

PRELIMINARY INFORMATION SHEET (CULVERT)

LRFD (AASHTO)/LFD (AREMA)

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STANDARDS LIST

D-1	PRECAST REINFORCED CONCRETE DROP INLET DETAILS	06-01-1994
D-30	UNDERDRAIN CONSTRUCTION DETAILS	08-13-2007
F-2	CHAIN LINK FENCE, TYPE I DETAILS	06-01-1994
G-1	STEEL BEAM GUARDRAIL DETAILS (POST, DELINEATOR, TYPICALS)	02-10-2014

FINAL HYDRAULIC REPORT

HYDROLOGIC DATA

Date: Oct. 2014

DRAINAGE AREA : 8.5 sq. mi.
 CHARACTER OF TERRAIN : Hilly to Mountainous, Mostly Forested
 STREAM CHARACTERISTICS : Perennial, < 100 ft wide, sm. floodplain, sinuous, not braided
 NATURE OF STREAMBED : Sand, gravel with cobble and some boulders

PEAK FLOW DATA

Q 2.33 =	275 cfs	Q 50 =	1100 cfs
Q 10 =	675 cfs	Q 100 =	1350 cfs
Q 25 =	875 cfs	Q 500 =	1900 cfs

DATE OF FLOOD OF RECORD : Unknown
 ESTIMATED DISCHARGE : Unknown
 WATER SURFACE ELEV. : Unknown
 NATURAL STREAM VELOCITY : 5 to 6 fps
 ICE CONDITIONS : Light
 DEBRIS : Heavy
 DOES THE STREAM REACH MAXIMUM HIGHWATER ELEV. RAPIDLY? Yes
 IS ORDINARY RISE RAPID? Yes
 IS STAGE AFFECTED BY UPSTREAM OR DOWNSTREAM CONDITIONS? Yes
 IF YES, DESCRIBE : Culvert discharges into the Connecticut River upstream of Ryegate (Dodge Falls) Dam.

WATERSHED STORAGE : Minimal HEADWATERS : 3-small ponds
 UNIFORM :
 IMMEDIATELY ABOVE SITE :

EXISTING STRUCTURE INFORMATION

STRUCTURE TYPE : 8' w x 6' h conc. box (US 5) / twin 2' w x 5' h box (WACR center portion)
 YEAR BUILT : UNKNOWN
 CLEAR SPAN(NORMAL TO STREAM) : 8' wide (US 5) / 4' wide (WACR center portion)
 VERTICAL CLEARANCE ABOVE STREAMBED : varies
 WATERWAY OF FULL OPENING : 48 sq ft (US 5) / 10 sq ft (WACR)
 DISPOSITION OF STRUCTURE : Partial removal / Partial fill w/flowable fill
 TYPE OF MATERIAL UNDER SUBSTRUCTURE : UNKNOWN

WATER SURFACE ELEVATIONS AT:

Q2.33 =	Not evaluated	VELOCITY =	
Q10 =	Not evaluated	"	
Q25 =	Not evaluated	"	
Q50 =	Not evaluated	"	
Q100 =	Not evaluated	"	

LONG TERM STREAMBED CHANGES:

IS THE ROADWAY OVERTOPPED BELOW Q100: Not evaluated
 FREQUENCY:
 RELIEF ELEVATION: Not evaluated
 DISCHARGE OVER ROAD @Q100: Not evaluated

UPSTREAM STRUCTURE

TOWN: Ryegate DISTANCE: 1700 ft.
 HIGHWAY #: I-91 STRUCTURE #: C69-4
 CLEAR SPAN: 11 ft CLEAR HEIGHT: 11 ft
 YEAR BUILT: 1976 FULL WATERWAY: 121 sq. ft.
 STRUCTURE TYPE: Reinforced Concrete Box

DOWNSTREAM STRUCTURE

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

LRFD LOAD RATING FACTORS (US 5 BRIDGE NO. 116)

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	10.04	7.48					
POSTING							
OPERATING	13.02	9.69	10.76	6.07	8.14	7.58	8.14

COMMENTS:

PROPOSED STRUCTURE

STRUCTURE TYPE: Concrete Arch
 CLEAR SPAN (NORMAL TO STREAM): 32'-0"
 VERTICAL CLEARANCE ABOVE STREAMBED: 20'-8 3/4" (at crown)
 WATERWAY OF FULL OPENING: 514.6 square ft.

