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LIST OF STANDARDS

C-1M	CURBS, BITUMINOUS CONCRETE SIDEWALKS GRANITE SLOPE EDGING, VERTICAL GRANITE CURB PRECAST REINFORCED CONCRETE CURB CAST IN PLACE CONCRETE CURB BITUMINOUS CONCRETE CURB, TREATED TIMBER CURB	01/09/2000
C-3M	SIDEWALK RAMPS	01/09/2000
D-8M	REINF. CONCRETE DROP INLET W/GRATE (DITCHES)	08/13/1997
D-11M	GRATES & COVERS (TYPE A)	08/13/1997
D-15M	PRECAST REINF. CONC. MANHOLE GRATES (BICYCLE S) CAST IRON GRATE WITH FRAME, TYPE D CAST IRON GRATE WITH FRAME, TYPE E	08/13/1997
E-100M	CONSTRUCTION APPROACH SIGNS	08/13/1997
E-101M	CONSTRUCTION SIGN DETAILS	08/13/1997
E-102M	CONSTRUCTION SIGN DETAILS	08/13/1997
E-102AM	CONSTRUCTION SIGN DETAILS	08/13/1997
E-103M	TRAFFIC CONTROL - MISCELLANEOUS DETAILS	08/13/1997
E-107M	DELINEATION, BARRICADES AND DETOURS FOR U-TURNS ON DIVIDED HIGHWAY	08/13/1997
E-107AM	BREAKAWAY BARRICADE DETAILS	06/13/1997
E-121M	STANDARD SIGN PLACEMENT - CONVENTIONAL ROAD	06/13/1997
E-123M	GUIDE SIGN PLACEMENT - MISCELLANEOUS DETAILS	06/13/1997
E-135M	INTERSTATE ROUTE MARKER SIGN DETAIL	06/13/1997
E-136AM	U.S. ROUTE MARKER SIGN DETAILS	06/13/1997
E-136BM	STATE ROUTE MARKER SIGN DETAILS	06/13/1997
E-136CM	STATE NUMBERED TOWN HIGHWAY SIGN DETAILS	06/13/1997
E-140M	REGULATORY SIGN DETAILS	06/13/1997
E-145M	REGULATORY SIGN DETAILS	06/13/1997
E-152M	WARNING SIGN DETAILS	06/13/1997
E-160M	FLANGED CHANNEL STEEL SIGN POST	06/13/1997
E-163M	TUBULAR STEEL SIGN POST	06/13/1997
E-173M	PULL BOXES AND JUNCTION BOXES	06/13/1997
E-175M	POWER DROP STANCHIONS	06/13/1997
E-180AM	STREET LIGHTING DETAILS	06/13/1997
E-180BM	STREET LIGHTING DETAILS	06/13/1997
E-181M	TYPICAL BRIDGE MOUNTING DETAILS FOR STREET LIG	06/13/1997
E-181M	PAVEMENT MARKING DETAILS	02/01/2000
E-183M	PAVEMENT MARKING DETAILS	06/13/1997
T-1M	TEMPORARY EROSION CONTROL DETAILS	06/13/1997
T-2M	TEMPORARY EROSION CONTROL DETAILS	06/13/1997

FINAL HYDRAULIC REPORT

HYDROLOGIC DATA Date: March 1, 2001

DRAINAGE AREA: 72.6 sq. km
 CHARACTER OF TERRAIN: Hilly, forested upland, developed suburban & urban lowlands
 STREAM CHARACTERISTICS: Perennial, non-alluvial, sinuous, not braided or anabranching
 NATURE OF STREAMBEDS: Ledge with some gravel and cobble deposits

PEAK FLOW DATA

Q 2.33 =	42 cms	Q 50 =	191 cms
Q 10 =	96 cms	Q 100 =	224 cms
Q 25 =	142 cms	Q 500 =	348 cms

DATE OF FLOOD OF RECORD: Unknown
 ESTIMATED DISCHARGE: Unknown
 WATER SURFACE ELEV.: Unknown
 NATURAL STREAM VELOCITY: @ Q50 = Unknown
 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. IMMEDIATELY ABOVE SITE. X

EXISTING STRUCTURE INFORMATION

STRUCTURE TYPE: Single-span steel girder bridge
 YEAR BUILT: 1938
 CLEAR SPAN(NORMAL TO STREAM): 15.1 m
 VERTICAL CLEARANCE ABOVE STREAMBED: 4.6 m (Ave. low beam = 75.3 m)
 WATERWAY OF FULL OPENING: 85 sq. m
 DISPOSITION OF STRUCTURE: Re-using abutments in rehabilitation
 TYPE OF MATERIAL UNDER SUBSTRUCTURE: Ledge

WATER SURFACE ELEVATIONS AT:

Q2.33 =	Unknown	VELOCITY =	Unknown
Q10 =	72.8 m ³	"	Unknown
Q25 =	Unknown	"	Unknown
Q50 =	73.5 m ³	"	Unknown
Q100 =	74.0 m ³	"	Unknown

LONG TERM STREAMBED CHANGES: None noted

PROPOSED STRUCTURE

STRUCTURE TYPE: Single-span steel girder bridge

CLEAR SPAN(NORMAL TO STREAM): 15.1 m
 VERTICAL CLEARANCE ABOVE STREAMBED: 5.1 m
 WATERWAY OF FULL OPENING: 73 sq. m

WATER SURFACE ELEVATIONS AT:

