

PRELIMINARY INFORMATION SHEET (CULVERT)

LRFD

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LIST OF STANDARDS

STANDARDS LIST

FINAL HYDRAULIC REPORT

HYDROLOGIC DATA

Date: Nov 2013

DRAINAGE AREA : 1.3 sq. mi.
CHARACTER OF TERRAIN : Mountainous, mostly forested, some development
STREAM CHARACTERISTICS : Sinuous and alluvial
NATURE OF STREAMBED : Boulders and gravel

PEAK FLOW DATA

Q 2.33 = 90 cfs Q 50 = 350 cfs
Q 10 = 225 cfs Q 100 = 420 cfs
Q 25 = 290 cfs Q 500 = 590 cfs

DATE OF FLOOD OF RECORD : Unknown
ESTIMATED DISCHARGE : Unknown
WATER SURFACE ELEV. : Unknown
NATURAL STREAM VELOCITY : @ Q50 = 11.7 fps
ICE CONDITIONS : Moderate
DEBRIS : Moderate
DOES THE STREAM REACH MAXIMUM HIGHWATER ELEV. RAPIDLY? No
IS ORDINARY RISE RAPID? No
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 : Multiplate Pipe Arch
YEAR BUILT : 1957
CLEAR SPAN(NORMAL TO STREAM): 8' - 10"
VERTICAL CLEARANCE ABOVE STREAMBED: 6' - 1"
WATERWAY OF FULL OPENING: 43 sq. ft.
DISPOSITION OF STRUCTURE: Remove and replace
TYPE OF MATERIAL UNDER SUBSTRUCTURE: See borings

WATER SURFACE ELEVATIONS AT:

Q2.33 = 1289.9' VELOCITY = 7.5 fps
Q10 = 1292.0' " 10.3 fps
Q25 = 1293.0' " 11.1 fps
Q50 = 1294.1' " 11.5 fps
Q100 = 1295.6' " 12.4 fps

LONG TERM STREAMBED CHANGES: None noted

IS THE ROADWAY OVERTOPPED BELOW Q100: No
FREQUENCY: N/A
RELIEF ELEVATION: 1296.4' @ arch
DISCHARGE OVER ROAD @Q100: N/A

UPSTREAM STRUCTURE

TOWN: Wardsboro DISTANCE: 500'
HIGHWAY # : TH 11 STRUCTURE # :
CLEAR SPAN: CLEAR HEIGHT:
YEAR BUILT: FULL WATERWAY: 12.6 sq. ft.
STRUCTURE TYPE: 4' boiler pipe

DOWNSTREAM STRUCTURE

TOWN: Wardsboro DISTANCE: 100'
HIGHWAY # : STRUCTURE # :
CLEAR SPAN: CLEAR HEIGHT:
YEAR BUILT: FULL WATERWAY:
STRUCTURE TYPE: Confluence with Wardsboro Brook

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						

AS BUILT "REBAR" DETAIL

LEVEL I	LEVEL II	LEVEL III
TYPE:	TYPE:	TYPE:
GRADE:	GRADE:	GRADE:

CULVERT DESIGN CRITERIA

- PROPOSED CULVERT IS A PRECAST CONCRETE STRUCTURE (14'-0" X 8'-0" X 60'-0" BOX).
- CULVERT ENDS ARE SKEWED BY AN ANGLE OF VARIES°
- CULVERT WILL BE SET AT A SLOPE OF 36.00 IN. ON 100 FT.
- CULVERT WILL REQUIRE FISH PASSAGE ACCOMMODATIONS
- CULVERT CONSTRUCTION WILL REQUIRE A TEMPORARY PIPE

PROPOSED STRUCTURE

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

WATER SURFACE ELEVATIONS AT:

Q2.33 = 1288.9' VELOCITY= 6.6 fps
Q10 = 1290.2' " 9.3 fps
Q25 = 1290.8' " 10.3 fps
Q50 = 1291.2' " 11.0 fps
Q100 = 1291.8' " 11.9 fps

IS THE ROADWAY OVERTOPPED BELOW Q100: No
FREQUENCY: N/A
RELIEF ELEVATION: 1296.4' at structure
DISCHARGE OVER ROAD @Q100: N/A

AVERAGE LOW ELEVATION OF SUPERSTRUCTURE: 1293.4' at inlet
VERTICAL CLEARANCE: @ Q50 = 2.2'

SCOUR: Scour not calculated for a box

REQUIRED CHANNEL PROTECTION: Stone Fill, Type III

PERMIT INFORMATION

AVERAGE DAILY FLOW: 3 cfs DEPTH OR ELEVATION:
ORDINARY LOW WATER: 1 cfs ~-0.5'
ORDINARY HIGH WATER: 40 cfs ~-1.0'

TEMPORARY BRIDGE REQUIREMENTS

STRUCTURE TYPE: None required - road closure
CLEAR SPAN (NORMAL TO STREAM):
VERTICAL CLEARANCE ABOVE STREAMBED:
WATERWAY AREA OF FULL OPENING:

ADDITIONAL INFORMATION

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 _p : 3.0 INCH
3. CULVERT OPENING	D: 84.00 FT

4. MIN. MID-SPAN POS. CAMBER @ RELEASE (PRESTRESSED UNITS)	Δ: ---
5. PRESTRESSING STRAND	f _y : ---
6. PRESTRESSED CONCRETE STRENGTH	f' _c : ---
7. PRESTRESSED CONCRETE RELEASE STRENGTH	f' _{cr} : ---
8. CONCRETE, HIGH PERFORMANCE CLASS AA	f' _c : ---
9. CONCRETE, HIGH PERFORMANCE CLASS A	f' _c : ---
10. CONCRETE, HIGH PERFORMANCE CLASS B	f' _c : ---
11. CONCRETE, CLASS C	f' _c : ---
12. REINFORCING STEEL	f _y : 60 KSI
13. STRUCTURAL STEEL AASHTO M270	f _y : ---
14. SOIL UNIT WEIGHT	γ: ---
15. NOMINAL BEARING RESISTANCE OF SOIL	q _n : ---
16. SOIL BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	φ: ---
17. NOMINAL BEARING RESISTANCE OF ROCK	q _n : ---
18. ROCK BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	φ: ---
19. NOMINAL AXIAL PILE RESISTANCE	q _p : ---
20. PILE YIELD STRENGTH ASTM A572	f _y : ---
21. PILE SIZE	---
22. EST. PILE LENGTH	L _p : ---
23. PILE RESISTANCE FACTOR	φ: ---
24. LATERAL PILE DEFLECTION	Δ: ---
25. BASIC WIND SPEED	V _{3s} : ---
26. MINIMUM GROUND SNOW LOAD	p _g : ---
27. SEISMIC DATA	PGA: --- S ₁ : ---

PROJECT NAME: WARDBORO

PROJECT NUMBER: BF 013-1(21)

FILE NAME: s13b072pi.dgn PLOT DATE: 2/13/2014
PROJECT LEADER: K. HIGGINS DRAWN BY: J. SALVATORI
DESIGNED BY: J. SALVATORI CHECKED BY: G. LAROCHE
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TRAFFIC DATA

YEAR	ADT	DHV	% D	% T	ADTT	20 year ESAL for flexible pavement from 2016 to 2036 : 898000	40 year ESAL for flexible pavement from 2016 to 2056 : 2056000
2016	1100	150	55	13.7	130		
2036	1200	170	55	20.4	210	Design Speed : 50 mph	