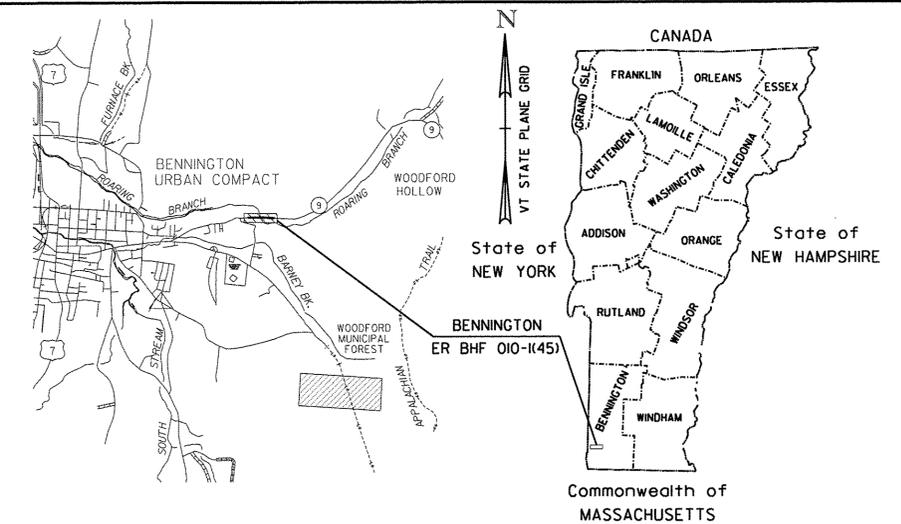


INDEX OF SHEETS
SEE SHEET 2

STATE OF VERMONT AGENCY OF TRANSPORTATION



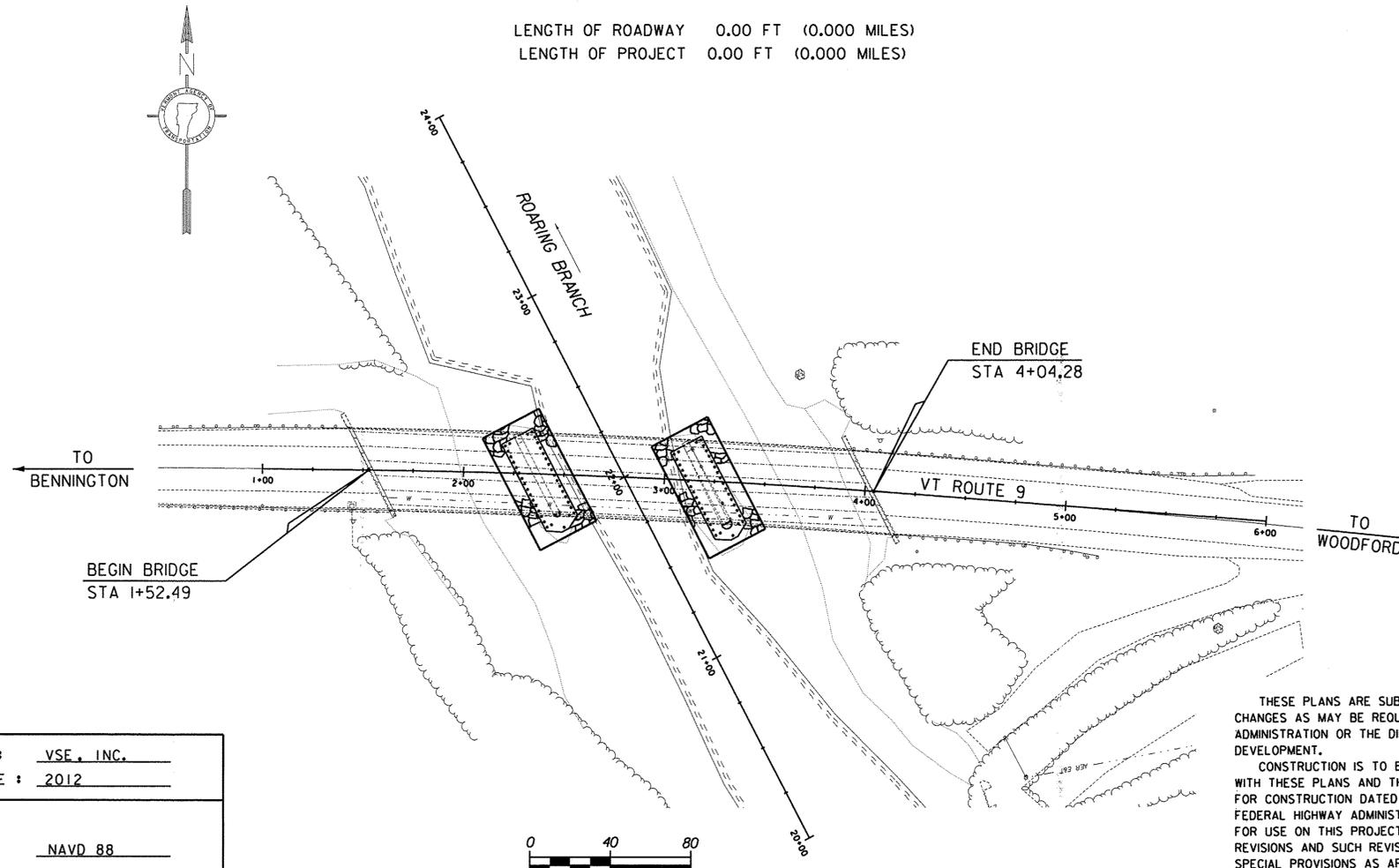
PROPOSED IMPROVEMENT BRIDGE PROJECT TOWN OF BENNINGTON COUNTY OF BENNINGTON VT. ROUTE 9 BRIDGE NO. 9



PROJECT LOCATION: LOCATED IN THE COUNTY OF BENNINGTON, TOWN OF BENNINGTON, VT. ROUTE 9 OVER ROARING BRANCH OF THE WALLOOMSAC RIVER, APPROXIMATELY 2.0 MILES EAST OF THE U.S. ROUTE 7 AND VT. ROUTE 9 INTERSECTION.

PROJECT DESCRIPTION: CONSTRUCTION OF THE RETROFIT MICROPILE FOUNDATIONS FOR BOTH PIERS OF EXISTING THREE SPAN CONTINUOUS STEEL ROLLED BEAM BRIDGE NO. 9 OVER THE ROARING BRANCH OF THE WALLOOMSAC RIVER.

LENGTH OF ROADWAY 0.00 FT (0.000 MILES)
LENGTH OF PROJECT 0.00 FT (0.000 MILES)



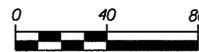
QUALITY ASSURANCE PROGRAM: LEVEL 1

CONVENTIONAL SYMBOLS

COUNTY LINE		COUNTY LINE	
TOWN LINE		TOWN LINE	
LIMITS OF ACCESS		LIMITS OF ACCESS	
POINT OF ACCESS		POINT OF ACCESS	
FENCE LINE		FENCE LINE	
STONE WALL		STONE WALL	
TRAVELED WAY		TRAVELED WAY	
GUARD RAIL		GUARD RAIL	
RAILROAD		RAILROAD	
SURVEY LINE		SURVEY LINE	
CULVERT		CULVERT	
POWER POLE		POWER POLE	
TELEPHONE POLE		TELEPHONE POLE	
TREES		TREES	
CONTROL OF ACCESS		CONTROL OF ACCESS	
PROPERTY LINE		PROPERTY LINE	
R.O.W. TAKING LINE		R.O.W. TAKING LINE	
SLOPE RIGHTS		SLOPE RIGHTS	
TOP OF CUT		TOP OF CUT	
TOE OF SLOPE		TOE OF SLOPE	

SURVEYED BY : VSE, INC.
SURVEYED DATE : 2012

DATUM
VERTICAL NAVD 88
HORIZONTAL NAD 83



PLANS PREPARED BY

[Signature] 8/31/12



III Winners Circle, PO Box 5269 • Albany, NY 12205-0269
Main: (518) 453-4500 • www.chacompanies.com

THESE PLANS ARE SUBJECT TO SUCH ENGINEERING CHANGES AS MAY BE REQUIRED BY THE FEDERAL HIGHWAY ADMINISTRATION OR THE DIRECTOR OF PROGRAM DEVELOPMENT.
CONSTRUCTION IS TO BE CARRIED ON IN ACCORDANCE WITH THESE PLANS AND THE STANDARD SPECIFICATIONS FOR CONSTRUCTION DATED 2011, AS APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION ON JULY 20, 2011 FOR USE ON THIS PROJECT, INCLUDING ALL SUBSEQUENT REVISIONS AND SUCH REVISED SPECIFICATIONS AND SPECIAL PROVISIONS AS ARE INCORPORATED IN THESE PLANS.

DIRECTOR OF PROGRAM DEVELOPMENT	APPROVED <i>Kevin A. Nausica</i> DATE <u>8/31/12</u>
PROJECT MANAGER :	JENNIFER FITCH
PROJECT NAME :	BENNINGTON
PROJECT NUMBER :	ER BHF 010-1 (45)
SHEET 1 OF	40 SHEETS

FILE NAME = H:\P\2012\2012\2012\2012\CADD\MST\IN\z\11b326.cov.dgn
DATE/TIME = 8/21/2012 10:40:56
USER = 40666

PRELIMINARY INFORMATION SHEET

INDEX OF SHEETS

PLAN SHEETS	STANDARDS LIST
1. TITLE SHEET	E-100 01-02-2004
2. PRELIMINARY INFORMATION SHEET	E-101 05-30-2003
3. TYPICAL SECTION SHEET	E-102 06-30-2003
4-5. QUANTITY SHEETS 1-2	E-106 03-01-2004
6. TIE SHEET	E-110 08-08-1995
7. RESOURCE LAYOUT SHEET	E-111 03-11-1997
8. CONSTRUCTION APPROACH SIGNING SHEET	G-1 01-03-2000
9. EROSION PREVENTION AND SEDIMENT CONTROL NOTES	G-17A 09-27-2002
10. EROSION CONTROL EXISTING CONDITION SHEET	G-17B 09-27-2002
11. EROSION CONTROL STAGE 1 PLAN SHEET	G-19 11-15-2002
12. EROSION CONTROL STAGE 2 PLAN SHEET	
13. EROSION CONTROL FINAL CONDITION SHEET	
14-15. EROSION CONTROL DETAILS SHEETS 1-2	
16. BORING INFORMATION SHEET	
17-22. BORING LOGS SHEETS 1-6	
23. PLAN AND ELEVATION STAGE 1	
24. PLAN AND ELEVATION STAGE 2	
25. PROJECT NOTES SHEET	
26. RETROFIT FOUNDATION PLAN	
27. PIER 1 RETROFIT DETAILS SHEET	
28. PIER 2 RETROFIT DETAILS SHEET	
29. CORING AND DEMOLITION DETAILS SHEET	
30. PIER NOSING DETAIL SHEET	
31. REINFORCING STEEL SCHEDULE	
32-36. CHANNEL CROSS SECTIONS SHEETS 1-5	
37. 1987 PIER 1 WIDENING PLANS	
38. 1987 PIER 2 WIDENING PLANS	
39. 1940 PIER 1 CONSTRUCTION PLANS	
40. 1940 PIER 2 CONSTRUCTION PLANS	

FINAL HYDRAULIC REPORT

HYDROLOGIC DATA Date: Aug. 21, 2012

DRAINAGE AREA : 40.2 sq. mi.
 CHARACTER OF TERRAIN : Ranges from Steep Mountainous to Flat Valley
 STREAM CHARACTERISTICS : Steep Braided Stream
 NATURE OF STREAMBED : Gravel and Small Boulders

PEAK FLOW DATA

Q 2.33 =	1,550 cfs	Q 50 =	5,750 cfs
Q 10 =	3,300 cfs	Q 100 =	7,100 cfs
Q 25 =	4,700 cfs	Q 500 =	11,300 cfs

DATE OF FLOOD OF RECORD : 8/28/2011 (Tropical Storm Irene)
 ESTIMATED DISCHARGE: 9,420 cfs
 WATER SURFACE ELEV.: Unknown

NATURAL STREAM VELOCITY : @ Q25 = 8 to 12 fps
 ICE CONDITIONS : Moderate
 DEBRIS : High
 DOES THE STREAM REACH MAXIMUM HIGHWATER ELEV. RAPIDLY? Yes
 IS ORDINARY RISE RAPID? Yes
 IS STAGE AFFECTED BY UPSTREAM OR DOWNSTREAM CONDITIONS? No
 IF YES, DESCRIBE: -

WATERSHED STORAGE: Minimal HEADWATERS: -
 UNIFORM: -
 IMMEDIATELY ABOVE SITE: -

EXISTING STRUCTURE INFORMATION

STRUCTURE TYPE: 3 Span Continuous, Composite Rolled Beam
 YEAR BUILT: 1940, Reconstructed 1989
 CLEAR SPAN(NORMAL TO STREAM): 69.7' (Span 1) 69.3' (Span 2) 68.7' (Span 3)
 VERTICAL CLEARANCE ABOVE STREAMBED: 26' Max
 WATERWAY OF FULL OPENING: 3,571 sq. ft.
 DISPOSITION OF STRUCTURE: Retain, retrofit spread foundations
 TYPE OF MATERIAL UNDER SUBSTRUCTURE: Stratified soil deposits

WATER SURFACE ELEVATIONS AT:

Q2.33 =	908.0' (FIELD VERIFIED)	VELOCITY =	4.4 fps
Q10 =	909.4'	"	5.9 fps
Q25 =	910.3'	"	6.6 fps
Q50 =	910.9'	"	7.0 fps
Q100 =	911.6'	"	7.5 fps

LONG TERM STREAMBED CHANGES: Vertically Stable, Laterally Active

IS THE ROADWAY OVERTOPPED BELOW Q100: No
 FREQUENCY: -
 RELIEF ELEVATION: 926.8
 DISCHARGE OVER ROAD @Q100: -

UPSTREAM STRUCTURE

TOWN: Woodford DISTANCE: 1.76 miles
 HIGHWAY # : VT Route 9 STRUCTURE #: 11
 CLEAR SPAN: 275' CLEAR HEIGHT: N.A.
 YEAR BUILT: 2007 FULL WATERWAY: N.A.
 STRUCTURE TYPE: 3 Span Steel Stringer

DOWNSTREAM STRUCTURE

TOWN: Bennington DISTANCE: 0.68 miles
 HIGHWAY # : VT Route 279 STRUCTURE #: 15N and 15S
 CLEAR SPAN: 475' CLEAR HEIGHT: 41 ft.
 YEAR BUILT: 2011 FULL WATERWAY: 13,420 sq. ft.
 STRUCTURE TYPE: 3 Span Curved Continuous Plate Girder

XXXX LOAD RATING (TONS)

LOADING LEVELS	TRUCK				
	H	HS	3S2	6 AXLE	3A STR. 4A STR. 5A SEM
INVENTORY					
POSTED					
OPERATING					
COMMENTS:					

TRAFFIC DATA

YEAR	ADT	DHV	% D	% T	ADTT

20 year ESAL for flexible pavement from to :
 40 year ESAL for flexible pavement from to :
 Design Speed : mph

PROPOSED STRUCTURE

STRUCTURE TYPE: Retain existing structure, retrofit existing spread footings

CLEAR SPAN(NORMAL TO STREAM): -
 VERTICAL CLEARANCE ABOVE STREAMBED: 26' Max
 WATERWAY OF FULL OPENING: 3,593 sq. ft.

WATER SURFACE ELEVATIONS AT:

Q2.33 =	908.1'	VELOCITY=	4.4 fps
Q10 =	909.4'	"	5.9 fps
Q25 =	910.3'	"	6.6 fps
Q50 =	910.9'	"	7.0 fps
Q100 =	911.6'	"	7.5 fps

IS THE ROADWAY OVERTOPPED BELOW Q100: No
 FREQUENCY: -
 RELIEF ELEVATION: 926.8'
 DISCHARGE OVER ROAD @Q100: -

AVERAGE LOW ELEVATION OF SUPERSTRUCTURE: 926.3
 VERTICAL CLEARANCE: @ Q25 = 926.3 -910.3 = 16 ft

SCOUR: @ Q500 Total Scour = 0.0 (Abutment 1), 21.6' (Pier 1), 23.1' (Pier 2), 6.4' (Abutment 2)
 REQUIRED CHANNEL PROTECTION: Riprap, Heavy Type (at Piers 1 and 2)

PERMIT INFORMATION

AVERAGE DAILY FLOW: 125 cfs DEPTH OR ELEVATION:
 ORDINARY LOW WATER: - 903.5'
 ORDINARY HIGH WATER: - 905.0'

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

- DESIGN CRITERIA**
- DESIGN LIVE LOAD AASHTO HL-93 (Impact exluded for pile loads)
 - DESIGN SPAN -
 - ALLOWABLE LOAD FOR SPREAD FOOTINGS ON SOIL ON LEDGE -
 - ALLOWABLE LOAD FOR PILING Contractor-designed
 TYPE Cased Micropiles
 ESTIMATED LENGTH 70'
 - STRUCTURAL STEEL AASHTO M270/M270 GRADE -
 - REINFORCING STEEL GRADE 60
 - CONCRETE, HIGH PERFORMANCE CLASS A f'c: -
 CONCRETE, HIGH PERFORMANCE CLASS B f'c: 3500 psi
 - DESIGN SOIL UNIT WEIGHT
 - DESIGN LOAD FOR SPREAD FOOTINGS ON SOIL

- TRAFFIC MAINTENANCE**
- IS TRAFFIC TO BE MAINTAINED? Yes
 IF YES, ON EXISTING STRUCTURE? Yes
 OR ON TEMPORARY BRIDGE? No
 ONE OR TWO-WAY TRAVEL? Two-Way
 - TRAFFIC CONTROL SIGNALS REQUIRED? No
 - ARE SIDEWALKS REQUIRED? No
 IF SO, ON WHAT SIDE? N/A

PROJECT NAME: BENNINGTON
 PROJECT NUMBER: ER BHF 010-1(45)

FILE NAME: z11b326_pi.xls PLOT DATE: 8/21/2012
 PROJECT LEADER: DEG DRAWN BY: KJK
 DESIGNED BY: BTH CHECKED BY: SAW
PRELIMINARY INFORMATION SHEET SHEET 2 OF 40



QUANTITY SHEET 1 BENNINGTON

SUMMARY OF ESTIMATED QUANTITIES						TOTALS		DESCRIPTIONS				DETAILED SUMMARY OF QUANTITIES		
	ROADWAY	EROSION CONTROL	BRIDGE	FULL C.E. ITEMS	GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND	QUANTITIES	UNIT	ITEMS	
	1				1		LS	CLEARING AND GRUBBING, INCLUDING INDIVIDUAL TREES AND STUMPS	201.10					
			150		150		CY	UNCLASSIFIED CHANNEL EXCAVATION	203.27	25.0				
	1				1		CY	TRENCH EXCAVATION OF EARTH, EXPLORATORY (N.A.B.I.)	204.22					
			45		45		CY	GRANULAR BACKFILL FOR STRUCTURES	204.30	3.5				
			240		240		CY	COFFERDAM EXCAVATION, EARTH	208.30	24.0				
			25		25		CY	COFFERDAM EXCAVATION, ROCK	208.35	EST.				
			1		1		LS	COFFERDAM (PIER 1)	208.40					
			1		1		LS	COFFERDAM (PIER 2)	208.40					
		170			170		CY	SUBBASE OF DENSE GRADED CRUSHED STONE	301.35	11.0				
			260		260		CY	CONCRETE, HIGH PERFORMANCE CLASS B	501.34					
			27,510		27,510		LB	REINFORCING STEEL, LEVEL I	507.11					
			304		304		LF	DRILLING AND GROUTING DOWELS	507.16					
			50		50		EACH	MECHANICAL BAR CONNECTOR	507.19					
			50		50		GAL	WATER REPELLENT, SILANE	514.10					
			4		4		CY	REMOVAL OF CONCRETE OR MASONRY	529.25					
	120				120		HR	POWER BROOM RENTAL, TYPE II	608.31	EST.				
		25			25		CY	STONE FILL, TYPE I	613.10	EST.				
			200		200		CY	RIPRAP, HEAVY TYPE	613.15					
	2				2		EACH	MANUFACTURED TERMINAL SECTION, FLARED	621.50					
	112.5				112.5		LF	REMOVE AND RESET GUARDRAIL	621.75					
	75				75		LF	REMOVAL AND DISPOSAL OF GUARDRAIL	621.80					
	40				40		HR	UNIFORMED TRAFFIC OFFICERS	630.10	EST.				
	240				240		HR	FLAGGERS	630.15	EST.				
				1	1		LS	FIELD OFFICE, ENGINEERS	631.10					
				1	1		LS	TESTING EQUIPMENT, CONCRETE	631.16					
				3000	3000		DL	FIELD OFFICE TELEPHONE (N.A.B.I.)	631.26					
	1				1		LS	MOBILIZATION/DEMOBILIZATION	635.11					

FILE NAME = N:\p\2012\1025\BENNINGTON\CADD\MSTIN_z11b326-quant_01.dgn
 DATE/TIME = 8/21/2012 10:56:40
 USER = 4066



QUANTITY SHEET #1

PROJECT NAME: BENNINGTON	
PROJECT NUMBER: ER BHF 010-1(45)	
FILE NAME: z11b326-quant_01.dgn	PLOT DATE: 8/21/2012
PROJECT LEADER: D.E.G.	DRAWN BY: M.E.D.
DESIGNED BY: K.J.K.	CHECKED BY: D.E.G.
DWG. NO.: z11b326quant01.1	SHEET 4 OF 40

QUANTITY SHEET 2 BENNINGTON

SUMMARY OF ESTIMATED QUANTITIES						TOTALS		DESCRIPTIONS				DETAILED SUMMARY OF QUANTITIES		
	ROADWAY	EROSION CONTROL	BRIDGE	FULL C.E. ITEMS	GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND	QUANTITIES	UNIT	ITEMS	
	1				1		LS	TRAFFIC CONTROL	641.10					
	2				2		EACH	PORTABLE CHANGEABLE MESSAGE SIGN	641.15					
		1080			1080		SY	GEOTEXTILE FOR ROADBED SEPARATOR	649.11	6.3				
			240		240		SY	GEOTEXTILE UNDER STONE FILL	649.31					
		150			150		SY	GEOTEXTILE FOR SILT FENCE	649.51	7.3				
		30			30		LB	SEED	651.15	EST.				
		250			250		LB	FERTILIZER	651.18	EST.				
		1			1		TON	AGRICULTURAL LIMESTONE	651.20	EST.				
		1			1		TON	HAY MULCH	651.25	EST.				
		40			40		CY	TOPSOIL	651.35	EST.				
		1			1		LS	EPSC PLAN	652.10					
		40			40		HR	MONITORING EPSC PLAN	652.20					
		1			1		LU	MAINTENANCE OF EPSC PLAN (N.A.B.I.)	652.30					
		100			100		SY	TEMPORARY EROSION MATTING	653.20	EST.				
		50			50		CY	TEMPORARY STONE CHECK DAM, TYPE I	653.25	2.0				
		55			55		CY	VEHICLE TRACKING PAD	653.35	6.4				
		1300			1300		LF	PROJECT DEMARCATION FENCE	653.55	13.0				
			74		74		EACH	SPECIAL PROVISION (MICROPILE)	900.620					
			2		2		EACH	SPECIAL PROVISION (MICROPILE VERIFICATION LOAD TEST)	900.620					
			350		350		LF	SPECIAL PROVISION (CORING CONCRETE)	900.640					
			1		1		LS	SPECIAL PROVISION (FURNISHING EQUIPMENT FOR INSTALLING MICROPILES)	900.645					

FILE NAME = N:\p\2012\1025\BENNINGTON\CADD\MSTIN_zlib326-quant_02.dgn
 DATE/TIME = 8/21/2012 10:56:00 AM
 USER = 4066



QUANTITY SHEET #2

PROJECT NAME: BENNINGTON
 PROJECT NUMBER: ER BHF 010-1(45)

FILE NAME: z11b326-quant_02.dgn
 PROJECT LEADER: D.E.G.
 DESIGNED BY: K.J.K.
 DWG. NO.: z11b326quant02.i

PLOT DATE: 8/21/2012
 DRAWN BY: M.E.D.
 CHECKED BY: D.E.G.
 SHEET 5 OF 40

GPS/NGS CONTROL POINTS

BENNINGTON CORS ARP

PID DK8255
 N = 140182.53
 E = 1452827.06
 ELLIP HEIGHT = 603.37

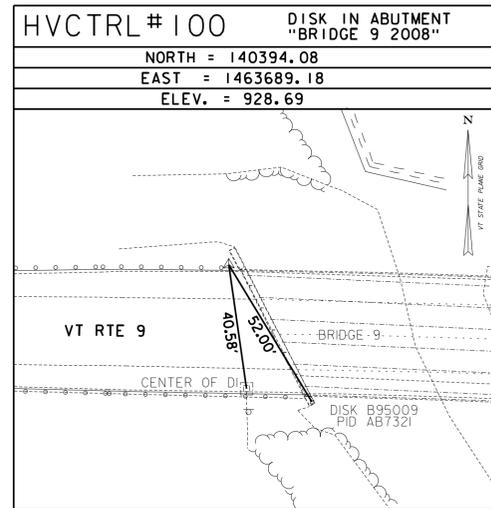
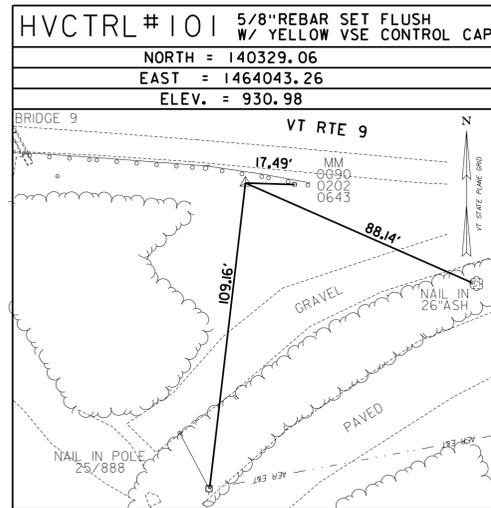
STATION IS A GPS CONTINUOUSLY OPERATING REFERENCE STATION. STATION IS THE ANTENNA REFERENCE POINT OF THE GPS ANTENNA. LOCATED AT THE BENNINGTON, VERMONT FIRE DEPARTMENT, THE MONUMENT IS ATTACHED TO A THREE STORY CONCRETE & BRICK BUILDING WITH A 10 FT CONCRETE FOUNDATION BUILT IN 1998. THE MAST IS A 1.75 INCH DIA. GALV PIPE THAT IS 108 INCHES LONG. THE MAST IS ATTACHED TO A STEEL MOUNTING FRAME WITH THREE ATTACHMENTS CONSISTING OF 3/8 INCH SS THROUGH BOLTS. THE MOUNTING FRAME IS ATTACHED TO THE BUILDING USING 6 ATTACHMENT POINTS. ALL 6 ATTACHMENTS ARE THROUGH BOLTED AND CONSIST OF 1/2 INCH SS THREADED ROD AND NUTS.

B95009

PID AB7321
 N = 140349.66
 E = 1463716.18
 ELEVATION = 929.01

TO REACH FROM THE INTERSECTION OF U.S. ROUTE 7 AND VT ROUTE 9 IN BENNINGTON, GO EAST ALONG VT ROUTE 9 FOR 2.0 MI (3.2 KM) TO THE WEST END OF THE VT ROUTE 9 BRIDGE OVER THE ROARING BRANCH AND THE MARK ON THE RIGHT IN THE TOP OF THE ABUTMENT AT THE SOUTHWEST CORNER OF THE BRIDGE. THE MARK IS 0.2 M (0.7 FT) WEST OF THE EAST FACE OF THE ABUTMENT, 0.25 M (0.82 FT) NORTH OF THE SOUTH EDGE OF THE ABUTMENT, AND 0.8 M (2.6 FT) SOUTH OF THE NORTH FACE OF THE BRIDGE CURB. THE MARK IS A SURVEY DISK STAMPED B95009.

