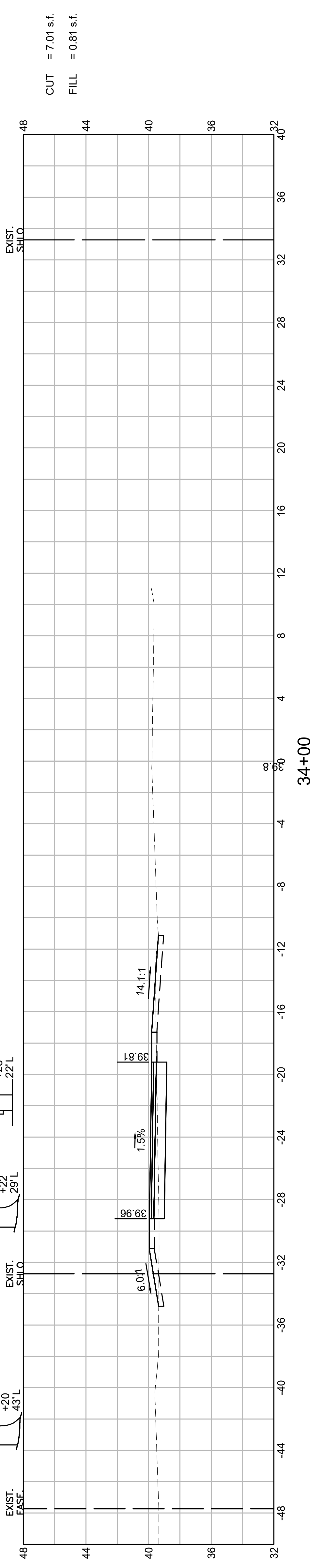
CROSS SECTIONS  
MILESTONE ROAD



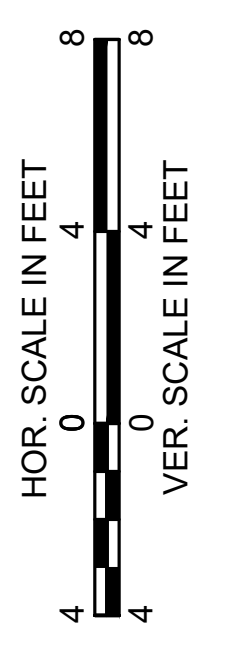
35+00



34+50



34+00



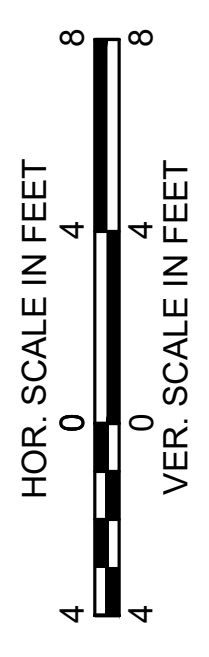
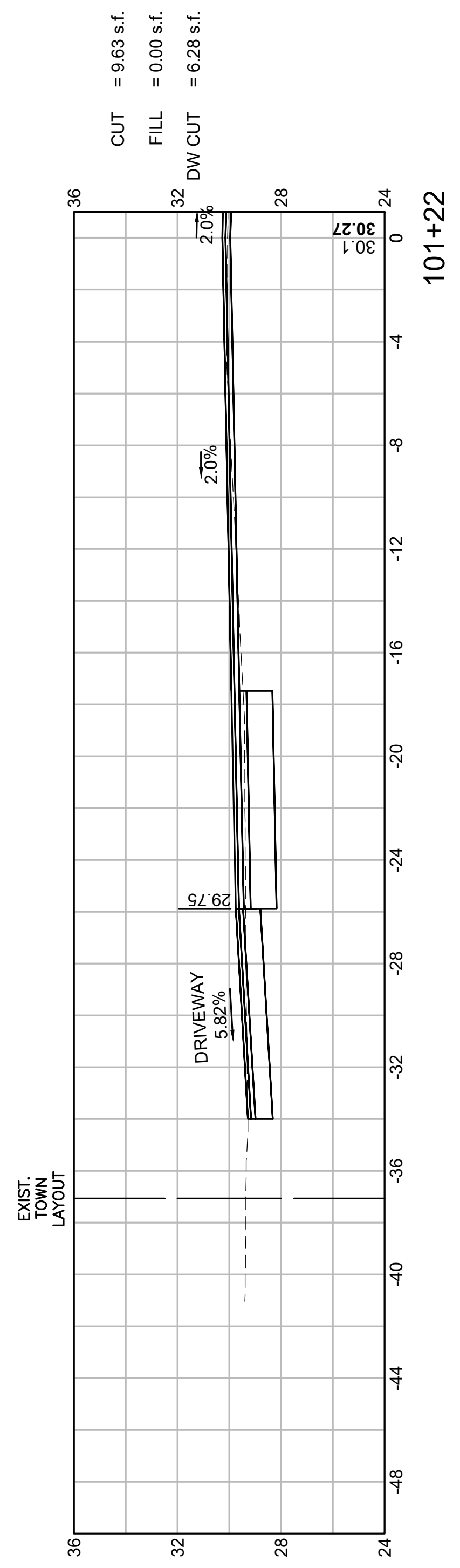
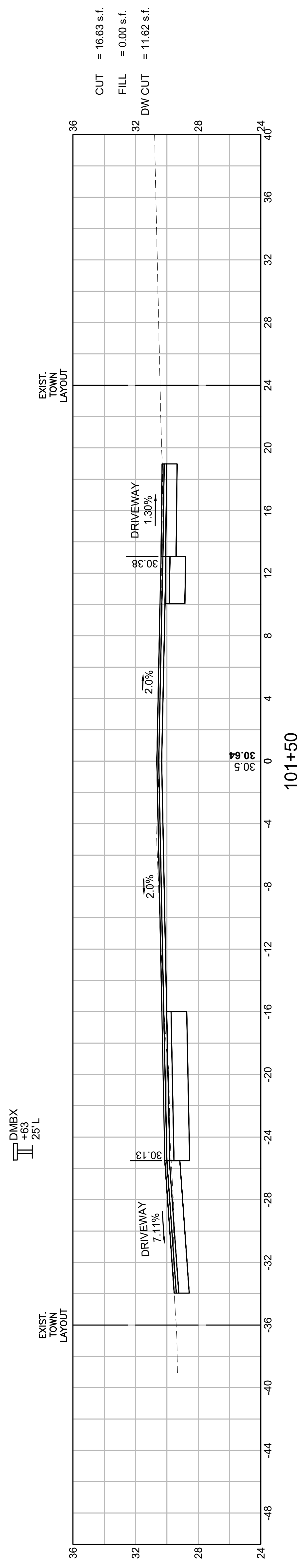
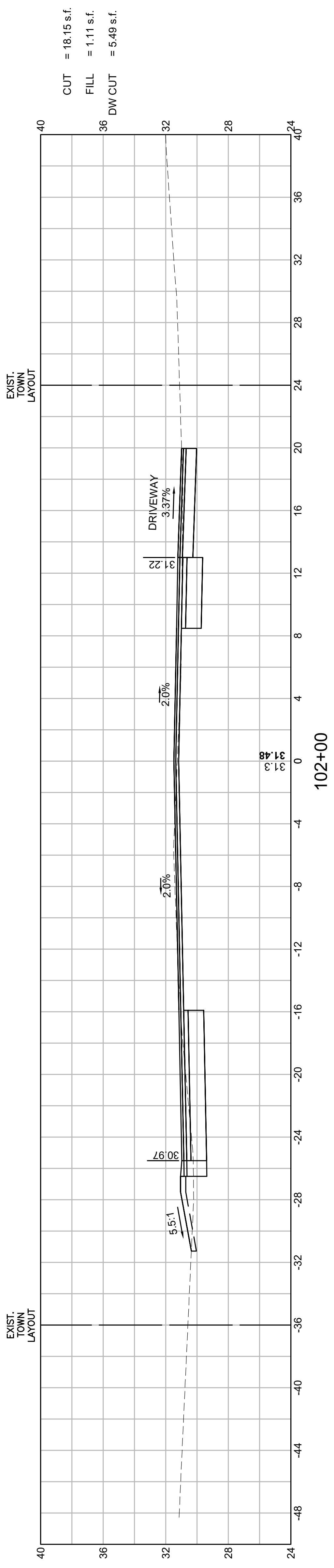




NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

|                  |                    |           |              |
|------------------|--------------------|-----------|--------------|
| STATE            | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA               | -                  | 48        | 50           |
| PROJECT FILE NO. |                    | 613129    |              |

