HOP BROOK CULVERT REPLACEMENT

WARREN WRIGHT ROAD · BELCHERTOWN · MASSACHUSETTS

FINAL CONSTRUCTION PLANS

MAY 7, 2026

PREPARED FOR

TOWN OF BELCHERTOWN
290 JACKSON STREET
P.O. BOX 306
BELCHERTOWN, MA 01007-0670

PREPARED BY

FUSS & O'NEILL
1550 MAIN STREET, SUITE 400
SPRINGFIELD, MA 01103
413.452.0445
www.fando.com

SHEET INDEX

PROJECT TEAM

SHERMAN & FRYDRYK
A DIVISION OF HANCOCK SURVEY ASSOCIATES, INC.
3 CONVERSE STREET, SUITE 203
PALMER, MA 01069
413.283.6210

SHERMAN & FRYDRYK
Land Surveying and Engineering
A division of Hancock Survey Associates, Inc.

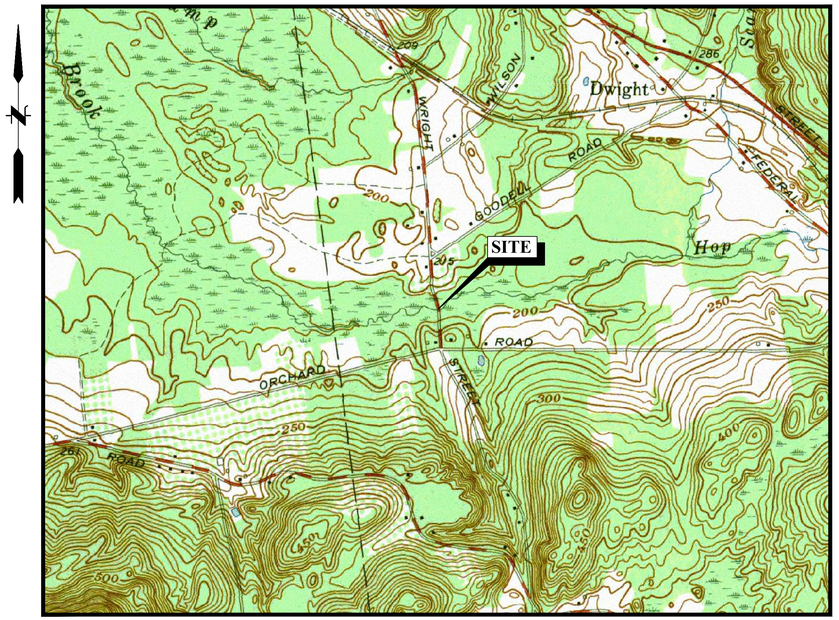
O'REILLY, TALBOT & OKUN ASSOCIATES, INC.
293 BRIDGE STREET, SUITE 500
SPRINGFIELD MA, 01103
413.788.6222

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

PROJECT FUNDING BY

MVP
Municipal Vulnerability Preparedness

Division of Ecological Restoration
Invested in Nature and Community



LOCATION MAP
SCALE: 1" = 1,000'

COMMONWEALTH OF MASSACHUSETTS
LARA SIUT
CIVIL ENGINEER
No. 59240
REGISTERED
PROFESSIONAL ENGINEER

PROJ. No.: 2002548.E30
DATE: MAY 7, 2026

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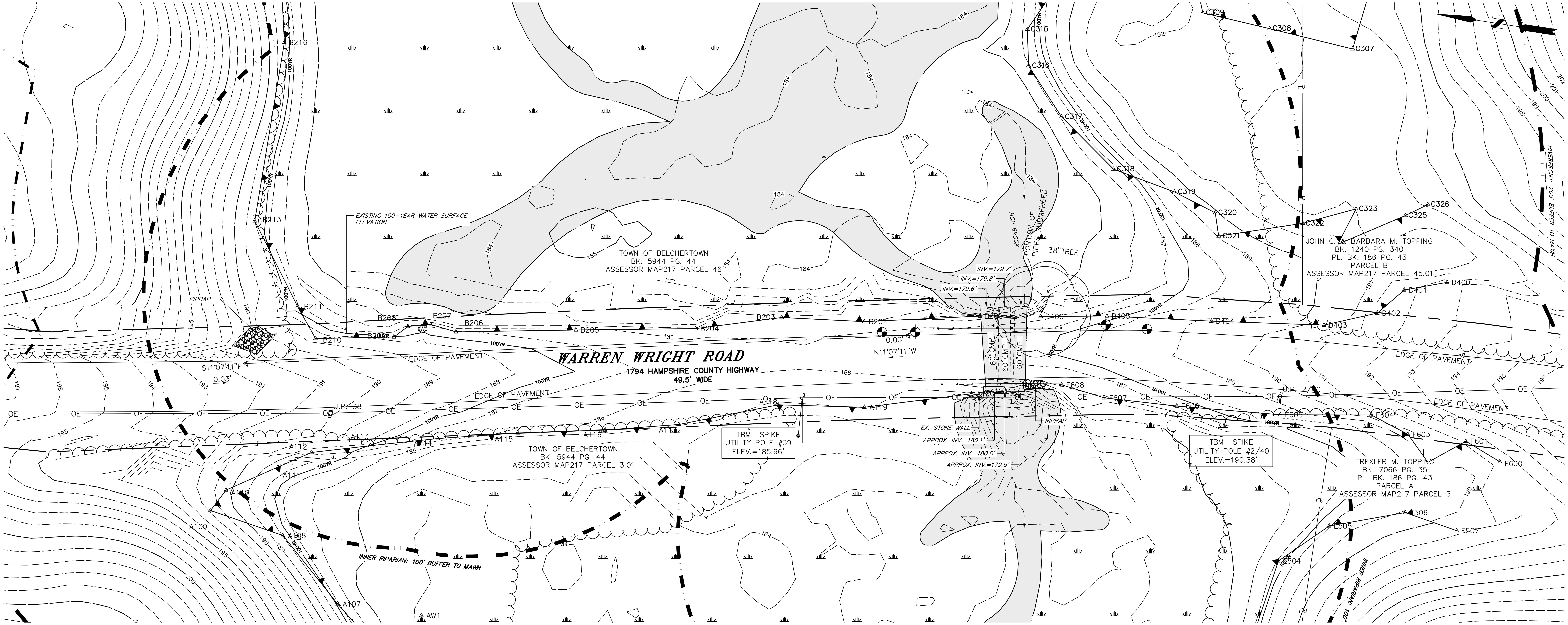

EXISTING CONDITION NOTES

MAP REFERENCE

1. EXISTING CONDITIONS DEPICTED ON THIS PLAN ARE BASED ON
   - 1.1. A PLAN ENTITLED: PLAN OF LAND IN BELCHERTOWN, MASSACHUSETTS, PREPARED FOR FUSS & O'NEILL, EXISTING CONDITIONS WARREN WRIGHT ROAD, REVISED THROUGH: DECEMEBER 17, 2021 PREPARED BY SHERMAN & FRYDRYK, 3 CONVERSE STREET, SUITE 203, PALMER, MASSACHUSETTS, JOB # 21178, DWG # 21178-EC. VERTICAL BENCHMARKS WERE SET AND ARE SHOWN ON THE PLANS.
   - 1.2. A GPS FIELD INVESTIGATION OF WETLAND FLAG SERIES C AND MEAN ANNUAL HIGH WATER/BANK/OHW PERFORMED BY FUSS & O'NEILL ON OCTOBER 19, 2021.
   - 1.3. 2019 USGS LEAF-OFF AERIAL IMAGERY USED TO APPROXIMATE BANKS WHERE ACCESS WAS NOT FEASIBLE.
   - 1.4. 2015 MAINE AND MASSACHUSETTS QL1 AND QL2 USGS LIDAR DATA.
2. TOPOGRAPHIC ELEVATIONS ARE BASED ON NAVD88 DATUM. HORIZONTAL DATUM IS NAD83.
3. PROPERTY AND EASEMENT LINES SHOWN ARE BASED ON MASSGIS DATA AND ARE NOT THE RESULT OF A PROPERTY LINE SURVEY.
4. GEOTECHNICAL DATA INCLUDING BORING LOCATIONS AND ELEVATIONS WERE OBTAINED FROM O'REILLY, TALBOT & OKUN ENGINEERING ASSOCIATES.
5. WETLANDS WERE DELINEATED BY FUSS & O'NEILL SOIL SCIENTIST MICHAEL SOARES ON OCTOBER 19, 2021.
6. THE 100-FOOT WETLAND BUFFER ZONE IS NOT SHOWN: AREAS OUTSIDE OF LAND UNDER WATER (LUW) AND BORDERING VEGETATED WETLANDS (BVW) ARE LOCATED WITHIN THE 100-FOOT BUFFER ZONE.
7. 100 YEAR FLOOD BASE FLOOD ELEVATION OF 187.4 FEET AT WARREN WRIGHT ROAD BASED ON HEC-RAS 2D HYDRAULIC MODEL CREATED BY FUSS & O'NEILL.

GENERAL NOTES

1. SYMBOLS AND LEGENDS OF PROJECT FEATURES ARE GRAPHIC REPRESENTATIONS AND ARE NOT NECESSARILY SHOWN ON THE DRAWINGS TO SCALE OR TO THEIR ACTUAL DIMENSION OR LOCATION. COORDINATE DETAIL SHEET DIMENSIONS, MANUFACTURERS' LITERATURE, SHOP DRAWINGS AND FIELD MEASUREMENTS OF SUPPLIED PRODUCTS FOR LAYOUT OF THE PROJECT FEATURES.
2. DO NOT RELY SOLELY ON ELECTRONIC VERSIONS OF DRAWINGS, SPECIFICATIONS, AND DATA FILES THAT ARE PROVIDED BY THE ENGINEER. FIELD VERIFY LOCATION OF PROJECT FEATURES.
3. PERFORM NECESSARY CONSTRUCTION NOTIFICATIONS, APPLY FOR AND OBTAIN NECESSARY PERMITS, PAY FEES, AND POST BONDS ASSOCIATED WITH THE WORK AS REQUIRED BY THE CONTRACT DOCUMENTS.
4. LOCATION OF UTILITIES SHOWN HEREON ARE THE RESULT OF SURFACE EVIDENCE AS LOCATED BY FIELD SURVEY, PLANS OF RECORD, INFORMATION FURNISHED BY THE RESPECTIVE UTILITY COMPANIES, AND OTHER AVAILABLE SOURCES. THIS PLAN DOES NOT NECESSARILY DEPICT THE EXACT LOCATION OF ALL UTILITIES WHICH MAY EXIST AT THIS TIME WITHIN THE PREMISES SURVEYED. 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.
5. REFER TO CONTRACT DOCUMENTS FOR GEOTECHNICAL REQUIREMENTS.

REGULATORY REQUIREMENTS

1. REVIEW AND APPROVALS – CHAPTER 85 SECTION 35: IN ACCORDANCE AND COMPLIANCE WITH THE REQUIREMENTS OF CHAPTER 85 SECTION 35 OF MASSACHUSETTS GENERAL LAWS, 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 PRECAST RIGID FRAME 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.
2. REVISIONS TO THE APPROVED PLANS SHALL ALSO BE SUBMITTED TO FUSS & O'NEILL, INC. AND MASSDOT FOR APPROVALS.
3. THIS PROJECT DISTURBS AREAS LOCATED WITHIN DEPARTMENT OF ENVIRONMENTAL PROTECTION (DEP) REGULATED AREAS AND REQUIRES THE FILING OF A NOTICE OF INTENT (NOI). THE TOWN OF BELCHERTOWN HAS SUBMITTED REQUIRED INFORMATION TO THE DEP AND TOWN/CITY CONSERVATION COMMISSION.
4. CONTRACTOR IS RESPONSIBLE FOR COMPLIANCE WITH THE ORDER OF CONDITIONS. COORDINATE WITH THE TOWN. THE ORDER OF CONDITIONS IS INCLUDED IN THE PROJECT SPECIFICATIONS.
5. CONTRACTOR IS RESPONSIBLE FOR DEWATERING PLAN AS INDICATED IN THE ORDER OF CONDITIONS SPECIAL CONDITION #24: BEFORE WORK STARTS A DEWATERING PLAN,(WESTERN REGION-BUREAU OF WATER RESOURCES-WETLANDS PROGRAM MINIMUM INFORMATION AND DOCUMENTATION FOR DEWATERING PLANS) DESIGNED ACCORDING TO STREAM SIMULATION: AN ECOLOGICAL APPROACH TO PROVIDING PASSAGE FOR AQUATIC ORGANISMS AT ROAD CROSSINGS (USDA FOREST SERVICE-NATIONAL TECHNOLOGY AND DEVELOPMENT PROGRAM 0877 1801-SDTDC, MAY 2008), SHALL BE SUBMITTED TO AND APPROVED BY THE COMMISSION. SEE C1.11 FOR ADDITIONAL DEWATERING NOTES.
6. CONTRACTOR IS RESPONSIBLE FOR COMPLIANCE WITH THE WOOD TURTLE PROTECTION PLAN PROVIDED IN THE PROJECT DOCUMENTS. REQUIREMENTS INCLUDE SWEEPING THE WORK AREA AT THE START OF EACH WORK DAY AND PRIOR TO HEAVY MACHINERY ENTERING THE WORK AREA. IF A TURTLE IS ENCOUNTERED, THE ENGINEER'S WILDLIFE MONITOR MUST BE NOTIFIED.
7. CONTRACTOR TO PROVIDE AT LEAST 48 HOURS NOTICE FOR REQUESTS FOR ENGINEER SITE VISITS (E.G. PRECONSTRUCTION MEETINGS, CRITICAL CONSTRUCTION MILESTONE VISIT).
8. NOTIFY TOWN/CITY CONSERVATION COMMISSION A MINIMUM OF 72 HOURS PRIOR TO CONSTRUCTION.
9. FIELD INSPECTOR SHALL BE NOTIFIED 48 HOURS PRIOR TO CONSTRUCTION.
10. POST DEP SIGN NUMBER ASSIGNED IN ACCORDANCE WITH THE ORDER OF CONDITIONS.
11. APPROVED PLANS TO BE ON SITE AT ALL TIMES.
12. WITHIN LOCAL RIGHTS-OF-WAY, PERFORM THE WORK IN ACCORDANCE WITH LOCAL MUNICIPAL STANDARDS.
13. WITHIN STATE RIGHTS-OF-WAY, PERFORM THE WORK IN ACCORDANCE WITH THE MASS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS.
14. THE CONTRACTOR IS RESPONSIBLE FOR SITE SECURITY AND JOB SAFETY. PERFORM CONSTRUCTION ACTIVITIES IN ACCORDANCE WITH OSHA STANDARDS AND LOCAL REQUIREMENTS.
15. DISPOSE OF DEMOLITION DEBRIS IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS, ORDINANCES AND STATUTES.

LEGEND

- BORDERING VEGETATED WETLAND
- WETLAND FLAG — B213 C301
- SURVEY CONTOUR MAJOR — 195
- SURVEY CONTOUR MINOR — 194
- LIDAR CONTOUR MAJOR — 195
- LIDAR CONTOUR MINOR — 194
- EDGE OF VEGETATION
- METAL GUARD RAIL
- OVERHEAD UTILITY WIRES — OE
- RIPRAP SLOPE
- STONE HEADWALL
- EDGE OF PAVEMENT
- PROPERTY LINE — PL
- RIGHT OF WAY LINE
- 100-YEAR BASE FLOOD ELEVATION — 100YR
- MEAN ANNUAL HIGH WATER/BANK/OHW
- 100' BUFFER TO MAHW
- 200' BUFFER TO MAHW
- 100' BUFFER TO WETLANDS
- UTILITY POLE
- SIGN
- SOIL BORING
- GUY POLE
- DECIDUOUS TREE

CONSTRUCTION DOCUMENTS

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

COMMONWEALTH OF MASSACHUSETTS
LARA S...
CIVIL ENGINEER
No. 59240
REGISTERED
PROFESSIONAL ENGINEER

SEAL

SCALE:
HORZ.: 1" = 20'
VERT.: -
DATUM:
HORZ.: -
VERT.: -
0 10' 20' 40'
GRAPHIC SCALE

FUSS & O'NEILL
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TOWN OF BELCHERTOWN

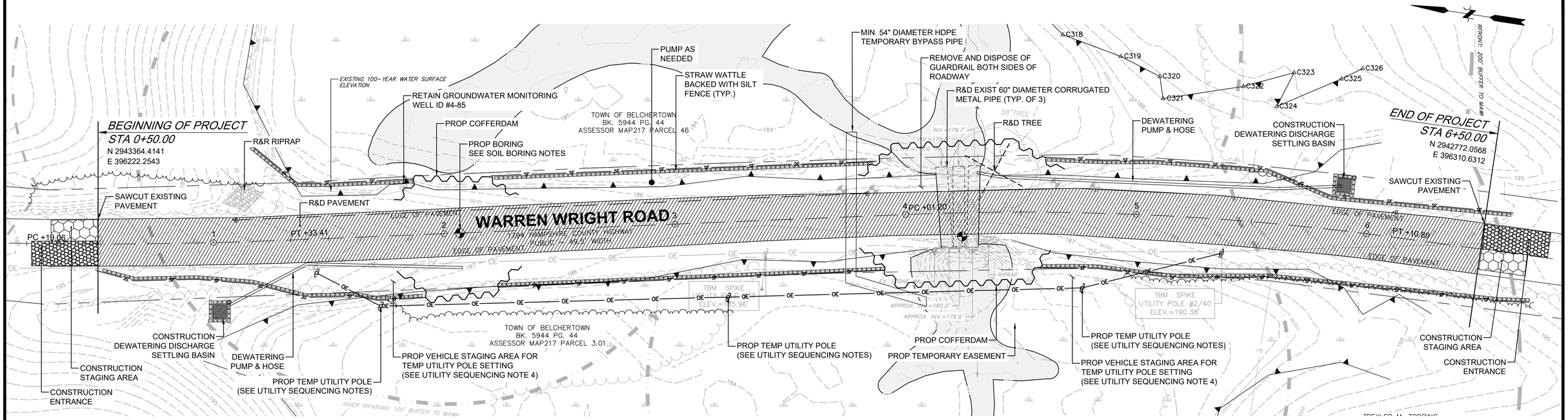
EXISTING CONDITIONS

HOP BROOK CULVERT REPLACEMENT
WARREN WRIGHT ROAD
BELCHERTOWN MASSACHUSETTS

PROJ. No.: 2002548.E30
DATE: MAY 7, 2026

EX-101

MS VIEW:
LAYER STATE:



SOIL EROSION AND SEDIMENT CONTROL NOTES

1. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED PRIOR TO CONSTRUCTION. STABILIZATION OF ALL REGRADED AND SOIL STOCKPILE AREAS WILL BE INITIATED AND MAINTAINED DURING ALL PHASES OF CONSTRUCTION.
2. SEDIMENT REMOVED FROM EROSION CONTROL STRUCTURES WILL BE DISPOSED OF IN A MANNER WHICH IS CONSISTENT WITH THE INTENT OF THIS PLAN. ALL STRAW BALES OR SILT FENCE RETAINING SEDIMENT OVER 6" HIGH SHALL HAVE THE SEDIMENT REMOVED AND ALL DAMAGED EROSION CONTROLS REMOVED AND REPLACED.
3. THE CONTRACTOR WILL BE ASSIGNED THE RESPONSIBILITY FOR IMPLEMENTING THIS EROSION AND SEDIMENT CONTROL PLAN. THIS RESPONSIBILITY INCLUDES THE INSTALLATION AND MAINTENANCE OF CONTROL MEASURES, INFORMING ALL PARTIES ENGAGED ON THE CONSTRUCTION SITE OF THE REQUIREMENTS AND OBJECTIVES OF THE PLAN, AND NOTIFYING THE PROPER TOWN AGENCY OF ANY TRANSFER OF THIS RESPONSIBILITY.
4. THE CONTRACTOR SHALL BE RESPONSIBLE TO CONTROL DUST AND WIND EROSION THROUGHOUT THE LIFE OF THE CONTRACT. DUST CONTROL SHALL INCLUDE, BUT IS NOT LIMITED TO, SPRINKLING OF WATER ON EXPOSED SOILS AND HAUL ROADS. CONTRACTOR SHALL CONTROL DUST TO PREVENT A HAZARD TO TRAFFIC ON ADJACENT ROADWAYS.
5. IF FINAL GRADING IS TO BE DELAYED FOR MORE THAN THIRTY (30) DAYS AFTER LAND DISTURBANCES CEASE, TEMPORARY VEGETATION OR MULCH SHALL BE USED TO STABILIZE SOILS. OUTSIDE OF THE GROWING SEASON, ONLY WOOD MULCH SHALL BE USED.
6. CONTRACTOR SHALL SUBMIT A DETAILED DEWATERING PLAN AS OUTLINED IN THE ORDER OF CONDITIONS FOR REVIEW AND APPROVAL BY THE ENGINEER AND CONSERVATION COMMISSION PRIOR TO ANY LAND DISTURBING ACTIVITIES.
7. WHERE DEWATERING IS NECESSARY, THERE SHALL NOT BE A DISCHARGE DIRECTLY INTO WETLANDS OR WATERCOURSES. PROPER METHODS AND DEVICES SHALL BE UTILIZED TO THE EXTENT PERMITTED BY LAW, SUCH AS PUMPING WATER INTO A DEWATERING BAG WITHIN A DEWATERING DISCHARGE SETTLING BASIN, PROVIDING SURGE PROTECTION AT THE INLET AND THE OUTLET OF PUMPS, FLOATING THE INTAKE OF THE PUMP, OR OTHER METHODS TO MINIMIZE AND RETAIN THE SUSPENDED SOLIDS. 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. THE CONTRACTOR MUST SUBMIT HIS DESIGN ALONG WITH THE LOCATIONS OF THE BASIN TO THE TOWN PRIOR TO CONSTRUCTION.
8. PERFORM CONSTRUCTION SEQUENCING IN SUCH A MANNER TO CONTROL EROSION AND TO MINIMIZE THE TIME THAT EARTH MATERIALS ARE EXPOSED BEFORE THEY ARE COVERED, SEEDED, OR OTHERWISE STABILIZED.

UTILITY POLE SEQUENCING NOTES

1. THE CONTRACTOR SHALL COORDINATE ALL WORK WITH NATIONAL GRID FOR THE RESETTING AND SEQUENCING OF UTILITY POLES REQUIRED TO ACCOMMODATE CONSTRUCTION OF THE TEMPORARY COFFERDAM.
2. THE CONTRACTOR SHALL COORDINATE WITH NATIONAL GRID FOR FINAL UTILITY POLE LOCATIONS FOLLOWING COMPLETION OF PROPOSED ROADWAY GRADING.
3. ALL UTILITY POLES SHALL BE INSTALLED WITH A MINIMUM OFFSET OF 2 FEET FROM THE FACE OF POLE TO THE EDGE OF PAVEMENT.
4. TEMPORARY ACCESS FOR UTILITY POLE INSTALLATION AND RESETTING WITHIN WETLAND AREAS SHALL UTILIZE SWAMP MATS TO PREVENT PERMANENT DISTURBANCE OF WETLAND RESOURCE AREAS.
5. TREES AND GROUND BRUSH SHALL BE CLEARED AT UTILITY POLE LOCATIONS AND ALONG THE PROPOSED SPANS OF WIRES IN ORDER TO STAKE POLES.

SOIL BORING NOTES

1. PERFORM TWO TEST BORINGS WITHIN 10 FEET OF THE PROPOSED ABUTMENT LOCATIONS AS SHOWN ON THE PLANS AND IN ACCORDANCE WITH THE MASSDOT BRIDGE MANUAL. BORINGS SHALL EXTEND TO SUFFICIENT DEPTH TO DEFINE SUBSURFACE CONDITIONS FOR FOUNDATION DESIGN, AS APPROVED BY THE ENGINEER.

OPERATION & MAINTENANCE PLAN DURING CONSTRUCTION

AN OPERATION AND MAINTENANCE (O&M) PLAN DURING CONSTRUCTION FOR STORMWATER CONTROLS IS DESCRIBED AS FOLLOWS:

1. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL OPERATION & MAINTENANCE OF THE SITE.
2. NO EARTHWORK ACTIVITIES SHALL COMMENCE UNTIL SILT FENCE HAS BEEN INSTALLED. SILT FENCE SHALL BE INSTALLED AS SHOWN ON THE DRAWINGS.
3. AREAS LEFT EXPOSED TO EROSION FOR MORE THAN SEVEN DAYS SHALL BE ROUGH GRADED AND TEMPORARILY STABILIZED. AREAS DISTURBED BUT INACTIVE FOR MORE THAN THIRTY DAYS SHALL BE TEMPORARILY SEEDED.
4. BIODEGRADABLE EROSION CONTROL MATTING FOR STABILIZATION SHALL BE PLACED ON ALL SLOPES 3:1 OR GREATER.
5. EROSION AND SEDIMENTATION CONTROLS SHALL BE MAINTAINED UNTIL SUCCESSFUL ESTABLISHMENT OF GROUND COVER.
6. NO STAGING OF MATERIALS OR LAY DOWN AREAS SHALL BE LOCATED WITHIN ANY BORDERING VEGETATED WETLAND OR BANK AREAS.
7. PAVED AREAS SHALL BE KEPT FREE OF SEDIMENT, AND SHALL BE CLEANED PERIODICALLY AS REQUIRED BY CONSTRUCTION ACTIVITIES.
8. TEMPORARY SOIL STOCKPILES SHALL BE LOCATED WITHIN AREAS CONSISTING OF FORMERLY PAVED OR DEVELOPED SURFACES AND WILL BE MOVED AS NECESSARY TO ACCOMMODATE ONGOING WORK.
9. SEDIMENT STOCKPILES SHALL HAVE A SIDE SLOPE OF NO GREATER 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 STRAW BALE AND SILT FENCE BARRIER SHALL BE INSTALLED AROUND STOCKPILE AREA APPROXIMATELY 10 FEET FROM TOE OF SLOPE.
10. ENSURE PROPER MAINTENANCE OF BARRIERS AROUND STOCKPILES TO PREVENT WOOD TURTLE NESTING.
11. THE CONTRACTOR IS RESPONSIBLE TO INSPECT AND REPAIR EROSION AND SEDIMENTATION CONTROL MEASURES AS REQUIRED TO PREVENT DAMAGE OR SEDIMENTATION.
12. UPON COMPLETION OF CONSTRUCTION AND ESTABLISHMENT OF PERMANENT GROUND COVER, REMOVE AND DISPOSE OF TEMPORARY EROSION CONTROL MEASURES. CLEAN SEDIMENT AND DEBRIS FROM STORM DRAINAGE SYSTEMS.

POST-CONSTRUCTION RESTORATION, OPERATION & MAINTENANCE

1. INSPECT FOR PLANT SURVIVAL. PROVIDE TEMPORARY IRRIGATION AS NEEDED UNTIL PLANTS MATURE.
2. INSPECT AFTER EVERY RAINFALL EVENT IN THE FIRST SIX MONTHS; INSPECT SEMI-ANNUALLY AND AFTER SIGNIFICANT RAIN EVENTS (E.G. >0.5 INCH) THEREAFTER.
3. CHECK FOR SCOUR OR EXCESSIVE EROSION OF STREAMBANKS AND STREAM CROSSINGS. REPAIR TO MATCH DESIGN GRADES AS NECESSARY. UTILIZE ORIGINAL DESIGN MATERIAL.
4. REMOVE DEBRIS THAT COULD CAUSE DAMAGE TO THE STRUCTURE OR ANY BLOCKAGES THAT ARE ALTERING THE FLOW IN A MANNER THAT MAY DAMAGE THE STRUCTURE OR CAUSE BANK EROSION.
5. REPAIR DAMAGE CAUSED BY VEHICLES, EROSION, WILDLIFE, ETC. THAT AFFECT THE INTEGRITY OF THE STRUCTURE OR ADJACENT STREAMBANKS.
6. INSPECT FOR PLANT HEALTH/SURVIVAL AND REPLACE DEAD OR DYING NATIVE VEGETATION TO MAINTAIN PERCENT COVER AS DESIGNED IN SITE PLANS. DEVELOP A REINFORCEMENT PLANTING PLAN IF THE VEGETATION GENERATES A VEGETATIVE COVER OF LESS THAN 50% WITHIN THE FIRST TWO YEARS OF OPERATION.
7. CONDUCT AN ANNUAL VISUAL INSPECTION OF THE STRUCTURE; FOLLOW-UP ON ANY DEFICIENCIES NOTED BY THE TOWN OR BY MASSDOT INSPECTIONS.
8. REMOVE BURROWNG ANIMALS IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL GUIDELINES AND REGULATIONS. IMPLEMENT LOW-IMPACT PEST MANAGEMENT CONTROLS IF PEST-CONTROL IS NECESSARY. EXAMPLES INCLUDE REMOVAL BY HAND, VACUUM, OR SPRAYING WATER.
9. DO NOT APPLY FERTILIZER.
10. DO NOT DUMP OR STORE SNOW WITHIN THE STRUCTURE.
11. DO NOT OBSTRUCT ACCESS TO AND AROUND THE INFRASTRUCTURE. ACCESS IS REQUIRED FOR MAINTENANCE PURPOSES.