TRAVERSE TIES



* MAIN TRAVERSE COMPLETED: JANUARY 5, 2012 BY VSE, T. SCARZELLO-PC, T. YEFCHAK

ALIGNMENT TIES

NORTH =
EAST =

NORTH =
EAST =

NORTH =
EAST =

NORTH =
EAST =

NORTH =
EAST =

DATUM
 VERTICAL NAVD 88 FT
 HORIZONTAL NAD 83(CORS) sFT
 ADJUSTMENT LSO

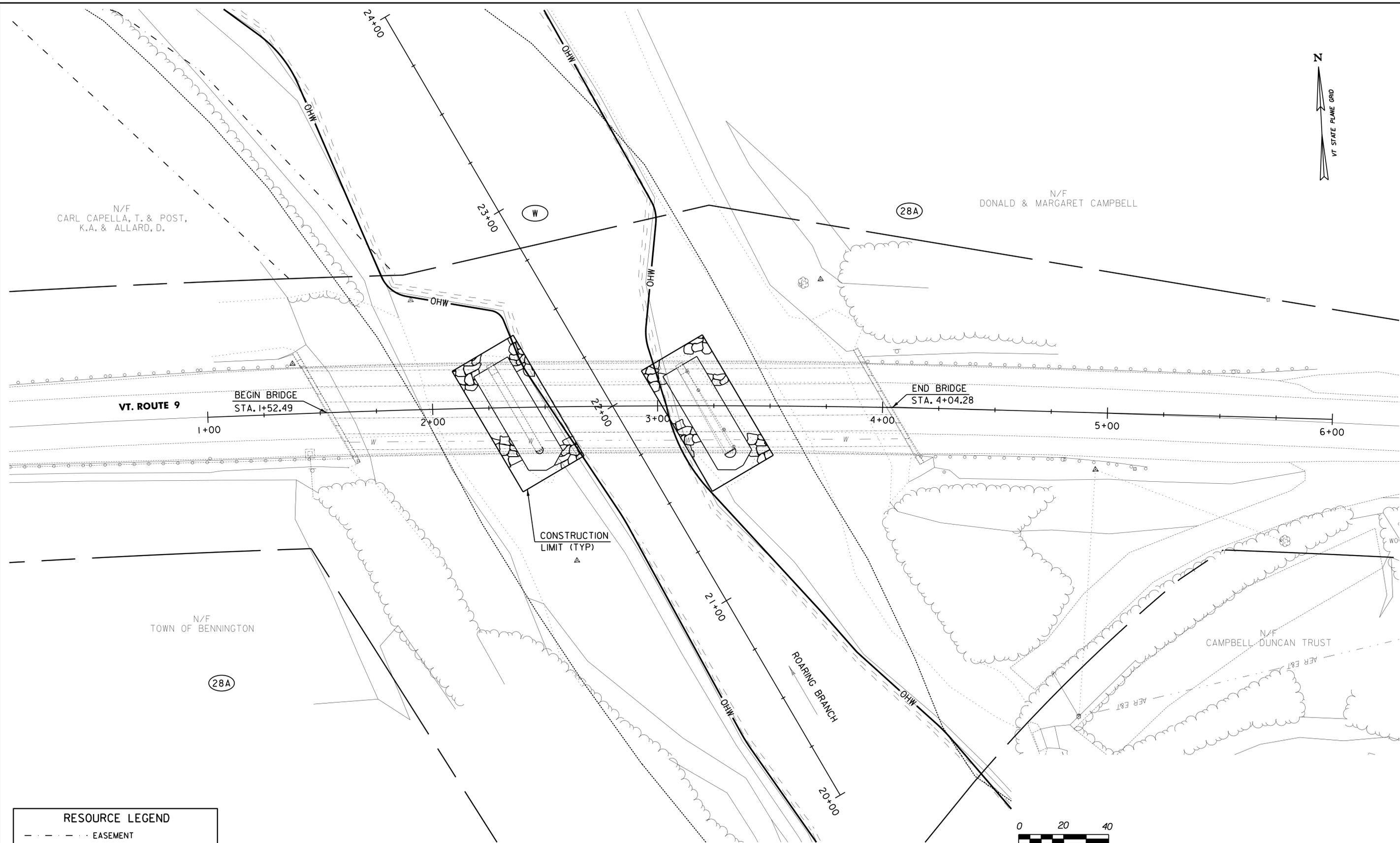


TIE SHEET

PROJECT NAME: BENNINGTON
 PROJECT NUMBER: ER BHF 010-1(45)

FILE NAME: z11b326.bl+dgn
 PROJECT LEADER: D.E.G.
 DESIGNED BY: K.J.K.
 DWG. NO.: z11b326bl+1

PLOT DATE: 8/21/2012
 DRAWN BY: M.E.D.
 CHECKED BY: D.E.G.
 SHEET 6 OF 40



RESOURCE LEGEND

- - - - - EASEMENT
- SOILS BOUNDARY
- FLOOD PLAIN
- OHW — ORDINARY HIGH WATER
- (XX) SOIL MAP UNIT SYMBOL (SEE SHEET 9 FOR DETAILS)

NOTE:
 1. COORDINATION WITH VTRANS' ENVIRONMENTAL SECTION INDICATED THAT THERE ARE NO RESOURCES AT THIS LOCATION.



RESOURCE LAYOUT SHEET

PROJECT NAME: BENNINGTON		PLOT DATE: 8/21/2012	
PROJECT NUMBER: ER BHF 010-I(45)		DRAWN BY: M.E.D.	
FILE NAME: z11b326_r1p.dgn	DESIGNED BY: K.J.K.	CHECKED BY: D.E.G.	
DWG. NO.: z11b326r1p.1		SHEET 7 OF 40	

FILE NAME = N:\p\2012\er\er_bhf_010\cadd\mstn_z11b326_r1p.dgn
 DATE/TIME = 8/21/2012 10:56:56
 USER = 4066

EPSC PLAN NARRATIVE

1.1 PROJECT DESCRIPTION

THIS PROJECT INVOLVES THE RETROFITTING OF THE VERMONT ROUTE 9 BRIDGE 9 PIER FOUNDATIONS WITH MICROPILES IN THE TOWN OF BENNINGTON. THIS PROJECT DOES NOT INCLUDE ANY BRIDGE OR ROADWAY PAVEMENT REHABILITATION. THIS PROJECT WILL INVOLVE THE CONSTRUCTION OF TWO TEMPORARY ACCESS ROADS FROM VERMONT ROUTE 9 TO EITHER BRIDGE PIER.

NOTE: AREA OF DISTURBANCE INCLUDES LIMITS OF EARTH DISTURBANCE WITHIN THE PROJECT AREA, AS WELL AS WASTE, BORROW AND STAGING AREAS, AND OTHER EARTH DISTURBING ACTIVITIES WITHIN OR DIRECTLY ADJACENT TO THE PROJECT LIMITS AS SHOWN ON THE ATTACHED EPSC PLAN.

TOTAL AREA OF DISTURBANCE AS SHOWN ON THE ATTACHED EPSC PLANS (SHEETS II TO I3) IS APPROXIMATELY 0.70 ACRES.

IT IS ANTICIPATED THAT THIS PROJECT WILL LAST ONE CONSTRUCTION SEASON.

1.2 SITE INVENTORY

1.2.1 TOPOGRAPHY

THE TOPOGRAPHY OF THE PROJECT AREA CONSISTS PRIMARILY OF LEVEL TERRAIN AND THE BRIDGE IS SITUATED OVER THE ROARING BRANCH OF THE WALLOOMSAC RIVER. THE GREEN MOUNTAIN NATIONAL FOREST IS LOCATED EAST OF THE PROJECT AREA.

1.2.2 DRAINAGE, WATERWAYS, BODIES OF WATER, AND PROXIMITY TO NATURAL OR MAN-MADE WATER FEATURES.

THE PROJECT AREA IS LOCATED ON THE ROARING BRANCH OF THE WALLOOMSAC RIVER. THE ROARING BRANCH IS A PERENNIAL RELATIVELY PERMANENT WATER THAT FLOWS NORTHWEST IN THE VICINITY OF THE PROJECT. THE STREAM BED APPEARS TO CONSIST OF SOME COBBLE, BOULDERS, SILT AND SAND. THE EXISTING DRAINAGE PATTERNS WITHIN THE ROADWAY AND ADJACENT ROADWAY AREAS FLOW OVERLAND INTO THE RIVER. THE PROPOSED PROJECT WILL MAINTAIN THE SAME GENERAL DRAINAGE PATTERNS ASSOCIATED WITH THE EXISTING AREA.

1.2.3 VEGETATION

THE VEGETATION IN THE PROJECT AREA PRIMARILY CONSISTS OF UPLAND MEADOW AREAS AND UPLAND FOREST. IMPACTS TO THE EXISTING VEGETATION WILL BE LIMITED TO THAT WHICH IS DIRECTLY AFFECTED BY THE CONSTRUCTION OF THE MICROPILE RETROFIT AND/OR THE CONTRACTOR ACCESS REQUIRED TO COMPLETE THOSE MODIFICATIONS. UPON PROJECT COMPLETION, THE BANKS WILL BE ARMORED WITH STONE FILL AS NECESSARY AND DISTURBED VEGETATION WILL BE REESTABLISHED WITH STANDARD SEED AND MULCH PRACTICES.

1.2.4 SOILS

ALL SOIL DATA CAME FROM THE U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE FOR THE COUNTY OF BENNINGTON, VERMONT. SEE THE BELOW TABLE FOR SOIL TYPES LOCATED WITHIN THE PROJECT AREA.

MAP UNIT	DESCRIPTION	SLOPES	K-VALUE
28A	UDIFLUVENTS, LOAMY- SKELETAL	3 TO 8%	0.24
W	WATER		

NOTE: K-VALUES GENERALLY INDICATE THE FOLLOWING:
 0.0-0.23 = LOW EROSION POTENTIAL
 0.24-0.36 = MODERATE EROSION POTENTIAL
 0.37 AND HIGHER = HIGH EROSION POTENTIAL

1.2.5 SENSITIVE RESOURCE AREAS

CRITICAL HABITATS: NO
 HISTORICAL OR ARCHEOLOGICAL AREAS: NO
 PRIME AGRICULTURAL LAND: NO
 THREATENED AND ENDANGERED SPECIES: NO
 WATER RESOURCE: ROARING BRANCH OF THE WALLOOMSAC RIVER
 WETLANDS: NO

1.3 RISK EVALUATION

THIS PROJECT DOES NOT FALL UNDER THE JURISDICTION OF GENERAL PERMIT 3-9020 FOR STORM WATER RUNOFF FROM CONSTRUCTION SITES. SHOULD CHANGES PRIOR TO OR DURING CONSTRUCTION RESULT IN ONE OR MORE ACRES OF EARTH DISTURBANCE OR SHOULD THE PROJECT BECOME PART OF A LARGER PLAN OF DEVELOPMENT, THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY ADDITIONAL PERMITTING.

1.4 EROSION PREVENTION AND SEDIMENT CONTROL

THE EROSION CONTROL PLANS ARE MEANT AS A GUIDELINE FOR PREVENTING EROSION AND CONTROLLING SEDIMENT TRANSPORT. THE PRINCIPLES OUTLINED IN THIS NARRATIVE CONSIST OF APPLYING MEASURES THROUGHOUT CONSTRUCTION OF THE PROJECT IN ORDER TO MINIMIZE SEDIMENT TRANSPORT TO THE RECEIVING WATERS. THE MEASURES INCLUDE STABILIZATION AND STRUCTURAL PRACTICES, STORM WATER CONTROLS AND OTHER POLLUTION PREVENTION PRACTICES. THEY HAVE BEEN PROPOSED BY THE DESIGNER AS A BASIS FOR PROTECTING RESOURCES AND WILL NEED TO BE BUILT UPON BASED ON THE SPECIFIC MEANS AND METHODS OF THE CONTRACTOR. REFER TO THE LOW RISK SITE HANDBOOK AND APPROPRIATE DETAIL SHEETS FOR SPECIFIC GUIDANCE AND CONSTRUCTION DETAILING.

ALL MEASURES SHALL BE REGULARLY MAINTAINED AND SHALL BE CHECKED FOR SEDIMENT BUILD-UP. SEDIMENT SHALL BE DISPOSED OF AT AN APPROVED SITE WHERE IT WILL NOT BE SUBJECT TO EROSION.

1.4.1 MARK SITE BOUNDARIES

SITE BOUNDARIES AND AREAS CONSTRUCTION EQUIPMENT CAN ACCESS SHALL BE DELINEATED.

PROJECT DEMARCATION FENCING (PDF) SHALL BE USED TO PHYSICALLY MARK SITE BOUNDARIES.

1.4.2 LIMIT DISTURBANCE AREA

PREVENTING INITIAL SOIL EROSION BY MINIMIZING THE EXPOSED AREA IS MUCH MORE EFFECTIVE THAN TREATING ERODED SEDIMENT. EARTH DISTURBANCE CAN BE MINIMIZED THROUGH CONSTRUCTION PHASING BY ONLY OPENING UP EARTH AS NECESSARY. THIS CAN LIMIT THE AREA THAT WILL BE DISTURBED AND EXPOSED TO EROSION. EMPLOY TEMPORARY CONSTRUCTION STABILIZATION PRACTICES IN INCREMENTAL STAGES AS PHASES CHANGE. FOR PROJECTS WHICH FALL UNDER THE CONSTRUCTION GENERAL PERMIT, ONLY THE ACREAGE LISTED ON THE PERMIT AUTHORIZATION MAY BE EXPOSED AT ANY GIVEN TIME.

MAINTAINING VEGETATED BUFFERS ALONG STREAM BANKS, WETLANDS OR OTHER SENSITIVE AREAS IS A CRUCIAL EROSION AND SEDIMENT CONTROL MEASURE THAT SHOULD BE ESTABLISHED WHEREVER POSSIBLE.

1.4.3 SITE ENTRANCE/EXIT STABILIZATION

TRACKING OF SEDIMENT ONTO PUBLIC HIGHWAYS SHALL BE MINIMIZED TO REDUCE THE POTENTIAL FOR RUNOFF ENTERING RECEIVING WATERS. INSTALLATION SHALL COINCIDE WITH THE CONTRACTOR'S PROGRESS SCHEDULE.

STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED AS PROPOSED ON THE EPSC PLAN AND ANYWHERE EQUIPMENT WILL BE GOING FROM AREAS OF EXPOSED SOILS TO PAVED SURFACES.

1.4.4 INSTALL SEDIMENT BARRIERS

SEDIMENT BARRIERS SHALL BE UTILIZED TO INTERCEPT RUNOFF AND ALLOW SUSPENDED SEDIMENT TO SETTLE OUT. THEY SHALL BE INSTALLED PRIOR TO ANY UP SLOPE WORK.

SILT FENCE WILL BE INSTALLED AS PROPOSED ON THE EPSC PLAN.

1.4.5 DIVERT UPLAND RUNOFF

DIVERSIONARY MEASURES SHALL BE USED TO INTERCEPT RUNOFF FROM ABOVE THE CONSTRUCTION AND DIRECT IT AROUND THE DISTURBED AREA SO THAT CLEAN WATER DOES NOT BECOME MUDDIED WHILE TRAVELING OVER EXPOSED SOILS ON THE CONSTRUCTION SITE.

THE PROJECT AREA IS RELATIVELY FLAT. THEREFORE IT IS NOT ANTICIPATED THAT DIVERSION MEASURES WILL BE NECESSARY.

1.4.6 SLOW DOWN CHANNELIZED RUNOFF

CHECK STRUCTURES SHALL BE UTILIZED TO REDUCE THE VELOCITY, AND THUS THE EROSION POTENTIAL, OF CONCENTRATED FLOW IN CHANNELS.

CHECK DAMS SHALL BE UTILIZED AS PROPOSED ON THE EPSC PLANS.

1.4.7 CONSTRUCT PERMANENT CONTROLS

NO PERMANENT STORMWATER TREATMENT DEVICES ARE PROPOSED.

1.4.8 STABILIZE EXPOSED SOILS DURING CONSTRUCTION

ALL AREAS OF DISTURBANCE MUST HAVE TEMPORARY STABILIZATION IN PLACE WITHIN 48 HOURS OF DISTURBANCE.

SURFACE ROUGHENING OF ALL EXPOSED SLOPES, COMBINED WITH TEMPORARY MULCHING, SHALL BE UTILIZED ON A REGULAR BASIS. BIODEGRADABLE EROSION CONTROL MATTING OR AN EQUIVALENT SHALL BE USED TO STABILIZE ALL SLOPES STEEPER THAN 1:3.

THE FORECAST OF RAINFALL EVENTS SHALL TRIGGER IMMEDIATE PROTECTION OF EXPOSED SOILS.

1.4.9 WINTER STABILIZATION

VARIOUS MEASURES SPECIFIC TO WINTER MAY BE NECESSARY SHOULD THE PROJECT EXTEND INTO WINTER (OCTOBER 15 THROUGH APRIL 15). REFER TO THE LOW RISK SITE HANDBOOK FOR GUIDANCE.

1.4.10 STABILIZE SOIL AT FINAL GRADE

EXPOSED SOIL MUST BE STABILIZED WITHIN 48 HOURS OF REACHING FINAL GRADE.

SEED, MULCH, FERTILIZER AND LIME SHALL BE USED TO ESTABLISH PERMANENT VEGETATION. FOR SLOPES STEEPER THAN 1:3, BIODEGRADABLE EROSION CONTROL MATTING OR AN EQUIVALENT SHALL BE USED INSTEAD OF MULCH.

1.4.11 DE-WATERING ACTIVITIES

DISCHARGE FROM DEWATERING ACTIVITIES THAT FLOWS OFF OF THE CONSTRUCTION SITE MUST NOT CAUSE OR CONTRIBUTE TO A VIOLATION OF THE VERMONT WATER QUALITY STANDARDS.

TREATMENT OF DEWATERING COFFERDAM IS ANTICIPATED. THE SPECIFIC MEANS FOR TREATMENT OF DISCHARGE SHALL BE PROVIDED BY THE CONTRACTOR.

1.4.12 INSPECT YOUR SITE

INSPECT THE PROJECT SITE BASED ON SPECIAL PROVISION REQUIREMENTS OR CONSTRUCTION GENERAL PERMIT AUTHORIZATION STIPULATIONS.

1.5 SEQUENCE AND STAGING

THIS SECTION WILL BE DEVELOPED BY THE CONTRACTOR USING THE GUIDANCE OUTLINED IN THE VTRANS EPSC PLAN CONTRACTOR CHECKLIST.

1.5.1 CONSTRUCTION SEQUENCE

1.5.2 OFF-SITE ACTIVITIES

IN ADDITION TO THE CONTRACTOR CHECKLIST ANY ACTIVITIES OUTSIDE THE CONSTRUCTION LIMITS SHALL FOLLOW SUBSECTIONS 105.25- 105.29 OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION.

1.5.3 UPDATES

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 DATE/TIME = 9/6/2012 4:06:56
 USER =



EROSION PREVENTION AND SEDIMENT CONTROL NOTES	PROJECT NAME: BENNINGTON	PLOT DATE: 9/6/2012
	PROJECT NUMBER: ER BHF 010-1(45)	DRAWN BY: M.E.D.
	FILE NAME: z11b326.epn.dgn	CHECKED BY: D.E.G.
	PROJECT LEADER: D.E.G. DESIGNED BY: B.T.H. DWG. NO.: z11b326epn.i	SHEET 9 OF 40

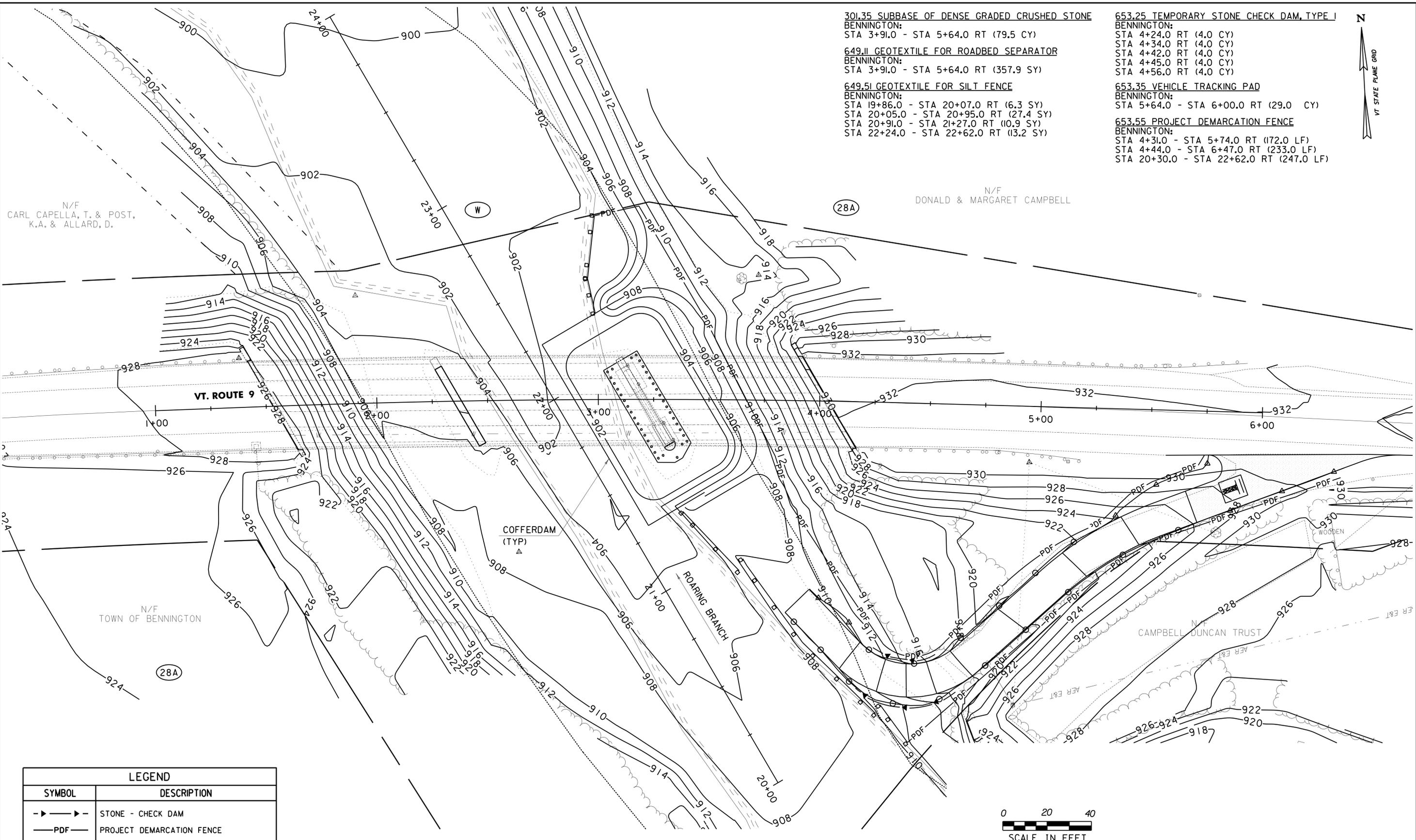


RESOURCE LEGEND	
	SOILS BOUNDARY
	FLOOD PLAIN
	SOIL MAP UNIT SYMBOL (SEE SHEET 9 FOR DETAILS)



EROSION CONTROL EXISTING CONDITION SHEET	PROJECT NAME: BENNINGTON	PLOT DATE: 8/21/2012
	PROJECT NUMBER: ER BHF 010-1(45)	DRAWN BY: M.E.D.
	FILE NAME: z11b326.ecp.dgn	CHECKED BY: D.E.G.
	PROJECT LEADER: D.E.G.	SHEET 10 OF 40
	DESIGNED BY: B.T.H.	
	DWG. NO.: z11b326ec.1	

FILE NAME = N:\p\2012\er\11b326\11b326.dgn
 DATE/TIME = 8/21/2012 10:56:00
 USER = 4066



301.35 SUBBASE OF DENSE GRADED CRUSHED STONE
 BENNINGTON:
 STA 3+91.0 - STA 5+64.0 RT (79.5 CY)

649.11 GEOTEXTILE FOR ROADBED SEPARATOR
 BENNINGTON:
 STA 3+91.0 - STA 5+64.0 RT (357.9 SY)

649.51 GEOTEXTILE FOR SILT FENCE
 BENNINGTON:
 STA 19+86.0 - STA 20+07.0 RT (6.3 SY)
 STA 20+05.0 - STA 20+95.0 RT (27.4 SY)
 STA 20+91.0 - STA 21+27.0 RT (10.9 SY)
 STA 22+24.0 - STA 22+62.0 RT (13.2 SY)

653.25 TEMPORARY STONE CHECK DAM, TYPE I
 BENNINGTON:
 STA 4+24.0 RT (4.0 CY)
 STA 4+34.0 RT (4.0 CY)
 STA 4+42.0 RT (4.0 CY)
 STA 4+45.0 RT (4.0 CY)
 STA 4+56.0 RT (4.0 CY)

653.35 VEHICLE TRACKING PAD
 BENNINGTON:
 STA 5+64.0 - STA 6+00.0 RT (29.0 CY)

653.55 PROJECT DEMARCATION FENCE
 BENNINGTON:
 STA 4+31.0 - STA 5+74.0 RT (172.0 LF)
 STA 4+44.0 - STA 6+47.0 RT (233.0 LF)
 STA 20+30.0 - STA 22+62.0 RT (247.0 LF)

N/F
 CARL CAPELLA, T. & POST,
 K.A. & ALLARD, D.

N/F
 DONALD & MARGARET CAMPBELL

N/F
 TOWN OF BENNINGTON

CAMPBELL DUNCAN TRUST

LEGEND	
SYMBOL	DESCRIPTION
	STONE - CHECK DAM
	PROJECT DEMARCATION FENCE
	COFFERDAM
	SILT FENCE
	STABILIZED CONSTRUCTION ENTRANCE



**EROSION CONTROL
 STAGE 1
 PLAN SHEET**

PROJECT NAME: BENNINGTON
 PROJECT NUMBER: ER BHF 010-1(45)

FILE NAME: z11b326_ercp_stgl.dgn
 PROJECT LEADER: D.E.G.
 DESIGNED BY: B.T.H.
 DWG. NO.: z11b326ecl.1

PLOT DATE: 8/21/2012
 DRAWN BY: M.E.D.
 CHECKED BY: D.E.G.
 SHEET II OF 40



FILE NAME: N:\p\2012\er\11b326\11b326_ercp_stgl.dgn
 DATE/TIME: 8/21/2012 10:45:00
 USER: 4066



301.35 SUBBASE OF DENSE GRADED CRUSHED STONE
 BENNINGTON:
 APPROACH - STA 2+63.0 RT (79.5 CY)

621.50 MANUFACTURED TERMINAL END SECTION, FLARED
 BENNINGTON:
 APPROACH RT (2 EACH)

621.75 REMOVE AND RESET GUARDRAIL
 BENNINGTON:
 APPROACH RT (112.5 LF)

621.80 REMOVAL AND DISPOSAL OF GUARDRAIL
 BENNINGTON:
 APPROACH RT (37.5 LF)
 APPROACH RT (37.5 LF)
 (SEE NOTE 2)

649.11 GEOTEXTILE FOR ROADBED SEPARATOR
 BENNINGTON:
 APPROACH - STA 2+63.0 RT (357.9 SY)

653.25 TEMPORARY STONE CHECK DAM, TYPE I
 BENNINGTON:
 STA 1+91.0 RT (4.0 CY)
 STA 2+05.0 RT (4.0 CY)
 STA 2+06.0 RT (4.0 CY)
 STA 2+14.0 RT (4.0 CY)
 STA 2+21.0 RT (4.0 CY)
 STA 2+27.0 RT (4.0 CY)
 STA 2+34.0 RT (4.0 CY)

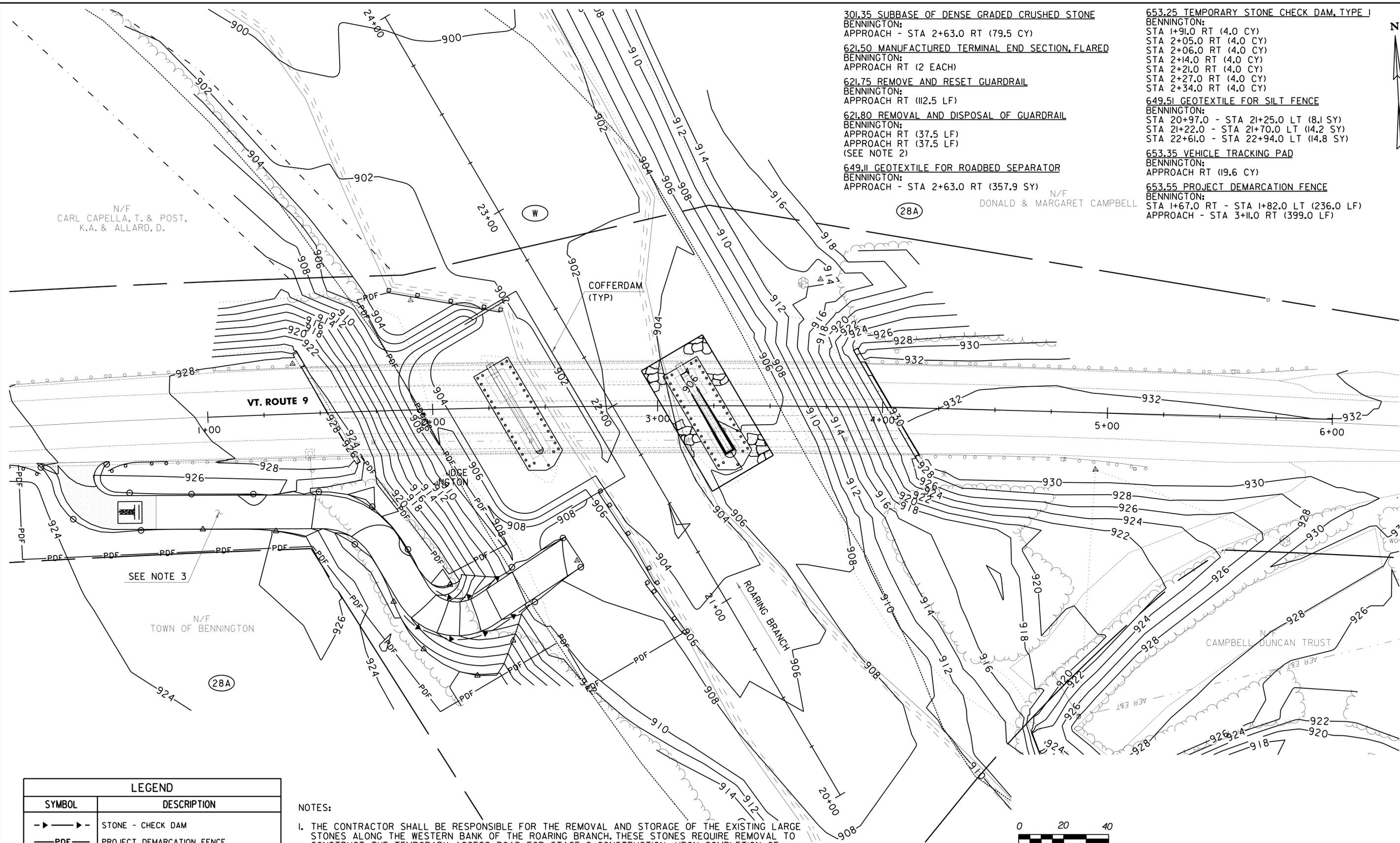
649.51 GEOTEXTILE FOR SILT FENCE
 BENNINGTON:
 STA 20+97.0 - STA 21+25.0 LT (8.1 SY)
 STA 21+22.0 - STA 21+70.0 LT (14.2 SY)
 STA 22+61.0 - STA 22+94.0 LT (14.8 SY)

653.35 VEHICLE TRACKING PAD
 BENNINGTON:
 APPROACH RT (19.6 CY)

653.55 PROJECT DEMARCATION FENCE
 BENNINGTON:
 STA 1+67.0 RT - STA 1+82.0 LT (236.0 LF)
 APPROACH - STA 3+11.0 RT (399.0 LF)

N/F
 CARL CAPELLA, T. & POST,
 K.A. & ALLARD, D.