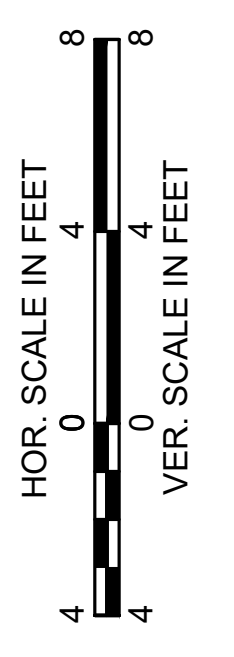
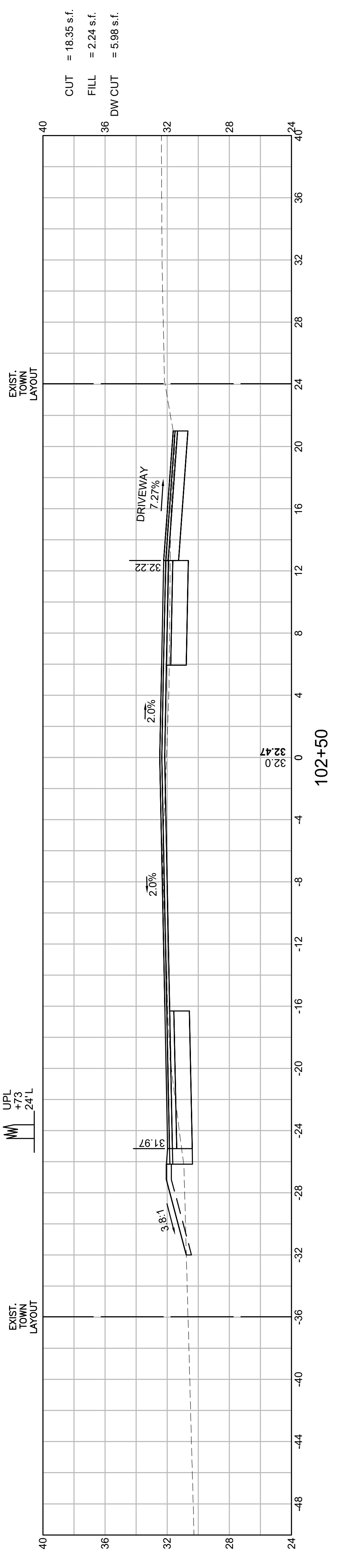
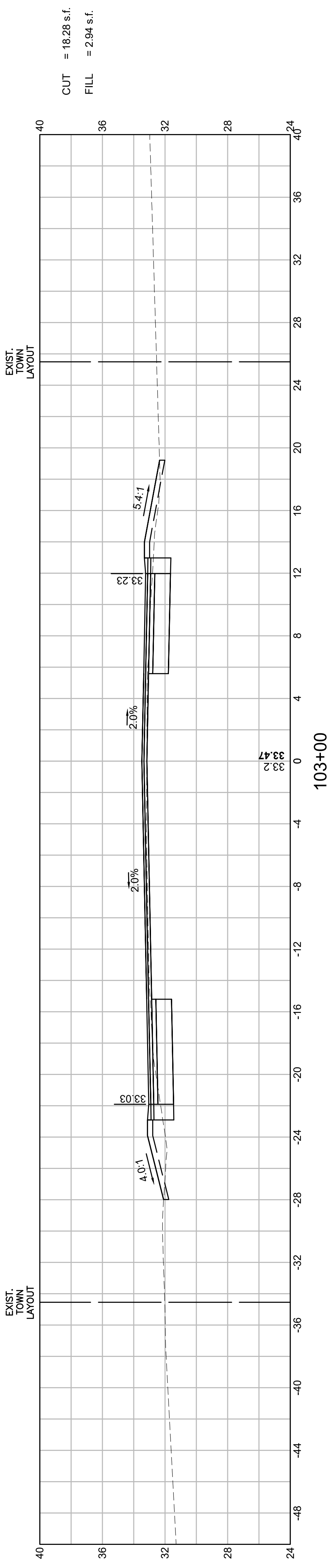
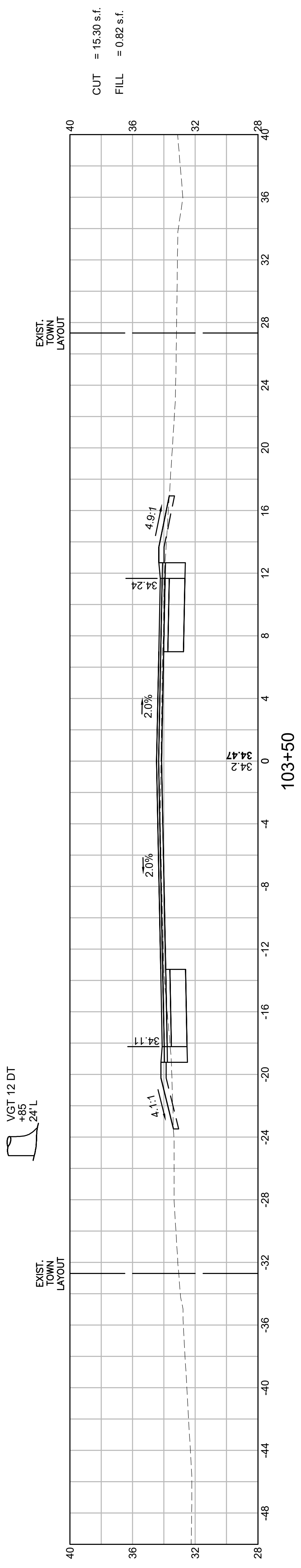
CROSS SECTIONS  
POLPIS ROAD



NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

|                  |                    |           |              |
|------------------|--------------------|-----------|--------------|
| STATE            | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA               | -                  | 49        | 50           |
| PROJECT FILE NO. |                    | 613129    |              |

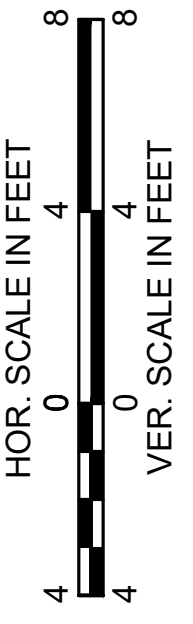
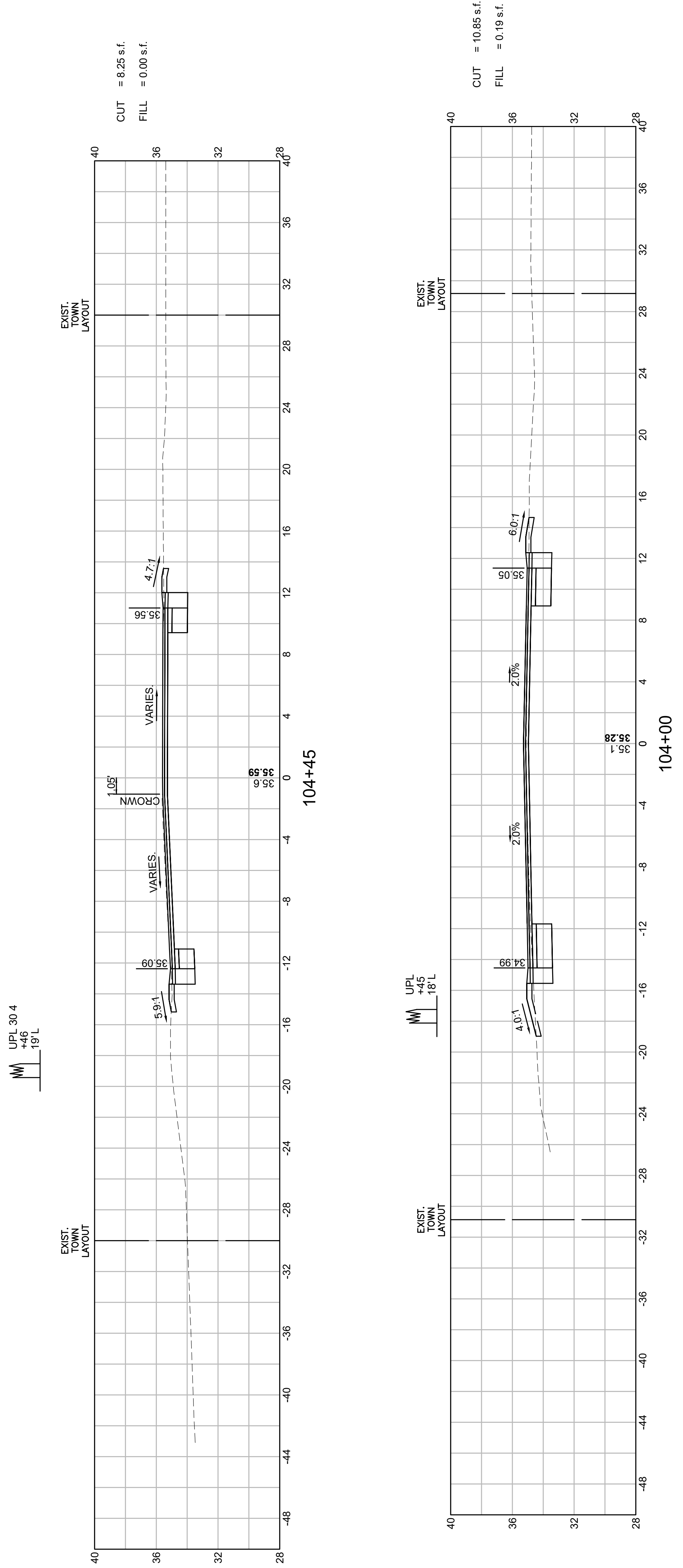
CROSS SECTIONS  
POLPIS ROAD



