

MOUNTAIN AVENUE CULVERT REPLACEMENT & DOWNSTREAM IMPROVEMENTS

SOUTH HADLEY · MASSACHUSETTS
PRELIMINARY DESIGN PLANS

MAY 01, 2023

PREPARED FOR
TOWN OF SOUTH HADLEY
116 MAIN STREET
ROOM U6
SOUTH HADLEY, MA 01075



PREPARED BY
FUSS & O'NEILL
1550 MAIN STREET, SUITE 400
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SHEET INDEX

| SHEET No. | SHEET TITLE |
|-----------|--|
| GI-001 | COVER SHEET |
| GI-002 | GENERAL NOTES |
| EX-101 | EXISTING CONDITIONS PLAN |
| CS-101 | SITE PLAN |
| CP-101 | SITE PREPARATION PLAN |
| CE-101 | EROSION & SEDIMENT CONTROL PLAN |
| CW-101 | WATER CONTROL PLAN |
| CR-101 | RESTORATION & PLANTINGS PLAN |
| CD-501 | CONSTRUCTION DETAILS |
| CD-502 | CONSTRUCTION DETAILS |
| STR-01 | STRUCTURES PLAN |
| STR-02 | STRUCTURES ELEVATION, SECTION, & PROFILE |
| STR-03 | BORING LOGS I |
| STR-04 | BORING LOGS II |
| STR-05 | WINGWALL ELEVATIONS |
| STR-06 | FOOTING PLAN |
| STR-07 | STRUCTURAL DETAILS |

PROJECT TEAM

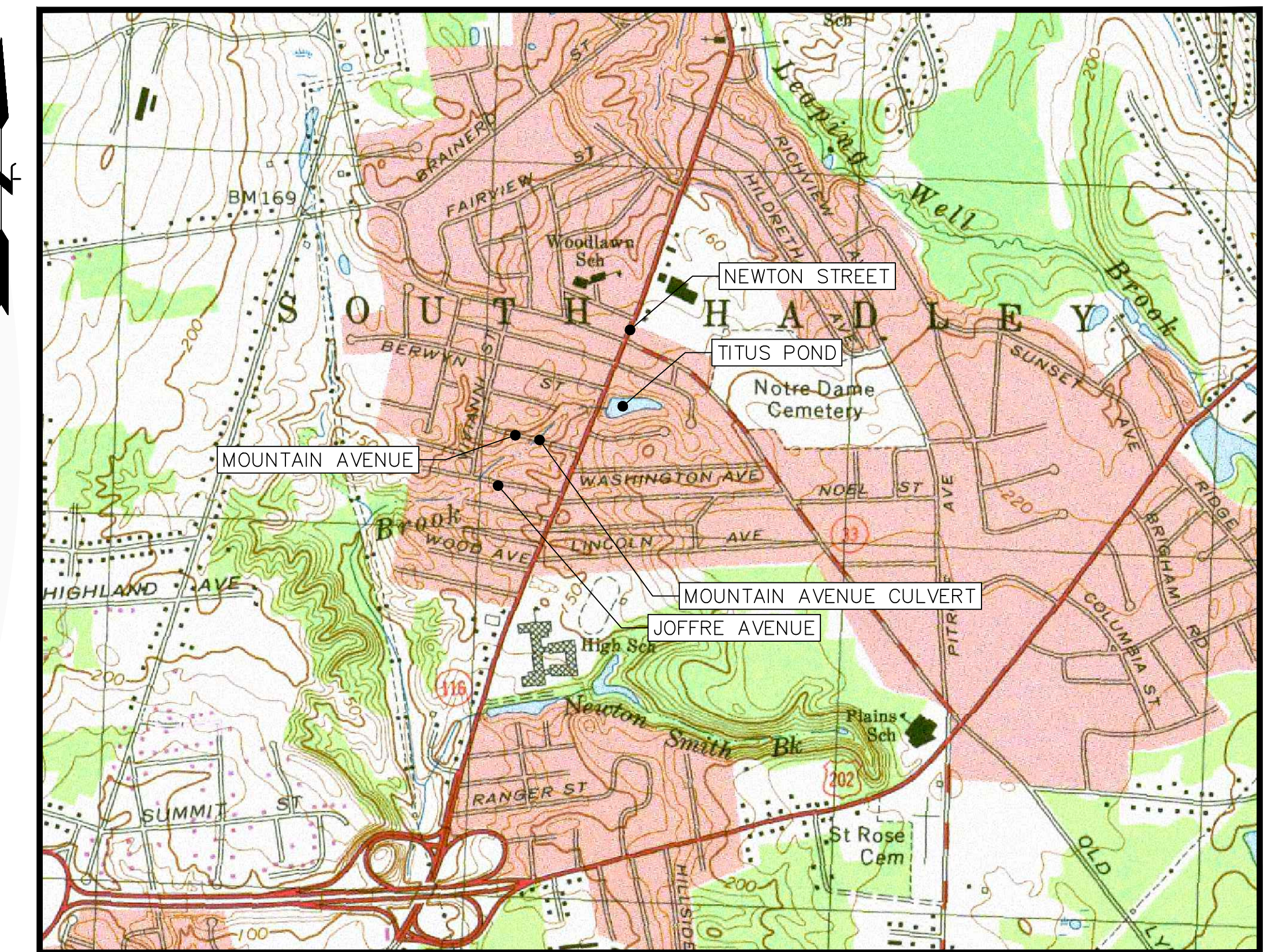
MUNICIPAL VULNERABILITY
PREPAREDNESS PROGRAM
(MVP)
MASSACHUSETTS EXECUTIVE OFFICE
OF ENERGY AND ENVIRONMENTAL
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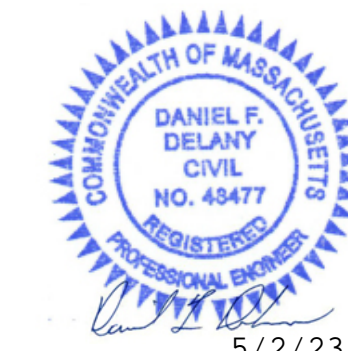
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LOCATION MAP
SCALE: 1" = 1000'



5/2/23

PROJ. No.: 20170390.V50
DATE: 05/01/2023

GI-001

File: J:\DWG\2017\0390\050\Civil\Plan\Mountain Avenue Culvert Replacement\20170390\50_GEN01_MountainAve.dwg Layout: GI-002 Plotted: 2023-05-01 3:00 PM Saved: 2023-05-01 2:16 PM User: jlriles
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GENERAL NOTES

1. REFERENCES:
 - A. COMMONWEALTH OF MASSACHUSETTS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGES, 2022 EDITION, REVISIONS AND ALL CURRENT ADDENDA, ARE MADE A PART HEREOF, AS IF ATTACHED HERETO. ALL REFERENCES TO "STATE STANDARD SPECIFICATIONS" SHALL REFER TO THE LATEST EDITION OF THE COMMONWEALTH OF MASSACHUSETTS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES CONSTRUCTION.
 - B. THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION CONSTRUCTION STANDARD DETAILS, 2017 EDITION, AND ALL CURRENT REVISIONS, ARE MADE A PART HEREOF, AS IF ATTACHED HERETO.
 - C. THE MASSACHUSETTS EROSION AND SEDIMENT CONTROL GUIDELINES FOR URBAN AND SUBURBAN AREAS, 2013 EDITION, REVISIONS AND ALL CURRENT ADDENDA, ARE MADE A PART HEREOF, AS IF ATTACHED HERETO. ALL REFERENCES TO "SOIL EROSION AND SEDIMENT CONTROL HANDBOOK" SHALL REFER TO THE LATEST EDITION OF THE MASSACHUSETTS EROSION AND SEDIMENT CONTROL GUIDELINES FOR URBAN AND SUBURBAN AREAS.
2. EXISTING CONDITIONS:
 - A. EXISTING CONDITIONS DEPICTED ON THIS PLAN ARE BASED ON A PLAN ENTITLED: PLAN OF LAND IN SOUTH HADLEY, MASSACHUSETTS, PREPARED FOR FUSS & O'NEILL, EXISTING CONDITIONS QUEENSVILLE DAM/BUTTERY BROOK, REVISED THROUGH: OCTOBER 14, 2022 PREPARED BY SHERMAN & FRYDRYK, 3 CONVERSE STREET, SUITE 203, PALMER, MASSACHUSETTS, JOB #21178, DWG #21178-EC.
 - B. WETLANDS WERE DELINEATED BY FUSS & O'NEILL WETLAND SCIENTIST MICHAEL SOARES ON OCTOBER 18 AND 21, 2021.
 - C. UTILITIES ARE SHOWN HEREON FROM FIELD LOCATIONS OF SURFACE VISIBLE STRUCTURES AND AVAILABLE RECORD INFORMATION. OTHER UNDERGROUND UTILITIES MAY EXIST. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE LOCATION, SIZE & ELEVATION OF ALL UTILITIES WITHIN THE AREA OF PROPOSED WORK AND TO CONTACT "DIG-SAFE" AT 811 AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION, DEMOLITION OR CONSTRUCTION.
 - D. PROPERTY AND EASEMENT LINES SHOWN ARE BASED ON MASSGIS DATA AND ARE NOT THE RESULT OF A PROPERTY LINE SURVEY.
 - E. ABUTTER INFORMATION SHOWN IS BASED ON SOUTH HADLEY'S ASSESSOR'S RECORDS AS SHOWN ON THE TOWNS WEB SITE.
3. MATERIAL:
 - F. LANDSCAPE AREAS: ALL SURFACED AREAS OR DISTURBED AREAS NOT SPECIFIED ON THE PLANS SHALL RECEIVE 4 INCHES OF TOPSOIL, SEED, MULCH, AND BE WATERED UNTIL A HEALTHY STAND OF GRASS IS OBTAINED.

GENERAL CONSTRUCTION REQUIREMENTS

1. THE CONTRACTOR SHALL VERIFY THE PROPOSED LAYOUT WITH ITS RELATIONSHIP TO THE EXISTING SITE SURVEY. THE CONTRACTOR SHALL ALSO VERIFY ALL DIMENSIONS, SITE CONDITIONS, AND MATERIAL SPECIFICATIONS AND SHALL NOTIFY THE OWNER AND ENGINEER IN WRITING OF ANY ERRORS, OMISSIONS OR DISCREPANCIES BEFORE COMMENCING OR PROCEEDING WITH WORK.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS, INSPECTIONS, BONDS, ETC. AND OTHER APPROVAL RELATED ITEMS WITH THE LOCAL AND STATE MUNICIPALITIES. APPLICATION FEES SHALL BE PAID BY OWNER. NO CONSTRUCTION SHALL COMMENCE UNTIL SUCH PERMITS HAVE BEEN SECURED AND THE CONTRACTOR HAS SUPPLIED THE REQUIRED NOTICES.
3. METHODS AND MATERIALS USED IN THE CONSTRUCTION OF IMPROVEMENTS FOR THIS PROJECT SHALL CONFORM TO THE CURRENT CONSTRUCTION STANDARDS AND SPECIFICATIONS OF THE LOCAL MUNICIPALITY AND THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION.
4. DEVIATIONS OR CHANGES FROM THESE PLANS WILL NOT BE ALLOWED UNLESS APPROVED BY THE ENGINEER/OWNER.
5. THE CONTRACTOR SHALL CONTACT 'DIG SAFE' AT 1-888-344-7233, 72 HOURS PRIOR, EXCLUDING WEEKENDS AND HOLIDAYS, TO ANY EXCAVATION PERFORMED ON SITE.
6. THE EXISTENCE AND/OR LOCATION OF UTILITIES SHOWN ON THESE PLANS MAY BE ONLY APPROXIMATELY CORRECT. THE CONTRACTOR SHALL MAKE EXPLORATORY EXCAVATIONS AND LOCATE ANY EXISTING UTILITIES AND NOTIFY OWNER/ENGINEER OF ANY DISCREPANCIES FROM CONTRACT DOCUMENTS. THE OWNER SHALL BE NOTIFIED AS TO THE RELOCATIONS REQUIRED PRIOR TO THE START OF CONSTRUCTION. CONTRACTOR IS REQUIRED TO TAKE PRECAUTIONARY MEASURES TO PROTECT THE UTILITIES SHOWN HEREON AND ANY OTHER EXISTING UTILITIES NOT OF RECORD OR NOT SHOWN ON THESE PLANS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING, AT HIS/HER EXPENSE, ANY EXISTING UTILITIES DAMAGED DURING CONSTRUCTION.
7. AN APPROVED SET OF PLANS AND ALL APPLICABLE PERMITS MUST BE AVAILABLE AT THE CONSTRUCTION SITE AT ALL TIMES.
8. CONTRACTOR SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.
9. CONTRACTOR SHALL IDENTIFY TREES TO BE REMOVED PRIOR TO CONSTRUCTION AND MARK THEM WITH CONSTRUCTION TAPE FOR REVIEW BY THE OWNER/ENGINEER. TREES AND OTHER EXISTING VEGETATION SHALL BE RETAINED WHEREVER FEASIBLE. CONTRACTOR SHALL NOT REMOVE TREES UNTIL REVIEWED AND APPROVED BY THE OWNER/ENGINEER.
10. PROVIDE PROPER TRANSITIONS BETWEEN EXISTING AND PROPOSED SITE IMPROVEMENTS.
11. THE CONTRACTOR SHALL RESTORE HARDSCAPE IMPROVEMENTS WITH MATCHING MATERIALS (I.E. ANY PAVEMENT, WALKS, CURBS, ETC.) THAT MUST BE CUT OR THAT ARE DAMAGED DURING CONSTRUCTION.
12. THE CONTRACTOR SHALL RESTORE DISTURBED LANDSCAPE AREAS TO ORIGINAL CONDITION (I.E. SEEDED, SODDED, PLANTED) UNLESS OTHERWISE DIRECTED WITHIN CONTRACT DOCUMENTS.
13. ALL EXCESS EXCAVATED MATERIALS, EXCESS FILL, EXCESS CONSTRUCTION MATERIALS, DEBRIS, AND WASTE SHALL BE REMOVED FROM THE SITE AND SHALL BE DISPOSED OF IN ACCORDANCE WITH APPLICABLE LAWS.
14. DO NOT CLOSE OR OBSTRUCT ROADWAYS, SIDEWALKS, FIRE HYDRANTS, AND UTILITIES WITHOUT APPROPRIATE PERMITS.
15. WORK IS RESTRICTED TO THE HOURS OF 7 AM TO 5 PM ON MONDAY THROUGH FRIDAY, EXCLUDING HOLIDAYS, UNLESS OTHERWISE APPROVED BY THE OWNER.

SOIL EROSION AND SEDIMENT CONTROL INSTALLATION

1. THE CONTRACTOR SHALL FOLLOW THE SITE-SPECIFIC EROSION & SEDIMENT CONTROL PLAN, SITE PREPARATION PLAN, AS WELL AS THE EROSION & SEDIMENT CONTROL SPECIFICATION IN CONSTRUCTING THE EROSION AND SEDIMENT CONTROLS INDICATED ON THE PLANS. ALL EROSION AND SEDIMENT CONTROL MEASURES OR WORKS AND REHABILITATION MEASURES MUST CONFORM TO OR EXCEED THESE REQUIREMENTS.
2. THE TIMELY INSTALLATION, INSPECTION, AND MAINTENANCE/REPLACEMENT OF SEDIMENT AND EROSION CONTROL DEVICES TO ENSURE PROPER OPERATION AND PERMIT COMPLIANCE IS THE RESPONSIBILITY OF THE CONTRACTOR UNTIL CONSTRUCTION OF THE PROJECT IS COMPLETE AND ACCEPTED BY THE OWNER. THE OWNER IS RESPONSIBLE THEREAFTER. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL CONTINUE TO BE MAINTAINED IN EFFECTIVE CONDITION UNTIL SITE STABILIZATION.
3. PRIOR TO THE COMMENCEMENT OF CONSTRUCTION ACTIVITIES, THE CONTRACTOR SHALL INSTALL ALL EROSION AND SEDIMENT CONTROL DEVICES AS SHOWN ON THE PLAN, OR AS MAY BE REQUIRED TO PREVENT SEDIMENT FLOW TO STORM DRAINS OR SURFACE WATERS.

LEGEND (EXISTING)

- | | | |
|------------------------------------|--|--------------------------|
| WETLAND DELINEATION FLAG | | ○ SANITARY SEWER MANHOLE |
| BORDERING VEGETATED WETLANDS | | ⊙ STORM DRAIN MANHOLE |
| CONTOUR (MAJOR) | | □ CATCH BASIN |
| CONTOUR (MINOR) | | ⊖ TELECOMM MANHOLE |
| 50' CONSERVATION ZONE (LOCAL) | | ⊕ UTILITY POLE W/GUY |
| 100' BUFFER ZONE | | ⊙ UTILITY POLE |
| BANK/MEAN ANNUAL HIGH WATER (MAHW) | | ⊙ LIGHTPOST |
| PROPERTY LINE | | ⊙ G.G. GAS GATE |
| SANITARY SEWER | | ⊙ GAS TEST BOX |
| STORM DRAIN | | ⊙ WATER GATE |
| WATER MAIN | | ⊙ HYDRANT |
| UNDERGROUND ELECTRIC | | ⊙ SIGN |
| UNDERGROUND TELEPHONE | | ⊙ MAILBOX |
| GAS LINE | | ⊙ BUSH |
| OVERHEAD ELECTRIC | | ⊙ CONIFEROUS TREE |
| GUARDRAIL | | ⊙ DECIDUOUS TREE |
| EDGE OF PAVEMENT | | |
| BITUMINOUS CURB | | |

LEGEND (PROPOSED)

- | | |
|--|--|
| MINOR CONTOUR | |
| MAJOR CONTOUR | |
| LIMIT OF DISTURBANCE | |
| SILT FENCE | |
| PROPOSED PAVEMENT RECONSTRUCTION | |
| PROPOSED GUARDRAIL | |
| TEMPORARY COFFERDAM | |
| EROSION CONTROL BLANKET | |
| PROPOSED CONCRETE HEADWALL & WINGWALLS | |
| PROPOSED DEMOLITION | |
| CONSTRUCTION ENTRANCE | |
| STAGING & ACCESS AREA | |
| STONE CROSS VANE | |
| ROOTWAD | |
| IN-STREAM LARGE WOODY DEBRIS FEATURES | |
| TEMPORARY PUMP SETTLING BASIN | |



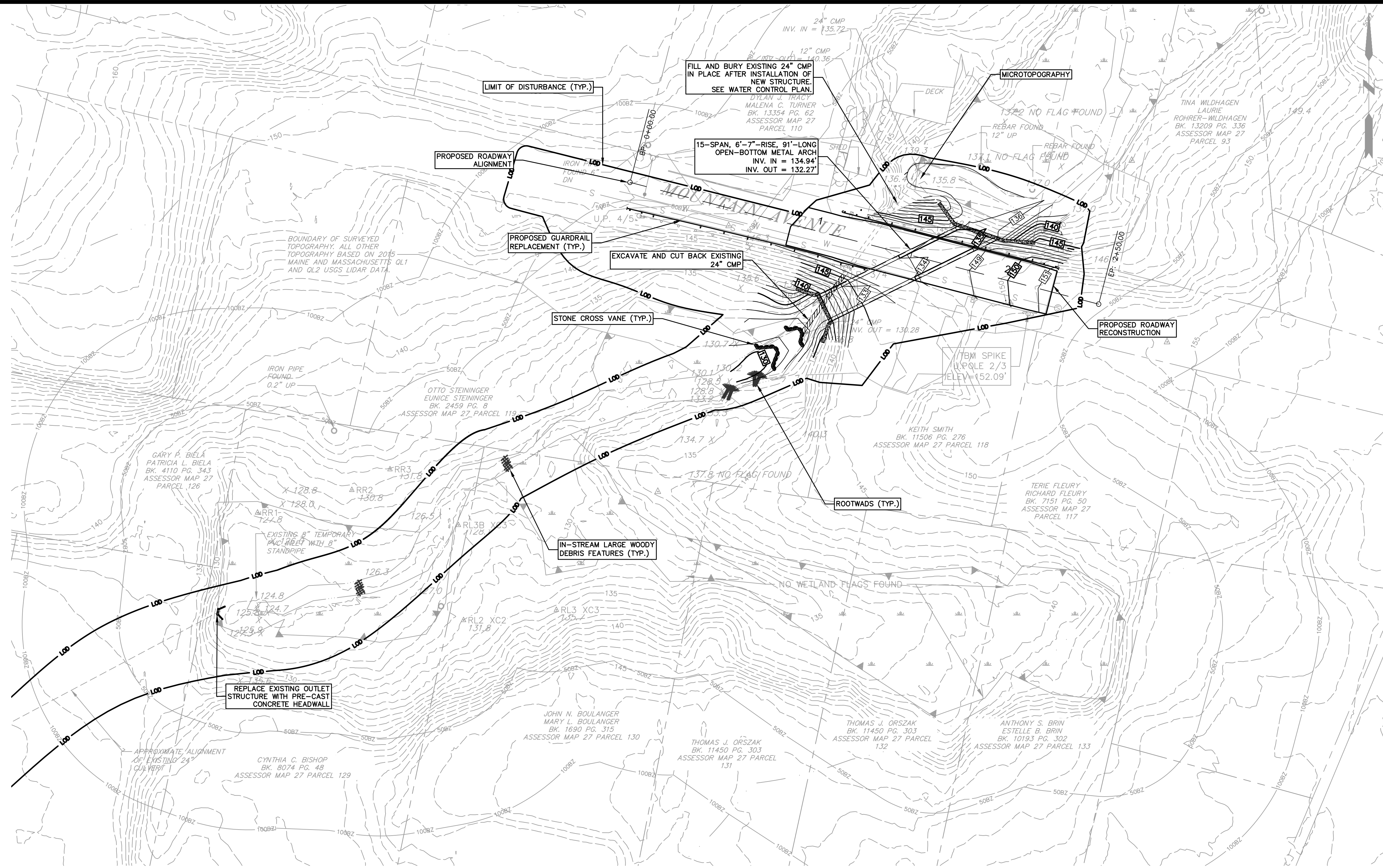
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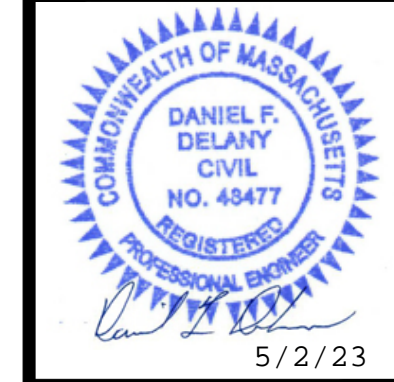
TOWN OF SOUTH HADLEY
 GENERAL NOTES
 MOUNTAIN AVENUE CULVERT REPLACEMENT
 & DOWNSTREAM IMPROVEMENTS
 SOUTH HADLEY MASSACHUSETTS

