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Standards List

B-5M	Embankments, Muck, Slope Rounding	01/03/00
B-12M	Side Road Intersection	01/03/00
B-17M	Turnouts	01/03/00
BR1-97M	N.E.T.C. Bridge Rail	09/24/01
BR2-97M	N.E.T.C. Bridge Rail	09/24/01
D-4M	Corrugated Pipe End Section, Arch End Sections, and Elbow Granular Material at Metal Culvert Locations Typical Water-fall for Culverts	08/13/07
D-16M	Precast Reinforced Concrete Curb Drop Inlet with Grate, Cast Iron Grates Types B & C, Underdrain Riser, Reinforced Concrete Pipe End Section, Energy Dissipator	06/13/97
D-17M	Saddle Branch For Corrugated Steel Pipe Corrugated Steel Pipe Vertical Riser	06/13/97
D-30	Underdrain Construction Details	08/13/07
E-100AM	Side Road Construction Approach Signs	02/02/98
E-100M	Construction Approach Signs	06/13/97
E-101M	Construction Sign Details	05/30/03
E-102M	Construction Sign Details	06/30/03
E-102AM	Construction Sign Details	06/13/97
E-106M	Traffic Control Miscellaneous Details	06/13/97
E-107M	Delineation, Barriolades and Detours for Construction Areas	06/30/03
E-107AM	Breakaway Barriolade Details	06/13/97

Standards List (cont'd)

E-108M	Construction Zone Longitudinal Drop Offs	06/13/97
E-121M	Standard Sign Placement Conventional Road	06/13/97
E-123M	Guide Sign Placement Miscellaneous Details	06/13/97
E-134M	Bridge Number Plaque	06/13/97
E-138M	Reference Plaque Details State and Town Highways	05/30/03
E-142M	Regulatory Sign Details	06/13/97
E-143M	Regulatory Sign Details	06/13/97
E-150M	Warning Sign Details	06/13/97
E-151M	Warning Sign Details	06/13/97
E-155M	Warning Sign Details	06/13/97
E-160M	Flanged Channel Steel Sign Post	06/13/97
E-191M	Pavement Marking Details	02/01/99
E-192M	Pavement Marking Details	12/28/98
E-193M	Pavement Marking Details	06/13/97
E-197M	Delineator Placement Typical	06/13/97
G-1M	Steel Beam Guardrail with Steel Posts	01/03/00
G-1dM	Steel Beam Guardrail with Wood Posts	
G-4M	Plank Rail, Guide Posts, Yielding Marker Posts	06/13/97
G-18AM	Positive Connection Details Between Temporary Barrier Rail and Existing Steel Beam Guardrail	07/10/97
G-18M	Precast Concrete Temporary Traffic Barrier	06/13/97
G-19M	Generic Plans for Guardrail End Terminals	11/15/02
J-1M	Boundary Markers	06/13/97

FINAL HYDRAULICS REPORT



HYDROLOGIC DATA

DRAINAGE AREA = 176 mi²
 CHARACTER OF TERRAIN: ROLLING HILLS TO LEVEL (FLOODPLAIN)
 CHARACTER & TYPE OF STREAM: PERENNIAL, NOT INCISED, SINUOUS, NOT BRAIDED, NOT ANABRANCHED
 NATURE OF STREAMBED: SILT-CLAY
 02.33+ 33.7 m³/s 050+ 113.1 m³/s
 010+ 72.4 m³/s 0100+ 132.0 m³/s
 025+ 91.9 m³/s 0500+ 193.8 m³/s
 DATE OF FLOOD OF RECORD: NO RECORD
 WATER SURFACE ELEV.: UNKNOWN ESTIMATED DISCHARGE:
 NATURAL STREAM VELOCITY @ 050+ 0.95 m/s
 ICE CONDITIONS: SLIGHT DEBRIS: SLIGHT
 IS ORDINARY RISE RAPID? NO
 DOES THE STREAM REACH MAXIMUM HIGHWATER ELEVATION RAPIDLY? NO
 IS STAGE AFFECTED BY UPSTREAM OR DOWNSTREAM CONDITIONS? YES
 IF YES, DESCRIBE: THERE IS A LARGE WETLAND AREA UPSTREAM OF THE BRIDGE SITE WHICH PROVIDES SIGNIFICANT FLOOD STORAGE THEREBY REDUCING PEAK FLOWS
 WATERSHED STORAGE: 2.85 HEADWATERS: UNIFORM THROUGHOUT WATERSHED: IMMEDIATELY ABOVE SITE: YES