NANTUCKET  
MILESTONE ROAD AT POLPIS ROAD

|                  |                    |           |              |
|------------------|--------------------|-----------|--------------|
| STATE            | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| MA               | -                  | 50        | 50           |
| PROJECT FILE NO. |                    | 613129    |              |

CROSS SECTIONS  
POLPIS ROAD



DOCUMENT A00871

**MASSACHUSETTS  
DIVISION OF FISHERIES AND WILDLIFE**

**NATURAL HERITAGE AND  
ENDANGERED SPECIES  
PROGRAM**

**Determination Letter**

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MASSWILDLIFE

## DIVISION OF FISHERIES & WILDLIFE

1 Rabbit Hill Road, Westborough, MA 01581

p: (508) 389-6300 | f: (508) 389-7890

[MASS.GOV/MASSWILDLIFE](https://www.mass.gov/masswildlife)

April 16, 2024

David Paulson  
MA DOT  
10 Park Plaza  
Boston, MA 02116

RE: Project Location: Milestone Road and Polpis Road, Nantucket  
Project Description: Intersection Improvements, Extension of Bike Path  
**NHESP File No.:** 24-18352  
**Heritage Hub Form ID:** RC-84536

Dear Applicant:

Thank you for submitting the MESA Project Review Checklist, site plans (dated 2/23/24) and other required materials to the Natural Heritage and Endangered Species Program of the MA Division of Fisheries & Wildlife (the "Division") for review pursuant to the Massachusetts Endangered Species Act (MESA) (MGL c.131A) and its implementing regulations (321 CMR 10.00).

Based on a review of the information that was provided and the information that is currently contained in our database, the Division has determined that this project, as currently proposed, **will not result in a prohibited Take** of state-listed rare species. This determination is a final decision of the Division of Fisheries & Wildlife pursuant to 321 CMR 10.18. Any changes to the proposed project or any additional work beyond that shown on the site plans may require an additional filing with the Division pursuant to the MESA. This project may be subject to further review if no physical work is commenced within five years from the date of issuance of this determination, or if there is a change to the project.

Please note that this determination addresses only the matter of state-listed species and their habitats. If you have any questions regarding this letter please contact Emily Holt, Endangered Species Review Assistant, at [Emily.Holt@mass.gov](mailto:Emily.Holt@mass.gov), (508) 389-6385.

---

MASSWILDLIFE

Sincerely,

A handwritten signature in black ink, consisting of several overlapping loops and a final horizontal stroke.

Jesse Leddick  
Assistant Director

cc:



DOCUMENT A00875

**POLICY DIRECTIVE P-22-001  
AND  
POLICY DIRECTIVE P-22-002**

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zoned property, schools, daycare facilities, playgrounds, parks, recreational areas, hospitals, elderly housing and convalescent facilities.

Temporary off-site storage of excavated soil from a MassDOT project is only permissible at a location approved and permitted by MassDOT. The temporary storage location should be located within the same municipality where the soil was excavated, where possible. Stockpiled soil must be securely covered, and appropriate measures must be taken to minimize fugitive dust and erosion.

Signs indicating the source of the soil, the date the soil was generated, and contact information must be erected and maintained until the stockpiled soils are transported to a disposal facility or reused on the project site.

### **Implementation Procedures**

To ensure that off-site storage of excavated soils is managed properly on MassDOT projects, this policy requires the following:

#### **1. Off-Site Stockpile Storage Locations**

- a. The Contractor shall provide proposed off-site storage locations to the Engineer for approval at least 30 days prior to transporting soil off site. Off-site storage locations should be in the same municipality as the work site.
- b. The Contractor shall keep excavated soil on site until adequately characterized to the satisfaction of the Engineer.
- c. The Contractor shall provide notification of the approved off-site storage location to the local Board of Health and the Town Manager's/Mayor's Office at least 7-days prior to transporting soil off site.
- d. The Contractor shall provide the Engineer with at least 3-days' notice prior to transporting soil off site.
- e. For off-site storage locations on MassDOT property, the Contractor is required to obtain an Access Permit through the District Permits Office prior to storage of soil or other materials. MassDOT will issue these permits at no cost to the Contractor. Information to be submitted by the Contractor as part of the permit application shall include:
  - i. A description of material to be stored off-site, including available analytical data;
  - ii. A figure of the location with distances to residences and residential receptors; and
  - iii. Anticipated duration of temporary storage.
- f. Stockpile locations should not be within 500 feet of residential receptors (e.g., residential dwellings, residentially zoned property, schools, daycare facilities, playgrounds, parks, recreational areas, hospitals, elderly housing and convalescent facilities).
  - i. If the stockpile location must be within 500 feet of residential receptors, then soil must be less than RCS-1 (per 310 CMR 40.1600) and free of potentially hazardous or regulated items.

- g. For off-site storage locations on non-MassDOT property, the Contractor must notify the property owner(s) at least 7 days prior to transporting material.
- h. Exceptions to these rules will be reviewed by MassDOT and may be approved by the District Highway Director on a case-by-case basis.

## **2. Off-Site Stockpile Management**

- a. The Contractor shall keep soil stockpiles on impermeable surfaces (e.g., asphalt or concrete) or on 10-mil polyethylene sheeting.
- b. The Contractor shall cover soil stockpiles with 10-mil polyethylene sheeting and surround with a berm made of hay bales, straw wattles, or similar.
  - i. Piles that are actively being worked on must be covered and re-secured at the end of the work shift.
- c. The Contractor shall label stockpiles with signs, including:
  - i. Location of origin (including any Release Tracking Numbers)
  - ii. Stockpile ID number (including MassDOT District office-assigned tracking ID, if different)
  - iii. Date of initial accumulation
  - iv. Applicable telephone numbers for the Contractor and MassDOT.
- d. The Contractor shall mitigate fugitive dust at storage locations under the direction of an appropriately trained/certified environmental professional.
- e. The Contractor shall remedy noncompliance with this policy within 48 hours.
- f. The Contractor shall remedy noncompliance with this policy on the SAME DAY for potentially hazardous material, as determined by the Engineer.
- g. The Contractor shall handle excavated soil according to federal, state, and local regulations.
- h. The Contractor shall use appropriate shipping documents for all movements of excavated soil on public roadways (e.g., Bill of Lading, Material Shipping Record, Manifest, Asbestos Waste Shipment Record, etc.).

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Number:           P-22-002            
Date:           9/23/22          

# **POLICY DIRECTIVE**

Jonathan Gulliver (signature on original)  
\_\_\_\_\_  
HIGHWAY ADMINISTRATOR

## **Use of MassDOT Property for Staging and other Construction-Related Operations**

### **Purpose**

This Policy Directive is intended to address the use of MassDOT property by MassDOT Contractors for construction staging and other construction-related operations that are not specifically defined in the construction contract. Such use of MassDOT property will only be allowed if permitted by the District Office in accordance with 700 CMR 13.00, Approval of Access to MassDOT Highways and Other Property. This includes the use of MassDOT property for staging, laydown, and storage of equipment and materials, including soil excavated from a project site.

This Policy Directive requires the Contractor/applicant to obtain a Non-Vehicular Access Permit from MassDOT to use MassDOT property for these purposes.

This Policy Directive is effective immediately and applies to all MassDOT construction projects.

### **General Permit Considerations and Conditions**

In addition to other normal MassDOT Access Permit procedures, MassDOT shall consider the following during the application, review, implementation and monitoring processes of Access Permits required by this Policy Directive:

- Storage and placement of the Contractor’s equipment and materials should not be allowed within the clear zone of the roadway.
- Stockpiled soils should not be located within 500 feet of residential receptors, as defined herein to include, but not be limited to, residential dwellings, residentially zoned property, schools, daycare facilities, playgrounds, parks, recreational areas, hospitals, elderly housing and convalescent facilities.
- The Contractor/applicant shall identify the access/egress locations of the proposed storage areas. MassDOT will only approve locations determined to be safe for roadway users, construction workers and the general public.
- The Contractor may be required to submit a Traffic Management Plan and/or Lighting Plan for MassDOT review and approval as part of the permit application, depending on the proposed use of the area.