PROJ. No.: 20170390.V50
 DATE: 05/01/2023
GI-002

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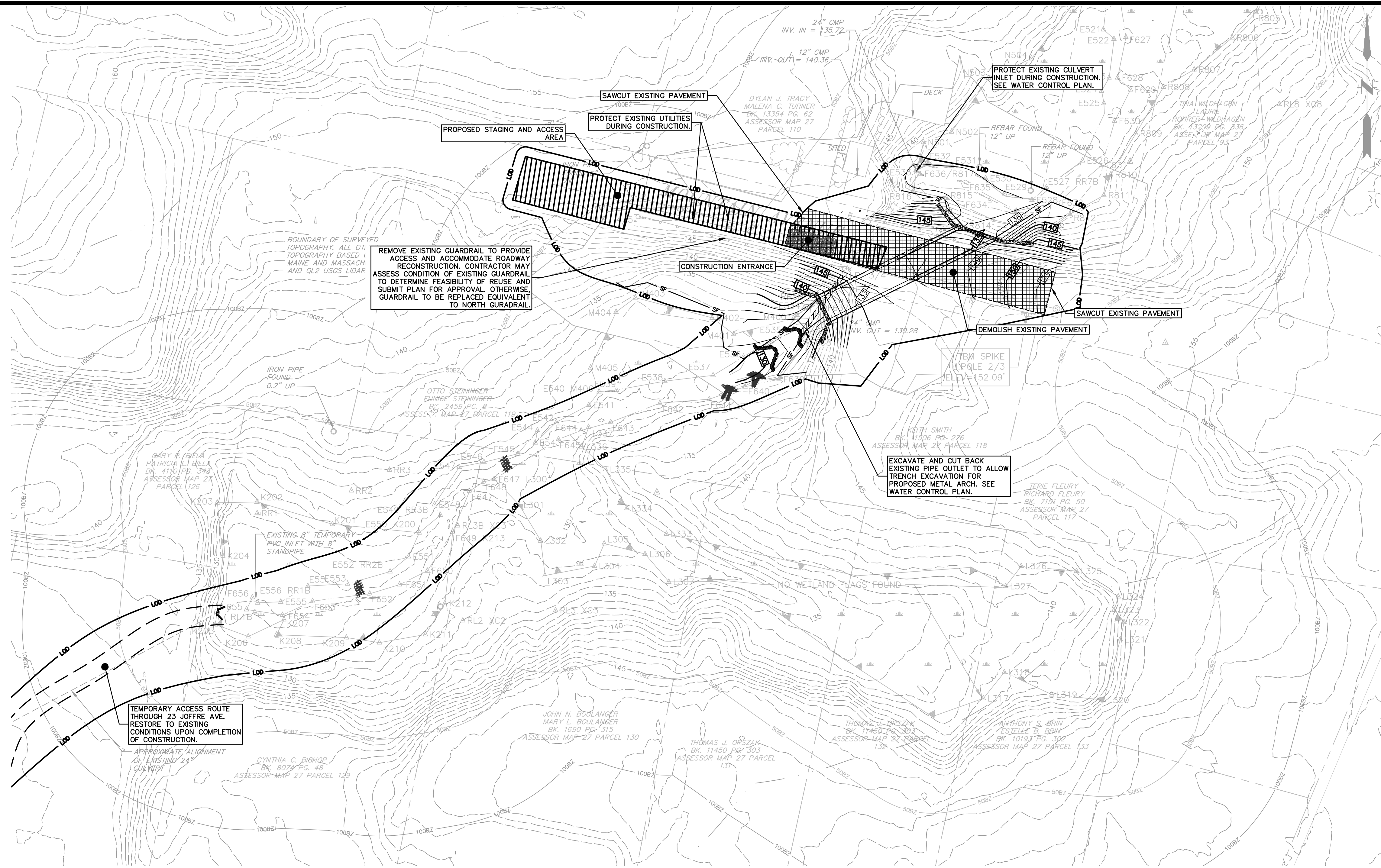


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| | GRAPHIC SCALE |

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TOWN OF SOUTH HADLEY
 SITE PLAN
 MOUNTAIN AVE CULVERT REPLACEMENT
 & DOWNSTREAM IMPROVEMENTS
 SOUTH HADLEY MASSACHUSETTS

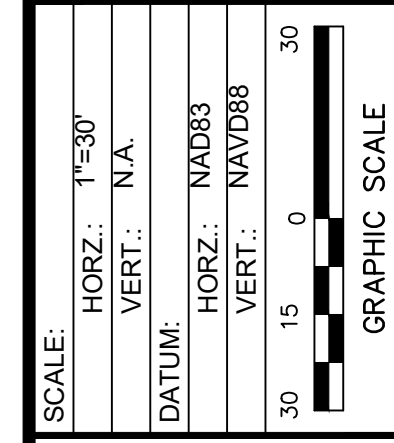
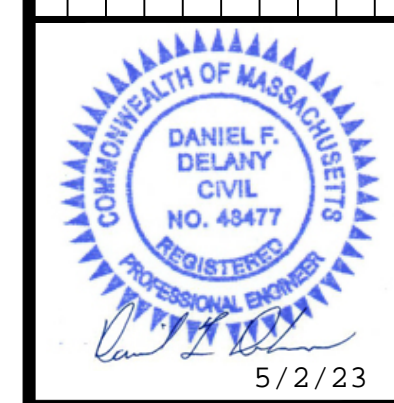
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SITE PREPARATION NOTES

1. THE SITE PREPARATION PLAN IS PROVIDED FOR INFORMATION ONLY AND MAY NOT INDICATE ALL ITEMS REQUIRED TO BE DEMOLISHED. PERFORM A PRE-BID SITE INSPECTION. COORDINATE DEMOLITION OF UNIDENTIFIED UTILITIES OR STRUCTURES WITH OWNER. DEMOLISH STRUCTURES, SITE IMPROVEMENTS, UTILITIES, ETC. AS REQUIRED TO CONSTRUCT PROPOSED FACILITY AND UTILITY SERVICES.
2. TREES, BRUSH AND STUMPS REMOVED BY CLEARING & GRUBBING OPERATIONS SHALL BE TRANSPORTED OFF THE PROJECT SITE TO AN APPROVED DISPOSAL LOCATION.
3. ITEMS TO BE STOCKPILED ON-SITE FOR REUSE OR TO BE RELOCATED SHALL BE PROTECTED FROM CONSTRUCTION OPERATIONS. IF DAMAGED DURING CONSTRUCTION THEY SHALL BE REPLACED IN-KIND AT NO ADDITIONAL COST TO THE OWNER.

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TOWN OF SOUTH HADLEY
SITE PREPARATION PLAN
 MOUNTAIN AVE CULVERT REPLACEMENT
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 SOUTH HADLEY
 MASSACHUSETTS

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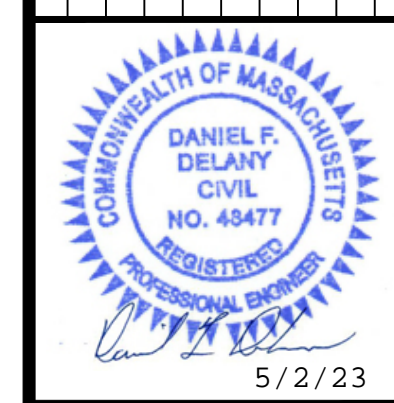


DURING CONSTRUCTION AND THEREAFTER, EROSION CONTROL MEASURES ARE TO BE IMPLEMENTED AS NOTED:

- INSTALLATION OF PERIMETER CONTROLS (SILT FENCE) SHALL BE COMPLETED PRIOR TO THE START OF SITE WORK IN ANY GIVEN AREA. PREFABRICATED SILT FENCES SHALL BE INSTALLED ACCORDING TO THE MANUFACTURERS' RECOMMENDATIONS.
- PERIMETER CONTROLS SHALL BE KEPT CLEAN DURING CONSTRUCTION AND REMOVED WHEN ALL SLOPES HAVE A HEALTHY STAND OF VEGETATIVE COVER. EROSION CONTROL MEASURES SHALL BE INSPECTED ON A WEEKLY BASIS AND AFTER EVERY RAINFALL.
- EXISTING VEGETATION IS TO REMAIN UNDISTURBED WHEREVER POSSIBLE.
- ALL DISTURBED AREAS SHALL BE STABILIZED WITHIN 72 HOURS AFTER FINAL GRADING.
- PERMANENT OR TEMPORARY COVER MUST BE IN PLACE BEFORE THE GROWING SEASON ENDS. WHEN SEEDED AREAS ARE MULCHED, PLANTINGS MAY BE MADE FROM EARLY SPRING TO EARLY OCTOBER. WHEN SEEDED AREAS ARE NOT MULCHED, PLANTINGS SHOULD BE MADE FROM EARLY SPRING TO MAY 20 OR FROM AUGUST 15 TO SEPTEMBER 15. NO DISTURBED AREA SHALL BE LEFT EXPOSED DURING WINTER MONTHS. PLANT ANNUAL RYE GRASS PRIOR TO OCTOBER 15TH.
- THE LAND AREA EXPOSED SHOULD BE KEPT TO THE SHORTEST PRACTICAL PERIOD OF TIME AND SHALL NOT REMAIN EXPOSED MORE THAN 45 DAYS FROM INITIAL DISTURBANCE.
- THE SMALLEST PRACTICAL AREA SHALL BE DISTURBED DURING CONSTRUCTION.
- AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:
 - A MINIMUM OF 85% OF VEGETATED GROWTH HAS BEEN ESTABLISHED
 - A MINIMUM OF 3" NON EROSION MATERIAL SUCH AS STONE OR RIPRAP HAS BEEN INSTALLED
 - EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.
- ALL CONTRIBUTING WATERSHED AREAS MUST BE FULLY STABILIZED PRIOR TO DIRECTING STORMWATER TO THEM.
- DURING CONSTRUCTION, ALL EROSION CONTROLS SHALL BE INSPECTED WEEKLY AND AFTER EVERY 0.25" OR GREATER RAINFALL WITHIN A 24-HOUR PERIOD.
- TEMPORARY WATER DIVERSION (SEDIMENT BASINS, SWALES, ETC.) MUST BE USED AS NECESSARY TO CONTAIN RUNOFF UNTIL SOILS ARE STABILIZED.

- STAGING AREAS SHALL BE LOCATED WITHIN LIMITS OF WORK AND MUST BE LOCATED OUTSIDE RESOURCE AREAS.
- SEDIMENT STOCKPILES SHALL HAVE A SIDE SLOPE OF NO STEEPER THAN 2:1. ALL STOCKPILES SHALL BE ROUGH GRADED OR MAINTAIN A ROUGHENED SURFACE TO PREVENT EROSION. STOCKPILES THAT ARE NOT TO BE USED WITHIN 7 DAYS SHALL BE SEEDED AFTER FORMATION OF STOCKPILE AS TO PREVENT EROSION. A SILT FENCE BARRIER SHALL BE INSTALLED AROUND STOCKPILE AREA APPROXIMATELY 10 FEET FROM TOE OF SLOPE.
- IN THE EVENT OF DEWATERING, ENSURE THAT THERE IS NO DISCHARGE PLACED DIRECTLY INTO WETLANDS AREAS OR WATERCOURSES. USE PROPER METHODS AND DEVICES TO MINIMIZE AND RETAIN SUSPENDED SOLIDS, SUCH AS PUMPING WATER INTO A TEMPORARY SEDIMENTATION BASIN, PROVIDING SURGE PROTECTION AT THE INLET AND THE OUTLET OF PUMPS, FLOATING THE INTAKE OF THE PUMP, OR OTHER METHODS. ALSO BE RESPONSIBLE FOR ANY PERMITTING REQUIRED FOR DEWATERING ACTIVITIES. IF A PUMPING OPERATION IS CAUSING TURBIDITY PROBLEMS, SAID OPERATION SHALL CEASE UNTIL SUCH TIME AS FEASIBLE MEANS OF CONTROLLING TURBIDITY ARE DETERMINED AND IMPLEMENTED. SUBMIT DESIGN ALONG WITH THE LOCATIONS OF THE BASIN TO THE TOWN PRIOR TO CONSTRUCTION.
- NO CHEMICALS CLEANERS ARE PERMITTED TO BE USED ON SITE.

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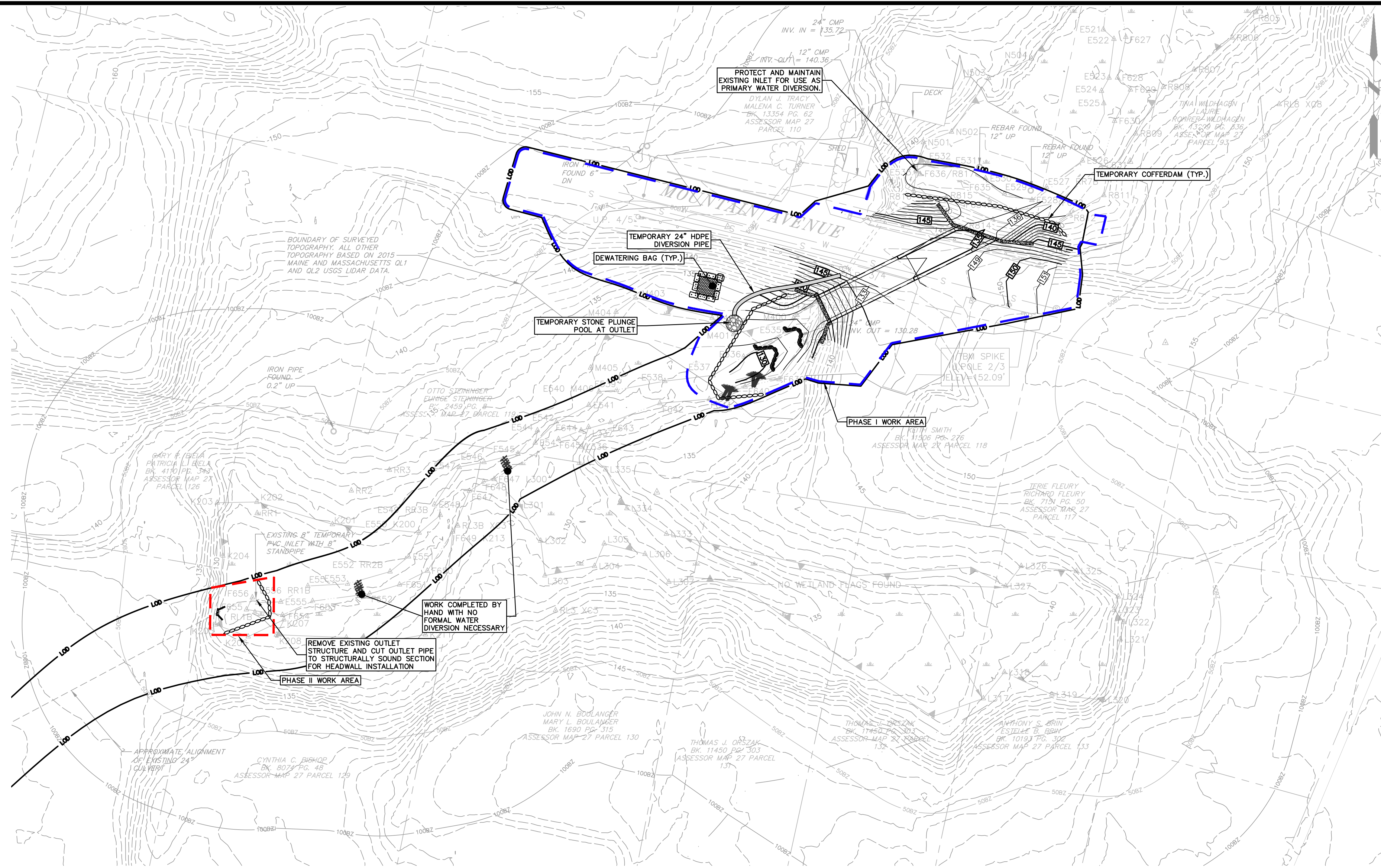


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TOWN OF SOUTH HADLEY
EROSION & SEDIMENT CONTROL PLAN
 MOUNTAIN AVE CULVERT REPLACEMENT & DOWNSTREAM IMPROVEMENTS
 SOUTH HADLEY MASSACHUSETTS

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| PROJ. No.: 20170390.V50 |
| DATE: 05/01/2023 |
| CE-101 |



GENERAL WATER CONTROL SYSTEM NOTES:

- PRIOR TO ANY LAND DISTURBANCE ACTIVITIES, THE CONTRACTOR MUST PHYSICALLY MARK THE LIMITS OF DISTURBANCE IN ACCORDANCE WITH THE APPROVED PLANS.
- THE TEMPORARY COFFERDAMS MUST BE INSTALLED DURING THE LOW FLOW PERIOD (I.E., THE PERIOD BETWEEN JULY 1 THROUGH OCTOBER 31). COFFERDAMMED AREAS, WHERE APPLICABLE, SHALL BE MAINTAINED TO ALLOW A DRY WORKING CONDITION (NO SEDIMENT PLUME) IN THE WATERCOURSE. SOIL DISTURBANCE IN COFFERDAMMED AREAS OR THE WATERCOURSE MUST TEMPORARILY CEASE IN THE EVENT OF ANY ABNORMALLY HIGH STORMWATER RUNOFF EVENT THAT OVERTOPS THE COFFERDAMS OR TEMPORARY RIVER CROSSINGS.
- OBTAIN CONFIRMATORY ELEVATIONS OF THE CHANNEL BOTTOM ALONG THE PROPOSED ALIGNMENTS OF THE TEMPORARY COFFERDAMS TO VERIFY EXISTING CONDITIONS AND ACTUAL COFFERDAM HEIGHTS PRIOR TO INSTALLATION.
- THIS PLAN ILLUSTRATES ONE CONCEPTUAL APPROACH TO WATER CONTROL FOR THE PROJECT. THE CONTRACTOR SHALL SUBMIT A FINAL WATER CONTROL PLAN TO FUSS & O'NEILL AND THE MASSDEP FOR REVIEW WITH ADEQUATE TIME FOR THEIR REVIEW AND ACCEPTANCE PRIOR TO THE INITIATION OF CONSTRUCTION.
- TEMPORARY COFFERDAMS AND BYPASS PROVISIONS SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD TO ENSURE RESPECTIVE COMPONENTS FUNCTION AS INTENDED TO PROTECT ADJACENT PROPERTIES, WETLAND RESOURCES AND DOWNSTREAM WORK AREAS.

