STATE OF VERMONT
AGENCY OF TRANSPORTATION

# PRELIMINARY INFORMATION SHEET (CULVERT)

Version
**LRFD**

## INDEX OF SHEETS

### PLAN SHEETS



### STANDARDS LIST

| | |
|---|---|
| G-1 | 11-10-2015 |
| T-1 | 04-25-2016 |
| T-10 | 08-06-2012 |
| T-28 | 08-06-2012 |
| T-29 | 08-06-2012 |
| T-30 | 08-06-2012 |
| T-42 | 04-09-2014 |
| T-45 | 01-02-2013 |

### STRUCTURES DETAIL SHEETS

| | | |
|---|---|---|
| SD-501.00 | CONCRETE DETAILS AND NOTES | 5/7/2010 |
| SD-502.00 | CONCRETE DETAILS AND NOTES | 5/7/2010 |

## FINAL HYDRAULIC REPORT

### HYDROLOGIC DATA

Date: March 2015

DRAINAGE AREA : 0.34 sq. mi.
CHARACTER OF TERRAIN : Hilly, mixture of open and forested land cover
STREAM CHARACTERISTICS : Sinuous, alluvial, low grade upstream & steep downstream
NATURE OF STREAMBED : Silt & sand upstream, stone, gravel, silt & sand downstream

PEAK FLOW DATA

| | | | |
|---|---|---|---|
| Q 2.33 = | 45 cfs | Q 50 = | 120 cfs |
| Q 10 = | 80 cfs | Q 100 = | 140 cfs |
| Q 25 = | 100 cfs | Q 500 = | 190 cfs |

DATE OF FLOOD OF RECORD: Unknown
ESTIMATED DISCHARGE: Unknown
WATER SURFACE ELEV.: Unknown
NATURAL STREAM VELOCITY : @ Q50 = 13.3 fps
ICE CONDITIONS : Light to moderate
DEBRIS: Moderate to heavy
DOES THE STREAM REACH MAXIMUM HIGHWATER ELEV. RAPIDLY? Yes
IS ORDINARY RISE RAPID? Yes
IS STAGE AFFECTED BY UPSTREAM OR DOWNSTREAM CONDITIONS? No
IF YES, DESCRIBE:

WATERSHED STORAGE: < 1%
HEADWATERS:
UNIFORM: X
IMMEDIATELY ABOVE SITE:

### EXISTING STRUCTURE INFORMATION

STRUCTURE TYPE: Reinforced Concrete Box
YEAR BUILT: Unknown
CLEAR SPAN(NORMAL TO STREAM): 4.0'
VERTICAL CLEARANCE ABOVE STREAMBED: 4.0'
WATERWAY OF FULL OPENING: 16 sq. ft.
DISPOSITION OF STRUCTURE: Abandon and fill with flowable fill
TYPE OF MATERIAL UNDER SUBSTRUCTURE: See boring logs

WATER SURFACE ELEVATIONS AT:

| | | | |
|---|---|---|---|
| Q2.33 = | 259.5' | VELOCITY = | 11.2 fps |
| Q10 = | 260.7' | " | 12.9 fps |
| Q25 = | 261.3' | " | 13.6 fps |
| Q50 = | 262.0' | " | 14.2 fps |
| Q100 = | 262.7' | " | 14.7 fps |

LONG TERM STREAMBED CHANGES: The only changes noted are deposition upstream and erosion downstream, likely due to the inadequate size and failure of the existing structure.

IS THE ROADWAY OVERTOPPED BELOW Q100: No
FREQUENCY: Above Q100
RELIEF ELEVATION: 285.0'
DISCHARGE OVER ROAD @Q100: None

### UPSTREAM STRUCTURE

TOWN: None
HIGHWAY # :
CLEAR SPAN:
YEAR BUILT:
STRUCTURE TYPE:
DISTANCE:
STRUCTURE #:
CLEAR HEIGHT:
FULL WATERWAY:

### DOWNSTREAM STRUCTURE

TOWN: Highgate
HIGHWAY # : Rail trail
CLEAR SPAN: Unknown
YEAR BUILT: Unknown
STRUCTURE TYPE: Unknown
DISTANCE: 800'
STRUCTURE #: -
CLEAR HEIGHT: Unknown
FULL WATERWAY: -

### LRFR LOAD RATING FACTORS

| LOADING LEVELS | TRUCK | | | | | | |
|---|---|---|---|---|---|---|---|
| | H-20 | HL-93 | 3S2 | 6 AXLE | 3A. STR. | 4A. STR. | 5A. SEMI |
| TONNAGE | 20 | 36 | 36 | 66 | 30 | 34.5 | 38 |
| INVENTORY | | | | | | | |
| POSTING | | | | | | | |
| OPERATING | | | | | | | |
| COMMENTS: | TABLE TO BE COMPLETED BY CONTRACTOR'S DESIGNER | | | | | | |

### CULVERT DESIGN CRITERIA

1. PROPOSED CULVERT IS A STEEL CORRUGATED (6'-0" X 6'-0" X 131'-0" PIPE).
2. CULVERT ENDS ARE NOT SKEWED.
3. CULVERT WILL BE SET AT A SLOPE OF 12.00 IN. ON 50 FT.
4. CULVERT WILL NOT REQUIRE FISH PASSAGE ACCOMODATIONS
5. CULVERT CONSTRUCTION WILL NOT REQUIRE A TEMPORARY PIPE

### PROPOSED STRUCTURE

STRUCTURE TYPE: Smooth interior steel pipe with cement mortar lining

CLEAR SPAN(NORMAL TO STREAM): 5.9'
VERTICAL CLEARANCE ABOVE STREAMBED: 5.9'
WATERWAY OF FULL OPENING: 27 sq. ft.