WATER CONTROL SEQUENCE

1. INSTALL TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES AND DEFINE/STABILIZE CONSTRUCTION STAGING AREAS.
2. INSTALL PARTIAL UPSTREAM AND DOWNSTREAM COFFERDAMS AT MAIN CROSSING TO DIVERT CHANNEL FLOWS TO ONE EXISTING 60"CMP AND CREATE DRY CONDITION FOR TWO EXISTING CMPS.
3. REMOVE TWO 60"CMPS UNDER DRY CONDITION AND REPLACE WITH TEMPORARY HDPE BYPASS PIPE (MIN. 54"DIAMETER) INSTALLED THROUGH UPSTREAM AND DOWNSTREAM COFFERDAM (APPROXIMATE LENGTH = 85').
4. DIVERT FLOWS AWAY FROM REMAINING 60"CMP TO TEMPORARY BYPASS PIPE.
5. REMOVE REMAINING 60"CMP UNDER DRY CONDITION.
6. CONFIGURE COFFERDAMS AND BYPASS PIPE TO CREATE DRY CONDITION FOR WORKING AREA. MAINTAIN DRY CONDITION BY PUMPING AS NECESSARY.
7. EXCAVATE AS NECESSARY TO INSTALL RIGID FRAME AND APPURTENANCES,
8. BACKFILL AND GRADE PROPOSED STREAM BED IN ACCORDANCE WITH PROPOSED CONTOURS AND MATERIAL SPECIFICATIONS. REPOSITION HDPE BYPASS AND PUMPING EQUIPMENT AS NECESSARY TO ACCOMMODATE WORK IN DRY AREAS.
9. REMOVE TEMPORARY COFFERDAMS AND OTHER WATER DIVERSION EQUIPMENT.
10. BACKFILL AND GRADE ABOVE RIGID FRAME AND SURROUNDING AREA INCLUDING ROADWAY EMBANKMENT IN ACCORDANCE WITH PROPOSED CONTOURS.
11. STABILIZE DISTURBED AREAS AND SLOPES.
12. WATER CONTROL AT TERRESTRIAL PASSAGE CULVERT WILL REQUIRE COFFERDAMS TO PREVENT FLOW DURING HIGH WATER, AND PUMPING TO MAINTAIN DRY CONDITION IN WORK AREA. HOWEVER, THE MAIN CROSSING WILL PROVIDE CAPACITY FOR FLOWS THROUGH THE 2-YEAR EVENT AND WILL SERVE AS ADEQUATE FLOW DIVERSION DURING CONSTRUCTION OF THE TERRESTRIAL PASSAGE CULVERT.
13. REFER TO COFFERDAM NOTES ON THE STRUCTURAL PLANS FOR GUIDANCE ON A COMPARABLE CONSTRUCTION APPROACH FOR THE TERRESTRIAL PASSAGE CULVERT INSTALLATION.

LEGEND

PROPOSED TEMPORARY COFFERDAM
PROPOSED SILT FENCE — SF —
PROPOSED STRAW BALES
PROPOSED TREE LINE
PROPOSED TEMPORARY EASEMENT — TE —
PROPOSED OVERHEAD ELECTRICAL WIRE — OE —
PROPOSED CONSTRUCTION STAGING AREA
PROPOSED CONSTRUCTION ENTRANCE
PROPOSED DEMOLITION
PROPOSED DEWATERING DISCHARGE SETTLING BASIN
PROPOSED TEMP UTILITY POLE
PROPOSED SOIL BORING

EXISTING BORDERING VEGETATED WETLAND
EXISTING WETLAND FLAG — A B213 A C301
EXISTING SURVEY CONTOUR MAJOR — 195 —
EXISTING SURVEY CONTOUR MINOR — 194 —
EXISTING LIDAR CONTOUR MAJOR — 195 —
EXISTING LIDAR CONTOUR MINOR — 194 —
EXISTING TREE LINE
EXISTING METAL GUARD RAIL
EXISTING OVERHEAD ELECTRICAL WIRE — OE — OE —
EXISTING RIPRAP
EXISTING STONE HEADWALL
EXISTING EDGE OF PAVEMENT
PROPERTY LINE — PL —
RIGHT OF WAY LINE
EXISTING 100-YEAR BASE FLOOD ELEVATION — 100YR —
MEAN ANNUAL HIGH WATER/BANK/OHW — OHW —
100' BUFFER TO MAHW
200' BUFFER TO MAHW
100' BUFFER TO WETLANDS
EXISTING UTILITY POLE
EXISTING SIGN
EXISTING SOIL BORING
EXISTING GUY POLE
EXISTING DECIDUOUS TREE
WELL

WATER CONTROL SYSTEM NOTES

1. PRIOR TO ANY LAND DISTURBANCE ACTIVITIES, THE CONTRACTOR MUST PHYSICALLY MARK THE LIMITS OF DISTURBANCE IN ACCORDANCE WITH THE APPROVED PLANS.
2. 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.
3. CONFIRM ELEVATIONS OF THE CHANNEL BOTTOM ALONG THE PROPOSED ALIGNMENTS OF THE TEMPORARY COFFERDAMS TO VERIFY EXISTING CONDITIONS AND ACTUAL COFFERDAM HEIGHTS PRIOR TO INSTALLATION.
4. 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.
5. 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 AT BRIDGE STRUCTURE = 54.6 CFS
   2-YEAR PRESENT DAY WSE AT INLET OF BRIDGE STRUCTURE FOR EXISTING CONDITIONS = 183.6'

CONSTRUCTION DOCUMENTS

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

COMMONWEALTH OF MASSACHUSETTS — LARA SIA — CIVIL ENGINEER — No. 59240 — REGISTERED PROFESSIONAL ENGINEER

SEAL

SCALE:
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DATUM:
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0 10' 20' 40'
GRAPHIC SCALE

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TOWN OF BELCHERTOWN

SITE PREPARATION PLAN

HOP BROOK CULVERT REPLACEMENT
WARREN WRIGHT ROAD
BELCHERTOWN MASSACHUSETTS

PROJ. No.: 2002548.E30
DATE: MAY 7, 2026

CE-101

File: J:\DWG\P2002548E10\CivilPlan\2002548E10_ERO01.dwg Layout: CE-101 - 24X36 Plotted: 2026-05-07 2:56 PM Saved: 2026-05-07 9:33 AM User: Sarah.Frisby
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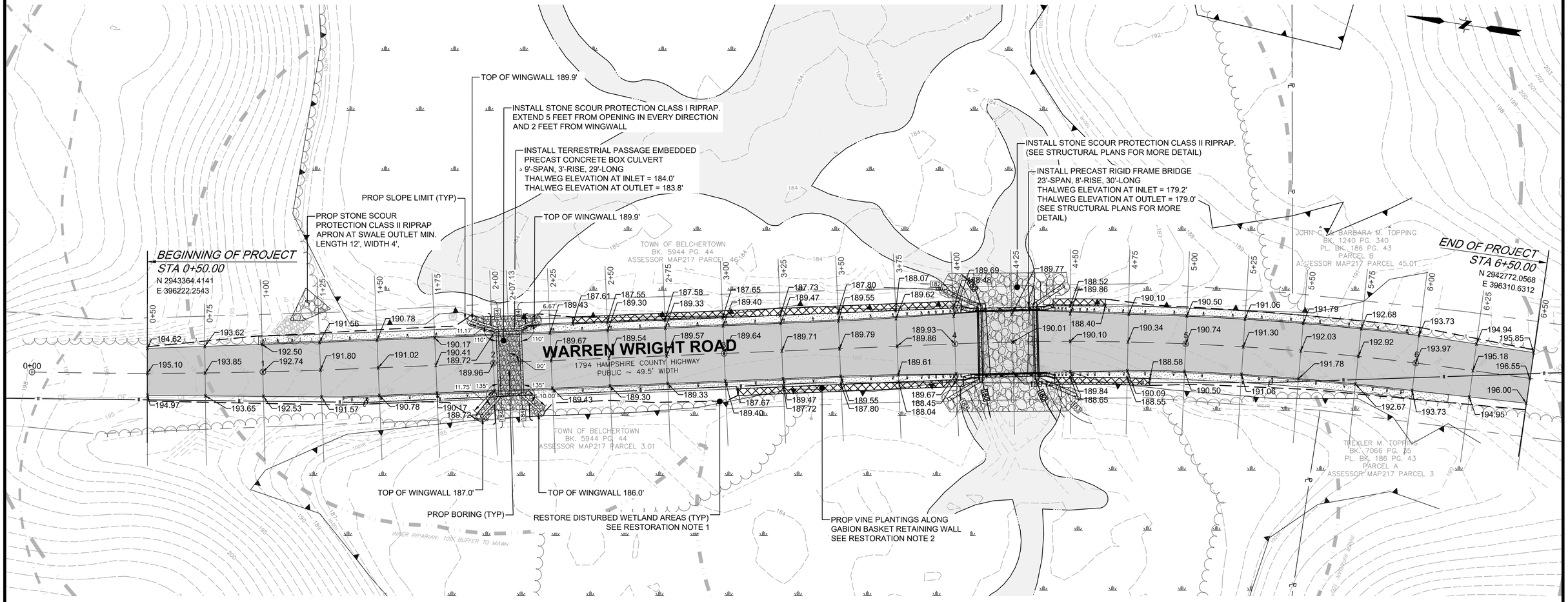

RESTORATION NOTES

1. RESTORE DISTURBED WETLAND AREAS WITH WETLAND SEED MIX AND STRAW MULCH AFTER CONSTRUCTION.
2. REFER TO VINE DETAIL FOR INSTALLATION AND SPACING OF VINES ALONG GABION BASKETS. REFER TO SPECIFICATIONS FOR MATERIAL AND PLANTING REQUIREMENTS.

LEGEND

- PROPOSED FULL DEPTH PAVEMENT RECONSTRUCTION
- PROPOSED ROADWAY SHOULDER
- PROPOSED CONCRETE CULVERT & WINGWALLS
- PROPOSED GABION BASKETS
- STONE SCOUR PROTECTION CLASS I RIPRAP
- STONE SCOUR PROTECTION CLASS II RIPRAP
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- LIMIT OF DISTURBANCE
- PROPOSED OVERHEAD UTILITY WIRE
- PROPOSED GUARDRAIL
- PROPOSED UTILITY POLE
- EXISTING BORDERING VEGETATED WETLAND
- EXISTING WETLAND FLAG
- EXISTING SURVEY CONTOUR MAJOR
- EXISTING SURVEY CONTOUR MINOR
- EXISTING LIDAR CONTOUR MAJOR
- EXISTING LIDAR CONTOUR MINOR
- EXISTING EDGE OF VEGETATION
- EXISTING METAL GUARD RAIL
- EXISTING OVERHEAD UTILITY WIRES
- EXISTING RIPRAP SLOPE
- EXISTING STONE HEADWALL
- EXISTING EDGE OF PAVEMENT
- PROPERTY LINE
- RIGHT OF WAY LINE
- EXISTING 100-YEAR BASE FLOOD ELEVATION
- MEAN ANNUAL HIGH WATER/BANK/OHW
- 100' BUFFER TO MAHW
- 200' BUFFER TO MAHW
- 100' BUFFER TO WETLANDS
- B213 C301
- EXISTING UTILITY POLE
- EXISTING GUY POLE
- EXISTING SIGN
- EXISTING DECIDUOUS TREE

CONSTRUCTION DOCUMENTS

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

SEAL

COMMONWEALTH OF MASSACHUSETTS
LARA SISBY
CIVIL ENGINEER
No. 59240
REGISTERED PROFESSIONAL ENGINEER

SCALE:
HORZ.: 1" = 20'
VERT.: -
DATUM:
HORZ.: -
VERT.: -
0 10' 20' 40'
GRAPHIC SCALE

FUSS & O'NEILL
1550 MAIN STREET, SUITE 400
SPRINGFIELD, MA 01103
413.452.0445
www.fando.com

TOWN OF BELCHERTOWN

CONSTRUCTION & GRADING PLAN

HOP BROOK CULVERT REPLACEMENT
WARREN WRIGHT ROAD

BELCHERTOWN MASSACHUSETTS

PROJ. No.: 2002548.E30
DATE: MAY 7, 2026

CG-101

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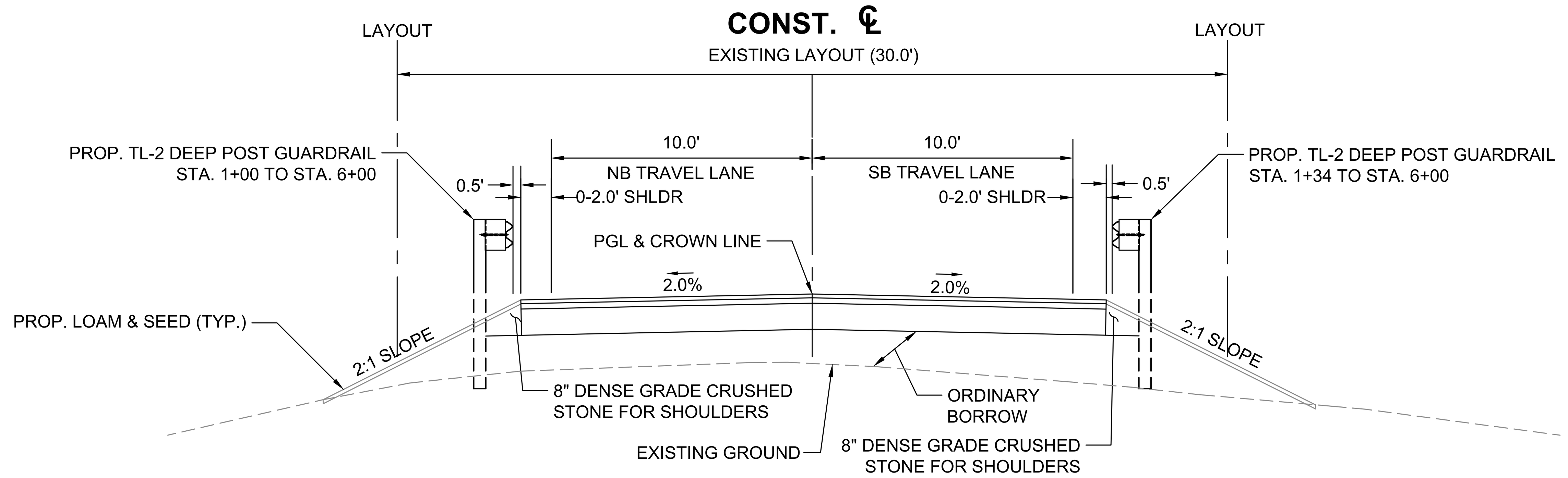
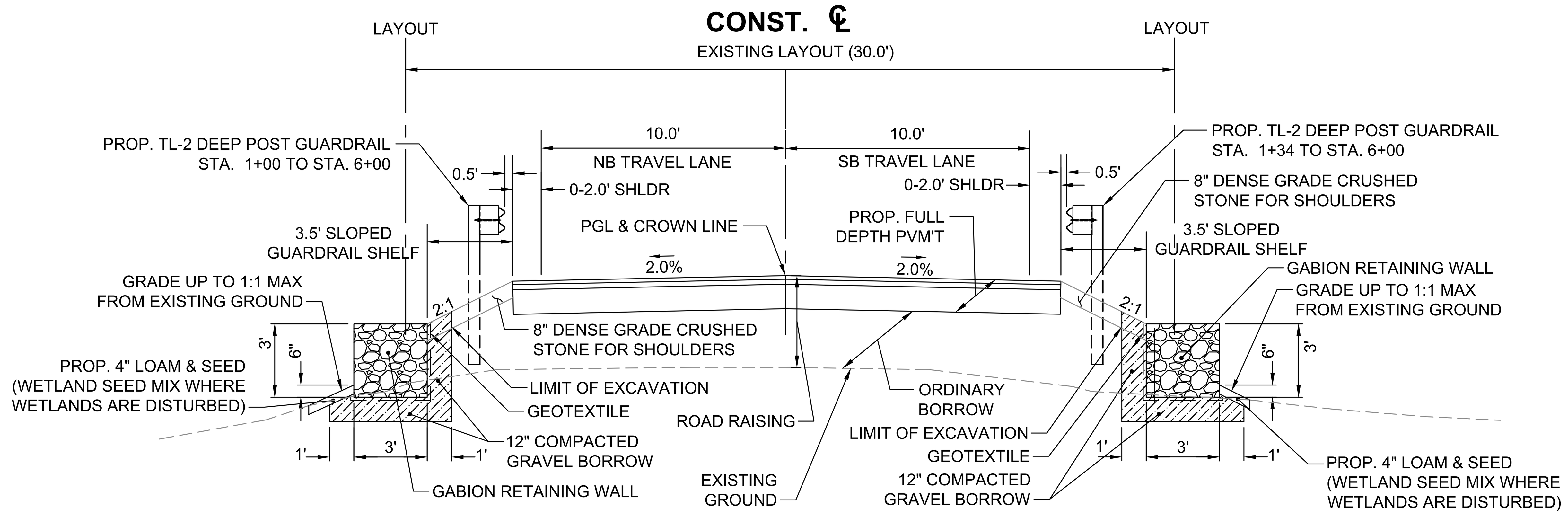
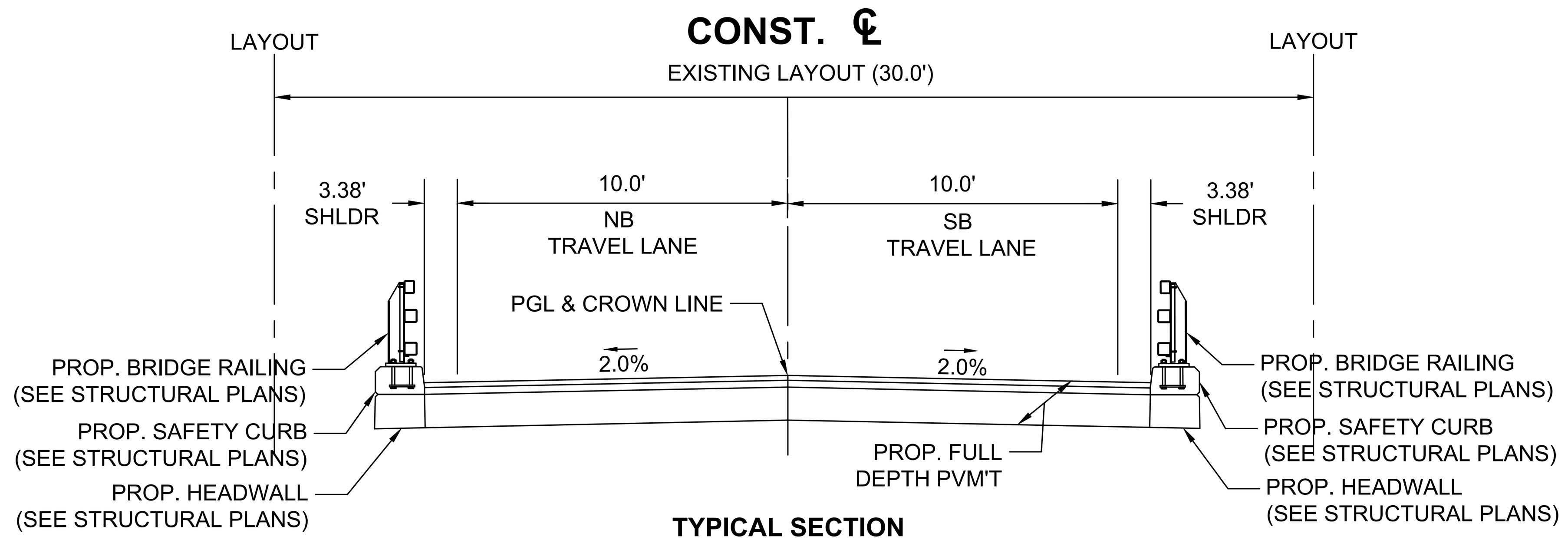


TYPICAL SECTION
WARREN WRIGHT ROAD - FULL DEPTH PAVEMENT CONSTRUCTION NO GABION BASKETS
STA. 0+50.00 TO STA. 4+10.61 & STA. 4+35.61 TO 6+50.00
N.T.S



TYPICAL SECTION
WARREN WRIGHT ROAD - FULL DEPTH PAVEMENT CONSTRUCTION WITH GABION BASKETS
SEE TABLE FOR GABION WALL LOCATIONS
N.T.S



TYPICAL SECTION
WARREN WRIGHT ROAD - FULL DEPTH PAVEMENT CONSTRUCTION OVER BRIDGE
STA. 4+10.60 TO STA. 4+35.61
N.T.S

PAVEMENT NOTES

PROPOSED FULL-DEPTH PAVEMENT CONSTRUCTION - WARREN WRIGHT ROAD

SURFACE: 2" SUPERPAVE SURFACE COURSE - 12.5 POLYMER (SSC-12.5-P) OVER TACK COAT OVER

INTERMEDIATE: 2-1/2" SUPERPAVE INTERMEDIATE COURSE - (SIC 19.0) OVER

SUBBASE: 4" DENSE GRADED CRUSHED STONE
8" GRAVEL BORROW, M1.03.0 TYPE B

ASPHALT EMULSION FOR TACK COAT AND HMA JOINT SEALANT SHALL BE APPLIED PER SPECIFICATIONS.

HMA FOR PATCHING SHALL BE USED FOR ALL PERMANENT, PARTIAL, AND FULL DEPTH PAVEMENT REPAIRS OF UNSOUND PAVEMENT PER MASSDOT SPECIFICATION, DIV. II, SECTION 450. THIS INCLUDES ALL PERMANENT TRENCH REPAIR FOR DRAINAGE WORK

HMA FOR MISCELLANEOUS WORK SHALL BE USED FOR ALL TEMPORARY CONSTRUCTION, TAPER RAMPS, CURB CUT RAMPS, TEMPORARY TRENCH REPAIR, ETC.

GABION NOTES

GABION WALL LOCATIONS	
ROAD SIDE	STA.
LEFT	02+35.00 TO 04+03.53
LEFT	04+42.69 TO 04+65.00
RIGHT	03+05.00 TO 04+03.10
RIGHT	04+43.19 TO 04+85.00

CONSTRUCTION DOCUMENTS

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PC3: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 STB/CTB: FO.STB
MS VIEW:
LAYER STATE:

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

COMMONWEALTH OF MASSACHUSETTS
LARA S...
CIVIL ENGINEER
No. 59240
REGISTERED
PROFESSIONAL ENGINEER

SEAL

SCALE:
HORZ.: 1" = 20'
VERT.: 1" = 6'
DATUM:
HORZ.: NAD83
VERT.: NAVD88
0 10' 20' 40'
GRAPHIC SCALE

FUSS & O'NEILL
1550 MAIN STREET, SUITE 400
SPRINGFIELD, MA 01103
413.452.0445
www.fando.com

TOWN OF BELCHERTOWN

TYPICAL ROADWAY SECTION

HOP BROOK CULVERT REPLACEMENT
WARREN WRIGHT ROAD
BELCHERTOWN MASSACHUSETTS

PROJ. No.: 2002548.E30
DATE: MAY 7, 2026

TYP-101

GUARDRAIL NOTES:
1. DEEP POST TL-2 GUARDRAIL TO BE INSTALLED PER MASSDOT STANDARD DETAILS 620.12.1 & 620.13.1
2. GUARDRAIL TANGENT END TREATMENT TO BE INSTALLED PER MASSDOT STANDARD DETAIL 627.0.1
3. GUARDRAIL TRAILING ANCHORAGE TO BE INSTALLED PER MASSDOT STANDARD DETAILS 627.1.1 & 627.1.2
4. GUARDRAIL TRANSITION TO BRIDGE RAIL TO BE INSTALLED PER MASSDOT STANDARD DETAILS 628.24.2 & 628.24.3

WARREN WRIGHT ROAD - ALIGNMENT CONSTRUCTION BASELINE DATA

NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L1	0+00.00	2943413.917	396215.229		S7°48'15"E 19.06'	0+19.06	2943395.037	396217.817
C1	0+19.06	2943395.037	396217.817	R - 2008.00 Δ=3°15'47" L=114.36' T=57.19'		1+33.41	2943282.242	396236.562
L2	1+33.41	2943282.242	396236.562		S11°04'02"E 267.79'	4+01.20	2943019.434	396287.966
C2	4+01.20	2943019.434	396287.966	R - 1192.00 Δ=10°04'45" L=209.69' T=105.11'		6+10.89	2942811.175	396309.956
L3	6+10.89	2942811.175	396309.956		S0°59'17"E 156.86'	7+67.75	2942654.340	396312.661

BEGINNING OF PROJECT
STA 0+50.00
N 2943364.4141
E 396222.2543

END OF PROJECT
STA 6+50.00
N 2942772.0568
E 396310.6312

WARREN WRIGHT ROAD
1794 HAMPSHIRE COUNTY HIGHWAY
PUBLIC ~ 49.5' WIDTH

PROP TRAILING ANCHORAGE STA 1+00
PROTECT MONITORING WELL
PROP EDGE OF PVMNT
LIMIT OF FULL DEPTH RECONSTRUCTION
STANDARD TL-2 GUARDRAIL RUN (12'-6") CENTERED ON CULVERT TO CLEAR STRUCTURE WITH POSTS
END PROP TL-2 GUARDRAIL APPROX STA 3+76
BEGIN TRANSITION TO BRIDGE RAIL
END PROP TRANSITION TO BRIDGE RAIL
BEGIN PROP TL-2 GUARDRAIL APPROX STA 4+70
PROP TANGENT END TREATMENT STA 5+95
0+00
L1 PC +19.06
S 7° 48' 15" E 19.06'
Δ=3° 15' 47" L=114.36' R=2008.00'
C1
PT +33.41
L2
S 11° 04' 02" E 267.79'
PC +01.20
C2
CONSTRUCTION CL
Δ=10° 04' 45" L=209.69' R=1192.00'
PT +10.89
L3
S 0° 59' 17" E 156.86'
APPROX SLOPE LIMIT (TYP)
PROP TANGENT END TREATMENT STA 1+35
R&R UP COORDINATE WITH UTILITY COMPANY
4" SOLID WHITE LINE (TYP)
TBM SPIKE UTILITY POLE #39 ELEV.=185.96'
TMB SPIKE U.P. #39 ELEV=185.96
TBM SPIKE UTILITY POLE #2/40 ELEV.=190.38'
TMB SPIKE U.P. #2 / 40 ELEV=190.38
PROP TRAILING ANCHORAGE STA 5+95
LIMIT OF FULL DEPTH RECONSTRUCTION STA. 6+50.00
TOWN OF BELCHERTOWN BK. 5944 PG. 44 ASSESSOR MAP217 PARCEL 46
TOWN OF BELCHERTOWN BK. 5944 PG. 44 ASSESSOR MAP217 PARCEL 3.01
JOHN C. & BARBARA M. TOPPING BK. 1240 PG. 340 PL. BK. 186 PG. 43 PARCEL B ASSESSOR MAP217 PARCEL 45.01
TREXLER M. TOPPING BK. 7066 PG. 35 PL. BK. 186 PG. 43 PARCEL A ASSESSOR MAP217 PARCEL 3

WARREN WRIGHT ROAD

LOW POINT ELEV = 189.53
LOW POINT STA = 2+57.06
PVI STA = 1+64.71
PVI ELEV = 189.25
A.D. = 5.39%
K = 38.41
207' VC
208.0' HSD

PVI STA = 5+40.63
PVI ELEV = 190.35
A.D. = 5.38%
K = 38.39
207' VC
207.9' HSD

PVC: 0+61.12 ELEV: 194.53
PVT: 2+68.30 ELEV: 189.55
PVC: 4+37.32 ELEV: 190.04
PVT: 6+43.94 ELEV: 196.21
STA. = 0+50.00 ELEV = 195.10
-5.10%
0.29%
5.67%
STA. = 6+50.00 ELEV = 196.55
PROPOSED GRADE
EXISTING GRADE
TERRESTRIAL PASSAGE BURIED PRECAST CONCRETE BOX CULVERT
EXISTING CULVERT (TYP.)
PRECAST RIGID FRAME BRIDGE
HOP BROOK
EXISTING ELEV.
PROPOSED ELEV.
HOR. SCALE IN FEET
VER. SCALE IN FEET
NAVD 88 ELEV

0+00	0+50	1+00	1+50	2+00	2+50	3+00	3+50	4+00	4+50	5+00	5+50	6+00	6+50
195.1 **195.10**	192.7 **192.74**	190.3 **191.02**	188.3 **189.96**	187.1 **189.54**	186.1 **189.64**	186.0 **189.79**	186.7 **189.93**	187.7 **190.10**	189.0 **190.74**	191.0 **192.03**	193.4 **193.97**	196.6 **196.55**

CONSTRUCTION DOCUMENTS

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

LARA SAB CIVIL ENGINEER No. 59240 REGISTERED PROFESSIONAL ENGINEER
COMMONWEALTH OF MASSACHUSETTS

SEAL

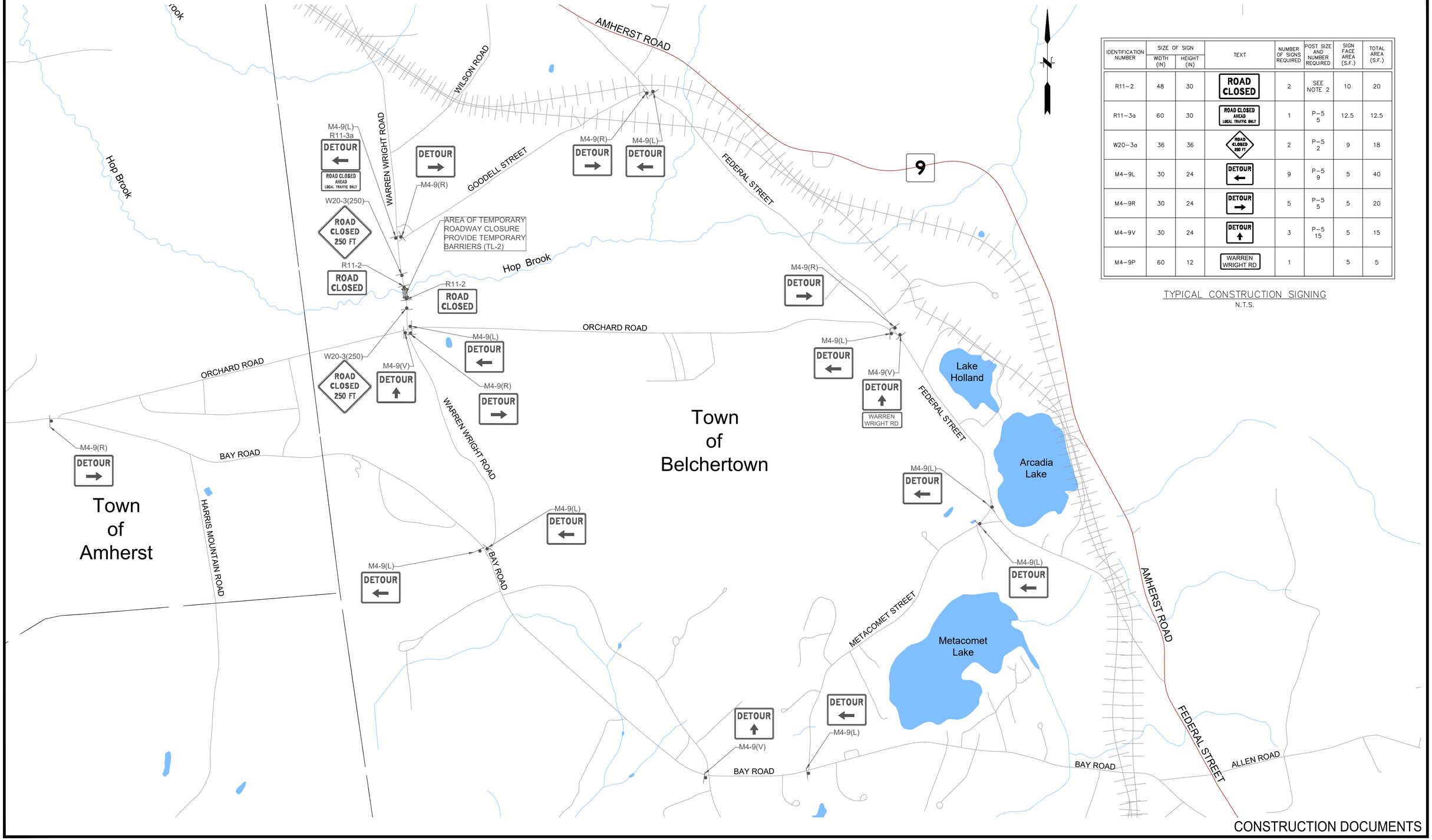
SCALE:
HORZ.: 1" = 20'
VERT.: 1" = 4'
DATUM:
HORZ.: NAD83
VERT.: NAVD88
0 10' 20' 40'
GRAPHIC SCALE

FUSS & O'NEILL
1550 MAIN STREET, SUITE 400
SPRINGFIELD, MA 01103
413.452.0445
www.fando.com

TOWN OF BELCHERTOWN
ROADWAY PLAN & PROFILE
HOP BROOK CULVERT REPLACEMENT
WARREN WRIGHT ROAD
BELCHERTOWN MASSACHUSETTS

PROJ. No.:2002548.E30
DATE:MAY 7, 2026

CR-101



IDENTIFICATION NUMBER	SIZE OF SIGN WIDTH (IN)	SIZE OF SIGN HEIGHT (IN)	TEXT	NUMBER OF SIGNS REQUIRED	POST SIZE AND NUMBER REQUIRED	SIGN FACE AREA (S.F.)	TOTAL AREA (S.F.)
R11-2	48	30	ROAD CLOSED	2	SEE NOTE 2	10	20
R11-3a	60	30	ROAD CLOSED AHEAD LOCAL TRAFFIC ONLY	1	P-5 5	12.5	12.5
W20-3a	36	36	ROAD CLOSED 250 FT	2	P-5 2	9	18
M4-9L	30	24	DETOUR ←	9	P-5 9	5	40
M4-9R	30	24	DETOUR →	5	P-5 5	5	20
M4-9V	30	24	DETOUR ↑	3	P-5 15	5	15
M4-9P	60	12	WARREN WRIGHT RD	1		5	5

TYPICAL CONSTRUCTION SIGNING
N.T.S.