2-YEAR PRESENT DAY FLOW = 15.3 CFS
 2-YEAR PRESENT DAY WSE AT INLET FOR EXISTING CONDITIONS = 140.20

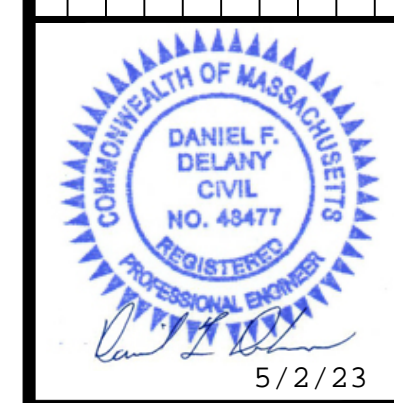
PHASE I WATER CONTROL & CONSTRUCTION SEQUENCE

- INSTALL TEMPORARY EROSION CONTROL MEASURES AND DEFINE/STABILIZE CONSTRUCTION STAGING AREAS.
- USING SIPHONS/PUMPS DRAIN STANDING WATER IN WORK AREA AS NECESSARY.
- EXCAVATE ROADWAY OVER LOCATION OF PROPOSED METAL ARCH TO FACILITATE SLOPE GRADING FOR ACCESS TO NORTH AND SOUTH WORK AREAS. PROTECT EXISTING UTILITIES THROUGHOUT CONSTRUCTION.
- EXCAVATE AND CUT BACK EXISTING 24" CMP TO RELOCATE OUTLET AWAY FROM EXCAVATION AREA ASSOCIATED WITH PROPOSED OPEN-BOTTOM METAL ARCH.
- INSTALL UPSTREAM COFFERDAM.
- INSTALL TEMPORARY 24" HDPE DIVERSION PIPE AND TEMPORARY STONE PLUNGE POOL AT OUTLET.
- INSTALL DOWNSTREAM COFFERDAM. DEWATER WORK AREA BY PUMPING AS NECESSARY.
- INSTALL STREAM RESTORATION FEATURES INCLUDING ROOTWADS AND STONE CROSS VANES MOVING DOWNSTREAM TO UPSTREAM.
- EXCAVATE AS NECESSARY TO ACCOMMODATE METAL ARCH, CONCRETE FOOTINGS, AND HEADWALLS/WINGWALLS.
- INSTALL CONCRETE FOOTINGS FOR OPEN-BOTTOM METAL ARCH.
- BACKFILL AND GRADE PROPOSED STREAM BED IN ACCORDANCE WITH PROPOSED CONTOURS.
- INSTALL OPEN-BOTTOM METAL ARCH AND PRECAST CONCRETE HEADWALLS/WINGWALLS.
- REMOVE TEMPORARY COFFERDAMS AND OTHER WATER DIVERSION EQUIPMENT.
- BACKFILL AND GRADE ABOVE OPEN-BOTTOM METAL ARCH AND SURROUNDING AREA INCLUDING ROADWAY EMBANKMENT IN ACCORDANCE WITH PROPOSED CONTOURS. FILL WITH FLOWABLE FILL AND BURY OBSOLETE 24" CMP IN PLACE.
- STABILIZE DISTURBED AREAS AND SLOPES IN ACCORDANCE WITH EROSION & SEDIMENT CONTROL PLAN AND RESTORATION & PLANTINGS PLAN.

PHASE II WATER CONTROL & CONSTRUCTION SEQUENCE

- INSTALL TEMPORARY EROSION CONTROL MEASURES AND CONSTRUCTION STAGING AREAS.
- DEVELOP CONTINGENCY PLAN FOR DEWATERING IN CASE OF UNEXPECTED PRECIPITATION OR DELAYS.
- PLAN AND EXECUTE INSTALLATION OF COFFERDAM (IF NEEDED), REMOVAL OF EXISTING OUTLET STRUCTURE, AND INSTALLATION OF NEW CONCRETE HEADWALL DURING PERIODS OF LOW FLOW AND LITTLE TO NO EXPECTED PRECIPITATION.
- BACKFILL AND GRADE TO MATCH EXISTING SURROUNDING TOPOGRAPHY.
- STABILIZE SURROUNDING AREA WITH EROSION & SEDIMENT CONTROL PLAN AND RESTORATION & PLANTINGS PLAN.

| No. | DATE | DESCRIPTION | DESIGNER/REVIEWER |
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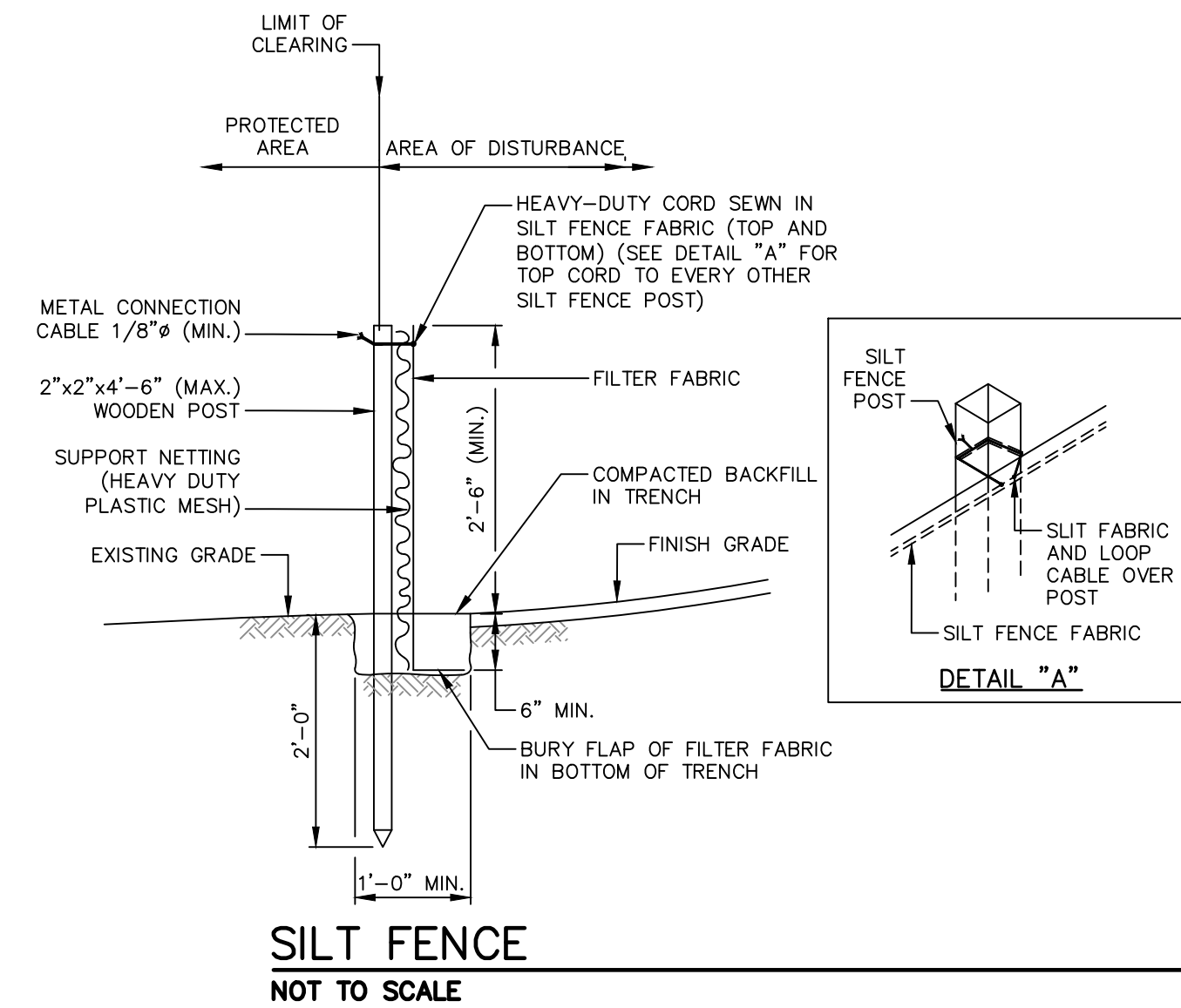
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| | VERT.: N/A |
| DATUM: | NAD83 |
| | VERT.: NAVD88 |
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FUSS & O'NEILL
 158 MAIN STREET, SUITE 400
 SOUTH HADLEY, MA 01075
 413-452-0445
 www.fussandoneill.com

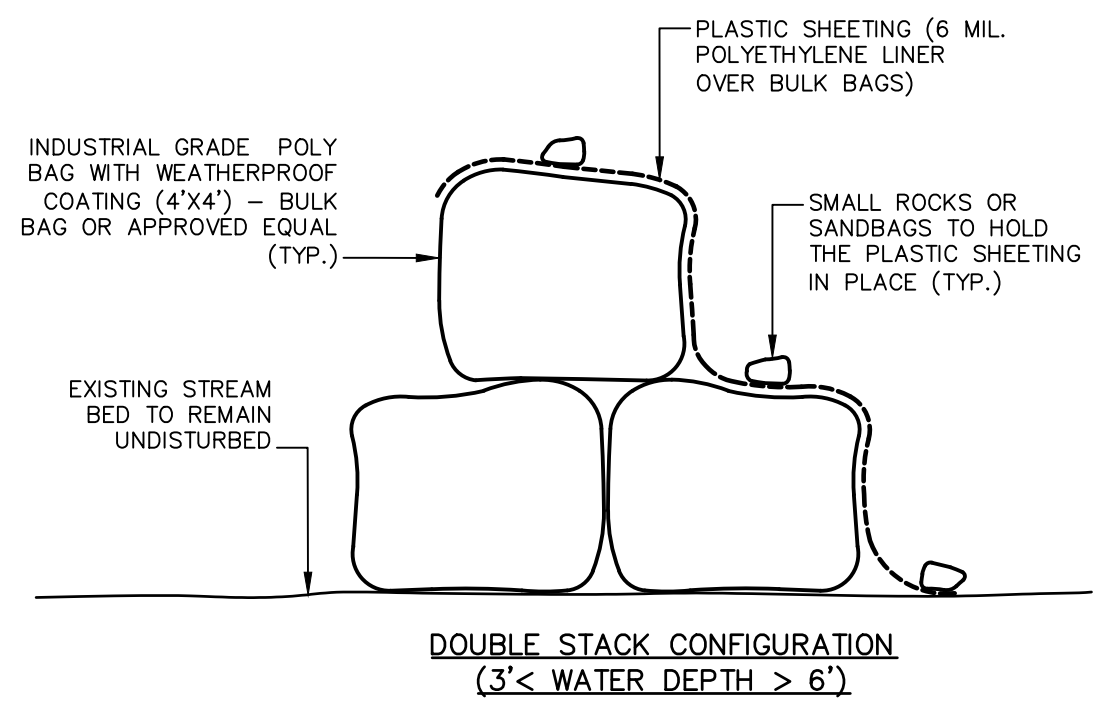
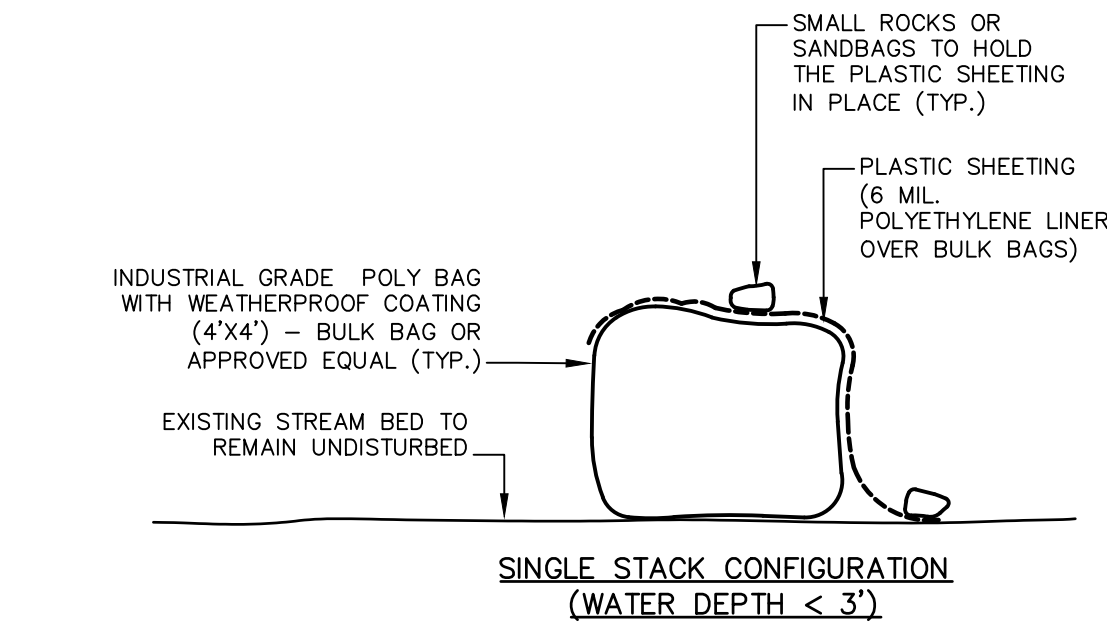
TOWN OF SOUTH HADLEY
WATER CONTROL PLAN
 MOUNTAIN AVE CULVERT REPLACEMENT
 & DOWNSTREAM IMPROVEMENTS
 SOUTH HADLEY, MASSACHUSETTS

PROJ. No.: 20170390.V50
 DATE: 05/01/2023
CW-101

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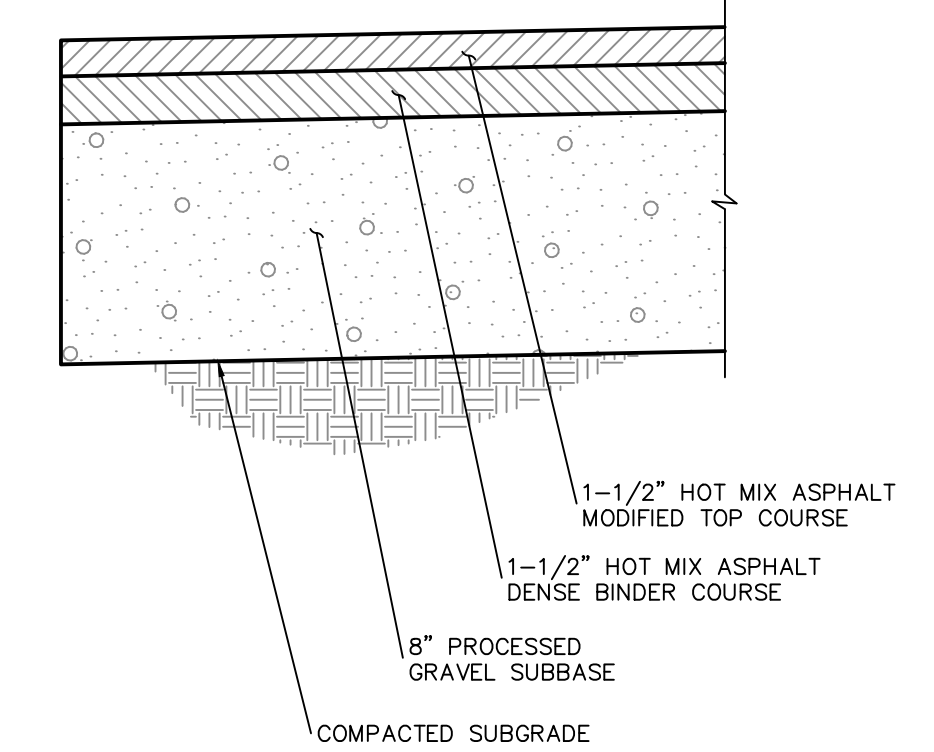
SILT FENCE
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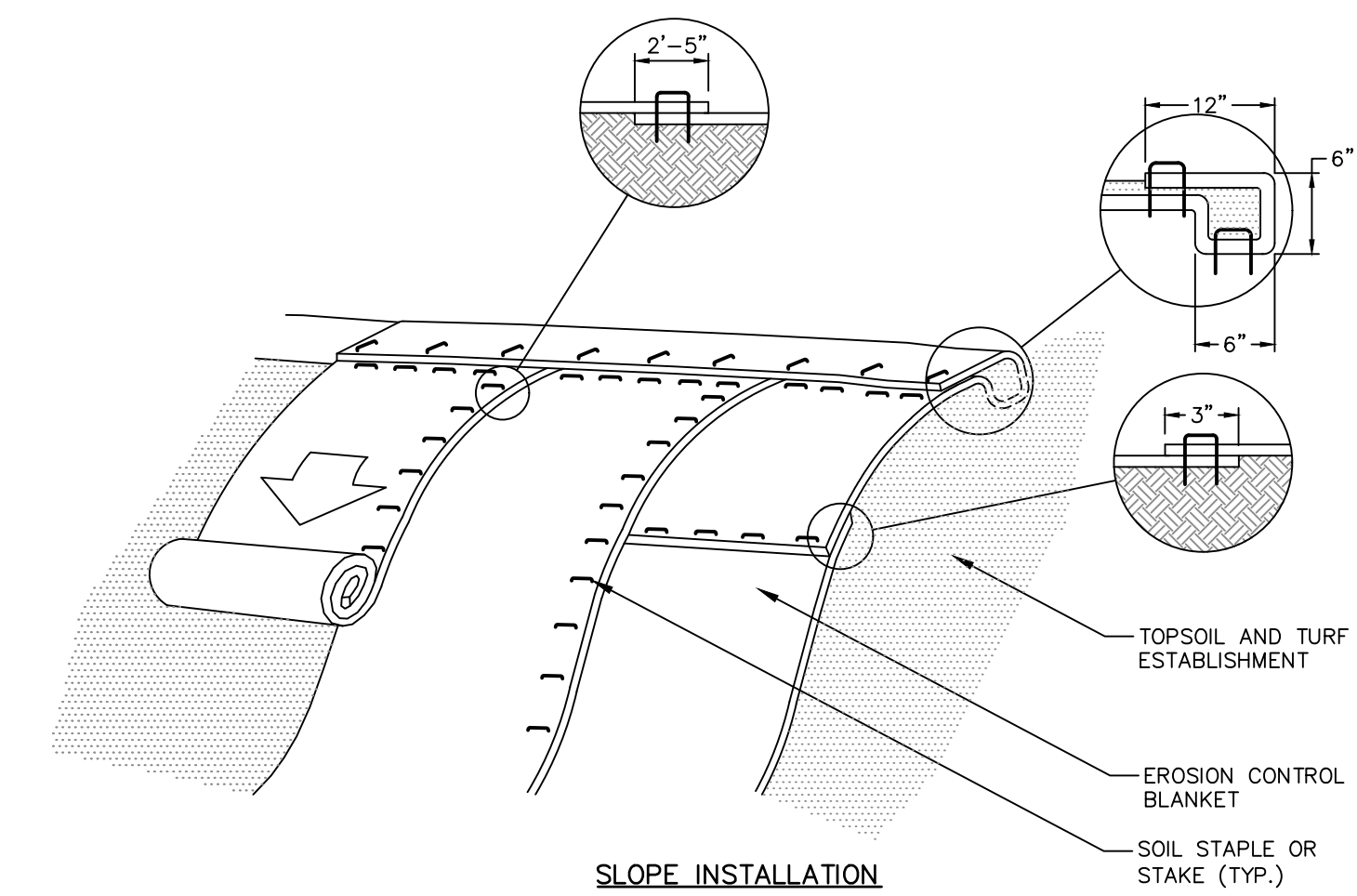
TEMPORARY LARGE SANDBAG COFFERDAM (BULK BAGS OR APPROVED EQUAL)
NOT TO SCALE

WATER CONTROL NOTES:

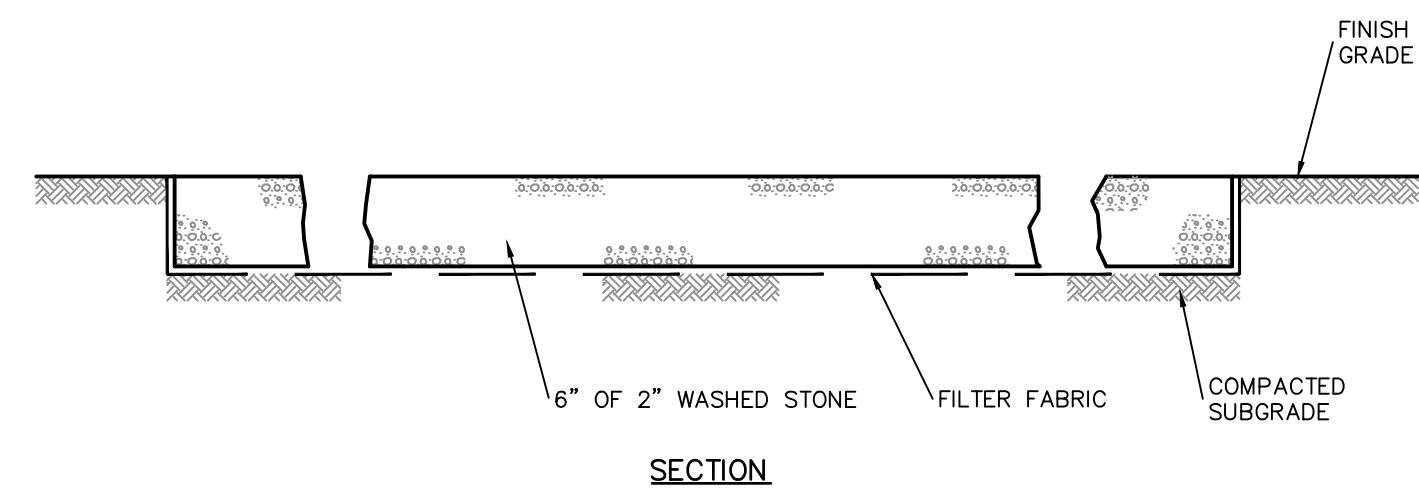
1. TEMPORARY SANDBAGS SHALL CONSIST OF POLYPROPYLENE LARGE SANDBAGS, BULK BAGS OR APPROVED EQUAL, AND SHALL BE FILLED WITH SAND CONFORMING TO SUBSECTION M1.04.0 (TYPE B) OF THE MASSDOT STANDARD SPECIFICATIONS.
2. INSTALL DURING PERIOD OF LOW-FLOW IN BROOK. MONITOR WATER CONTROL SYSTEM DAILY. PROMPTLY CORRECT SEEPAGE, BREAKAGE, OR OTHER EVIDENCE OF MOVEMENT TO ENSURE THAT TEMPORARY COFFERDAM(S) AND WATER BYPASS CONVEYANCES REMAIN STABLE AND FUNCTIONING AS INTENDED.
3. MAINTAIN CRUSHED STONE AND PUMPS AS NECESSARY TO MAINTAIN DEWATERED CONDITIONS WITHIN COFFERDAMMED AREAS SUFFICIENT FOR COMPLETION OF WORK AND PLACEMENT PROPOSED MATERIALS UNDER SAFE, CONTROLLED CONDITIONS.
4. REMOVE ALL SANDBAGS, ACCUMULATED SEDIMENT, AND OTHER COFFERDAM MATERIALS AFTER IN-RIVER CONSTRUCTION IN RESPECTIVE PHASE IS COMPLETE.



