

# PRELIMINARY INFORMATION SHEET (BRIDGE)

LRFD

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STANDARDS LIST

B-5	SLOPE GRADING, EMBANKMENTS, MUCK	06-01-1994
G-1b	BOX BEAM GUARDRAIL	06-01-1994
S-364A	BRIDGE RAILING, GALVANIZED 3 RAIL BOX BEAM	04-23-2012
S-364B	GUARDRAIL APPROACH SECTION, GALVANIZED 3 RAIL BOX BEAM	04-23-2012
S-364C	GUARDRAIL APPROACH SECTION, GALVANIZED 3 RAIL BOX BEAM	04-23-2012
S-364D	GUARDRAIL APPROACH SECTION, GALVANIZED 3 RAIL BOX BEAM	04-23-2012
T-1	TRAFFIC CONTROL GENERAL NOTES	08-06-2012
T-10	CONVENTIONAL ROADS CONSTRUCTION APPROACH SIGNING	08-06-2012
T-28	CONSTRUCTION SIGN DETAILS	08-06-2012
T-40	DELINEATORS AND MILEPOSTS	01-02-2013
T-45	SQUARE TUBE SIGN POST AND ANCHOR	01-02-2013

STRUCTURES DETAILS

SD-501.00	CONCRETE DETAILS AND NOTES	02-09-2012
SD-502.00	CONCRETE DETAILS AND NOTES	10-10-2012

FINAL HYDRAULIC REPORT

**HYDROLOGIC DATA** Date: September 27, 2013

DRAINAGE AREA : 47.3 SQ. MI.  
 CHARACTER OF TERRAIN : HILLY TO MOUNTAINOUS  
 STREAM CHARACTERISTICS : STRAIGHT, NON-ALLUVIAL, AND PERENNIAL CHANNEL  
 NATURE OF STREAMBED : GRAVEL AND COBBLES WITH SILT

PEAK FLOW DATA

Q 2.33 =	1510 CFS	Q 50 =	7060 CFS
Q 10 =	3730 CFS	Q 100 =	8570 CFS
Q 25 =	5390 CFS	Q 500 =	13810 CFS

DATE OF FLOOD OF RECORD : UNKNOWN  
 ESTIMATED DISCHARGE : N/A  
 WATER SURFACE ELEV. : N/A  
 NATURAL STREAM VELOCITY : @ Q25 = 8.2 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: CONCRETE JACK ARCH WITH STONE ABUTMENTS  
 YEAR BUILT: 1919  
 CLEAR SPAN(NORMAL TO STREAM): 26 FT  
 VERTICAL CLEARANCE ABOVE STREAMBED: 9.5 FT (EL. 571.7 FT)  
 WATERWAY OF FULL OPENING: 240 SQ. FT.  
 DISPOSITION OF STRUCTURE: REPLACEMENT  
 TYPE OF MATERIAL UNDER SUBSTRUCTURE: SEE BORINGS

WATER SURFACE ELEVATIONS AT:

Q2.33 =	571.3 FT	VELOCITY =	9.1 FPS
Q10 =	576.2 FT	"	8.0 FPS
Q25 =	577.3 FT	"	8.2 FPS
Q50 =	578.0 FT	"	8.8 FPS
Q100 =	578.5 FT	"	9.3 FPS

LONG TERM STREAMBED CHANGES: MINIMAL DUE TO LARGE SIZE OF STREAMBED MATERIAL

IS THE ROADWAY OVERTOPPED BELOW Q100: YES  
 FREQUENCY: Q10  
 RELIEF ELEVATION: 573.6 FT  
 DISCHARGE OVER ROAD @Q100: 1438 CFS

UPSTREAM STRUCTURE

TOWN: RANDOLPH DISTANCE: 0.5 MI.  
 HIGHWAY #: TH NO. 64 STRUCTURE #: 38  
 CLEAR SPAN: 33 FT CLEAR HEIGHT: UNKNOWN  
 YEAR BUILT: 1904 (REBUILT 2008) FULL WATERWAY: UNKNOWN  
 STRUCTURE TYPE: ROLLED BEAM / SEMI KG POST - COVERED BRIDGE

DOWNSTREAM STRUCTURE

TOWN: RANDOLPH DISTANCE: 0.4 MI.  
 HIGHWAY #: VT 14 STRUCTURE #: 34  
 CLEAR SPAN: 55 FT CLEAR HEIGHT: UNKNOWN  
 YEAR BUILT: 1995 FULL WATERWAY: UNKNOWN  
 STRUCTURE TYPE: ROLLED BEAM

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	1.50	1.02					
POSTING							
OPERATING	1.88	1.33	1.86	1.04	1.35	1.23	1.47
COMMENTS:							

AS BUILT "REBAR" DETAIL

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

TRAFFIC DATA

YEAR	ADT	DHV	% D	% T	ADTT	20 year ESAL for flexible pavement from 2014 to 2034 : 4000
2014	15	2	64	7.3	1	40 year ESAL for flexible pavement from 2014 to 2054 : 9000
2034	20	2	64	9	2	Design Speed : 25 mph

PROPOSED STRUCTURE

STRUCTURE TYPE: CONCRETE NEXT BEAMS ON INTEGRAL ABUTMENTS

CLEAR SPAN(NORMAL TO STREAM): 47 FT  
 VERTICAL CLEARANCE ABOVE STREAMBED: 9.7 FT (EL. 571.9 FT)  
 WATERWAY OF FULL OPENING: 354 SQ. FT.