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

SEAL

COMMONWEALTH OF MASSACHUSETTS — LARA SZA — CIVIL ENGINEER — No. 59240 — REGISTERED PROFESSIONAL ENGINEER

SCALE:
HORZ.: 1" = 600'
VERT.: -
DATUM:
HORZ.: NAD83
VERT.: NAVD88
0 300' 600' 1000'
GRAPHIC SCALE

FUSS & O'NEILL
1550 MAIN STREET, SUITE 400
SPRINGFIELD, MA 01103
413.452.0445
www.fando.com

TOWN OF BELCHERTOWN

DETOUR PLAN

HOP BROOK CULVERT REPLACEMENT
WARREN WRIGHT ROAD

BELCHERTOWN MASSACHUSETTS

PROJ. No.: 2002548.E30
DATE: MAY 7, 2026

TMP-101

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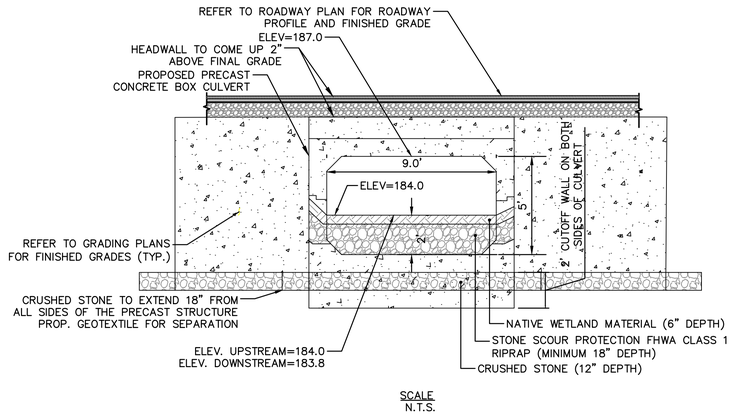
PC3: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 STB/CTB: FO.STB
LAYER STATE:
MS VIEW:

TERRESTRIAL PASSAGE EMBEDDED PRECAST CONCRETE BOX CULVERT SECTION AT UPSTREAM FACE



SCALE
N.T.S.

STREAMBED RESTORATION NOTES:

1. PRIOR TO CONSTRUCTION, CONTRACTOR SHALL REVIEW THE INLAND RESOURCE AREAS REPORT COMPLETED BY FUSS & O'NEILL FOR THE PROJECT SITE (JANUARY 2022).
2. EXCAVATE STREAM CHANNEL AND GRADE STREAM BANKS AS SHOWN ON THE PLANS. GRADE AND MATERIAL TRANSITION FROM CONSTRUCTED CHANNEL TO EXISTING UPSTREAM AND DOWNSTREAM AREAS SHALL BE SMOOTH AND NATURAL IN APPEARANCE.
3. STREAMBED MATERIAL SHALL CONSIST OF NATURAL ROUNDED STONE OR NATURAL RIVER ROCK WITH A GRADATION SIMILAR TO THAT OF THE PEBBLE COUNT DATA COLLECTED IN PREVIOUS SAMPLING: D15: 0.1", D50: 0.4", D85: 1.0", D100: 7.1". IMPORTED STREAMBED MATERIALS SHALL CONFORM TO THE SAME GRADATION.
4. STREAMBED MATERIAL SOURCE AND GRADATION SHALL BE REVIEWED AND APPROVED BY DESIGNER PRIOR TO INSTALLATION.
5. STREAMBED MATERIAL SHALL BE INSTALLED TO A MINIMUM DEPTH OF 6 INCHES OVER ROUNDED STONE SCOUR PROTECTION IN RESTORED AREAS.
6. VOIDS IN STREAMBED MATERIAL SHALL BE MINIMIZED THROUGH PROPER INSTALLATION AND THE SELECTION OF WELL-GRADED MATERIAL APPROVED BY THE DESIGNER. VOIDS IN LARGER STREAMBED MATERIALS SHALL BE WASHED IN WITH FINES DURING INSTALLATION AND BETWEEN MATERIAL LIFTS.

PRECAST CONCRETE ELEMENTS FOR TERRESTRIAL PASSAGE CULVERT NOTES:

1. THE CONTRACTOR SHALL SUBMIT DESIGN CALCULATIONS FOR THE FOUR-SIDED TERRESTRIAL PASSAGE CULVERT AND WINGWALLS, INCLUDING THE HEADWALL CONNECTION TO THE FRAME, AND WINGWALL CONNECTION TO THE FRAME IF REQUIRED IN ACCORDANCE WITH THE LATEST AASHTO LRFD DESIGN SPECIFICATIONS AND THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION'S LRFD BRIDGE DESIGN MANUAL FOR HL-93 VEHICULAR LIVE LOADING (WITH LESS THAN 2 FEET OF COVER) FOR APPROVAL OF THE ENGINEER. THE DESIGN COMPUTATIONS SHALL CONSIDER ALL LOADINGS AS APPROPRIATE DURING FABRICATION, SHIPMENT, ERECTION, CONSTRUCTION, AND AFTER COMPLETION OF CONSTRUCTION BASED ON THESE CONSTRUCTION DRAWINGS.
2. THE FRAME DIMENSIONS PROVIDED ARE SHOWN TO ESTABLISH THE SIZE OF THE PROPOSED OPENING OF 184 SQUARE FEET. THE WIDTHS AND THICKNESS OF EACH FRAME UNIT MAY VARY DEPENDING UPON THE MANUFACTURER'S SPECIFICATIONS. A FRAME TYPE STRUCTURE SHALL BE REQUIRED.
3. BOTTOM OF WINGWALL FOOTING SHALL BE AT OR BELOW FROST DEPTH.

CONSTRUCTION DOCUMENTS

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

COMMONWEALTH OF MASSACHUSETTS
LARA SUE
CIVIL ENGINEER
No. 59240
REGISTERED
PROFESSIONAL ENGINEER

SEAL

SCALE:
HORZ.: 1" = 4'
VERT.: 1" = 4'
DATUM:
HORZ.: NAD83
VERT.: NAVD88
0 2' 4' 8'
GRAPHIC SCALE

FUSS & O'NEILL
1550 MAIN STREET, SUITE 400
SPRINGFIELD, MA 01103
413.452.0445
www.fando.com

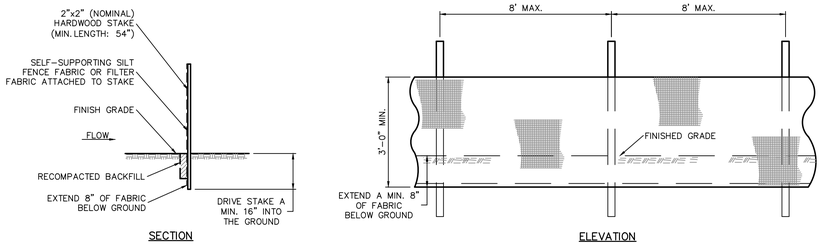
TOWN OF BELCHERTOWN

STREAM PROFILE & SECTIONS

HOP BROOK CULVERT REPLACEMENT
WARREN WRIGHT ROAD
BELCHERTOWN MASSACHUSETTS

PROJ. No.: 2002548.E30
DATE: MAY 7, 2026

CX-101



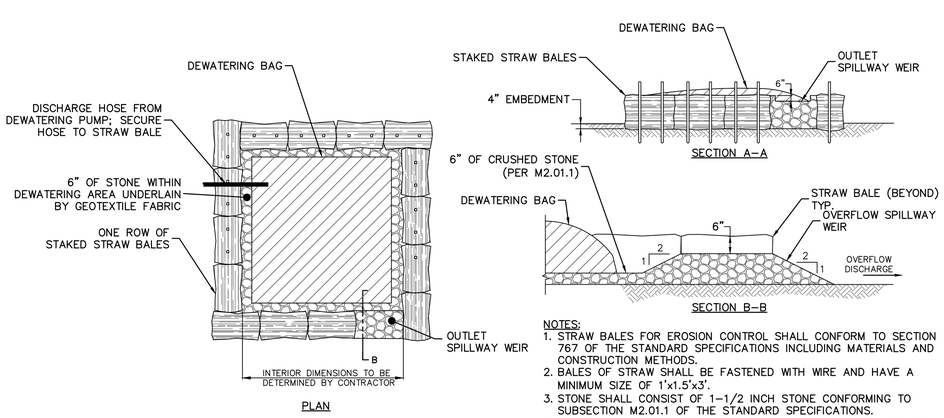
SILT FENCE NOTES:

1.) INSTALL SILT FENCE & WOOD STAKES AS RECOMMENDED BY MANUFACTURER.

2.) SYNTHETIC FILTER FABRIC SHALL BE A PERVIOUS SHEET OF PROPYLENE, NYLON, POLYESTER OR ETHYLENE FILAMENTS AND SHALL BE CERTIFIED BY THE MANUFACTURER OR SUPPLIER AS CONFORMING TO THE SPECIFICATIONS.

SILT FENCE

SCALE: N.T.S.

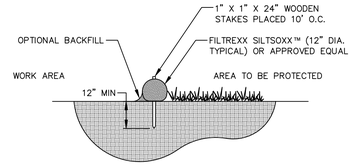


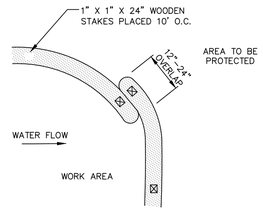
SIZING FORMULA:
CUBIC FT. OF REQUIRED STORAGE = PUMP DISCHARGE RATE (GPM) x 16

NOTES:
1. STRAW BALES FOR EROSION CONTROL SHALL CONFORM TO SECTION 767 OF THE STANDARD SPECIFICATIONS INCLUDING MATERIALS AND CONSTRUCTION METHODS.
2. BALES OF STRAW SHALL BE FASTENED WITH WIRE AND HAVE A MINIMUM SIZE OF 1'x1.5'x3'.
3. STONE SHALL CONSIST OF 1-1/2 INCH STONE CONFORMING TO SUBSECTION M2.01.1 OF THE STANDARD SPECIFICATIONS.
4. FILTER FABRIC SHALL CONFORM TO A TYPE I FABRIC AS INCLUDED WITHIN SECTION M9.50.0 OF THE STANDARD SPECIFICATIONS.
5. FILTER BAG (SILT BAG): MANUFACTURED NON-WOVEN GEOTEXTILE FABRIC BAG, SEWN WITH HIGH-STRENGTH THREAD, WITH A SPOUT TO ACCOMMODATE A 4-INCH DISCHARGE HOSE (MAXIMUM), AND ATTACHED STRAPS.

CONSTRUCTION DEWATERING DISCHARGE SETTLING BASIN

SCALE: N.T.S.



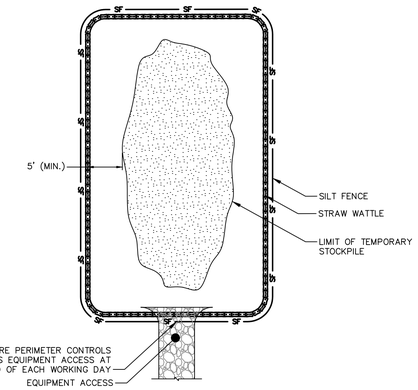


NOTES:

1. FILTER MEDIA™ FILL TO MEET APPLICATION REQUIREMENTS.
2. COMPOST MATERIAL TO BE DISPERSED ON SITE, AS DETERMINED BY ENGINEER.

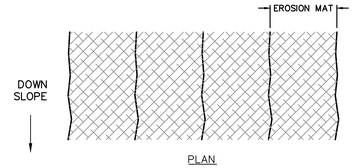
STRAW WATTLE EROSION CONTROL BARRIER

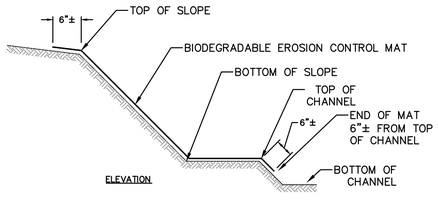
SCALE: NTS



SOIL STOCKPILE AREA

SCALE: N.T.S.

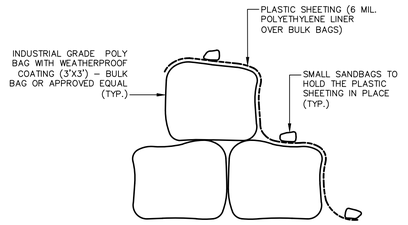




NOTE:
1. MATS SHALL BE STAPLED TO SLOPE. REFER TO MANUFACTURERS INSTALLATION INSTRUCTIONS FOR DETAILS OF STAPLING PATTERN.
2. BIODEGRADABLE EROSION CONTROL MAT SHALL BE ABLE TO WITHSTAND 8 FPS WATER VELOCITIES AND 2.10 PSF SHEAR STRESS.
3. REFER TO MANUFACTURERS INSTALLATION INSTRUCTIONS FOR DETAILS ON INSTALLATION INCLUDING STAPLING PATTERN, OVERLAPPING DETAILS, EDGE EMBEDMENT, AND ANCHOR DETAILS. TO BE INSTALLED ON SLOPES 3:1 OR GREATER.

BIODEGRADABLE EROSION CONTROL MAT

SCALE: N.T.S.



TEMPORARY COFFERDAM FOR TERRESTRIAL PASSAGE CULVERT

SCALE: N.T.S.

CONSTRUCTION DOCUMENTS

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

LARA SAB CIVIL ENGINEER No. 59240 REGISTERED PROFESSIONAL ENGINEER COMMONWEALTH OF MASSACHUSETTS

SEAL

SCALE:
HORZ.: NOT TO SCALE
VERT.:
DATUM:
HORZ.: -
VERT.: -

FUSS & O'NEILL
1550 MAIN STREET, SUITE 400
SPRINGFIELD, MA 01103
413.452.0445
www.fando.com

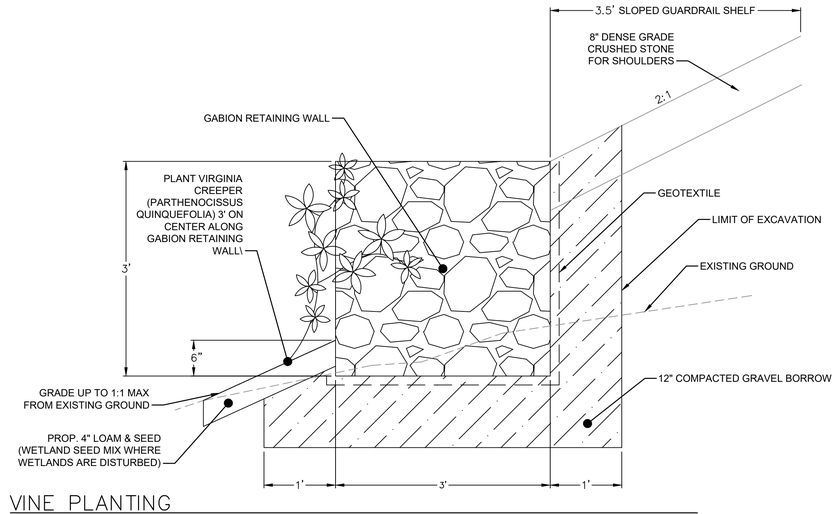
TOWN OF BELCHERTOWN

CONSTRUCTION DETAILS

HOP BROOK CULVERT REPLACEMENT
WARREN WRIGHT ROAD
BELCHERTOWN MASSACHUSETTS

PROJ. No.: 2002548.E30
DATE: MAY 7, 2026

CD-501



VINE PLANTING

SCALE: N.T.S.

CONSTRUCTION DOCUMENTS

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

COMMONWEALTH OF MASSACHUSETTS
LARA SIA
CIVIL ENGINEER
No. 59240
REGISTERED
PROFESSIONAL ENGINEER

SEAL

SCALE:
HORZ.: NOT TO SCALE
VERT.:
DATUM:
HORZ.: -
VERT.: -

FUSS & O'NEILL
1550 MAIN STREET, SUITE 400
SPRINGFIELD, MA 01103
413.452.0445
www.fando.com

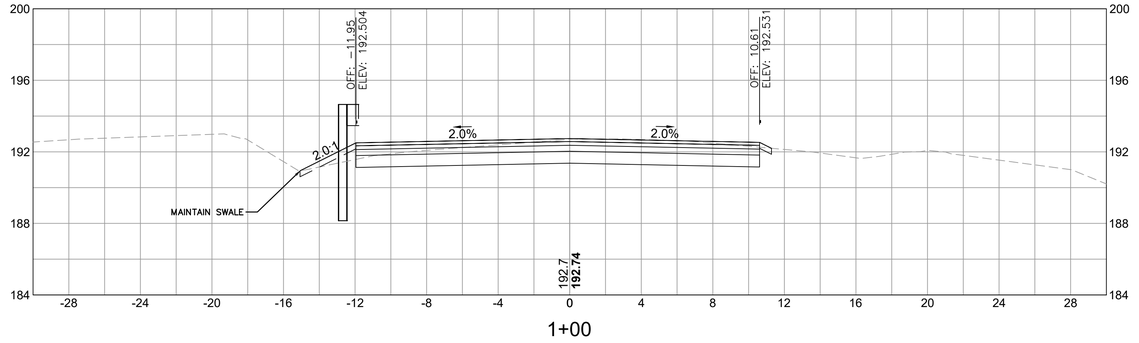
TOWN OF BELCHERTOWN

CONSTRUCTION DETAILS

HOP BROOK CULVERT REPLACEMENT
WARREN WRIGHT ROAD
BELCHERTOWN MASSACHUSETTS

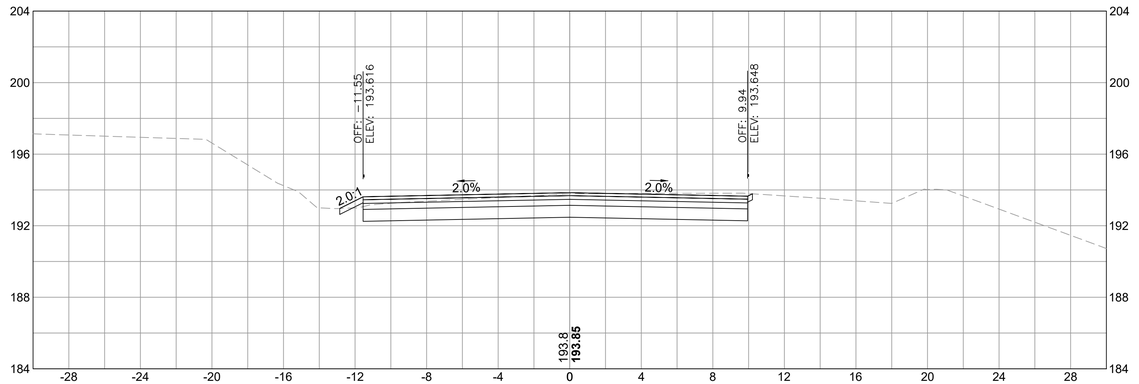
PROJ. No.: 2002548.E30
DATE: MAY 7, 2026

CD-502



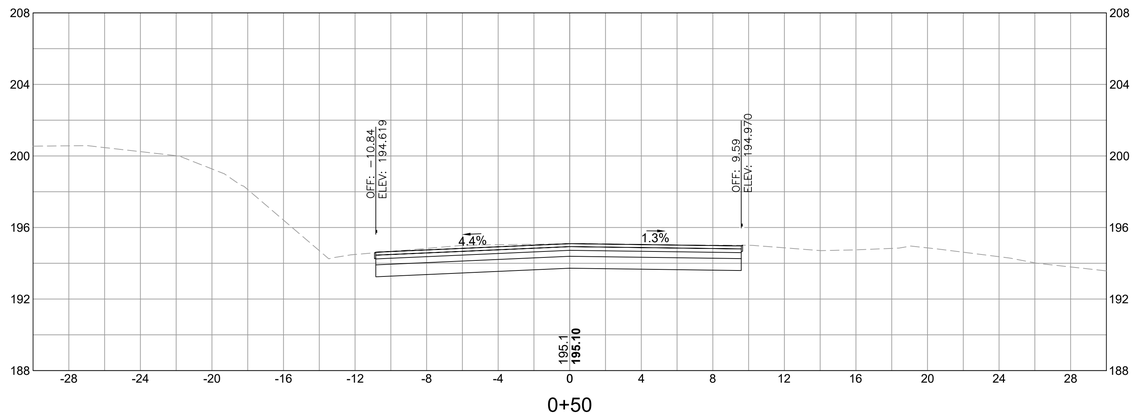
1+00

Total Volume at Station 1+00.00	
Cut Area (SF)	26.093
Fill Area (SF)	0.597
Cut Vol (CY)	24.889
Fill Vol (CY)	0.3
Cum Cut Vol (CY)	51.162
Cum Fill Vol (CY)	0.3
Net Vol (CY)	50.8



0+75

Total Volume at Station 0+75.00	
Cut Area (SF)	27.666
Fill Area (SF)	0.073
Cut Vol (CY)	26.274
Fill Vol (CY)	0.0
Cum Cut Vol (CY)	26.274
Cum Fill Vol (CY)	0.0
Net Vol (CY)	26.2



0+50

Total Volume at Station 0+50.00	
Cut Area (SF)	29.085
Fill Area (SF)	0.000
Cut Vol (CY)	0.000
Fill Vol (CY)	0.0
Cum Cut Vol (CY)	0.000
Cum Fill Vol (CY)	0.0
Net Vol (CY)	0.0

CONSTRUCTION DOCUMENTS

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PC3: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 STB/CTB: FO.STB
LAYER STATE:
MS VIEW:

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

COMMONWEALTH OF MASSACHUSETTS
LARA SAD
CIVIL ENGINEER
No. 59240
REGISTERED
PROFESSIONAL ENGINEER

SEAL

SCALE:
HORZ.: 1" = 4'
VERT.: 1" = 4'
DATUM:
HORZ.: -
VERT.: -
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GRAPHIC SCALE

FUSS & O'NEILL
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SPRINGFIELD, MA 01103
413.452.0445
www.fando.com

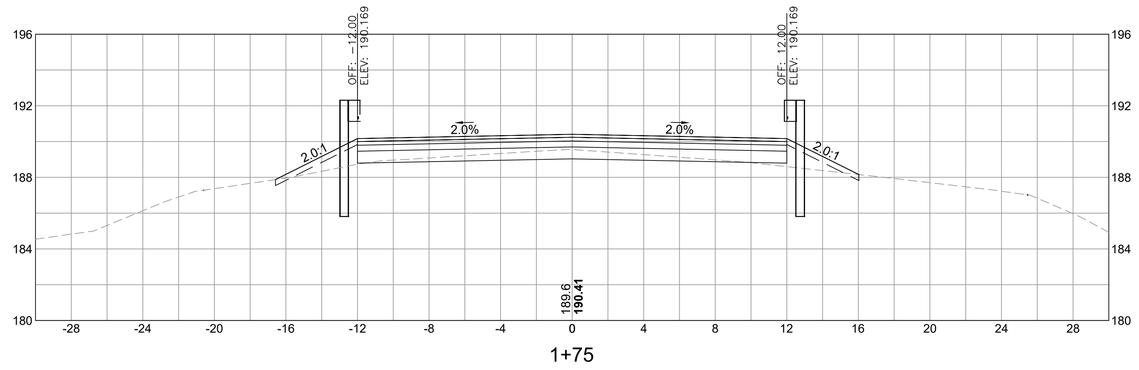
TOWN OF BELCHERTOWN

ROADWAY CROSS SECTIONS

HOP BROOK CULVERT REPLACEMENT
WARREN WRIGHT ROAD
BELCHERTOWN MASSACHUSETTS

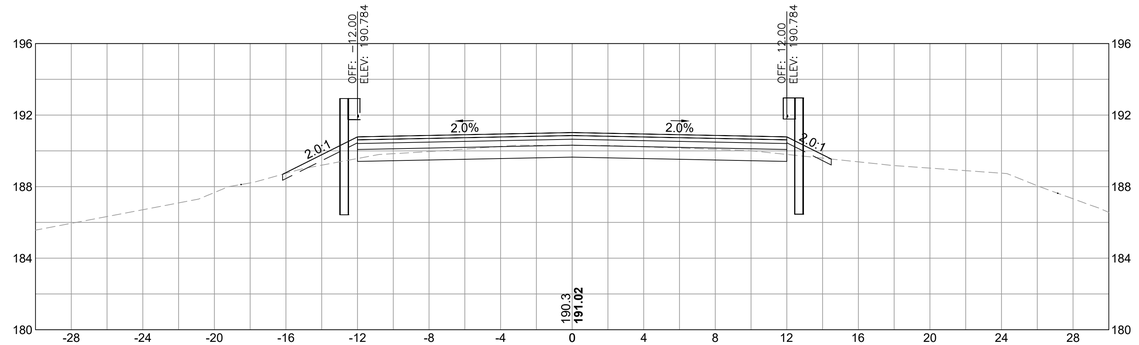
PROJ. No.: 2002548.E30
DATE: MAY 7, 2026

XSC-101



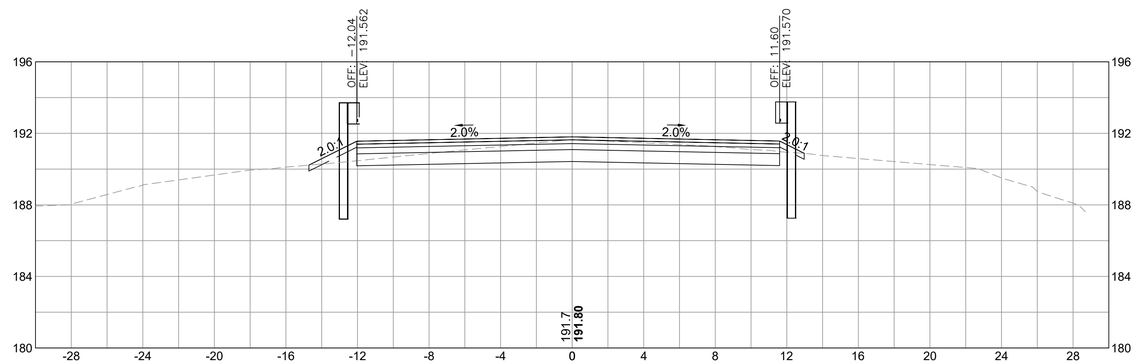
1+75

Total Volume at Station 1+75.00	
Cut Area (SF)	6.431
Fill Area (SF)	4.189
Cut Vol (CY)	9.562
Fill Vol (CY)	2.8
Cum Cut Vol (CY)	99.780
Cum Fill Vol (CY)	4.9
Net Vol (CY)	94.8