- The Contractor shall submit the permit application through MassDOT's online State Highway Access Permit System (SHAPS).
- MassDOT will waive the permit application fee for any application received from a MassDOT Contractor for any permit required by this Policy Directive and will waive any subsequent amendment and extension fees that may otherwise be required.
- MassDOT will review the permit application in accordance with applicable standard procedures and will apply standard permit terms and conditions, as necessary.
- The Resident Engineer will verify that the permit is approved before allowing the Contractor to use the affected area for the requested purpose.
- Areas permitted are for use by the approved applicant only and are not to be shared with or used by other vendors. Subcontractors specifically engaged with the applicant working on the specific MassDOT project will be allowed to use the area in accordance with the terms of the permit.
- Permits are issued on an annual basis and will require the Contractor to file for an extension each year to continue use.

### **Exemptions from Permit Requirements**

Equipment and materials being used for active construction operations and located within the work zone of the construction contract are exempt from this permit requirement, provided they do not interfere with the safety or operation of the roadway or the work zone. Examples of these types of exempt uses are:

- Equipment and materials parked or stored within a protected (barriered) work zone.
- Materials placed in the work zone prior to same-day installation or use.
- Soils excavated temporarily and scheduled to be replaced, such as for trenching operations or for installation of drainage structures.



DOCUMENT B00420

PROPOSAL

NANTUCKET

For: **Intersection Improvements at Milestone Road and Polpis Road  
and Extension of ‘Sconset Bike Path**

COMMONWEALTH OF MASSACHUSETTS

LOCATION

The work referred to herein is in the Town of NANTUCKET in Nantucket County, in the Commonwealth of Massachusetts, and is shown by the locus map (Document 00331) in the Proposal Pamphlet, the work locations extend as follows:

**Milestone Road/Polpis Road**

**Beginning – Station 18+65.00 +/- Milestone Road BL**

**Ending –Station 35+05.00 +/- Milestone Road BL**

**Ending Station - 102+90.00 +/- Polpis Road BL**

The contract prices shall include the furnishing of all materials (except as otherwise herein specified), the performing of all the labor requisite or proper, the providing of all necessary machinery, tools, apparatus and other means of construction, the doing of all the abovementioned work in the manner set forth, described and shown in the specifications and on the drawings for the work, and in the form of contract, and the completion thereof within **614 CALENDAR DAYS** upon receipt of a Notice to Proceed, except that if the completion date falls between December 1 and March 15 then the same number of days beyond December 1st will be extended after March 15<sup>th</sup>.

The Work of this project is described by the following Items and quantities.

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| Project # 613129                                                                                             |          | Contract # 126584                                                                            |             |             |
|--------------------------------------------------------------------------------------------------------------|----------|----------------------------------------------------------------------------------------------|-------------|-------------|
| Location : NANTUCKET                                                                                         |          |                                                                                              |             |             |
| Description : Intersection Improvements at Milestone Road and Polpis Road and Extension of 'Sconset Bikepath |          |                                                                                              |             |             |
| ITEM #                                                                                                       | QUANTITY | ITEM WITH UNIT BID PRICE<br>WRITTEN IN WORDS                                                 | UNIT PRICE  | AMOUNT      |
| 100.                                                                                                         | 1        | SCHEDULE OF OPERATIONS - FIXED PRICE \$13000<br><br>AT Thirteen Thousand Dollars<br>LUMP SUM | \$13,000.00 | \$13,000.00 |
| 101.                                                                                                         | 1        | CLEARING AND GRUBBING<br><br>AT _____<br>PER ACRE                                            |             |             |
| 102.2                                                                                                        | 1        | TREE TRIMMING<br><br>AT _____<br>LUMP SUM                                                    |             |             |
| 102.3                                                                                                        | 12       | HERBICIDE TREATMENT OF INVASIVE PLANTS<br><br>AT _____<br>PER HOUR                           |             |             |
| 102.33                                                                                                       | 8        | INVASIVE PLANT MANAGEMENT STRATEGY<br><br>AT _____<br>PER HOUR                               |             |             |
| 102.511                                                                                                      | 11       | TREE PROTECTION - ARMORING AND PRUNING<br><br>AT _____<br>EACH                               |             |             |
| 102.521                                                                                                      | 140      | TREE AND PLANT PROTECTION FENCE<br><br>AT _____<br>PER FOOT                                  |             |             |
| 120.                                                                                                         | 1,750    | EARTH EXCAVATION<br><br>AT _____<br>PER CUBIC YARD                                           |             |             |
| 121.                                                                                                         | 5        | CLASS A ROCK EXCAVATION<br><br>AT _____<br>PER CUBIC YARD                                    |             |             |

| Project # 613129                                                                                             |          | Contract # 126584                                                              |            |        |
|--------------------------------------------------------------------------------------------------------------|----------|--------------------------------------------------------------------------------|------------|--------|
| Location : NANTUCKET                                                                                         |          |                                                                                |            |        |
| Description : Intersection Improvements at Milestone Road and Polpis Road and Extension of 'Sconset Bikepath |          |                                                                                |            |        |
| ITEM #                                                                                                       | QUANTITY | ITEM WITH UNIT BID PRICE<br>WRITTEN IN WORDS                                   | UNIT PRICE | AMOUNT |
| 141.1                                                                                                        | 30       | TEST PIT FOR EXPLORATION<br><br>AT _____<br>PER CUBIC YARD                     |            |        |
| 142.                                                                                                         | 25       | CLASS B TRENCH EXCAVATION<br><br>AT _____<br>PER CUBIC YARD                    |            |        |
| 146.                                                                                                         | 5        | DRAINAGE STRUCTURE REMOVED<br><br>AT _____<br>EACH                             |            |        |
| 150.                                                                                                         | 25       | ORDINARY BORROW<br><br>AT _____<br>PER CUBIC YARD                              |            |        |
| 151.                                                                                                         | 1,325    | GRAVEL BORROW<br><br>AT _____<br>PER CUBIC YARD                                |            |        |
| 156.                                                                                                         | 50       | CRUSHED STONE<br><br>AT _____<br>PER TON                                       |            |        |
| 170.                                                                                                         | 3,800    | FINE GRADING AND COMPACTING - SUBGRADE AREA<br><br>AT _____<br>PER SQUARE YARD |            |        |
| 180.01                                                                                                       | 1        | ENVIRONMENTAL HEALTH AND SAFETY PROGRAM<br><br>AT _____<br>LUMP SUM            |            |        |
| 180.02                                                                                                       | 40       | PERSONAL PROTECTION LEVEL C UPGRADE<br><br>AT _____<br>PER HOUR                |            |        |

| Project # 613129                                                                                             |          | Contract # 126584                                                             |            |        |
|--------------------------------------------------------------------------------------------------------------|----------|-------------------------------------------------------------------------------|------------|--------|
| Location : NANTUCKET                                                                                         |          |                                                                               |            |        |
| Description : Intersection Improvements at Milestone Road and Polpis Road and Extension of 'Sconset Bikepath |          |                                                                               |            |        |
| ITEM #                                                                                                       | QUANTITY | ITEM WITH UNIT BID PRICE<br>WRITTEN IN WORDS                                  | UNIT PRICE | AMOUNT |
| 180.03                                                                                                       | 40       | LICENSED SITE PROFESSIONAL SERVICES<br><br>AT _____<br>PER HOUR               |            |        |
| 181.11                                                                                                       | 1,560    | DISPOSAL OF UNREGULATED SOIL<br><br>AT _____<br>PER TON                       |            |        |
| 181.12                                                                                                       | 190      | DISPOSAL OF REGULATED SOIL - IN-STATE FACILITY<br><br>AT _____<br>PER TON     |            |        |
| 181.13                                                                                                       | 95       | DISPOSAL OF REGULATED SOIL - OUT-OF-STATE FACILITY<br><br>AT _____<br>PER TON |            |        |
| 181.14                                                                                                       | 20       | DISPOSAL OF HAZARDOUS WASTE<br><br>AT _____<br>PER TON                        |            |        |
| 184.1                                                                                                        | 1        | DISPOSAL OF TREATED WOOD PRODUCTS<br><br>AT _____<br>PER TON                  |            |        |
| 201.                                                                                                         | 15       | CATCH BASIN<br><br>AT _____<br>EACH                                           |            |        |
| 202.                                                                                                         | 9        | MANHOLE<br><br>AT _____<br>EACH                                               |            |        |
| 220.                                                                                                         | 18       | DRAINAGE STRUCTURE ADJUSTED<br><br>AT _____<br>EACH                           |            |        |