N/F
 DONALD & MARGARET CAMPBELL



SEE NOTE 3

N/F
 TOWN OF BENNINGTON

N/F
 CAMPBELL DUNCAN TRUST

LEGEND	
SYMBOL	DESCRIPTION
	STONE - CHECK DAM
	PROJECT DEMARCATION FENCE
	COFFERDAM
	SILT FENCE
	STABILIZED CONSTRUCTION ENTRANCE

NOTES:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL AND STORAGE OF THE EXISTING LARGE STONES ALONG THE WESTERN BANK OF THE ROARING BRANCH. THESE STONES REQUIRE REMOVAL TO CONSTRUCT THE TEMPORARY ACCESS ROAD FOR STAGE 2 CONSTRUCTION. UPON COMPLETION OF STAGE 2 CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING THE EXISTING LARGE STONES IN THEIR ORIGINAL LOCATION. THE COST OF THIS WORK SHALL BE INCIDENTAL TO OTHER CONTRACT ITEMS.
2. WHEN THE CONSTRUCTION ACCESS ROAD IS REMOVED, THE CONTRACTOR SHALL REMOVE AND SALVAGE THE TWO MANUFACTURED TERMINAL SECTIONS IN ACCORDANCE WITH SUBSECTION 621.3 OF THE 2011 STANDARD SPECIFICATIONS FOR CONSTRUCTION BOOK. THE TERMINAL SECTIONS SHALL BECOME THE PROPERTY OF VTRANS MAINTENANCE DISTRICT 1.
3. CONTRACTOR SHALL PLACE TOPSOIL AND SEED ONCE TEMPORARY ACCESS ROAD IS REMOVED.



**EROSION CONTROL
 STAGE 2
 PLAN SHEET**

PROJECT NAME: BENNINGTON
 PROJECT NUMBER: ER BHF 010-1(45)

FILE NAME: z11b326.ercp_stg2.dgn
 PROJECT LEADER: D.E.G.
 DESIGNED BY: B.T.H.
 DWG. NO.: z11b326ec2.i

PLOT DATE: 9/6/2012
 DRAWN BY: M.E.D.
 CHECKED BY: D.E.G.
 SHEET 12 OF 40



FILE NAME = N:\p\projects\NANY\K2\23770\CADD\MSTIN_z11b326.ercp_stg2.dgn
 DATE/TIME = 9/6/2012 10:46:42
 USER = 4066



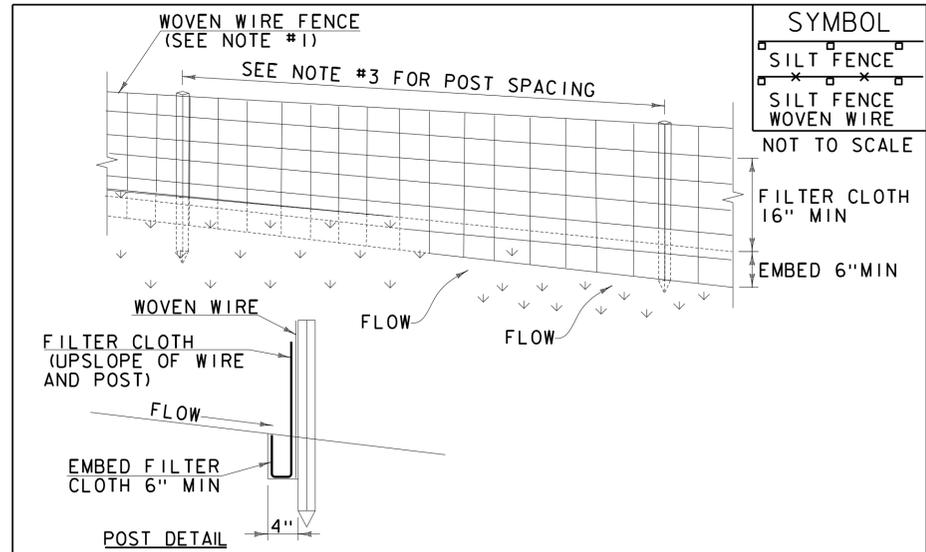
LEGEND	
SYMBOL	DESCRIPTION
	PROPOSED RIPRAP
	AREA OF STONE PLACMENT (SEE NOTE 1)

NOTE:
 1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL AND STORAGE OF THE EXISTING LARGE STONES ALONG THE WESTERN BANK OF THE ROARING BRANCH. THESE STONES REQUIRE REMOVAL TO CONSTRUCT THE TEMPORARY ACCESS ROAD FOR STAGE 2 CONSTRUCTION. UPON COMPLETION OF STAGE 2 CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING THE EXISTING LARGE STONES IN THEIR ORIGINAL LOCATION. THE COST OF THIS WORK SHALL BE INCIDENTAL TO OTHER CONTRACT ITEMS.



EROSION CONTROL FINAL CONDITION SHEET	PROJECT NAME: BENNINGTON	PLOT DATE: 8/21/2012
	PROJECT NUMBER: ER BHF 010-1(45)	DRAWN BY: M.E.D.
	FILE NAME: z11b326.fcp.dgn	CHECKED BY: D.E.G.
	PROJECT LEADER: D.E.G. DESIGNED BY: B.T.H. DWG. NO.: z11b326fc.1	SHEET 13 OF 40

FILE NAME = N:\p\2012\er\er_bhf010\cadd\mstn\z11b326.fcp.dgn
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 USER = 4066



SYMBOL	
[Symbol]	SILT FENCE
[Symbol]	SILT FENCE WOVEN WIRE

CONSTRUCTION SPECIFICATIONS

1. WOVEN WIRE REINFORCED FENCE IS REQUIRED WITHIN 100' UPSLOPE OF RECEIVING WATERS WHEN THE PROJECT FALLS UNDER A CONSTRUCTION STORMWATER PERMIT. WOVEN WIRE SHALL BE A MIN. 14 GAUGE WITH A 6" MAX. MESH OPENING.
2. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAF1100X, STABILINKA T140N OR APPROVED EQUIVALENT.
3. POST SPACING FOR WIRE-BACKED FENCE SHALL BE 10' MAXIMUM. FOR FILTER-CLOTH FENCE, WHEN ELONGATION IS >50%, POST SPACING SHALL NOT EXCEED 4' AND WHEN ELONGATION IS <50%, POST SPACING SHALL NOT EXCEED 6'.
4. WOVEN WIRE FENCE IS TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES. FILTER CLOTH IS TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.
5. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY 6" AND FOLDED.
6. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN SEDIMENT REACHES HALF OF FABRIC HEIGHT.

ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC
ORIGINALLY DEVELOPED BY USDA-NRCS
VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SILT FENCE

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- " FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 649 AND AS SHOWN IN THE PLANS FOR GEOTEXTILE FOR SILT FENCE (PAY ITEM 649.51) OR GEOTEXTILE FOR SILT FENCE, WOVEN WIRE REINFORCED (PAY ITEM 649.515).

REVISIONS	
MARCH 21, 2008	WHF
DECEMBER 11, 2008	WHF
JANUARY 13, 2009	WHF

VAOT RURAL AREA MIX					
% WEIGHT	LBS/AC		NAME	GERM %	PURITY %
	BROADCAST	HYDROSEED			
37.5%	22.5	45	CREeping RED FESCUE	85%	98%
37.5%	22.5	45	TALL FESCUE	90%	95%
5.0%	3	6	RED TOP	90%	95%
15.0%	9	18	BIRDSFOOT TREFOIL	85%	98%
5.0%	3	6	ANNUAL RYE GRASS	85%	95%
100%	60	120			

VAOT URBAN AREA MIX					
% WEIGHT	LBS/AC		NAME	GERM %	PURITY %
	BROADCAST	HYDROSEED			
42.5%	34	68	CREeping RED FESCUE	85%	98%
10.0%	8	16	PERENNIAL RYE GRASS	90%	95%
42.5%	34	68	KENTUCKY BLUE GRASS	85%	85%
5.0%	4	8	ANNUAL RYE GRASS	85%	95%
100%	80	160			

SOIL AMENDMENT GUIDANCE			
FERTILIZER		LIME	
BROADCAST	HYDROSEED	BROADCAST	HYDROSEED
10-20-10	FOLLOW	PELLETIZED	FOLLOW
500 LBS/AC	MANUFACTURER	2 TONS/AC	MANUFACTURER

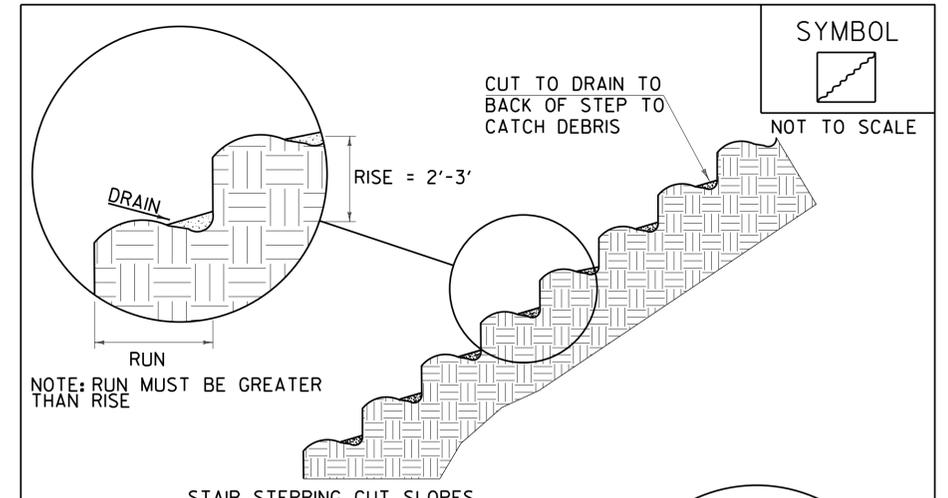
CONSTRUCTION GUIDANCE

1. RURAL SEED MIX: USE AS INDICATED IN THE PLANS AND/OR FOR ALL ESTABLISHED UPLAND (NON WETLAND) AREAS DISTURBED BY THE CONTRACTOR.
2. URBAN SEED MIX: USE AS INDICATED IN THE PLANS AND/OR FOR ALL ESTABLISHED LAWN AREAS DISTURBED BY THE CONTRACTOR.
3. ALL SEED MIXTURES: SHALL NOT HAVE A WEED CONTENT EXCEEDING 0.40% BY WEIGHT AND SHALL BE FREE OF ALL NOXIOUS SEED.
4. FERTILIZER AND LIMESTONE: SHALL FOLLOW RATES SHOWN ON PLAN OR AS DIRECTED BY THE ENGINEER
5. HAY MULCH: TO BE PLACED ON EARTH SLOPES AT THE RATE OF 2 TONS/ACRE, ACHIEVE 90% GROUND COVER OR AS DIRECTED BY THE ENGINEER.
6. TOPSOIL: TO BE USED WITH SEED AS INDICATED ON THE PLANS, OR AS DIRECTED BY THE ENGINEER.
7. HYDROSEEDING: ALTHOUGH GUIDANCE IS GIVEN ABOVE THE SITE CONDITIONS AND THE TYPE OF HYDROSEED WILL ULTIMATELY DICTATE THE AMOUNTS AND TYPES OF SOIL AMENDMENTS TO BE APPLIED
8. TURF ESTABLISHMENT: PLACING SEED, FERTILIZER, LIME AND MULCH PRIOR TO SEPTEMBER 15 AND AFTER APRIL 15 CAN BETTER ENSURE A VIGOROUS GROWTH OF GRASS.

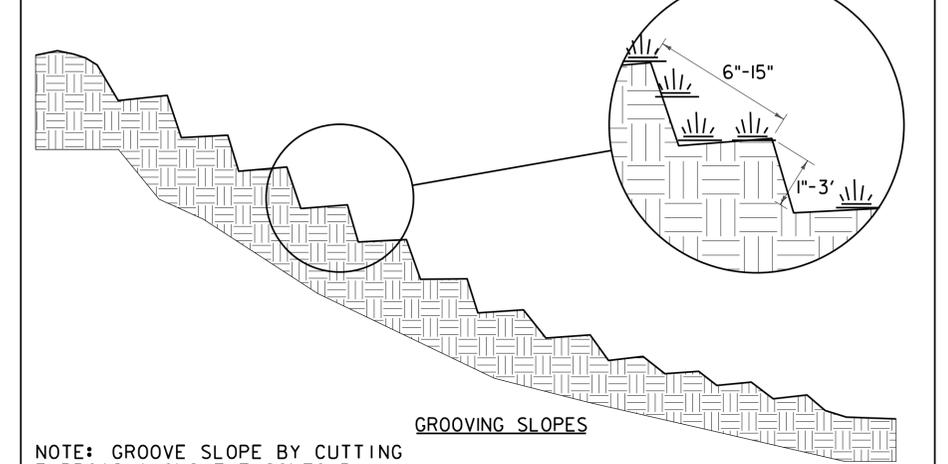
ADAPTED FROM VTRANS TECHNICAL LANDSCAPE MANUAL FOR ROADWAYS AND TRANSPORTATION FACILITIES

TURF ESTABLISHMENT

REVISIONS	
JUNE 23, 2009	WHF
JANUARY 15, 2010	WHF
FEBRUARY 16, 2011	WHF



SYMBOL	
[Symbol]	NOT TO SCALE



NOTE: GROOVE SLOPE BY CUTTING FURROWS ALONG THE CONTOUR. IRREGULARITIES IN THE SOIL SURFACE CATCH RAINWATER AND RETAIN LIME, FERTILIZER AND SEED.

ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC
ORIGINALLY DEVELOPED BY USDA-NRCS
VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SURFACE ROUGHENING

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- " FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE CONTRACT

REVISIONS	
APRIL 1, 2008	WHF
JANUARY 13, 2009	WHF

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DATE/TIME = 8/21/2012 10:56:00 AM
USER = 4066



NOT TO SCALE

EROSION CONTROL DETAILS SHEET #1

PROJECT NAME: BENNINGTON	PLOT DATE: 8/21/2012
PROJECT NUMBER: ER BHF 010-1(45)	DRAWN BY: M.E.D.
FILE NAME: z11b326.ecd_01.dgn	CHECKED BY: D.E.G.
PROJECT LEADER: D.E.G.	SHEET 14 OF 40
DESIGNED BY: B.T.H.	
DWG. NO.: z11b326ecd.1	

SOIL CLASSIFICATION

AASHTO

A1	GRAVEL AND SAND
A2	SILTY OR CLAYEY GRAVEL AND SAND
A3	FINE SAND
A4	SILTY SOIL - LOW COMPRESSIBILITY
A5	SILTY SOIL - HIGHLY COMPRESSIBLE
A6	CLAYEY SOIL - LOW COMPRESSIBILITY
A7	CLAYEY SOIL - HIGHLY COMPRESSIBLE

ROCK QUALITY DESIGNATION

R.O.D. (%)	ROCK DESCRIPTION
<25	VERY POOR
25 to 50	POOR
51 to 75	FAIR
76 to 90	GOOD
>90	EXCELLENT

SHEAR STRENGTH

UNDRAINED SHEAR STRENGTH IN P.S.F.	CONSISTENCY
<250	VERY SOFT
250-500	SOFT
500-1000	MED. STIFF
1000-2000	STIFF
2000-4000	VERY STIFF
>4000	HARD

CORRELATION GUIDE OF "N" TO DENSITY/CONSISTENCY

DENSITY (GRANULAR SOILS)		CONSISTENCY (COHESIVE SOILS)	
N	DESCRIPTIVE TERM	N	DESCRIPTIVE TERM
<5	VERY LOOSE	<2	VERY SOFT
5-10	LOOSE	2-4	SOFT
11-24	MED. DENSE	5-8	MED. STIFF
25-50	DENSE	9-15	STIFF
>50	VERY DENSE	16-30	VERY STIFF
		31-60	HARD
		>60	VERY HARD

COMMONLY USED SYMBOLS

- ▼ WATER ELEVATION
- ⊙ STANDARD PENETRATION BORING
- ⊕ AUGER BORING
- ⊖ ROD SOUNDING
- SAMPLE
- S STANDARD PENETRATION TEST BLOW COUNT PER FOOT FOR: 2" O.D. SAMPLER 1 3/8" I.D. SAMPLER
- N HAMMER WEIGHT OF 140 LBS. HAMMER FALL OF 30"
- VS FIELD VANE SHEAR TEST
- US UNDISTURBED SOIL SAMPLE
- B BLAST
- DC DIAMOND CORE
- MD MUD DRILL
- WA WASH AHEAD
- HSA HOLLOW STEM AUGER
- AX CORE SIZE 1 1/8"
- BX CORE SIZE 1 3/8"
- NX CORE SIZE 2 1/8"
- M DOUBLE TUBE CORE BARREL USED
- LL LIQUID LIMIT
- PL PLASTIC LIMIT
- PI PLASTICITY INDEX
- NP NON PLASTIC
- w MOISTURE CONTENT (DRY WGT. BASIS)
- D DRY
- M MOIST
- MTW MOIST TO WET
- W WET
- Sat SATURATED
- Bo BOULDER
- Gr GRAVEL
- Sa SAND
- Sl SILT
- Cl CLAY
- HP HARDPAN
- Le LEDGE
- NLTD NO LEDGE TO DEPTH
- CNPF CAN NOT PENETRATE FURTHER
- TLOB TOP OF LEDGE OR BOULDER
- NR NO RECOVERY
- Rec. RECOVERY
- 1/2 Rec. PERCENT RECOVERY
- ROD ROCK QUALITY DESIGNATION
- CBR CALIFORNIA BEARING RATIO
- < LESS THAN
- > GREATER THAN
- R REFUSAL (N >100)
- VTSPG NAD83 - SEE NOTE 7

COLOR

blk	BLACK	pnk	PINK
bl	BLUE	pu	PURPLE
brn	BROWN	rd	RED
dk	DARK	tn	TAN
gr	GRAY	wh	WHITE
gn	GREEN	yel	YELLOW
lt	LIGHT	mltc	MULTICOLORED
or	ORANGE		

DEFINITIONS (AASHTO)

BEDROCK (LEDGE) - ROCK IN ITS NATIVE LOCATION OF INDEFINITE THICKNESS.

BOULDER - A ROCK FRAGMENT WITH AN AVERAGE DIMENSION > 12 INCHES.

COBBLE - ROCK FRAGMENTS WITH AN AVERAGE DIMENSION BETWEEN 3 AND 12 INCHES.

GRAVEL - ROUNDED PARTICLES OF ROCK < 3" AND > 0.075" (#10 SIEVE).

SAND - PARTICLES OF ROCK < 0.075" (#10 SIEVE) AND > 0.0029" (#200 SIEVE).

SILT - SOIL < 0.0029" (#200 SIEVE), NON OR SLIGHTLY PLASTIC AND EXHIBITS NO STRENGTH WHEN AIR-DRIED.

CLAY - FINE GRAINED SOIL, EXHIBITS PLASTICITY WHEN MOIST AND CONSIDERABLE STRENGTH WHEN AIR-DRIED.

VARVED - ALTERNATE LAYERS OF SILT AND CLAY.

HARDPAN - EXTREMELY DENSE SOIL, CEMENTED LAYER, NOT SOFTENED WHEN WET.

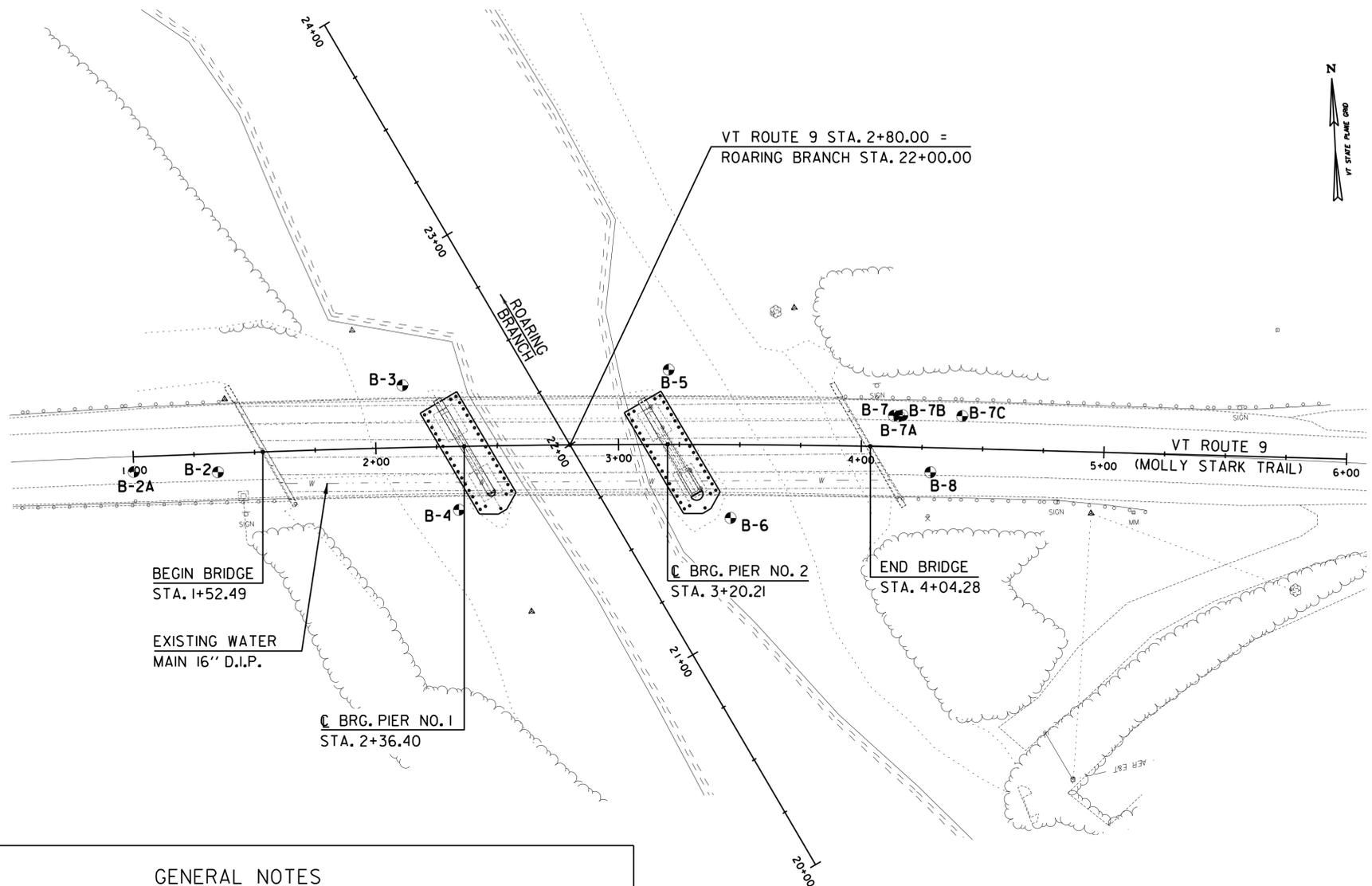
MUCK - SOFT ORGANIC SOIL (CONTAINING > 10% ORGANIC MATERIAL).

MOISTURE CONTENT - WEIGHT OF WATER DIVIDED BY DRY WEIGHT OF SOIL.

FLOWING SAND - GRANULAR SOIL SO SATURATED (LOOSE) THAT IT FLOWS INTO DRILL CASING DURING EXTRACTION OF WASH ROD.

STRIKE - ANGLE FROM MAGNETIC NORTH TO LINE OF INTERSECTION OF BED WITH A HORIZONTAL PLANE.

DIP - INCLINATION OF BED WITH A HORIZONTAL PLANE.



BORING PLAN
0 30 60
SCALE IN FEET

GENERAL NOTES

- THE SUBSURFACE EXPLORATIONS SHOWN HEREIN WERE MADE BETWEEN JANUARY 16 AND FEBRUARY 2, 2012 BY CHA.
- SOIL AND ROCK CLASSIFICATIONS, PROPERTIES AND DESCRIPTIONS ARE BASED ON ENGINEERING INTERPRETATION FROM AVAILABLE SUBSURFACE INFORMATION BY THE AGENCY AND MAY NOT NECESSARILY REFLECT ACTUAL VARIATIONS IN SUBSURFACE CONDITIONS THAT MAY BE ENCOUNTERED BETWEEN INDIVIDUAL BORING OR SAMPLE LOCATIONS.
- OBSERVED WATER LEVELS AND/OR CONDITIONS INDICATED ARE AS RECORDED AT THE TIME OF EXPLORATION AND MAY VARY ACCORDING TO THE PREVAILING RAINFALL, METHODS OF EXPLORATION AND OTHER FACTORS.
- ENGINEERING JUDGMENT WAS EXERCISED IN PREPARING THE SUBSURFACE INFORMATION PRESENTED HEREIN. ANALYSIS AND INTERPRETATION OF SUBSURFACE DATA WAS PERFORMED AND INTERPRETED FOR AGENCY DESIGN AND ESTIMATING PURPOSES. PRESENTATION OF THE INFORMATION IN THE CONTRACT IS INTENDED TO PROVIDE THE CONTRACTOR ACCESS TO THE SAME DATA AVAILABLE TO THE AGENCY. THE SUBSURFACE INFORMATION IS PRESENTED IN GOOD FAITH AND IS NOT INTENDED AS A SUBSTITUTE FOR PERSONAL INVESTIGATION, INDEPENDENT INTERPRETATION, INDEPENDENT ANALYSIS OR JUDGMENT BY THE CONTRACTOR.
- PICTORIAL STRUCTURE DETAILS SHOWN ON THE BORING PLAN LAYOUT OR SOILS PROFILE ARE FOR ILLUSTRATIVE PURPOSES ONLY AND MAY NOT ACCURATELY PORTRAY FINAL CONTRACT DETAILS.
- TERMINOLOGY USED ON BORING LOGS TO DESCRIBE THE HARDNESS, DEGREE OF WEATHERING, AND SPACING OF FRACTURES, JOINTS AND OTHER DISCONTINUITIES IN THE BEDROCK IS DEFINED IN THE AASHTO MANUAL ON SUBSURFACE INVESTIGATIONS, 1988.
- NORTHING AND EASTING COORDINATES ARE SHOWN IN VERMONT STATE PLANE GRID NORTH AMERICAN DATUM 1983 IN METERS AND SURVEY FEET.