1+50

Total Volume at Station 1+50.00	
Cut Area (SF)	14.220
Fill Area (SF)	1.764
Cut Vol (CY)	16.780
Fill Vol (CY)	1.2
Cum Cut Vol (CY)	90.219
Cum Fill Vol (CY)	2.2
Net Vol (CY)	88.0



1+25

Total Volume at Station 1+25.00	
Cut Area (SF)	22.024
Fill Area (SF)	0.798
Cut Vol (CY)	22.277
Fill Vol (CY)	0.6
Cum Cut Vol (CY)	73.439
Cum Fill Vol (CY)	1.0
Net Vol (CY)	72.4

CONSTRUCTION DOCUMENTS

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

COMMONWEALTH OF MASSACHUSETTS
LARA SWIM
CIVIL ENGINEER
No. 59240
REGISTERED PROFESSIONAL ENGINEER

SEAL

SCALE:
HORZ.: 1" = 4'
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DATUM:
HORZ.: -
VERT.: -
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GRAPHIC SCALE

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413.452.0445
www.fando.com

TOWN OF BELCHERTOWN

ROADWAY CROSS SECTIONS

HOP BROOK CULVERT REPLACEMENT
WARREN WRIGHT ROAD
BELCHERTOWN MASSACHUSETTS

PROJ. No.: 2002548.E30
DATE: MAY 7, 2026

XSC-102

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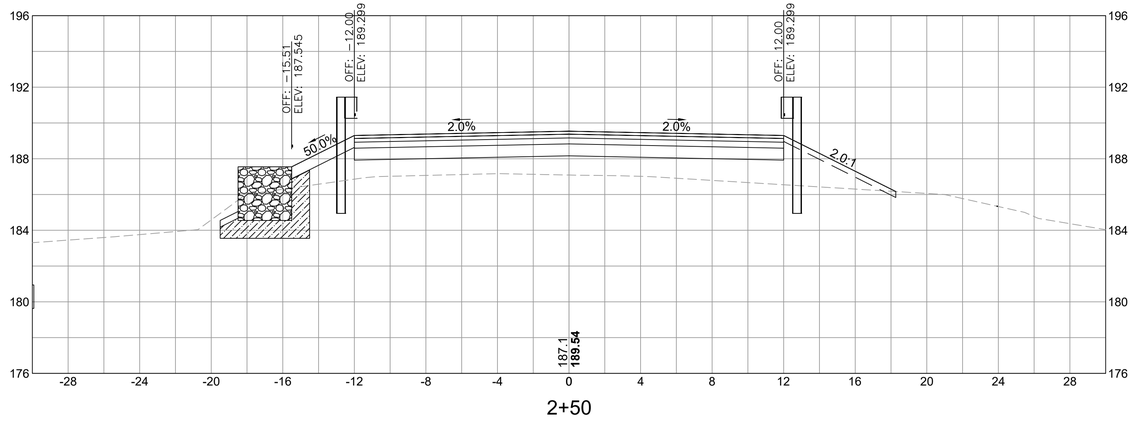
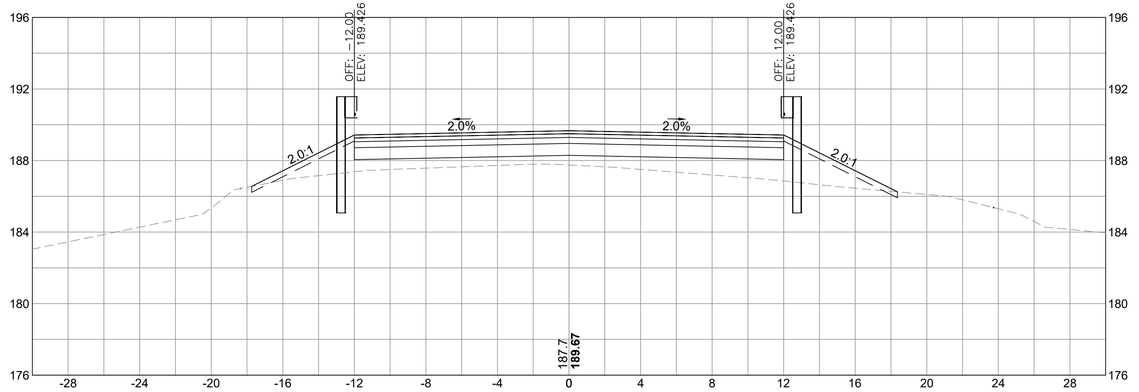
MS VIEW:



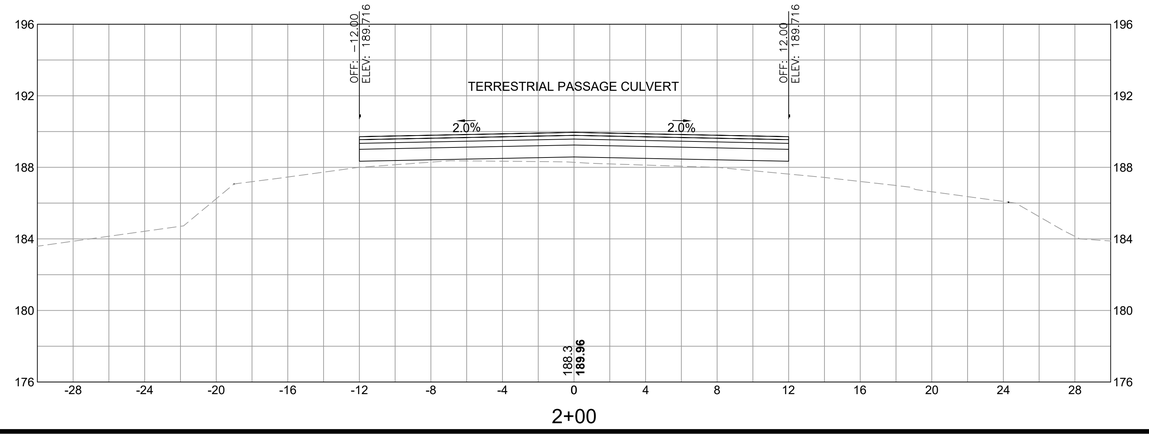
2+50

Total Volume at Station 2+50.00	
Cut Area (SF)	0.126
Fill Area (SF)	36.731
Cut Vol (CY)	0.205
Fill Vol (CY)	29.2
Cum Cut Vol (CY)	103.731
Cum Fill Vol (CY)	56.8
Net Vol (CY)	46.9



2+25

Total Volume at Station 2+25.00	
Cut Area (SF)	0.315
Fill Area (SF)	26.431
Cut Vol (CY)	0.458
Fill Vol (CY)	16.5
Cum Cut Vol (CY)	103.527
Cum Fill Vol (CY)	27.6
Net Vol (CY)	75.9



2+00

Total Volume at Station 2+00.00	
Cut Area (SF)	0.673
Fill Area (SF)	9.168
Cut Vol (CY)	3.290
Fill Vol (CY)	6.2
Cum Cut Vol (CY)	103.069
Cum Fill Vol (CY)	11.1
Net Vol (CY)	92.0

CONSTRUCTION DOCUMENTS

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

COMMONWEALTH OF MASSACHUSETTS
LARA SZA
CIVIL ENGINEER
No. 59240
REGISTERED PROFESSIONAL ENGINEER

SEAL

SCALE:
HORZ.: 1" = 4'
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DATUM:
HORZ.: -
VERT.: -
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GRAPHIC SCALE

FUSS & O'NEILL
1550 MAIN STREET, SUITE 400
SPRINGFIELD, MA 01103
413.452.0445
www.fando.com

TOWN OF BELCHERTOWN

ROADWAY CROSS SECTIONS

HOP BROOK CULVERT REPLACEMENT
WARREN WRIGHT ROAD
BELCHERTOWN MASSACHUSETTS

PROJ. No.: 2002548.E30
DATE: MAY 7, 2026

XSC-103

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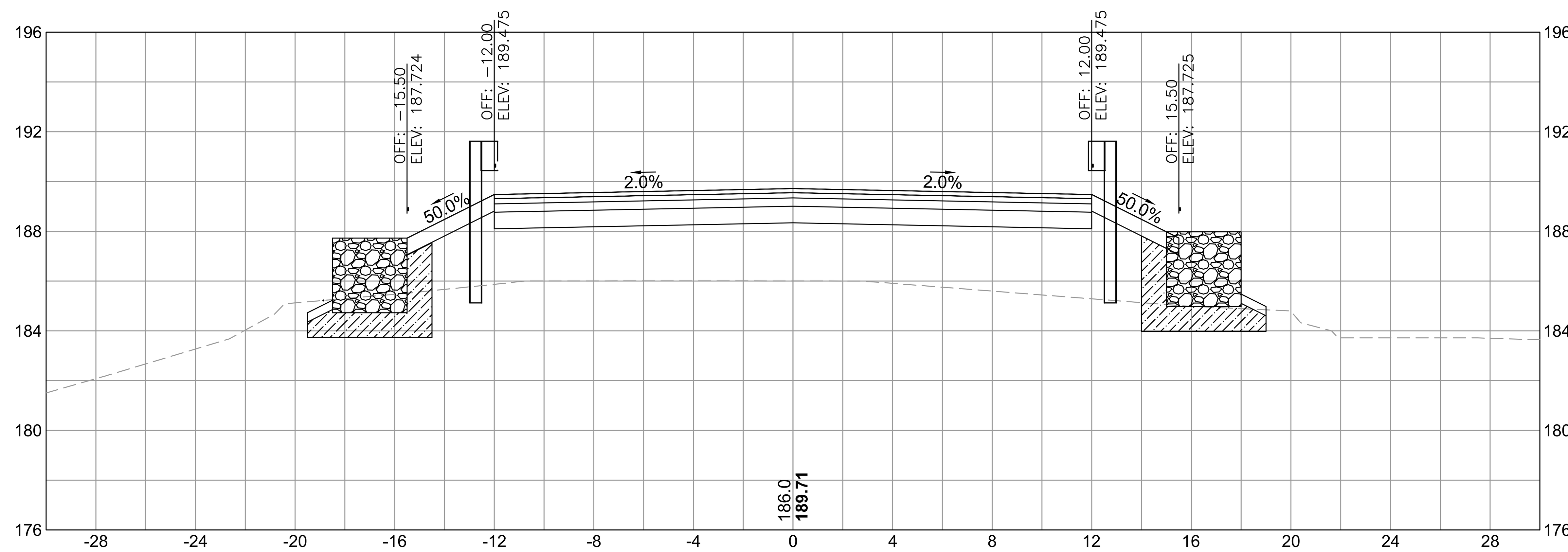
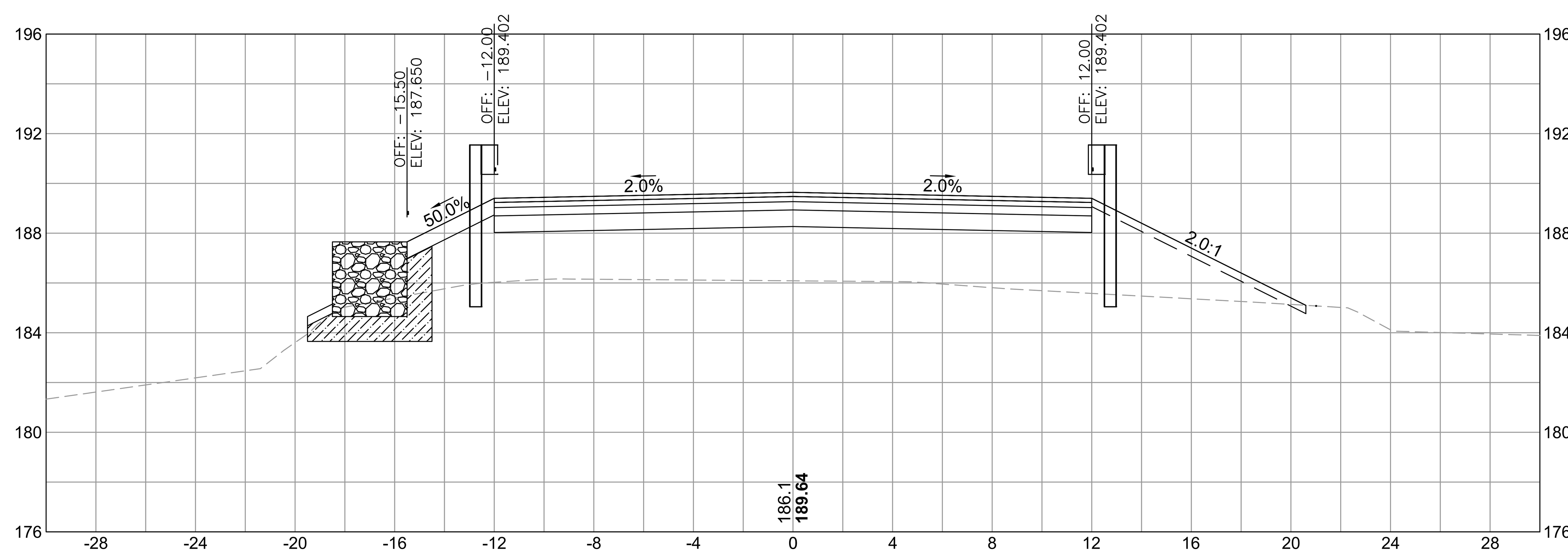


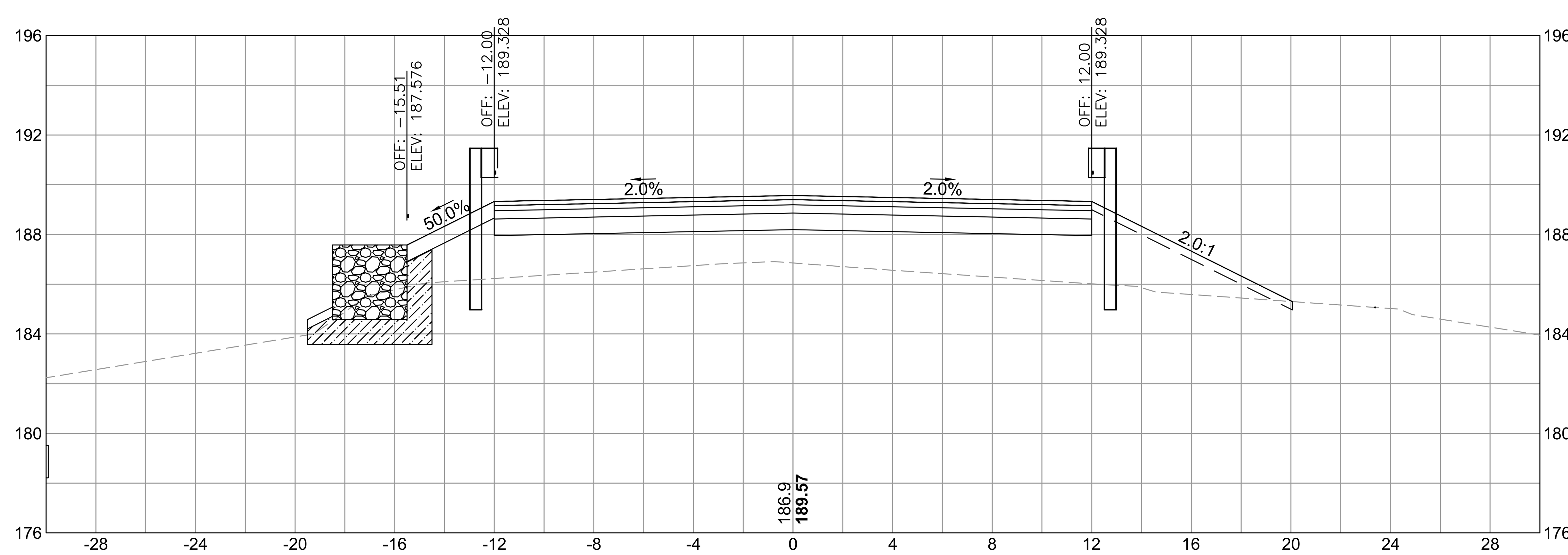
3+25

Total Volume at Station 3+25.00	
Cut Area (SF)	0.000
Fill Area (SF)	74.189
Cut Vol (CY)	0.059
Fill Vol (CY)	67.7
Cum Cut Vol (CY)	104.026
Cum Fill Vol (CY)	225.2
Net Vol (CY)	-121.2



3+00

Total Volume at Station 3+00.00	
Cut Area (SF)	0.126
Fill Area (SF)	72.115
Cut Vol (CY)	0.119
Fill Vol (CY)	58.5
Cum Cut Vol (CY)	103.968
Cum Fill Vol (CY)	157.5
Net Vol (CY)	-53.5



2+75

Total Volume at Station 2+75.00	
Cut Area (SF)	0.129
Fill Area (SF)	54.278
Cut Vol (CY)	0.119
Fill Vol (CY)	42.1
Cum Cut Vol (CY)	103.850
Cum Fill Vol (CY)	99.0
Net Vol (CY)	4.9

CONSTRUCTION DOCUMENTS

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

COMMONWEALTH OF MASSACHUSETTS
LARA S...
CIVIL ENGINEER
No. 59240
REGISTERED PROFESSIONAL ENGINEER

SEAL

SCALE:
HORZ.: 1" = 4'
VERT.: 1" = 4'
DATUM:
HORZ.: -
VERT.: -
GRAPHIC SCALE

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1550 MAIN STREET, SUITE 400
SPRINGFIELD, MA 01103
413.452.0445
www.fando.com

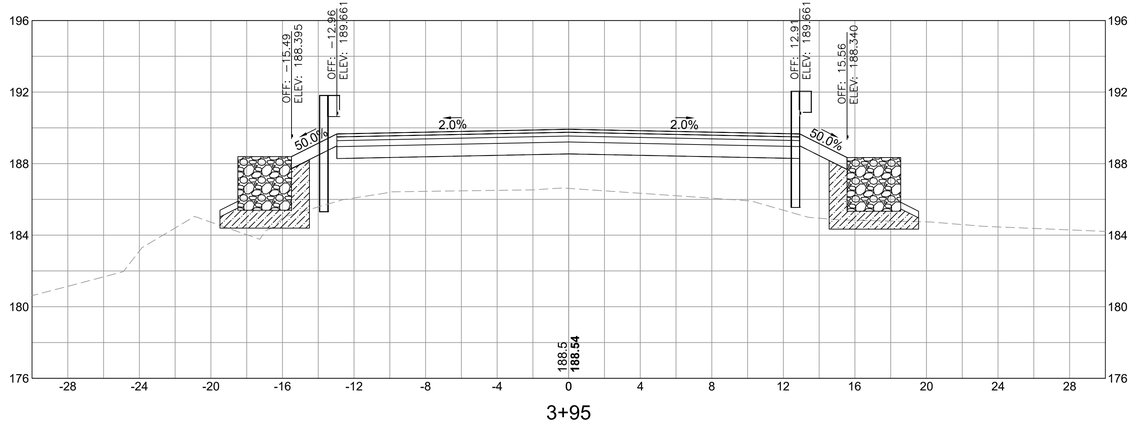
TOWN OF BELCHERTOWN

ROADWAY CROSS SECTIONS

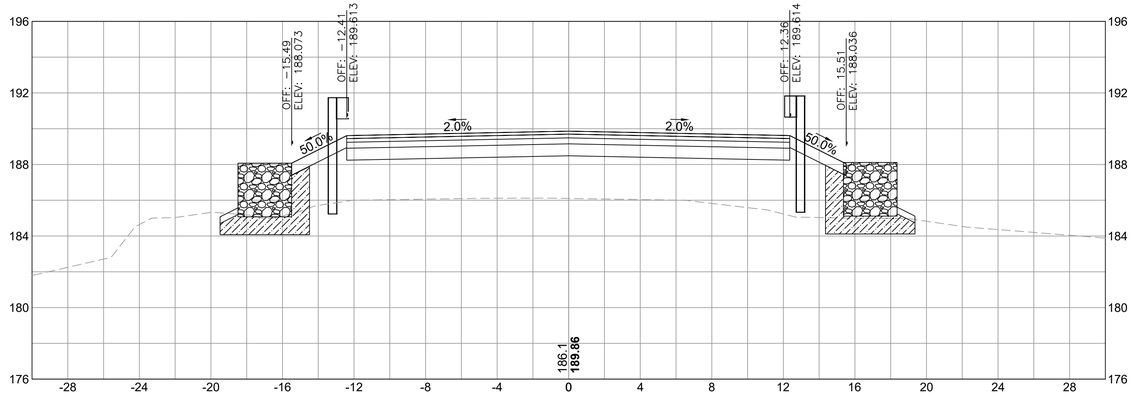
HOP BROOK CULVERT REPLACEMENT
WARREN WRIGHT ROAD
BELCHERTOWN MASSACHUSETTS

PROJ. No.: 2002548.E30
DATE: MAY 7, 2026

XSC-104

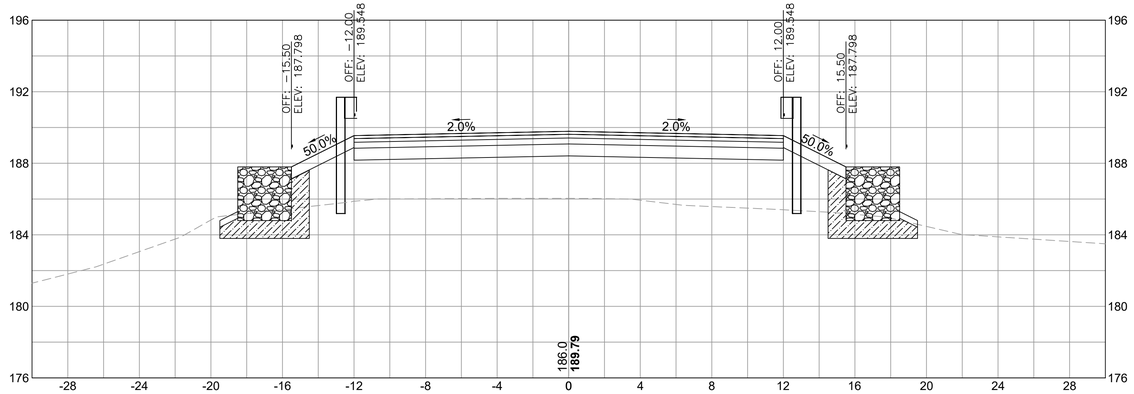


3+95



3+75

Total Volume at Station 3+75.00	
Cut Area (SF)	0.000
Fill Area (SF)	76.979
Cut Vol (CY)	0.000
Fill Vol (CY)	70.6
Cum Cut Vol (CY)	104.026
Cum Fill Vol (CY)	365.2
Net Vol (CY)	-261.1



3+50

Total Volume at Station 3+50.00	
Cut Area (SF)	0.000
Fill Area (SF)	75.568
Cut Vol (CY)	0.000
Fill Vol (CY)	69.3
Cum Cut Vol (CY)	104.026
Cum Fill Vol (CY)	294.6
Net Vol (CY)	-190.5

CONSTRUCTION DOCUMENTS

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

COMMONWEALTH OF MASSACHUSETTS
LARA SAD
CIVIL ENGINEER
No. 59240
REGISTERED
PROFESSIONAL ENGINEER

SEAL

SCALE:
HORZ.: 1" = 4'
VERT.: 1" = 4'
DATUM:
HORZ.: -
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GRAPHIC SCALE

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TOWN OF BELCHERTOWN

ROADWAY CROSS SECTIONS

HOP BROOK CULVERT REPLACEMENT
WARREN WRIGHT ROAD
BELCHERTOWN MASSACHUSETTS

PROJ. No.: 2002548.E30
DATE: MAY 7, 2026

XSC-105

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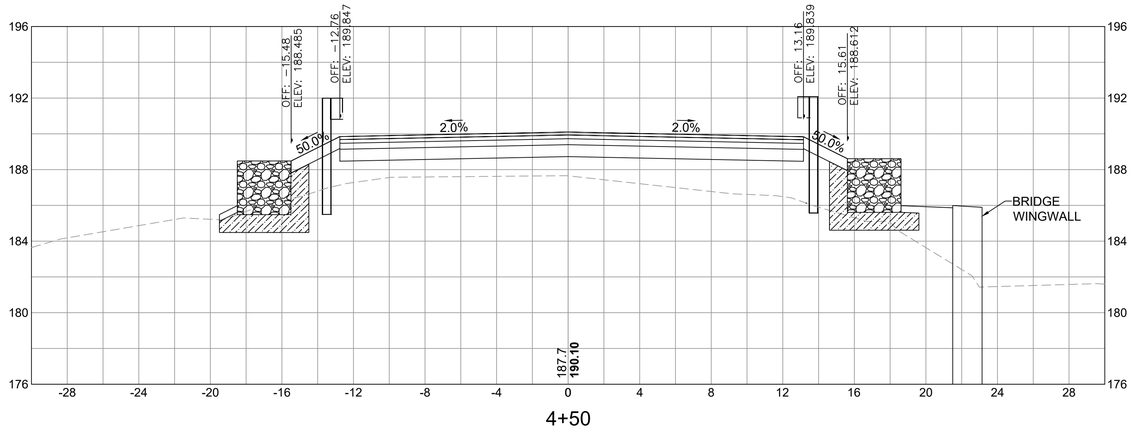
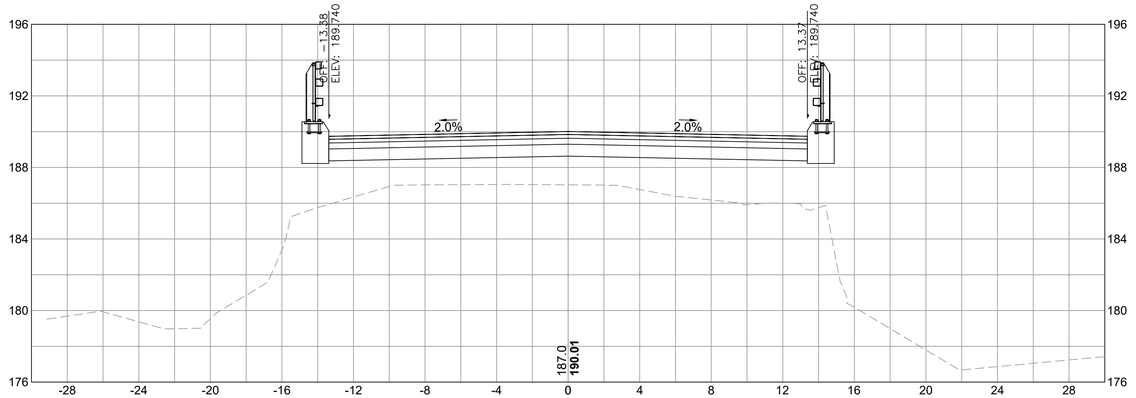


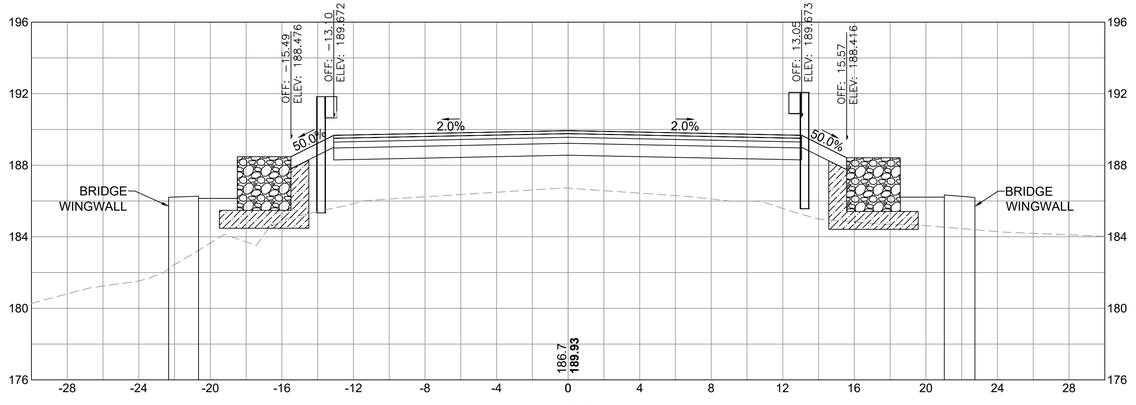
4+50

Total Volume at Station 4+50.00	
Cut Area (SF)	0.000
Fill Area (SF)	48.267
Cut Vol (CY)	0.000
Fill Vol (CY)	52.1
Cum Cut Vol (CY)	104.026
Cum Fill Vol (CY)	549.2
Net Vol (CY)	-445.2



4+25

Total Volume at Station 4+25.00	
Cut Area (SF)	0.000
Fill Area (SF)	64.327
Cut Vol (CY)	0.000
Fill Vol (CY)	63.4
Cum Cut Vol (CY)	104.026
Cum Fill Vol (CY)	497.1
Net Vol (CY)	-393.1



4+00

Total Volume at Station 4+00.00	
Cut Area (SF)	0.000
Fill Area (SF)	72.711
Cut Vol (CY)	0.000
Fill Vol (CY)	13.4
Cum Cut Vol (CY)	104.026
Cum Fill Vol (CY)	433.6
Net Vol (CY)	-329.6

CONSTRUCTION DOCUMENTS

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

COMMONWEALTH OF MASSACHUSETTS
LARA SHY
CIVIL ENGINEER
No. 59240
REGISTERED PROFESSIONAL ENGINEER

SEAL

SCALE:
HORZ.: 1" = 4'
VERT.: 1" = 4'
DATUM:
HORZ.: -
VERT.: -
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GRAPHIC SCALE