| Project # 613129                                                                                             |          | Contract # 126584                                                        |            |        |
|--------------------------------------------------------------------------------------------------------------|----------|--------------------------------------------------------------------------|------------|--------|
| Location : NANTUCKET                                                                                         |          |                                                                          |            |        |
| Description : Intersection Improvements at Milestone Road and Polpis Road and Extension of 'Sconset Bikepath |          |                                                                          |            |        |
| ITEM #                                                                                                       | QUANTITY | ITEM WITH UNIT BID PRICE<br>WRITTEN IN WORDS                             | UNIT PRICE | AMOUNT |
| 221.                                                                                                         | 9        | FRAME AND COVER<br><br>AT _____<br>EACH                                  |            |        |
| 222.1                                                                                                        | 12       | FRAME AND GRATE - MASSDOT CASCADE TYPE<br><br>AT _____<br>EACH           |            |        |
| 223.2                                                                                                        | 5        | FRAME AND GRATE (OR COVER) REMOVED AND DISCARDED<br><br>AT _____<br>EACH |            |        |
| 227.4                                                                                                        | 10       | MASONRY PLUG<br><br>AT _____<br>PER SQUARE FOOT                          |            |        |
| 238.10                                                                                                       | 10       | 10 INCH DUCTILE IRON PIPE<br><br>AT _____<br>PER FOOT                    |            |        |
| 242.18                                                                                                       | 1        | 18 INCH REINFORCED CONCRETE PIPE FLARED END<br><br>AT _____<br>EACH      |            |        |
| 244.12                                                                                                       | 760      | 12 INCH REINFORCED CONCRETE PIPE CLASS V<br><br>AT _____<br>PER FOOT     |            |        |
| 244.15                                                                                                       | 115      | 15 INCH REINFORCED CONCRETE PIPE CLASS V<br><br>AT _____<br>PER FOOT     |            |        |
| 244.18                                                                                                       | 100      | 18 INCH REINFORCED CONCRETE PIPE CLASS V<br><br>AT _____<br>PER FOOT     |            |        |

| Project # 613129                                                                                             |          | Contract # 126584                                                              |            |        |
|--------------------------------------------------------------------------------------------------------------|----------|--------------------------------------------------------------------------------|------------|--------|
| Location : NANTUCKET                                                                                         |          |                                                                                |            |        |
| Description : Intersection Improvements at Milestone Road and Polpis Road and Extension of 'Sconset Bikepath |          |                                                                                |            |        |
| ITEM #                                                                                                       | QUANTITY | ITEM WITH UNIT BID PRICE<br>WRITTEN IN WORDS                                   | UNIT PRICE | AMOUNT |
| 258.                                                                                                         | 5        | STONE FOR PIPE ENDS<br><br>AT _____<br>PER SQUARE YARD                         |            |        |
| 272.12                                                                                                       | 90       | 12 INCH AND UNDER PIPE REMOVED AND DISCARDED<br><br>AT _____<br>PER FOOT       |            |        |
| 303.06                                                                                                       | 40       | 6 INCH DUCTILE IRON WATER PIPE (MECHANICAL JOINT)<br><br>AT _____<br>PER FOOT  |            |        |
| 303.10                                                                                                       | 25       | 10 INCH DUCTILE IRON WATER PIPE (MECHANICAL JOINT)<br><br>AT _____<br>PER FOOT |            |        |
| 303.12                                                                                                       | 20       | 12 INCH DUCTILE IRON WATER PIPE (MECHANICAL JOINT)<br><br>AT _____<br>PER FOOT |            |        |
| 309.                                                                                                         | 1,100    | DUCTILE IRON FITTINGS FOR WATER PIPE<br><br>AT _____<br>PER POUND              |            |        |
| 350.06                                                                                                       | 1        | 6 INCH GATE AND GATE BOX<br><br>AT _____<br>EACH                               |            |        |
| 358.                                                                                                         | 2        | GATE BOX ADJUSTED<br><br>AT _____<br>EACH                                      |            |        |
| 371.06                                                                                                       | 2        | 6 INCH COUPLING<br><br>AT _____<br>EACH                                        |            |        |

| Project # 613129                                                                                             |          | Contract # 126584                                                                     |            |        |
|--------------------------------------------------------------------------------------------------------------|----------|---------------------------------------------------------------------------------------|------------|--------|
| Location : NANTUCKET                                                                                         |          |                                                                                       |            |        |
| Description : Intersection Improvements at Milestone Road and Polpis Road and Extension of 'Sconset Bikepath |          |                                                                                       |            |        |
| ITEM #                                                                                                       | QUANTITY | ITEM WITH UNIT BID PRICE<br>WRITTEN IN WORDS                                          | UNIT PRICE | AMOUNT |
| 376.1                                                                                                        | 1        | HYDRANT - EXCLUDING COST OF HYDRANT<br><br>AT _____<br>EACH                           |            |        |
| 376.2                                                                                                        | 2        | HYDRANT - REMOVED AND RESET<br><br>AT _____<br>EACH                                   |            |        |
| 376.3                                                                                                        | 1        | HYDRANT - REMOVED AND STACKED<br><br>AT _____<br>EACH                                 |            |        |
| 381.3                                                                                                        | 1        | SERVICE BOX ADJUSTED<br><br>AT _____<br>EACH                                          |            |        |
| 382.3                                                                                                        | 2        | METER BOX ADJUSTED<br><br>AT _____<br>EACH                                            |            |        |
| 415.1                                                                                                        | 2,550    | PAVEMENT STANDARD MILLING<br><br>AT _____<br>PER SQUARE YARD                          |            |        |
| 431.                                                                                                         | 150      | HIGH EARLY STRENGTH CEMENT CONCRETE BASE<br>COURSE<br><br>AT _____<br>PER SQUARE YARD |            |        |
| 440.                                                                                                         | 3,700    | CALCIUM CHLORIDE FOR ROADWAY DUST CONTROL<br><br>AT _____<br>PER POUND                |            |        |
| 443.                                                                                                         | 10       | WATER FOR ROADWAY DUST CONTROL<br><br>AT _____<br>PER 1000 GALLONS                    |            |        |



| Project # 613129                                                                                             |          | Contract # 126584                                                                 |            |        |
|--------------------------------------------------------------------------------------------------------------|----------|-----------------------------------------------------------------------------------|------------|--------|
| Location : NANTUCKET                                                                                         |          |                                                                                   |            |        |
| Description : Intersection Improvements at Milestone Road and Polpis Road and Extension of 'Sconset Bikepath |          |                                                                                   |            |        |
| ITEM #                                                                                                       | QUANTITY | ITEM WITH UNIT BID PRICE<br>WRITTEN IN WORDS                                      | UNIT PRICE | AMOUNT |
| 450.22                                                                                                       | 185      | SUPERPAVE SURFACE COURSE - 9.5 (SSC - 9.5)<br><br>AT _____<br>PER TON             |            |        |
| 450.221                                                                                                      | 325      | SUPERPAVE SURFACE COURSE - 9.5 POLYMER (SSC - 9.5 - P)<br><br>AT _____<br>PER TON |            |        |
| 450.23                                                                                                       | 300      | SUPERPAVE SURFACE COURSE - 12.5 (SSC - 12.5)<br><br>AT _____<br>PER TON           |            |        |
| 450.32                                                                                                       | 700      | SUPERPAVE INTERMEDIATE COURSE - 19.0 (SIC - 19.0)<br><br>AT _____<br>PER TON      |            |        |
| 451.                                                                                                         | 100      | HMA FOR PATCHING<br><br>AT _____<br>PER TON                                       |            |        |
| 452.                                                                                                         | 550      | ASPHALT EMULSION FOR TACK COAT<br><br>AT _____<br>PER GALLON                      |            |        |
| 453.                                                                                                         | 4,550    | HMA JOINT ADHESIVE<br><br>AT _____<br>PER FOOT                                    |            |        |
| 470.2                                                                                                        | 1,550    | HOX MIX ASPHALT BERM, TYPE A - MODIFIED<br><br>AT _____<br>PER FOOT               |            |        |
| 472.                                                                                                         | 80       | TEMPORARY ASPHALT PATCHING<br><br>AT _____<br>PER TON                             |            |        |

| Project # 613129                                                                                             |          | Contract # 126584                                                        |            |        |
|--------------------------------------------------------------------------------------------------------------|----------|--------------------------------------------------------------------------|------------|--------|
| Location : NANTUCKET                                                                                         |          |                                                                          |            |        |
| Description : Intersection Improvements at Milestone Road and Polpis Road and Extension of 'Sconset Bikepath |          |                                                                          |            |        |
| ITEM #                                                                                                       | QUANTITY | ITEM WITH UNIT BID PRICE<br>WRITTEN IN WORDS                             | UNIT PRICE | AMOUNT |
| 482.5                                                                                                        | 1,950    | SAWCUTTING ASPHALT PAVEMENT FOR BOX WIDENING<br><br>AT _____<br>PER FOOT |            |        |
| 485.                                                                                                         | 25       | GRANITE RUBBLE BLOCK PAVEMENT<br><br>AT _____<br>PER SQUARE YARD         |            |        |
| 504.                                                                                                         | 60       | GRANITE CURB TYPE VA4 - STRAIGHT<br><br>AT _____<br>PER FOOT             |            |        |
| 504.1                                                                                                        | 20       | GRANITE CURB TYPE VA4 - CURVED<br><br>AT _____<br>PER FOOT               |            |        |
| 670.                                                                                                         | 25       | FENCE REMOVED AND RESET<br><br>AT _____<br>PER FOOT                      |            |        |
| 697.1                                                                                                        | 14       | SILT SACK<br><br>AT _____<br>EACH                                        |            |        |
| 698.3                                                                                                        | 40       | GEOTEXTILE FABRIC FOR SEPARATION<br><br>AT _____<br>PER SQUARE YARD      |            |        |
| 701.2                                                                                                        | 70       | CEMENT CONCRETE PEDESTRIAN CURB RAMP<br><br>AT _____<br>PER SQUARE YARD  |            |        |
| 702.                                                                                                         | 90       | HOT MIX ASPHALT SIDEWALK OR DRIVEWAY<br><br>AT _____<br>PER TON          |            |        |