BORING LOCATIONS (FEET)

BORING	NORTHING	EASTING	STATION	OFFSET	SURFACE EL.	BOTTOM EL.
B-1						
BORING NOT ADVANCED						
B-2	140364.27	1463684.91	1+34.6	7.6 RT	929	918
B-2A	140366.15	1463648.56	1+00	6.2 RT	928	919
B-3	140396.05	1463762.64	2+11.6	25.6 LT	905	810.6
B-4	140343.77	1463783.29	2+33.7	26.1 RT	907	886
B-5	140396.90	1463872.54	3+20.7	30.7 LT	905	884
B-6	140334.74	1463894.87	3+46.3	30.1 RT	907	782.7
B-7	140373.29	1463964.23	4+13.2	12.8 LT	932	927
B-7A	140373.00	1463966.23	4+15.2	12.6 LT	932	927
B-7B	140373.28	1463967.76	4+16.7	13.0 LT	932	909
B-7C	140371.55	1463995.70	4+43.9	13.4 LT	932	927
B-8	140349.28	1463978.01	4+28.7	10.2 RT	932	916

BORING INFORMATION SHEET	PROJECT NAME: BENNINGTON
	PROJECT NUMBER: ER BHF 010-1(45)
	FILE NAME: z11b326_bor_plan.dgn
	PLOT DATE: 8/21/2012
PROJECT LEADER: D.E.G.	DRAWN BY: M.E.D.
DESIGNED BY: K.J.K.	CHECKED BY: D.E.G.
DWG. NO.: z11b326borplan.i	SHEET 16 OF 40



FILE NAME: N:\P\2012\BENNINGTON\ER BHF 010-1(45)\z11b326_bor_plan.dgn
DATE/TIME: 8/21/2012 10:46:56
USER: kjk

FILE NAME = N:\p\2012\1025\BENNINGTON\23770\CADD\MSTIN_zlib326_bor_log_04.dgn
 DATE/TIME = 8/21/2012
 USER = 4056

VT Trans		STATE OF VERMONT AGENCY OF TRANSPORTATION MATERIALS & RESEARCH SECTION SUBSURFACE INFORMATION		BORING LOG		Boring No.: B-6			
		Bridge 9, VT Route 9 23770.1000.32000 Bridge 9, VT Route 9		Page No.: 3 of 4		Pin No.: ER BHF 010-1(45)			
Boring Crew: J. Leonhardt, K. Owens		Casing: WB		Sampler: SS		Groundwater Observations			
Date Started: 1/16/12 Date Finished: 1/18/12		I.D.: 4 in 1.25 in		Date: 01/17/12		Depth (ft): 2.0			
VTSPG NAD83: N 140334.74 ft E 1463894.87 ft		Hammer Wt: N.A. 140 lb		Notes: At river level					
Station: 3+46.30 Offset: 30.1 RT		Hammer Fall: N.A. 30 in							
Ground Elevation: 906.81 ft		Hammer/Rod Type: Auto/NWJ							
		Rig: CME 75 TRACK		C _e = 1.4					
Depth (ft)	Strata (1)	Run (Dip deg.)	Blows/ft (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %
85	orange, Wet, Rec. = 0.2 ft (ML), Clayey SILT , Some f. Sand, trace f. gravel, very soft, Light brown, Wet, Rec. = 1.2 ft		WH-1 (1) WH-1 (1)	26.2				33	9
85	(ML), becomes hard, Rec. = 1.4 ft (SM), f. SAND , Some clayey Silt, little f.c. gravel, very compact, orange/brown, Wet, Lenses of gray/brown f.c. gravel		10-18 41-43 (59)						
90	(CL) (CL), Silty CLAY , little f.m.c. sand, very stiff, orange/brown, Moist, Rec. = 1.6 ft, Stratified by color		12-10 13-16 (23)	27.6				37	15
95	(CL), Silty CLAY , little f.m.c. sand, trace f. gravel, hard, Light brown, Moist, Rec. = 0.8 ft		33- 100/3" (R)						
100	(GM) (GM), Crushed GRAVEL , Some f.m.c. Sand, little clayey silt, very compact, orange/gray, Moist, Rec. = 0.1 ft		100/3" (R)						
105	(SM) (SM), f.m.c. SAND , Some clayey Silt, Some crushed Gravel, very compact, Light brown/white, Moist, Rec. = 0.3 ft, Lense of light brown clayey silt		100/3" (R)						
110	(SM), Similar Soil , Rec. = 0.2 ft		100/2" (R)						
115	(SM), f.m.c. SAND , Some crushed Gravel, little clayey silt, very compact, Light brown, Moist, Rec. = 0.2 ft		150/2" (R)						
	(SM), Similar Soil , Rec. = 0.2 ft		150/2" (R)						

2010.DCPY 23770.ERBHF01045.BENNINGTON.GPJ VERMONT AOT.GDT 3/7/12

Notes:
 1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
 2. N Values have not been corrected for hammer energy. C_e is the hammer energy correction factor.
 3. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

VT Trans		STATE OF VERMONT AGENCY OF TRANSPORTATION MATERIALS & RESEARCH SECTION SUBSURFACE INFORMATION		BORING LOG		Boring No.: B-6			
		Bridge 9, VT Route 9 23770.1000.32000 Bridge 9, VT Route 9		Page No.: 4 of 4		Pin No.: ER BHF 010-1(45)			
Boring Crew: J. Leonhardt, K. Owens		Casing: WB		Sampler: SS		Groundwater Observations			
Date Started: 1/16/12 Date Finished: 1/18/12		I.D.: 4 in 1.25 in		Date: 01/17/12		Depth (ft): 2.0			
VTSPG NAD83: N 140334.74 ft E 1463894.87 ft		Hammer Wt: N.A. 140 lb		Notes: At river level					
Station: 3+46.30 Offset: 30.1 RT		Hammer Fall: N.A. 30 in							
Ground Elevation: 906.81 ft		Hammer/Rod Type: Auto/NWJ							
		Rig: CME 75 TRACK		C _e = 1.4					
Depth (ft)	Strata (1)	Run (Dip deg.)	Blows/ft (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %
125	(SM), Similar Soil , Rec. = 0.2 ft		150/3" (R)						
Hole stopped @ 124.3 ft									
Remarks: The description of the classification of the materials is based on USCS criteria that gravel is defined as material retained on a #4 sieve or larger. Laboratory data provided follows AASHTO classification guidelines that gravel is defined as material retained on a #10 sieve or larger.									
Cobbles & boulders visible at ground surface.									
Very difficult drilling ground surface to 21.0'.									
Easier, smoother drilling at 21.0'.									
Drilling mud added at 26.0'.									
Harder drilling, chattering drill rig at 37.0'.									
Easier drilling at 53.0'.									
Increased drilling resistance at 85.0'.									
Greatly increased drilling resistance 95.0' to termination.									

2010.DCPY 23770.ERBHF01045.BENNINGTON.GPJ VERMONT AOT.GDT 3/7/12

Notes:
 1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
 2. N Values have not been corrected for hammer energy. C_e is the hammer energy correction factor.
 3. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

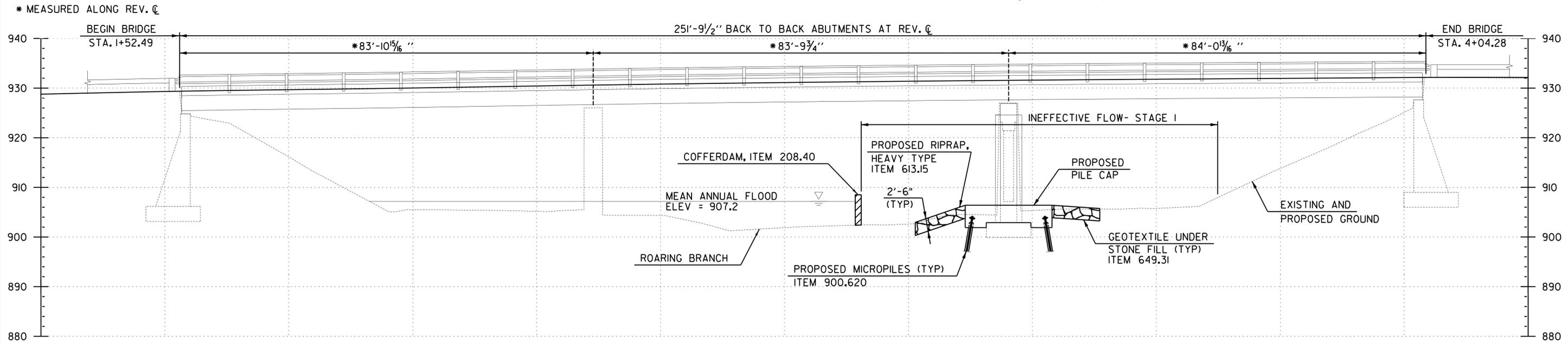
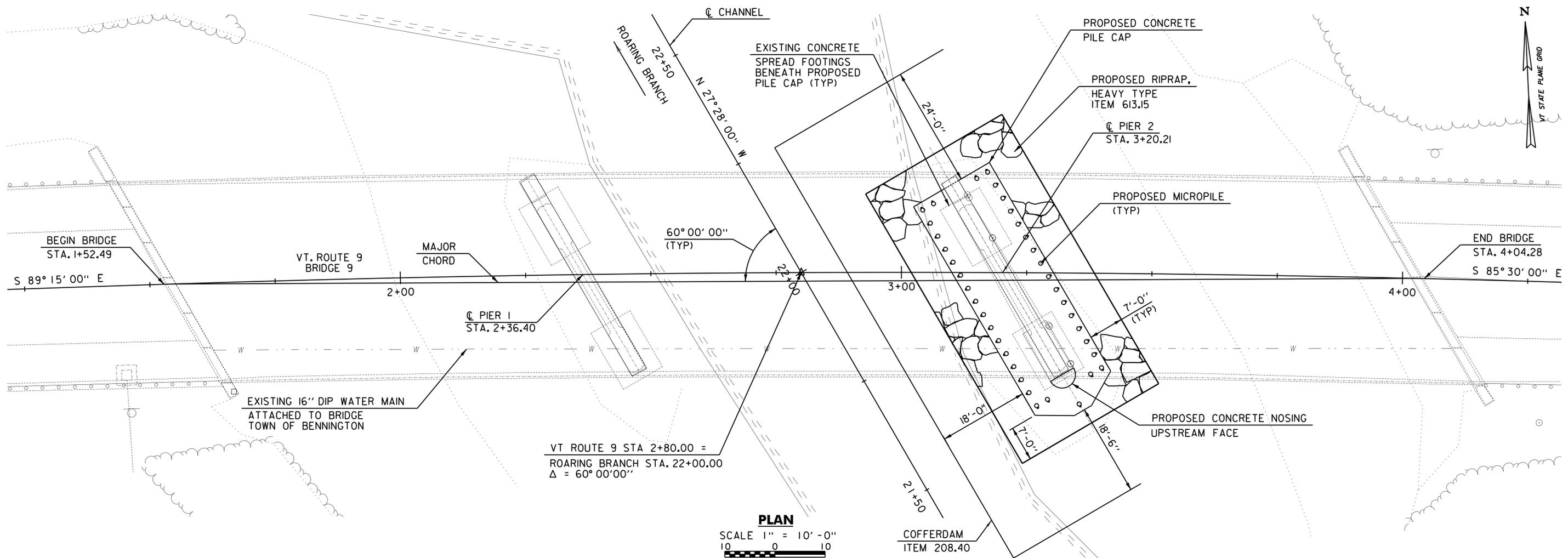
VT Trans		STATE OF VERMONT AGENCY OF TRANSPORTATION MATERIALS & RESEARCH SECTION SUBSURFACE INFORMATION		BORING LOG		Boring No.: B-7			
		Bridge 9, VT Route 9 23770.1000.32000 Bridge 9, VT Route 9		Page No.: 1 of 1		Pin No.: ER BHF 010-1(45)			
Boring Crew: J. Leonhardt, K. Owens		Casing: WB		Sampler: SS		Groundwater Observations			
Date Started: 1/26/12 Date Finished: 1/26/12		I.D.: 4 in 1.25 in		Date:		Depth (ft):			
VTSPG NAD83: N 140373.29 ft E 1463964.23 ft		Hammer Wt: N.A. 140 lb		Notes:					
Station: 4+13.20 Offset: 12.8 LT		Hammer Fall: N.A. 30 in							
Ground Elevation: 932.27 ft		Hammer/Rod Type: Auto/NWJ							
		Rig: CME 75 TRACK		C _e = 1.4					
Depth (ft)	Strata (1)	Run (Dip deg.)	Blows/ft (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %
5	Asphalt, 0.0 ft - 0.5 ft (Granular FILL), f.m.c. SAND , little f.c. gravel, trace silt, compact, gray, Moist, Rec. = 0.7 ft		18-19- 27 (46)						
5	(Granular FILL), f.c. GRAVEL , little f.m.c. sand, trace concrete, very compact, gray, Wet, Rec. = 0.1 ft		50/1" (R)						
Hole stopped @ 5.0 ft									
Remarks: The description of the classification of the materials is based on USCS criteria that gravel is defined as material retained on a #4 sieve or larger. Laboratory data provided follows AASHTO classification guidelines that gravel is defined as material retained on a #10 sieve or larger.									
Advanced casing through asphalt pavement.									
Casing refusal at 5.0', offset to B-7A.									

2010.DCPY 23770.ERBHF01045.BENNINGTON.GPJ VERMONT AOT.GDT 3/7/12

Notes:
 1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
 2. N Values have not been corrected for hammer energy. C_e is the hammer energy correction factor.
 3. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING LOGS SHEET #4	PROJECT NAME: BENNINGTON	PLOT DATE: 8/21/2012
	PROJECT NUMBER: ER BHF 010-1(45)	DRAWN BY: M.E.D.
	FILE NAME: z11b326_bor_log_04.dgn	CHECKED BY: D.E.G.
	DESIGNED BY: K.J.K.	SHEET 20 OF 40
DWG. NO.: z11b326borlog4.i		



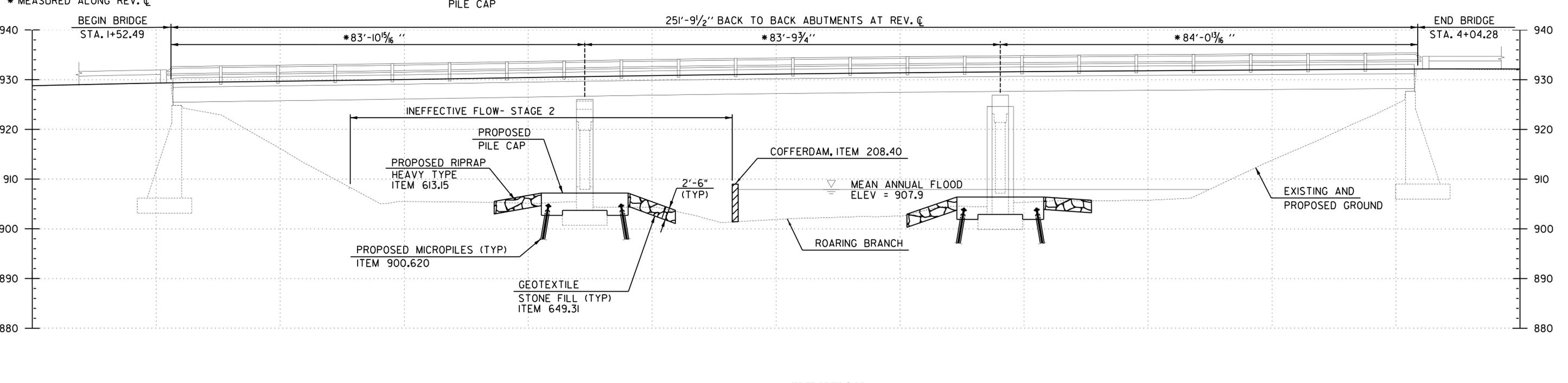
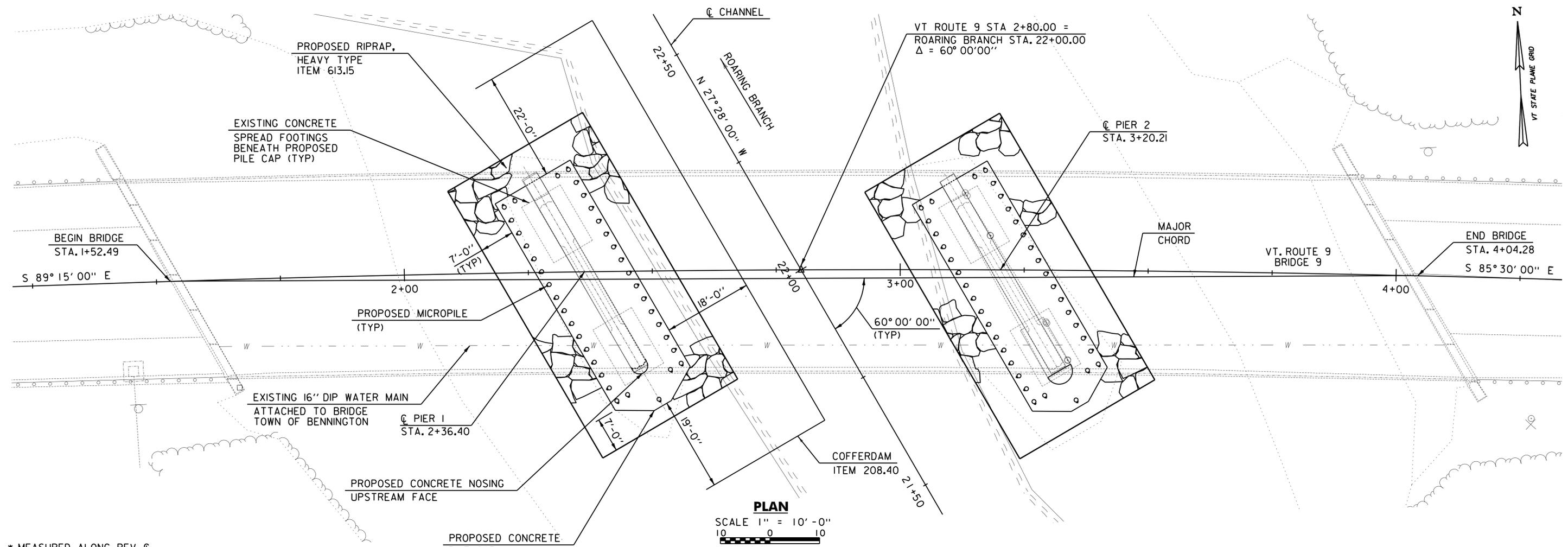


NOTE:
1. THE COFFERDAM LIMITS SHOWN IN PLAN REPRESENT THE MAXIMUM COFFERDAM SIZE PERMISSIBLE TO SATISFY PERMITTING AND ENVIRONMENTAL REQUIREMENTS. ACTUAL COFFERDAM LIMITS TO BE DETERMINED BY THE CONTRACTOR.



PLAN AND ELEVATION STAGE 1	PROJECT NAME: BENNINGTON	PLOT DATE: 9/6/2012
	PROJECT NUMBER: ER BHF 010-I(45)	DRAWN BY: M.E.D.
	FILE NAME: z11b326.pe.stgl.dgn	CHECKED BY: A.M.P.
	DWG. NO.: z11b326pestgl.i	SHEET 23 OF 40

FILE NAME: N:\p\projects\BENNINGTON\237770\CADD\MSTIN\z11b326.pe.stgl.dgn
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 USER: 4066



NOTE:
1. THE COFFERDAM LIMITS SHOWN IN PLAN REPRESENT THE MAXIMUM COFFERDAM SIZE PERMISSIBLE TO SATISFY PERMITTING AND ENVIRONMENTAL REQUIREMENTS. ACTUAL COFFERDAM LIMITS TO BE DETERMINED BY THE CONTRACTOR.



PLAN AND ELEVATION STAGE 2	PROJECT NAME: BENNINGTON	PLOT DATE: 9/6/2012
	PROJECT NUMBER: ER BHF 010-1(45)	DRAWN BY: M.E.D.
	FILE NAME: z11b326.pe.stg2.dgn	CHECKED BY: A.M.P.
	DESIGNED BY: K.J.K.	SHEET 24 OF 40
	DWG. NO.: z11b326pestg2.i	

FILE NAME: N:\p\projects\BENNINGTON\23770\CADD\MSTIN\z11b326.pe.stg2.dgn
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 USER: 4066

GENERAL NOTES:

1. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO THE STATE OF VERMONT, AGENCY OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION, DATED 2011, AND ITS LATEST REVISIONS, AND THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, FIFTH EDITION DATED 2010, AND ITS LATEST REVISIONS.
2. FOUNDATION DESIGN IS FOR HL-93 LIVE LOADING, IMPACT EXCLUDED.
3. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PREVENT SILTATION OR POLLUTION, ESPECIALLY THE DISCHARGE OF RAW CONCRETE, INTO ROARING BRANCH AS DIRECTED BY THE RESIDENT ENGINEER AND STANDARD SPECIFICATION SECTION 105.
4. THE MINIMUM COVER FOR REINFORCING STEEL IN THE SUBSTRUCTURES SHALL BE THREE INCHES UNLESS DETAILED OTHERWISE.
5. ALL REINFORCING STEEL SHALL BE DETAILED AND FABRICATED USING PROCEDURES AND TOLERANCES IN ACCORDANCE WITH APPLICABLE PUBLICATIONS OF THE CONCRETE REINFORCING STEEL INSTITUTE (CRSI).

REINFORCING STEEL PLACEMENT TOLERANCES SHALL BE AS FOLLOWS:
SPACING +/- 1"
CLEARANCE +/- 1/4"
6. THE COFFERDAM LIMITS SHOWN IN PLAN REPRESENT THE MAXIMUM COFFERDAM SIZE PERMISSIBLE TO SATISFY PERMITTING AND ENVIRONMENTAL REQUIREMENTS. ACTUAL COFFERDAM LIMITS TO BE DETERMINED BY THE CONTRACTOR.
7. TWO-WAY TRAFFIC WILL BE MAINTAINED ON THE EXISTING STRUCTURE, ALTHOUGH DURING THE DAILY CONSTRUCTION PERIOD, THE CONTRACTOR MAY USE ALTERNATING ONE-WAY TRAFFIC WITH FLAGGERS.
8. UTILITY RELOCATIONS ARE NOT ANTICIPATED AS PART OF THIS PROJECT; HOWEVER, THE CONTRACTOR SHALL COORDINATE WITH THE TOWN OF BENNINGTON PRIOR TO EXCAVATION AT THE PIERS TO ENSURE THE INTEGRITY OF THE 16" DUCTILE IRON WATER MAIN ATTACHED TO THE EXISTING BRIDGE IS PRESERVED AND PROTECTED DURING CONSTRUCTION. SEE SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
9. THE CONTRACTOR SHALL CONDUCT WORK IN A MANNER AS TO PREVENT, OR REDUCE TO A MINIMUM, POLLUTION ON VERMONT ROUTE 9 BY DEBRIS OR SEDIMENT; OR FROM THE MANIPULATION OF EQUIPMENT AND/OR MATERIALS. THE CONTRACTOR SHALL KEEP VERMONT ROUTE 9 PAVEMENT AND SHOULDER CLEAN AT ALL TIMES AS DIRECTED BY THE ENGINEER. PAYMENT UNDER ITEM 608.31 POWER BROOM RENTAL, TYPE II.

CONCRETE NOTES:

10. ALL PORTIONS OF THE SUBSTRUCTURES INCLUDING THE PROPOSED PILE CAPS AND NOSING ON UPSTREAM FACE SHALL BE "CONCRETE, HIGH PERFORMANCE - CLASS B".
11. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 1" X 1"
12. THE VERTICAL FACES OF THE EXISTING PIER COLUMNS, VERTICAL FACES OF THE EXISTING PIER I WEB WALL, AND TOPS OF EXISTING FOOTINGS WHERE FRESH CONCRETE IS PLACED AGAINST HARDENED CONCRETE SHALL BE INTENTIONALLY ROUGHENED OR THOROUGHLY SANDBLASTED TO REMOVE ALL LAMINATE AND TO PRODUCE A ROUGHENED SURFACE FOR BONDING TO THE FRESH CONCRETE. THE ROUGHENED SURFACE SHALL HAVE AN AMPLITUDE OF APPROXIMATELY 1/4". AFTER ROUGHENING IS COMPLETED, ALL SURFACES SHALL BE AIR-BLOWN OR VACUUM-CLEANED.

IMMEDIATELY PRIOR TO PLACING THE NEW CONCRETE, EPOXY BONDING COMPOUND WHICH CONFORMS TO THE REQUIREMENTS OF SUBSECTION 719.02 SHALL BE APPLIED TO THE PREPARED SURFACES BY MEANS OF STIFF BRUSHES OR OTHER MEANS ACCEPTABLE TO THE ENGINEER. THE COST OF SURFACE TREATMENT, INCLUDING EPOXY BONDING COMPOUND, WILL NOT BE PAID FOR SEPARATELY BUT WILL BE CONSIDERED INCIDENTAL TO THE CONTRACT UNIT PRICE FOR ITEM 501.34 CONCRETE, HIGH PERFORMANCE CLASS B.
13. THE COST OF ANY LABOR, EQUIPMENT, OR MATERIAL REQUIRED FOR LOCATING THE EXISTING PIER REINFORCEMENT SHALL BE INCLUDED IN THE UNIT PRICE BID FOR ITEM 501.34 CONCRETE, HIGH PERFORMANCE CLASS B.
14. ALL PERMANENTLY EXPOSED CONCRETE SURFACES AT PIER 1 AND PIER 2 SHALL BE TREATED WITH WATER REPELLENT, SILANE IN ACCORDANCE WITH SECTION 514. THE TREATED SURFACES SHALL INCLUDE THE TOPS AND SIDES OF NEW PILE CAP CONSTRUCTION, PIER NOSINGS, EXISTING COLUMNS, EXISTING WEB WALLS, AND TOPS AND SIDES OF EXISTING PIER CAPS. PRIOR TO APPLICATION OF THE SILANE WATER REPELLENT, ALL EXPOSED CONCRETE AT PIER 1 AND PIER 2 WHICH WAS CONSTRUCTED PRIOR TO THIS PROJECT SHALL BE PREPARED IN ACCORDANCE WITH SUBSECTION 514.04.

FOUNDATION NOTES:

15. MICROPILES, INCLUDING PILE TO FOOTING CONNECTIONS, STEEL CASING AND JOINTS, CENTRAL REINFORCING BAR(S), MECHANICAL SPLICES, UNCASSED PILE LENGTHS, AND GROUT SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF VERMONT TO HAVE BOTH SUFFICIENT STRUCTURAL RESISTANCE AND GEOTECHNICAL RESISTANCE FOR THE FOLLOWING FACTORED AXIAL LOADS AND CONCURRENT MOMENTS WITH THE CORRESPONDING UNBRACED LENGTHS:

LIMIT STATE	COMBINED AXIAL COMPRESSION AND FLEXURE (PER PILE)		COMBINED AXIAL TENSION AND FLEXURE (PER PILE)		UNBRACED LENGTH (FT)
	FACTORED AXIAL COMPRESSIVE LOAD (KIP)	FACTORED RESULTANT FLEXURAL MOMENT (KIP-FT)	FACTORED AXIAL TENSILE LOAD (KIP)	FACTORED RESULTANT FLEXURAL MOMENT (KIP-FT)	
STRENGTH	130.0	14.3	-	-	25.75
STRENGTH	-	-	12.0	10.5	25.75
EXTREME	187.0	23.6	-	-	25.75
EXTREME	-	-	109.0	28.6	25.75
SERVICE	114.4	8.8	-	-	25.75
SERVICE			0	0	25.75

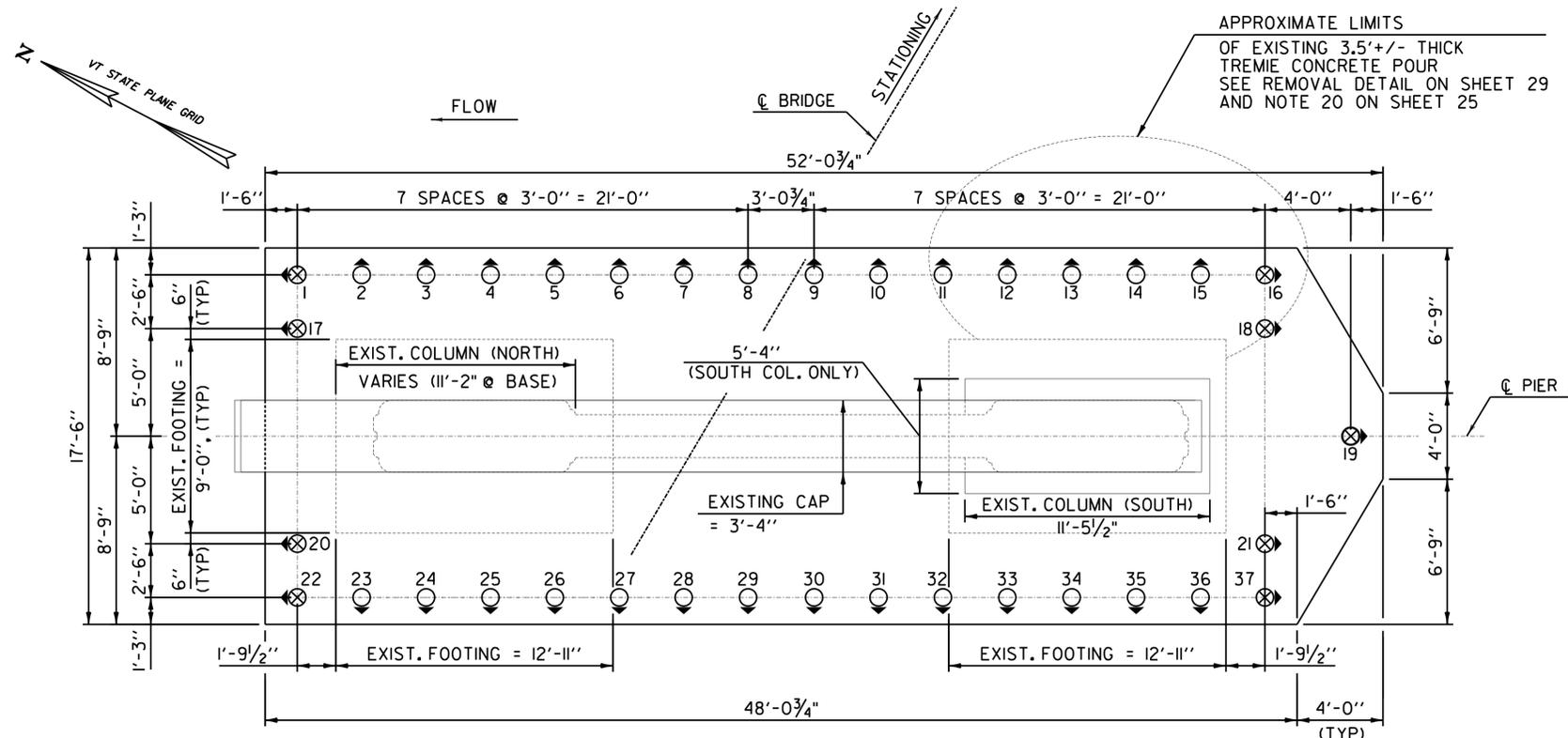
AXIAL LOADS AND MOMENTS SHALL BE APPLIED CONCURRENTLY. LOAD COMBINATIONS ARE APPLICABLE FOR BOTH PIER 1 AND PIER 2 MICROPILES. SEE SPECIAL PROVISION (MICROPILE) FOR ADDITIONAL REQUIREMENTS.