WATER SURFACE ELEVATIONS AT:

| | | | |
|---|---|---|---|
| Q2.33 = | 259.1' | VELOCITY= | 13.0 fps |
| Q10 = | 260.1' | " | 14.6 fps |
| Q25 = | 260.6' | " | 15.2 fps |
| Q50 = | 261.0' | " | 15.7 fps |
| Q100 = | 261.5' | " | 16.2 fps |

IS THE ROADWAY OVERTOPPED BELOW Q100: No
FREQUENCY: Above Q100
RELIEF ELEVATION: 285.0'
DISCHARGE OVER ROAD @Q100: None

AVERAGE LOW ELEVATION OF SUPERSTRUCTURE: 262.6' (top of pipe at inlet)
VERTICAL CLEARANCE: @ Q50 = 1.6'

SCOUR: Not applicable for a pipe

REQUIRED CHANNEL PROTECTION: Stone Fill, Type II at inlet and Type IV at outlet

### PERMIT INFORMATION

| | | |
|---|---|---|
| AVERAGE DAILY FLOW: | 1 cfs | DEPTH OR ELEVATION: |
| ORDINARY LOW WATER: | 0.5 cfs | Depth < 0.5' |
| ORDINARY HIGH WATER: | 20 cfs | Depth = 2' |

### TEMPORARY BRIDGE REQUIREMENTS

STRUCTURE TYPE: No temporary structure required
CLEAR SPAN (NORMAL TO STREAM):
VERTICAL CLEARANCE ABOVE STREAMBED:
WATERWAY AREA OF FULL OPENING:

### ADDITIONAL INFORMATION

### TRAFFIC MAINTENANCE NOTES

1. MAINTAIN TWO-WAY TRAFFIC ON THE EXISTING STRUCTURE.
2. TRAFFIC SIGNALS ARE NOT NECESSARY.
3. SIDEWALKS ARE NOT NECESSARY

### DESIGN VALUES

| | | |
|---|---|---|
| 1. DESIGN LIVE LOAD | | HL-93 |
| 2. FUTURE PAVEMENT | $d_P$: | 3.0 INCH |
| 3. CULVERT OPENING | $D$: | 6.00 FT |
| 4. MIN. MID-SPAN POS. CAMBER @ RELEASE (PRESTRESSED UNITS) | $\Delta$: | - - - |
| 5. PRESTRESSING STRAND | $f_y$: | - - - |
| 6. PRESTRESSED CONCRETE STRENGTH | $f'_c$: | - - - |
| 7. PRESTRESSED CONCRETE RELEASE STRENGTH | $f'_{ci}$: | - - - |
| 8. CONCRETE, HIGH PERFORMANCE CLASS AA | $f'_c$: | 4.0 KSI |
| 9. CONCRETE, HIGH PERFORMANCE CLASS A | $f'_c$: | 4.0 KSI |
| 10. CONCRETE, HIGH PERFORMANCE CLASS B | $f'_c$: | 3.5 KSI |
| 11. CONCRETE, CLASS C | $f'_c$: | 3.0 KSI |
| 12. REINFORCING STEEL | $f_y$: | 60 KSI |
| 13. STRUCTURAL STEEL AASHTO M270 | $f_y$: | - - - |
| 14. NOMINAL BEARING RESISTANCE OF SOIL | $q_n$: | - - - |
| 15. SOIL BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD) | $\phi$: | 0.45 |
| 16. NOMINAL BEARING RESISTANCE OF ROCK | $q_n$: | 10.0 KSF |
| 17. ROCK BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD) | $\phi$: | 0.45 |
| 18. PILE RESISTANCE FACTOR | $\phi$: | - - - |
| 19. LATERAL PILE DEFLECTION | $\Delta$: | - - - |
| 20. BASIC WIND SPEED | $V_{3s}$: | - - - |
| 21. MINIMUM GROUND SNOW LOAD | $p_g$: | - - - |
| 22. SEISMIC DATA PGA: 0 | $S_s$: | - - - |
| | $S_1$: | - - - |
| 23. | | - - - |
| 24. | | - - - |
| 25. | | - - - |
| 26. | | - - - |

### AS BUILT "REBAR" DETAIL

| LEVEL I | LEVEL II | LEVEL III |
|---|---|---|
| TYPE: | TYPE: | TYPE: |
| GRADE: | GRADE: | GRADE: |

### TRAFFIC DATA

| YEAR | ADT | DHV | % D | % T | ADTT |
|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 |
| XXXX | 0 | 0 | 0 | 0 | 0 |

20 year ESAL for flexible pavement from XXXX to XXXX : 0
40 year ESAL for flexible pavement from XXXX to XXXX : 0
Design Speed : 0 mph

**PROJECT NAME:** HIGHGATE
**PROJECT NUMBER:** STP SCRP(12)

FILE NAME: d13c134_PI.xls
PROJECT LEADER: B. MARTIN
DESIGNED BY: A. KEMPTON
PRELIMINARY INFORMATION SHEET 1

PLOT DATE: 10/13/2016
DRAWN BY: A. KEMPTON
CHECKED BY: D. WILLEY
SHEET 2 OF 40