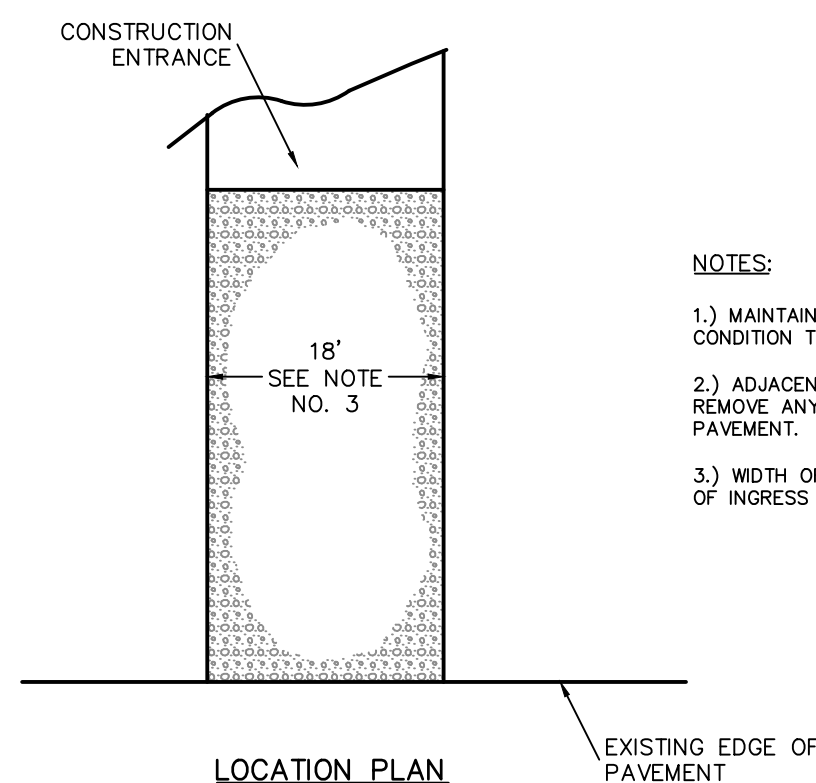
TYPICAL PAVEMENT SECTION
N.T.S.



SLOPE INSTALLATION



SECTION

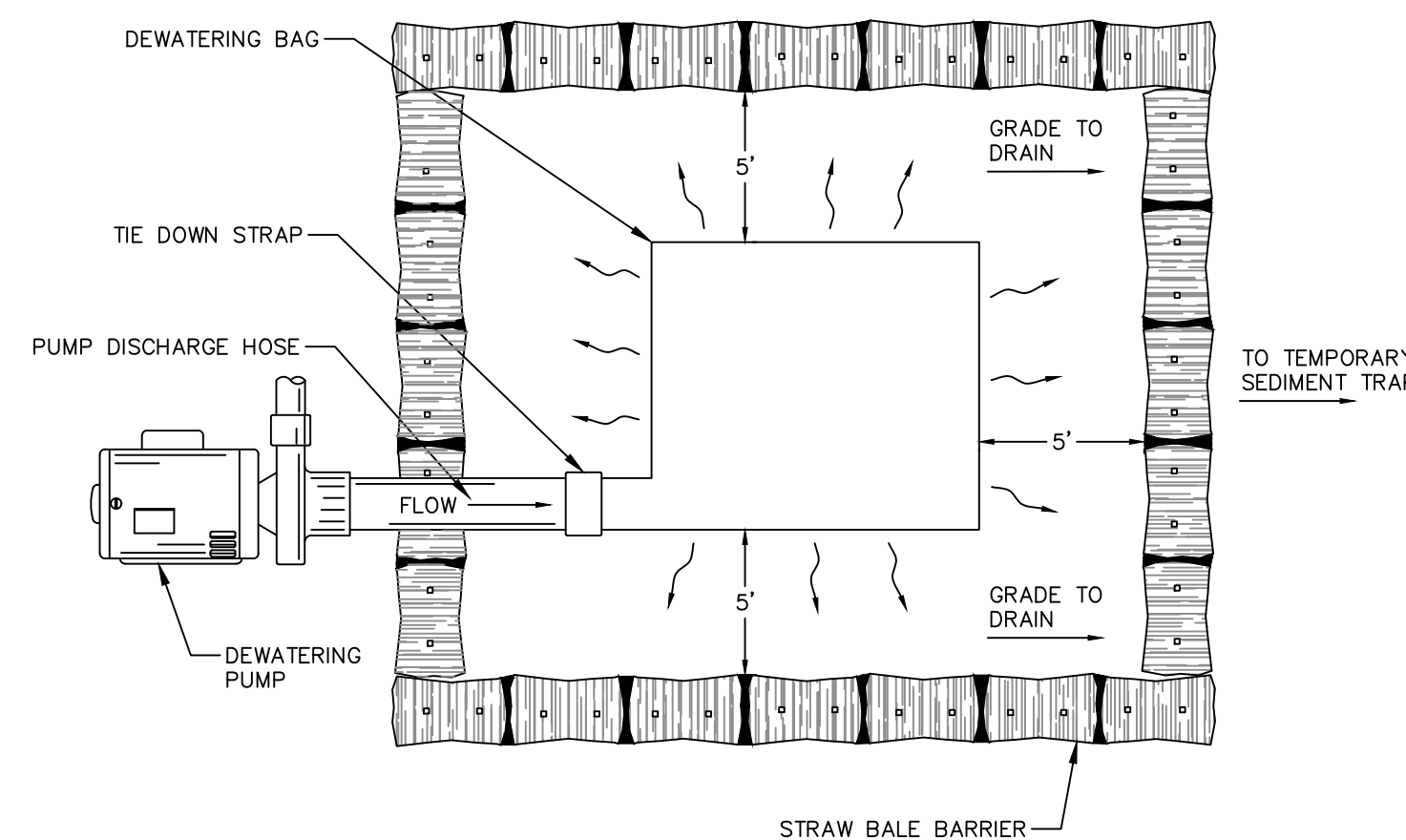


LOCATION PLAN

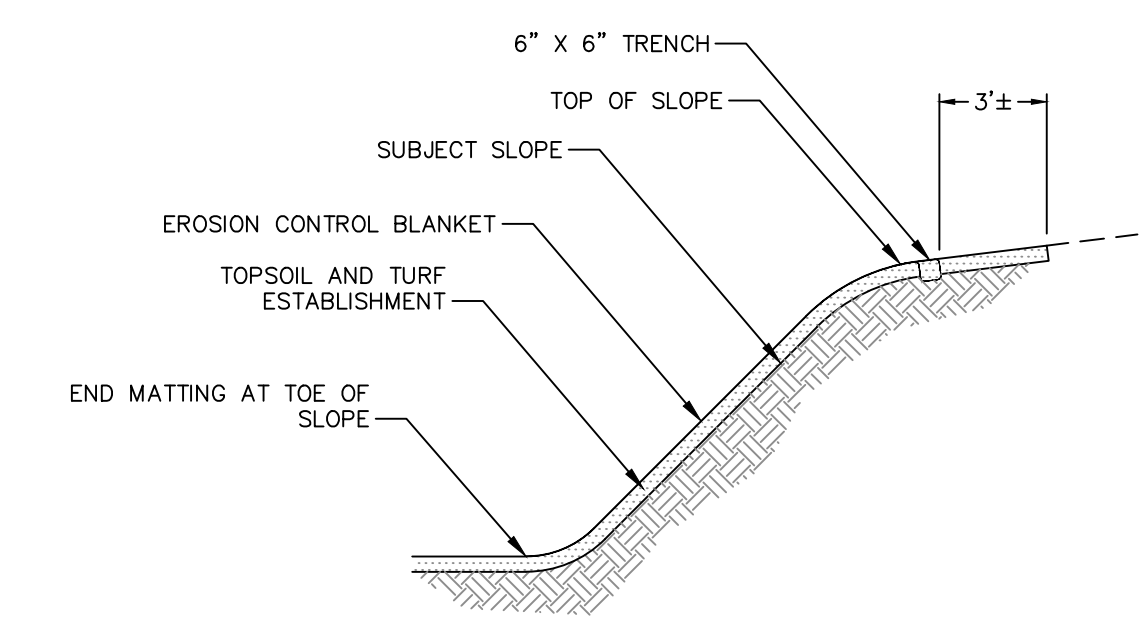
CONSTRUCTION ENTRANCE
NOT TO SCALE

NOTES:

1. MAINTAIN ANTI-TRACKING APRON IN GOOD CONDITION THROUGHOUT CONSTRUCTION PERIOD.
2. ADJACENT ROADWAY SHALL BE SWEEP DAILY TO REMOVE ANY MATERIAL THAT MAY BE TRACKED ONTO PAVEMENT.
3. WIDTH OF APRON SHALL NOT BE LESS THAN WIDTH OF INGRESS OR EGRESS.



DEWATERING BAG
NOT TO SCALE



SECTION VIEW

NOTES:

1. PREPARE TOPSOIL BEFORE INSTALLING BLANKET, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED.
2. INSTALL IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
3. IN LOOSE SOIL CONDITIONS THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6\"/>

EROSION CONTROL BLANKET
NOT TO SCALE

| No. | DATE | DESCRIPTION | DESIGNER | REVIEWER |
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5/2/23

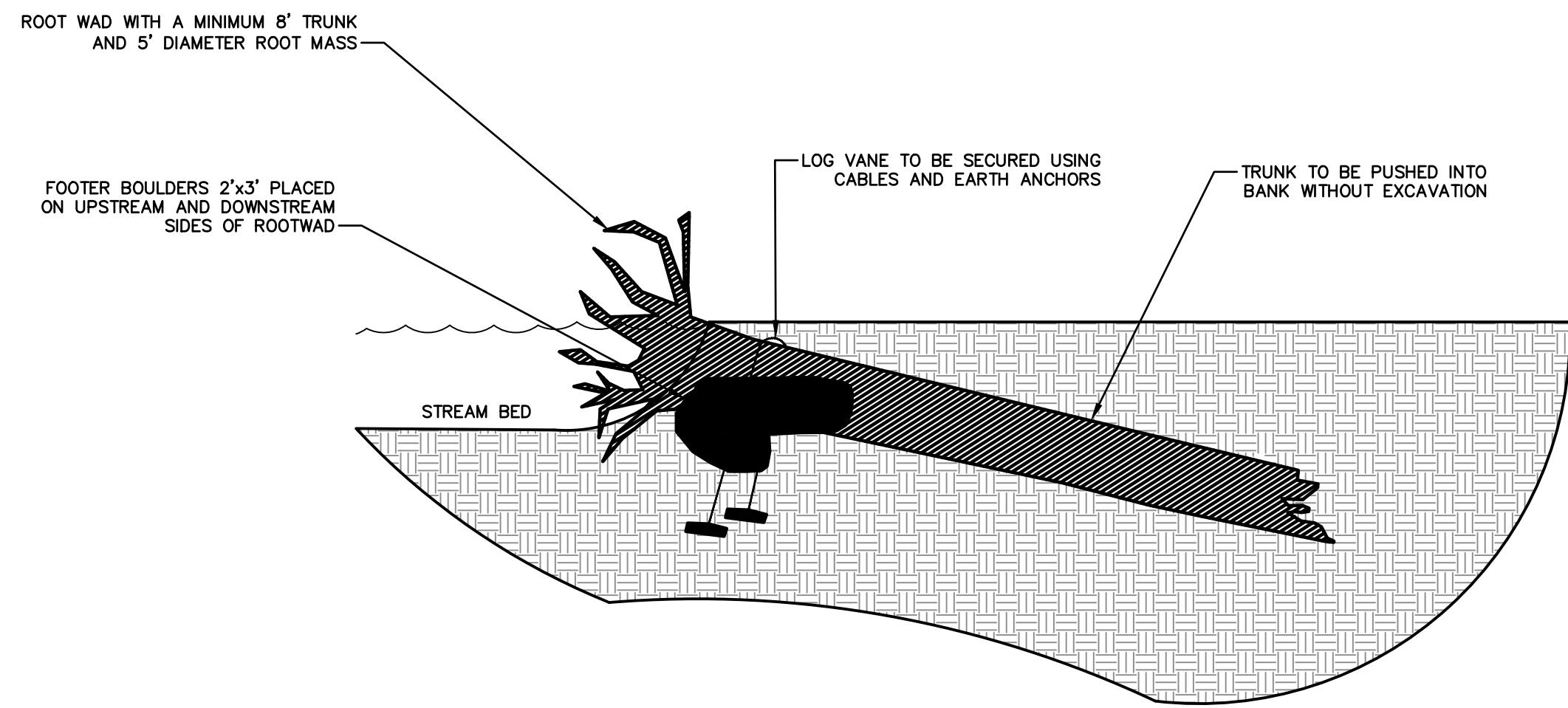
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 HORZ.: AS NOTED
 VERT.: N.A.
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 HORZ.:
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 GRAPHIC SCALE

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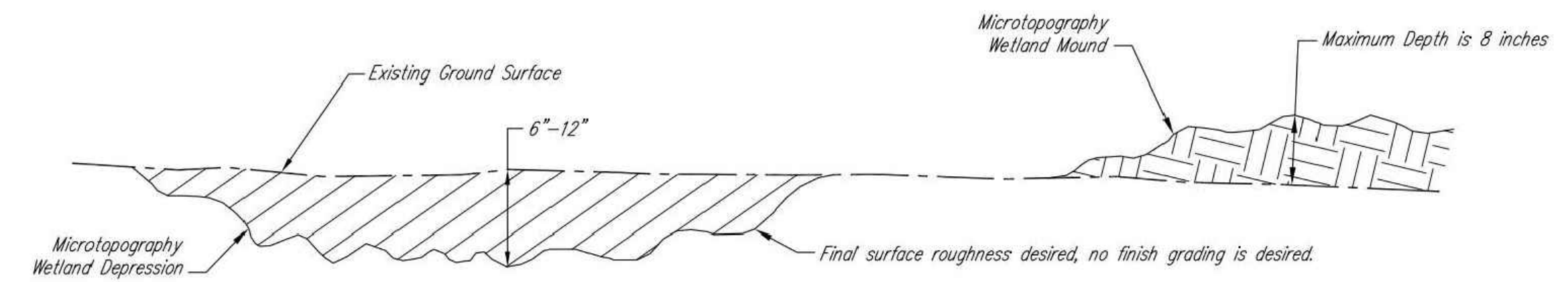
TOWN OF SOUTH HADLEY
 CONSTRUCTION DETAILS
 MOUNTAIN AVENUE CULVERT REPLACEMENT & DOWNSTREAM IMPROVEMENTS
 SOUTH HADLEY MASSACHUSETTS

PROJ. No.: 20170390.V50
 DATE: 05/01/2023
CD-501

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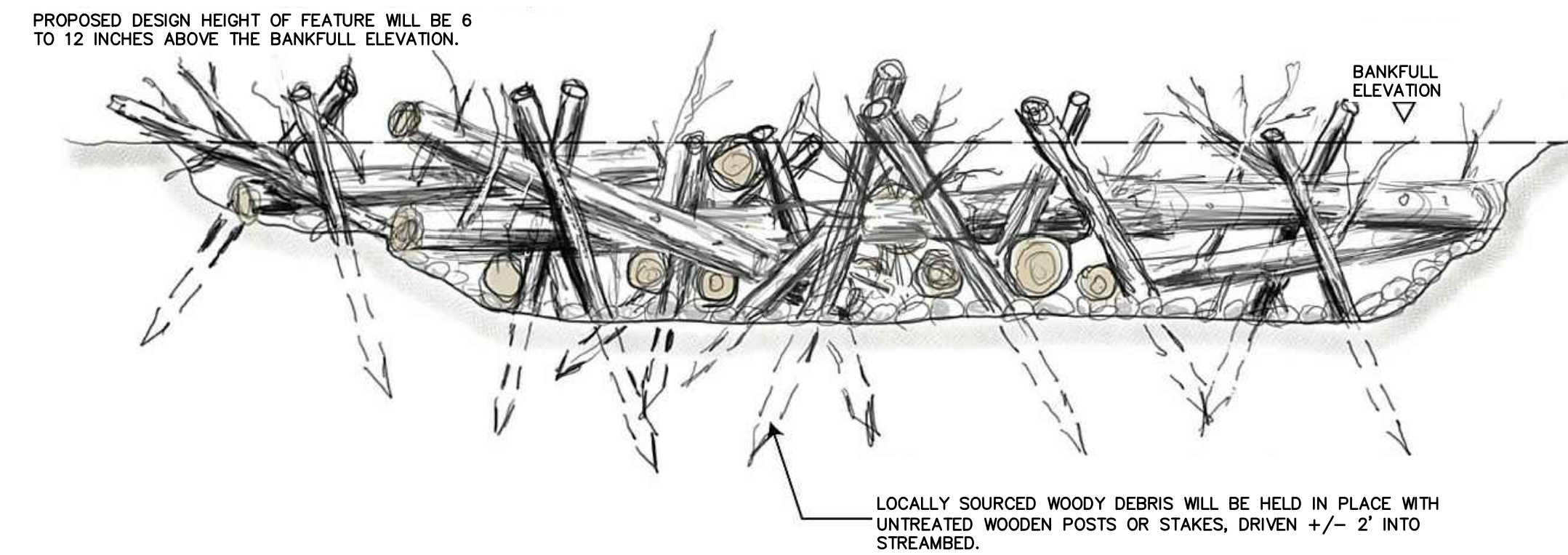
ROOTWAD
NOT TO SCALE



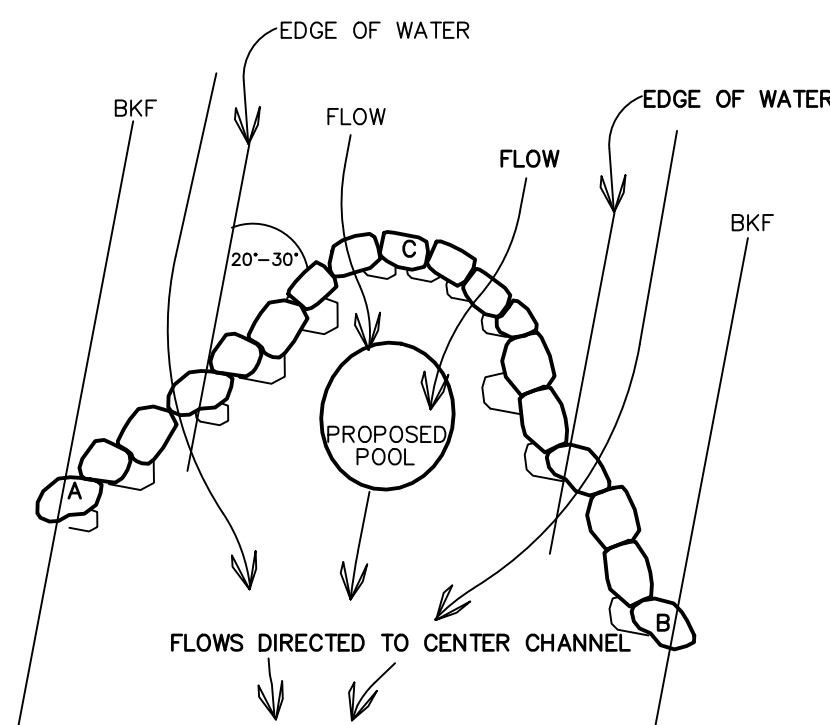
- NOTES:
1. CUSTOMIZE SHAPES TO FIT EXISTING LANDSCAPE CONDITIONS IN A RANDOM ORDER. EXCAVATION AND MOUND AREAS ARE TO BE IRREGULAR IN SHAPE AND VARY IN DEPTH (SEE TYPICAL CROSS SECTION FOR EXAMPLE). LENGTH AND WIDTH RATIO OF DEPRESSION AND MOUND SHAPES SHALL NOT EXCEED 2:1.
 2. MINIMUM TOPSOIL DEPTH IN AREAS FOR MICROTOPOGRAPHY SHALL BE 8 INCHES. WHERE THERE IS INSUFFICIENT TOPSOIL, SALVAGING AND SPREADING WILL BE REQUIRED TO ENSURE A MINIMUM LAYER OF 2 INCHES TOPSOIL THROUGHOUT THE DEPRESSION.

TYPICAL MICROTOPOGRAPHY CROSS SECTION
N.T.S.