16. THE MICROPILE CASING OUTSIDE DIAMETER SHALL NOT BE LESS THAN 9 5/8". SEE SPECIAL PROVISION (MICROPILE) FOR SACRIFICIAL THICKNESS AND OTHER CASING DESIGN REQUIREMENTS.
17. A TOTAL OF TWO TENSILE VERIFICATION LOAD TESTS SHALL BE PERFORMED. ONE PLUMB TEST PILE SHALL BE INSTALLED AT A LOCATION THAT IS NOT WITHIN THE PROPOSED PIER 1 PILE CAP LIMITS AND NOT MORE THAN 10 FT FROM THE NORTH END OF THE PIER 1 PILE CAP. A SECOND PLUMB TEST PILE SHALL BE INSTALLED AT A LOCATION THAT IS NOT WITHIN THE PROPOSED PIER 2 PILE CAP LIMITS AND NOT MORE THAN 10 FT FROM THE SOUTH END OF THE PIER 2 PILE CAP. THE LOCATION OF THE TEST PILES SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
18. THE DESIGN TEST LOAD (DTL) FOR BOTH VERIFICATION LOAD TESTS SHALL BE 187 KIPS IN TENSION. PAYMENT WILL BE MADE UNDER ITEM 900.620 SPECIAL PROVISION (MICROPILE VERIFICATION LOAD TEST).
19. ONCE VERIFICATION LOAD TESTING IS COMPLETED AND ACCEPTED, TEST PILES SHALL BE REMOVED TO AN ELEVATION THAT IS A MINIMUM OF TWO FEET BELOW FINISHED GRADE.
20. A KNOWN OBSTRUCTION CONSISTING OF AN APPROXIMATELY 3.5 FT THICK TREMIE CONCRETE POUR IS LOCATED ADJACENT TO THE SOUTHEASTERLY CORNER OF PIER 2, AS INDICATED IN THE FOUNDATION PLANS. THE LIMITS OF THE TREMIE CONCRETE ARE UNKNOWN, BUT BASED ON PHOTOGRAPHIC DOCUMENTATION, IT IS ESTIMATED THAT APPROXIMATELY SEVEN PROPOSED MICROPILES WILL PENETRATE THE OBSTRUCTION. THE COST OF CORING, DRILLING, OR OTHER MEANS OF ADVANCING THE MICROPILES THROUGH THE TREMIE CONCRETE SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID FOR ITEM 900.620 SPECIAL PROVISION (MICROPILE).

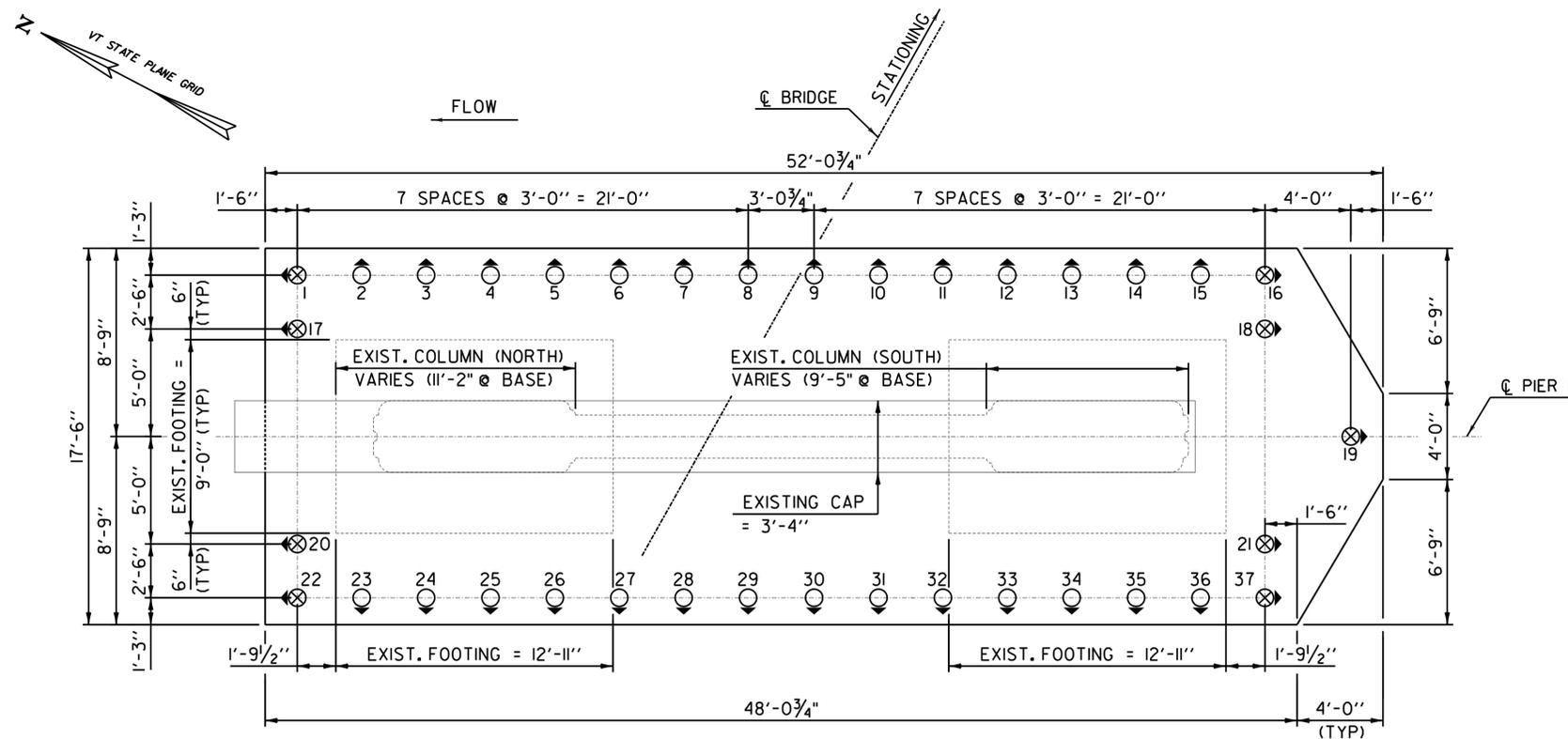
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 USER = 4066



PROJECT NOTES SHEET	PROJECT NAME: BENNINGTON	
	PROJECT NUMBER: ER BHF 010-1(45)	
	FILE NAME: z11b326_gn.dgn	PLOT DATE: 8/21/2012
	PROJECT LEADER: D.E.G.	DRAWN BY: M.E.D.
DESIGNED BY: K.J.K.	CHECKED BY: A.M.P.	
DWG. NO.: z11b326gn.1	SHEET 25 OF 40	



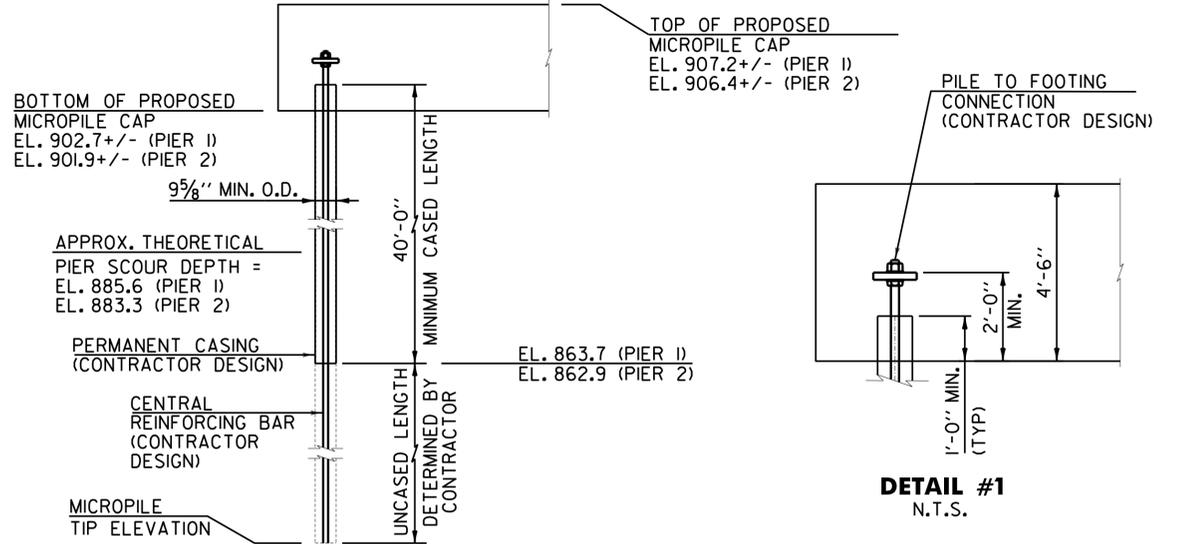
PIER #2 FOUNDATION PLAN
SCALE: 1/4" = 1'-0"



PIER #1 FOUNDATION PLAN
SCALE: 1/4" = 1'-0"

- LEGEND**
- ITEM 900.620 SPECIAL PROVISION (MICROPILE) INSTALLED ON A 1:6 BATTER
 - ⊗ ITEM 900.620 SPECIAL PROVISION (MICROPILE) INSTALLED ON A 1:4 BATTER

NOTE:
1. EXISTING COLUMN AND FOOTING DIMENSIONS ARE APPROXIMATE. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND ELEVATIONS PRIOR TO FABRICATING STEEL REINFORCING.



TYPICAL MICROPILE DETAIL
N.T.S.

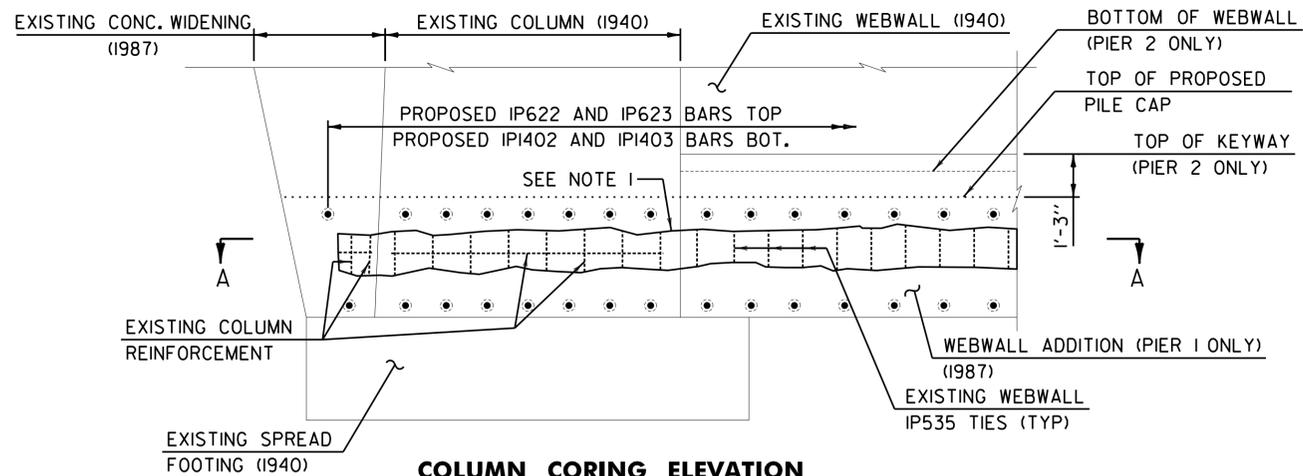
AS-BUILT MICROPILE DATA					
PIER 1			PIER 2		
PILE NO.	TIP ELEV.	CASED LENGTH (FT)	PILE NO.	TIP ELEV.	CASED LENGTH (FT)
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
11			11		
12			12		
13			13		
14			14		
15			15		
16			16		
17			17		
18			18		
19			19		
20			20		
21			21		
22			22		
23			23		
24			24		
25			25		
26			26		
27			27		
28			28		
29			29		
30			30		
31			31		
32			32		
33			33		
34			34		
35			35		
36			36		
37			37		

AS-BUILT MICROPILE DATA TABLE IS TO BE FILLED IN BY THE MICROPILE CONTRACTOR AND SUBMITTED TO THE ENGINEER AS A PERMANENT RECORD OF THE BRIDGE CONSTRUCTION.

RETROFIT FOUNDATION PLAN	PROJECT NAME: BENNINGTON	PLOT DATE: 8/21/2012
	PROJECT NUMBER: ER BHF 010-1(45)	DRAWN BY: M.E.D.
	FILE NAME: z11b326_foundation.dgn	CHECKED BY: A.M.P.
	DESIGNED BY: K.J.K.	SHEET 26 OF 40



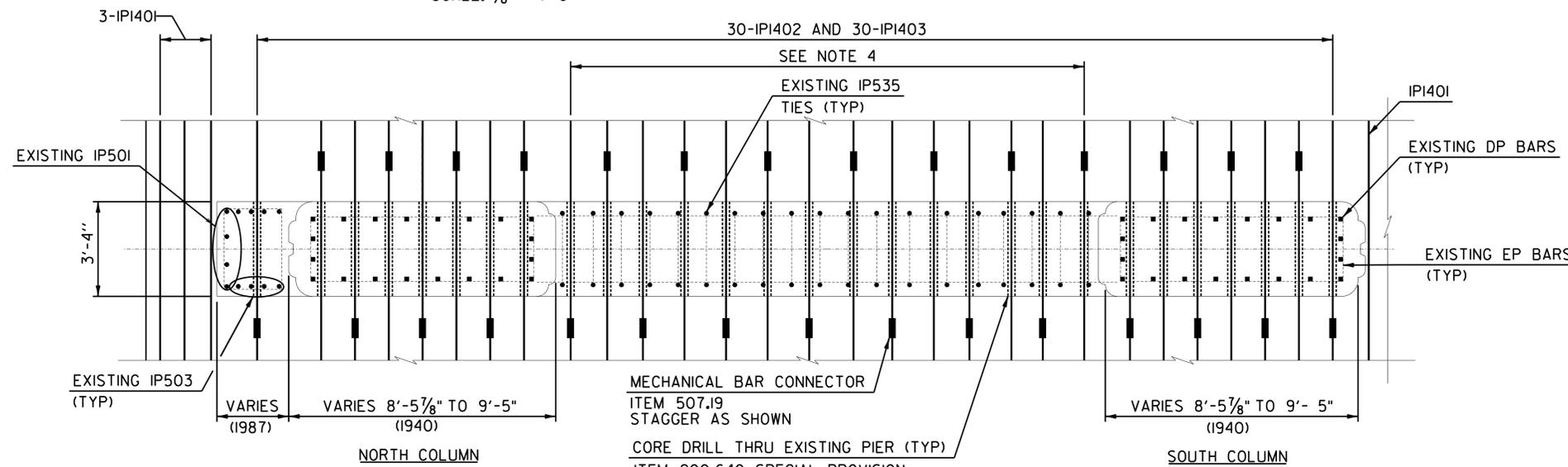
FILE NAME: N:\p\2012\er_bhf\er_bhf\010-1(45)\MSTIN_z11b326_foundation.dgn
DATE/TIME: 8/21/2012 4:06:56
USER: 4056



**COLUMN CORING ELEVATION
 (PIER 1 SHOWN, PIER 2 SIMILAR)**
 SCALE: 3/8" = 1'-0"

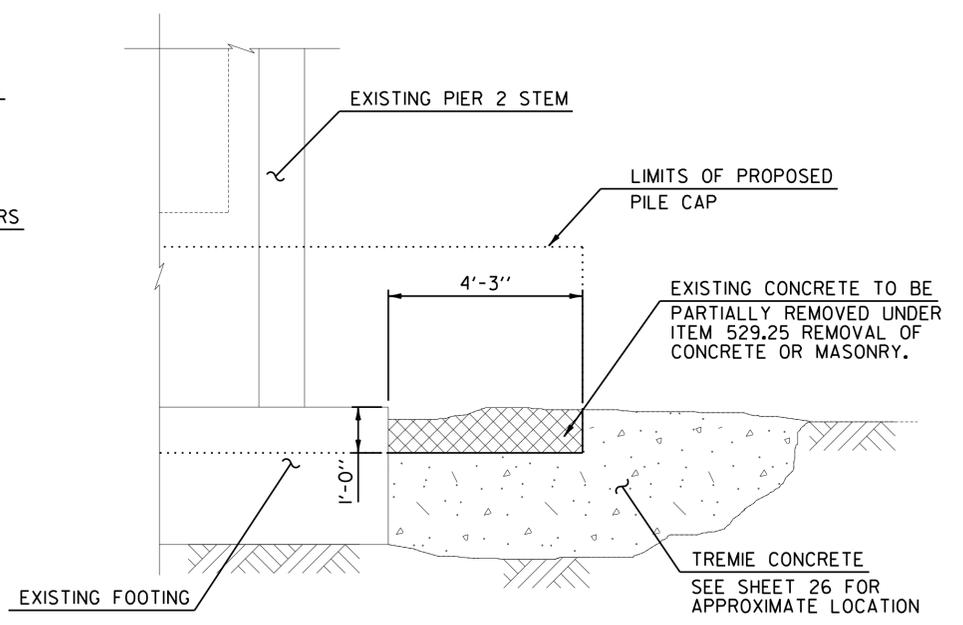
NOTES:

1. LOCATE THE EXISTING REINFORCING PRIOR TO ANY CORE DRILLING THROUGH THE EXISTING PIER CONCRETE FOR THE IP622, IP623, 2P622, 2P623, IPI402, IPI403, 2PI402, AND 2PI403 BARS. REMOVE AN AREA OR MULTIPLE AREAS OF CONCRETE DOWN TO THE EXISTING REINFORCING STEEL AS REQUIRED TO LOCATE THE EXISTING COLUMN BARS AND TIES AND THE EXISTING WEBWALL TIES. THE AREA OF CONCRETE REMOVAL SHALL BE LIMITED TO THE AREA WITHIN THE PROPOSED PILE CAP AS SHOWN. ONCE THE EXISTING REINFORCEMENT LOCATIONS HAVE BEEN IDENTIFIED, ADJUST THE SPACING OF THE CORED HOLES AS REQUIRED TO AVOID DAMAGING THE EXISTING REINFORCEMENT. THE MAXIMUM SPACING FOR THE CORED HOLES IS 16".
2. ALL LOCATIONS OF EXISTING REINFORCEMENT ARE APPROXIMATED BASED ON RECORD PLANS. CONTRACTOR SHALL VERIFY EXISTING REINFORCEMENT LOCATIONS AS SPECIFIED IN NOTE 1.
3. IF CONFLICTS BETWEEN PROPOSED CORE DRILLING AND EXISTING DP BARS AND F50I BARS ARE UNAVOIDABLE AT THE SOUTH COLUMN ON PIER 2, AVOIDANCE OF THE EXISTING DP BARS SHALL BE THE HIGHER PRIORITY. CORING WHICH PENETRATES EXISTING REINFORCEMENT SHALL BE APPROVED BY THE ENGINEER.
4. FOR EXISTING PIER 1 AND 2 DIMENSIONS AND REINFORCEMENT LOCATIONS, SEE THE RECORD PLANS ON SHEETS 39 AND 40 (1940 CONSTRUCTION) AND SHEETS 37 AND 38 (1987 WIDENING).
5. CONTRACTOR'S OPTION - IN LIEU OF CORING TO INSTALL THE IPI402 AND IPI403 BARS THROUGH THE PIER 1 WEBWALL, THE BOTTOM 6" OF CONCRETE MAY BE CAREFULLY REMOVED BY CHIPPING. IPI40I BARS MAY BE SUBSTITUTED FOR THE IPI402 AND IPI403 BARS SHOWN AND MECHANICAL BAR CONNECTORS ELIMINATED IF THE CONCRETE REMOVAL OPTION IS SELECTED. NO ADDITIONAL PAYMENT WILL BE MADE FOR CONCRETE REMOVAL.

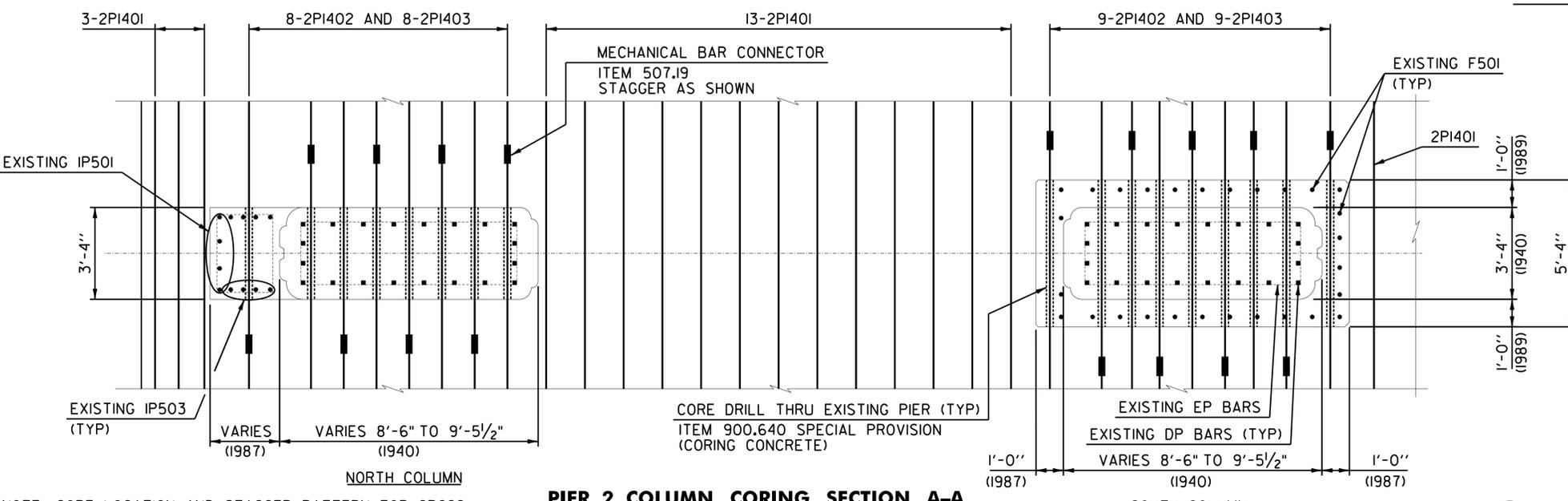


PIER 1 COLUMN CORING SECTION A-A
 SCALE: 3/8" = 1'-0"

NOTE: CORE LOCATION AND STAGGER PATTERN FOR IP622 AND IP623 BARS SIMILAR TO THAT SHOWN FOR IPI402 AND IPI403 BARS.



PIER 2 TREMIE CONCRETE REMOVAL DETAIL
 N.T.S.



PIER 2 COLUMN CORING SECTION A-A
 SCALE: 3/8" = 1'-0"

NOTE: CORE LOCATION AND STAGGER PATTERN FOR 2P622 AND 2P623 BARS SIMILAR TO THAT SHOWN FOR 2PI402 AND 2PI403 BARS.

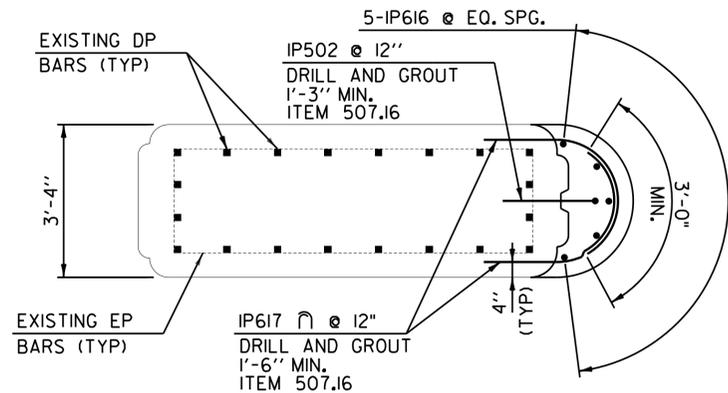
LEGEND

NF	= NEAR FACE
FF	= FAR FACE
EF	= EACH FACE
(1940)	= INDICATES APPROXIMATE YEAR OF CONSTRUCTION
•	= CORED REINFORCING BAR

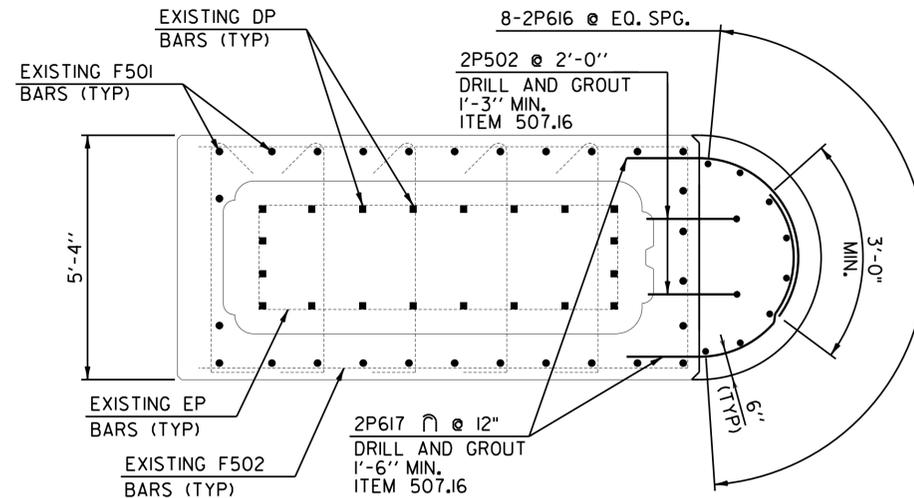
CORING AND DEMOLITION DETAILS SHEET	PROJECT NAME: BENNINGTON	PLOT DATE: 8/21/2012
	PROJECT NUMBER: ER BHF 010-1(45)	DRAWN BY: M.E.D.
	FILE NAME: z11b326_pier_detail.01.dgn	CHECKED BY: A.M.P.
	DWG. NO.: z11b326pierdetail01	SHEET 29 OF 40



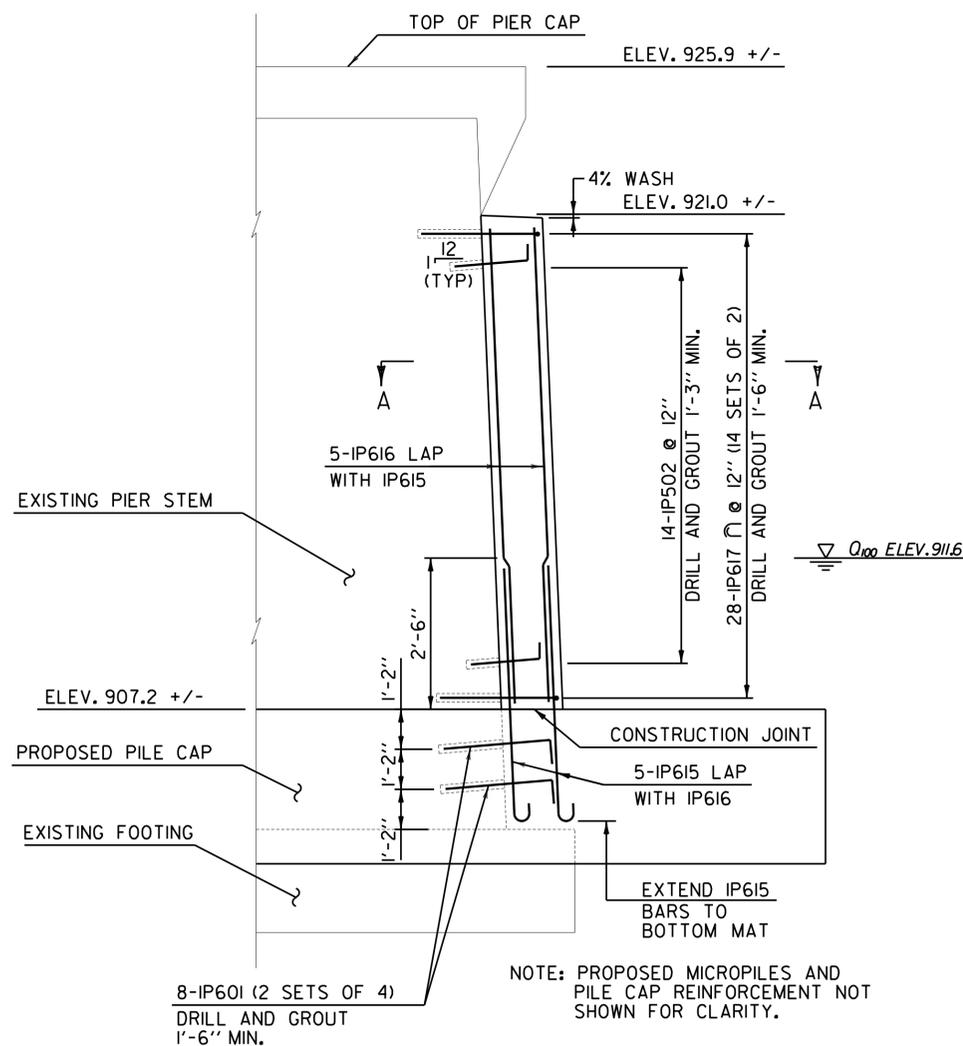
FILE NAME: N:\P\2015\BENNINGTON\CAD\CADD\MSTIN_z11b326_pier_detail.01.dgn
 DATE/TIME: 8/21/2012 4:06:56
 USER: 4066



PIER 1 SECTION A-A
SCALE: 1/2" = 1'-0"

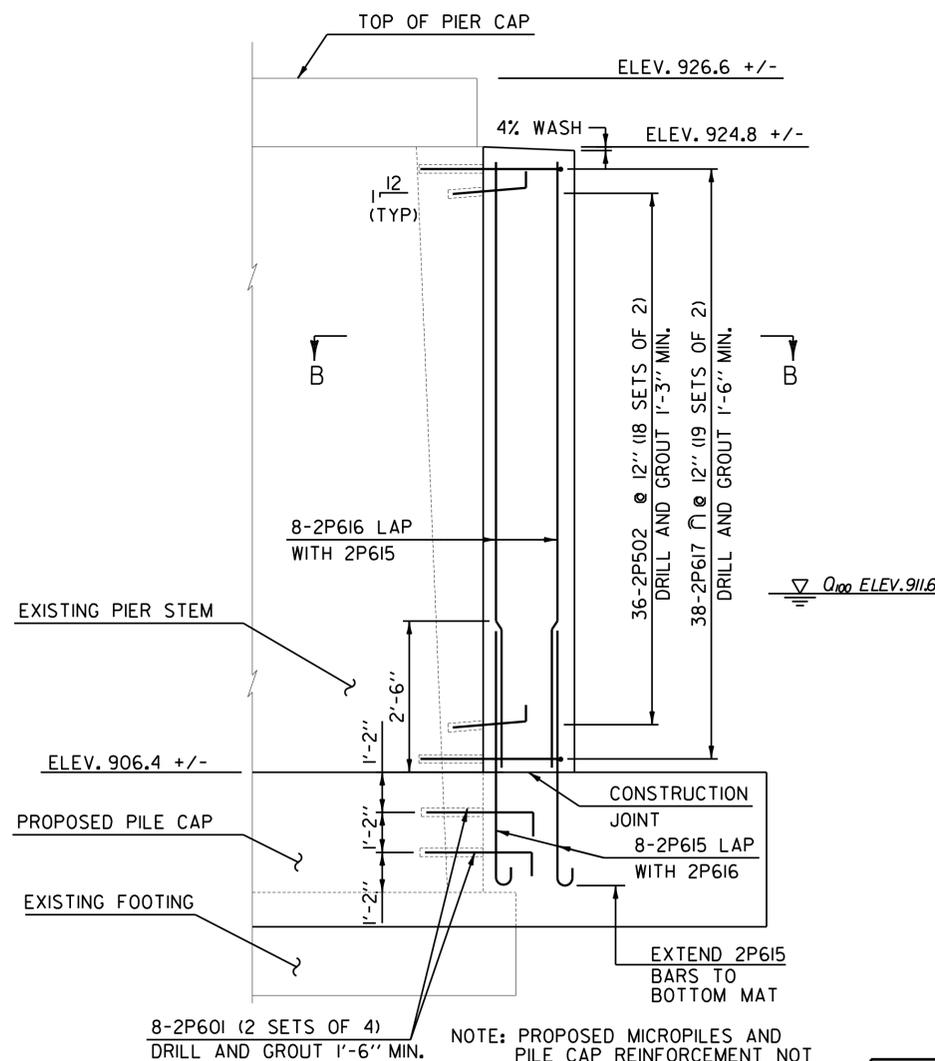


PIER 2 SECTION B-B
SCALE: 1/2" = 1'-0"



PIER 1 NOSING ELEVATION
SCALE: 3/8" = 1'-0"

NOTE: PROPOSED MICROPILES AND PILE CAP REINFORCEMENT NOT SHOWN FOR CLARITY.