EXISTING STRUCTURE

STRUCTURE TYPE: 2 SPAN MULTI-BEAM YEAR BUILT: 1936
 CLEAR SPAN (NORMAL TO STREAM): 36.5 m
 VERTICAL CLEARANCE ABOVE STREAMBED: 5.2 m
 WATERWAY OF FULL OPENING: 149.11 m²
 DISPOSITION OF STRUCTURE: REMOVE
 TYPE OF MATERIAL UNDER SUBSTRUCTURE: SILT-CLAY
 WATER SURFACE ELEV.: 02.33+ 43.51 m VELOCITY: 0.64 m/s
 010+ 44.95 m VELOCITY: 0.82 m/s
 025+ 44.97 m VELOCITY: 0.88 m/s
 050+ 45.39 m VELOCITY: 0.95 m/s
 0100+ 45.73 m VELOCITY: 1.00 m/s
 LONG TERM STREAM BED CHANGES: CHANNEL HAS SCURED OR DEGRADED 0.8m SINCE 1936 BASED ON 1936 BRIDGE PLANS
 IS THE ROADWAY OVERTOPPED BELOW THE Q100? NO FREQUENCY: N/A
 RELIEF ELEVATION: 46.86 m DISCHARGE OVER ROAD @ Q100: 0
 UPSTREAM STRUCTURE: TOWN: SHOREHAM DISTANCE: 8.23 km
 HIGHWAY NO.: VT 74 STRUCTURE NO.: 2
 STRUCTURE TYPE: 3 SPAN STEEL BEAM
 CLEAR SPAN: 86.5 m CLEAR HEIGHT: 2.7 m
 YEAR BUILT: 1939 FULL WATERWAY: <149.85 m²
 DOWNSTREAM STRUCTURE: TOWN: WYBRIDGE DISTANCE: 4.66 km
 HIGHWAY NO.: T.B. 17 STRUCTURE NO.: 10
 STRUCTURE TYPE: ROLLED BEAM
 CLEAR SPAN: 22.5 m CLEAR HEIGHT: 2.1 m
 YEAR BUILT: 1968 FULL WATERWAY: <47.25 m²

PROPOSED STRUCTURE

STRUCTURE TYPE: SINGLE SPAN MULTI-PLATE GIRDER
 CLEAR SPAN (NORMAL TO STREAM): 44.0 m
 VERTICAL CLEARANCE ABOVE STREAMBED: 5.1 m
 WATERWAY OF FULL OPENING: 147.36 m²
 WATER SURFACE ELEV.: 02.33+ 43.51 m VELOCITY: 0.64 m/s
 010+ 44.95 m VELOCITY: 0.82 m/s
 025+ 44.96 m VELOCITY: 0.88 m/s
 050+ 45.38 m VELOCITY: 0.95 m/s
 0100+ 45.72 m VELOCITY: 1.00 m/s
 IS THE ROADWAY OVERTOPPED BELOW THE Q100? NO FREQUENCY: N/A
 RELIEF ELEVATION: 47.44 m DISCHARGE OVER ROAD @ Q100: 0
 AVERAGE LOW ELEVATION OF SUPERSTRUCTURE: 46.105 m
 VERTICAL CLEARANCE @ 050+ 0.735 m (average)
 SCOUR: CONTRACTION SCOUR = 1.03 m @ 0100 & 2.50 m @ 0500
 REQUIRED CHANNEL PROTECTION: TYPE 11 STONE IN FRONT OF ABUTMENTS