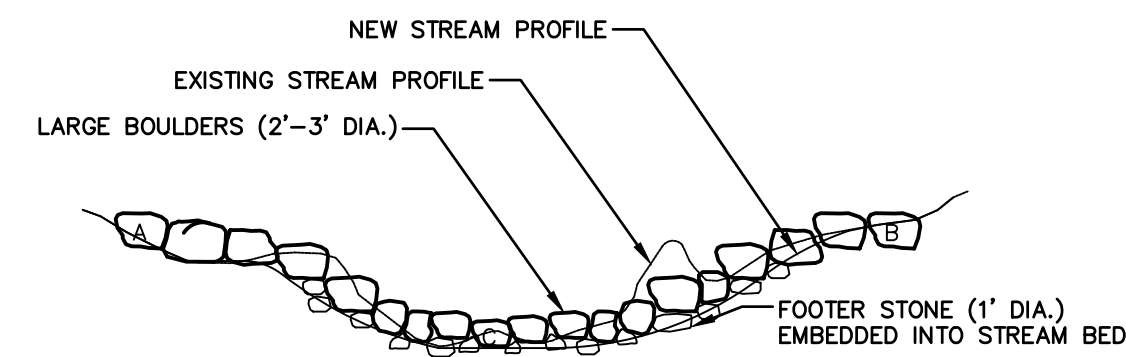
X-SECTION VIEW



PLANFORM VIEW

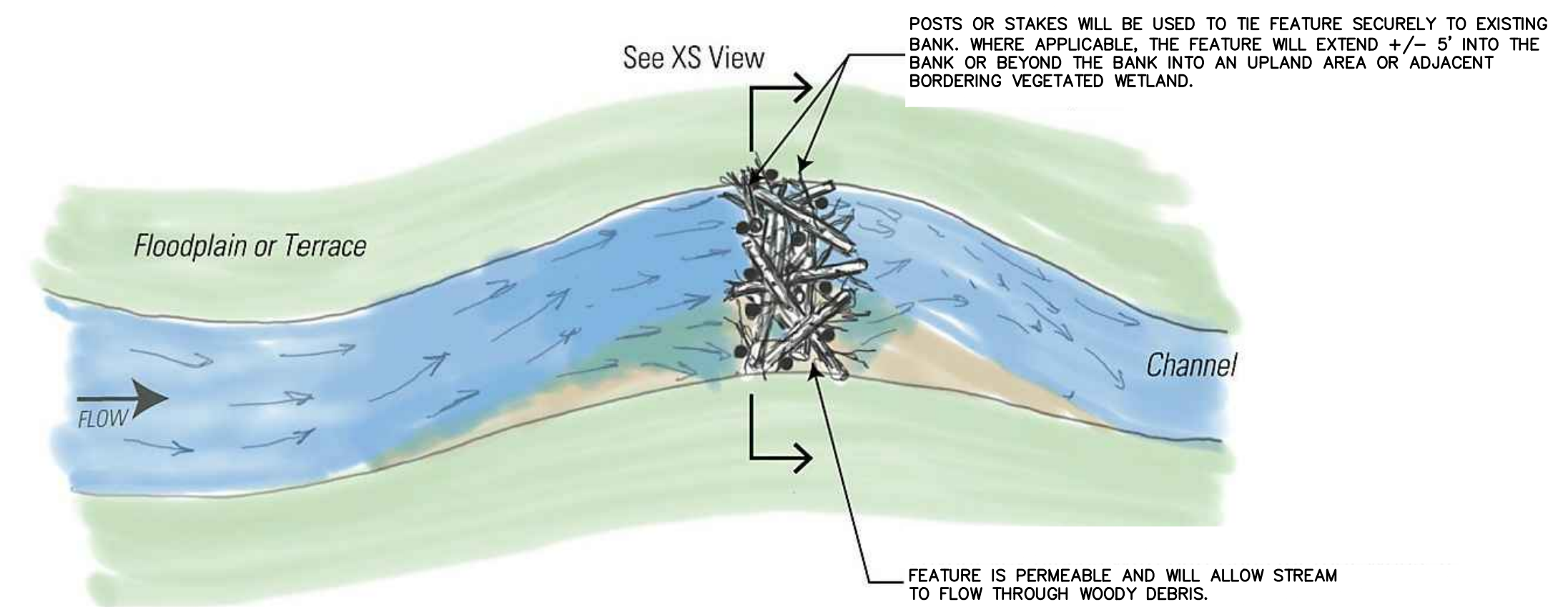


STONE CROSS VANE PLAN VIEW
NOT TO SCALE



STONE CROSS VANE SECTION
NOT TO SCALE

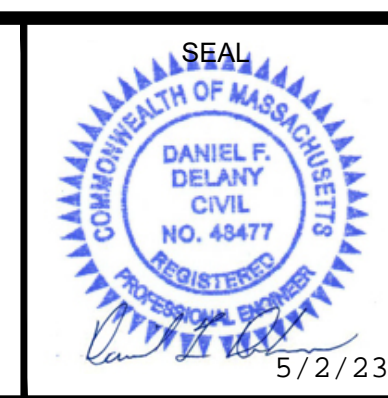
- GENERAL NOTES:
1. THE PURPOSE OF THE CROSS VANE STRUCTURE IS TO INCREASE THE SPEED OF FUTURE FLOWS AND DIRECT FLOW TO THE CENTER OF THE CHANNEL, ALLOWING MORE SEDIMENT TO BE TRANSPORTED.
 2. CROSS VANE TO BE CONSTRUCTED UNDER THE SUPERVISION OF PROJECT DESIGNER.
 3. CROSS VANE TO BE CONSTRUCTED USING 2'-3' DIAMETER BOULDERS.
 4. THE FOOTER STONE SHALL BE 1-2' DIAMETER BOULDERS.
 5. FOOTER STONES ARE TO BE EMBEDDED IN THE STREAMBED AND LARGER BOULDERS TO BE PLACED ON TOP.
 6. VANE SHALL RUN UPSTREAM AT A 20-30 DEGREE ANGLE FROM THE EDGE OF THE BANK.
 7. A PLUNGE POOL SHALL BE CREATED WITHIN THE DOWNSTREAM CENTER OF THE CROSS VANE.



LARGE WOODY DEBRIS FEATURE
NOT TO SCALE
ADAPTED FROM "LOW-TECH PROCESS-BASED RESTORATION OF RIVERSCAPES: DESIGN MANUAL" BY UTAH STATE UNIVERSITY RESTORATION CONSORTIUM (2019)

| No. | DATE | DESCRIPTION | DESIGNER | REVIEWER |
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5/2/23

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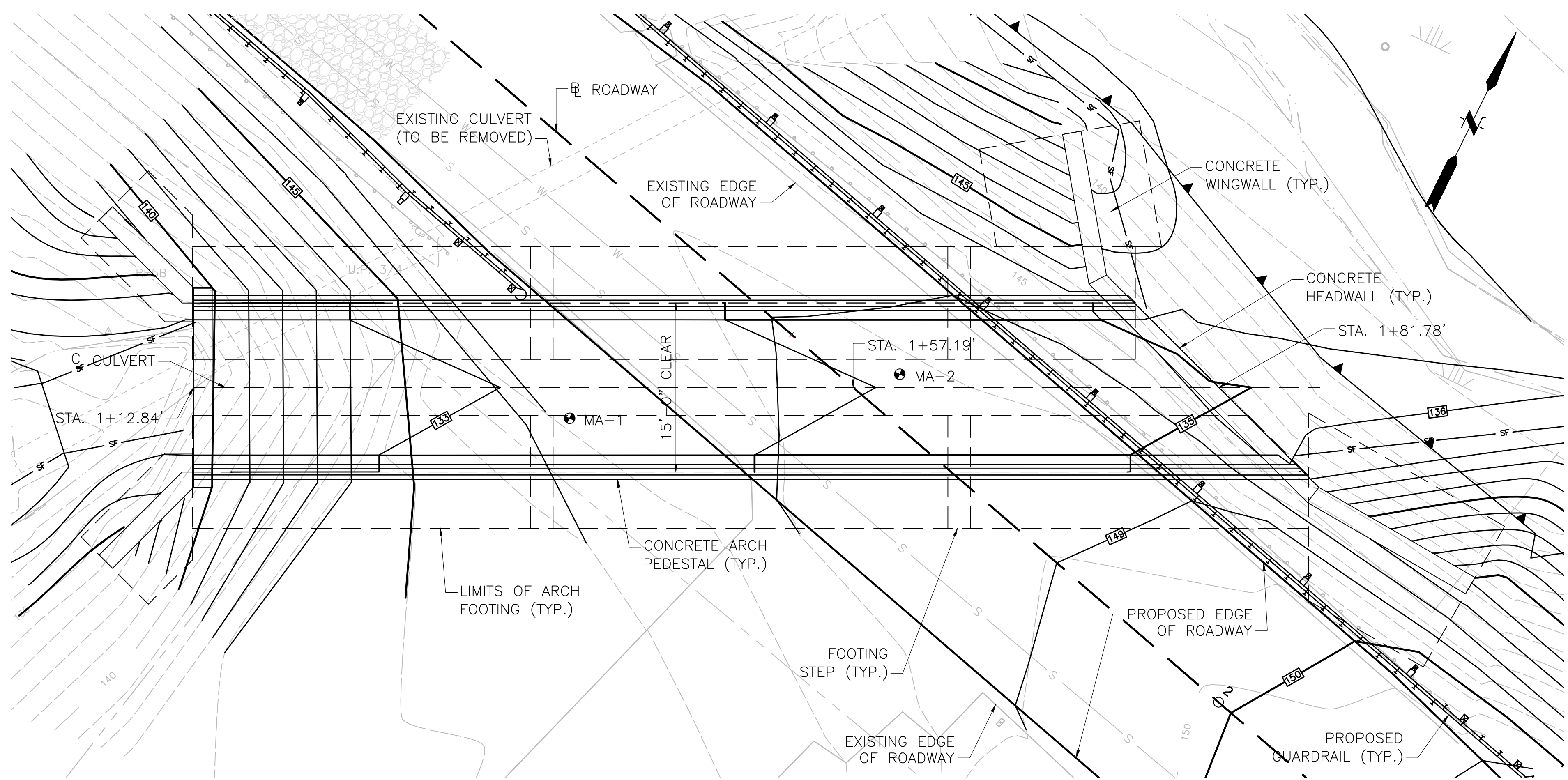
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| HORIZ.: |
| VERT.: |

GRAPHIC SCALE

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TOWN OF SOUTH HADLEY
RESTORATION DETAILS
MOUNTAIN AVENUE CULVERT REPLACEMENT & DOWNSTREAM IMPROVEMENTS
SOUTH HADLEY MASSACHUSETTS

PROJ. No.: 20170390.V50
DATE: 05/01/2023
CD-502



GENERAL PLAN
SCALE: 1" = 7'

LEGEND:
● BORING LOCATION

DESIGN REVIEW AND APPROVALS – CHAPTER 85 SECTION 35:
IN ACCORDANCE AND COMPLIANCE WITH THE REQUIREMENTS OF CHAPTER 85 SECTION 35 OF MASSACHUSETTS GENERAL LAWS, THE 2021 MASS DOT STANDARD SPECIFICATIONS, AND THE 2021 SUPPLEMENTAL SPECIFICATIONS AND CODES. AND THE CONTRACTOR SHALL SUBMIT TO THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION ALL CONSTRUCTION DRAWINGS AND DESIGN CALCULATIONS THAT SHALL BE USED TO FABRICATE AND CONSTRUCT THE ALUMINUM PLATE STRUCTURE DENOTED ON THESE PLANS FOR REVIEW AND APPROVAL. THIS APPROVAL SHALL CONSTITUTE THE FINAL APPROVAL AS STIPULATED BY CHAPTER 85 SECTION 35 OF THE MASSACHUSETTS GENERAL LAWS.

REVISIONS TO THE APPROVED PLANS SHALL ALSO BE SUBMITTED TO MASSDOT FOR APPROVAL.

DESIGN:
IN ACCORDANCE WITH THE 2020 (9TH EDITION) AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIAL LRFD BRIDGE DESIGN SPECIFICATIONS WITH CURRENT INTERIM SPECIFICATIONS, FOR HL-93 LOADING.

BENCHMARK:
VERTICAL DATUM IS BASED AND PROVIDED BY SURVEY PERFORMED BY SHERMAN AND FRYDRYK IS 1988 NAVD SYSTEM. TEMPORARY BENCHMARKS WERE ESTABLISHED ON SITE. TBM, SPIKE UTILITY POLE, EL. 748.27. TBM, SPIKE UTILITY POLE, EL. 742.24.

DATE:
TO BE PLACED ON THE NORTHEAST AND SOUTHWEST GUARDRAIL TRANSITIONS. A SHEET SHOWING SIZE AND CHARACTER OF NUMERALS WILL BE FURNISHED. THE DATE USED SHALL BE THE LATEST YEAR OF CONTRACT COMPLETION AS OF THE DATE THE FIRST GUARDRAIL TRANSITION IS CONSTRUCTED.

FOUNDATIONS:
FOUNDATIONS MAY BE ALTERED, IF NECESSARY, TO SUIT CONDITIONS ENCOUNTERED DURING CONSTRUCTION, WITH THE APPROVAL OF THE DESIGN ENGINEER OF RECORD.

UNSUITABLE MATERIAL:
ALL UNSUITABLE MATERIAL SHALL BE REMOVED WITHIN THE LIMITS OF THE FOUNDATIONS OF THE STRUCTURE, AS DIRECTED BY THE DESIGN ENGINEER OF RECORD.

CONSTRUCTION SPECIFICATIONS:
ALL CONSTRUCTION WORK TO BE PERFORMED IN ACCORDANCE WITH THE COMMONWEALTH OF MASSACHUSETTS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, 2022 EDITION.

CONSTRUCTION REQUIREMENTS AND PROCEDURES:
THE EXISTING BRIDGE TO BE REPLACED IS TO REMAIN CLOSED DURING CONSTRUCTION OF THE NEW BRIDGE REPLACEMENT. ADDITIONALLY THE CONTRACTOR SHALL TAKE THE PROPER PRECAUTIONS TO ENSURE THE STABILITY AND SAFE PERFORMANCE OF ALL STRUCTURAL ELEMENTS DURING DEMOLITION AND CONSTRUCTION. REFER TO APPROVED DEMOLITION/ ERECTION PLANS.

EXISTING CONSTRUCTION:
DIMENSIONS SHOWN ARE TAKEN FROM SURVEY AND VARIOUS FIELD MEASUREMENTS AND ARE NOT GUARANTEED. THE CONTRACTOR SHALL DETERMINE AND ESTABLISH ALL DIMENSIONS AND DETAILS NECESSARY FOR COMPLETION OF ALL WORK BY FIELD MEASUREMENT AND SURVEY. THE CONTRACTOR SHALL BE RESPONSIBLE AND NOT ORDER ANY MATERIAL OF COMMENCE ANY FABRICATION UNTIL HE HAS MADE THE REQUIRED MEASUREMENTS ON THE ACTUAL STRUCTURE AND THE EXTENT OF THE PROPOSED WORK HAS BEEN APPROVED BY THE ENGINEER.

UTILITIES:
AS ENCOUNTERED THE CONTRACTOR SHALL LOCATE, NOT DAMAGE AND PROTECT ALL UTILITIES, POLES WTC. WHEN LOCATING, TEMPORARILY RELOCATING AND PERMANENTLY RECONSTRUCTING ALL EXISTING AND NEWLY CONSTRUCTED UTILITIES AS NOTED HEREIN THROUGHOUT CONSTRUCTION. THE CONTRACTOR SHALL COORDINATE WITH RESPECTIVE UTILITY OWNERS ALL UTILITIES THAT ARE TO BE TEMPORARILY OR PERMANENTLY RELOCATED DURING ALL PHASES OF BRIDGE REPLACEMENT CONSTRUCTION.

AREAS SURROUNDING THE CONSTRUCTION SITE AND UTILITIES OUTSIDE THE LIMITS OF PROPOSED WORK DISRUPTED BY THE CONTRACTORS OPERATIONS SHALL BE RESTORED TO THEIR ORIGINAL CONDITION AT THE CONTRACTORS EXPENSE.

DOWEL BAR SPLICERS:
DOWEL BAR SPLICERS SHALL HAVE THE SAME COATINGS AS THE REINFORCING BARS THEY ARE SPLICING.

CONCRETE MIXES:
THE FOLLOWING CONCRETE MIXES UNLESS NOTED ELSEWHERE ARE TO BE USED:
4000 PSI, 1 1/2IN, 565 CEMENT FOOTINGS, HEADWALL, RETAINING WALLS

| HYDRAULIC DESIGN DATA | |
|---|--------|
| DRAINAGE AREA (SQ. MILES) | 0.18 |
| DESIGN FLOOD DISCHARGE (C.F.S.) | 56.42 |
| DESIGN FLOOD FREQUENCY (YEARS) | 10 |
| DESIGN FLOOD VELOCITY (F.P.S.) | 5.23 |
| DESIGN FLOOD ELEVATION (FEET, NAVD) | 136.81 |
| BASE (100-YEAR) FLOOD DATA | |
| BASE FLOOD DISCHARGE (C.F.S.) | 94.98 |
| BASE FLOOD ELEVATION (FEET, NAVD) | 137.20 |
| DESIGN AND CHECK SCOUR DATA | |
| DESIGN SCOUR FLOOD EVENT RETURN FREQUENCY (YEARS) | 25 |
| DESIGN FLOOD ABUTMENT SCOUR DEPTH (FEET) | 1.2 |
| DESIGN FLOOD PIER SCOUR DEPTH (FEET) | N/A |
| CHECK SCOUR FLOOD EVENT RETURN FREQUENCY (YEARS) | 50 |
| CHECK FLOOD ABUTMENT SCOUR DEPTH (FEET) | 1.6 |
| CHECK FLOOD PIER SCOUR DEPTH (FEET) | N/A |
| FLOOD OF RECORD | |
| DISCHARGE (C.F.S.) | xx |
| FREQUENCY (IF KNOWN, YEARS) | xx |
| MAXIMUM ELEVATION (FEET, NAVD) | xx |
| DATE (MM/YYYY) | xx |
| HISTORY OF ICE FLOES | xx |
| EVIDENCE OF SCOUR AND EROSION | x |

| SEISMIC DESIGN CRITERIA | |
|-------------------------------|----|
| DESIGN RETURN PERIOD: | XX |
| DESIGN SPECTRA | |
| As | xx |
| SDs | xx |
| SD1 | xx |
| SITE CLASS | xx |
| SEISMIC DESIGN CATEGORY (SDC) | xx |

COMMONWEALTH OF MASSACHUSETTS
MassDOT, Highway Division
CONCEPTUAL DESIGN IS ACCEPTABLE
TO MASSDOT FOR CONTRACTING

DISTRICT TWO BRIDGE ENGINEER _____ DATE _____

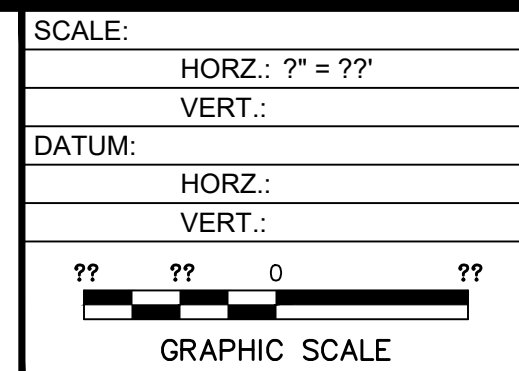
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5/2/23