FUSS & O'NEILL
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SPRINGFIELD, MA 01103
413.452.0445
www.fando.com

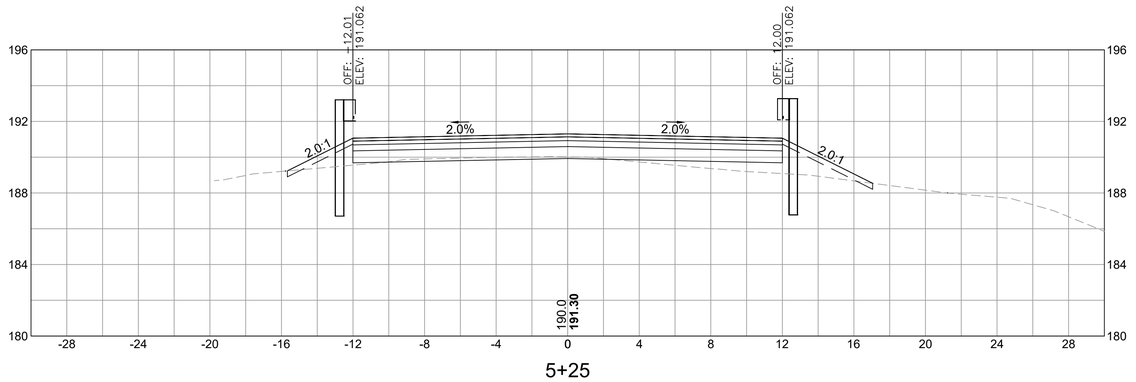
TOWN OF BELCHERTOWN

ROADWAY CROSS SECTIONS

HOP BROOK CULVERT REPLACEMENT
WARREN WRIGHT ROAD
BELCHERTOWN MASSACHUSETTS

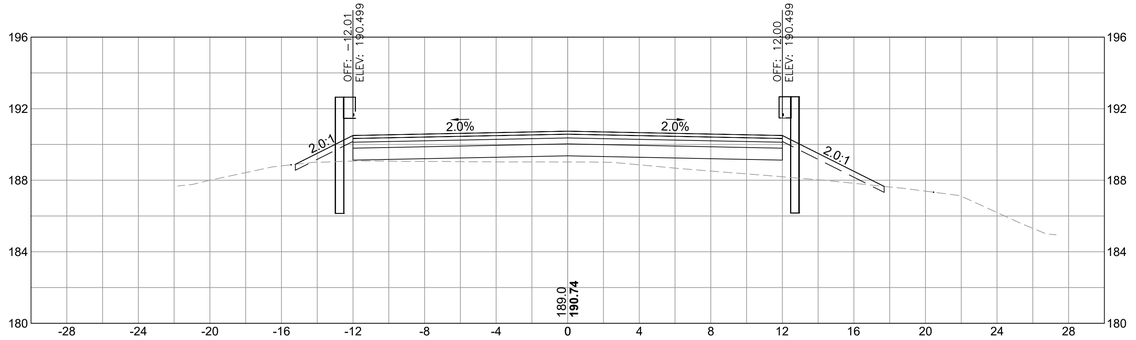
PROJ. No.: 2002548.E30
DATE: MAY 7, 2026

XSC-106



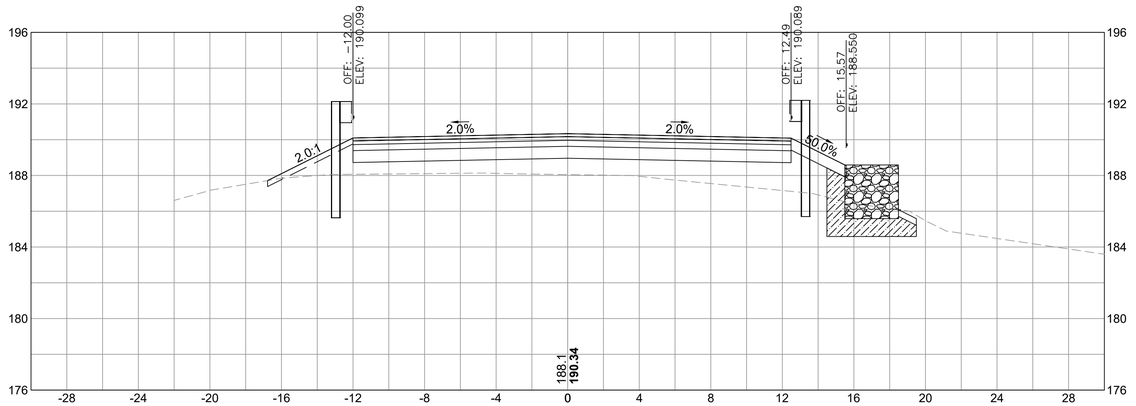
5+25

Total Volume at Station 5+25.00	
Cut Area (SF)	1.742
Fill Area (SF)	8.262
Cut Vol (CY)	1.043
Fill Vol (CY)	10.9
Cum Cut Vol (CY)	105.716
Cum Fill Vol (CY)	621.2
Net Vol (CY)	-515.5



5+00

Total Volume at Station 5+00.00	
Cut Area (SF)	0.509
Fill Area (SF)	15.301
Cut Vol (CY)	0.442
Fill Vol (CY)	22.9
Cum Cut Vol (CY)	104.674
Cum Fill Vol (CY)	610.3
Net Vol (CY)	-505.6



4+75

Total Volume at Station 4+75.00	
Cut Area (SF)	0.445
Fill Area (SF)	34.154
Cut Vol (CY)	0.206
Fill Vol (CY)	38.2
Cum Cut Vol (CY)	104.232
Cum Fill Vol (CY)	587.4
Net Vol (CY)	-483.1

CONSTRUCTION DOCUMENTS

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

COMMONWEALTH OF MASSACHUSETTS
LARA SOD
CIVIL ENGINEER
No. 59240
REGISTERED PROFESSIONAL ENGINEER

SEAL

SCALE:
HORZ.: 1" = 4'
VERT.: 1" = 4'
DATUM:
HORZ.: -
VERT.: -
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GRAPHIC SCALE

FUSS & O'NEILL
1550 MAIN STREET, SUITE 400
SPRINGFIELD, MA 01103
413.452.0445
www.fando.com

TOWN OF BELCHERTOWN

ROADWAY CROSS SECTIONS

HOP BROOK CULVERT REPLACEMENT
WARREN WRIGHT ROAD
BELCHERTOWN MASSACHUSETTS

PROJ. No.: 2002548.E30
DATE: MAY 7, 2026

XSC-107

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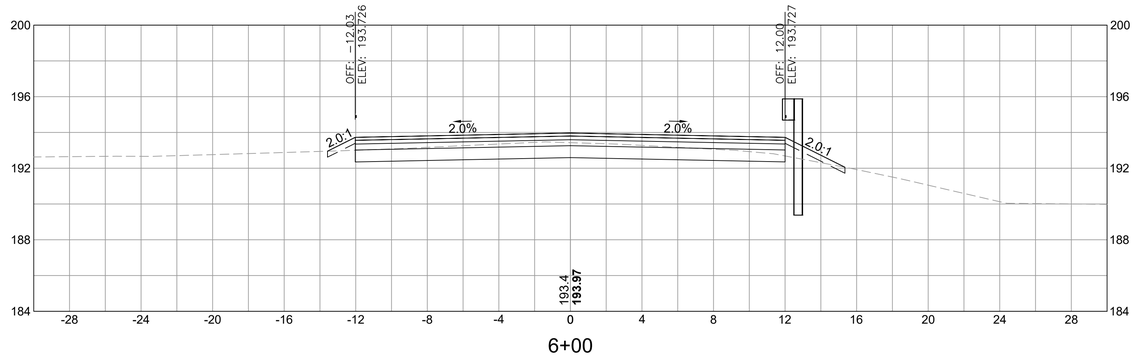
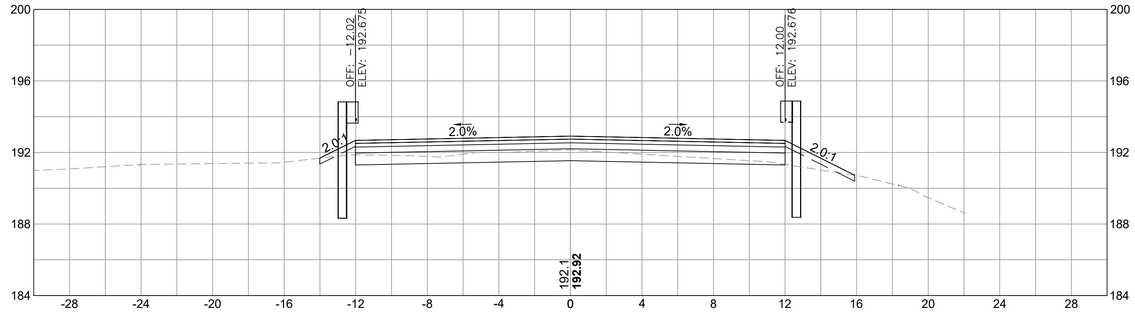


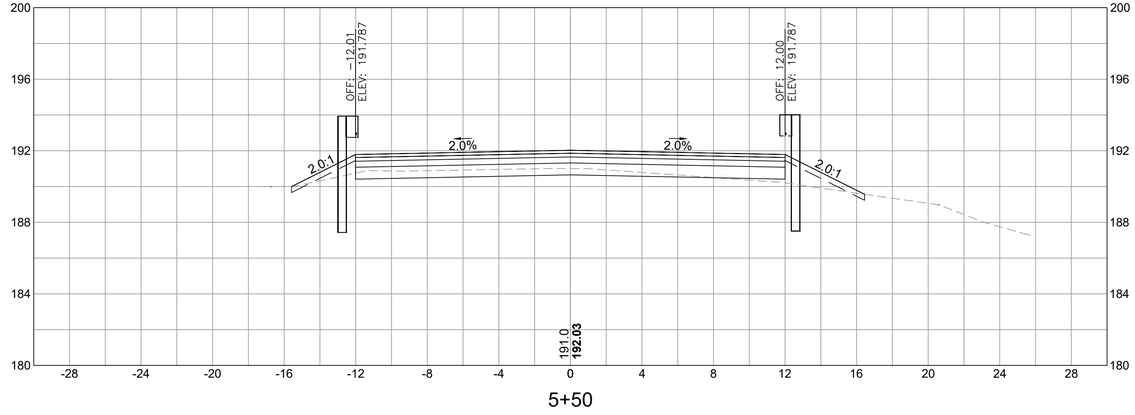
6+00

Total Volume at Station 6+00.00	
Cut Area (SF)	17.828
Fill Area (SF)	0.969
Cut Vol (CY)	13.297
Fill Vol (CY)	1.3
Cum Cut Vol (CY)	131.099
Cum Fill Vol (CY)	630.3
Net Vol (CY)	-499.2



5+75

Total Volume at Station 5+75.00	
Cut Area (SF)	10.892
Fill Area (SF)	1.740
Cut Vol (CY)	8.162
Fill Vol (CY)	2.4
Cum Cut Vol (CY)	117.803
Cum Fill Vol (CY)	629.0
Net Vol (CY)	-511.2



5+50

Total Volume at Station 5+50.00	
Cut Area (SF)	6.737
Fill Area (SF)	3.465
Cut Vol (CY)	3.926
Fill Vol (CY)	5.4
Cum Cut Vol (CY)	109.642
Cum Fill Vol (CY)	626.6
Net Vol (CY)	-517.0

CONSTRUCTION DOCUMENTS

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

COMMONWEALTH OF MASSACHUSETTS
LARA SAS
CIVIL ENGINEER
No. 59240
REGISTERED PROFESSIONAL ENGINEER

SEAL

SCALE:
HORZ.: 1" = 4'
VERT.: 1" = 4'
DATUM:
HORZ.: -
VERT.: -
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GRAPHIC SCALE

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1550 MAIN STREET, SUITE 400
SPRINGFIELD, MA 01103
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TOWN OF BELCHERTOWN

ROADWAY CROSS SECTIONS

HOP BROOK CULVERT REPLACEMENT
WARREN WRIGHT ROAD
BELCHERTOWN MASSACHUSETTS

PROJ. No.: 2002548.E30
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XSC-108

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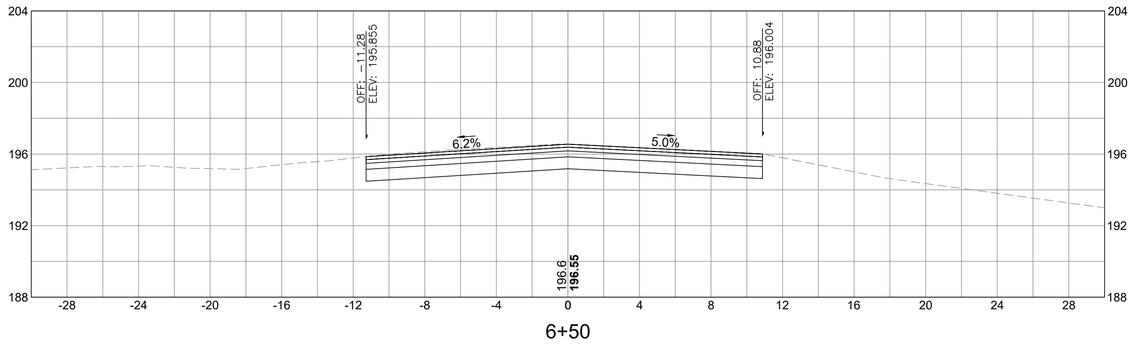
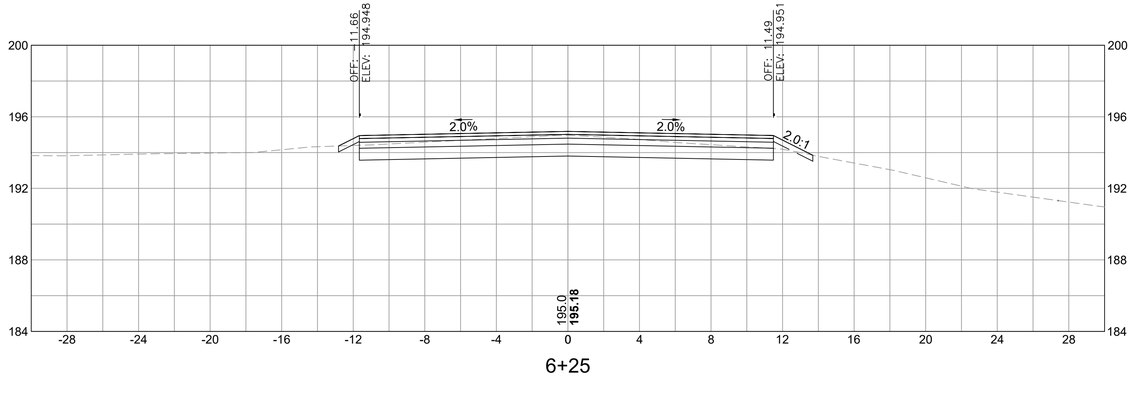


6+50

Total Volume at Station 6+50.00	
Cut Area (SF)	31.233
Fill Area (SF)	0.000
Cut Vol (CY)	24.849
Fill Vol (CY)	0.1
Cum Cut Vol (CY)	174.589
Cum Fill Vol (CY)	630.9
Net Vol (CY)	-456.3



6+25

Total Volume at Station 6+25.00	
Cut Area (SF)	22.439
Fill Area (SF)	0.242
Cut Vol (CY)	18.642
Fill Vol (CY)	0.6
Cum Cut Vol (CY)	149.741
Cum Fill Vol (CY)	630.8
Net Vol (CY)	-481.1

CONSTRUCTION DOCUMENTS

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

COMMONWEALTH OF MASSACHUSETTS
LARA SOO
CIVIL ENGINEER
No. 59240
REGISTERED PROFESSIONAL ENGINEER

SEAL

SCALE:
HORZ.: 1" = 4'
VERT.: 1" = 4'
DATUM:
HORZ.: -
VERT.: -
0 ?? ?? ??
GRAPHIC SCALE

FUSS & O'NEILL
1550 MAIN STREET, SUITE 400
SPRINGFIELD, MA 01103
413.452.0445
www.fando.com

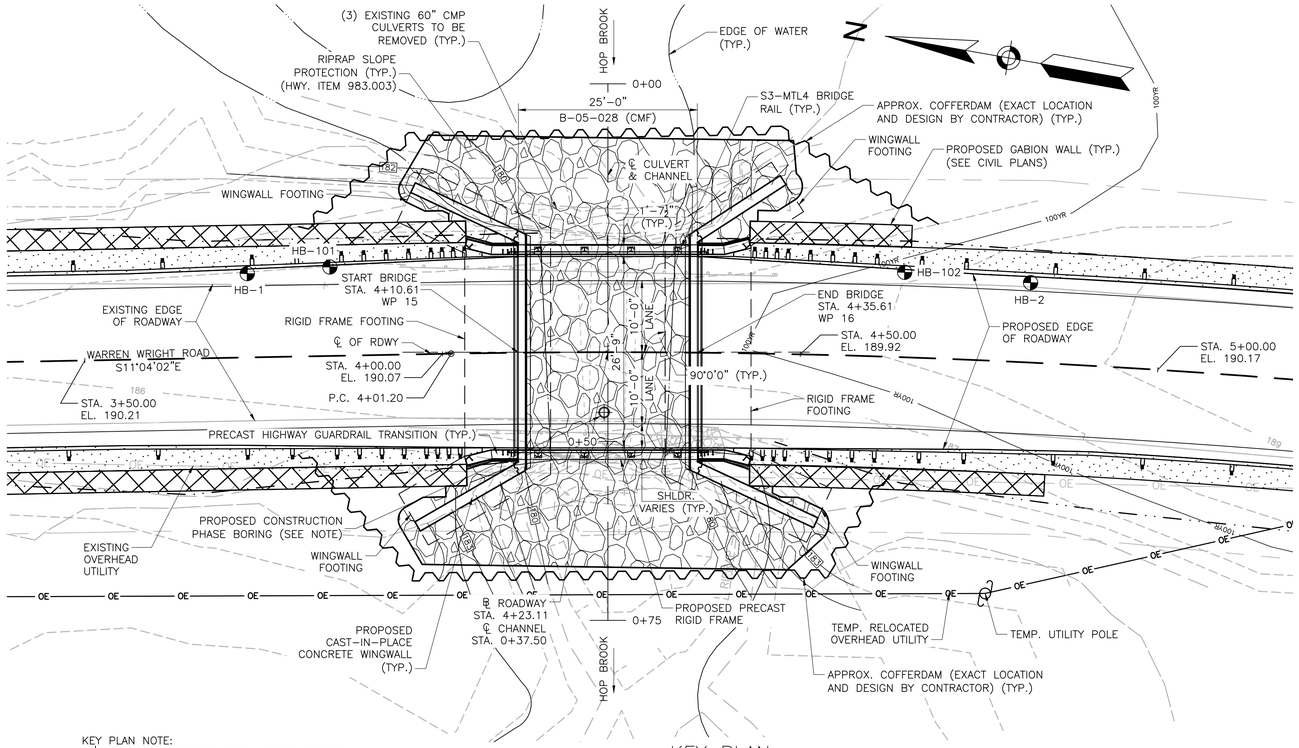
TOWN OF BELCHERTOWN

ROADWAY CROSS SECTIONS

HOP BROOK CULVERT REPLACEMENT
WARREN WRIGHT ROAD
BELCHERTOWN MASSACHUSETTS

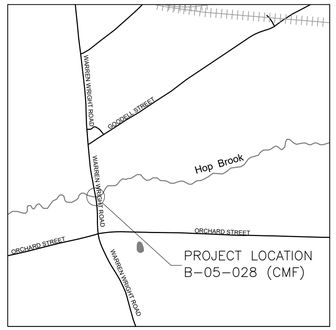
PROJ. No.: 2002548.E30
DATE: MAY 7, 2026

XSC-109



KEY PLAN NOTE:
⊕ PROPOSED CONSTRUCTION PHASE BORING – SUGGESTED APPROXIMATE LOCATION SHOWN. CONTRACTOR TO SELECT EXACT LOCATION OF THE BORING WITH APPROVAL OF THE ENGINEER.

KEY PLAN
SCALE: 1" = 10'-0"



LOCUS MAP
SCALE: 1" = 1000'

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

STATE BRIDGE ENGINEER — DATE

BELCHERTOWN
WARREN WRIGHT ROAD

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	01	14
PROJECT FILE NO.	N/A		

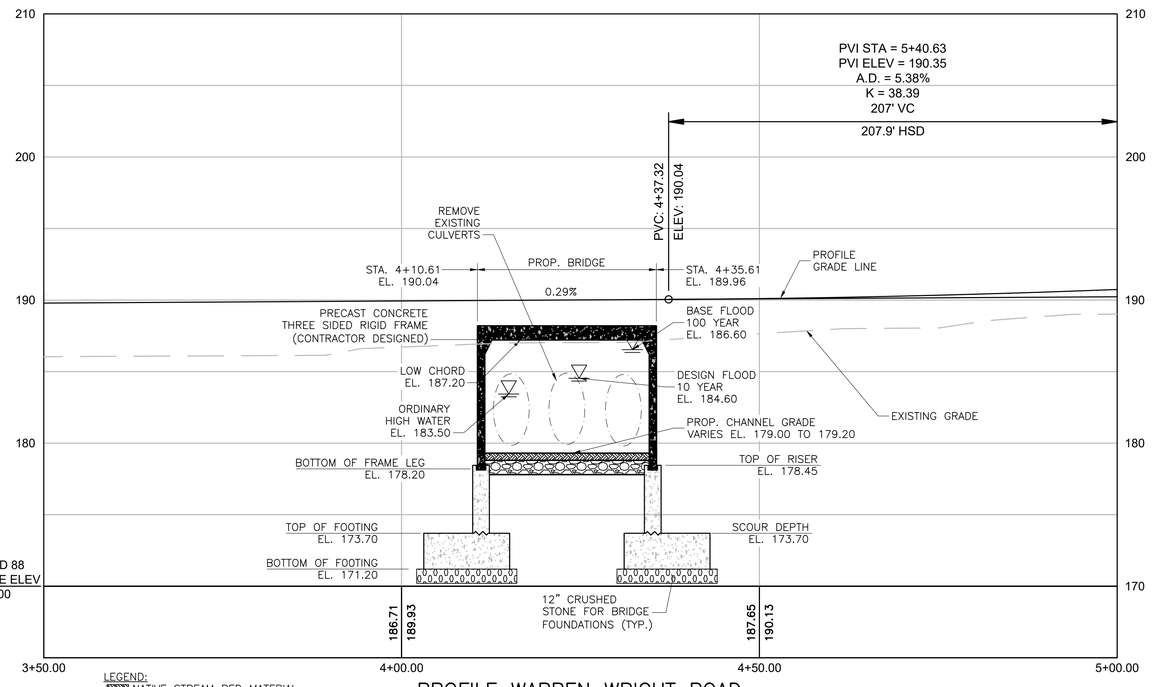
STRUCTURE PLAN, PROFILE AND INDEX

ESTIMATED QUANTITIES (NOT GUARANTEED)

MUCK EXCAVATION	1060 C.Y.
BRIDGE EXCAVATION WITHIN COFFERDAM	150 C.Y.
GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	620 C.Y.
CRUSHED STONE FOR BRIDGE FOUNDATIONS	90 TON
CONSTRUCTION PHASE BORING	30 L.F.
SUPERPAVE SURFACE COURSE - 9.5 (SSC - 9.5)	9 TON
SUPERPAVE INTERMEDIATE COURSE - 12.5 (SIC - 12.5)	11 TON
GEOTEXTILE FABRIC FOR SEPARATION	380 S.Y.
COFFERDAM STRUCTURE NO. B-05-028 (CMF)	1 L.S.
CONTROL OF WATER - BRIDGE NO. B-05-028 (CMF)	1 L.S.
BRIDGE STRUCTURE, BRIDGE NO. B-05-028 (CMF)	1 L.S.
DEMOLITION OF BRIDGE NO. B-05-028 (5KR)	1 L.S.

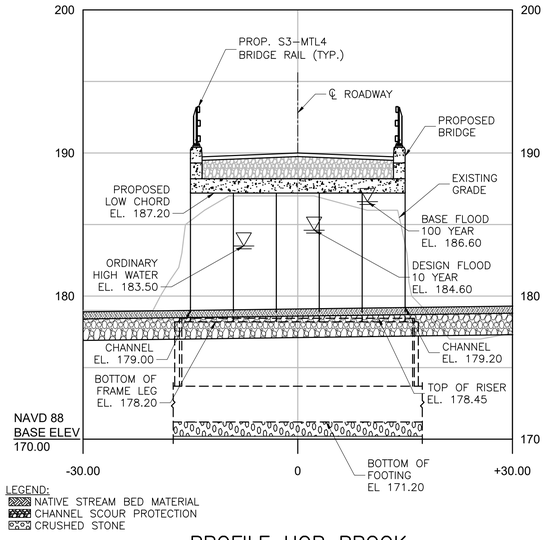
WARREN WRIGHT ROAD - ALIGNMENT CONSTRUCTION BASELINE DATA

NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
C16	0+19.06	2943395.037	396217.817	R=2008.00' Δ=3°15'47" L=114.36' T=57.19'		1+33.41	2943282.242	396236.562
L19	1+33.41	2943282.242	396236.562		S11°04'02"E 267.79'	4+01.20	2943019.434	396287.966
C15	4+01.20	2943019.434	396287.966	R=1192.00' Δ=10°04'45" L=209.69' T=105.11'		6+10.89	2942811.175	396309.956
L20	6+10.89	2942811.175	396309.956		S0°59'17"E 156.86'	7+67.75	2942654.340	396312.661



LEGEND:
NATIVE STREAM BED MATERIAL
CHANNEL SCOUR PROTECTION
CRUSHED STONE

PROFILE WARREN WRIGHT ROAD
HORIZONTAL SCALE: 1" = 10'-0"
VERTICAL SCALE 1" = 5'-0"



LEGEND:
NATIVE STREAM BED MATERIAL
CHANNEL SCOUR PROTECTION
CRUSHED STONE

PROFILE HOP BROOK
HORIZONTAL SCALE: 1" = 10'-0"
VERTICAL SCALE 1" = 5"

INDEX

COMMONWEALTH OF MASSACHUSETTS
SHANNON R. BEAUMONT
CIVIL
No. 49381
REGISTERED PROFESSIONAL ENGINEER

MAY 04, 2026	ISSUED FOR CONSTRUCTION

TOWN OF BELCHERTOWN
290 JACKSON STREET, P.O. BOX 306
BELCHERTOWN, MA 01007

BRIDGE REPLACEMENT
BELCHERTOWN
WARREN WRIGHT ROAD
OVER HOP BROOK

GENERAL NOTES:

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 CONTRACTOR SHALL SUBMIT TO THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION ALL CONSTRUCTION DRAWINGS AND DESIGN CALCULATIONS THAT SHALL BE USED TO FABRICATE AND CONSTRUCT THE 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 AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION, 2020, FOR HL–93 LOADING.

BENCHMARK:
VERTICAL DATUM BASED ON NAVD 88 AND SURVEY PROVIDED BY SHERMAN AND FRYDRYK. TEMPORARY BENCHMARKS WERE ESTABLISHED ON SITE. TBM, SPIKE UTILITY POLE #39, EL. 185.96 AND TBM SPIKE UTILITY POLE #2/40, EL. 190.38.

DATE:
TO BE PLACED ON THE INSIDE FACE OF THE NORTHWEST AND SOUTHEAST HIGHWAY 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 HIGHWAY GUARDRAIL TRANSITION IS CONSTRUCTED. BOTH HIGHWAY GUARDRAIL TRANSITIONS SHALL FEATURE THE SAME DATE.

SCALES:
SCALES NOTED ON THE PLANS ARE NOT APPLICABLE TO REDUCED SIZE PRINTS. DIVIDE SCALES BY 2 FOR HALF–SIZE PRINTS (A3).

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

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

CONSTRUCTION SPECIFICATIONS:
ALL CONSTRUCTION WORK TO BE PERFORMED IN ACCORDANCE WITH THE COMMONWEALTH OF MASSACHUSETTS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, 2024 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.

EXCAVATION:
ALL EXCAVATION FOR THE PROPOSED BRIDGE SHALL BE PAID FOR UNDER ITEM NO. 123., MUCK EXCAVATION OR ITEM NO. 140.1, BRIDGE EXCAVATION WITHIN COFFERDAM, EXCEPT THAT REMOVAL OF ANY BOULDERS LARGER THAN 1 CUBIC YARD SHALL BE PAID FOR UNDER ITEM NO. 121., CLASS A ROCK EXCAVATION.

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 OR COMMENCE 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, ETC. 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 CONTRACTOR'S OPERATIONS SHALL BE RESTORED TO THEIR ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE.