PIER 2 NOSING ELEVATION
SCALE: 3/8" = 1'-0"

NOTE: PROPOSED MICROPILES AND PILE CAP REINFORCEMENT NOT SHOWN FOR CLARITY.



PIER NOSING DETAIL SHEET

PROJECT NAME: BENNINGTON
PROJECT NUMBER: ER BHF 010-1(45)

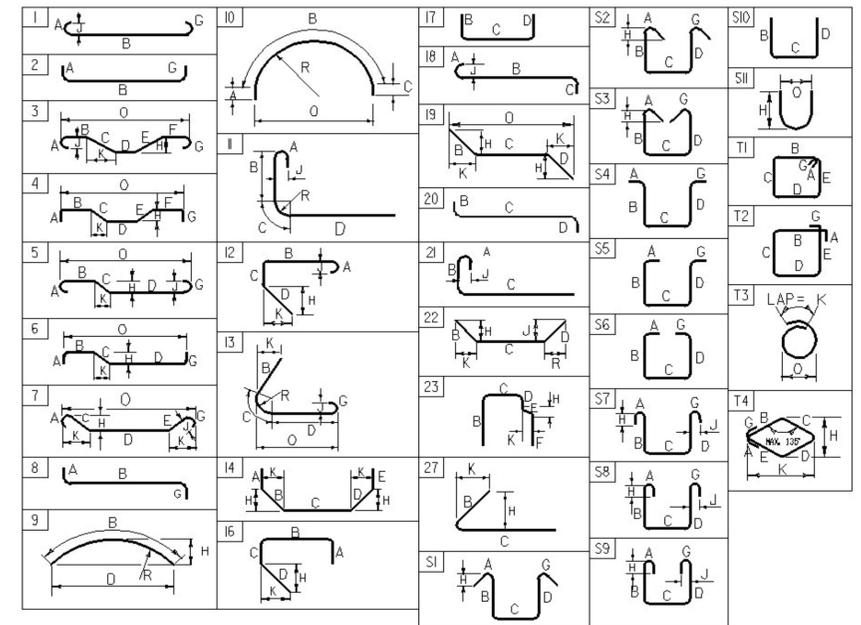
FILE NAME: z11b326_pier_detail.02.dgn PLOT DATE: 8/21/2012
PROJECT LEADER: D.E.G. DRAWN BY: M.E.D.
DESIGNED BY: K.J.K. CHECKED BY: A.M.P.
DWG. NO.: z11b326pierdetail02.1 SHEET 30 OF 40

REINFORCING STEEL SCHEDULE

ITEM	EACH	SIZE	LENGTH	MARK	TYPE	A	B	C	D	E	F	G	H	J	K	R	O	ITEM	EACH	SIZE	LENGTH	MARK	TYPE	A	B	C	D	E	F	G	H	J	K	R	O						
PIER 1																																									
*	61	4	6'-7"	1P401	STR																																				
	74	4	4'-3"	1P402	2	8"		2'-11"				8"																													
△	30	5	3'-4"	1P501	2	10"		2'-6"				---																													
	14	5	2'-10"	1P502	2	10"		2'-0"				---																													
	16	6	3'-6"	1P601	2	1'-0"		2'-6"				---																													
	16	6	40'-0"	1P602	STR																																				
▲	16	6	14'-7"	1P603	STR																																				
	3	6	8'-6"	1P604	STR																																				
	2	6	47'-7"	1P606	STR																																				
	1	6	17'-0"	1P608	STR																																				
	6	6	14'-1"	1P609	22		3'-0"	7'-7"	3'-6"																																
	35	6	4'-11"	1P610	2	1'-0"		2'-11"				1'-0"																													
▲	3	6	8'-7"	1P611	17		2'-10"	2'-11"	2'-10"																																
*	6	6	6'-4"	1P615	1		8"	5'-8"				0"																													
	5	6	13'-3"	1P616	STR																																				
	28	6	5'-2"	1P617	10	1'-6"	3'-8"	0"																																	
	9	6	19'-0"	1P621	2	1'-0"	17'-0"					1'-0"																													
	30	6	14'-4"	1P622	2	1'-0"	13'-4"					0"																													
*	31	6	7'-8"	1P623	2	1'-0"	6'-8"					0"																													
▲	6	6	14'-3"	1P624	STR																																				
	16	8	40'-0"	1P801	1	11"	39'-1"					---																													
	16	8	18'-5"	1P802	1	11"	17'-6"					0"																													
*	4	8	8'-6"	1P803	STR																																				
	8	14	22'-2"	1P1401	2	2'-7"	17'-0"					2'-7"																													
	30	14	15'-1"	1P1402	2	2'-7"	12'-6"					0"																													
*	31	14	7'-1"	1P1403	2	2'-7"	4'-6"					0"																													
PIER 2																																									
*	37	4	6'-7"	2P401	STR																																				
	74	4	4'-3"	2P402	2	8"		2'-11"				8"																													
△	30	5	3'-4"	2P501	2	10"		2'-6"				0"																													
	36	5	2'-10"	2P502	2	10"		2'-0"				0"																													
	32	6	3'-6"	2P601	2	1'-0"		2'-6"				0"																													
	14	6	40'-0"	2P602	STR																																				
▲	14	6	14'-7"	2P603	STR																																				
	2	6	32'-2"	2P604	STR																																				
*	6	6	7'-9"	2P605	STR																																				
	2	6	47'-7"	2P606	STR																																				
	3	6	18'-0"	2P607	STR																																				
	1	6	17'-0"	2P608	STR																																				
	6	6	14'-1"	2P609	22		3'-0"	7'-7"	3'-6"																																
	35	6	4'-11"	2P610	2	1'-0"		2'-11"				1'-0"																													
▲	3	6	8'-7"	2P611	17		2'-10"	2'-11"	2'-10"																																
	19	6	6'-4"	2P612	S10		1'-9"	2'-10"	1'-9"																																
	8	6	6'-4"	2P615	1		8"	5'-8"				0"																													
	8	6	18'-0"	2P616	STR																																				
	38	6	6'-5"	2P617	10	1'-6"	4'-11"																																		
	27	6	19'-0"	2P621	2	1'-0"	17'-0"					1'-0"																													
	17	6	15'-6"	2P622	2	1'-0"	14'-6"					0"																													
*	18	6	6'-8"	2P623	2	1'-0"	5'-8"					0"																													
▲	6	6	14'-3"	2P624	STR																																				
	14	8	40'-0"	2P801	1	11"	39'-1"					0"																													
	14	8	18'-5"	2P802	1	11"	17'-6"					0"																													
*	▲	6	8	7'-9"	2P803	STR																																			
	2	8	33'-1"	2P804	1	11"	32'-2"																																		
	3	8	18'-0"	2P805	STR																																				
	20	14	22'-2"	2P1401	2	2'-7"	17'-0"					2'-7"																													
	17	14	15'-1"	2P1402	2	2'-7"	12'-6"					0"																													
*	18	14	7'-1"	2P1403	2	2'-7"	4'-6"					0"																													

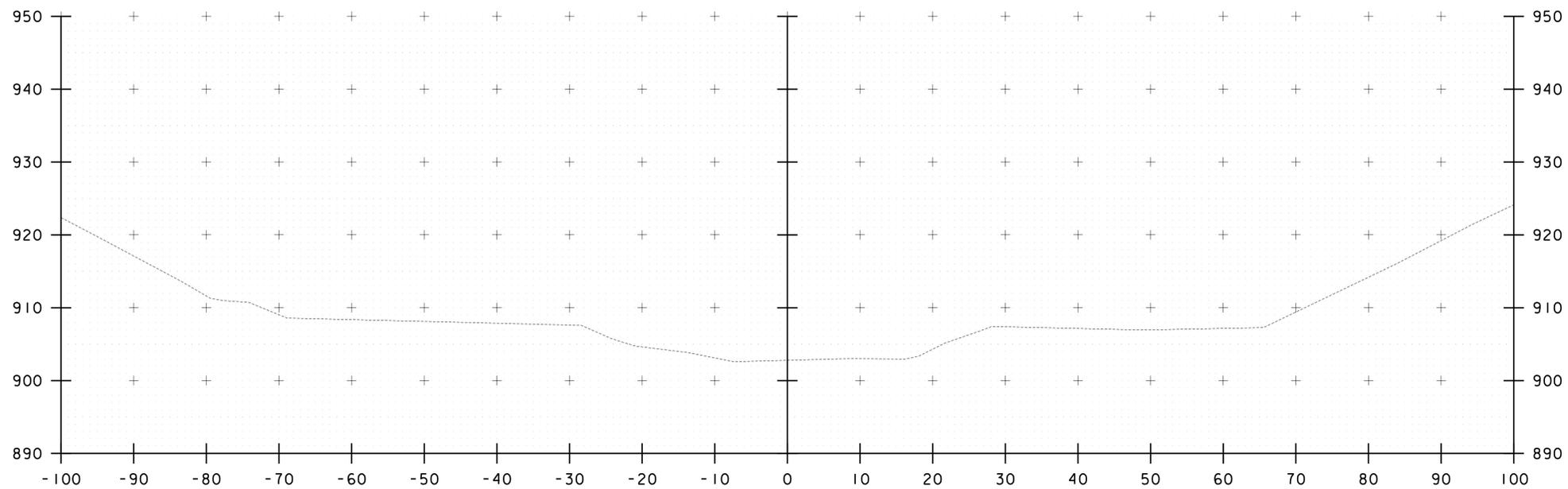
~ NOTES ~

- UNLESS OTHERWISE DESIGNATED, ALL BAR REINFORCEMENT FOR CONCRETE IN SIZES UP TO AND INCLUDING NO. 18 SHALL CONFORM TO THE REQUIREMENTS OF THE "SPECIFICATIONS FOR DEFORMED BILLET-STEEL BARS FOR CONCRETE REINFORCEMENT", AASHTO M 31 (ASTM A 615-S). ALL BARS SHALL BE GRADE 60, UNLESS OTHERWISE DESIGNATED.
- FOR TYPICAL BENDING DETAILS, RECOMMENDED PIN DIAMETER "D" OF BENDS AND HOOKS, AND OTHER STANDARD PRACTICE, SEE CURRENT CONCRETE REINFORCING STEEL INSTITUTE "MANUAL OF STANDARD PRACTICE".
- BARS WHICH REQUIRE MORE ACCURATE BENDING THAN STANDARD PRACTICES SHOULD HAVE LIMITS INDICATED.
- ALL DIMENSIONS ARE OUT TO OUT OF BAR EXCEPT "A" AND "G" ON STANDARD 180 DEGREE AND 135 DEGREE HOOKS.
- "J" DIMENSION ON 180 DEGREE HOOKS TO BE SHOWN ONLY WHERE NECESSARY TO RESTRICT HOOK SIZE. OTHERWISE, STANDARD HOOKS ARE TO BE USED.
- "H" DIMENSION ON STIRRUPS TO BE SHOWN ONLY WHEN NECESSARY TO MAINTAIN CLEARANCES.
- WHERE SLOPE DIFFERS FROM 45 DEGREES, DIMENSIONS "H" AND "K" MUST BE SHOWN.
- ▲ DENOTES BARS TO BE CUT IN FIELD.
- * DENOTES ONE EXTRA BAR ADDED FOR TESTING PURPOSES.
- △ DENOTES TWO EXTRA BARS ADDED FOR TESTING PURPOSES.
- E IN BAR MARK PREFIX DENOTES EPOXY COATED REINFORCING STEEL.

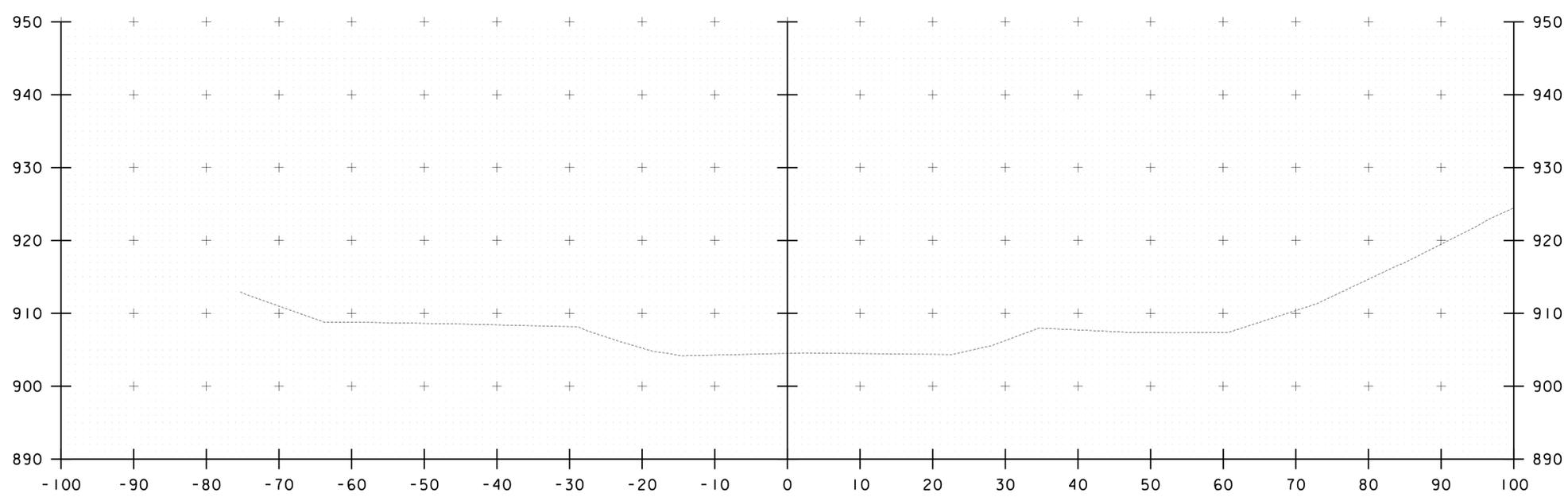


ASTM STANDARD
REINFORCING BARS

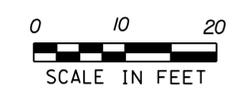
BAR SIZE DESIGNATION	WEIGHT POUNDS PER FOOT	NOMINAL DIMENSIONS ROUND SECTION		
		DIAMETER INCHES	AREA INCHES ²	PERIMETER INCHES
#3	0.376	0.375	0.11	1.178
#4	0.668	0.500	0.20	1.571



21+25.00

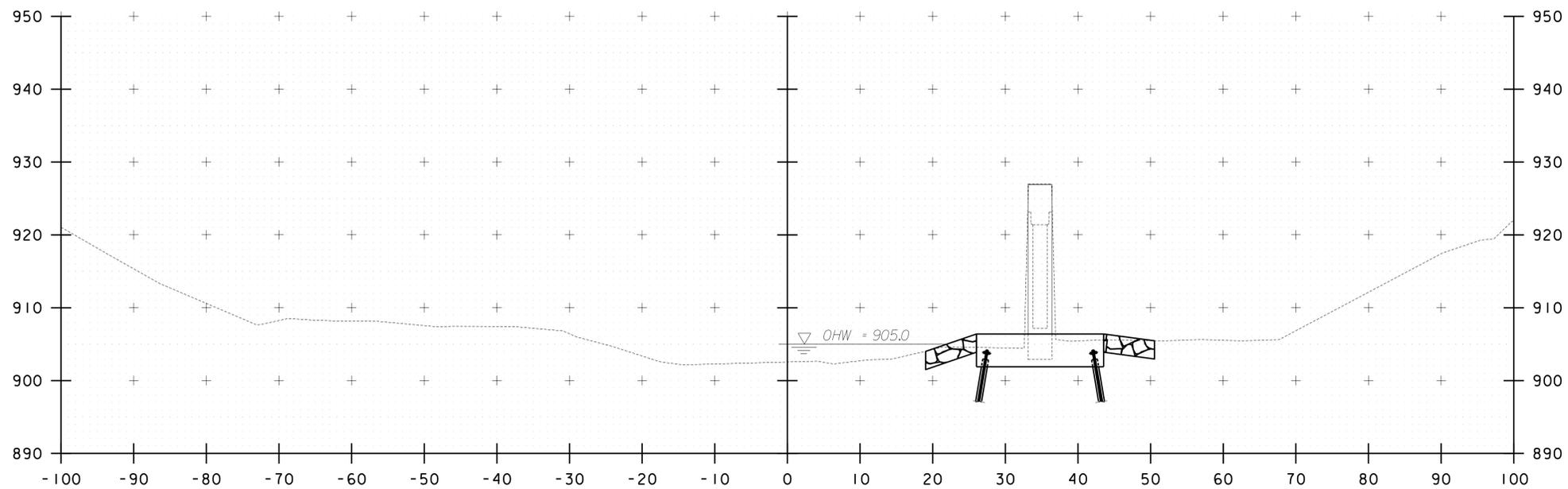


21+00.00

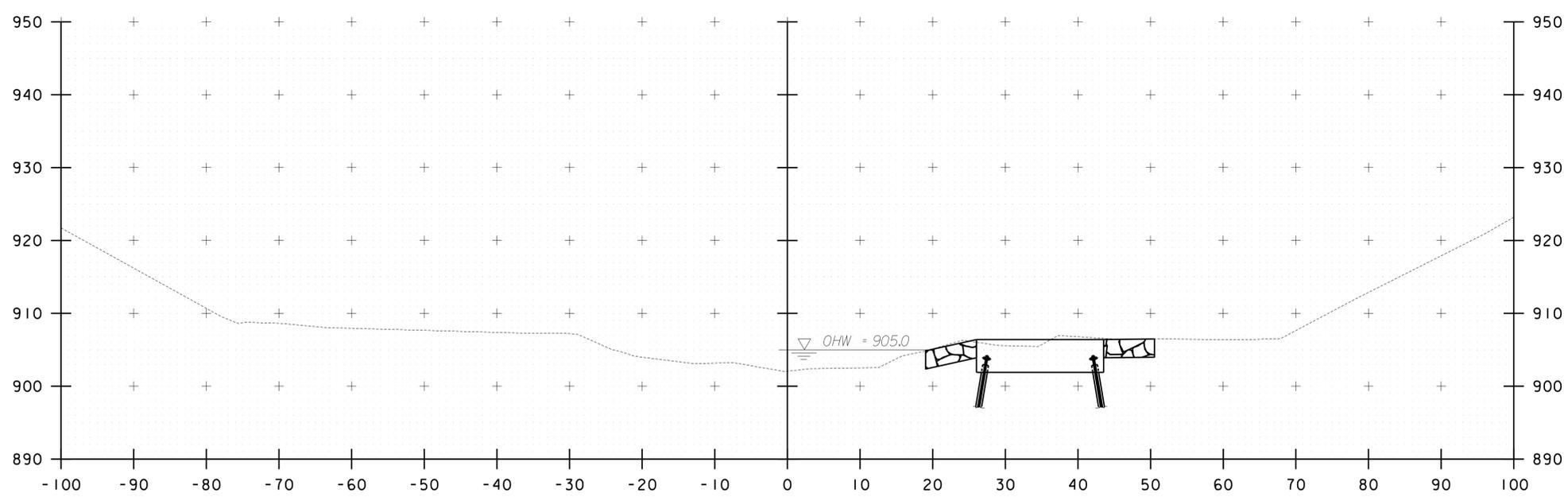


CHANNEL CROSS SECTIONS SHEET #1	PROJECT NAME: BENNINGTON	
	PROJECT NUMBER: ER BHF 010-I(45)	
	FILE NAME: z11b326_xs_channel.dgn	PLOT DATE: 8/21/2012
	PROJECT LEADER: D.E.G.	DRAWN BY: W.E.P.
	DESIGNED BY: B.T.H.	CHECKED BY: D.E.G.
	DWG. NO.: z11b326xs.i	SHEET 32 OF 40

FILE NAME = N:\p\2105ts\ANY\K2\3770\CADD\MSTN_z11b326_xs_channel.dgn
 DATE/TIME = 8/21/2012 10:56:00
 USER = 4066

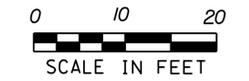


21+75.00



21+50.00

STA 21+45.00 RT
 BEGIN RIPRAP, HEAVY TYPE
 BEGIN STRUCTURE EXCAVATION
 BEGIN GEOTEXTILE UNDER STONE FILL

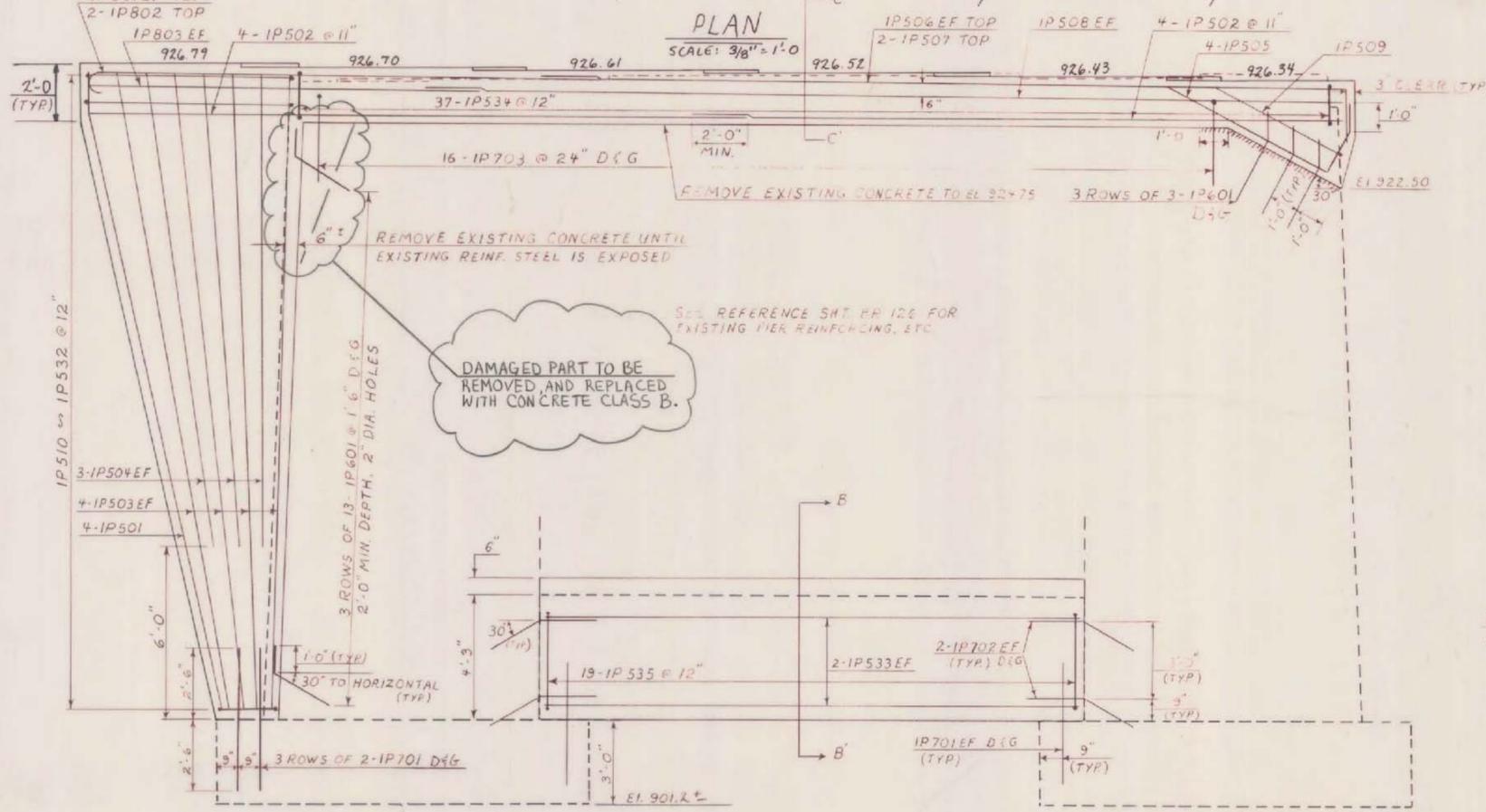
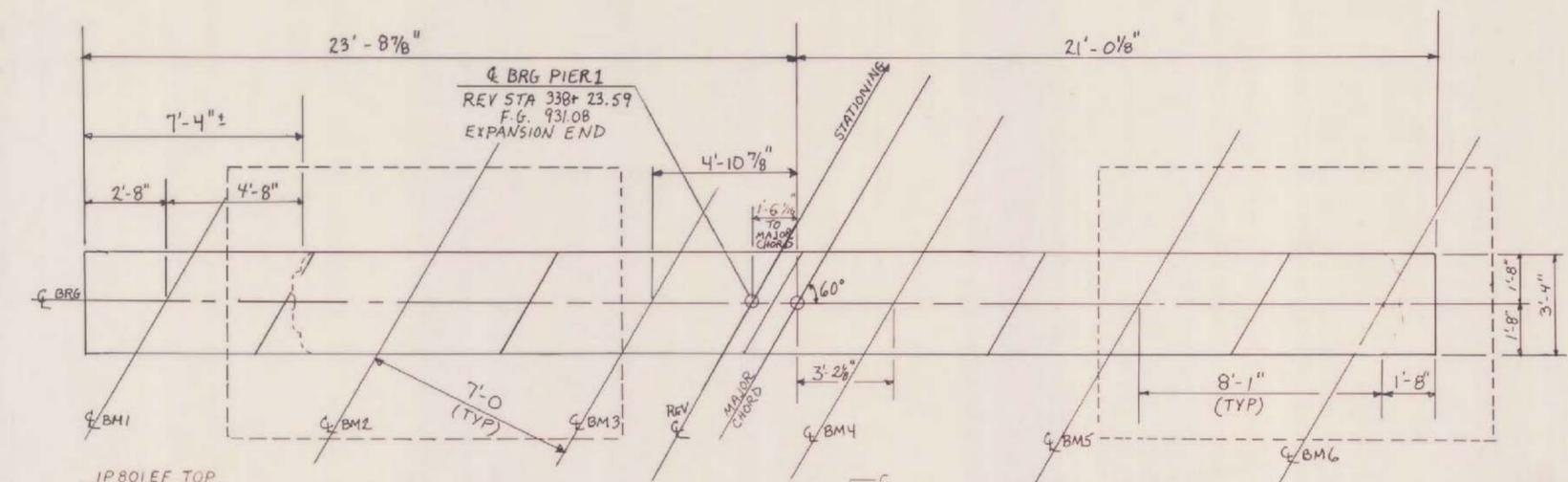