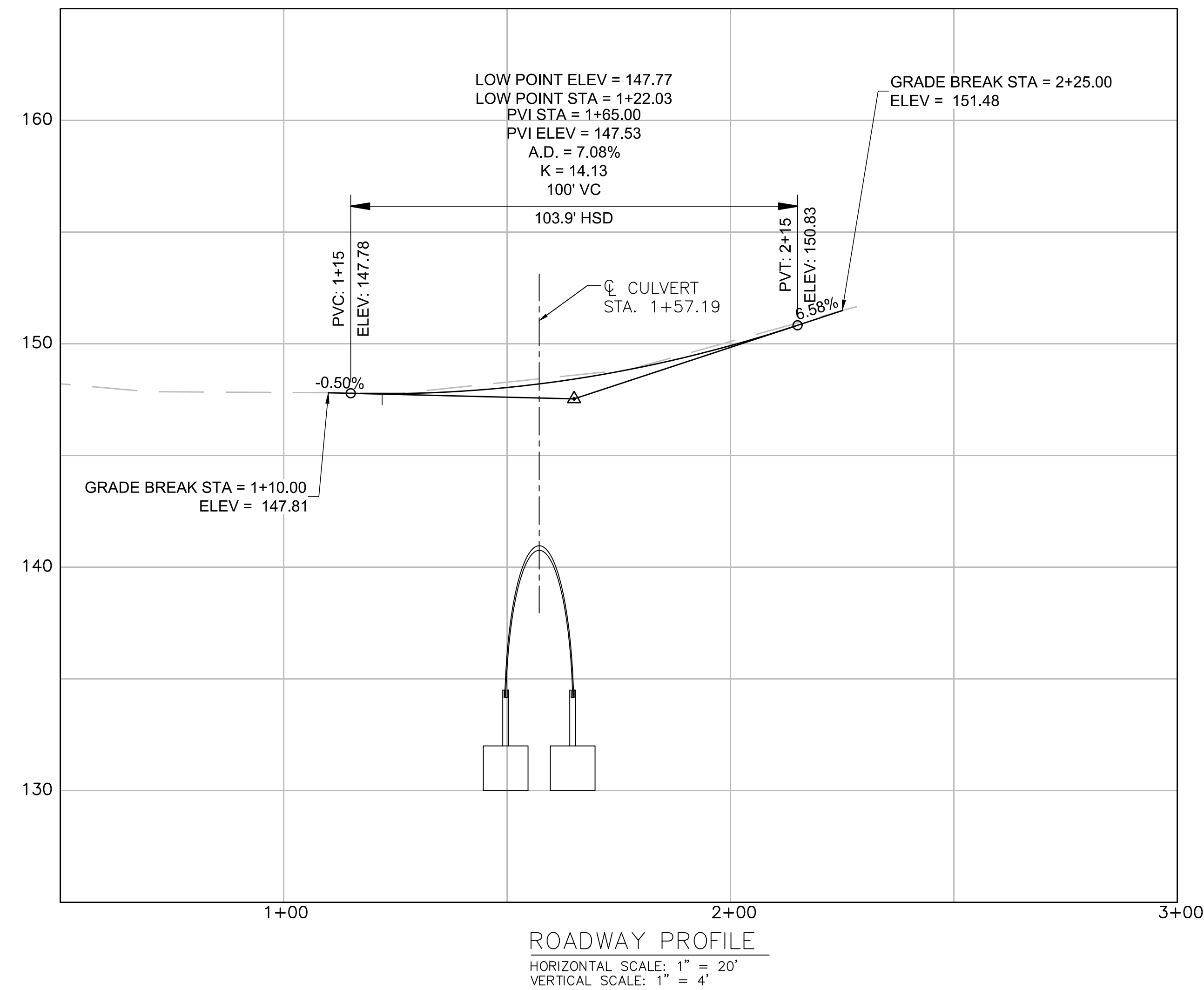
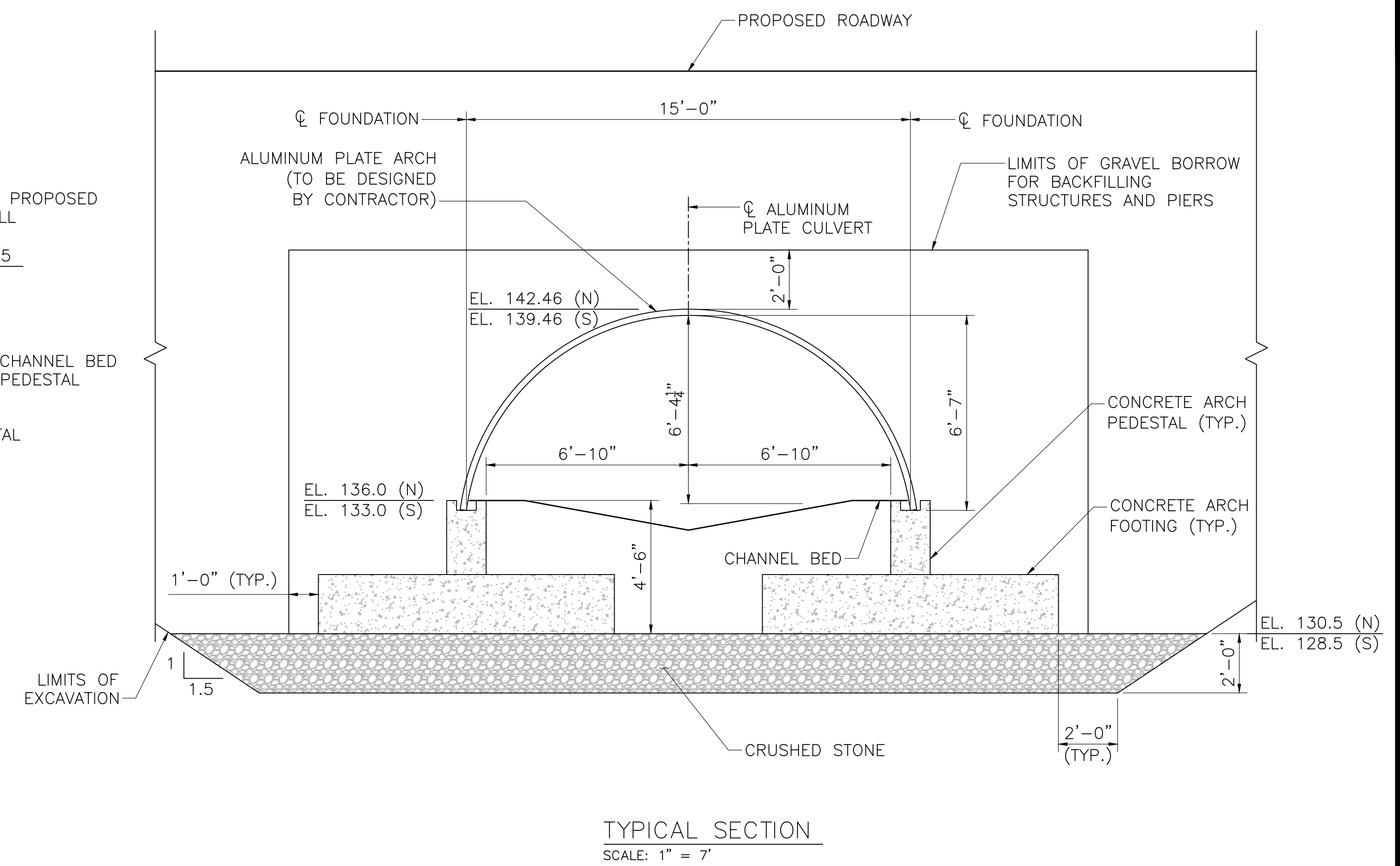
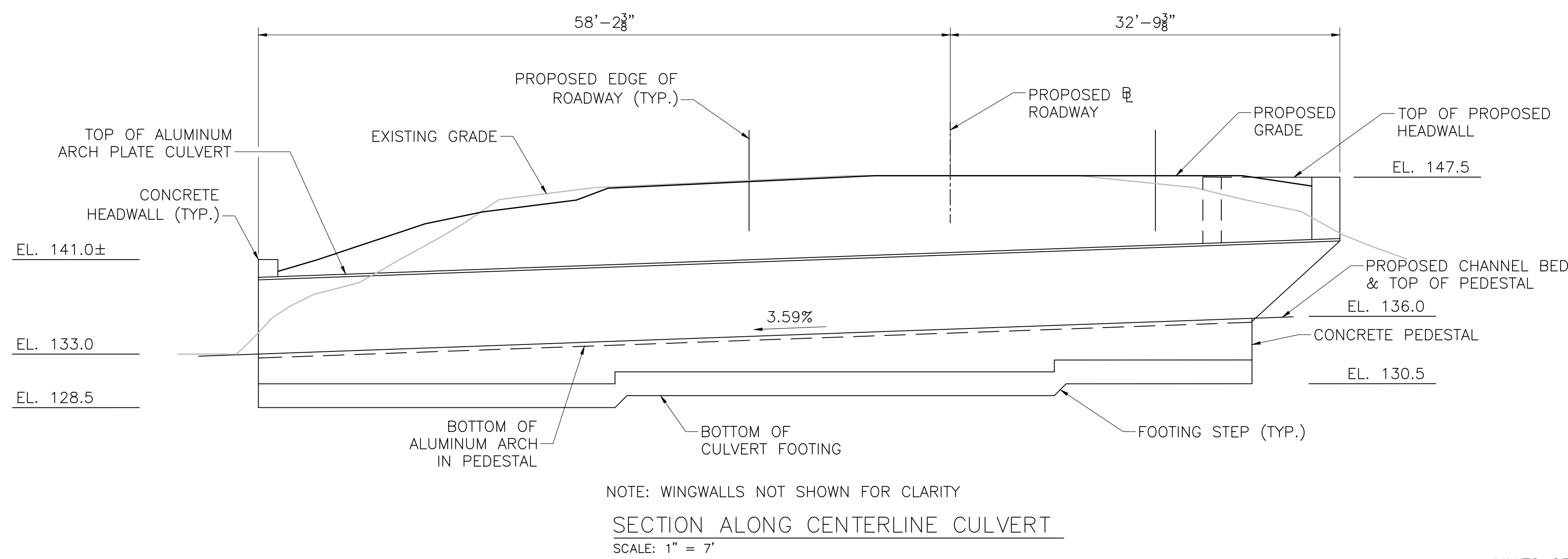
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146 HARTFORD ROAD
MANCHESTER, CONNECTICUT 06040
860.646.2469
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TOWN OF SOUTH HADLEY
MOUNTAIN AVE. STRUCTURES PLAN
MOUNTAIN AVENUE CULVERT REPLACEMENT &
DOWNSTREAM IMPROVEMENTS
SOUTH HADLEY MASSACHUSETTS

PROJ. No.: 20170390.V50
DATE: 05/01/2023

STR-01

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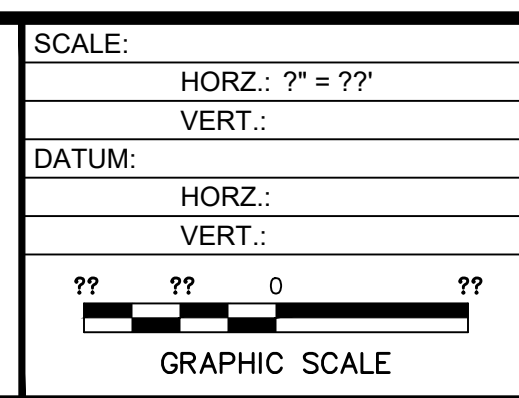
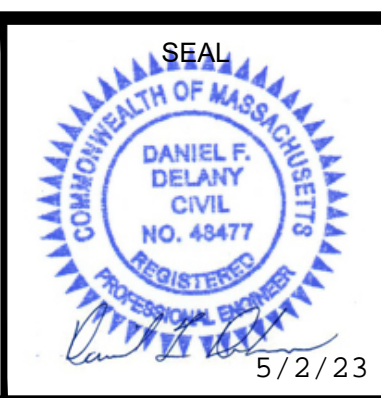


COMMONWEALTH OF MASSACHUSETTS
MassDOT, Highway Division
CONCEPTUAL DESIGN IS ACCEPTABLE
TO MASSDOT FOR CONTRACTING

DISTRICT TWO BRIDGE ENGINEER _____ DATE _____

| No. | DATE | DESCRIPTION | DESIGNER | REVIEWER |
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TOWN OF SOUTH HADLEY
MOUNTAIN AVE. STRUCTURES ELEVATION,
SECTION AND PROFILE
MOUNTAIN AVENUE CULVERT REPLACEMENT &
DOWNSTREAM IMPROVEMENTS
SOUTH HADLEY MASSACHUSETTS

PROJ. No.: 20170390.V50
DATE: 05/01/2023

STR-02

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PC3: NONE STRUCTB: MADOT-D.STB



LOG OF BORING MA-1

Page 1 of 2

| | | | |
|--------------------|----------------------------------|---------------------|---------------------------------|
| PROJECT | Mountain Ave Culvert Replacement | CONTRACTOR | Seaboard Environmental Drilling |
| JOB NUMBER | 2950-11-02 | DRILLING EQUIPMENT | Track Mounted Rig |
| LOCATION | South Hadley, MA | FOREMAN | Jeff |
| START DATE | 9/21/2022 | HELPER | Joe |
| FINISH DATE | 9/21/2022 | UNDISTURBED SAMPLES | 0 |
| ENGINEER/SCIENTIST | Caren Irgang | BIT TYPE | Roller Bit with Wash |
| | | ROD TYPE | N (2 3/8" O.D.) |
| | | SAMPLER | 2" O.D. Split Spoon |
| | | HAMMER TYPE | Automatic |
| | | HAMMER WGT/DROP | 140 lb / 30" |

| DEPTH (ft) SAMPLES | PENETR. RESIST. (bl / 6 in) | REC. (in) | TYPE/ NO. | FIELD TEST DATA | SAMPLE DESCRIPTION (MODIFIED BURMISTER) | PROFILE DEPTH (ft) ELEV. | REMARKS/ WELL CONSTRUCTION |
|--------------------|-----------------------------|-------------|----------------------------------|-----------------|--|--|----------------------------|
| 2/4/5 | 8/24 | S-1 (0-2) | -- | | Top 4": Loose, dark brown, fine SAND, some silt, little medium sand, trace coarse sand, trace organics (grass, roots), damp (TOPSOIL) Bottom 4": Loose, black, fine to medium SAND, little to some silt, trace coarse sand, damp | TOPSOIL DEBRIS FILL | |
| 4/5/6 | 0/24 | S-2 (2-4) | -- | | NO RECOVERY (likely pushing gravel pieces) | | |
| 4/5/4/3 | 19/24 | S-3 (4-6) | -- | | Loose, black, fine to medium SAND, little coarse sand, little fine gravel, little debris (cinders, ash), damp | | |
| 1/1/1 for 12" | 8/24 | S-4 (6-8) | -- | | Top 5": Very loose, black, fine to medium SAND, little coarse sand, little fine gravel, little debris (cinders, ash), damp Bottom 3": Very loose, light red, fine SAND and SILT, trace debris (brick, coal), damp | | |
| WOH for 24" | 11/24 | S-5 (8-10) | -- | | Top 5": Very loose, brown, medium to coarse SAND, some silt, some fine sand, trace organics (roots), damp Bottom 6": Very loose, black, DEBRIS (cinders), damp | | 1 |
| 1/1/1 for 12" | 16/24 | S-6 (10-12) | -- | | Top 6": Very loose, black, DEBRIS (cinders), damp Next 5": Very loose, brown, medium to coarse SAND, some silt, some fine sand, damp Bottom 5": Very loose, black, fine to medium SAND, little coarse sand, little fine gravel, little debris (cinders, ash), damp | | 2 |
| 2/1/1/1 | 11/24 | S-7 (15-17) | -- | | Top 1.5": Soft, brown gray, clayey SILT and fine SAND, little organics, trace medium to coarse sand (organic odor) Bottom 9.5": Very loose, brown gray, fine to medium SAND, trace silt | 15.0 132.0 ORGANIC SILT AND SAND | 3 |
| WOH for 18/12" | 24/24 | S-8 (20-22) | TV = 0.5 PP = 0.55 w = 49% | | Soft, gray, varved SILT and CLAY (3/4" clay, 1/4" silt) | 19.0 128.0 VARVED SILT AND CLAY | 4, 5 6 7 |
| 1/2/3/3 | 22/24 | S-9 (25-27) | TV = 0.15 PP = 0.7 w = 49% | | Medium stiff, gray, varved SILT and CLAY (1/2-3/4" clay, 1/4-1/2" silt) | | |

Remarks:
 1. WOH = Weight of rods and 140 lb. hammer.
 2. Drive casing and begin drilling with wash after sampling S-6.
 3. Easy drilling conditions from 15' to 18'. Wood pieces in wash water at 18'.
 4. Begin open-hole drilling at 20'.
 5. Undrained shear strength estimated in field using E285 Pocket Torvane (TV). Values in tons/ft².
 6. Unconfined compressive strength estimated in field using Pocket Penetrometer (PP). Values in tons/ft².
 7. In-situ moisture content (w) determined according to ASTM D2216 Method A.
 8. Bit bouncing at 28.5'.
 9. Bit grinding at 39'.

PROJECT NO.
2950-11-02
LOG OF BORING
MA-1



LOG OF BORING MA-1

Job No. 2950-11-02

Page 2 of 2

| DEPTH (ft) SAMPLES | PENETR. RESIST. (bl / 6 in) | REC. (in) | TYPE/ NO. | FIELD TEST DATA | SAMPLE DESCRIPTION (MODIFIED BURMISTER) | PROFILE DEPTH (ft) ELEV. | REMARKS/ WELL CONSTRUCTION |
|--------------------|-----------------------------|-----------|----------------|-----------------|---|--|----------------------------|
| 30' | 20/15/24/24 | 16/24 | S-10 (30-32) | -- | Dense, red brown, fine SAND, some silt, some medium to coarse sand, little coarse sand, little fine gravel, trace coarse gravel (1" gravel piece near bottom) | VARVED SILT AND CLAY (Continued) GLACIAL TILL | 8 |
| 35' | 21/22/28/46 | 18/24 | S-11 (35-37) | -- | Very dense, red brown, fine SAND, some silt, some medium sand, little coarse sand, trace gravel (2" medium sand layer near top) | | |
| 40' | 50 for 4" | 0/4 | S-12 (39-39.4) | -- | NO RECOVERY Bit refusal at 39.4' | 39.0 108.0 BEDROCK | 9 |



LOG OF BORING MA-2

Page 1 of 2

| | | | |
|--------------------|----------------------------------|---------------------|---------------------------------|
| PROJECT | Mountain Ave Culvert Replacement | CONTRACTOR | Seaboard Environmental Drilling |
| JOB NUMBER | 2950-11-02 | DRILLING EQUIPMENT | Track Mounted Rig |
| LOCATION | South Hadley, MA | FOREMAN | Jeff |
| START DATE | 9/21/2022 | HELPER | Joe |
| FINISH DATE | 9/21/2022 | UNDISTURBED SAMPLES | 0 |
| ENGINEER/SCIENTIST | Caren Irgang | BIT TYPE | Roller Bit with Wash |
| | | ROD TYPE | N (2 3/8" O.D.) |
| | | SAMPLER | 2" O.D. Split Spoon |
| | | HAMMER TYPE | Automatic |
| | | HAMMER WGT/DROP | 140 lb / 30" |

| DEPTH (ft) SAMPLES | PENETR. RESIST. (bl / 6 in) | REC. (in) | TYPE/ NO. | FIELD TEST DATA | SAMPLE DESCRIPTION (MODIFIED BURMISTER) | PROFILE DEPTH (ft) ELEV. | REMARKS/ WELL CONSTRUCTION |
|--------------------|-----------------------------|-------------|-----------------------------------|-----------------|---|--|----------------------------|
| 5/7/5/3 | 16/24 | S-1 (0-2) | -- | | Top 3": ASPHALT Next 3": Medium dense, dark gray, medium to coarse SAND, some fine gravel, damp Bottom 10": Medium dense, orange, black and brown, fine to coarse SAND, little to some fine gravel, little silt, damp | ASPHALT / BASE DEBRIS FILL | |
| 2/2/3/1 | 12/24 | S-2 (2-4) | -- | | Loose, black to light gray, DEBRIS (cinders, ash), damp | | |
| 2/2/2/2 | 21/24 | S-3 (5-7) | -- | | Loose, black to light gray, DEBRIS (cinders, ash), damp | | |
| 1/1/1/1 | 18/24 | S-4 (11-13) | -- | | Top 11": Very loose, black, DEBRIS (cinders, ash), trace coarse sand Bottom 9": Very loose, gray and orange, DEBRIS (cinders, ash) | | |
| 1/1/1/1 | 18/24 | S-5 (13-15) | -- | | Very loose, black to gray, DEBRIS (cinders, ash), damp (rust stained orange at bottom) | | |
| 3/2/2/2 | 24/24 | S-6 (15-17) | w = 46% | | Top 7": Loose, black to gray, DEBRIS (cinder, ash), little fine to coarse sand Next 10": Medium stiff, very dark brown to gray brown, clayey SILT and fine SAND, little organics (1/8" black seams in top 4" with 1/2" medium sand trace silt seam below, organic odor) Next 4": Loose, gray brown, fine SAND, trace silt, wet Bottom 3": Loose, gray brown, fine SAND and SILT, wet | 15.5 132.0 ORGANIC SILT AND SAND | 1, 2 |
| 2/1 for 12/1" | 18/24 | S-7 (20-22) | TV = 0.75 PP = 0.75 w = 39% | | Very soft, gray to red brown, varved clayey SILT, trace fine sand (1/4-1/2" red brown silt, 1/4" clay) | 19.5 128.0 VARVED SILT AND CLAY | 3 4, 5 6 |
| 1/2/3/3 | 6/24 | S-8 (25-27) | TV = 0.25 PP = 0.25 w = 51% | | Medium stiff, gray, varved SILT and CLAY, trace fine sand (3/4" clay, 1/4" silt) | | |

Remarks:
 1. Drive casing and begin drilling with wash after sampling S-6.
 2. In-situ moisture content (w) determined according to ASTM D2216.
 3. Casing sinking at approximately 19'.
 4. Begin open-hole drilling at 20'.
 5. Undrained shear strength estimated in field using E285 Pocket Torvane (TV). Values in tons/ft².
 6. Unconfined compressive strength estimated in field using Pocket Penetrometer (PP). Values in tons/ft².
 7. Drilling slightly more difficult below 29.5'.
 8. Bit grinding at 32' and 39'.

PROJECT NO.
2950-11-02
LOG OF BORING
MA-2

BORING NOTES:

1. LOCATION OF THE BORINGS ARE SHOWN THUS:
2. BORINGS ARE TAKEN FOR PURPOSE OF DESIGN AND SHOW CONDITIONS AT BORING POINTS ONLY, BUT DO NOT NECESSARILY SHOW THE NATURE OF THE MATERIALS TO BE ENCOUNTERED DURING CONSTRUCTION.