Q2.33 =	Unknown	VELOCITY =	Unknown
Q10 =	72.8 m ³	"	Unknown
Q25 =	Unknown	"	Unknown
Q50 =	73.5 m ³	"	Unknown
Q100 =	74.0 m ³	"	Unknown

IS THE ROADWAY OVERTOPPED BELOW Q100: No
 FREQUENCY: > Q100
 RELIEF ELEVATION: 77.4 m
 DISCHARGE OVER ROAD @Q100: None

AVERAGE LOW ELEVATION OF SUPERSTRUCTURE: 75.8 m
 VERTICAL CLEARANCE: @ Q50 = 2.3 m

SCOUR: None, Channel bottom & Abutments on Ledge

REQUIRED CHANNEL PROTECTION: N/A

PERMIT INFORMATION

AVERAGE DAILY FLOW: 2 cms DEPTH OR ELEVATION:
 ORDINARY LOW WATER: 1 cms 0.3 m
 ORDINARY HIGH WATER: 18 cms 0.9 m

TEMPORARY BRIDGE REQUIREMENTS

STRUCTURE TYPE: N/A
 CLEAR SPAN (NORMAL TO STREAM): N/A
 VERTICAL CLEARANCE ABOVE STREAMBED: N/A
 WATERWAY AREA OF FULL OPENING: N/A

ADDITIONAL INFORMATION

* Water Surface Elevations taken from FEMA Flood Insurance Study for the Town of Brattleboro, Dated Dec. 4, 1985
 Note: A detailed hydraulic analysis was not performed due to limited survey and the fact that this is a rehabilitation of a hydraulically adequate bridge with no new adverse hydraulic conditions.

IS THE ROADWAY OVERTOPPED BELOW Q100: No
 FREQUENCY: > Q100
 RELIEF ELEVATION: 77.4 m
 DISCHARGE OVER ROAD @Q100: None

UPSTREAM STRUCTURE

TOWN: Brattleboro DISTANCE: 425 m
 HIGHWAY #: TH 438 (FAU Elm St.) STRUCTURE #: Br# 32
 CLEAR SPAN: 25.9 m CLEAR HEIGHT: 4.6 m
 YEAR BUILT: 1989 FULL WATERWAY: Unknown
 STRUCTURE TYPE: Single-span prestressed concrete box girder bridge

DOWNSTREAM STRUCTURE

TOWN: Brattleboro DISTANCE: 90 m
 HIGHWAY #: Railroad STRUCTURE #: Unknown
 CLEAR SPAN: Unknown CLEAR HEIGHT: Unknown
 YEAR BUILT: Unknown FULL WATERWAY: Unknown
 STRUCTURE TYPE: Stone and concrete arch bridge

LOAD FACTOR LOAD RATING (TONS)

LOADING LEVELS	TRUCK						
	#	MS	95Z	5 AXLE	3A. STR.	4A. STR.	SA. SEMI
INVENTORY	35	43					
POSTED	49	60	80		54	55	63
OPERATING		71	95	110	64	66	

COMMENTS: SERVICEABILITY GOVERNS

TRAFFIC DATA

YEAR	ADT	DHV	% D	% T	ADTT
1999	15260	1626	54	2	785
2018	19730	1975	54	2	960

20 year ESAL for flexible pavement: 1999 to 2019 : 7,338,000
 40 year ESAL for flexible pavement: 1999 to 2039 : 22,496,000
 Design Speed : 40 km/h

DESIGN CRITERIA

- DESIGN LIVE LOAD AASHTO: MS 22.5
- DESIGN SPAN: 19m ALONG CENTERLINE U.S. 5
- ALLOWABLE LOAD FOR SPREAD FOOTINGS ON SOIL ON LEDGE: N/A
- ALLOWABLE LOAD FOR PILING: N/A
- ESTIMATED LENGTH: N/A
- STRUCTURAL STEEL AASHTO M270/M270M GRADE: S45W
- REINFORCING STEEL GRADE: 420
- CONCRETE CLASS A (HPC-A) f'c: 30 MPa
CONCRETE CLASS B (HPC-B) f'c: 25 MPa
- SOIL UNIT WEIGHT: 22.00 Kn/m³
- DESIGN LOAD FOR SPREAD FOOTINGS ON SOIL: N/A

TRAFFIC MAINTENANCE

- IS TRAFFIC TO BE MAINTAINED? YES
 IF YES, ON EXISTING STRUCTURE? YES; (COMBINATION ON BRIDGE & DETOUR)
 OR ON TEMPORARY BRIDGE? N/A
 ONE OR TWO-WAY TRAVEL? N/A
- TRAFFIC CONTROL SIGNALS REQUIRED? NO
- ARE SIDEWALKS REQUIRED? YES, ON DOWNSTREAM SIDE OF EXISTING BRIDGE DURING PHASE ONE, UPSTREAM SIDE OF NEW BRIDGE DURING PHASE TWO.

PROJECT NAME: BRATTLEBORO
 PROJECT NUMBER: BHF 2000 (17)
 FILE NAME: I94J078StructuresI978pl.xls PLOT DATE: 01/28/2003
 PROJECT MANAGER: R. R. WHITCOMB DRAWN BY: G. ROY
 DESIGNED BY: T. SUMNER CHECKED BY: T. SUMNER
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