PERMIT INFORMATION

AVERAGE DAILY FLOW: 2.6 m³/s
 ORDINARY LOW WATER: 42.37 m DEPTH: 1.33 m
 ORDINARY HIGH WATER: 42.74 m DEPTH: 1.70 m

TEMPORARY BRIDGE REQUIREMENTS

STRUCTURE TYPE: SINGLE SPAN
 CLEAR SPAN (NORMAL TO STREAM): 36.5 (MIN)
 VERTICAL CLEARANCE ABOVE STREAM BED: 5.2 (MIN)
 WATERWAY AREA OF FULL OPENING: 149.11 (MIN)

ADDITIONAL COMMENTS

DESIGN CRITERIA:
 1. DESIGN LIVE LOAD AASHTO MS22.5
 2. DESIGN SPAN 45.0 m
 3. ALLOWABLE LOAD FOR SPREAD FOOTINGS ON SOIL: N/A ON LEDGE: N/A
 4. ULTIMATE CAPACITY OF PILE: 2350 kN TYPE: HP360x132 ESTIMATED LENGTH: 14 m
 5. STRUCTURAL STEEL AASHTO GRADE: 345W
 6. REINFORCING STEEL GRADE: 420
 7. CONCRETE CLASS A: F_c: 30 MPa
 CONCRETE CLASS B: F_c: 25 MPa
 SILICA-FUME CONCRETE: F_c: 35 MPa
 TRAFFIC MAINTENANCE:
 1. IS TRAFFIC TO BE MAINTAINED? YES IF YES, ON EXISTING STRUCTURE OR ON TEMPORARY BRIDGE: X
 2. TEMPORARY BRIDGE REQUIREMENTS: ONE OR TWO WAY: TWO-WAY TRAFFIC CONTROL SIGNALS REQUIRED: NO
 MINIMUM
 ARE SIDEWALKS REQUIRED? NO IF SO, ON WHAT SIDE?

LOADING LEVELS (LOAD FACTOR)	TRUCK						
	M	MS	3S2	6 AXLE	3A. STR.	4A. STR.	5A. SEMI
INVENTORY A=2.17 B=1.00	26	48					
POSTED A=1.55 B=1.40	37	67	73		64	65	71
OPERATING A=1.30 B=1.67	80	87	95		77	77	

STRENGTH $RF = \frac{M_u}{A \times M_{LL+1}} - 1.3 \frac{M_{uL}}{A \times M_{LL+1}}$ SERVICEABILITY $RF = B \left[\frac{.95 F_y S_{LL+1} - M_{uL}}{1.67 M_{LL+1}} - \frac{M_{uL}}{M_{LL+1}} \right]$

YEAR	ADT	DHV	% D	% T	ADTT
2009	2700	300	67	10.2	310
2029	3300	370	67	13.6	500

20 year ESAL for flexible pavement from 2009 to 2029: 2,393,000
 40 year ESAL for flexible pavement from 2009 to 2049: 5,638,000
 Design speed: 50 km/h

STATE OF VERMONT AGENCY OF TRANSPORTATION

Town Of: CORNWALL Bridge No. 9
 Highway No.: VT ROUTE 125 Log Sta. Surv. Sta.
PRELIMINARY INFORMATION SHEET
 VT ROUTE 125 OVER LEMON FAIR RIVER
 Designed By: _____ Drawn By: _____
 Checked By: _____ Date: _____ Bridge Design Supervisor: _____
 Date: _____
 PROJECT: CORNWALL PROJECT NO.: BRS 01721G
 I.G.C. Info: r85e042pl.dgn
 Bridge Sheet No. _____ Sheet 2 of 30