COMMONWEALTH OF MASSACHUSETTS
MassDOT, Highway Division
CONCEPTUAL DESIGN IS ACCEPTABLE
TO MASSDOT FOR CONTRACTING
 DISTRICT TWO BRIDGE ENGINEER _____ DATE _____

| | | | | |
|-----|------|-------------|----------|----------|
| No. | DATE | DESCRIPTION | DESIGNER | REVIEWER |
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TOWN OF SOUTH HADLEY
 BORING LOGS I
 MOUNTAIN AVENUE CULVERT REPLACEMENT &
 DOWNSTREAM IMPROVEMENTS
 SOUTH HADLEY MASSACHUSETTS

PROJ. No.: 20170390.V50
 DATE: 05/01/2023
STR-03

LOG OF BORING MA-2

| DEPTH (ft) SAMPLES | SAMPLES | | | | SAMPLE DESCRIPTION (MODIFIED BURMISTER) | PROFILE | | REMARKS/ WELL CONSTRUCTION |
|-----------------------|-----------------------------------|--------------|-------------------|----------------------------------|--|---------------|-------|---|
| | PENETR. RESIST. (bl / 6 in) | REC. (in) | TYPE/ NO. | FIELD TEST DATA | | DEPTH (ft) | ELEV. | |
| 30' | 4/4/18 | 8/24 | S-9 (30-32) | TV = 0.2 PP = 1.25 w = 41% | Stiff, gray to red brown, varved clayey SILT, trace fine sand (1/4" clay, 1/4" silt) | 32.0 | 115.5 | 7 VARVED SILT AND CLAY (Continued) |
| 35' | 29/31/29/33 | 19/24 | S-10 (35-37) | -- | Very dense, red brown, fine SAND, some silt, little medium to coarse sand, little gravel | | | 8 GLACIAL TILL |
| 40' | 50 for 3.5" | 2/24 | S-11 (39-39.4) | -- | Hard, dark gray, ROCK (fractured pieces of likely sandstone) Bit refusal at 39.4' | 39.0 | 108.5 | 8 BEDROCK |

LOG OF BORING QD-2

| | | | |
|--------------------|--|-------------------------|-----------------------------------|
| PROJECT | Queensville Dam Removal and Culvert Replacements | CONTRACTOR | Seaboard Environmental Drilling |
| JOB NUMBER | 2950-11-01 | DRILLING EQUIPMENT | B-53 Truck Mounted Rig |
| LOCATION | South Hadley, MA | SURFACE ELEV (ft) | 148.0 |
| START DATE | 9/29/2021 | FOREMAN | Mike G |
| FINISH DATE | 9/29/2021 | HELPER | Ben B |
| ENGINEER/SCIENTIST | Jhonatan Escobar | BIT TYPE | H.S.A. & Roller Bit with Wash |
| | | ROD TYPE | A (1 5/8" O.D.) & N (2 3/8" O.D.) |
| | | SAMPLER | 2" O.D. Split Spoon |
| | | HAMMER TYPE | Safety |
| | | HAMMER WGT/DROP | 140 lb / 30" Wire Line |
| | | ROCK CORING INFORMATION | |
| | | TYPE | N/A |
| | | SIZE | N/A |

| DEPTH (ft) SAMPLES | SAMPLES | | | | SAMPLE DESCRIPTION (MODIFIED BURMISTER) | PROFILE | | REMARKS/ WELL CONSTRUCTION |
|-----------------------|-----------------------------------|--------------|------------------|----------------------------------|---|---------------|-------|----------------------------------|
| | PENETR. RESIST. (bl / 6 in) | REC. (in) | TYPE/ NO. | FIELD TEST DATA | | DEPTH (ft) | ELEV. | |
| 7' | 12/10/8/7 | 13/24 | S-1 (0.5-2.5) | -- | 7" ASPHALT Medium dense, dark brown to black, fine to medium SAND, some coarse sand, little silt, trace debris (brick, coal), damp (FILL) | | | |
| 5' | 5/6/6/14 | 5/24 | S-2 (2.5-4.5) | -- | Medium dense, dark brown to black, fine to medium SAND, some coarse sand, little to trace silt, trace debris (coal, coal ash), damp (FILL) | | | |
| 5' | 7/8/4/4 | 12/24 | S-3 (5-7) | -- | Top 10": Medium dense, dark brown to black, fine to coarse SAND, little fine gravel, trace silt, wet (FILL) Bottom 2": Stiff, gray brown with slight rust staining, clayey SILT, trace fine sand, wet (Varved) | 143.0 | 141.5 | |
| 4' | 4/7/9/11 | 14/24 | S-4 (7-9) | -- | Very stiff, gray brown, SILT and CLAY, trace fine sand, damp (Varved) | | | |
| 10' | 4/5/6/6 | 24/24 | S-5 (10-12) | PP=2.25 TSF TV=0.45 TSF | Stiff, brown, CLAY and SILT, trace fine sand, wet (Varved, 1/2 to 1" Varves) | | | 1,2,3 |
| 15' | 6/8/10/10 | 22/24 | S-6 (15-17) | PP=1.0 TSF TV=0.6 TSF | Very stiff, brown, SILT and CLAY, trace fine sand (Varved) | | | |
| 20' | 3/3/4/4 | 24/24 | S-7 (20-22) | PP=0.5 TSF TV=0.2 TSF | Medium, gray, CLAY and SILT, trace fine sand (Varved) | | | |
| 25' | 7/7/6/6 | 7/24 | S-8 (25-27) | -- | Stiff, gray, CLAY and SILT, trace fine sand (Varved) | | | |

- Remarks:
- Augured to 10 feet then telescoped casing to 10 feet
 - Began drilling with wash after telescoping casing
 - Began open hole drilling at 10 feet, after sampling S-5
 - Roller bit grinding significantly from 33 to 39 feet, upon likely dense till
 - Undrained shear strength estimated in field using E285 Pocket Torvane (TV). Values in tons/ft².
 - Unconfined compressive strength estimated in field using Pocket Penetrometer (PP). Values in tons/ft².

PROJECT NO.
2950-11-01

LOG OF BORING
QD-2

LOG OF BORING QD-2

| DEPTH (ft) SAMPLES | SAMPLES | | | | SAMPLE DESCRIPTION (MODIFIED BURMISTER) | PROFILE | | REMARKS/ WELL CONSTRUCTION |
|-----------------------|-----------------------------------|--------------|-------------------|-----------------------|---|---------------|-------|---|
| | PENETR. RESIST. (bl / 6 in) | REC. (in) | TYPE/ NO. | FIELD TEST DATA | | DEPTH (ft) | ELEV. | |
| 30' | 50 FOR 5" | 5/5 | S-8 (30-30.4) | -- | Very dense, red brown, fine SAND, some silt, little medium sand, trace fine gravel (GLACIAL TILL) | 30.0 | 118.0 | 4 VARVED SILT AND CLAY (CONTINUED) GLACIAL TILL |
| 35' | 28/50 FOR 5" | 8/11 | S-9 (35-35.9) | -- | Very dense, red brown, fine SAND, some silt, little medium sand, little gravel, trace coarse sand (GLACIAL TILL) | | | |
| 40' | 50 FOR 1" | 0/1 | S-10 (39-39.1) | -- | No Recovery, Likely pushing rock End of exploration at 39.1', upon likely dense till | 39.1 | 108.9 | |

BORING NOTES:

- LOCATION OF THE BORINGS ARE SHOWN THUS:
- BORINGS ARE TAKEN FOR PURPOSE OF DESIGN AND SHOW CONDITIONS AT BORING POINTS ONLY, BUT DO NOT NECESSARILY SHOW THE NATURE OF THE MATERIALS TO BE ENCOUNTERED DURING CONSTRUCTION.

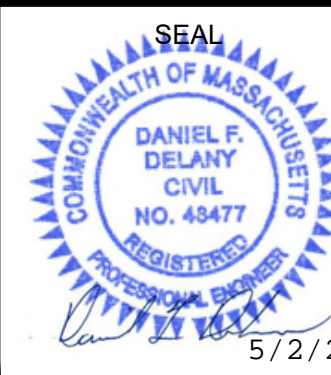
COMMONWEALTH OF MASSACHUSETTS
MassDOT, Highway Division
CONCEPTUAL DESIGN IS ACCEPTABLE
TO MASSDOT FOR CONTRACTING

DISTRICT TWO BRIDGE ENGINEER

DATE

| No. | DATE | DESCRIPTION | DESIGNER | REVIEWER |
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SEAL



5/2/23

SCALE:

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TOWN OF SOUTH HADLEY

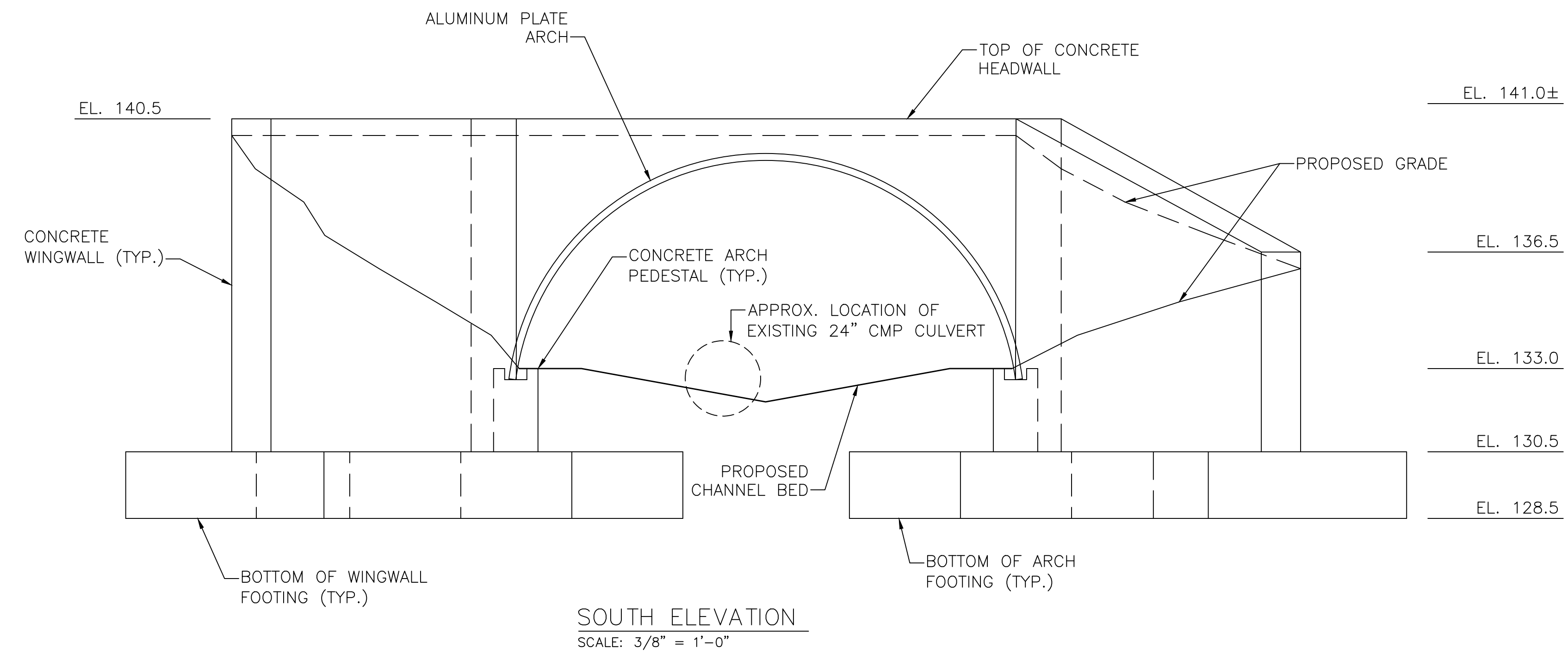
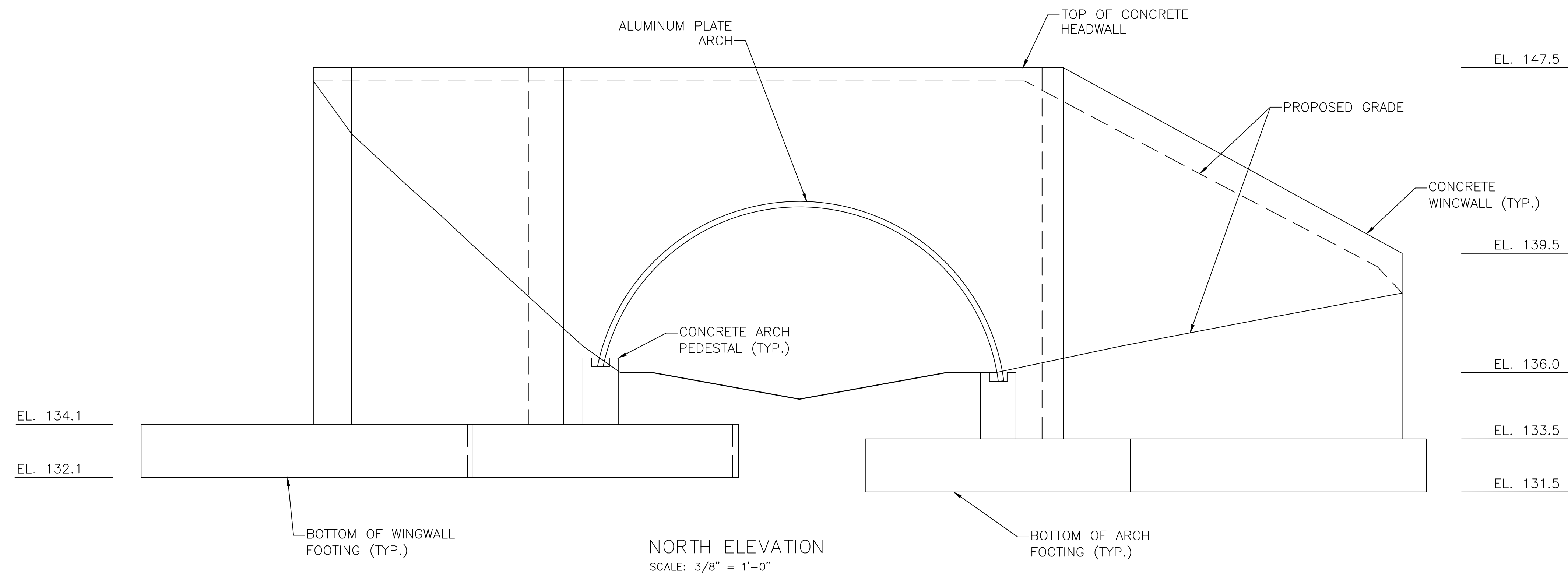
BORING LOGS II

MOUNTAIN AVENUE CULVERT REPLACEMENT &
DOWNSTREAM IMPROVEMENTS
SOUTH HADLEY MASSACHUSETTS

PROJ. No.: 20170390.V50
DATE: 05/01/2023

STR-04

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 PC3: NONE STRIBCTB.MADOT-D.STB
 LAYER STATE:

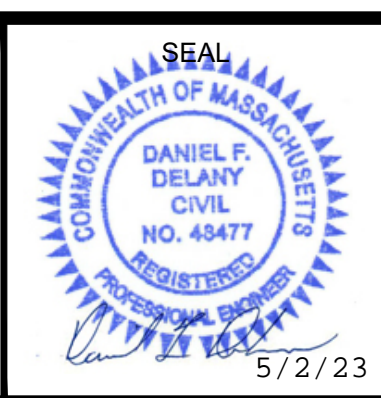


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MassDOT, Highway Division
CONCEPTUAL DESIGN IS ACCEPTABLE
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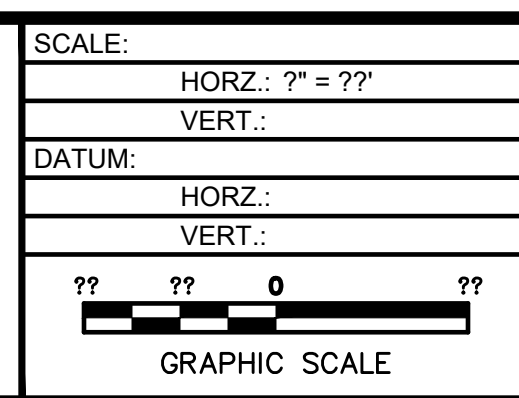
DISTRICT TWO BRIDGE ENGINEER _____ DATE _____

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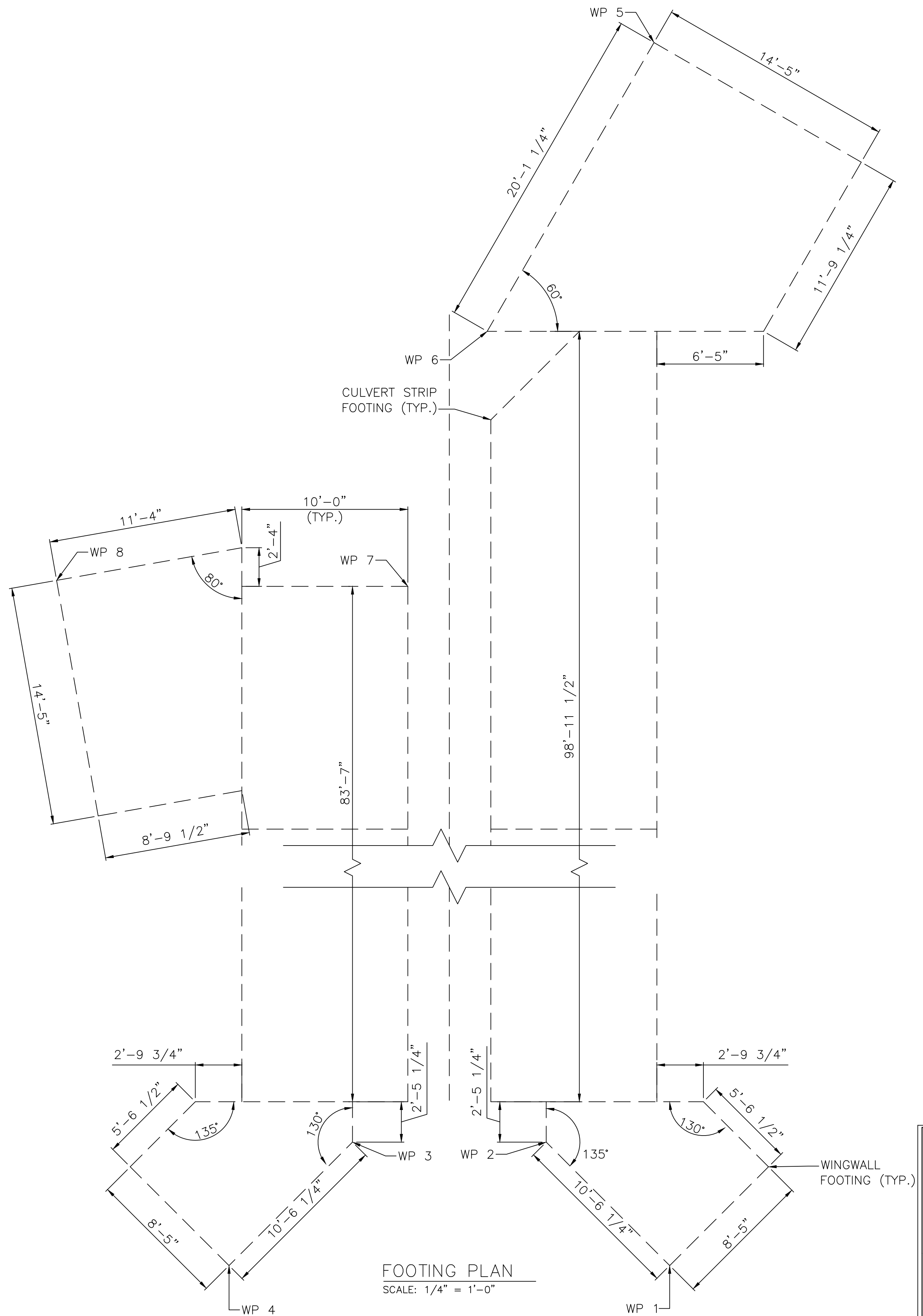
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TOWN OF SOUTH HADLEY
 WINGWALL ELEVATIONS
 MOUNTAIN AVENUE CULVERT REPLACEMENT &
 DOWNSTREAM IMPROVEMENTS
 SOUTH HADLEY MASSACHUSETTS