**CHANNEL
 CROSS
 SECTIONS
 SHEET #2**

PROJECT NAME: BENNINGTON	PLOT DATE: 8/21/2012
PROJECT NUMBER: ER BHF 010-I(45)	DRAWN BY: W.E.P.
FILE NAME: z11b326_xs_channel.dgn	CHECKED BY: D.E.G.
PROJECT LEADER: D.E.G.	SHEET 33 OF 40
DESIGNED BY: B.T.H.	
DWG. NO.: z11b326xs.i	

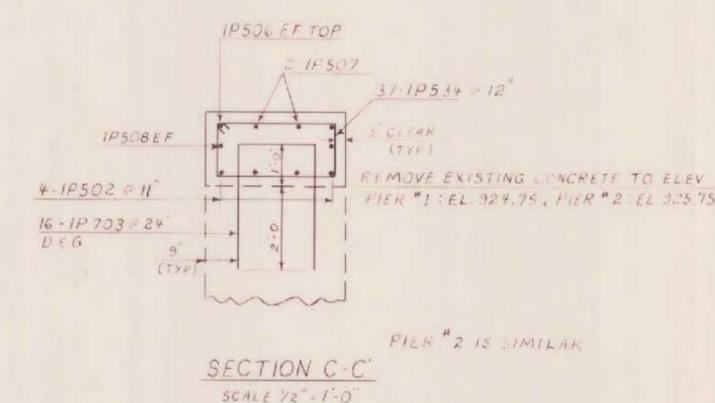


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 DATE/TIME: 8/21/2012 10:56:00
 USER: 4066

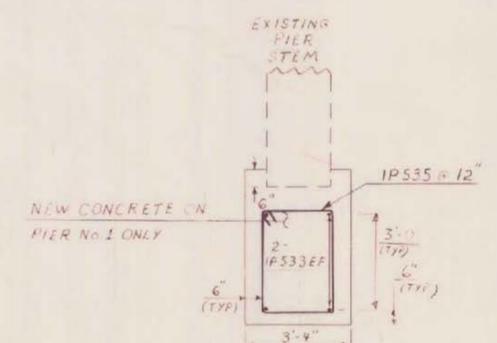


ELEVATION
SCALE: 3/8" = 1'-0"

FOR ADDITIONAL INFORMATION SEE
PIER No. 2 DETAIL SHEET



SECTION C-C'
SCALE 1/2" = 1'-0"



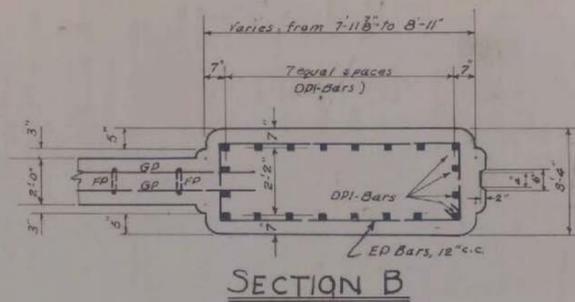
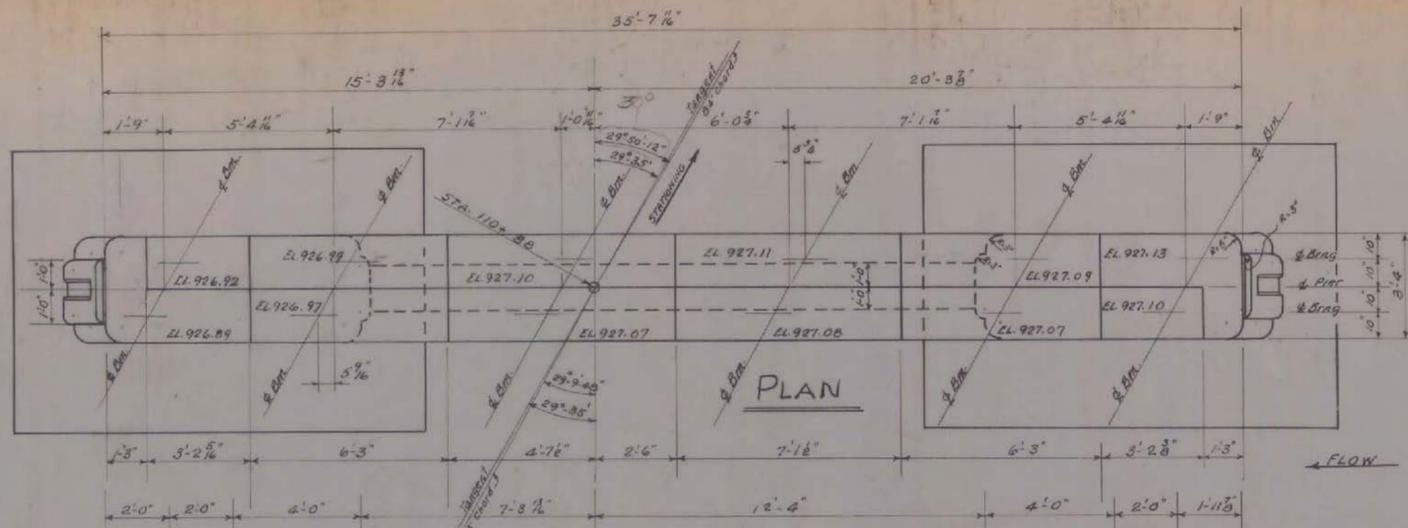
SECTION B-B'
SCALE 3/8" = 1'-0"

D&G = Drill and Grout Reinforcing Steel with Existing Concrete. See Gen. Note #6.
Epoxy = Place Epoxy Bonding Compound

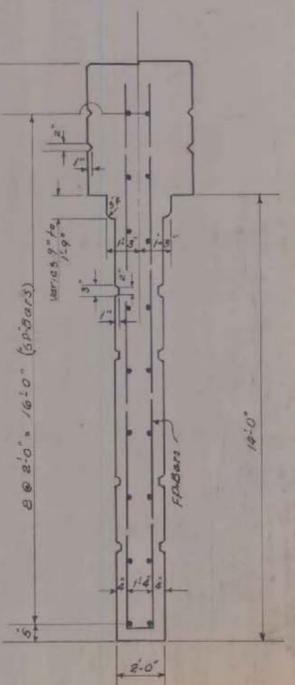
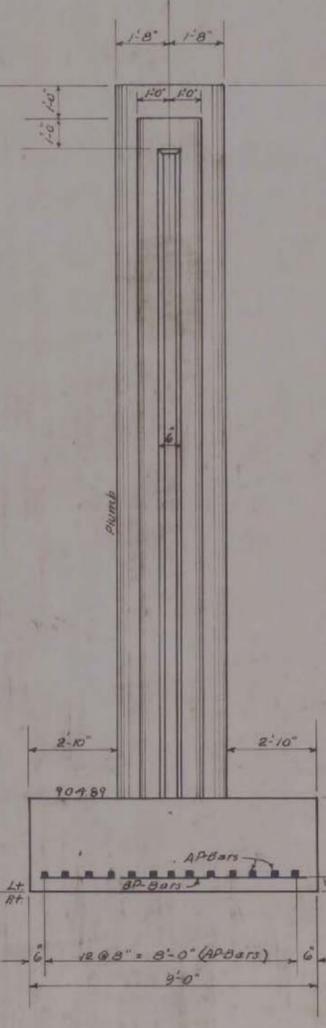
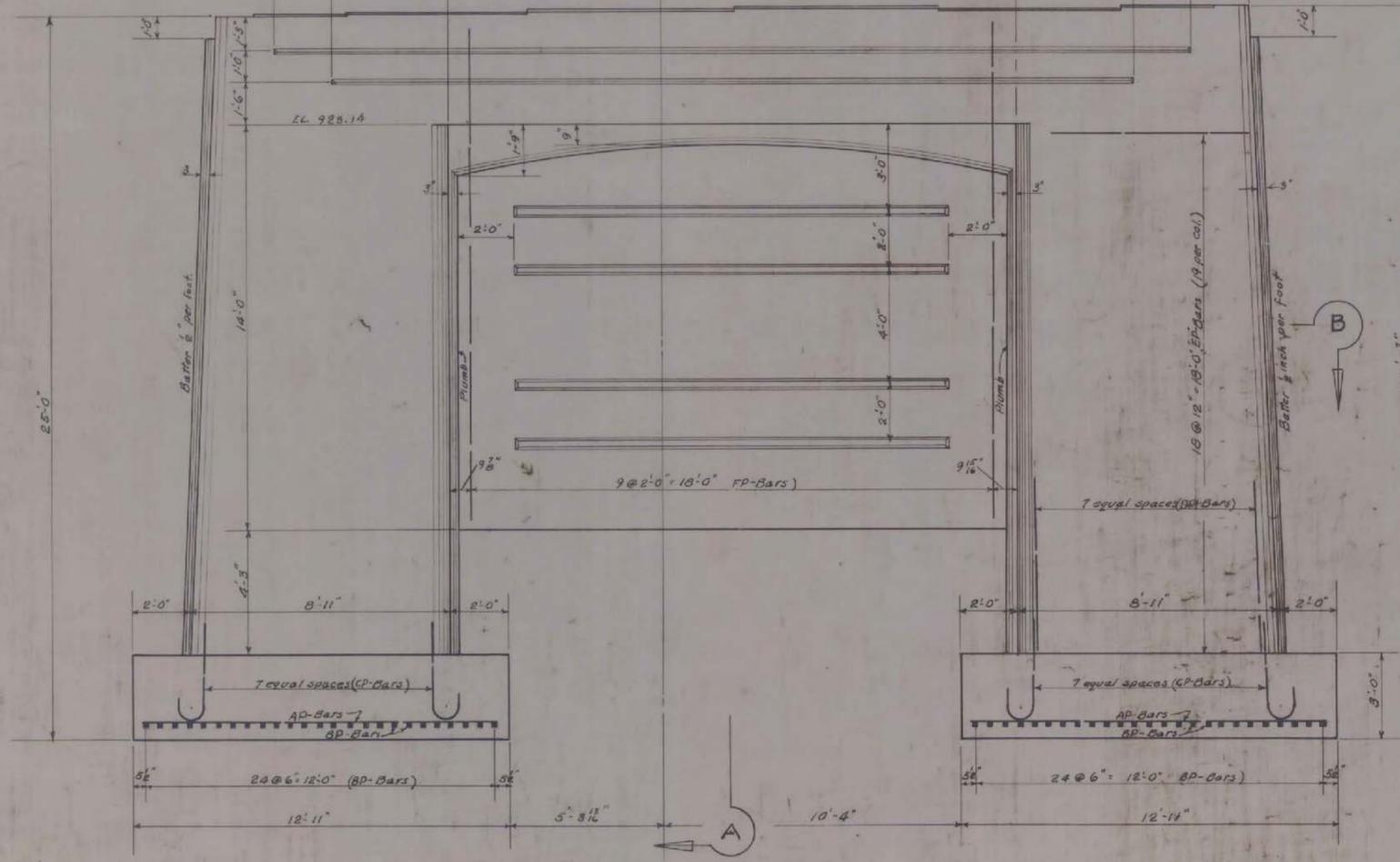
REVISED SHEET
S. FARNSWORTH 5/88
REVISION - REMOVAL OF DAMAGED CONCRETE AT DOWNSTREAM TOP CORNER OF PIER.

STATE OF VERMONT AGENCY OF TRANSPORTATION	
Town of BENNINGTON	Bridge No. 9
Highway No. VT. RTE 9	Log Sta. 338+66 REV. Sta. 338+65.58
VT RTE 9 OVER ROARING BRANCH PIER # 1 DETAILS	
Designed By S.G. FARNSWORTH	Drawn By D.Z. GILMAN
Checked By C. MUMFORD	Bridge Design Supervisor F.W. Bolkun Date 2/87
PROJECT BENNINGTON	PROJECT NO. BHF 010-1(21)S
I.G.C. Info.	
Bridge Sheet No. BR 11 R	Sheet 23 of 70

BRUNING 44332 64442



REINFORCING STEEL				
MARK	REQD. SIZE	TOTL LGTH.	SHAPE	
AP	26	1" dia	12'-3"	Straight
BP	50	1" dia	8'-4"	Straight
CP	40	1 1/2" dia	9'-8"	
DP	40	1 1/2" dia	21'-6"	Straight
EP	38	3/8" dia	21'-0" (avg) Lengths vary from 20'-0" to 22'-0" (avg 21'-0")	
FP	10	5/8" dia	35'-0"	
GP	18	5/8" dia	22'-0"	Straight



FRONT ELEVATION

END ELEVATION

SECTION A

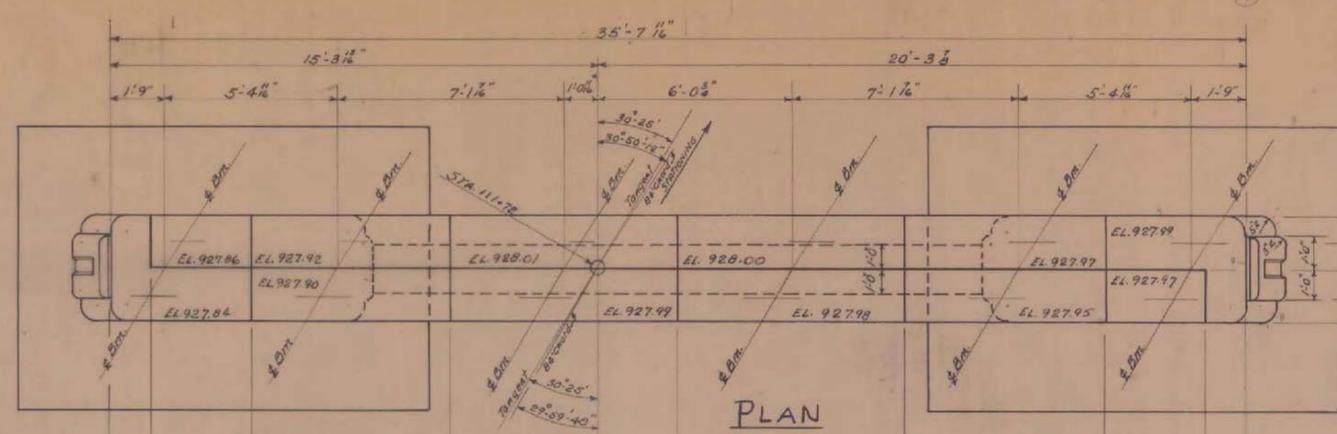
FOR REFERENCE ONLY
 Bennington
 BHF 210-2(21)S
 Sheet BR126 of

DETAILS OF PIER 2
 FURNACE BRIDGE
 BENNINGTON, VT.
 SCALE 3/4"=1'

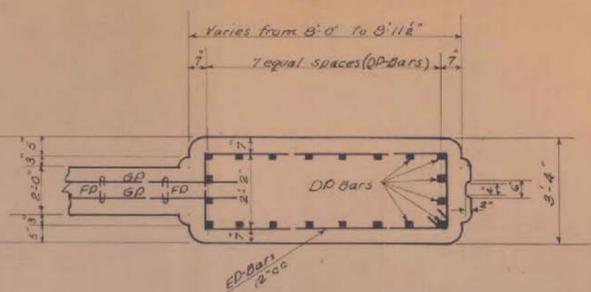
ESTIMATED QUANTITIES

STRUCTURE EXCAVATION	90-C.Y.	90.7
CONCRETE CLASS 'A'	103-C.Y.	104.5
REINFORCING STEEL	10120 LBS	10116

Surveyed by
 Designed by J.G.G.
 Drawn by J.G.G. Feb. 28, 1940
 Traced by D.W.P.
 Checked by L.M.B.
 Series R.A.P. No. 105.C(1) Filed
 Sheet 13 of 41 Sheets



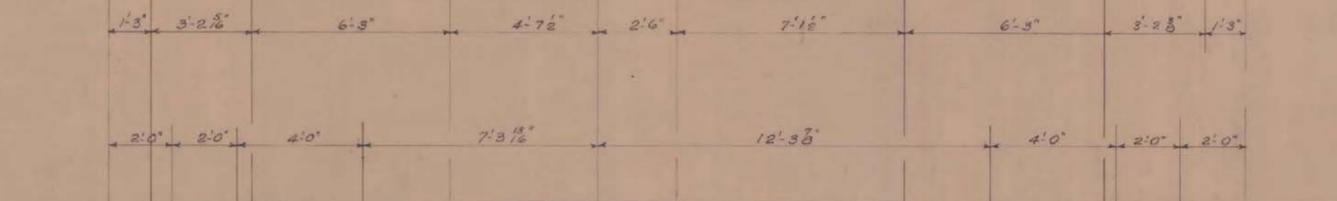
PLAN



SECTION-B

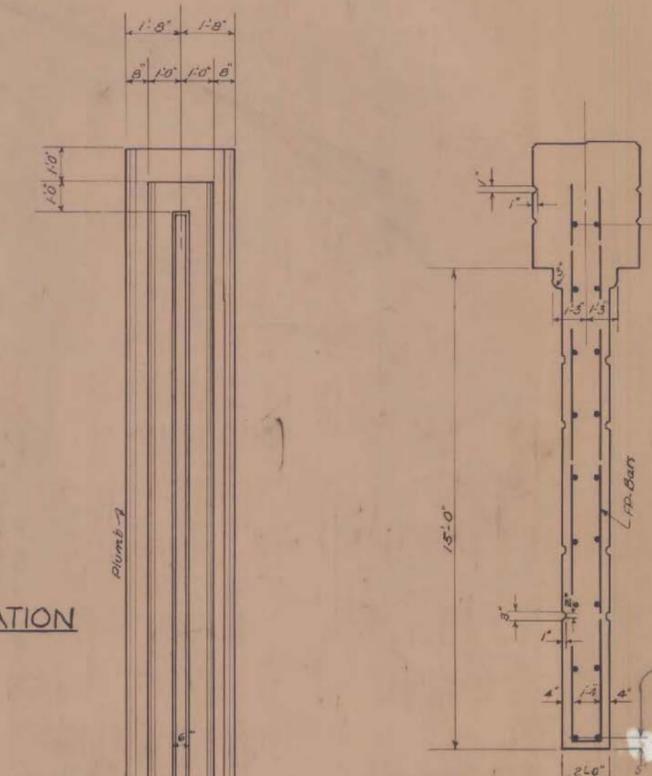
REINFORCING STEEL

MARK	REQ'D SIZE	TOT. LGTH.	SHAPE
AP	26 1"φ	12'-3"	Straight
BP	50 1"φ	8'-4"	"
CP	40 1 1/2"φ	9'-3"	7'-6"
DP	2 40 1 1/4"φ	22'-6"	Straight
EP	40 3/8"φ	21'-0" avg Lgth. varies from 20'-0" to 22'-0" (avg 21'-0")	"
FP	10 5"φ	35'-4"	17'-0"
GP	18 5"φ	22'-0"	Straight



FRONT ELEVATION

END ELEVATION



SECTION A

FOR REFERENCE ONLY

Bennington
BHF 010-2(21)5
Sheet BR127 of

DETAILS OF DIER 2
FURNACE BRIDGE
BENNINGTON, VT.

Scale 3/8" = 1 ft.

ESTIMATED QUANTITIES

Structure Excavation	102 C.Y.	112.9	Surveyed by	J. G. G.	2-29-40
Concrete Class "A"	107 C.Y.	112.2	Designed by	J. G. G.	
Reinforcing Steel	10,348 lbs.	10348	Drawn by	J. G. G.	
			Traced by	D. W. P.	
			Checked by	L. M. B.	
			Series	FAR No. 105 C(1)	Filed
				Sheet 114 of 114	Shaded

NOTES CONT.

MAINTENANCE

SIGNS SHALL BE MAINTAINED IN A CLEAN AND LEGIBLE CONDITION SATISFACTORY TO THE ENGINEER. THEY SHALL BE COMPLETELY VISIBLE TO APPROACHING TRAFFIC AT ALL TIMES. THEY SHALL BE KEPT PLUMB AND LEVEL, AND ALWAYS PRESENT A NEAT APPEARANCE. DAMAGED, DEFACED, OR DIRTY SIGNS SHALL BE REPAIRED, CLEANED OR REPLACED AS ORDERED BY THE ENGINEER.

GENERAL

THE COST OF FURNISHING, INSTALLING, MAINTAINING AND REMOVING ALL CONSTRUCTION APPROACH SIGNS WILL BE CONSIDERED INCIDENTAL WORK PERTAINING TO THE PROJECT AS A WHOLE AND SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID FOR VARIOUS ITEMS INVOLVED IN THE CONTRACT. DURING ALL PHASES OF CONSTRUCTION THE REQUIREMENTS SET FORTH IN THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" SHALL BE MET.

SIGN COVERS

SIGN COVERS SHALL CONSIST OF A PANEL PAINTED FLAT BLACK, THE SAME SIZE AS THE SIGN IT COVERS. THE PANEL SHALL BE OF WOOD, PLYWOOD, HARDBOARD OR ANY MATERIAL SATISFACTORY TO THE ENGINEER. NO MATERIAL WILL BE APPROVED THAT WILL DETERIORATE BY EXPOSURE TO THE WEATHER DURING THE PROJECT. MOUNTING OF THE PANEL SHALL BE DONE IN SUCH A WAY AS NOT TO DAMAGE THE SIGN FACE MATERIAL.

CONTRACTORS SHALL COORDINATE THEIR SIGNING ACTIVITIES WITH OTHER CONTRACTORS WITHIN THE PROJECT LIMITS, AS DIRECTED BY THE REGIONAL CONSTRUCTION ENGINEER.

SIGN POSTS

WHERE CONSTRUCTION SIGN INSTALLATIONS ARE NOT PROTECTED BY GUARD RAIL OR OTHER APPROVED TRAFFIC BARRIERS, THE POSTS ON WHICH THE SIGNS ARE MOUNTED SHALL BE YIELDING METAL POSTS AS DESIGNATED IN THE E SERIES OF STANDARD DRAWINGS OR YIELDING WOODEN POSTS IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS:

WOODEN POSTS ARE ACCEPTABLE FOR USE WITH CONSTRUCTION SIGNS. THESE POSTS SHALL HAVE A UNIFORM CROSS-SECTION AND SHALL BE MADE FROM GRADE 2, AIR-DRIED SOUTHERN YELLOW PINE OR ANOTHER EQUIVALENT SOFTWOOD. AN ACCEPTABLE EQUIVALENT SOFTWOOD SHALL HAVE AN EXTREME FIBER IN BENDING "FB" DESIGN VALUE NOT TO EXCEED 1400 PSI AND HORIZONTAL SHEAR "FV" DESIGN VALUE NOT TO EXCEED 90 PSI SPECIFICATION. DESIGN VALUES FOR WOOD CONSTRUCTION AND RELATED SUPPLEMENT, LATEST EDITION.

AS ESTABLISHED BY THE NATIONAL FOREST PRODUCTS ASSOCIATION IN THEIR NATIONAL DESIGN. THE FOLLOWING ARE CONSIDERED TO BE ACCEPTABLE WOODEN POSTS:

- 1. 4" X 4" (ACTUAL DIMENSIONS ARE S4S 3.5" X 3.5")
- A) ACCEPTABLE FOR SINGLE OR DUAL POSTS INSTALLATION WITH NO MODIFICATIONS.

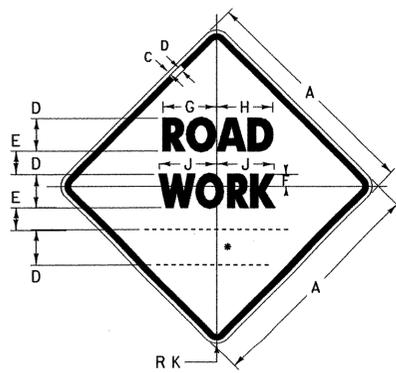
ALL WOODEN POSTS SHALL HAVE AN EMBEDMENT DEPTH OF 4 FEET. NO CROSS-BRACING OR BACK-BRACING TO KEEP THE POSTS PLUMB WILL BE ALLOWED. CONCRETE FOUNDATIONS, COLLARS, OR SOIL BEARING PLATES ARE NOT PERMITTED. CONSTRUCTION SIGNS SHALL BE PLACED ON TWO OR MORE POSTS WHEN ANY OF THE FOLLOWING CONDITIONS GOVERN:

- A) THE SIGN WIDTH (HORIZONTAL DIMENSIONS FOR DIAMOND SHAPED SIGNS) EXCEEDS 3 1/2 FEET.
- B) THE EXPOSED SIGN AREA OF ANY SINGLE SIGN OR ASSEMBLY EXCEEDS 7 SQ. FEET.
- C) THE Sv OF A SINGLE POST IS 64.

OTHER STDS. REQUIRED: E-100A, E-101, E-102

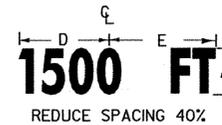
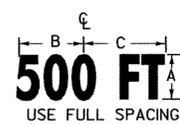


**STANDARD
E-100**

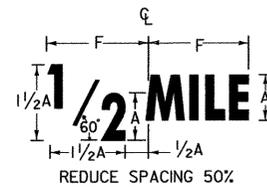
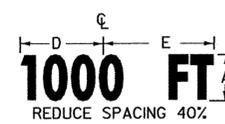


W20-1

• SEE DISTANCE DETAILS



REDUCE SPACING 40%



REDUCE SPACING 50%



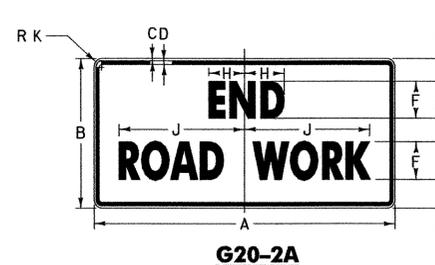
USE FULL SPACING

DISTANCE DETAILS

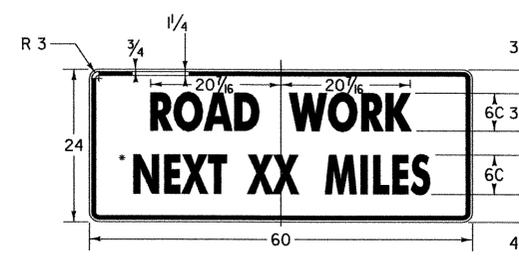
SIGN	DIMENSIONS (INCHES)									
	A	B	C	D	E	F	G	H	J	K
MIN.	36	3/8	7/8	5D	3 1/2	3 1/4	8 3/8	8 7/8	9	2 1/4
STD.	48	3/4	1 1/4	7D	4 3/4	4 1/2	11 1/8	12 1/8	12 5/8	3

DIMENSIONS (INCHES)							
A	B	C	D	E	F	G	H
5D	10 3/16	10 3/16	11 5/8	11 1/4	11 1/4	9 1/2	10 7/8
7D	14 1/4	15 1/8	14 7/8	15 3/4	15 3/4	13 1/16	15 1/2

(ALL DIMENSIONS SHOWN IN INCHES)



G20-2A



G20-1

• OPTICALLY CENTER

THIS SIGN TO BE USED WHEN PROJECT LENGTH EXCEEDS 2 MILES OR AS REQUESTED BY THE RESIDENT ENGINEER. SHOW MILEAGE TO NEAREST 1/4 MILE USING FRACTIONS, NOT DECIMALS. HAND LETTERING OF MILEAGE WILL NOT BE ALLOWED.

SIGN	DIMENSIONS (INCHES)										
	A	B	C	D	E	F	G	H	J	K	
MIN.	36	18	3/8	7/8	3 3/4	4C	2 1/2	4	12 5/8	2 1/4	
STD.	48	24	3/4	1 1/4	4 1/8	6C	3 3/4	5 7/8	22	3	

NOTES

THE SIGNS SHOWN ON THIS SHEET ARE INTENDED FOR USE IN PROVIDING ADVANCE WARNING AND INFORMATION ON CONSTRUCTION PROJECTS OVER WHICH TRAFFIC WILL BE MAINTAINED. WHEN ADDITIONAL APPROACH SIGNS OR OTHER TYPES OF ADVANCE SIGNING OR CONTROL ARE NECESSARY, THE PLANS AND/OR THE SPECIFICATIONS FOR THAT PROJECT WILL GIVE THE DETAILS OF THE SIGNS AND DEVICES REQUIRED. FOR ON-PROJECT CONSTRUCTION SIGNS, REFER TO APPROPRIATE STANDARD SHEETS.

