

# PRELIMINARY INFORMATION SHEET (CULVERT)

LRFD

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STANDARDS LIST

|        |  |            |
|--------|--|------------|
| E-100  | CONSTRUCTION APPROACH SIGNS                                | 01-02-2004 |
| E-101  | CONSTRUCTION SIGN DETAILS                                  | 05-30-2003 |
| E-102  | CONSTRUCTION SIGN DETAILS                                  | 06-30-2003 |
| E-102A | CONSTRUCTION SIGN DETAILS                                  | 05-01-2004 |
| E-107  | DELINEATION, BARRICADES AND DETOURS FOR CONSTRUCTION AREAS | 06-30-2003 |
| E-134  | BRIDGE NUMBER PLAQUE                                       | 08-08-1995 |
| E-144  | SQUARE STEEL SIGN POST                                     | 06-05-2009 |
| E-192  | PAVEMENT MARKING DETAILS                                   | 10-12-2000 |
| G-1    | STEEL BEAM GUARDRAIL DETAILS (POST, DELINEATOR, TYPICALS)  | 01-03-2000 |
| G-19   | GENERIC GRADING PLANS FOR GUARDRAIL END TERMINALS          | 11-15-2002 |

FINAL HYDRAULIC REPORT

HYDROLOGIC DATA

Date: Sept. 2011

DRAINAGE AREA: 3.7 sq. mi.  
 CHARACTER OF TERRAIN: Hilly to mountainous uplands to nearly flat at the site  
 STREAM CHARACTERISTICS: Wetlands and ponded water at the site  
 NATURE OF STREAMBED: Silt and sand

PEAK FLOW DATA  
 Q 2.33 = 190 cfs      Q 50 = 590 cfs  
 Q 10 = 360 cfs      Q 100 = 680 cfs  
 Q 25 = 475 cfs      Q 500 = 950 cfs

DATE OF FLOOD OF RECORD: Unknown  
 ESTIMATED DISCHARGE: Unknown  
 WATER SURFACE ELEV.: Unknown  
 NATURAL STREAM VELOCITY: @ Q50 = 5.9 fps  
 ICE CONDITIONS: Slight to moderate  
 DEBRIS: Slight to moderate except history of beaver dams  
 DOES THE STREAM REACH MAXIMUM HIGH WATER ELEV. RAPIDLY? No  
 IS ORDINARY RISE RAPID? No  
 IS STAGE AFFECTED BY UPSTREAM OR DOWNSTREAM CONDITIONS? Yes  
 IF YES, DESCRIBE: Water levels are controlled by Island Pond, Back Pond and the downstream railroad structure.

WATERSHED STORAGE: 3%      HEADWATERS: \_\_\_\_\_  
 UNIFORM: \_\_\_\_\_  
 IMMEDIATELY ABOVE SITE: X

EXISTING STRUCTURE INFORMATION

STRUCTURE TYPE: Corrugated metal plate pipe arch  
 YEAR BUILT: 1959  
 CLEAR SPAN (NORMAL TO STREAM): 7'-8"  
 VERTICAL CLEARANCE ABOVE STREAMBED: \_\_\_\_\_  
 WATERWAY OF FULL OPENING: 23 sq. ft.      5'-5"  
 DISPOSITION OF STRUCTURE: Remove and replace  
 TYPE OF MATERIAL UNDER SUBSTRUCTURE: Silt and sand

WATER SURFACE ELEVATIONS AT:  
 Q2.33 = 1177.4'      VELOCITY = 9.5 fps  
 Q10 = 1180.2'      "      11.6 fps  
 Q25 = 1180.6'      "      11.8 fps  
 Q50 = 1180.8'      "      12.0 fps  
 Q100 = 1181.0'      "      12.1 fps

LONG TERM STREAMBED CHANGES: None noted.

