

# PRELIMINARY INFORMATION SHEET (CULVERT)

LRFD

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STANDARDS LIST

E-100	CONSTRUCTION APPROACH SIGNS	2-Jan-04
E-100A	SIDE ROAD CONSTRUCTION - APPROACH SIGNS	2-Jan-04
E-101	CONSTRUCTION SIGN DETAILS	30-May-03
E-102	CONSTRUCTION SIGN DETAILS	30-Jun-03
E-103	MAINLINE TRAFFIC CONTROL DIVIDED HIGHWAY ONE LANE CLOSED	1-Mar-04
E-107	DELINEATION BARRICADES AND DETOURS FOR CONSTRUCTION AREAS	30-Jun-03
E-134	BRIDGE NUMBER PLAQUE	8-Aug-95
G-1	STEEL BEAM GUARDRAIL WITH STEEL POSTS :: STEEL BEAM GUARDRAIL WITH W	3-Jan-00
G-1D	STEEL BEAM GUARDRAIL (40MPH & LESS) :: HEAVY DUTY STEEL BEAM GUARDRA	3-Jan-00

FINAL HYDRAULIC REPORT

PROJECT #: NH CULV(15) STREAM: Unnamed  
HIGHWAY #: VT 103 STRUCTURE #: 4

HYDROLOGIC DATA

DRAINAGE AREA: 2.6 sq. mi.  
CHARACTER OF TERRAIN: Hilly to mountainous, mostly forested  
STREAM CHARACTERISTICS: Sinuous, incised  
NATURE OF STREAMBED: Sandy gravel and cobbles

PEAK FLOW DATA

Q 2.33 =	120 cfs	Q 50 =	500 cfs
Q 10 =	300 cfs	Q 100 =	600 cfs
Q 25 =	400 cfs	Q 500 =	850 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? yes  
IS ORDINARY RISE RAPID? yes  
IS STAGE AFFECTED BY UPSTREAM OR DOWNSTREAM CONDITIONS? no  
IF YES, DESCRIBE:

WATERSHED STORAGE: 1.2% HEADWATERS: UNIFORM: X  
IMMEDIATELY ABOVE SITE:

EXISTING STRUCTURE INFORMATION

STRUCTURE TYPE: 6' dia. CGMP  
YEAR BUILT: 1958  
CLEAR SPAN(NORMAL TO STREAM): 6'  
VERTICAL CLEARANCE ABOVE STREAMBED: 6'  
WATERWAY OF FULL OPENING: 28.3 sq. ft.  
DISPOSITION OF STRUCTURE: Remove  
TYPE OF MATERIAL UNDER SUBSTRUCTURE: Unknown

WATER SURFACE ELEVATIONS AT:

Q2.33 =	469.4'	VELOCITY =	12.9 fps
Q10 =	474.3'	"	16.8 fps
Q25 =	478.4'	"	18.7 fps
Q50 =	480.3'	"	17.7 fps
Q100 =	481.0'	"	17.9 fps

LONG TERM STREAMBED CHANGES: None noted

IS THE ROADWAY OVERTOPPED BELOW Q100: Yes  
FREQUENCY: Below Q100  
RELIEF ELEVATION: 480.6'  
DISCHARGE OVER ROAD @Q100: 95 cfs

UPSTREAM STRUCTURE

TOWN: Rockingham DISTANCE: 1984'  
HIGHWAY #: TH 27 STRUCTURE #:  
CLEAR SPAN: 8' CLEAR HEIGHT: 8'  
YEAR BUILT: FULL WATERWAY: 50.3 sq. ft.  
STRUCTURE TYPE: Corrugated metal pipe

DOWNSTREAM STRUCTURE

TOWN: Rockingham DISTANCE: 1865'  
HIGHWAY #: STRUCTURE #:

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

- PROPOSED CULVERT IS A CONCRETE STRUCTURE (14'-0" X 8'-0" X 84'-0" BOX).
- CULVERT ENDS ARE NOT SKEWED.
- CULVERT WILL BE SET AT A SLOPE OF 48.00 IN. ON 84 FT.
- CULVERT WILL NOT REQUIRE FISH PASSAGE ACCOMMODATIONS

YEAR BUILT: FULL WATERWAY:  
STRUCTURE TYPE: Confluence with Williams River

PROPOSED STRUCTURE

STRUCTURE TYPE: Concrete Box  
CLEAR SPAN(NORMAL TO STREAM): 14'  
VERTICAL CLEARANCE ABOVE STREAMBED: 8' with 1' baffles in the bottom  
WATERWAY OF FULL OPENING: 98 sq. ft.

WATER SURFACE ELEVATIONS AT:

Q2.33 =	466.1'	VELOCITY=	7.0 fps
Q10 =	467.9'	"	10.1 fps
Q25 =	468.8'	"	11.2 fps
Q50 =	469.7'	"	12.3 fps
Q100 =	470.6'	"	13.2 fps

IS THE ROADWAY OVERTOPPED BELOW Q100: No  
FREQUENCY: N/A  
RELIEF ELEVATION: 480.5'  
DISCHARGE OVER ROAD @Q100: None

AVERAGE LOW ELEVATION OF SUPERSTRUCTURE: 471.0' at inlet  
VERTICAL CLEARANCE: @ Q50 = 1.3' at inlet

SCOUR: N/A for culverts

REQUIRED CHANNEL PROTECTION: Stone Fill, Type IV

PERMIT INFORMATION

AVERAGE DAILY FLOW: 5 cfs DEPTH OR ELEVATION:  
ORDINARY LOW WATER: 3 cfs 0.5'  
ORDINARY HIGH WATER: 60 cfs 1.5'

TEMPORARY BRIDGE REQUIREMENTS

STRUCTURE TYPE: To be determined by contractor.  
CLEAR SPAN (NORMAL TO STREAM):  
VERTICAL CLEARANCE ABOVE STREAMBED:  
WATERWAY AREA OF FULL OPENING:

ADDITIONAL INFORMATION

Elevations based on NAV88.

TRAFFIC MAINTENANCE NOTES

- SEE PLANS AND SPECIAL PROVISIONS

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'c: ---
7. PRESTRESSED CONCRETE RELEASE STRENGTH	f'cr: ---
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 <sub>y</sub> : 60 KSI
13. STRUCTURAL STEEL AASHTO M270	f <sub>y</sub> : ---
14. SOIL UNIT WEIGHT	γ: 0.140 KCF
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 <sub>r</sub> : ---

PROJECT NAME: ROCKINGHAM

PROJECT NUMBER: NH CULV(15)

FILE NAME: PLOT DATE: 4/21/2009  
PROJECT LEADER: K. HIGGINS DRAWN BY: M. FESSEL  
DESIGNED BY: J. SALVATORI CHECKED BY: J. SALVATORI  
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TRAFFIC DATA

YEAR	ADT	DHV	% D	% T	ADTT	20 year ESAL for flexible pavement from 2010 to 2030 : 10678000
2010	6100	920	55	8.1	890	40 year ESAL for flexible pavement from 2010 to 2050 : 25699000
2030	7200	1100	55	8.1	1200	Design Speed : 50 mph