

GENERAL

1. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO THE STATE OF VERMONT AGENCY OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION DATED 2011, AND ITS LATEST REVISIONS, AND THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, DATED 2012, AND ITS LATEST REVISIONS.
2. ALL PRECAUTIONS SHALL BE TAKEN TO PREVENT SILTATION OR POLLUTION INTO THE STREAM, INCLUDING THE DISCHARGE OF RAW CONCRETE. ALL WATER PUMPED FROM EXCAVATION AREA SHALL MEET STATE WATER QUALITY STANDARDS.
3. IN-STREAM CONSTRUCTION SHALL BE RESTRICTED TO JULY 1 TO OCTOBER 1, UNLESS THE CONTRACTOR OBTAINS WRITTEN PERMISSION FROM THE AGENCY OF NATURAL RESOURCES TO DO WORK OUTSIDE OF THAT TIMEFRAME.
4. ALL REINFORCING STEEL SHALL BE DETAILED AND FABRICATED USING PROCEDURES AND TOLERANCES IN ACCORDANCE WITH APPLICABLE PUBLICATIONS OF THE "CONCRETE REINFORCING STEEL INSTITUTE".

CAST IN PLACE CONCRETE NOTES

1. JOINTS AND SCORE MARKS IN CONCRETE SHALL BE CONSTRUCTED AS INDICATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
2. THE KEY IN CONSTRUCTION JOINTS SHALL BE MONOLITHIC AND CONTINUOUS FOR THE FULL LENGTH OF THE JOINT.
3. WATER REPELLENT, SILANE SHALL BE APPLIED TO ALL EXPOSED CONCRETE ON THE STRUCTURE AND SUBSTRUCTURE. WILL BE PAID FOR UNDER ITEM 514.10, WATER REPELLENT, SILANE.
4. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 1" X 1".
5. ALL REBAR WILL BE EPOXY COATED, LEVEL I REINFORCING STEEL, PAID FOR UNDER ITEM 507.11, REINFORCING STEEL, LEVEL I.
6. MINIMUM CLEAR COVER FOR REINFORCING STEEL SHALL BE AS FOLLOWS:
ALONG FACES OF WALLS AGAINST EARTH - 2"
ELSEWHERE UNLESS OTHERWISE INDICATED - 3"
SPACING TOLERANCE +/- 1/2"
7. DESIGN VALUES
A. CONCRETE, CLASS B COMPRESSIVE STRENGTH: $f'_c = 3500$ PSI

PRECAST CONCRETE BOX CULVERT NOTES

1. ITEM 540.10 PRECAST CONCRETE STRUCTURE WILL INCLUDE THE DESIGN, FABRICATION, DELIVERY, HANDLING, REPAIR AND CONSTRUCTION OF ALL THE PRECAST BRIDGE ELEMENTS, INCLUDING THE BOX CULVERT, HEADWALLS, CUT-OFF WALLS, WINGWALLS, WINGWALL FOOTINGS, REINFORCING STEEL, MEMBRANE WATERPROOFING, WATER REPELLENT, SILANE, AND DRAINAGE MATERIALS.
2. THE FABRICATOR SHALL DESIGN THE PRECAST STRUCTURE ELEMENTS, INCLUDING, BUT NOT LIMITED TO, THE BOX CULVERT, HEADWALLS, CUT-OFF WALLS, WINGWALLS, WINGWALL FOOTINGS AND ALL CONNECTIONS INCLUDING CLOSURE HARDWARE. THE JOINTS BETWEEN THE PRECAST BOX CULVERT SECTIONS SHALL BE MADE WATERTIGHT UTILIZING FLEXIBLE RUBBER OR PLASTIC GASKETS. MECHANICAL DEVICES SHALL BE USED TO LOCK THE INDIVIDUAL SECTIONS TOGETHER. THE MANUFACTURER SHALL PROVIDE STAMPED DESIGN CALCULATIONS PREPARED BY A PROFESSIONAL ENGINEER LICENSED IN VERMONT. THE MANUFACTURER SHALL CONSIDER STRENGTH, SERVICEABILITY, STIFFNESS AND STABILITY OF THE PRECAST ELEMENTS FOR LOADS GENERATED DURING FABRICATION, TRANSPORTATION, ERECTION, CONSTRUCTION OPERATIONS, AND ULTIMATE TRAFFIC CONDITIONS. THE CONTRACTOR SHALL SUBMIT FABRICATION DRAWINGS TO THE ENGINEER FOR APPROVAL IN ACCORDANCE WITH SUBSECTION 105.03. ALL COSTS WILL BE INCLUDED IN THE APPLICABLE 540.10, PRECAST CONCRETE STRUCTURE PAY ITEM.
3. THE PRECAST BOX SECTIONS ARE SHOWN FOR REFERENCE ONLY. THE ACTUAL THICKNESS OF THE WALLS WILL BE DEPENDENT ON THE FABRICATOR. ALL UNITS EXCEPT THE FIRST AND LAST WILL BE THE SAME SHAPE AND THE SAME LENGTH.
4. ALL REINFORCING STEEL SHALL BE LEVEL I (UNCOATED). MINIMUM CLEAR COVER SHALL BE 2 INCHES.
5. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 1" X 1".
6. A MINIMUM OF 1'0" COVER OVER THE BOX MUST BE PROVIDED BEFORE ALLOWING ANY VEHICLE OVER THE STRUCTURE.