IS THE ROADWAY OVERTOPPED BELOW Q100: Yes  
 FREQUENCY: Below Q10  
 RELIEF ELEVATION: 1179.9'  
 DISCHARGE OVER ROAD @Q100: 350 cfs

UPSTREAM STRUCTURE

TOWN: Not applicable - stream divides      DISTANCE: \_\_\_\_\_  
 HIGHWAY #: \_\_\_\_\_      STRUCTURE #: \_\_\_\_\_  
 CLEAR SPAN: \_\_\_\_\_      CLEAR HEIGHT: \_\_\_\_\_  
 YEAR BUILT: \_\_\_\_\_      FULL WATERWAY: \_\_\_\_\_  
 STRUCTURE TYPE: \_\_\_\_\_

DOWNSTREAM STRUCTURE

TOWN: Brighton      DISTANCE: 1200'  
 HIGHWAY #: R.R.      STRUCTURE #: \_\_\_\_\_  
 CLEAR SPAN: 6'      CLEAR HEIGHT: 0'  
 YEAR BUILT: Unknown      FULL WATERWAY: 28 sq. ft.  
 STRUCTURE TYPE: Reinforced Concrete Pipe. Note: There may be other structures.

LRFR LOAD RATING FACTORS

| LOADING LEVELS | TRUCK |       |     |        |        |        |
|----------------|-------|-------|-----|--------|--------|--------|
|                | H-20  | HL-93 | SS2 | 6 AXLE | 3A STR | 4A STR |
| TONNAGE        | 20    | 36    | 36  | 66     | 30     | 34.5   |
| INVENTORY      |       |       |     |        |        |        |
| POSTING        |       |       |     |        |        |        |
| OPERATING      |       |       |     |        |        |        |

COMMENTS: TABLE TO BE COMPLETED BY CONTRACTOR'S DESIGNER

- PROPOSED CULVERT IS A PRESTRESS CONCRETE STRUCTURE (14'-0" X 7'-0" X 4'-0" BOX).
- CULVERT ENDS ARE SKEWED BY AN ANGLE OF SEE PLANS
- CULVERT WILL BE SET AT A SLOPE OF 0.00 IN ON 40 FT.
- CULVERT WILL REQUIRE FISH PASSAGE ACCOMMODATIONS
- CULVERT CONSTRUCTION WILL REQUIRE A TEMPORARY PIPE

PROPOSED STRUCTURE

STRUCTURE TYPE: Precast concrete box culvert  
 CLEAR SPAN (NORMAL TO STREAM): 14'  
 VERTICAL CLEARANCE ABOVE STREAMBED: 6'  
 WATERWAY OF FULL OPENING: 84 sq. ft.

WATER SURFACE ELEVATIONS AT:  
 Q2.33 = 1174.6'      VELOCITY = 3.7 fps  
 Q10 = 1176.4'      "      4.9 fps  
 Q25 = 1177.4'      "      5.7 fps  
 Q50 = 1178.4'      "      6.9 fps  
 Q100 = 1179.5'      "      8.1 fps

IS THE ROADWAY OVERTOPPED BELOW Q100: No  
 FREQUENCY: Above Q100  
 RELIEF ELEVATION: 1179.9'  
 DISCHARGE OVER ROAD @Q100: None

AVERAGE LOW ELEVATION OF SUPERSTRUCTURE: 1177.0' at inlet, 1176.5' at outlet  
 VERTICAL CLEARANCE: @ Q50 = -1.4' at inlet (inlet is submerged below Q25)

SCOUR: Not applicable for a box structure  
 REQUIRED CHANNEL PROTECTION: Stone Fill, Type II

PERMIT INFORMATION

AVERAGE DAILY FLOW: 7 cfs      DEPTH OR ELEVATION:  
 ORDINARY LOW WATER: 4 cfs      Depth = 0.5'  
 ORDINARY HIGH WATER: 80 cfs      Depth = 2.0'

TEMPORARY BRIDGE REQUIREMENTS

STRUCTURE TYPE: No temporary bridge.  
 CLEAR SPAN (NORMAL TO STREAM): \_\_\_\_\_  
 VERTICAL CLEARANCE ABOVE STREAMBED: \_\_\_\_\_  
 WATERWAY AREA OF FULL OPENING: \_\_\_\_\_

ADDITIONAL INFORMATION

We do not have good information on water levels in Back Pond, at the structure's outlet. Reported hydraulics is based on no tailwater from that pond. Velocities may be lower than reported and water surface elevations may be higher than reported, depending on the downstream water levels.