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

PRECAST CONCRETE ELEMENTS NOTES:

1. THE CONTRACTOR SHALL SUBMIT DESIGN CALCULATIONS FOR THE THREE–SIDED FRAME, INCLUDING THE HEADWALL CONNECTION TO THE FRAME, THE FRAME EXTENSIONS TO THE WINGWALL, AND WINGWALL CONNECTION TO THE FRAME EXTENSIONS IN ACCORDANCE WITH THE LATEST AASHTO LRFD DESIGN SPECIFICATIONS AND THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION'S LRFD BRIDGE DESIGN MANUAL FOR HL–93 VEHICULAR LIVE LOADING (WITH LESS THAN 2 FEET OF COVER) FOR APPROVAL OF THE ENGINEER. THE DESIGN COMPUTATIONS SHALL CONSIDER ALL LOADINGS AS APPROPRIATE DURING FABRICATION, SHIPMENT, ERECTION, CONSTRUCTION, AND AFTER COMPLETION OF CONSTRUCTION BASED ON THESE CONSTRUCTION DRAWINGS. THE RAIL POST ANCHORAGE SPACING SHALL BE DETAILED ON SHOP DRAWINGS FOR REVIEW AND APPROVAL BY THE ENGINEER.
2. THE FRAME DIMENSIONS PROVIDED ARE SHOWN TO ESTABLISH THE SIZE OF THE PROPOSED OPENING OF 184 SQUARE FEET. THE WIDTHS AND THICKNESSES OF EACH FRAME UNIT MAY VARY DEPENDING UPON THE MANUFACTURER'S SPECIFICATIONS. A FRAME TYPE STRUCTURE SHALL BE REQUIRED. THE CONTRACTOR, AT NOT ADDITIONAL COMPENSATION, HAS THE OPTION TO PROPOSE AN ALTERNATE FRAME DESIGN WITH THE SAME OR LARGER OPENING AREA. IF AN ALTERNATE DESIGN IS PROPOSED, THE CONTRACTOR, AT NO ADDITIONAL COMPENSATION, SHALL PROVIDE ALTERNATE FOOTING AND RISER DESIGNS, AS APPLICABLE.
3. THE CONTRACTOR, AT NO ADDITIONAL COMPENSATION, HAS THE OPTION TO PROVIDE PRECAST CONCRETE FOOTINGS, AND SHALL SUBMIT THE FINAL DESIGN OF THE PRECAST CONCRETE FOOTINGS.
4. THE PRECAST ELEMENTS ARE TO BE PARALLEL AND ALIGNED WITH THE CONSTRUCTION LINE AS SHOWN ON THESE CONSTRUCTION DRAWINGS.
5. THE TOP OF FOOTING ELEVATION AS SHOWN ON THESE PLANS SHALL BE MAINTAINED.
6. THE FABRICATOR IS RESPONSIBLE FOR THE DESIGN AND INSTALLATION OF LIFT HOOKS FOR ALL PRECAST ELEMENTS. PLANS PROVIDING SPACING AND LOCATION OF LIFTING DEVICES AND HANDLING STRESS CALCULATIONS SHALL BE PROVIDED TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO FABRICATION OF THE PRECAST ELEMENTS.
7. SHOP DRAWINGS AND DESIGN CALCULATIONS SHALL BE SIGNED AND SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE COMMONWEALTH OF MASSACHUSETTS.
8. PRECAST CONCRETE ELEMENTS SHALL CONFORM TO THE APPLICABLE PARTS OF SECTION 901 OF THE SPECIFICATIONS.
9. ALL TOLERANCES BETWEEN THE PRECAST ELEMENTS SHALL BE DETERMINED BY THE CONTRACTOR AND SHALL BE IN ACCORDANCE WITH PCI REQUIREMENTS.

ADDITIONAL NOTES:

CONCRETE:
UNLESS OTHERWISE SPECIFIED, ALL CONCRETE SHALL BE 5000 HP CONCRETE.

ALL CIP AND PRECAST CONCRETE POURS SHOWN ON THESE CONSTRUCTION DRAWINGS WHERE ALL VOLUMETRIC DIMENSIONS ARE 4 FEET OR GREATER SHALL BE CONSIDERED TO BE MASS CONCRETE PLACEMENTS AND SHALL REQUIRE A HEAT OF HYDRATION ANALYSIS AND THERMAL CONTROL PLAN, AS SPECIFIED IN THE MASSDOT STANDARD SPECIFICATIONS.

THE USE OF REMAIN–IN–PLACE FORMS ON THIS STRUCTURE IS NOT ALLOWED.

EXPOSED EDGES OF CONCRETE SHALL BE BEVELED 1" X 1" UNLESS DIMENSIONED OTHERWISE.

PRECAST: THREE SIDED RIGID FRAME (CONTRACTOR DESIGNED), HIGHWAY GUARDRAIL TRANSITIONS

CAST–IN–PLACE: FRAME RISERS, WINGWALLS, FOUNDATIONS, CURBS/HEADWALLS, APPROACH SLABS

REINFORCEMENT:
REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 31 GRADE 60 AND SHALL BE EPOXY COATED. UNLESS OTHERWISE NOTED ON THE CONSTRUCTION DRAWINGS, ALL BARS SHALL BE LAPPED AS FOLLOWS:

	MODIFICATION CONDITION	#4 BARS	#5 BARS	#6 BARS
1.	NONE	16"	17"	21"
2.	12" OF CONCRETE BELOW BAR	18"	22"	27"
3.	EPOXY COATED BARS, COVER $<3d_b$ OR CLEAR SPACING $<6d_b$	21"	26"	31"
4.	COATED BARS, ALL OTHER CASES	17"	21"	25"
5.	CONDITION 2 AND 3	23"	29"	35"
6.	CONDITION 2 AND 4	21"	27"	32"

ALL OTHER BARS SHALL BE LAPPED AS SHOWN ON THE CONSTRUCTION DRAWINGS.

ALL REINFORCEMENT SHALL HAVE 3" COVER AT BOTTOM OF FOOTINGS AND 2" COVER ELSEWHERE UNLESS DIMENSIONED OTHERWISE.

GEOTECHNICAL/H&H NOTES:

1. SEE GEOTECHNICAL REPORT BY O'REILLY, TALBOT & OKUN, DATED JUNE 10, 2024. REVISED APRIL 13, 2026.
2. SEE HYDRAULIC REPORT, DATED FEBRUARY, 2024. REVISED NOVEMBER, 2025.

SURVEY NOTES:

1. NATIONAL VERTICAL DATUM NAVD 88 IS USED THROUGHOUT.

BACKFILL MATERIALS:

A. GRAVEL BORROW (MASSDOT M1.03.0, TYPE B) SHALL BE USED ABOVE AND BEHIND THE RIGID FRAME AND BEHIND WINGWALLS.

B. CRUSHED STONE (M2.01.4) SHALL BE USED BELOW FOOTINGS, AND IN DRAINAGE STRUCTURES IN PLACE OF GRAVEL BORROW.

CONSTRUCTION JOINTS:
CONSTRUCTION JOINTS, OTHER THAN SHOWN ON THE PLANS, WILL NOT BE PERMITTED WITHOUT PRIOR APPROVAL OF THE ENGINEER.

BELCHERTOWN
WARREN WRIGHT ROAD

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	02	14
PROJECT FILE NO.	N/A		

GENERAL NOTES

SEISMIC DESIGN CRITERIA	
DESIGN RETURN PERIOD:	1000
DESIGN SPECTRA	
As	0.094
SDs	0.210
SD1	0.093
SITE CLASS	D
SEISMIC DESIGN CATEGORY (SDC)	A

HYDRAULIC DESIGN DATA	
DRAINAGE AREA (SQ. MILES)	7
DESIGN FLOOD DISCHARGE (C.F.S.)	312
DESIGN FLOOD FREQUENCY (YEARS)	10
DESIGN FLOOD VELOCITY (F.P.S.)	1.2
DESIGN FLOOD ELEVATION (FEET, NAVD)	184.6
BASE (100–YEAR) FLOOD DATA	
BASE FLOOD DISCHARGE (C.F.S.)	1,035
BASE FLOOD ELEVATION (FEET, NAVD)	186.6
DESIGN AND CHECK SCOUR DATA	
DESIGN SCOUR FLOOD EVENT RETURN FREQUENCY (YEARS)	25
DESIGN FLOOD ABUTMENT SCOUR DEPTH (FEET)	4.5
DESIGN FLOOD PIER SCOUR DEPTH (FEET)	N/A
CHECK SCOUR FLOOD EVENT RETURN FREQUENCY (YEARS)	50
CHECK FLOOD ABUTMENT SCOUR DEPTH (FEET)	5.3
CHECK FLOOD PIER SCOUR DEPTH (FEET)	N/A
FLOOD OF RECORD	
DISCHARGE (C.F.S.)	UNKNOWN
FREQUENCY (IF KNOWN, YEARS)	UNKNOWN
MAXIMUM ELEVATION (FEET, NAVD)	UNKNOWN
DATE (MM/YYYY)	UNKNOWN
HISTORY OF ICE FLOES	UNKNOWN
EVIDENCE OF SCOUR AND EROSION	YES

TEMPORARY WATER CONTROL DESIGN DATA	
DESIGN FLOOD DISCHARGE (C.F.S.)	55
DESIGN FLOOD FREQUENCY (YEARS)	2
DESIGN FLOOD VELOCITY (F.P.S.)	0.6
DESIGN FLOOD ELEVATION (FEET, NAVD)	183.6

NOTE: A TEMPORARY STREAM BYPASS WILL BE UTILIZED TO THE WEST SIDE OF THE STREAM CROSSING. SEE CIVIL PLANS FOR MORE DETAILS.

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

STATE BRIDGE ENGINEER _____ DATE _____

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

LOG OF BORING HB-1

Page 1 of 2

PROJECT	Hop Brook, Warren Wright Culvert Replacement			CONTRACTOR	Seaboard Environmental Drilling		
JOB NUMBER	2950-12-01	FINAL DEPTH (ft)	42.0	DRILLING EQUIPMENT	B-53 Truck Mounted Rig		
LOCATION	Belchertown, MA	SURFACE ELEV (ft)	186.0	FOREMAN	Mike G.	CASING	
START DATE	11/8/2021	DISTURBED SAMPLES	11	HELPER	Nick C.	CASE DIAMETER	4"
FINISH DATE	11/8/2021	UNDISTURBED SAMPLES	--	BIT TYPE	Roller Bit with Wash	HAMMER WGT	300 lb
ENGINEER/SCIENTIST	Jhonatan Escobar	WATER LEVEL		ROD TYPE	N (2 3/8" O.D.)	HAMMER DROP	30"
BORING LOCATION	Northeast of Existing Culvert	FIRST (ft)	1.75	SAMPLER	2" O.D. Split Spoon	ROCK CORING INFORMATION	
		LAST (ft)	--	HAMMER TYPE	Safety	TYPE	N/A
		TIME (hr)	--	HAMMER WGT/DROP	140 lb / 30" Wire Line	SIZE	N/A

DEPTH (ft)/ SAMPLES	SAMPLES: PENETR. RESIST. (bl / 6 in)	SAMPLES: REC. (in)	SAMPLES: TYPE/ NO.	SAMPLES: FIELD TEST DATA	SAMPLE DESCRIPTION (MODIFIED BURMISTER)	PROFILE DEPTH (ft) ELEV.	REMARKS/ WELL CONSTRUCTION
	4/5/3/5	16/24	S-1 (0-2')	--	Top 13": Loose, dark brown, fine to medium SAND, little coarse sand, trace gravel, trace silt, trace organics (roots), damp (FILL) Bottom 3": Loose, gray brown, SILT, little fine sand, trace organics (roots), wet (~~Slight organic odor~~)	FILL 1.5 184.5	
	2/2/2/1	18/24	S-2 (2-4')	--	Very loose, dark brown, SILT, little fine to medium sand, trace gravel, trace organics (roots), wet (Slight organic odor)	Reworked SILT with organic matter	
5'	2/2/2/2	16/24	S-3 (4-6')	--	Very loose, gray brown, SILT, little fine sand, trace organics (roots), wet (Significant organic odor)		
	1/2/3/5	15/24	S-4 (6-8')	--	Top 13": Loose, gray brown, SILT, little fine sand, trace organics (roots), wet (1" wood at bottom, Significant organic odor) Bottom 2": Loose, gray, fine to medium SAND, trace silt, wet	7.5 178.5	
10'						FINE TO MEDIUM SAND	
	2/5/5/8	13/24	S-5 (10-12')	--	Top 5": Loose, gray, fine to medium SAND, little coarse sand, trace silt Bottom 8": Loose, gray, SILT, little fine sand	11.0 175.0	
						SILT	
15'	4/7/8/13	5/24	S-6 (15-17')	--	Stiff, gray, clayey SILT, trace gravel	15.0 171.0	
						CLAYEY SILT	
20'	3/4/5/6	14/24	S-7 (20-22')	PP=1.0 TSF TV=0.3 TSF	Stiff, gray, clayey SILT, little fine to medium sand		
25'	8/11/7/7	7/24	S-8 (25-27')	--	Medium dense, red brown, fine to medium SAND, little silt	25.0 161.0 FINE TO MEDIUM SAND	

Remarks:
1. Undrained shear strength estimated in field using E285 Pocket Torvane (TV). Values in tons/ft^2.
2. Unconfined compressive strength estimated in field using Pocket Penetrometer (PP). Values in tons/ft^2.

PROJECT NO. 2950-12-01

LOG OF BORING HB-1

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

Job No. 2950-12-01

LOG OF BORING HB-1

Page 2 of 2

DEPTH (ft)/ SAMPLES	SAMPLES: PENETR. RESIST. (bl / 6 in)	SAMPLES: REC. (in)	SAMPLES: TYPE/ NO.	SAMPLES: FIELD TEST DATA	SAMPLE DESCRIPTION (MODIFIED BURMISTER)	PROFILE DEPTH (ft) ELEV.	REMARKS/ WELL CONSTRUCTION
						FINE TO MEDIUM SAND (CONTINUED)	
30'	2/2/3/2	15/24	S-9 (30-32')	--	Loose, red brown, fine SAND and SILT, little medium sand	30.0 156.0 FINE SAND AND SILT	
35'	8/9/10/13	15/24	S-10 (35-37')	--	Medium dense, red brown, fine SAND, some silt, some medium sand	35.0 151.0 SILTY SAND	
40'	9/8/8/7	10/24	S-11 (40-42')	--	Very stiff, red brown, clayey SILT, little fine sand	40.0 146.0 CLAYEY SILT	
					End of exploration at 42'	42.0 144.0	
45'							
50'							
55'							
60'							

BORING NOTES:

1. LOCATION OF BORINGS SHOWN ON THE PLANS, SEE SHEET 1. 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.
3. WATER LEVELS SHOWN ON THE BORING LOGS WERE OBSERVED AT THE TIME OF TAKING BORINGS AND DO NOT NECESSARILY SHOW THE TRUE GROUND WATER LEVEL.
4. FIGURES IN COLUMNS INDICATE NUMBER OF BLOWS REQUIRED TO DRIVE A 2" O.D. SPLIT SPOON SAMPLER 6" USING A 140 POUND WEIGHT FALLING 30".
5. BORINGS PERFORMED BY SEABOARD ENVIRONMENTAL DRILLING, INC. LOCATED AT 649 MEADOW STREET, CHICOPEE, MA 01013.
   5.1. BORINGS HB-1 & HB-2 TAKEN IN NOVEMBER, 2021.
   5.2. BORINGS HB-101 & HB-102 TAKEN IN NOVEMBER & DECEMBER, 2022.
6. THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988 IS USED THROUGHOUT.

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

STATE BRIDGE ENGINEER _____ DATE _____

BELCHERTOWN
WARREN WRIGHT ROAD

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	03	14
PROJECT FILE NO.	N/A		

BORING LOGS

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

LOG OF BORING HB-2

Page 1 of 2

PROJECT	Hop Brook, Warren Wright Culvert Replacement			CONTRACTOR	Seaboard Environmental Drilling		
JOB NUMBER	2950-12-01	FINAL DEPTH (ft)	42.0	DRILLING EQUIPMENT	B-53 Truck Mounted Rig		
LOCATION	Belchertown, MA	SURFACE ELEV (ft)	188.5	FOREMAN	Mike G.	CASING	
START DATE	11/8/2021	DISTURBED SAMPLES	12	HELPER	Nick C.	CASE DIAMETER	4"
FINISH DATE	11/8/2021	UNDISTURBED SAMPLES	--	BIT TYPE	Roller Bit with Wash	HAMMER WGT	300 lb
ENGINEER/SCIENTIST	Jhonatan Escobar	WATER LEVEL		ROD TYPE	N (2 3/8" O.D.)	HAMMER DROP	30"
BORING LOCATION	Southeast of Existing Culvert	FIRST (ft)	3.5	SAMPLER	2" O.D. Split Spoon	ROCK CORING INFORMATION	
		LAST (ft)	--	HAMMER TYPE	Safety	TYPE	N/A
		TIME (hr)	--	HAMMER WGT/DROP	140 lb / 30" Wire Line	SIZE	N/A

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
	5/9/13/10	12/24	S-1 (0-2')	--	Top 5": Medium dense, dark brown, fine to medium SAND, trace gravel, trace silt, trace debris (asphalt), trace organics (roots), damp (FILL)	FILL 1.0 187.5	
					Bottom 7": Medium dense, brown, fine to medium SAND, little gravel, little coarse sand, trace silt, damp	FINE TO MEDIUM SAND	
	4/4/4/4	11/24	S-2 (2-4')	--	Loose, gray brown, fine to medium SAND, little to trace silt, wet at bottom 6"	▽ 185.0	
5'	7/7/13/14	2/24	S-3 (4-6')	--	Medium dense, brown, fine to medium SAND, trace silt, trace gravel, wet		
	10/11/13/15	4/24	S-4 (6-8')	--	Medium dense, brown, fine to medium SAND, little coarse sand, trace gravel, trace silt, wet		
	16/14/10/8	11/24	S-5 (8-10')		Medium dense, gray brown, fine to medium SAND, little coarse sand, trace gravel, trace silt, wet		
10'	5/13/15/16	11/24	S-6 (10-12')	--	Medium dense, gray, SILT, little fine sand	10.0 178.5 SILT	
15'	6/7/9/9	18/24	S-7 (15-17')	PP=1.25 TSF TV=0.55 TSF	Very stiff, gray brown, clayey SILT, trace fine sand	15.0 173.5 CLAYEY SILT	
20'	4/5/5/6	19/24	S-8 (20-22')	--	Stiff, gray brown, clayey SILT, some fine sand		
25'	4/8/8/10	10/24	S-9 (25-27')	--	Medium dense, red brown, SILT, some fine sand	25.0 163.5 SANDY SILT	

185 180 175 PROP. B.O.F. EL. 171.2 170 165 160

Remarks:
1. Undrained shear strength estimated in field using E285 Pocket Torvane (TV). Values in tons/ft^2.
2. Unconfined compressive strength estimated in field using Pocket Penetrometer (PP). Values in tons/ft^2.

PROJECT NO. 2950-12-01

LOG OF BORING HB-2

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

Job No. 2950-12-01

LOG OF BORING HB-2

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
						SANDY SILT (CONTINUED)	
30'	9/9/11/10	7/24	S-10 (30-32')	--	Medium dense, red brown, fine SAND, little silt, trace medium sand	30.0 158.5 FINE SAND	
35'	5/9/7/7	17/24	S-11 (35-37')	--	Medium dense, red brown, SILT, little fine sand	35.0 153.5 SILT	
40'	12/12/13/17	5/24	S-12 (40-42')	--	Medium dense, red brown, fine to medium SAND, little coarse sand, trace silt	40.0 148.5 FINE TO MEDIUM SAND	
					End of exploration at 42'	42.0 146.5	
45'							
50'							
55'							
60'							

155 150 145 140

NOTE:

FOR BORING NOTES, SEE SHEET 3.

BELCHERTOWN
WARREN WRIGHT ROAD

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	04	14
PROJECT FILE NO.	N/A		

BORING LOGS

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

STATE BRIDGE ENGINEER _____ DATE _____

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

LOG OF BORING HB-101

PROJECT	Hop Brook, Warren Wright Culvert Replacement			CONTRACTOR	Seaboard Environmental Drilling		
JOB NUMBER	2950-12-02	FINAL DEPTH (ft)	120.0	DRILLING EQUIPMENT	Track Mounted Rig		
LOCATION	Belchertown, MA	SURFACE ELEV (ft)	186.0	FOREMAN	Doug	CASING	
START DATE	11/29/2022	DISTURBED SAMPLES	19	HELPER	Jarrett	CASE DIAMETER	4"
FINISH DATE	11/30/2022, 12/2/2022	UNDISTURBED SAMPLES	0	BIT TYPE	Roller Bit with Wash	HAMMER WGT	300 lb
ENGINEER/SCIENTIST	Caren Irgang	WATER LEVEL		ROD TYPE	N (2 3/8" O.D.)	HAMMER DROP	30"
BORING LOCATION	North side of existing culvert	FIRST (ft)	1.8	SAMPLER	2" O.D. Split Spoon	ROCK CORING INFORMATION	
		LAST (ft)	N/A	HAMMER TYPE	Automatic	TYPE	N/A
		TIME (hr)	N/A	HAMMER WGT/DROP	140 lb / 30"	SIZE	N/A

DEPTH (ft)/ SAMPLES	SAMPLES: PENETR. RESIST. (bl / 6 in)	SAMPLES: REC. (in)	SAMPLES: TYPE/ NO.	FIELD TEST DATA	SAMPLE DESCRIPTION (MODIFIED BURMISTER)	PROFILE DEPTH (ft) ELEV.	REMARKS/ WELL CONSTRUCTION
186	4/2/4/1	13/24	S-1 (0-2')	--	Top 11": Loose, brown, medium SAND, little fine sand, little coarse sand, little fine gravel, trace organics (roots in top 2"), damp (1" black layer near top) Bottom 2": Medium stiff, dark brown, clayey SILT, little fine sand, trace organics (straw), wet	FILL 1.5 184.5 SILT AND SAND with organic matter	
185	WOH for 6"/ 1/1/1	4/24	S-2 (2-4')	--	Very loose, brown to dark brown, fine SAND, some silt, trace organics (straw), wet		1
5'	1/1/2/1	15/24	S-3 (4-6')	--	Top 13": Soft, red to dark brown, clayey SILT, little to some fine sand (in bottom 6"), wet Bottom 2": Very loose, gray brown, fine SAND, some silt, little medium sand, wet (1.5" piece of gravel at tip)		
180	WOH for 24"	14/24	S-4 (6-8')	--	Very loose, dark brown, fine to medium SAND, little to some silt, little fine gravel, little to trace coarse sand, trace organics (straw in top 1"), wet (2" layer of clayey silt near top, 1.5" piece of gravel at tip)		
	3/3/3/4	24/24	S-5 (8-10')	--	Top: 2": Loose, brown, medium SAND, little fine gravel, little coarse sand, wet Next 3": Loose, dark brown, SILT, little to some fine sand, trace organics (wood chips), wet (organic odor) Next 7": Loose, gray, medium SAND, little fine sand, trace silt, wet	10.0 176.0	
10'					Next 9": Loose, dark brown, SILT, trace fine sand, wet (seam of clay near bottom) Bottom: 3": Loose, gray, fine to medium SAND, trace organics (wood chips), wet	SAND AND SILT	
175	1/3/1/2	15/24	S-6 (10-12')	--	Top 7": Loose, gray, fine SAND, trace silt, trace gravel (1/2" seam silt near center) Bottom 8": Loose, gray, varved fine SAND and SILT (1/8" clay seam near center)		
PROP. B.O.F. EL. 171.2							
15'	2/2/1/2	10/24	S-7 (15-17')	--	Top 5": Very loose, gray, fine SAND and SILT, trace fine gravel Bottom 5": Soft, red gray to gray, clayey SILT, little fine sand, trace fine gravel	16.0 170.0 CLAYEY SILT	
170							
20'	WOH for 6"/ 1/4/4	20/24	S-8 (20-22')	PP = 0.75 TSF TV = 0.15 TSF	Medium stiff, red gray, clayey SILT, trace to little fine sand		2 3
165							
25'	2/2/2/4	14/24	S-9 (25-27')	--	Loose, brown gray, fine SAND, trace to little silt, trace coarse sand (fine sand and silt in top 1")	25.0 161.0 FINE SAND	
160							

Remarks:
1. WOH = Weight of rods and 140 lb. hammer.
2. Undrained shear strength estimated in field using E285 Pocket Torvane (TV). Values in tons/ft^2.
3. Unconfined compressive strength estimated using Pocket Penetrometer (PP). Values in tons/ft^2.
4. Difficult to advance casing from 58.5' to 75'.
5. End of drilling on 11/29/2022 after advancing casing to 65'.
6. Hammer bouncing at 67' and 73'.
7. Wash water changed to lighter color at 73'.
8. More difficult drilling conditions at 82.5'.
9. End of drilling on 11/30/2022 after advancing casing to 90'.
10. 100 blows to advance casing 5" at 90', begin open hole drilling

PROJECT NO. 2950-12-02

LOG OF BORING HB-101

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

Job No. 2950-12-02

LOG OF BORING HB-101

DEPTH (ft)/ SAMPLES	SAMPLES: PENETR. RESIST. (bl / 6 in)	SAMPLES: REC. (in)	SAMPLES: TYPE/ NO.	FIELD TEST DATA	SAMPLE DESCRIPTION (MODIFIED BURMISTER)	PROFILE DEPTH (ft) ELEV.	REMARKS/ WELL CONSTRUCTION
						FINE SAND (Continued)	
155						30.0 156.0	
30'	1/4/4/6	20/24	S-10 (30-32')	--	Loose, red gray, fine SAND, little to some silt	FINE SAND AND SILT	
150							
35'	5/6/6/7	18/24	S-11 (35-37')	--	Top 12": Medium dense, brown gray, SILT, little fine sand, trace coarse gravel (few clayey layers) Bottom 6": Medium dense, brown gray, fine SAND and SILT	36.5 149.5 SILTY SAND	
145							
40'	3/2/4/4	13/24	S-12 (40-42')	--	Loose, brown gray, varved SILT and fine SAND		
140							
45'	4/3/5/7	14/24	S-13 (45-47')	--	Loose, light brown, fine SAND and SILT, trace coarse gravel		
135							
50'	5/6/6/9	17/24	S-14 (50-52')	--	Medium dense, gray red, fine SAND, little to some clayey silt (1/8" seams of clayey silt spaced approximately 1" apart)		
130							
55'	6/4/12/31	13/24	S-15 (55-57')	--	Top 2": Medium dense, brown red, fine SAND, little to some silt Next 3": Medium dense, orange, medium SAND, trace fine sand, trace silt (rust staining) Next 4": Medium dense, brown red, fine to coarse SAND and fine GRAVEL, some silt Bottom 4": Medium dense, gray, fine to medium SAND and GRAVEL, some silt, some coarse sand	56.5 129.5 SAND AND GRAVEL	
125					(from wash water at 59': brown, fine to coarse sand and fine gravel)		4
60'	50 for 2"	0/2	S-16 (60-60.2')	--	NO RECOVERY (likely gravel)		

BELCHERTOWN
WARREN WRIGHT ROAD

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	05	14
PROJECT FILE NO.	N/A		

BORING LOGS

NOTE:

FOR BORING NOTES, SEE SHEET 3.

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

STATE BRIDGE ENGINEER _____ DATE _____

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

Job No. 2950-12-02

LOG OF BORING HB-101

Page 3 of 4

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
					(from wash water 60-65': fine to medium sand and fine gravel, some coarse sand)	SAND AND GRAVEL (Continued)	
65'	3/5/14/ 50 for 2"	9/20	S-17 (65-66.6')	--	Medium dense, gray and brown, coarse SAND, some fine gravel, little fine to medium sand, little silt (piece of gravel in tip)		5
						67.0 119.0 FINE GRAVEL AND SAND	6
70'	19/50 for 4"	9/10	S-18 (70-70.8')	--	Very dense, brown, fine GRAVEL, some fine sand, little medium to coarse sand, little silt		
							6, 7
75'							
80'	50 for 4"	3/4	S-19 (80-80.3')	--	Very dense, brown, fine GRAVEL, some coarse sand, little fine to medium sand, little silt		
							8
85'					(from wash water at 85-90': fine gravel, some coarse sand, little fine to medium sand)		
90'							9, 10
95'					(from wash water at 95-97': red brown, fine to medium sand)	95.0 91.0 LIKELY SOFT, FRACTURED ROCK	

120 115 110 105 100 95 90

O'Reilly, Talbot & Okun
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Job No. 2950-12-02

LOG OF BORING HB-101

Page 4 of 4

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
						LIKELY SOFT, FRACTURED ROCK (Continued)	
100'					(from wash water at 99': red brown, fine to medium sand)		
105'					(from wash water at 105-106': red brown, fine sand, little silt, little medium sand)		
110'					(from wash water at 110': red brown, fine sand, little silt, little medium sand)		
115'							
120'					(from wash water at 119-120': red brown, fine sand)	120.0 66.0	
					End of Exploration at 120'		
125'							
130'							

85 80 75 70 65 60 55

BELCHERTOWN
WARREN WRIGHT ROAD

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	06	14
PROJECT FILE NO.	N/A		

BORING LOGS

NOTE:

FOR BORING NOTES, SEE SHEET 3.

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

STATE BRIDGE ENGINEER _____ DATE _____

20020548E10BR03-06 (BORING).DWG Plotted on 4-May-2026 12:29 PM
Final Structural Submittal (SF) 04-May-2026

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

LOG OF BORING HB-102

Page 1 of 3

PROJECT	Hop Brook, Warren Wright Culvert Replacement			CONTRACTOR	Seaboard Environmental Drilling		
JOB NUMBER	2950-12-02	FINAL DEPTH (ft)	65.5	DRILLING EQUIPMENT	Track Mounted Rig		
LOCATION	Belchertown, MA	SURFACE ELEV (ft)	188.0	FOREMAN	Mike	CASING	
START DATE	12/7/2022	DISTURBED SAMPLES	6	HELPER	Ben	CASE DIAMETER	4"
FINISH DATE	12/7/2022	UNDISTURBED SAMPLES	0	BIT TYPE	Roller Bit with Wash	HAMMER WGT	300 lb
ENGINEER/SCIENTIST	Caren Irgang	WATER LEVEL		ROD TYPE	N (2 3/8" O.D.)	HAMMER DROP	30"
BORING LOCATION	South side of existing culvert	FIRST (ft)	3.5	SAMPLER	2" O.D. Split Spoon	ROCK CORING INFORMATION	
		LAST (ft)	N/A	HAMMER TYPE	Automatic	TYPE	N/A
		TIME (hr)	N/A	HAMMER WGT/DROP	140 lb / 30"	SIZE	N/A

DEPTH (ft)/ SAMPLES	SAMPLES: PENETR. RESIST. (bl / 6 in)	SAMPLES: REC. (in)	SAMPLES: TYPE/ NO.	SAMPLES: FIELD TEST DATA	SAMPLE DESCRIPTION (MODIFIED BURMISTER)	PROFILE DEPTH (ft) ELEV.	REMARKS/ WELL CONSTRUCTION
188						FILL 1.0 187.0	1
						FINE TO MEDIUM SAND	
185 ▽						▽ 184.5	
5'							
180					(from wash water at 8-15': gray, silt and fine sand, little medium sand)		
10'						10.0 178.0 SILT	
175							
15'						15.0 173.0 CLAYEY SILT	
PROP. B.O.F. EL. 171.2							
170							
20'							
165							
25'						25.0 163.0 SANDY SILT	

Remarks:
1. Soil profile above 30' adopted from boring log HB-2.
2. Rod jumping at 54'.
3. Hammer bouncing during sampling of S-4, S-5, and S-6.
4. Bit grinding at 57', after sampling S-4.