WATER SURFACE ELEVATIONS AT:

Q2.33 =	430.6 ft	VELOCITY=	3.7 fps
Q10 =	432.2 ft	"	5.7 fps
Q25 =	432.9 ft	"	6.4 fps
Q50 =	433.7 ft	"	6.9 fps
Q100 =	434.4 ft	"	7.5 fps

IS THE ROADWAY OVERTOPPED BELOW Q100: No
 FREQUENCY:
 RELIEF ELEVATION: US RT 5 -EI. 450 to EI. 470 ft., WACR - EI. 480 ft
 DISCHARGE OVER ROAD @Q100: No

AVERAGE LOW ELEVATION OF SUPERSTRUCTURE: US RT 5 - EI. 447.7 ft
 VERTICAL CLEARANCE: @ Q50 = 14.0 ft

SCOUR: None anticipated.

REQUIRED CHANNEL PROTECTION: Stone Fill, Type IV and FHWA Class VII Riprap

PERMIT INFORMATION

AVERAGE DAILY FLOW: 17 cfs DEPTH OR ELEVATION:
 ORDINARY LOW WATER: 8 cfs 0.5 ft
 ORDINARY HIGH WATER: 118 cfs 1.5

TEMPORARY BRIDGE REQUIREMENTS

STRUCTURE TYPE: 2-Lane Temp. Bridge (US 5), Temp. Rail Bridge (WACR)
 CLEAR SPAN (NORMAL TO STREAM):
 VERTICAL CLEARANCE ABOVE STREAMBED:
 WATERWAY AREA OF FULL OPENING:

ADDITIONAL INFORMATION

SEE RAILROAD AGREEMENT FOR MAINTENANCE OF RAILROAD TRAFFIC

TRAFFIC MAINTENANCE NOTES

1. MAINTAIN TWO-WAY TRAFFIC ON A TEMPORARY BRIDGE.
2. TRAFFIC SIGNALS ARE NOT NECESSARY.
3. SIDEWALKS ARE NOT NECESSARY
4. THE APPROACHES FOR THE TEMPORARY BRIDGE SHALL BE PAVED.