PROJ. No.: 20170390.V50
 DATE: 05/01/2023

STR-05

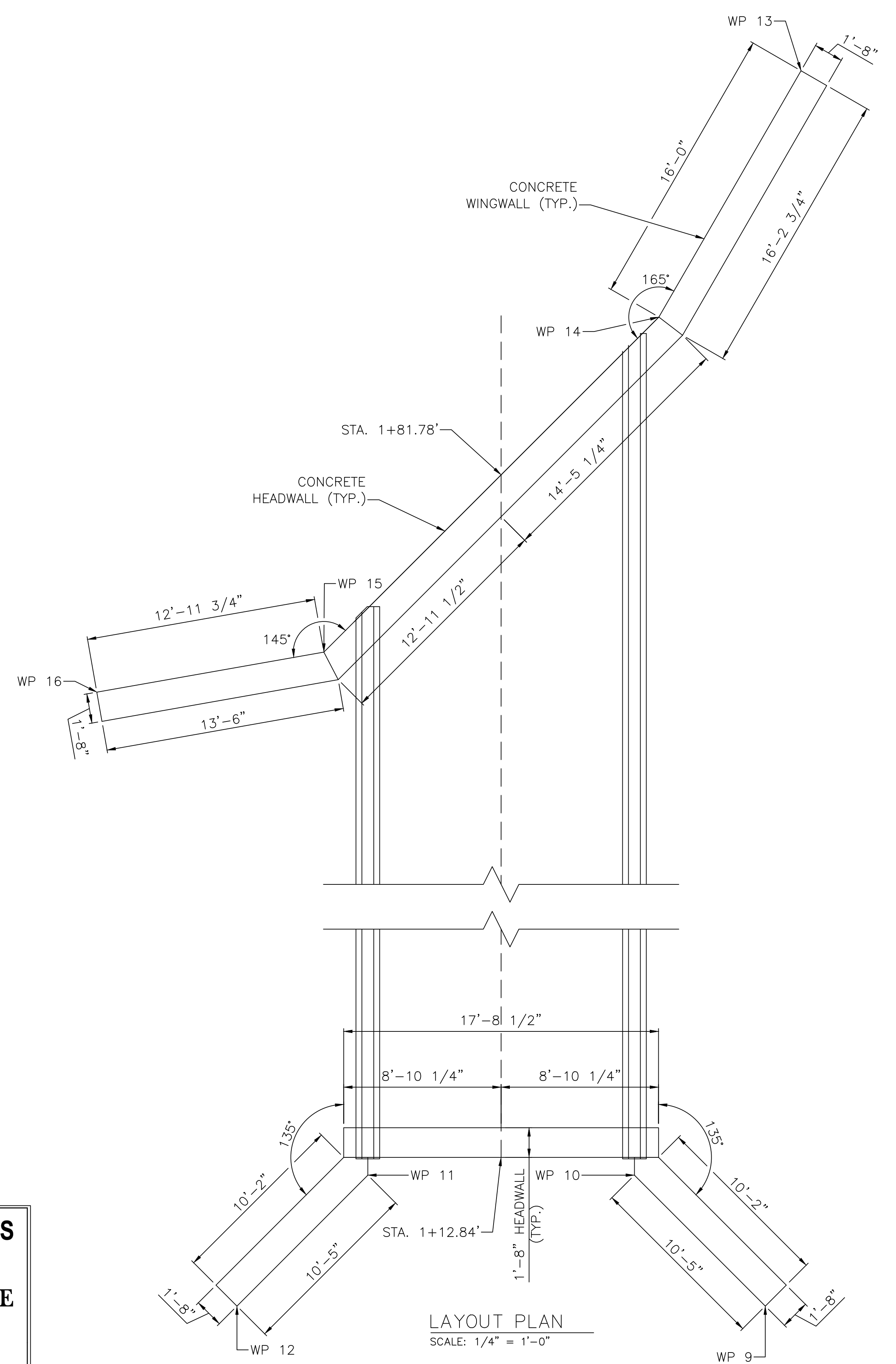
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 PC3: NONE STRICTB: MADOT-D.STB
 LAYER STATE:



| WP | STA. | OFFSET | ELEV |
|----|---------|--------|--------|
| 1 | | | 128.50 |
| 2 | | | 128.50 |
| 3 | | | 128.50 |
| 4 | | | 128.50 |
| 5 | | | 132.05 |
| 6 | | | 132.05 |
| 7 | | | 131.50 |
| 8 | | | 131.50 |
| 9 | 1+16.21 | 54.93 | 136.50 |
| 10 | 1+16.98 | 44.55 | 140.96 |
| 11 | 1+07.19 | 33.18 | 140.96 |
| 12 | 0+96.80 | 32.41 | 140.00 |
| 13 | 2+10.02 | -23.24 | 147.50 |
| 14 | 1+94.30 | -20.26 | 147.50 |
| 15 | 1+67.72 | -22.23 | 147.50 |
| 16 | 1+57.67 | -30.44 | 140.50 |

COMMONWEALTH OF MASSACHUSETTS
MassDOT, Highway Division
CONCEPTUAL DESIGN IS ACCEPTABLE
TO MASSDOT FOR CONTRACTING

DISTRICT TWO BRIDGE ENGINEER _____ DATE _____

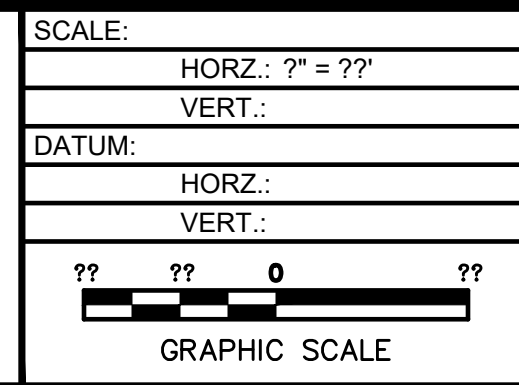


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SEAL



5/2/23



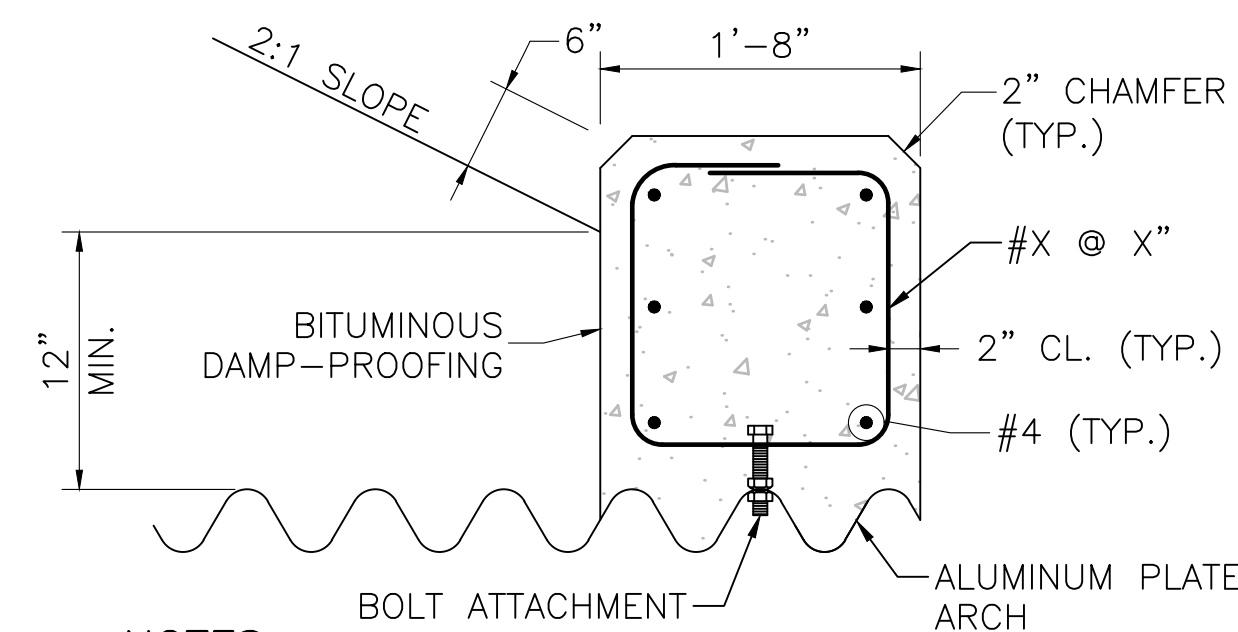
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TOWN OF SOUTH HADLEY
FOOTING PLAN
 MOUNTAIN AVENUE CULVERT REPLACEMENT &
 DOWNSTREAM IMPROVEMENTS
 SOUTH HADLEY MASSACHUSETTS

PROJ. No.: 20170390.V50
 DATE: 05/01/2023
STR-06

File: J:\DWG\20170390\50\Structures\STR04_20170390\50_DETAILS.dwg Layout: STR-07 Plotted: 2023-05-01 3:10 PM Saved: 2023-05-01 2:10 PM User: jslies
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 LAYER STATE:

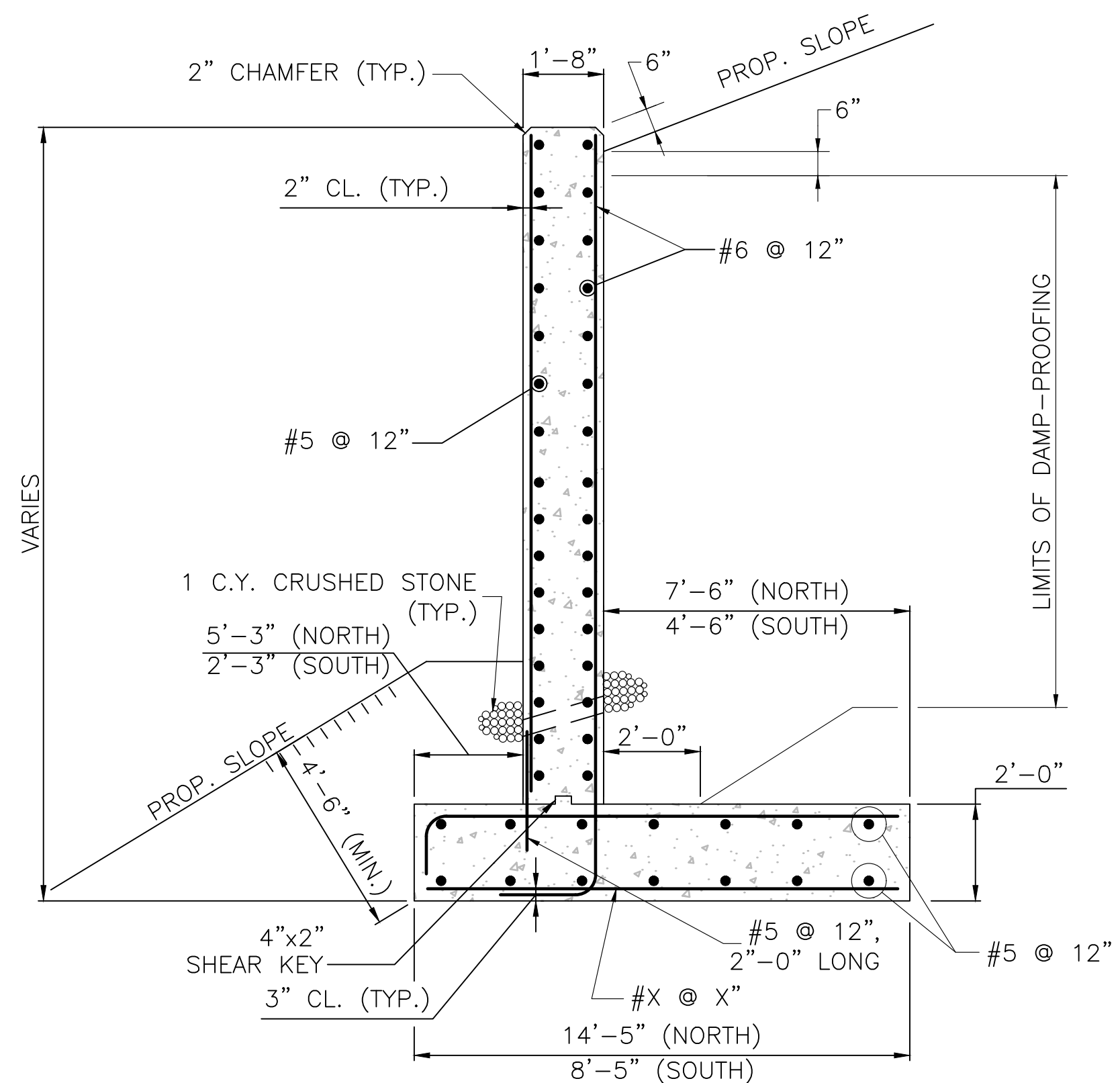


NOTES:

1. BOLT ATTACHMENT TO THE HEADWALL TO BE DESIGNED BY THE CULVERT MANUFACTURER.

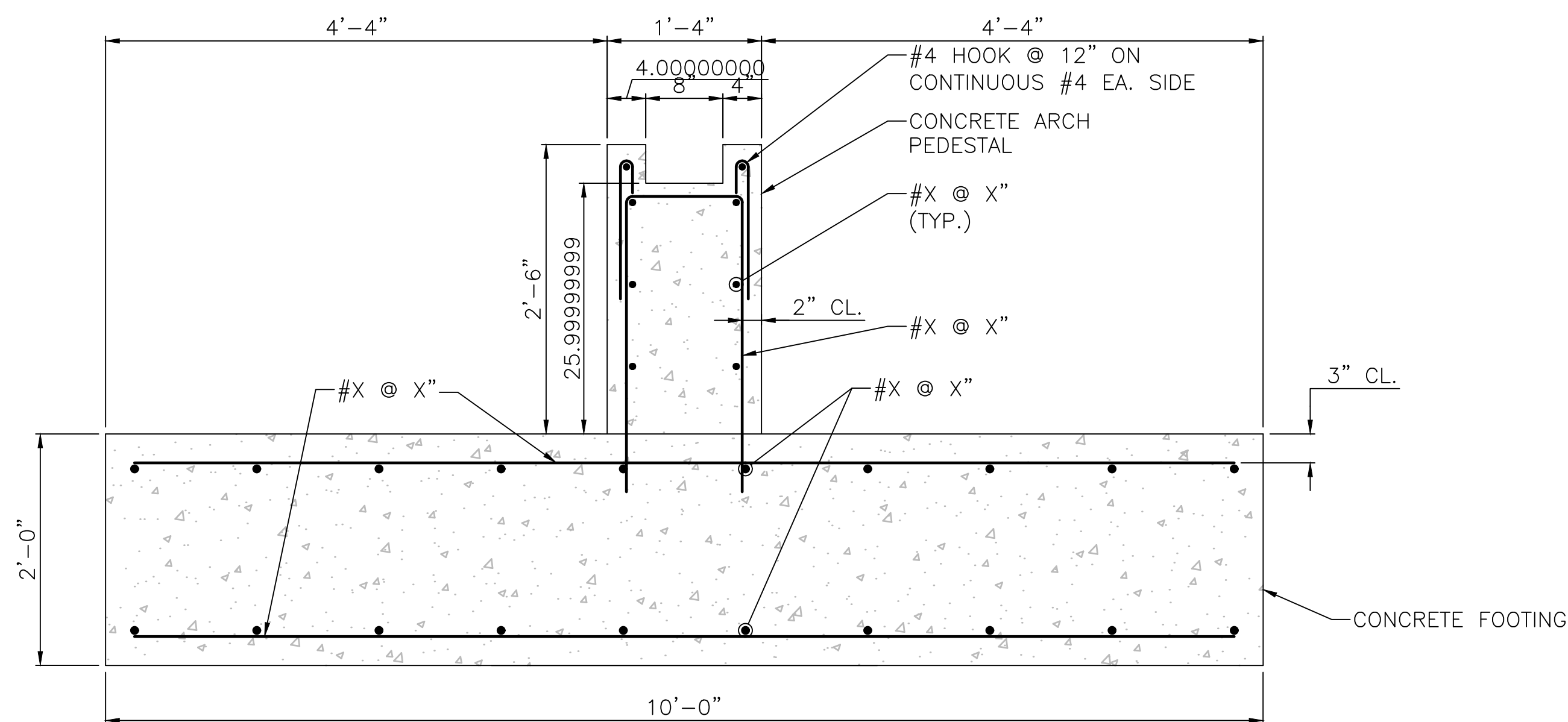
CULVERT END DETAIL

SCALE: 1" = 1'-0"



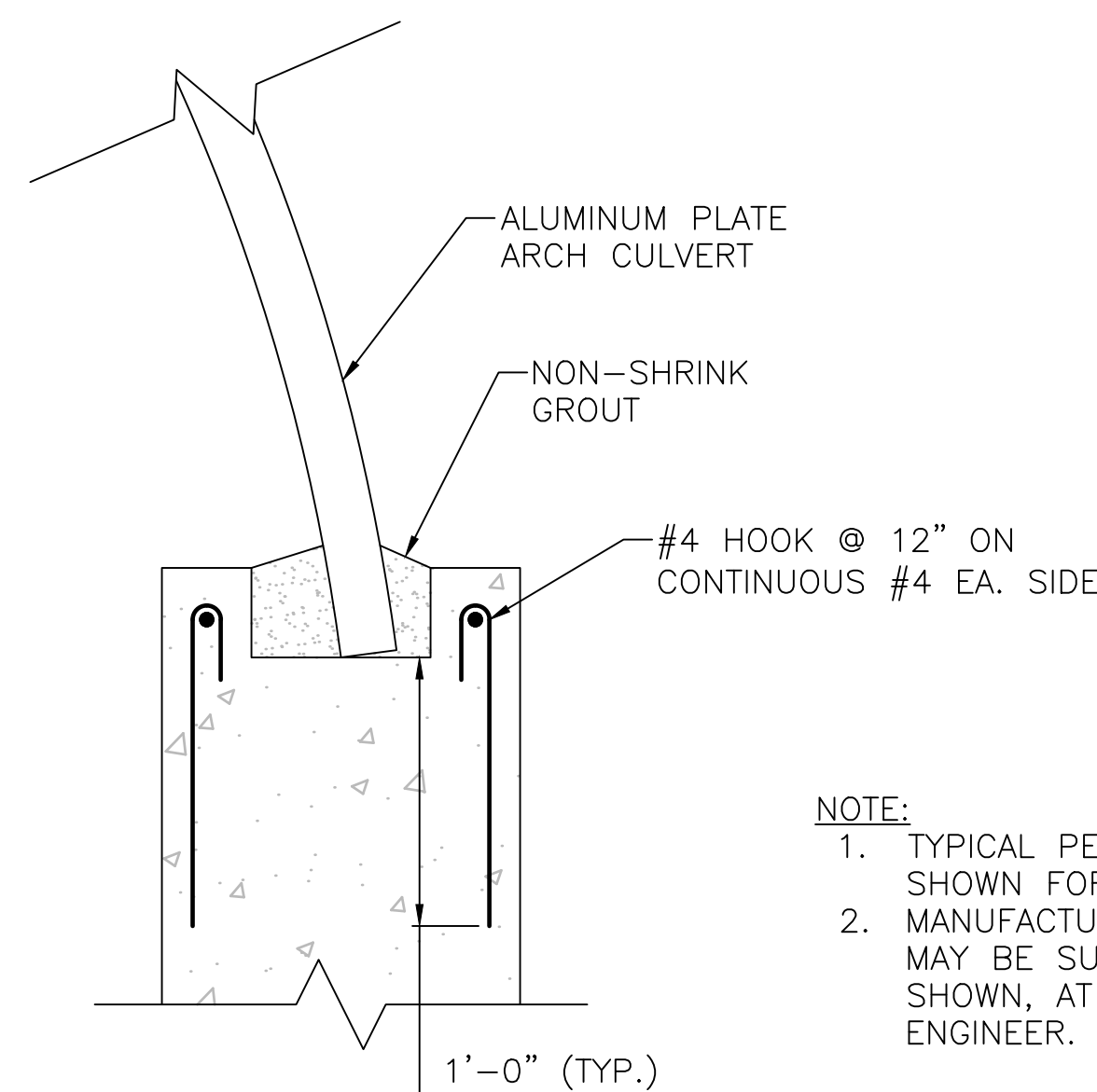
TYPICAL SECTION

SCALE: 3/8" = 1'-0"



TYPICAL ARCH FOOTING SECTION

SCALE: 1" = 1'-0"



SLOTTED CONCRETE FOOTING

SCALE: 1 1/2" = 1'-0"

NOTE:

1. TYPICAL PEDESTAL REINFORCING NOT SHOWN FOR CLARITY.
2. MANUFACTURER-PREFERRED DETAILS MAY BE SUBSTITUTED FOR THE NOTCH SHOWN, AT THE APPROVAL OF THE ENGINEER.

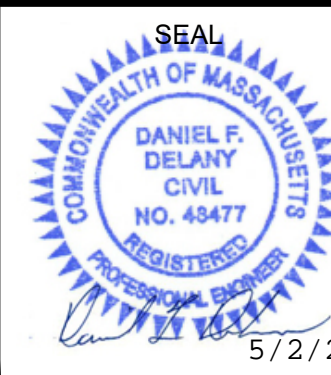
COMMONWEALTH OF MASSACHUSETTS
MassDOT, Highway Division
CONCEPTUAL DESIGN IS ACCEPTABLE
TO MASSDOT FOR CONTRACTING

DISTRICT TWO BRIDGE ENGINEER

DATE

| No. | DATE | DESCRIPTION | DESIGNER | REVIEWER |
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SEAL



5/2/23

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TOWN OF SOUTH HADLEY

DETAILS

MOUNTAIN AVENUE CULVERT REPLACEMENT &
 DOWNSTREAM IMPROVEMENTS
 SOUTH HADLEY MASSACHUSETTS

PROJ. No.: 20170390.V50
 DATE: 05/01/2023

STR-07