TRAFFIC MAINTENANCE NOTES

- MAINTAIN TRAFFIC ON AN OFF SITE DETOUR.
- TRAFFIC SIGNALS ARE NOT NECESSARY.
- SIDEWALKS ARE NOT NECESSARY.

DESIGN VALUES

|  |                           |
|--|---------------------------|
| 1. DESIGN LIVE LOAD  | HL-93                     |
| 2. FUTURE PAVEMENT   | d <sub>p</sub> : 3.0 INCH |
| 3. CULVERT OPENING   | D: 14.00 FT               |
| 4. MIN. MID-SPAN POS. CAMBER @ RELEASE (PRESTRESSED UNITS) | Δ: ---                    |
| 5. PRESTRESSING STRAND                                     | f <sub>y</sub> : ---      |
| 6. PRESTRESSED CONCRETE STRENGTH                           | f' <sub>c</sub> : ---     |
| 7. PRESTRESSED CONCRETE RELEASE STRENGTH                   | f' <sub>cr</sub> : ---    |
| 8. CONCRETE, HIGH PERFORMANCE CLASS AA                     | f' <sub>c</sub> : 4.0 KSI |
| 9. CONCRETE, HIGH PERFORMANCE CLASS A                      | f' <sub>c</sub> : 4.0 KSI |
| 10. CONCRETE, HIGH PERFORMANCE CLASS B                     | f' <sub>c</sub> : 3.5 KSI |
| 11. CONCRETE CLASS C                                       | f' <sub>c</sub> : 3.0 KSI |
| 12. REINFORCING STEEL                                      | f <sub>y</sub> : 60 KSI   |
| 13. STRUCTURAL STEEL AASHTO M270                           | f <sub>y</sub> : ---      |
| 14. SOIL UNIT WEIGHT                                       | γ: ---                    |
| 15. NOMINAL BEARING RESISTANCE OF SOIL                     | q <sub>n</sub> : ---      |
| 16. SOIL BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)  | φ: ---                    |
| 17. NOMINAL BEARING RESISTANCE OF ROCK                     | q <sub>n</sub> : ---      |
| 18. ROCK BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)  | φ: ---                    |
| 19. NOMINAL AXIAL PILE RESISTANCE                          | q <sub>p</sub> : ---      |
| 20. PILE YIELD STRENGTH ASTM A572                          | f <sub>y</sub> : ---      |
| 21. PILE SIZE  | ---                       |
| 22. EST. PILE LENGTH                                       | L <sub>p</sub> : ---      |
| 23. PILE RESISTANCE FACTOR                                 | φ: ---                    |
| 24. LATERAL PILE DEFLECTION                                | δ: ---                    |
| 25. BASIC WIND SPEED                                       | V <sub>3s</sub> : ---     |
| 26. MINIMUM GROUND SNOW LOAD                               | p <sub>g</sub> : ---      |
| 27. SEISMIC DATA   | PGA: ---      S: ---      |

PROJECT NAME: BRIGHTON  
 PROJECT NUMBER: STP 034-3(21)  
 FILE NAME: s00b246pl.xls      PLOT DATE: 6/11/2012  
 PROJECT LEADER: K. HIGGINS      DRAWN BY: J. SALVATORI  
 DESIGNED BY: J. SALVATORI      CHECKED BY: W. LAMMER  
 PRELIMINARY INFORMATION SHEET 1      SHEET 2 OF 30

TRAFFIC DATA

| YEAR | ADT  | DHV | % D | % T  | ADTT |
|------|------|-----|-----|------|------|
| 2012 | 1700 | 230 | 65  | 9.5  | 240  |
| 2032 | 1900 | 250 | 55  | 12.2 | 350  |

20 year ESAL for flexible pavement from 2012 to 2032 : 3045000  
 40 year ESAL for flexible pavement from 2012 to 2052 : 7372000  
 Design Speed : 50 mph