| Project # 613129                                                                                             |          | Contract # 126584                                                           |            |        |
|--------------------------------------------------------------------------------------------------------------|----------|-----------------------------------------------------------------------------|------------|--------|
| Location : NANTUCKET                                                                                         |          |                                                                             |            |        |
| Description : Intersection Improvements at Milestone Road and Polpis Road and Extension of 'Sconset Bikepath |          |                                                                             |            |        |
| ITEM #                                                                                                       | QUANTITY | ITEM WITH UNIT BID PRICE<br>WRITTEN IN WORDS                                | UNIT PRICE | AMOUNT |
| 711.                                                                                                         | 3        | BOUND REMOVED AND RESET<br><br>AT _____<br>EACH                             |            |        |
| 715.                                                                                                         | 2        | RURAL MAIL BOX REMOVED AND RESET<br><br>AT _____<br>EACH                    |            |        |
| 740.                                                                                                         | 20       | ENGINEER'S FIELD OFFICE AND EQUIPMENT (TYPE A)<br><br>AT _____<br>PER MONTH |            |        |
| 748.                                                                                                         | 1        | MOBILIZATION<br><br>AT _____<br>LUMP SUM                                    |            |        |
| 751.01                                                                                                       | 500      | SANDY LOAM<br><br>AT _____<br>PER CUBIC YARD                                |            |        |
| 751.8                                                                                                        | 175      | TILLING<br><br>AT _____<br>PER SQUARE YARD                                  |            |        |
| 756.                                                                                                         | 1        | NPDES STORMWATER POLLUTION PREVENTION PLAN<br><br>AT _____<br>LUMP SUM      |            |        |
| 765.                                                                                                         | 4,050    | SEEDING<br><br>AT _____<br>PER SQUARE YARD                                  |            |        |
| 765.554                                                                                                      | 5        | WETLAND SEED - SEASONALLY FLOODED MIX<br><br>AT _____<br>PER POUND          |            |        |

| Project # 613129                                                                                             |          | Contract # 126584                                                        |            |        |
|--------------------------------------------------------------------------------------------------------------|----------|--------------------------------------------------------------------------|------------|--------|
| Location : NANTUCKET                                                                                         |          |                                                                          |            |        |
| Description : Intersection Improvements at Milestone Road and Polpis Road and Extension of 'Sconset Bikepath |          |                                                                          |            |        |
| ITEM #                                                                                                       | QUANTITY | ITEM WITH UNIT BID PRICE<br>WRITTEN IN WORDS                             | UNIT PRICE | AMOUNT |
| 765.635                                                                                                      | 290      | NATIVE SEEDING AND ESTABLISHMENT<br><br>AT _____<br>PER SQUARE YARD      |            |        |
| 767.121                                                                                                      | 550      | SEDIMENT CONTROL BARRIER<br><br>AT _____<br>PER FOOT                     |            |        |
| 767.9                                                                                                        | 705      | JUTE MESH<br><br>AT _____<br>PER SQUARE YARD                             |            |        |
| 772.333                                                                                                      | 5        | CEDAR-RED 2-3 FEET<br><br>AT _____<br>EACH                               |            |        |
| 775.026                                                                                                      | 1        | ELM-PRINCETON 1.5-2 INCH CALIPER<br><br>AT _____<br>EACH                 |            |        |
| 776.520                                                                                                      | 3        | MAPLE-RED 1.5-2 INCH CALIPER<br><br>AT _____<br>EACH                     |            |        |
| 783.045                                                                                                      | 2        | SERVICEBERRY - SHADBLOW 5-6 FEET CLUMP<br><br>AT _____<br>EACH           |            |        |
| 801.502                                                                                                      | 1,000    | 5 INCH ELECTRICAL CONDUIT - TYPE NM (DOUBLE)<br><br>AT _____<br>PER FOOT |            |        |
| 802.402                                                                                                      | 500      | 4 INCH TELEPHONE CONDUIT - TYPE NM (DOUBLE)<br><br>AT _____<br>PER FOOT  |            |        |

| Project # 613129                                                                                             |          | Contract # 126584                                                                                   |            |        |
|--------------------------------------------------------------------------------------------------------------|----------|-----------------------------------------------------------------------------------------------------|------------|--------|
| Location : NANTUCKET                                                                                         |          |                                                                                                     |            |        |
| Description : Intersection Improvements at Milestone Road and Polpis Road and Extension of 'Sconset Bikepath |          |                                                                                                     |            |        |
| ITEM #                                                                                                       | QUANTITY | ITEM WITH UNIT BID PRICE<br>WRITTEN IN WORDS                                                        | UNIT PRICE | AMOUNT |
| 803.401                                                                                                      | 450      | 4 INCH CATV CONDUIT - TYPE NM ( SINGLE)<br><br>AT _____<br>PER FOOT                                 |            |        |
| 806.5                                                                                                        | 40       | 5 INCH ELECTRICAL CONDUIT TYPE RM - GALVANIZED<br>STEEL<br><br>AT _____<br>PER FOOT                 |            |        |
| 832.                                                                                                         | 40       | WARNING-REGULATORY AND ROUTE MARKER - ALUMINUM<br>PANEL (TYPE A)<br><br>AT _____<br>PER SQUARE FOOT |            |        |
| 840.1                                                                                                        | 9        | PRESSURE TREATED SIGN POST<br><br>AT _____<br>EACH                                                  |            |        |
| 850.41                                                                                                       | 350      | ROADWAY FLAGGER<br><br>AT _____<br>PER HOUR                                                         |            |        |
| 852.                                                                                                         | 375      | SAFETY SIGNING FOR TRAFFIC MANAGEMENT<br><br>AT _____<br>PER SQUARE FOOT                            |            |        |
| 852.11                                                                                                       | 500      | TEMPORARY PEDESTRIAN BARRICADE<br><br>AT _____<br>PER FOOT                                          |            |        |
| 852.12                                                                                                       | 4        | TEMPORARY PEDESTRIAN CURB RAMP<br><br>AT _____<br>EACH                                              |            |        |
| 853.1                                                                                                        | 4        | PORTABLE BREAKAWAY BARRICADE TYPE III<br><br>AT _____<br>EACH                                       |            |        |

| Project # 613129                                                                                             |          | Contract # 126584                                                                                     |            |        |
|--------------------------------------------------------------------------------------------------------------|----------|-------------------------------------------------------------------------------------------------------|------------|--------|
| Location : NANTUCKET                                                                                         |          |                                                                                                       |            |        |
| Description : Intersection Improvements at Milestone Road and Polpis Road and Extension of 'Sconset Bikepath |          |                                                                                                       |            |        |
| ITEM #                                                                                                       | QUANTITY | ITEM WITH UNIT BID PRICE<br>WRITTEN IN WORDS                                                          | UNIT PRICE | AMOUNT |
| 854.016                                                                                                      | 1,300    | TEMPORARY PAVING MARKINGS - 6 INCH (PAINTED)<br><br>AT _____<br>PER FOOT                              |            |        |
| 854.036                                                                                                      | 500      | TEMPORARY PAVING MARKINGS - 6 INCH (TAPE)<br><br>AT _____<br>PER FOOT                                 |            |        |
| 854.1                                                                                                        | 200      | PAVEMENT MARKING REMOVAL<br><br>AT _____<br>PER SQUARE FOOT                                           |            |        |
| 856.                                                                                                         | 525      | ARROW BOARD<br><br>AT _____<br>PER DAY                                                                |            |        |
| 856.12                                                                                                       | 90       | PORTABLE CHANGEABLE MESSAGE SIGN<br><br>AT _____<br>PER DAY                                           |            |        |
| 859.                                                                                                         | 6,550    | REFLECTORIZED DRUM<br><br>AT _____<br>PER DAY                                                         |            |        |
| 859.1                                                                                                        | 275      | REFLECTORIZED DRUMS WITH SEQUENTIAL FLASHING<br>WARNING LIGHTS<br><br>AT _____<br>PER DAY             |            |        |
| 864.04                                                                                                       | 150      | PAVEMENT ARROWS AND LEGENDS REFLECTORIZED<br>WHITE (THERMOPLASTIC)<br><br>AT _____<br>PER SQUARE FOOT |            |        |
| 864.31                                                                                                       | 4        | SLOTTED PAVEMENT MARKER ONE-WAY WHITE<br><br>AT _____<br>EACH                                         |            |        |