DESIGN VALUES

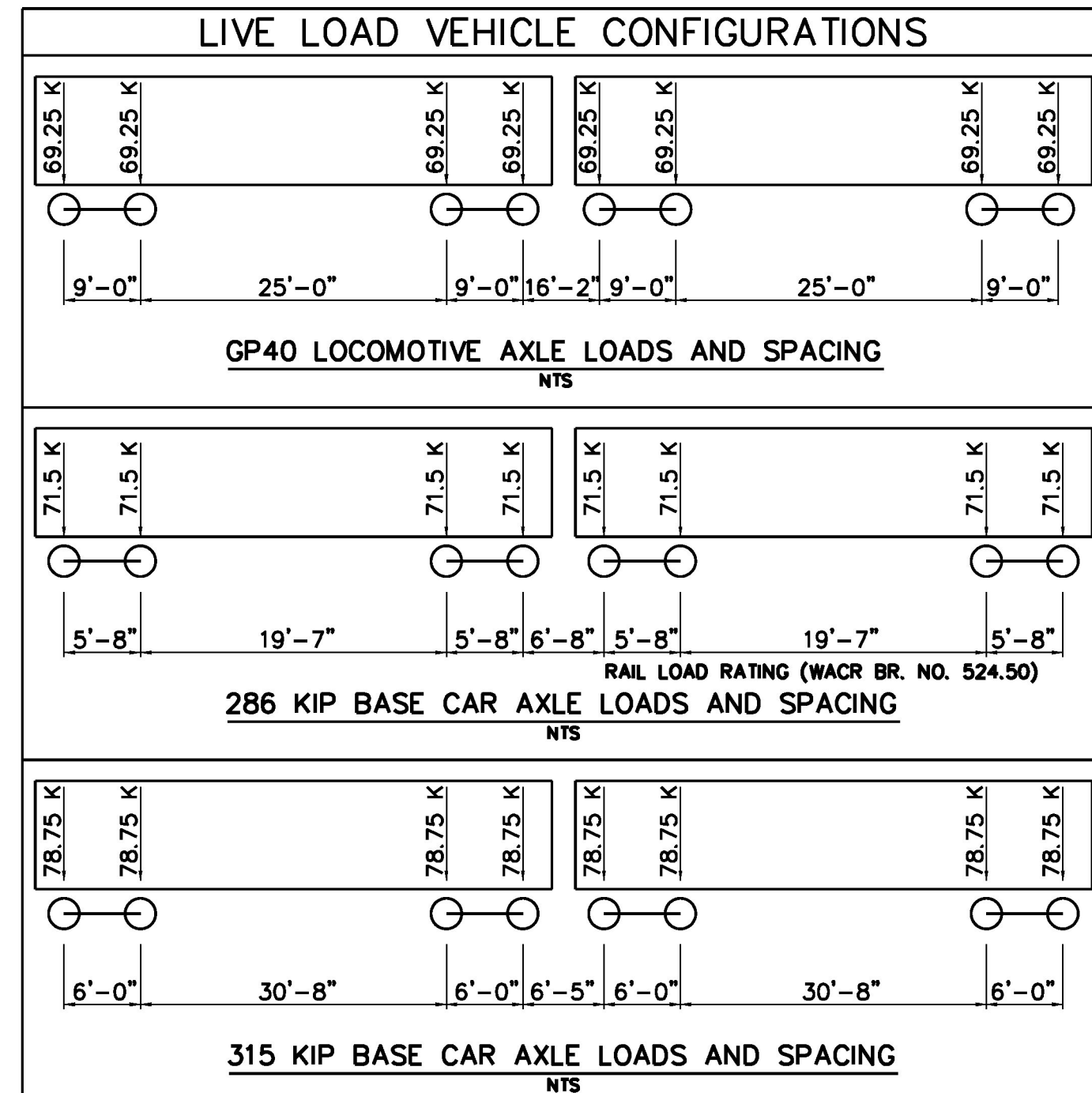
1. DESIGN LIVE LOAD	HL-93, E80
2. FUTURE PAVEMENT	d _p : 3.0 INCH
3. CULVERT OPENING	D: 32.00 FT
4. MIN. MID-SPAN POS. CAMBER @ RELEASE (PRESTRESSED UNITS)	Δ: ---
5. PRESTRESSING STRAND	f _y : ---
6. PRESTRESSED CONCRETE STRENGTH	f' _c : ---
7. PRESTRESSED CONCRETE RELEASE STRENGTH	f' _{cr} : ---
8. CONCRETE, HIGH PERFORMANCE CLASS AA	f' _c : ---
9. CONCRETE, HIGH PERFORMANCE CLASS A (MOD.)	f' _c : 5.0 KSI
10. CONCRETE, HIGH PERFORMANCE CLASS B	f' _c : 3.5 KSI
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: SEE NOTES
15. NOMINAL BEARING RESISTANCE OF SOIL	q _n : 15.0 KSF
16. SOIL BEARING RESISTANCE FACTOR (AASHTO LRFD) (SERVICE L.S.)	φ: 1.00
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 _s : --- S ₁ : ---

PROJECT NAME: RYEGATE
 PROJECT NUMBER: STP CULV(10)

FILE NAME: z06c156frm.dgn PLOT DATE: 2/4/2016
 PROJECT LEADER: E. DETRICK DRAWN BY: R. BARNES
 DESIGNED BY: R. BARNES CHECKED BY: E. DETRICK
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NOTE: SUBSURFACE INFORMATION IS AVAILABLE IN WP 3.2.2, PART 2 - GEOTECHNICAL DATA REPORT (REV. 1).

LOAD RATING FACTORS (WACR BR. NO. 524.50)



STRUCTURES DETAIL DRAWINGS

SD-501.00	CONCRETE DETAILS AND NOTES	2/9/2012
SD-502.00	CONCRETE DETAILS AND NOTES	10/10/2012

SPEED (mph)	LOAD RATING FACTOR						Permissible Engine Speed	
	Cooper E-80		286K Cars		315K Cars		GP-40 Engine	
	NORMAL	MAXIMUM	NORMAL	MAXIMUM	NORMAL	MAXIMUM	NORMAL	MAXIMUM
10	7.91	13.18	9.86	16.43	10.56	17.59		
20	7.91	13.18	9.86	16.43	10.56	17.59		
30	7.91	13.18	9.86	16.43	10.56	17.59		
40	7.91	13.18	9.86	16.43	10.56	17.59		
60	7.91	13.18	9.86	16.43	10.56	17.59		

COMMENTS: DUE TO DEPTH BELOW GRADE, IMPACT IS NEGLECTED AND RATINGS ARE INDEPENDENT OF SPEED.

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 2024 : 778000
2014	860	120	54	17.4	150	40 year ESAL for flexible pavement from 2014 to 2034 : 1880000
2024	890	120	54	20.7	184	Design Speed : 50 mph