WATER SURFACE ELEVATIONS AT:

Q2.33 =	570.7 FT	VELOCITY =	6.0 FPS
Q10 =	575.8 FT	"	8.4 FPS
Q25 =	577.1 FT	"	8.2 FPS
Q50 =	577.9 FT	"	8.9 FPS
Q100 =	578.4 FT	"	9.3 FPS

IS THE ROADWAY OVERTOPPED BELOW Q100: YES  
 FREQUENCY: Q10  
 RELIEF ELEVATION: 574.0 FT  
 DISCHARGE OVER ROAD @Q100: 642 CFS

AVERAGE LOW ELEVATION OF SUPERSTRUCTURE: 572.4 FT  
 VERTICAL CLEARANCE: @ Q25 = -4.7 FT (SUBMERGED)

SCOUR: CONTRACTION SCOUR - 0 FT

REQUIRED CHANNEL PROTECTION: TYPE IV STONE FILL

PERMIT INFORMATION

AVERAGE DAILY FLOW:	400 CFS	DEPTH OR ELEVATION:	
ORDINARY LOW WATER:	250 CFS		565.9 FT
ORDINARY HIGH WATER:	648 CFS		567.9 FT

TEMPORARY BRIDGE REQUIREMENTS

STRUCTURE TYPE: NO TEMPORARY STRUCTURE  
 CLEAR SPAN (NORMAL TO STREAM): N/A  
 VERTICAL CLEARANCE ABOVE STREAMBED: N/A  
 WATERWAY AREA OF FULL OPENING: N/A

ADDITIONAL INFORMATION

TRAFFIC MAINTENANCE NOTES

1. MAINTAIN TRAFFIC ON AN OFF SITE DETOUR.
2. TRAFFIC SIGNALS ARE NOT NECESSARY.
3. SIDEWALKS ARE NOT NECESSARY.

DESIGN VALUES

1. DESIGN LIVE LOAD	HL-93
2. FUTURE PAVEMENT	d <sub>p</sub> : 2.5 INCH
3. DESIGN SPAN	L: 53.00 FT
4. MIN. MID-SPAN POS. CAMBER @ RELEASE (PRESTRESSED UNITS)	Δ: 0.81 INCH
5. PRESTRESSING STRAND (0.60 INCH DIAMETER - LOW RELAX)	f <sub>y</sub> : 270 KSI
6. PRESTRESSED CONCRETE STRENGTH	f' <sub>c</sub> : 6.0 KSI
7. PRESTRESSED CONCRETE RELEASE STRENGTH	f' <sub>cr</sub> : 4.8 KSI
8. CONCRETE, HIGH PERFORMANCE CLASS AA	f' <sub>c</sub> : ---
9. CONCRETE, HIGH PERFORMANCE CLASS A	f' <sub>c</sub> : ---
10. CONCRETE, HIGH PERFORMANCE CLASS B	f' <sub>c</sub> : ---
11. CONCRETE, CLASS C	f' <sub>c</sub> : ---
12. REINFORCING STEEL	f <sub>y</sub> : 60 KSI
13. STRUCTURAL STEEL AASHTO M270	f <sub>y</sub> : ---
14. SOIL UNIT WEIGHT	γ: 0.125 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: 0.45
19. NOMINAL AXIAL PILE RESISTANCE	q <sub>p</sub> : 270.3 KIPS
20. PILE YIELD STRENGTH ASTM A572	f <sub>y</sub> : 50 KSI
21. PILE SIZE	HP 12X63
22. EST. PILE LENGTHS ( TWO SUBSTRUCTURES ) ( ABUTMENT 1 = 40 AND ABUTMENT 2 = 50 ) FT	L <sub>p</sub> : ---
23. PILE RESISTANCE FACTOR	φ: 0.50
24. LATERAL PILE DEFLECTION	Δ: 0.18 INCH
25. BASIC WIND SPEED	V <sub>3s</sub> : ---
26. MINIMUM GROUND SNOW LOAD	p <sub>g</sub> : ---
27. SEISMIC DATA	PGA: 8%g S <sub>s</sub> : 18%g S <sub>1</sub> : 5%g

PROJECT NAME: RANDOLPH  
 PROJECT NUMBER: BRO 1444(57)

FILE NAME: z11j078pi.xls PLOT DATE: 3/12/2014  
 PROJECT LEADER: J. BYATT DRAWN BY: S. GOODWIN  
 DESIGNED BY: N. CARON CHECKED BY: J. BYATT  
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SEE REVISED SHEET