| Project # 613129                                                                                             |          | Contract # 126584                                                            |            |        |
|--------------------------------------------------------------------------------------------------------------|----------|------------------------------------------------------------------------------|------------|--------|
| Location : NANTUCKET                                                                                         |          |                                                                              |            |        |
| Description : Intersection Improvements at Milestone Road and Polpis Road and Extension of 'Sconset Bikepath |          |                                                                              |            |        |
| ITEM #                                                                                                       | QUANTITY | ITEM WITH UNIT BID PRICE<br>WRITTEN IN WORDS                                 | UNIT PRICE | AMOUNT |
| 864.32                                                                                                       | 8        | SLOTTED PAVEMENT MARKER ONE-WAY YELLOW<br><br>AT _____<br>EACH               |            |        |
| 864.35                                                                                                       | 24       | SLOTTED PAVEMENT MARKER TWO-WAY<br>YELLOW/YELLOW<br><br>AT _____<br>EACH     |            |        |
| 866.106                                                                                                      | 2,050    | 6 INCH REFLECTORIZED WHITE LINE (THERMOPLASTIC)<br><br>AT _____<br>PER FOOT  |            |        |
| 866.112                                                                                                      | 450      | 12 INCH REFLECTORIZED WHITE LINE (THERMOPLASTIC)<br><br>AT _____<br>PER FOOT |            |        |
| 867.106                                                                                                      | 2,600    | 6 INCH REFLECTORIZED YELLOW LINE (THERMOPLASTIC)<br><br>AT _____<br>PER FOOT |            |        |
| 874.2                                                                                                        | 5        | TRAFFIC SIGN REMOVED AND RESET<br><br>AT _____<br>EACH                       |            |        |
| 874.4                                                                                                        | 5        | TRAFFIC SIGN REMOVED AND STACKED<br><br>AT _____<br>EACH                     |            |        |
| 874.41                                                                                                       | 1        | TRAFFIC SIGN REMOVED AND DISCARDED<br><br>AT _____<br>EACH                   |            |        |
| 903.                                                                                                         | 20       | 3000 PSI, 1.5 INCH, 470 CEMENT CONCRETE<br><br>AT _____<br>PER CUBIC YARD    |            |        |

| <b>Project # 613129</b>                                                                                             |                 | <b>Contract # 126584</b>                                   |                   |               |
|---------------------------------------------------------------------------------------------------------------------|-----------------|------------------------------------------------------------|-------------------|---------------|
| <b>Location : NANTUCKET</b>                                                                                         |                 |                                                            |                   |               |
| <b>Description : Intersection Improvements at Milestone Road and Polpis Road and Extension of 'Sconset Bikepath</b> |                 |                                                            |                   |               |
| <b>ITEM #</b>                                                                                                       | <b>QUANTITY</b> | <b>ITEM WITH UNIT BID PRICE<br/>WRITTEN IN WORDS</b>       | <b>UNIT PRICE</b> | <b>AMOUNT</b> |
| 986.                                                                                                                | 18              | MODIFIED ROCKFILL<br><br>AT _____<br>PER TON               |                   |               |
| 998.01                                                                                                              | 650             | SEDIMENT FOREBAY PAVERS<br><br>AT _____<br>PER SQUARE FOOT |                   |               |
| <b>Total Qty:</b>                                                                                                   |                 | 53,546                                                     |                   |               |



DOCUMENT B00853

SCHEDULE OF PARTICIPATION BY DISADVANTAGED BUSINESS ENTERPRISES (DBES)

PRIME BIDDER: \_\_\_\_\_

DATE OF BID OPENING: \_\_\_\_\_ PROJECT NO.: 613129

FEDERAL AID PROJECT NO. HSI(VUS)-003S(749)X

PROJECT LOCATION: NANTUCKET

| Name, Address, and Phone Number(s) of DBE | Name of Activity             | (a)†<br>DBE Contractor Activity Amount<br><i>Construction Work</i> | (b)<br>DBE Other Business Amount<br><i>Services, Supplies, Material</i> | (c)<br>Total amount eligible for credit under rules in Section 6 of Document 00719 - DBE Special Provisions |
|-------------------------------------------|------------------------------|--------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
|                                           |                              |                                                                    |                                                                         |                                                                                                             |
|                                           |                              |                                                                    |                                                                         |                                                                                                             |
|                                           |                              |                                                                    |                                                                         |                                                                                                             |
|                                           |                              |                                                                    |                                                                         |                                                                                                             |
| Total Bid Amount                          | TOTALS:                      | \$                                                                 | \$                                                                      | \$                                                                                                          |
| \$                                        | DBE Percentage of Total Bid: | %                                                                  | %                                                                       | %                                                                                                           |

†Column (a) must be at least one-half of the DBE participation goal. Attach additional sheets as necessary.

Is MassDOT Document B00855 (Joint Check Approval) being submitted for any of the above?  Yes  No  
 Not Known at This Time

Will any of the contractors listed above be using a third party (i.e. manufacturer) to deliver materials or perform any portion of work by a third party?  Yes  No

**CERTIFICATION:** I HEREBY DECLARE, TO THE BEST OF MY KNOWLEDGE, THAT I HAVE READ THE SPECIAL PROVISIONS FOR PARTICIPATION BY DISADVANTAGED BUSINESS ENTERPRISES - DOCUMENT 00719. BOTH THIS SCHEDULE AND THE RELEVANT AND ACCOMPANYING LETTER(S) OF INTENT ARE IN FULL COMPLIANCE WITH THE PROVISIONS OF, AND IN ACCORDANCE WITH, TITLE 49 CODE OF FEDERAL REGULATIONS, PART 26 (49 CFR Part 26).

SIGNATURE: \_\_\_\_\_ DATE \_\_\_\_\_

NAME AND TITLE (PRINT): \_\_\_\_\_

EMAIL ADDRESS: \_\_\_\_\_ TEL NO.: \_\_\_\_\_

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

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DOCUMENT B00854

DISADVANTAGED BUSINESS ENTERPRISES (DBE) PARTICIPATION  
LETTER OF INTENT

(To be completed by the DBE – Page 1 of 2)

TO: \_\_\_\_\_ (Prime Bidder)

FROM: \_\_\_\_\_ (DBE Firm)

RE: PROJECT NO.: 613129 FEDERAL AID PROJECT NO.: HSI(VUS)-003S(749)X

PROJECT LOCATION: NANTUCKET

DATE OF BID OPENING: \_\_\_\_\_

I, \_\_\_\_\_, authorized signatory of the above-referenced DBE firm hereby declare:  
*Print Name*

1. My company is currently certified as a Disadvantaged Business Enterprise (DBE) by the Massachusetts Supplier Diversity Office (“SDO”), formerly known as the State Office of Minority and Women Business Assistance (SOMWBA), as a: (check all applicable, see Section 1 of the Special Provisions For Participation By Disadvantaged Business Enterprises, MassDOT Document 00719 additional guidance is available at Title 49, Code of Federal Regulations, Part 26.55 (49 CFR Part 26.55)):

- CONTRACTOR       REGULAR DEALER       BROKER
- MANUFACTURER       TRUCKING OPERATIONS       PROFESSIONAL SERVICES

2. My firm has the ability to manage, supervise and perform the activity described on page 2 of this Letter of Intent. If you are awarded the contract, my company intends to enter into a contract with your firm to perform the items of work or other activity described on the following sheet for the prices indicated.

3. There have been no changes affecting the ownership, control or independence of my company since my last certification review on \_\_\_\_\_, 20\_\_\_. If any such change is planned or occurs prior to my company's completion of this proposed work, I will give prior written notification to your firm and to the Massachusetts Department of Transportation (“MassDOT”) Office of Civil Rights and SDO.

4. I have read the MassDOT proposal for the Project which may be entitled “Project Contract Documents and Special Provisions” or the draft “Contract” which includes MassDOT Document 00719, and acknowledge that my company will comply with that document and the requirements of 49 CFR Part 26.

5. For the purpose of obtaining subcontractor approval from MassDOT, my firm will provide to you:

**A. The following construction work:**

- (i) a resume, stating the qualifications and experience, of the superintendent or foreperson who will supervise on site-work;
- (ii) a list of equipment owned or leased by my firm for use on this project; and
- (iii) a list of all projects (public or private) upon which my firm is currently performing, is committed to perform, or intends to make a commitment to perform. I shall also include, for each project: the name and telephone number of a contact person for the contracting authority, person, or organization; the dollar value of the work; a description of the work; and my firm's work schedule for the project.

**B. The following services, materials or supplies:**

- (i) a written agreement and invoices for the materials or supplies, and any other documents evidencing the terms of providing such items;
- (ii) information concerning brokers fees and commissions for providing services or materials; and
- (iii) a statement concerning whether my firm intends or will be required to use a joint check arrangement; and any other documents that may be required by MassDOT.

