

PRELIMINARY INFORMATION SHEET (BRIDGE)

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FINAL HYDRAULIC REPORT

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STANDARDS LIST

B-71	STANDARD FOR RESIDENTIAL AND COMMERCIAL DRIVES	07-08-2005
C-10	CURBING	02-11-2008
D-1	PRECAST REINFORCED CONCRETE DROP INLET DETAILS	06-01-1994
D-3	TREATED GUTTERS	06-01-1994
D-9	REINFORCED CONCRETE DROP INLET WITH VERTICAL CURB & THROAT ADAPTER	06-01-1994
D-11	STEEL OR IRON GRATES & COVERS (TYPE A)	06-01-1994
E-171A	TRAFFIC CONTROL SIGNALS GENERAL NOTES & DETAILS	08-09-1995
E-193	PAVEMENT MARKING DETAILS	08-18-1995
G-1	STEEL BEAM GUARDRAIL DETAILS	11-10-2015
G-1D	STEEL BEAM GUARDRAIL APPROACH TERMINAL DETAILS	02-10-2014
J-3	MAIL BOX SUPPORT DETAILS	08-07-1995
S-352A	BRIDGE RAILING, GALVANIZED STEEL TUBING/CONC. COMBINATION	08-22-2012
S-352B	BRIDGE RAILING, GALVANIZED STEEL TUBING/CONC. COMBINATION	08-22-2012
S-352C	BRIDGE RAILING, GALVANIZED STEEL TUBING/CONC. COMBINATION	08-22-2012
S-352D	GUARDRAIL APPROACH SECTION TO CONC. COMBINATION BRIDGE RAILING, TL-3	08-22-2012
S-363	TIRIE BEAM TO STANDARD STEEL BEAM TRANSITION SECTION	04-23-2012
T-1	TRAFFIC CONTROL GENERAL NOTES	04-26-2016
T-10	CONVENTIONAL ROADS AND CONSTRUCTION APPROACH SIGNING	08-06-2012
T-28	CONSTRUCTION SIGN DETAILS	08-06-2012
T-30	CONSTRUCTION SIGN DETAILS	08-06-2012
T-35	CONSTRUCTION ZONE LONGITUDINAL DROP-OFFS	08-06-2012
T-36	CONSTRUCTION ZONE LONGITUDINAL DROP-OFFS FOR PAVING	08-06-2012
T-42	BRIDGE NUMBER PLAQUE	04-09-2014
T-45	SQUARE TUBE SIGN POST AND ANCHOR	01-02-2013

HYDROLOGIC DATA

Date: July 2014

DRAINAGE AREA : 46.5 sq. mi.
 CHARACTER OF TERRAIN : Hilly to mountainous, mixture of forested and open land cover.
 STREAM CHARACTERISTICS : Incised, alluvial, sinuous to meandering. Some armored banks.
 NATURE OF STREAMBED : Silt, sand, gravel and some stones

PEAK FLOW DATA

Q 2.33 =	1,500 cfs	Q 50 =	5,400 cfs
Q 10 =	3,200 cfs	Q 100 =	6,600 cfs
Q 25 =	4,400 cfs	Q 500 =	10,000 cfs

DATE OF FLOOD OF RECORD : Unknown
 ESTIMATED DISCHARGE : Unknown
 WATER SURFACE ELEV. : Unknown
 NATURAL STREAM VELOCITY : @ Q25 = 7.0 fps
 ICE CONDITIONS : Moderate
 DEBRIS : Slight to moderate
 DOES THE STREAM REACH MAXIMUM HIGHWATER ELEV. RAPIDLY? No
 IS ORDINARY RISE RAPID? No
 IS STAGE AFFECTED BY UPSTREAM OR DOWNSTREAM CONDITIONS? Yes
 IF YES, DESCRIBE: Railroad bridge 100' downstream & confluence with Passumpsic River 700' downstream, affect hydraulics at the site.