7. THE PRECAST BRIDGE SYSTEM SHALL BE DESIGNED PER THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 7TH EDITION, DATED 2014, AND ITS LATEST REVISIONS, AND SHALL CONSIDER THE FOLLOWING DESIGN CRITERIA:
 - A. DESIGN LOADING = HL - 93
 - B. WEIGHT OF BACKFILL MATERIAL = 140 PCF
 - C. SEE GEOTECHNICAL REPORT FOR FACTORED SOIL BEARING RESISTANCES FOR BOX AND WINGWALLS. BR. 141 REPORT DATED 8/10/2001, BR 141A REPORT DATED 3/27/2015.
 - D. PRECAST CONCRETE COMPRESSIVE STRENGTH: $f'_c = 5000$ PSI
 - E. REINFORCING STEEL: $F_y = 60,000$ PSI
8. WEEP HOLES IN THE WINGWALLS AND HEADWALLS SHALL BE PLACED APPROXIMATELY EVERY 10' OR AS INDICATED ON THE PLANS. WEEP HOLES SHALL BE SCREENED TO RETAIN CRUSHED STONE (MAXIMUM 1/2" SQUARE OPENINGS) AND TO PREVENT ENTRY BY ANIMALS.
9. JOINTS BETWEEN ABUTTING PRECAST UNITS SHALL BE WATERTIGHT. THE EXTERIOR (TOP AND SIDES) AND INTERIOR (SIDES AND BOTTOM) JOINTS, AND ALL LIFTING HOLES SHALL BE FILLED WITH MORTAR, TYPE IV, AFTER BEING SET IN THEIR FINAL POSITION. MORTAR SHALL BE WET CURED TO THE SATISFACTION OF THE ENGINEER PRIOR TO APPLYING WATERPROOFING MEASURES. PAYMENT WILL BE CONSIDERED INCIDENTAL TO THE APPLICABLE 540.10, PRECAST CONCRETE STRUCTURE PAY ITEM.
10. THE CONTRACTOR SHALL FOLLOW THE MANUFACTURER'S RECOMMENDATIONS REGARDING BACKFILL AND COMPACTION LIMITS, PROPERTIES, AND PROCEDURES, INCLUDING RESTRICTIONS OF CONSTRUCTION MACHINERY AND OPERATIONS.
11. THE CONTRACTOR SHALL PROVIDE EQUIPMENT CAPABLE OF UNLOADING, LIFTING, AND PLACING PRECAST UNITS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND UNDER THE DIRECTION OF THE MANUFACTURER'S FIELD REPRESENTATIVE. PAYMENT WILL BE CONSIDERED INCIDENTAL TO THE APPLICABLE 540.10, PRECAST CONCRETE STRUCTURE PAY ITEM.
12. THE DRILLING OF HOLES IN THE PRECAST ELEMENTS SHALL NOT BE PERMITTED, UNLESS APPROVED IN WRITING BY THE VERMONT AGENCY OF TRANSPORTATION. ANY LIFTING HOLES SHALL BE FILLED WITH MORTAR, TYPE IV. PAYMENT WILL BE CONSIDERED INCIDENTAL TO THE APPLICABLE 540.10, PRECAST CONCRETE STRUCTURE PAY ITEM.
13. THE CONTRACTOR SHALL REPAIR ANY DAMAGE TO PRECAST CONCRETE ELEMENTS AT THE CONTRACTOR'S EXPENSE AND TO THE SATISFACTION OF THE ENGINEER.
14. A TWO FOOT WIDE STRIP OF MEMBRANE WATERPROOFING SHALL BE APPLIED AT EACH SIDE JOINT. THE MEMBRANE SHALL BE CENTERED ON THE JOINT AND COVER THE FULL HEIGHT OF THE SIDE JOINTS. THE ENTIRE TOP SHALL THEN BE COVERED WITH MEMBRANE. THE MEMBRANE SHALL OVERLAP THE EDGES BY 2'-6" ON EACH SIDE. PAYMENT FOR THE MEMBRANE AND INSTALLATION WILL BE CONSIDERED INCIDENTAL TO THE APPLICABLE 540.10 ITEM.
15. WATER REPELLENT, SILANE SHALL BE APPLIED TO ALL EXPOSED CONCRETE SURFACES OF THE HEADWALLS, WINGWALLS, AND EXPOSED INTERIOR SURFACES OF THE ENTIRE BOX CULVERT, INCLUDING THE BOTTOM SURFACE OF THE TOP SLAB, THE TOP SURFACE OF THE BOTTOM SLAB, AND THE VERTICAL WALLS. PAYMENT AND APPLICATION WILL BE CONSIDERED INCIDENTAL TO THE APPLICABLE 540.10 ITEM.
16. MATERIAL SHALL MEET THE FOLLOWING REQUIREMENTS:

REINFORCING STEEL:	SECTION 507 FOR LEVEL I REINFORCING, UNCOATED.
MEMBRANE WATERPROOFING:	SECTION 519 FOR TOP OF BOX CULVERT AND SECTION 540 FOR BOX CULVERT JOINTS
WATER REPELLENT, SILANE:	SECTION 514
17. REINFORCING STEEL PLACEMENT TOLERANCES SHALL BE AS FOLLOWS:
 - A. SPACING +/- 1/2"
 - B. CLEARANCE +/- 1/4"

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PROJECT CULVERT AND BRIDGE NOTES	SHEET 227 OF 499