\_\_\_\_\_  
*DBE Company Authorized Signature*

\_\_\_\_\_  
Date

DISADVANTAGED BUSINESS ENTERPRISES (DBE) PARTICIPATION  
LETTER OF INTENT  
(To be completed by the DBE – Page 2 of 2)

DATE OF BID OPENING: \_\_\_\_\_

PROJECT NUMBER: 613129

FEDERAL AID PROJECT NUMBER: HSI(VUS)-003S(749)X

PROJECT LOCATION: NANTUCKET

PRIME BIDDER: \_\_\_\_\_

DBE COMPANY NAME: \_\_\_\_\_

| Item number<br>if applicable | NAICS<br>Code | Description of Activity<br>with notations such as Services, or Brokerage, Installation Only,<br>Material Only, or Complete | Quantity | Unit Price | Amount |
|------------------------------|---------------|----------------------------------------------------------------------------------------------------------------------------|----------|------------|--------|
|                              |               |                                                                                                                            |          |            |        |
|                              |               |                                                                                                                            |          |            |        |
|                              |               |                                                                                                                            |          |            |        |
|                              |               |                                                                                                                            |          |            |        |
|                              |               |                                                                                                                            |          |            |        |
| TOTAL AMOUNT:                |               |                                                                                                                            |          |            |        |

*Please give full explanations, attach additional sheets if necessary.*

I HEREBY VERIFY THAT \_\_\_\_\_ WILL SOLELY  
(DBE company name)  
PERFORM THE WORK, OR PROVIDE THE SERVICES OR MATERIALS, AS DESCRIBED ABOVE.

DBE AUTHORIZED SIGNATURE: \_\_\_\_\_

NAME AND TITLE (PRINT): \_\_\_\_\_

TELEPHONE NUMBER: \_\_\_\_\_ FAX NUMBER: \_\_\_\_\_

EMAIL ADDRESS: \_\_\_\_\_

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

Rev'd 9/20/19

DOCUMENT B00855

DBE JOINT CHECK ARRANGEMENT APPROVAL FORM

(to be submitted by Prime Contractor)

Contract No: 126584 Project No. 613129 Federal Aid No.: HSI(VUS)-003S(749)X

Location: NANTUCKET Bid Opening Date: \_\_\_\_\_

Project Description: Intersection Improvements at Milestone Road and Polpis Road and Extension of 'Sconset Bike Path

We have received the attached request for the use of a joint check arrangement from \_\_\_\_\_, a DBE on the above- referenced Contract and \_\_\_\_\_, a Material Supplier/Vendor for the subject Contract. The DBE has complied with the requirements of 49 CFR Part 26.55(c)(1). In particular, the DBE has:

- a written agreement with the material supplier/vendor;
- applied for credit with the subject material supplier and has supplied the vendor's response;
- shown that it will place all orders to the subject material supplier/vendor;
- made and retains all decision-making responsibilities concerning the materials; and
- provided a Joint Check Agreement that is acceptable to MassDOT;

As the Contractor for the Project, we agree to issue joint checks (made payable to the Material Supplier/Vendor and the DBE) for payment of sums due pursuant to invoices from the Supplier/Vendor and DBE.

**Contractor:**

|              |                              |
|--------------|------------------------------|
| Company Name | Signature<br>Duly Authorized |
|              | Printed Name                 |
| Date         | Title                        |

**SubContractor:**

|              |                                |
|--------------|--------------------------------|
| Company Name | Signature –<br>Duly Authorized |
|              | Printed Name                   |
| Date         | Title                          |

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

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DOCUMENT B00856

JOINT VENTURE AFFIDAVIT  
(All Firms)

- All Information Requested By This Schedule Must Be Answered. Additional Sheets May Be Attached.
- If, there is any change in the information submitted, the Joint Venture parties must inform MassDOT Pre-Qualifications Office (and, if one of the companies is a DBE, the Director of Contract Compliance, Office of Civil Rights) *prior* to such change, in writing, either directly or through the Prime Contractor if the Joint Venture is a subcontractor.
- If the Joint Venture Entity will be the bidder on a prime Contract, it must bid and submit all required documents (insurance, worker’s compensation, bonds, etc.) in the name of the Joint Venture Entity.

**I. Name of Joint Venture:** \_\_\_\_\_

Type of Entity if applicable (Corp., LLC): \_\_\_\_\_ Filing State \_\_\_\_\_

Address of joint venture: \_\_\_\_\_

Phone No(s) for JV Entity: \_\_\_\_\_ E-mail: \_\_\_\_\_

Contact Person(s) \_\_\_\_\_

Tax ID/EIN of Joint Venture: \_\_\_\_\_ Vendor Code: \_\_\_\_\_

**II. Identify each firm or party to the Joint Venture:**

Name of Firm: \_\_\_\_\_

Address: \_\_\_\_\_

Phone : \_\_\_\_\_ E-mail: \_\_\_\_\_

Contact person(s) \_\_\_\_\_

Name of Firm: \_\_\_\_\_

Address: \_\_\_\_\_

Phone: \_\_\_\_\_ E-mail: \_\_\_\_\_

Contact Person(s) \_\_\_\_\_

**III. Describe the role(s) of the each party to the Joint Venture:**

\_\_\_\_\_  
\_\_\_\_\_

- IV. Attach a copy of the Joint Venture Agreement.** The proposed Joint Venture Agreement should include specific details including, but not limited to: (1) the contributions of capital and equipment; (2) work items to be performed by each company’s forces, (3) work items to be performed under the supervision of any DBE Venturer; (4) the commitment of management, supervisory and operative personnel employed by the DBE to be dedicated to the performance of the Project; and (5) warranty, guaranty, and indemnification clauses.

**V. Attach any applicable Corporate or LLC Votes, Authorizations, etc.**

**VI. Ownership of the Joint Venture:**

A. What is the percentage(s) of each company's ownership in the Joint Venture?

ownership percentage(s): \_\_\_\_\_

ownership percentage(s): \_\_\_\_\_

B. Specify percentages for each of the following (provide narrative descriptions and other detail as applicable):

1. Sharing of profit and loss: \_\_\_\_\_

2. Capital contributions:

(a) Dollar amounts of initial contribution: \_\_\_\_\_

(b) Dollar amounts of anticipated on-going contributions: \_\_\_\_\_

(c) Contributions of equipment (specify types, quality and quantities of equipment to be provided by each firm): \_\_\_\_\_

4. Other applicable ownership interests, including ownership options or other agreements, which restrict or limit ownership and/or control:

\_\_\_\_\_  
\_\_\_\_\_

5. Provide copies of all other written agreements between firms concerning bidding and operation of this Project or projects or contracts.

6. Identify all current contracts and contracts completed during the past two (2) years by either of the Joint Venture partners to this Joint Venture:

\_\_\_\_\_  
\_\_\_\_\_

**VII. Control of and Participation in the Joint Venture.** Identify by name and firm those individuals who are, or will be, responsible for and have the authority to engage in the following management functions and policy decisions. (Indicate any limitations to their authority such as dollar limits and co-signatory requirements.):

A. Joint Venture check signing:

\_\_\_\_\_  
\_\_\_\_\_

B. Authority to enter Contracts on behalf of the Joint Venture:

\_\_\_\_\_  
\_\_\_\_\_

C. Signing, co-signing and/or collateralizing loans:

\_\_\_\_\_  
\_\_\_\_\_



D. Acquisition of lines of credit:

\_\_\_\_\_

\_\_\_\_\_

E. Acquisition and indemnification of payment and performance bonds:

\_\_\_\_\_

\_\_\_\_\_

F. Negotiating and signing labor agreements:

\_\_\_\_\_

\_\_\_\_\_

G. Management of contract performance. (*Identify by name and firm only*):

1. Supervision of field operations: \_\_\_\_\_
2. Major purchases: \_\_\_\_\_
3. Estimating: \_\_\_\_\_
4. Engineering: \_\_\_\_\_

**VIII. Financial Controls of Joint Venture:**

A. Which firm and/or individual will be responsible for keeping the books of account?

\_\_\_\_\_

\_\_\_\_\_

B. Identify the "Managing Partner," if any, and describe the means and measure of their compensation:

\_\_\_\_\_

\_\_\_\_\_

C. What authority does each firm have to commit or obligate the other to insurance and bonding companies, financing institutions, suppliers, subcontractors, and/or other parties participating in the performance of this Contract or the work of this Project?

\_\_\_\_\_

**IX. Personnel of Joint Venture:** State the approximate number of personnel (by trade) needed to perform the Joint Venture's work under this Contract. Indicate whether they will be employees of the majority firm, DBE firm, or the Joint Venture.

|                         | Firm 1<br>(number) | Firm 2<br>(number) | Joint Venture<br>(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 \*\*\*