PROJECT NO. 2950-12-02

LOG OF BORING HB-102

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

Job No. 2950-12-02

LOG OF BORING HB-102

Page 2 of 3

DEPTH (ft)/ SAMPLES	SAMPLES: PENETR. RESIST. (bl / 6 in)	SAMPLES: REC. (in)	SAMPLES: TYPE/ NO.	SAMPLES: FIELD TEST DATA	SAMPLE DESCRIPTION (MODIFIED BURMISTER)	PROFILE DEPTH (ft) ELEV.	REMARKS/ WELL CONSTRUCTION
160						SANDY SILT (Continued)	
30'	2/3/4/4	18/24	S-1 (30-32')	--	Loose, brown, fine SAND, little to trace silt	30.0 156.0 FINE SAND	
155							
35'							
150					(from wash water at 36": dark red brown clayey silt, little medium to coarse sand)	36.0 150.0 SILT	
40'	3/4/4/6	18/24	S-2 (40-42')	--	Loose, red brown, fine SAND, little medium sand, little to trace silt (1/4" layers of silt near top and bottom)	40.0 146.0 FINE SAND	
145							
45'							
140							
50'	3/4/5/8	23/24	S-3 (50-52')	--	Top 16": Loose, red brown, medium SAND, some fine sand, little coarse sand, trace silt Bottom 7": Loose, red brown, fine to medium SAND, little coarse sand, trace silt	50.0 136.0 MEDIUM SAND	
135							
55'	50 for 4"	4/4	S-4 (55-55.3')	--	Very dense, gray, fine to medium SAND, little silt, little coarse sand, trace gravel	54.0 134.0 SAND AND GRAVEL	2 3 4
130							
60'	47/50 for 3"	5/9	S-5 (60-60.8')	--	Very dense, gray, fine GRAVEL, little coarse gravel, little fine to medium sand, trace silt		3
125							

BELCHERTOWN
WARREN WRIGHT ROAD

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	07	14
PROJECT FILE NO.	N/A		

BORING LOGS

NOTE:

FOR BORING NOTES, SEE SHEET 3.

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

STATE BRIDGE ENGINEER _____ DATE _____

O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

Job No. 2950-12-02

LOG OF BORING HB-102

Page 3 of 3

DEPTH (ft)/ SAMPLES	SAMPLES: PENETR. RESIST. (bl / 6 in)	SAMPLES: REC. (in)	SAMPLES: TYPE/ NO.	SAMPLES: FIELD TEST DATA	SAMPLE DESCRIPTION (MODIFIED BURMISTER)	PROFILE DEPTH (ft) ELEV.	REMARKS/ WELL CONSTRUCTION
125 65' 122.5	100 for 5"	3/5	S-6 (65-65.4')	--	Very dense, gray, fine GRAVEL, some fine to medium sand, little silt, little coarse gravel	SAND AND GRAVEL (Continued) 65.5 122.5	3
					End of Exploration at 65.5'		

70' 75' 80' 85' 90' 95'

NOTE:

FOR BORING NOTES, SEE SHEET 3.

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

STATE BRIDGE ENGINEER _____ DATE _____

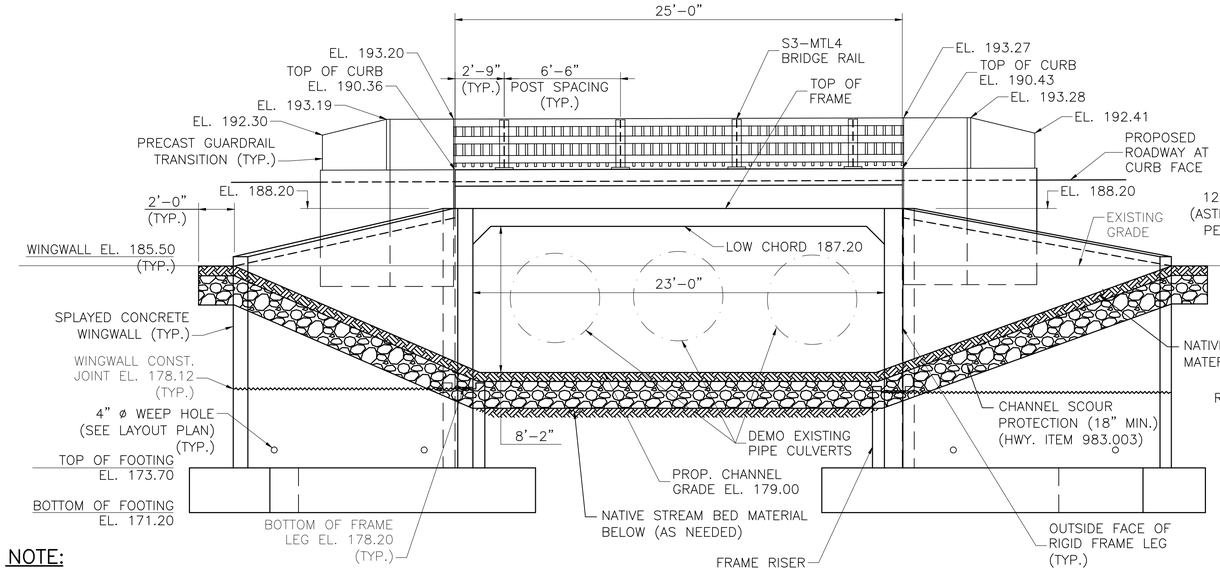
COMMONWEALTH OF MASSACHUSETTS
MassDOT, Highway Division
CONCEPTUAL DESIGN IS ACCEPTABLE TO MASSDOT FOR CONTRACTING

STATE BRIDGE ENGINEER — DATE

BELCHERTOWN
WARREN WRIGHT ROAD

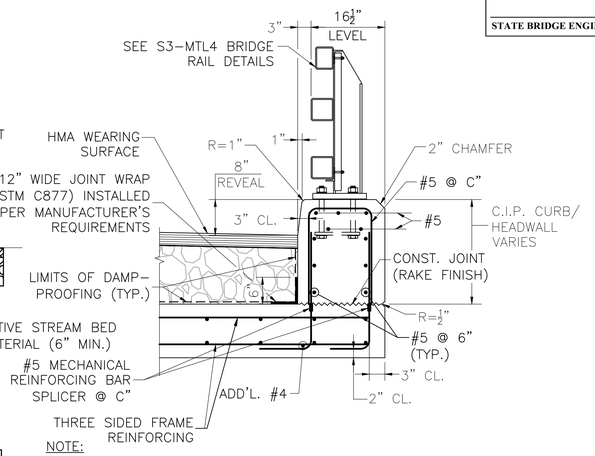
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	09	14
PROJECT FILE NO.	N/A		

STRUCTURE ELEVATIONS



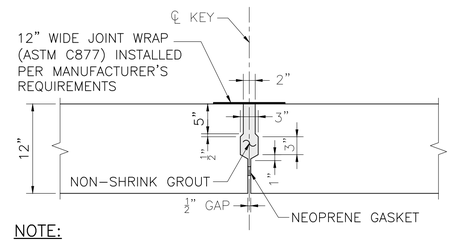
NOTE:
CRUSHED STONE BELOW FOOTINGS NOT SHOWN FOR CLARITY.

EAST ELEVATION
SCALE: 1/4" = 1'-0"



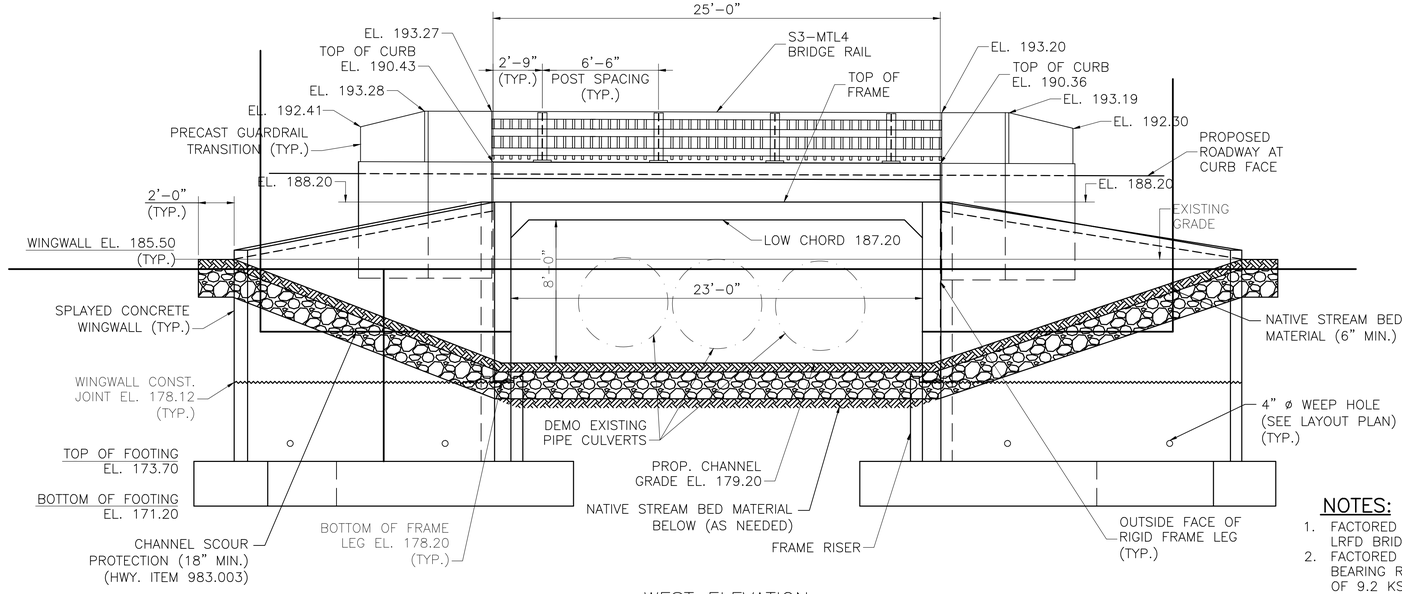
NOTE:
"C" = COORDINATE WITH FRAME MANUFACTURER TO MATCH PRIMARY REINFORCING SPACING. (6" MINIMUM)

DETAIL "A"
SCALE: 3/4" = 1'-0"



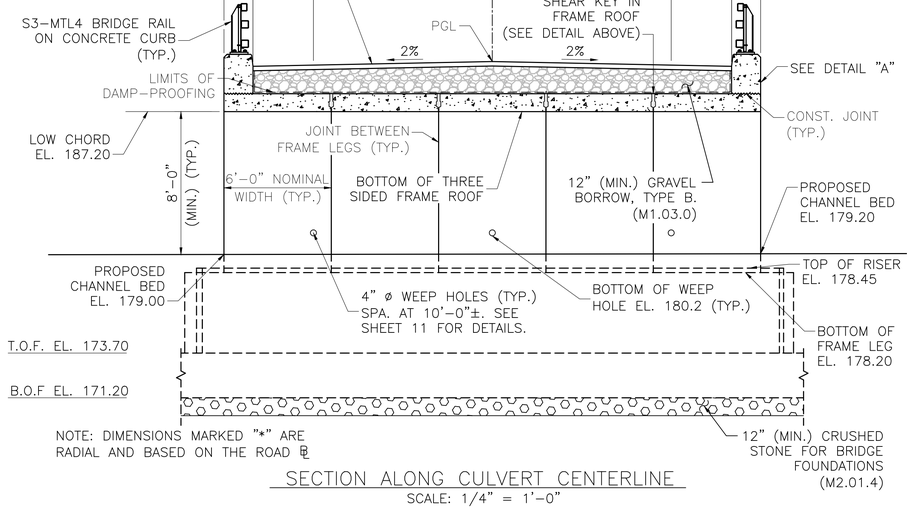
NOTE:
DETAILS AND DIMENSIONS ARE CONCEPTUAL AND MAY BE ALTERED BY THE FABRICATOR TO SUIT THEIR OPERATIONS, HOWEVER THE FUNCTION AND INTENT OF THE DETAIL MUST BE MET.

FRAME SHEAR KEY
SCALE: 1" = 1'-0"



NOTE:
CRUSHED STONE BELOW FOOTINGS NOT SHOWN FOR CLARITY.

WEST ELEVATION
SCALE: 1/4" = 1'-0"



SECTION ALONG CULVERT CENTERLINE
SCALE: 1/4" = 1'-0"

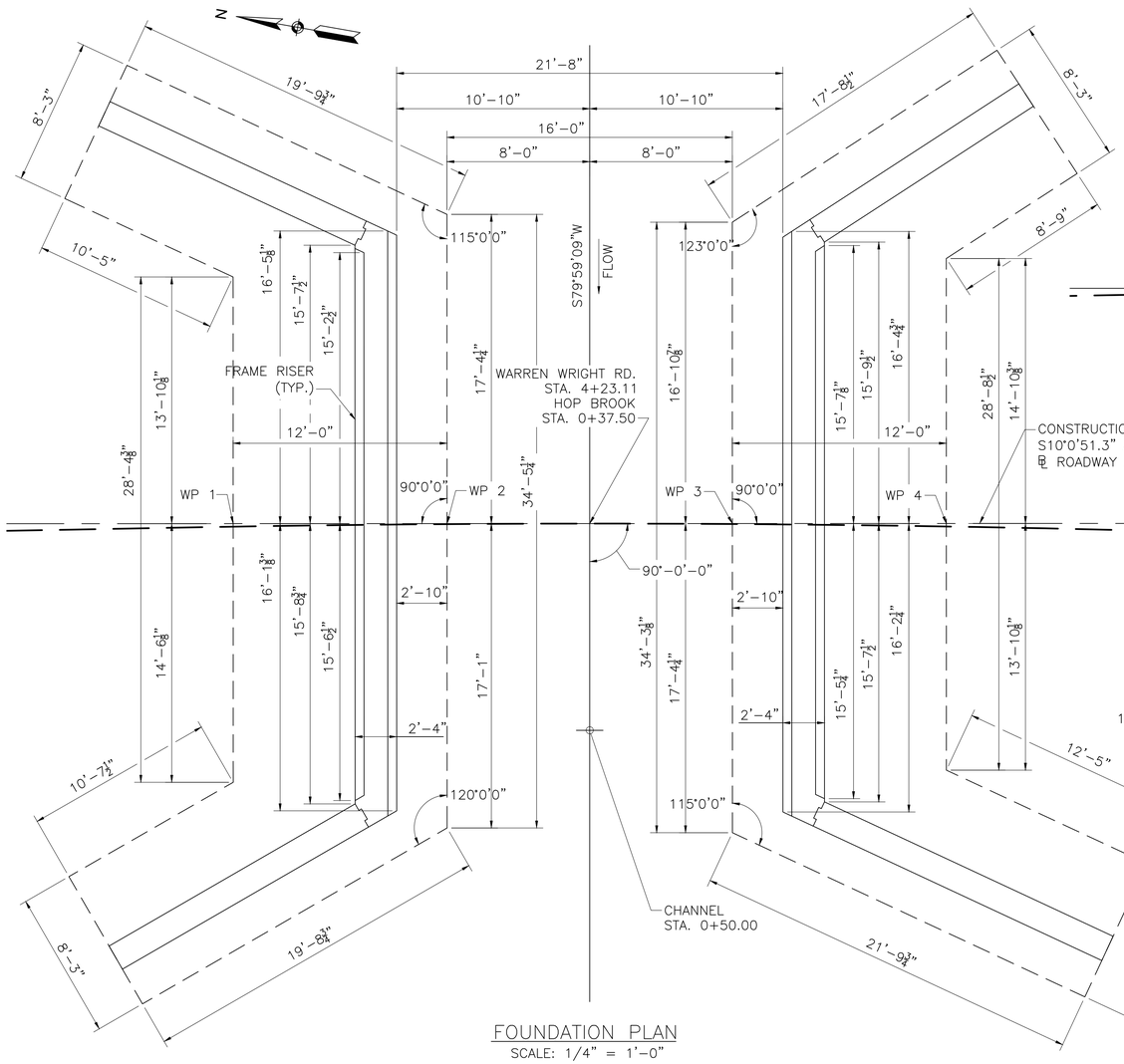
NOTES:
1. FACTORED BEARING PRESSURE FOR FRAME FOOTINGS = 4.0 KSF PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS STRENGTH I LOAD COMBINATION.
2. FACTORED BEARING RESISTANCE FOR FRAME FOOTINGS = 4.2 KSF. FACTORED BEARING RESISTANCE IS THE PRODUCT OF THE NOMINAL BEARING RESISTANCE OF 9.2 KSF AND A RESISTANCE FACTOR OF 0.45.
3. BEARING PRESSURE AND BEARING RESISTANCE CALCULATIONS DONE UNDER PRELIMINARY DESIGN.
4. THE FRAME DIMENSIONS PROVIDED AS SHOWN TO ESTABLISH THE SIZE OF PROPOSED CLEAR OPENING. THE WIDTH AND THICKNESS OF EACH FRAME UNIT MAY VARY DEPENDING UPON THE MANUFACTURER'S SPECIFICATIONS, PROVIDED THE CLEAR OPENING IS MAINTAINED.

WP	COMMENTS	STA.	OFFSET (FT)
1	INTERSECT OF CONST. LINE & FOOTING	4+03.11	-0.17
2	INTERSECT OF CONST. LINE & FOOTING	4+15.11	-0.12
3	INTERSECT OF CONST. LINE & FOOTING	4+31.11	-0.03
4	INTERSECT OF CONST. LINE & FOOTING	4+43.11	-0.26
5	START OF BRIDGE RAIL/HEADWALL	4+10.75	-13.44
6	END OF BRIDGE RAIL/HEADWALL	4+35.47	-13.44
7	START OF BRIDGE RAIL/HEADWALL	4+10.47	13.31
8	END OF BRIDGE RAIL/HEADWALL	4+35.75	13.31
9	INTERSECT OF CONST. LINE & INSIDE FACE OF FRAME	4+11.61	-0.07
10	INTERSECT OF CONST. LINE & INSIDE FACE OF FRAME	4+34.61	-0.07
11	GUARDRAIL TRANSITION BLOCK	4+03.32	-14.72
12	GUARDRAIL TRANSITION BLOCK	4+42.89	-14.72
13	GUARDRAIL TRANSITION BLOCK	4+02.83	14.38
14	GUARDRAIL TRANSITION BLOCK	4+43.38	14.38
15	START BRIDGE	4+10.61	-0.07
16	END BRIDGE	4+35.61	-0.07

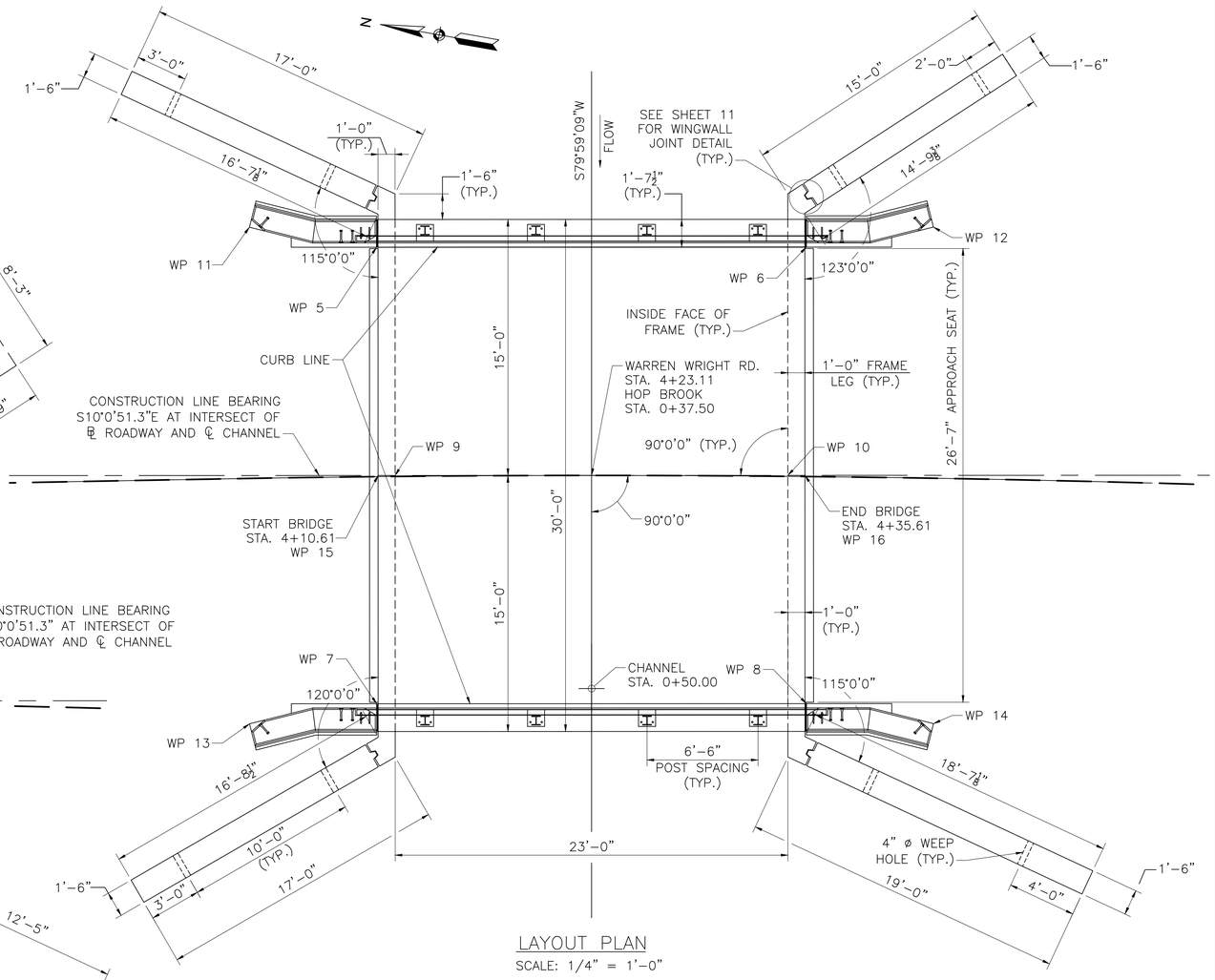
BELCHERTOWN
WARREN WRIGHT ROAD

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	10	14
PROJECT FILE NO.	N/A		

FOOTING AND WALL LAYOUT



FOUNDATION PLAN
SCALE: 1/4" = 1'-0"

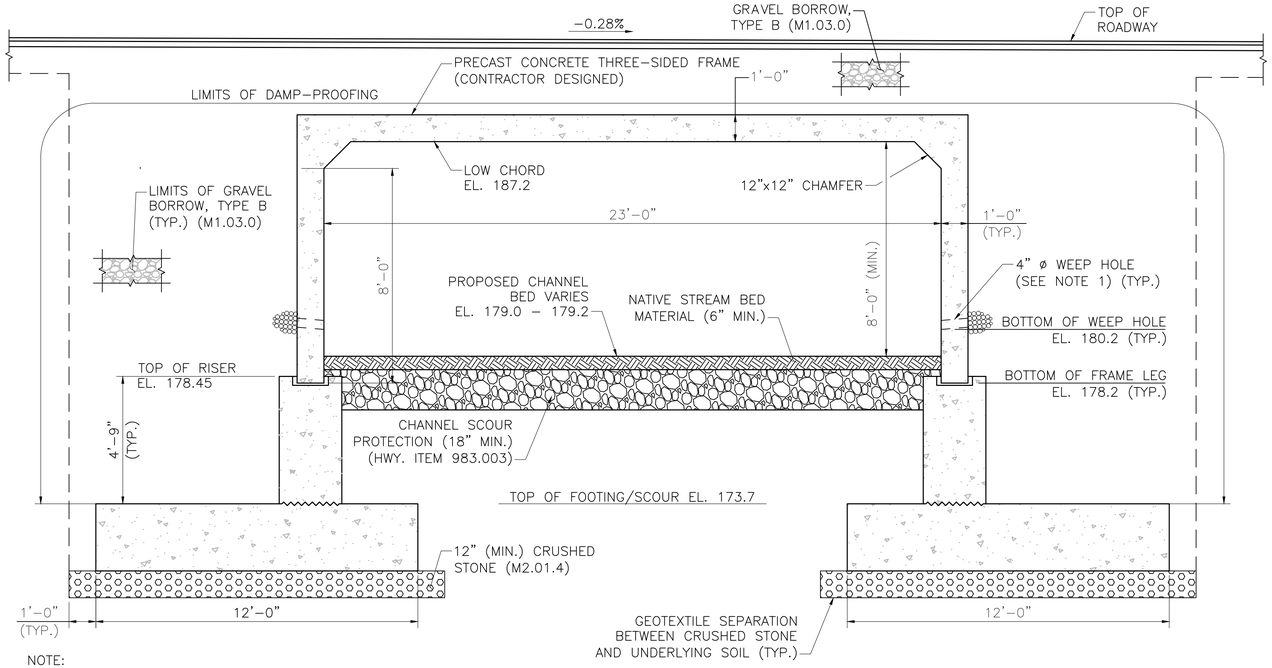


LAYOUT PLAN
SCALE: 1/4" = 1'-0"

NOTE:
BRIDGE IS SQUARE TO THE CONSTRUCTION LINE THAT IS TANGENT TO THE ROADWAY AT STATION 4+23.11 AND CHANNEL STATION 00+37.50. DIMENSIONS ARE SHOWN OFF THE CONSTRUCTION LINE AND ALL WORKING POINTS SHOWN ARE BASED OFF THE ROADWAY ALIGNMENT.

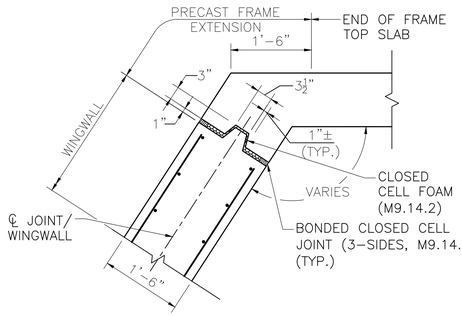
COMMONWEALTH OF MASSACHUSETTS
MassDOT, Highway Division
CONCEPTUAL DESIGN IS ACCEPTABLE TO MASSDOT FOR CONTRACTING

STATE BRIDGE ENGINEER _____ DATE _____

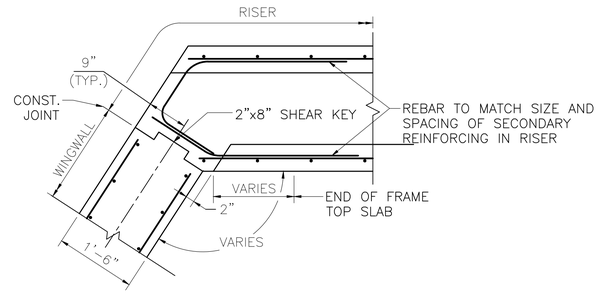


NOTE:
RISER AND FOUNDATION DESIGN ARE BASED ON PRELIMINARY FRAME DIMENSIONS. CONTRACTOR TO DETERMINE FINAL FRAME DIMENSIONS. DESIGNER SHALL VERIFY FOUNDATION ADEQUACY BASED ON FINAL DIMENSIONS. SEE PRECAST CONCRETE ELEMENT NOTES ON SHEET 2.