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

EXISTING STRUCTURE INFORMATION

STRUCTURE TYPE: 3 span concrete T-beam bridge
 YEAR BUILT: 1929
 CLEAR SPAN(NORMAL TO STREAM): 33' + 48' + 33' = 114' total
 VERTICAL CLEARANCE ABOVE STREAMBED: 21'
 WATERWAY OF FULL OPENING: 1,130 sq. ft.
 DISPOSITION OF STRUCTURE: Remove and replace with new bridge
 TYPE OF MATERIAL UNDER SUBSTRUCTURE: See boring logs

WATER SURFACE ELEVATIONS AT:

Q2.33 =	542.8'	VELOCITY =	7.0 fps
Q10 =	550.9'	"	5.8 fps
Q25 =	552.2'	"	7.5 fps
Q50 =	553.8'	"	8.3 fps
Q100 =	555.0'	"	9.5 fps

LONG TERM STREAMBED CHANGES: The streambed through the bridge has lowered 2' to 3' since 1928, based on a comparison between record plans and the current conditions.

IS THE ROADWAY OVERTOPPED BELOW Q100: No
 FREQUENCY: Above Q100
 RELIEF ELEVATION: 554.4'
 DISCHARGE OVER ROAD @Q100: None

UPSTREAM STRUCTURE

TOWN: ST. Johnsbury DISTANCE: 1,150'
 HIGHWAY #: US 5 STRUCTURE #: 127
 CLEAR SPAN: 2 spans at 20' each = 40' total CLEAR HEIGHT: 24'
 YEAR BUILT: 1975 FULL WATERWAY: 960 sq. ft.
 STRUCTURE TYPE: Twin cell concrete box

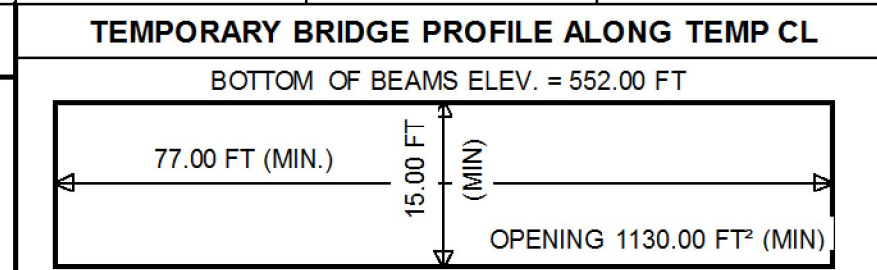
DOWNSTREAM STRUCTURE

TOWN: St. Johnsbury DISTANCE: 100'
 HIGHWAY #: Washington County Railroad STRUCTURE #:
 CLEAR SPAN: 48' CLEAR HEIGHT: 14'
 YEAR BUILT: FULL WATERWAY: 570 sq. ft.
 STRUCTURE TYPE: Single span side girder bridge

LRFD LOAD RATING FACTORS

LOADING LEVELS	TRUCK						
	H-20	HL-93	3S2	6 AXLE	3A. STR.	4A. STR.	5A. SEM
TONNAGE	20	36	36	66	30	34.5	38
INVENTORY	1.52	1.11					
POSTING							
OPERATING	1.97	1.44	1.8	1.12	1.8	1.59	1.6
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 2015 to 2035 : 0
2015	1200	160	54	5.5	160	40 year ESAL for flexible pavement from 2015 to 2055 : 0
2035	1200	160	54	6.9	200	Design Speed : 30 mph

PROPOSED STRUCTURE

STRUCTURE TYPE: Single span steel beam bridge
 CLEAR SPAN(NORMAL TO STREAM): 105'
 VERTICAL CLEARANCE ABOVE STREAMBED: 20'
 WATERWAY OF FULL OPENING: 1570 sq. ft.