TYPICAL FRAME SECTION
SCALE: 3/8" = 1'-0"



WINGWALL TO FRAME JOINT DETAIL
SCALE: 3/4" = 1'-0"

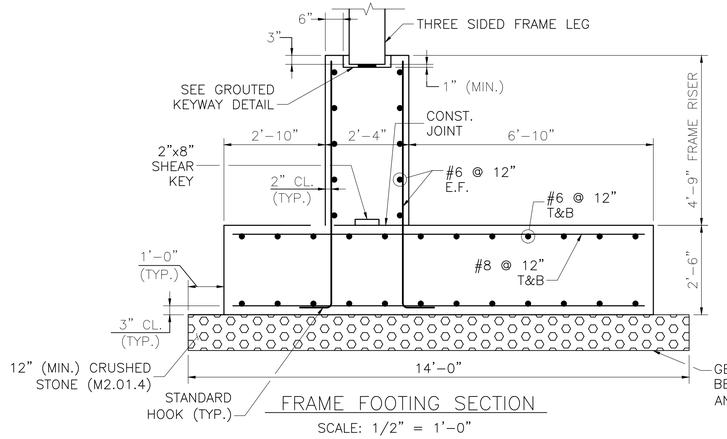


WINGWALL TO RISER JOINT DETAIL
SCALE: 3/4" = 1'-0"

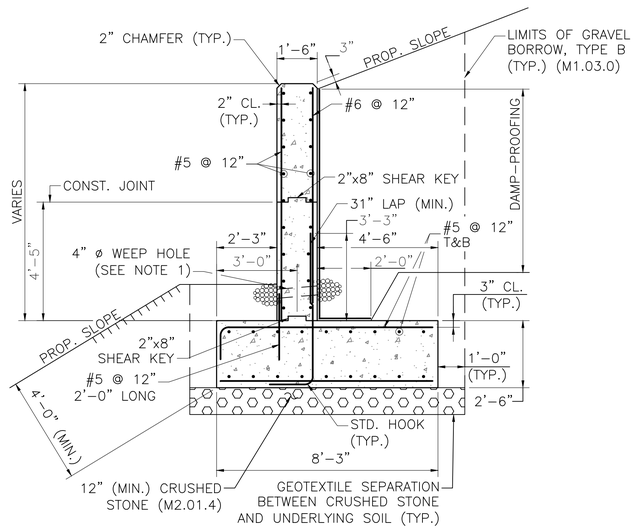
BELCHERTOWN
WARREN WRIGHT ROAD

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	11	14
PROJECT FILE NO.		N/A	

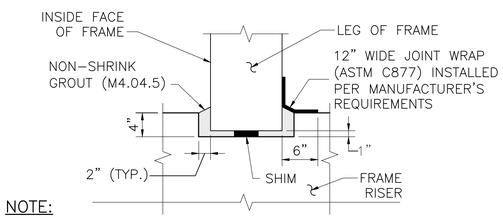
STRUCTURE SECTIONS AND DETAILS



FRAME FOOTING SECTION
SCALE: 1/2" = 1'-0"



TYPICAL WINGWALL SECTION
SCALE: 3/8" = 1'-0"



NOTE:
DETAILS AND DIMENSIONS ARE CONCEPTUAL AND MAY BE ALTERED BY THE FABRICATOR TO SUIT THEIR OPERATIONS, HOWEVER THE FUNCTION AND INTENT OF THE DETAIL MUST BE MET.

GROUTED KEYWAY
SCALE: 1" = 1'-0"

NOTES:

1. 4" ø WEEP HOLES 10'-0" O.C. LOCATED 12" ABOVE THE HEEL OF THE FOOTING OR BOTTOM OF FRAME SLOPING 1" PER FOOT TOWARDS THE FRONT FACE. PROVIDE 1 CUBIC YARD OF CRUSHED STONE AT EACH END OF WEEP HOLE.
2. FACTORED BEARING PRESSURE FOR WINGWALL FOOTINGS = 2.0 KSF PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS STRENGTH I LOAD COMBINATION.
3. FACTORED BEARING RESISTANCE FOR WINGWALL FOOTINGS = 3.2 KSF. FACTORED BEARING RESISTANCE IS THE PRODUCT OF THE NOMINAL BEARING RESISTANCE OF 7.0 KSF AND A RESISTANCE FACTOR OF 0.45.

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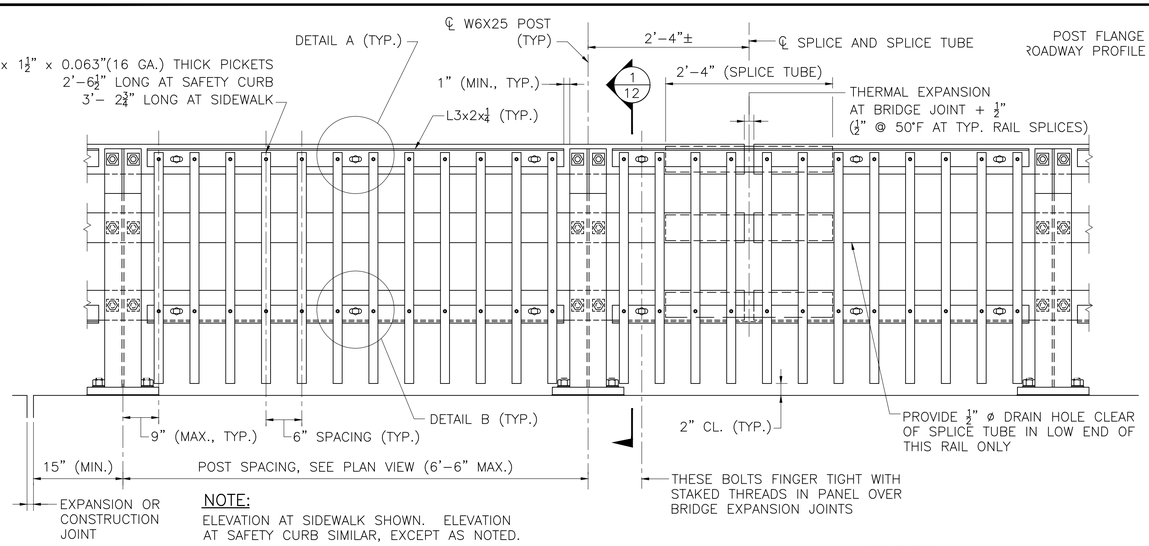
MassDOT, Highway Division
CONCEPTUAL DESIGN IS ACCEPTABLE TO MASSDOT FOR CONTRACTING

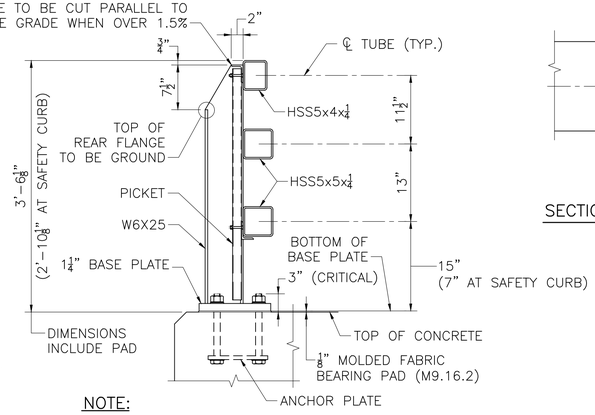
STATE BRIDGE ENGINEER _____ DATE _____



NOTE:
ELEVATION AT SIDEWALK SHOWN. ELEVATION AT SAFETY CURB SIMILAR, EXCEPT AS NOTED.

BRIDGE RAILING ELEVATION

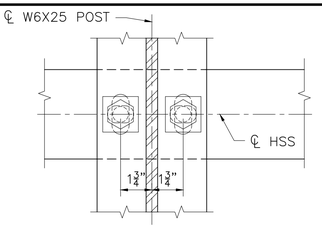
SCALE: 1" = 1'–0"



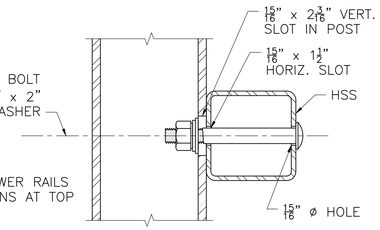
NOTE:
SECTION AT SIDEWALK SHOWN. SECTION AT SAFETY CURB SIMILAR, EXCEPT AS NOTED.

SECTION 1 / 12

SCALE: 1" = 1'–0"



SECTION THRU POST WEB



℄ ⅞" ø ROUND HEAD BOLT WITH NUT, ⅜" x 2" x 2" WASHER, AND LOCK WASHER

NOTE:
CONNECTIONS AT LOWER RAILS SHOWN. CONNECTIONS AT TOP RAIL SIMILAR.

SECTION THRU RAIL

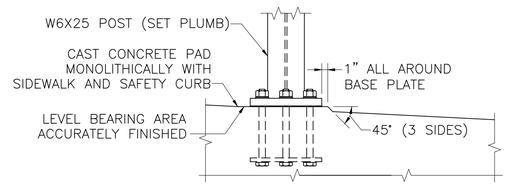
BELCHERTOWN
WARREN WRIGHT ROAD

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	12	14
	PROJECT FILE NO.	N/A	

S3-MTL4 BRIDGE RAILING

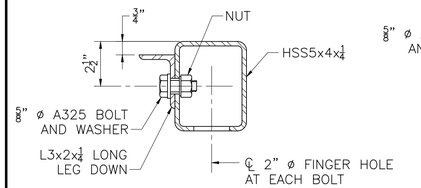
TYPICAL RAIL TO POST CONNECTIONS

SCALE: 3" = 1'–0"

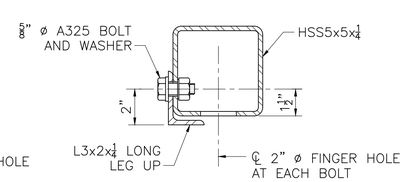


SETTING OF POSTS (PROFILE GRADE OVER 1.5%)

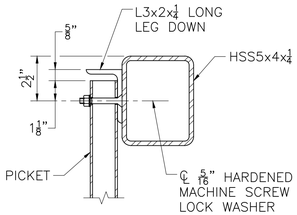
SCALE: 1" = 1'–0"



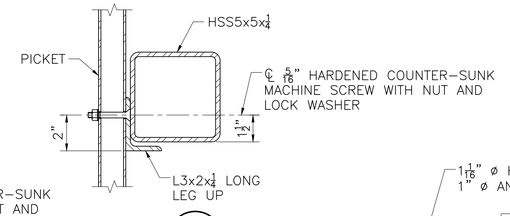
SECTION 2 / 12



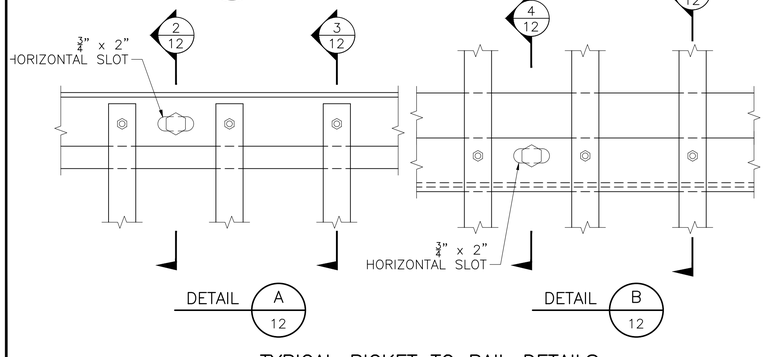
SECTION 4 / 12



SECTION 3 / 12



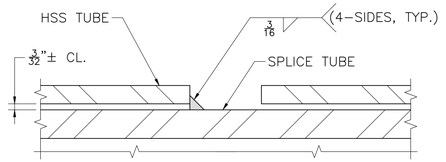
SECTION 5 / 12



DETAIL A / 12 DETAIL B / 12

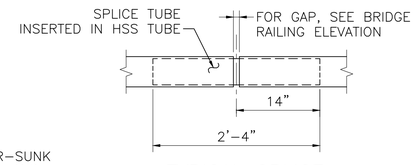
TYPICAL PICKET TO RAIL DETAILS

SCALE: 3" = 1'–0"



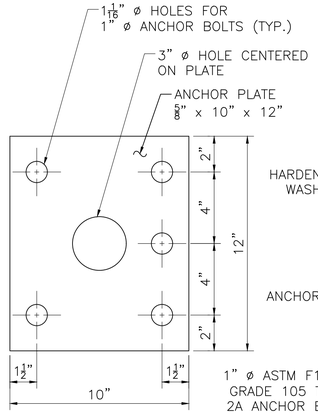
SPLICE DETAIL

SCALE: 1'–0" = 1'–0"



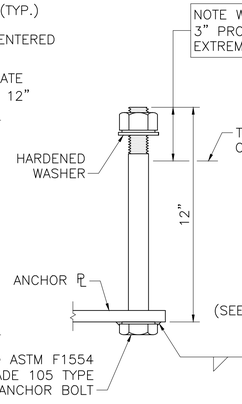
TYPICAL SPLICE

SCALE: 1" = 1'–0"



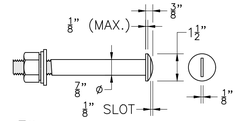
ANCHOR PLATE

SCALE: 3" = 1'–0"



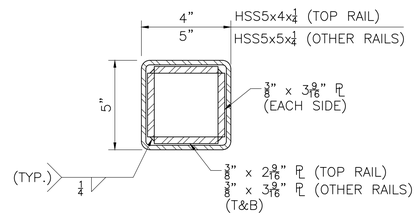
ANCHOR BOLT

SCALE: 3" = 1'–0"



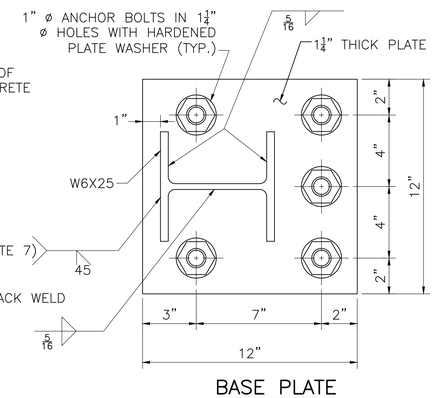
⅞" ø ROUND HEAD BOLT

SCALE: 3" = 1'–0"



SPLICE TUBE DETAILS

SCALE: 3" = 1'–0"



BASE PLATE

SCALE: 3" = 1'–0"

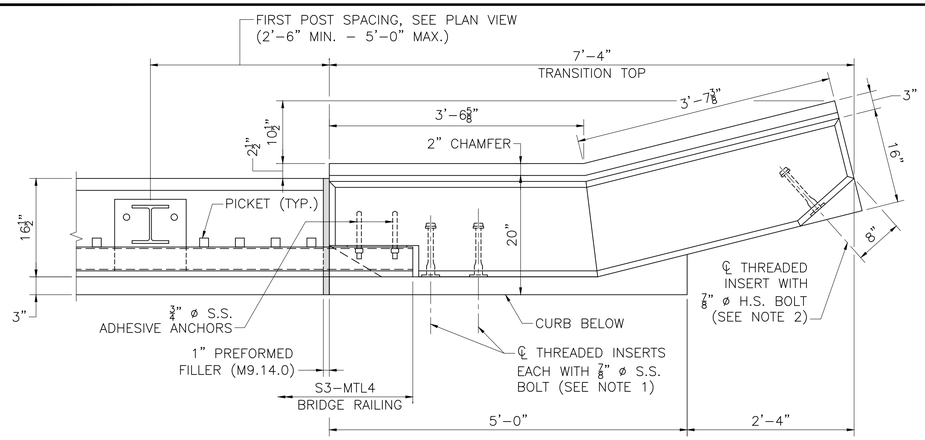
RAILING NOTES:

1. RAIL POST AND BASE PLATES SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 270 GRADE 50. HOLLOW RAILING STRUCTURAL TUBING (HSS) SHALL CONFORM TO THE REQUIREMENTS OF ASTM A 500 WITH A CERTIFIED Fy = 50 KSI MINIMUM. THE MINIMUM HORIZONTAL BENDING RADII OF THE HSS TUBING SHALL BE 8 FEET. PICKET CARRIER ANGLES, ANCHOR PLATES, AND SPLICE TUBE PLATES SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 270 GRADE 36. PICKET TUBING SHALL CONFORM TO ASTM A 513 WITH Fy = 36 KSI MIN. OR A 500 GRADE B.
2. ALL STEEL (EXCEPT THE ⅝" ANCHOR PLATE AND FASTENERS) SHALL BE GALVANIZED AND PAINTED DARK BRONZE (FEDERAL STD. 595B COLOR NO. 10045). ANCHOR PLATE SHALL BE GALVANIZED ONLY. HEADS OF ⅞" ø ROUND HEAD BOLTS SHALL BE PAINTED TO MATCH RAIL.
3. ANCHOR BOLTS SHALL BE SET WITH TEMPLATES. THE NUT SECURING THE POST BASE PLATE TO THE CONCRETE SHALL BE TIGHTENED TO A SNUG FIT AND GIVEN AN ADDITIONAL 1/8 TURN AFTER STEEL IS IN PLACE.
4. RAILS SHALL BE CONTINUOUS OVER A MINIMUM OF FOUR (4) POSTS WITHOUT SPLICES WHERE POSSIBLE. IN ADDITION SPLICES SHALL ALSO BE LOCATED IN RAILS OVER BRIDGE EXPANSION JOINTS.
5. ENDS OF TUBE SECTIONS SHALL BE SAWED. GRIND SMOOTH EXPOSED EDGES. ALL CUT ENDS SHALL BE TRUE AND SMOOTH.
6. ALL POSTS TO BE PLUMB WHEN PROFILE GRADE EXCEEDS 1.5%. FOR PROFILE GRADES LESS THAN 1.5%, POSTS SHALL BE SET PERPENDICULAR TO GRADE.
7. POST TO FLANGE WELD DOES NOT REQUIRE MAGNETIC PARTICLE TESTING. BEVEL OUTSIDE FLANGES OF POST. FIT POST TO BASE PLATE. WELD 5/16" FILLET ON INSIDE OF FLANGE AND WEB. BACKGOUGE OUTSIDE OF FLANGE TO SOUND METAL. COMPLETE GROOVE WELD WITH MINIMUM OF ⅜" REINFORCEMENT. WELD IS THE SAME ON BOTH FLANGES.
8. ⅞" ø ROUND HEAD BOLTS SHALL CONFORM TO THE CHEMICAL AND PHYSICAL REQUIREMENTS OF ASTM F3125 GRADE 325 TYPE 1 GALVANIZED.

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

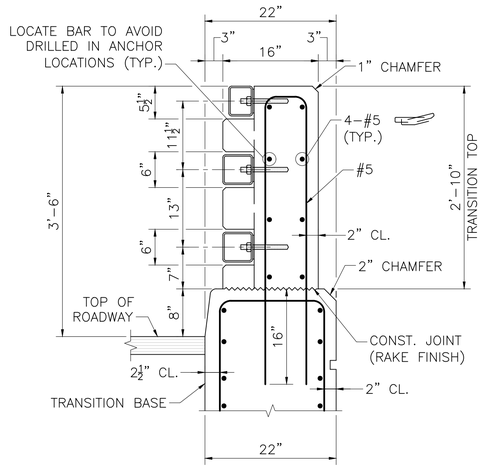
STATE BRIDGE ENGINEER _____ DATE _____

Date: APRIL 2024



PLAN AT SAFETY CURB

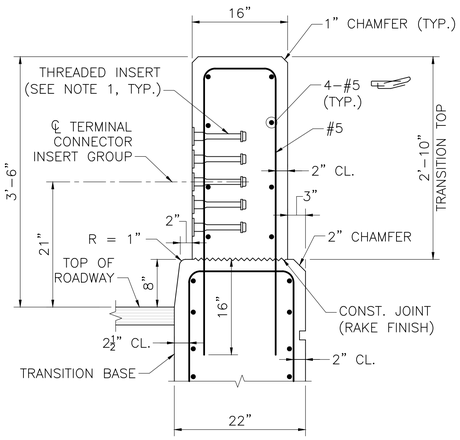
SCALE: 1" = 1'-0"



SECTION AT SAFETY CURB

SECTION 7 / 13

SCALE: 1" = 1'-0"



SECTION AT SAFETY CURB

SECTION 8 / 13

SCALE: 1" = 1'-0"

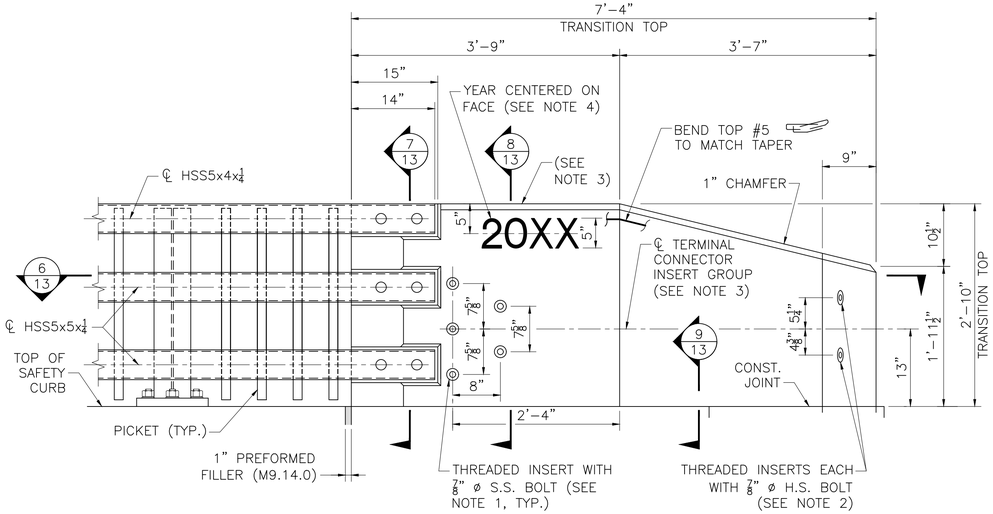
BELCHERTOWN
WARREN WRIGHT ROAD

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	13	14
PROJECT FILE NO.		N/A	

HIGHWAY GUARDRAIL TRANSITION DETAILS

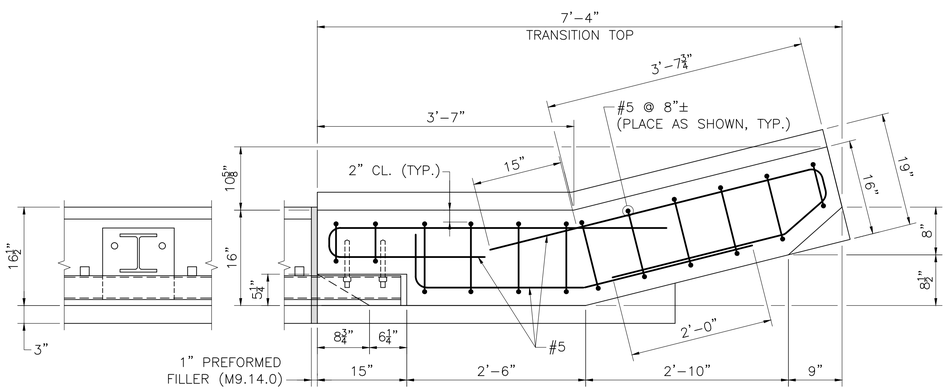
COMMONWEALTH OF MASSACHUSETTS
MassDOT, Highway Division
CONCEPTUAL DESIGN IS ACCEPTABLE TO MASSDOT FOR CONTRACTING

STATE BRIDGE ENGINEER — DATE



ELEVATION AT SAFETY CURB

SCALE: 1" = 1'-0"



SECTION 6 / 13

SCALE: 1" = 1'-0"

RAIL ATTACHMENT

SCALE: 1½" = 1'-0"

SECTION AT SAFETY CURB

SECTION 9 / 13

SCALE: 1" = 1'-0"

NOTES:

1. THREADED INSERTS SHALL BE PREQUALIFIED BY THE MANUFACTURER AS BEING CAPABLE OF DEVELOPING A NOMINAL SHEAR RESISTANCE OF 20 KIPS PER ⅞" ø S.S. (STAINLESS STEEL) BOLT. S.S. BOLTS SHALL BE ⅞" ø x 1½" LONG FULLY THREADED CONFORMING TO ASTM F593D WITH AISI TYPE 304N S.S. WASHERS. INSERTS FOR ⅞" S.S. BOLTS SHALL BE GALVANIZED AND CAST INTO THE TRANSITION.

2. ⅞" ø HIGH STRENGTH BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM F3125 AND BE GALVANIZED. USE ADDITIONAL WASHERS AS REQUIRED TO PROPERLY ENGAGE THE BOLTS.

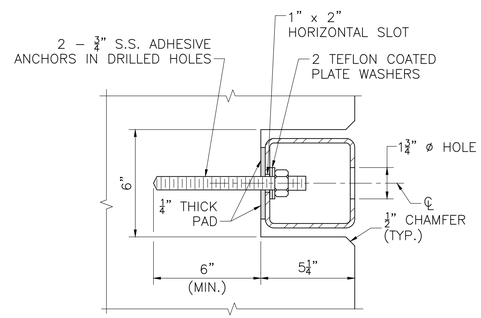
3. FOR AN APPROACH GRADE IN EXCESS OF 3%, THE TRANSITION TOP AND THE TOP OF CURB SHALL FOLLOW THE APPROACH GRADE. THE HEIGHT OF THE TRANSITION TOP SHALL VARY PROVIDED THAT THE MINIMUM DIMENSIONS SHOWN ON THE CONSTRUCTION DRAWINGS ARE MET. THE BOTTOM OF THE TRANSITION BASE SHALL BE SET LEVEL WITH THE MINIMUM EMBEDMENT DEPTH SHOWN. THE TERMINAL CONNECTOR INSERT GROUP SHALL BE SLOPED TO FOLLOW THE APPROACH GRADE.

   FOR AN APPROACH GRADE UP TO 3%, THE TRANSITION MAY BE CAST SQUARE AND SET PLUMB WITH THE MINIMUM EMBEDMENT DEPTH SHOWN. THE TERMINAL CONNECTOR INSERT GROUP SHALL BE SQUARE TO THE POST.

4. USE LATEST CONTRACT COMPLETION YEAR IN EFFECT WHEN THE FIRST GUARDRAIL TRANSITION IS CAST. USE THIS YEAR FOR ALL GUARDRAIL TRANSITIONS.

5. ALL CONCRETE FOR THE PRECAST HIGHWAY GUARDRAIL TRANSITION SHALL BE 5000 HP CEMENT CONCRETE.

6. LIFTING DEVICES (NOT SHOWN), INCLUDING THEIR NUMBER AND LOCATION, SHALL BE DESIGNED AND DETAILED BY THE PRECASTER. THEY SHALL BE GALVANIZED AND SHALL BE PLACED AND RECESSED IN POCKETS TO PROVIDE 1½" CLEAR COVER TO THE FACE OF THE TRANSITION CONCRETE. THESE DEVICES SHALL BE CLEARLY SHOWN ON THE SHOP DRAWINGS ALONG WITH ALL SUPPORTING CALCULATIONS AND/OR CATALOG CUTS. ONCE THE PRECAST TRANSITION IS SET IN PLACE, THE LIFTING DEVICE POCKETS SHALL BE FILLED WITH A NON-SHRINK GROUT THAT MATCHES THE COLOR OF THE TRANSITION CONCRETE WHEN CURED AND THE FILLED POCKETS SHALL BE RUBBED WITH A CORUNDUM STONE TO BLEND OUT THE JOINTS.



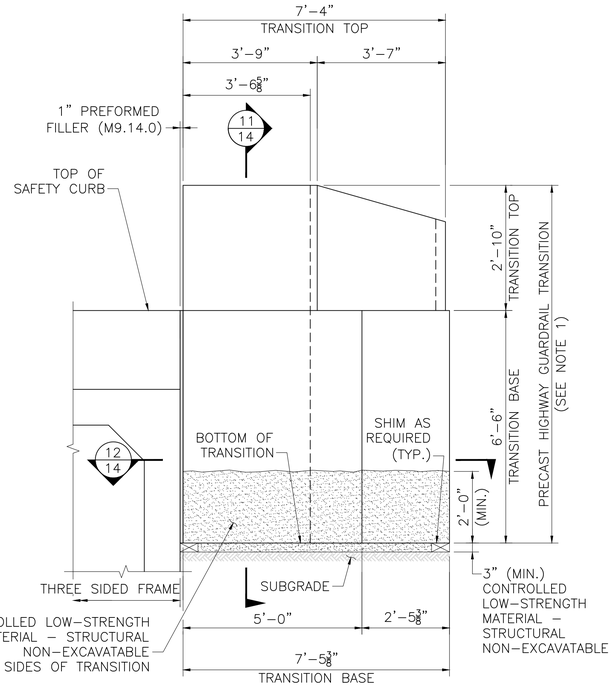
SECTION 10 / 13

SCALE: 3" = 1'-0"

BELCHERTOWN
WARREN WRIGHT ROAD

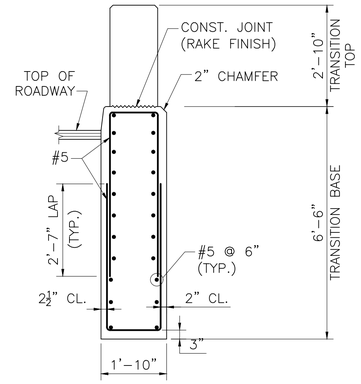
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	N/A	14	14
PROJECT FILE NO.	N/A		

ADDITIONAL DETAILS



PRECAST GUARDRAIL TRANSITION ELEVATION

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

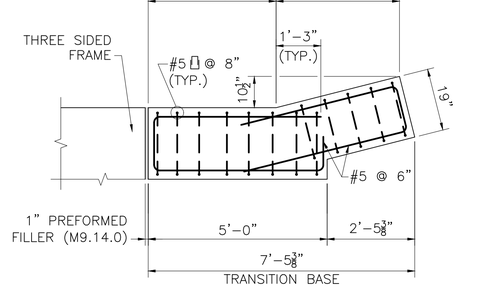


NOTE:

REINFORCEMENT OF THE TRANSITION TOP IS NOT SHOWN FOR CLARITY.

SECTION 11

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



NOTE:

RIGID FRAME REINFORCEMENT NOT SHOWN FOR CLARITY.

SECTION 12

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

NOTES:

1. GRAVEL BORROW SHALL BE PLACED AND THOROUGHLY COMPACTED TO THE GRADE OF 3" (MIN.) BELOW THE INTENDED BOTTOM OF THE GUARDRAIL TRANSITION BASE AND TO A HEIGHT OF 2'-0" (MIN.) ON ALL SIDES OF THE TRANSITION BASE TO FORM A TRENCH IN WHICH TO SET THE TRANSITION.
2. CONTRACTOR SHALL SET THE PRECAST GUARDRAIL TRANSITION TO THE REQUIRED ELEVATION AND ALIGNMENT, AND BACKFILL GUARDRAIL TRANSITION WITH CONTROLLED LOW-STRENGTH MATERIAL - STRUCTURAL NON-EXCAVATABLE TO THE ELEVATION SHOWN.
3. BACKFILL THE REMAINDER OF EXCAVATION WITH GRAVEL BORROW, WHICH SHALL BE THOROUGHLY COMPACTED IN 12" LIFTS.
4. THE REST OF REINFORCEMENT IS NOT SHOWN FOR CLARITY.

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

STATE BRIDGE ENGINEER _____ DATE _____