WATER SURFACE ELEVATIONS AT:

Q2.33 =	543.1'	VELOCITY=	7.1 fps
Q10 =	550.8'	"	5.3 fps
Q25 =	551.9'	"	6.6 fps
Q50 =	553.4'	"	7.2 fps
Q100 =	554.7'	"	7.9 fps

IS THE ROADWAY OVERTOPPED BELOW Q100: No
 FREQUENCY: Above Q100
 RELIEF ELEVATION: 554.4'
 DISCHARGE OVER ROAD @Q100: None

AVERAGE LOW ELEVATION OF SUPERSTRUCTURE: 557.1'
 VERTICAL CLEARANCE: @ Q25 = 5.2'

SCOUR: Total contraction scour and long term stream degradation = 4' at Q100.
 Contraction scour is 1' and there is a potential for 3' of long term stream degradation.
 REQUIRED CHANNEL PROTECTION: Stone Fill, Type III

PERMIT INFORMATION

AVERAGE DAILY FLOW: 95 cfs DEPTH OR ELEVATION:
 ORDINARY LOW WATER: 45 cfs Elevation 537'
 ORDINARY HIGH WATER: 640 cfs Elevation 541'

TEMPORARY BRIDGE REQUIREMENTS

STRUCTURE TYPE: Single span bridge
 CLEAR SPAN (NORMAL TO STREAM): 75' minimum
 VERTICAL CLEARANCE ABOVE STREAMBED: Minimum elev. 552.0' on low end*
 WATERWAY AREA OF FULL OPENING: 1,130 sq. ft.

ADDITIONAL INFORMATION

* Temporary bridge minimum average bottom of beam elevation 554.0'.
 **Hydraulics at this site is affected by water backing up from the Passumpsic River. This report is based on equal frequency floods on both the Sleepers River and that river. Velocities will be higher than reported when the the Passumpsic River is at lower levels.

TRAFFIC MAINTENANCE NOTES

1. MAINTAIN ONE-WAY TRAFFIC ON A TEMPORARY BRIDGE.
2. INSTALL AND MAINTAIN TRAFFIC SIGNALS.
3. INSTALL SIDEWALKS ON THE WEST SIDE OF THE BRIDGE.
4. THE APPROACHES FOR THE TEMPORARY BRIDGE SHALL BE PAVED.

DESIGN VALUES

1. DESIGN LIVE LOAD	HL-93
2. FUTURE PAVEMENT	d _p : 0.0 INCH
3. DESIGN SPAN	L: 111.00 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. SP HIGH PERFORMANCE CONCRETE, CLASS PCD	f' _c : 4.0 KSI
10. SP HIGH PERFORMANCE CONCRETE, CLASS PCS	f' _c : 3.5 KSI
11. CONCRETE, CLASS C	f' _c : ---
12. REINFORCING STEEL	f _y : 60 KSI
13. STRUCTURAL STEEL AASHTO M270 (WEATHERING)	f _y : 50 & 70 KSI
14. NOMINAL BEARING RESISTANCE OF SOIL	q _n : ---
15. SOIL BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	φ: ---
16. NOMINAL BEARING RESISTANCE OF ROCK	q _n : ---
17. ROCK BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	φ: ---
18. PILE RESISTANCE FACTOR	φ: 0.65
19. LATERAL PILE DEFLECTION	Δ: 0.50 INCH
20. BASIC WIND SPEED	V _{3s} : ---
21. MINIMUM GROUND SNOW LOAD	p _g : ---
22. SEISMIC DATA	PGA: 0.65 S _s : 18 %g S _r : 5%g
23.	---
24.	---
25.	18 %g
26.	5%g

PROJECT NAME: **ST. JOHNSBURY**
 PROJECT NUMBER: **BRO 1447(30)**
 FILE NAME: **st johnsbury pi.xls** PLOT DATE: 10/18/2016
 PROJECT LEADER: **Mike Chenette** DRAWN BY: **L. Buxton**
 DESIGNED BY: **G. Bogue** CHECKED BY: **M. Chenette**
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