APPLICATION OF STANDARDS

SINCE IT IS NOT POSSIBLE TO PRESCRIBE DETAILED STANDARDS OF APPLICATION FOR ALL OF THE SITUATIONS THAT MAY CONCEIVABLY ARISE ON A CONSTRUCTION PROJECT, REFERENCE SHALL BE MADE TO THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" FOR THE PRINCIPLES, PROCEDURES, AND STANDARDS THAT WILL BE REQUIRED IN CONNECTION WITH ADVANCED WARNING AND ON-PROJECT CONSTRUCTION SIGNS AND BARRICADES. THE SIGNS SHOWN IN E-101 AND E-102 REPRESENT A SAMPLE OF THOSE MORE COMMONLY USED.

LOCATION

THE SIGNS SHALL BE LOCATED AS DETAILED ON THIS SHEET OR AS OTHERWISE SHOWN ON THE PLANS. THEY SHALL APPEAR AT EACH END OF THE HIGHWAY UNDER CONSTRUCTION AND ON ALL INTERSECTING PUBLIC HIGHWAYS. THE ENGINEER SHALL DETERMINE THE EXACT LOCATIONS.

DESIGN

LETTERS, DIGITS, ARROWS, SPACING AND TEXT DIMENSIONS SHALL CONFORM WITH THE "STANDARD HIGHWAY SIGNS BOOK" AND DESIGNS PRESCRIBED IN THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) ADOPTED BY THE U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION (FHWA).

MATERIALS

THE SIGN BASE MATERIAL USED FOR THE SIGNS ON THIS SHEET MAY BE ANY OF THE FOLLOWING, WITH MINIMUM THICKNESS AS NOTED.

FLAT SHEET ALUMINUM	0.125 INCHES
HIGH DENSITY OVERLAYED PLYWOOD	5/8 INCHES

REFLECTORIZATION

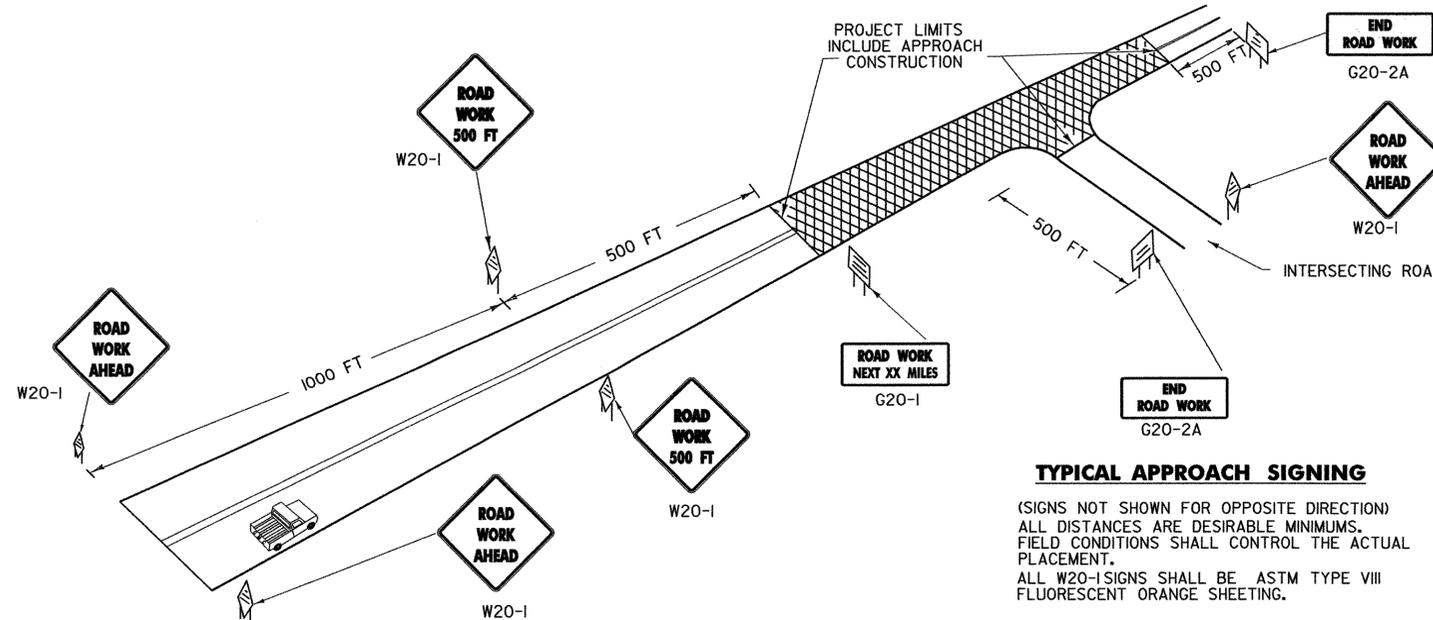
ALL LEAD SIGNS (W20-1) ON THIS SHEET SHALL BE ASTM TYPE VIII FLUORESCENT ORANGE SHEETING. ALL OTHER SIGNS ON THIS SHEET SHALL BE ASTM TYPE III RETROREFLECTORIZED SHEETING.

COLORS

THE COLORS SHALL CONFORM WITH THE STANDARD COLORS ADOPTED BY AASHTO AND APPROVED BY THE FHWA. COLORS SHOWN ON THIS SHEET CONSIST OF BLACK TEXT AND BORDER ON A RETROREFLECTORIZED ASTM TYPE III OR TYPE VIII ORANGE BACKGROUND.

INSTALLATION

THE SIGNS SHALL BE ERECTED BEFORE THE START OF ANY WORK AND SHALL BE COVERED UNTIL WORK COMMENCES, DURING PERIODS OF INACTIVITY, OR UPON COMPLETION OF THE WORK. EACH SIGN SHALL BE ERECTED IN A NEAT AND WORKMANLIKE MANNER ON POSTS SET SECURELY IN THE GROUND. THE BOTTOM OF A SIGN SHALL BE AT LEAST 7 FEET ABOVE THE EDGE OF PAVEMENT, AND THE NEAREST EDGE OF A SIGN SHALL BE AT LEAST 6 FEET OUTSIDE THE SHOULDER POINT, 4 FEET OUTSIDE GUARD RAIL, OR 2 FEET OUTSIDE CURBING, OR SIDEWALK. THE INSTALLATION OF SIGNS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER, IN URBAN AREAS, THE BOTTOM OF THE SIGN SHALL BE AT LEAST 7 FEET ABOVE THE SIDEWALK. SIGNS MAY BE REMOVED UPON COMPLETION OF THE WORK AT THE DISCRETION OF THE ENGINEER.



TYPICAL APPROACH SIGNING

(SIGNS NOT SHOWN FOR OPPOSITE DIRECTION)
ALL DISTANCES ARE DESIRABLE MINIMUMS.
FIELD CONDITIONS SHALL CONTROL THE ACTUAL PLACEMENT.
ALL W20-1 SIGNS SHALL BE ASTM TYPE VIII FLUORESCENT ORANGE SHEETING.

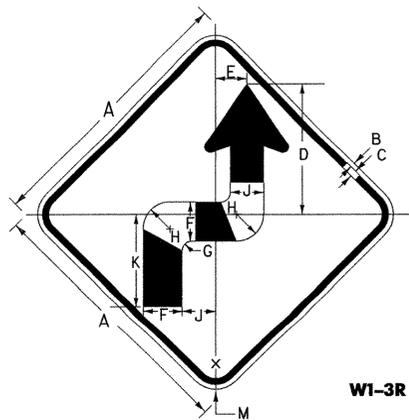
REVISIONS AND CORRECTIONS

- MAY 26, 1989 - DATE OF ORIGINAL ISSUE
- OCT 21, 1992 - REVISED WOOD POST REQUIREMENTS, ADDED SIGN DETAILS, & REVISED TITLE BLOCK
- AUG. 08, 1995 - MINOR NOTE REVISIONS
- JAN. 06, 1997 - MINOR NOTE AND DIMENSION REVISIONS
- JAN. 2, 2004 - CHANGED REFLECTIVE SHEETING TO ASTM TYPE III OR TYPE VIII

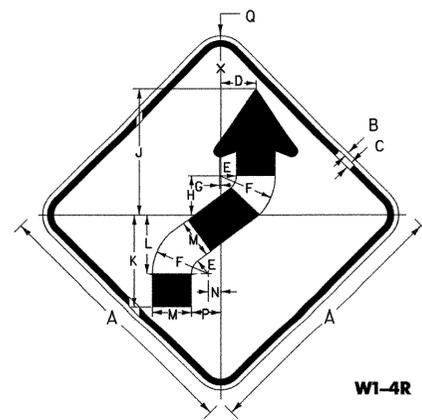
APPROVED

DIRECTOR OF PROGRAM DEVELOPMENT
TRAFFIC OPERATIONS ENGINEER
FEDERAL HIGHWAY ADMINISTRATION

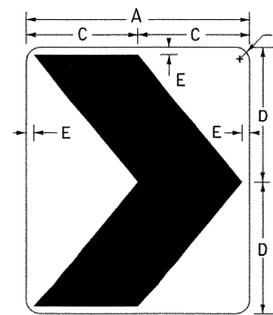
**CONSTRUCTION APPROACH
SIGNS**



W1-3R

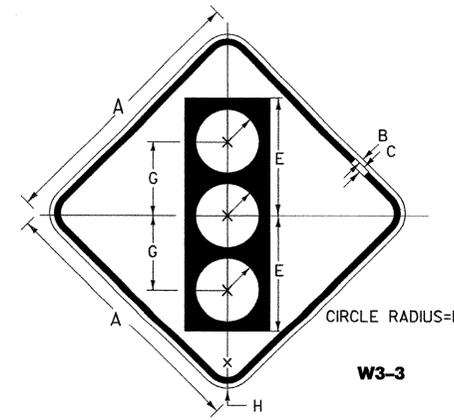


W1-4R



W1-8

SIGN	DIMENSIONS (INCHES)					
	A	B	C	D	E	F
STD.	18	24	9	12	3/4	1 1/2
SPECIAL	24	30	12	15	7/8	1 7/8
EXPWY.	30	36	15	18	1	1 7/8
FRWY.	36	48	18	24	1 1/8	2 1/4



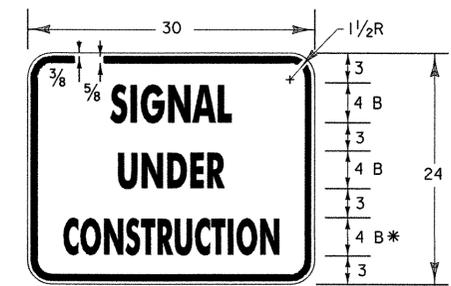
W3-3

SIGN	DIMENSIONS (INCHES)							
	A	B	C	D	E	F	G	H
STD. & MIN.	36	5/8	7/8	5 3/4	15 3/4	4 1/4	10	2 1/4
SPECIAL	48	3/4	1 1/4	7 1/2	20	5	12 1/2	3

COLORS

SYMBOL & LEGEND - BLACK (NON-REFL)
BACKGROUND - ORANGE (REFL)

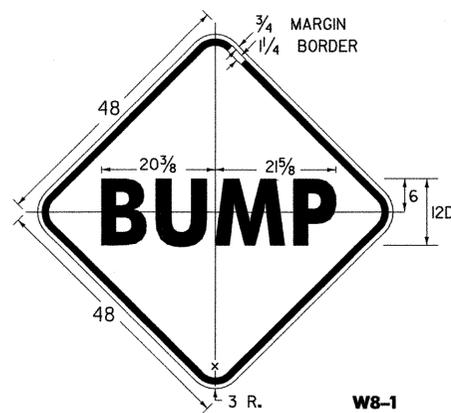
TOP CIRCLE RED (REFL)
MIDDLE CIRCLE YELLOW (REFL)
BOTTOM CIRCLE GREEN (REFL)



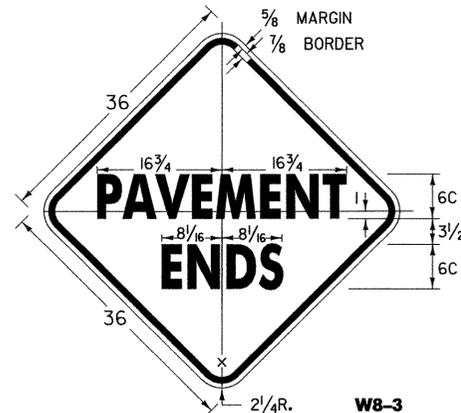
* REDUCE SPACING 50%

SIGN	DIMENSIONS (INCHES)												
	A	B	C	D	E	F	G	H	J	K	L	M	
STD. & MIN.	36	5/8	7/8	17 1/16	4 1/32	5 1/4	1 1/4	3 5/8	4 1/2	12 5/32	1 7/32	2 1/4	
SPECIAL	48	3/4	1 1/4	23 3/16	5 5/8	7	1 5/8	4 7/8	6	16 5/8	2 3/16	3	

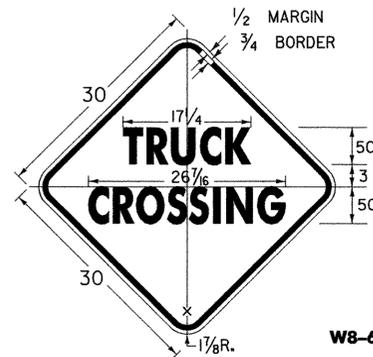
SIGN	DIMENSIONS (INCHES)															
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	
STD. & MIN.	36	5/8	7/8	4 2/32	2 1/4	7 1/2	5 3/32	5 1/4	16 7/8	12 3/8	7 7/8	5 1/4	1 1/16	3 15/16	2 1/4	
SPECIAL	48	3/4	1 1/4	6 5/16	3	10	3 1/16	7	22 1/2	16 1/2	10 1/2	7	2 1/4	5 1/4	3	



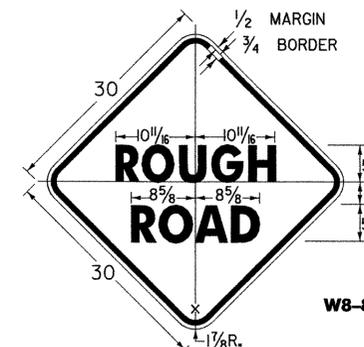
W8-1



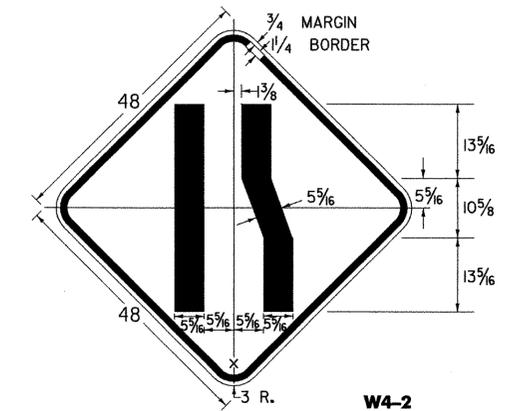
W8-3



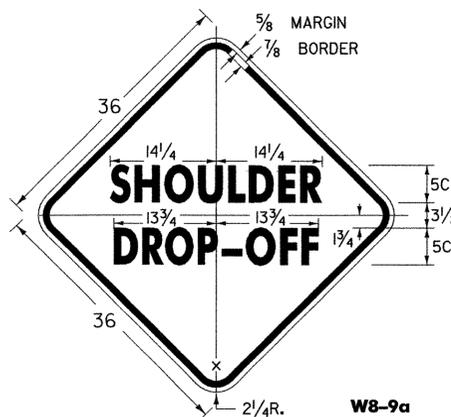
W8-6



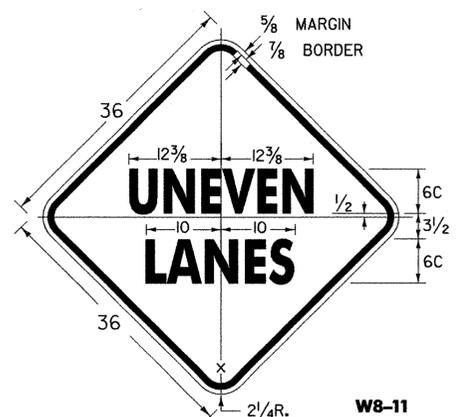
W8-8



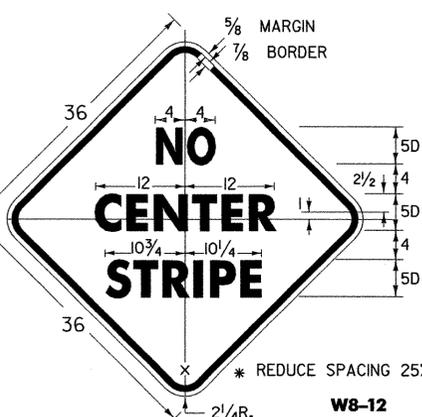
W4-2



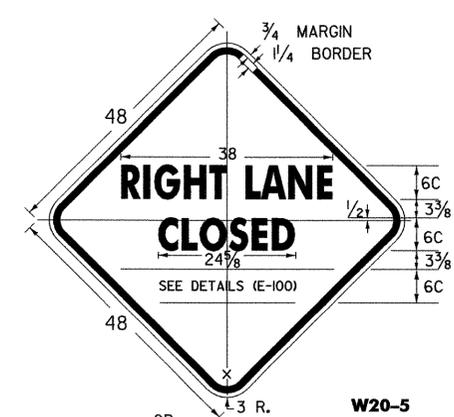
W8-9a



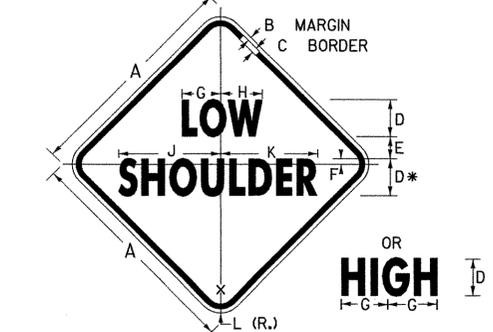
W8-11



W8-12



W20-5



W8-9

SIGN	DIMENSIONS (INCHES)										
	A	B	C	D	E	F	G	H	J	K	L
STD.	30	1/2	3/4	5C	3	3/4	5 5/8	5 5/8	13 1/16	13 1/16	1 7/8
FWY.	48	3/4	1 1/4	8C	5	1 1/4	8 1/4	9	21 5/8	20 5/8	3

* REDUCE SPACING 25%

NOTES

SEE STANDARD SHEET E-100 FOR NOTES AND TEXT DETAILS
COLORS FOR SIGNS SHOWN ON THIS SHEET SHALL BE BLACK TEXT,
BORDER AND SYMBOLS ON ASTM TYPE III OR TYPE VI
RETROREFLECTORIZED ORANGE BACKGROUND, UNLESS OTHERWISE NOTED.

(ALL DIMENSIONS SHOWN IN INCHES)

CONSTRUCTION SIGN
DETAILS

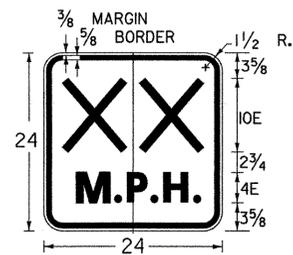
OTHER STDS. E-100
REQUIRED:



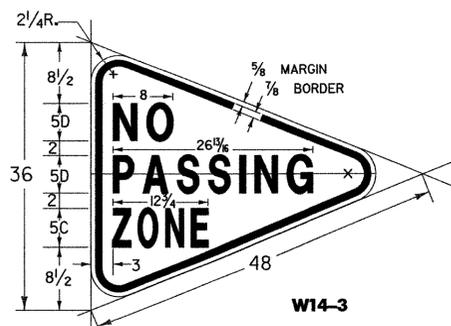
STANDARD
E-101

REVISIONS AND CORRECTIONS
OCT. 30, 1987 - DATE OF ORIGINAL ISSUE
OCT. 21, 1992 - ADDED ADDITIONAL SIGN DIMENSIONS,
REVISED CHEVRON BACKGROUND TO ORANGE,
& REVISED TITLE BLOCK
AUG. 08, 1995 - ADDED AND DELETED VARIOUS
SIGN DETAILS
MAR., 10 1997 - REVISED SIGN DETAILS
MAY 30, 2003 - CHANGED REFLECTIVE SHEETING TO ASTM
TYPE III OR TYPE VI

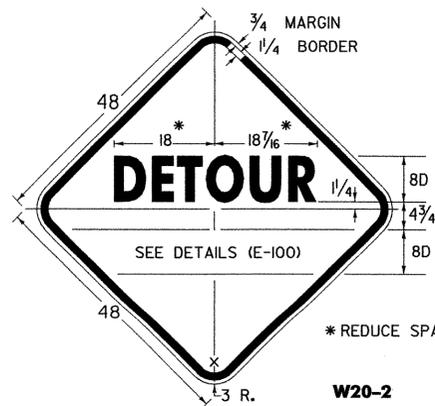
APPROVED
John H. Kell
DIRECTOR OF PROGRAM DEVELOPMENT
TRAFFIC OPERATIONS ENGINEER
Michael
FEDERAL HIGHWAY ADMINISTRATION



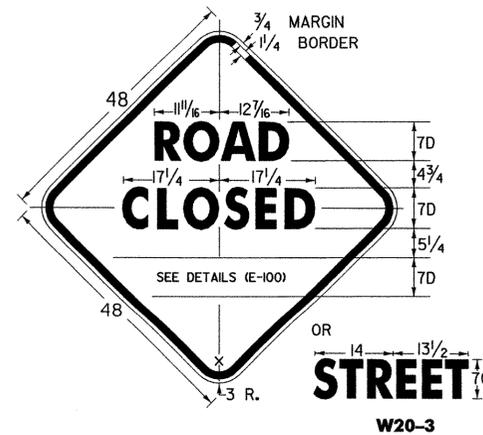
W13-1
XX DENOTES ADVISORY SPEED AS SHOWN ON THE PLANS



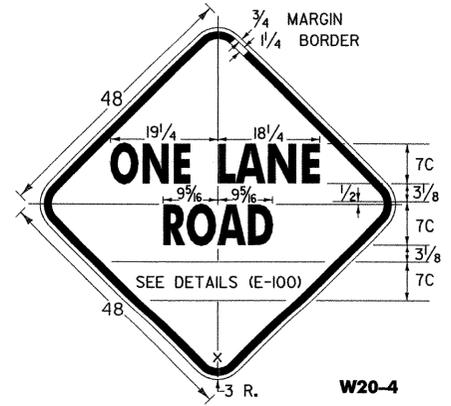
W14-3



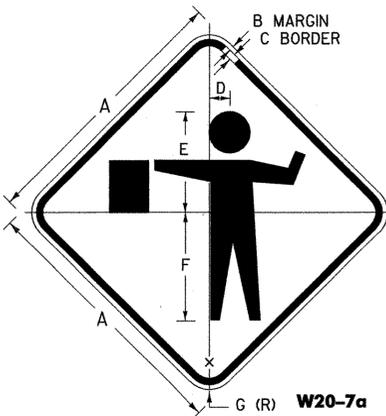
W20-2



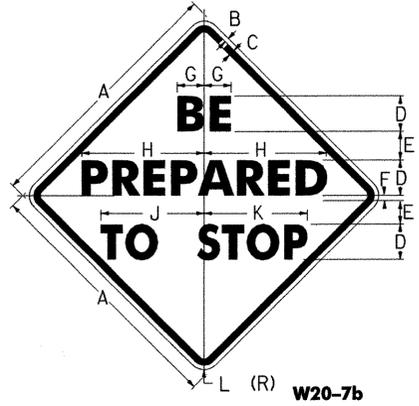
W20-3



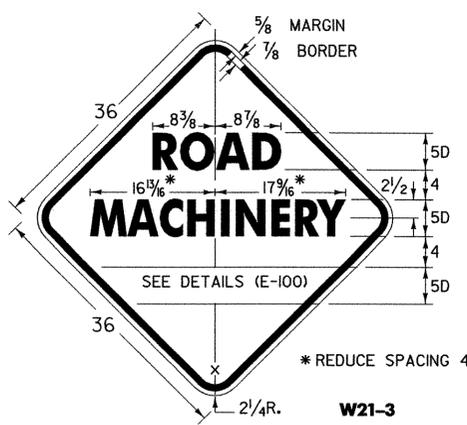
W20-4



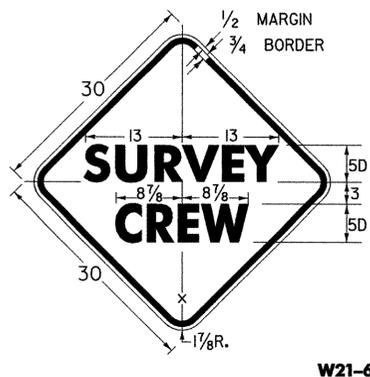
W20-7a



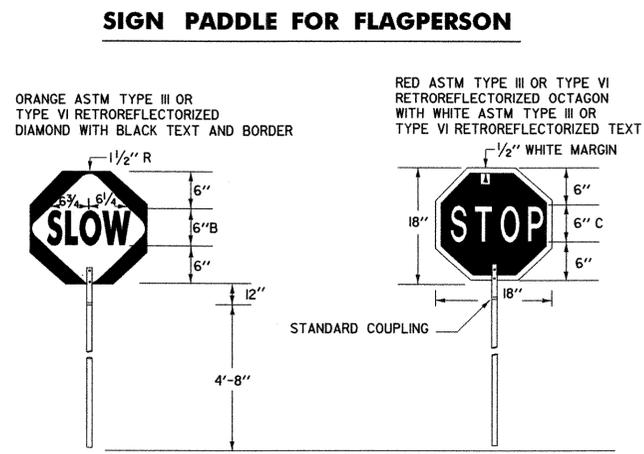
W20-7b



W21-3



W21-6



SIGN PADDLE FOR FLAGPERSON

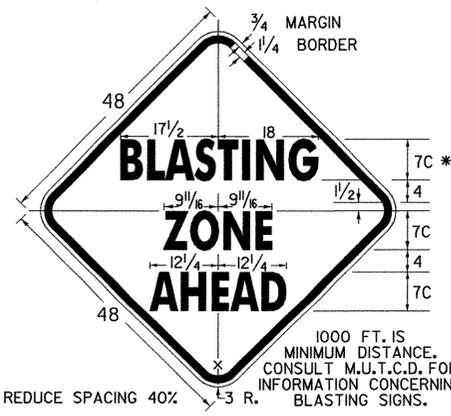
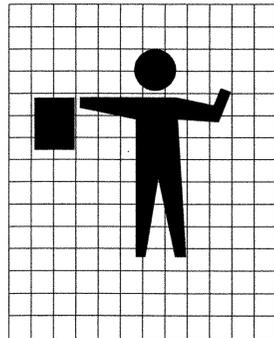
SIGN	DIMENSIONS (INCHES)						
	A	B	C	D	E	F	G
STD.	36	5/8	7/8	2 3/4	13 1/2	14 5/8	2 1/4
FWY.	48	3/4	1 1/4	3 3/4	18	19 1/2	3

COLORS:
BLACK BORDER AND TEXT (NON RETRORFL.)
ORANGE BACKGROUND (RETRORFL.)

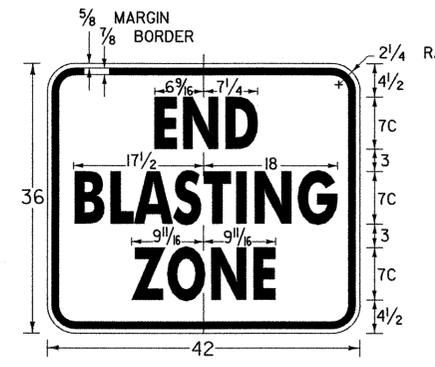
W3-4

COLORS:
BLACK BORDER AND TEXT (NON RETRORFL.)
YELLOW BACKGROUND (RETRORFL.)

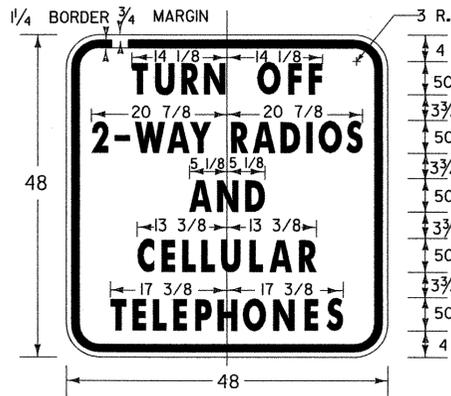
SIGN	DIMENSIONS (INCHES)											
	A	B	C	D	E	F	G	H	J	K	L	
MIN.	36	5/8	7/8	6C	3 3/8	7/8	3 3/4	16 3/8	13	13 3/8	2 1/4	
STD.	48	3/4	1 1/4	8C	4 7/8	1 1/4	5	21 7/8	17 3/8	18 1/2	3	
EXPWY.	60	3/4	1 1/4	9C	5 3/8	1 3/8	5 5/8	24 3/4	19 3/8	20 1/4	3	



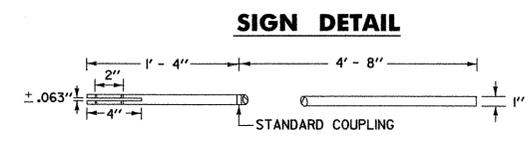
W22-1



W22-3



VW22-1



SIGN DETAIL



STAFF DETAIL

MATERIALS
THE SIGN MATERIALS SHALL BE 0.063" ALUMINUM WITH COLORS AS INDICATED ON DETAILS.
THE STAFF SHALL BE 3/4" TO 1 1/4" DIAMETER RIGID ALUMINUM CONDUIT/TUBING WITH A WALL THICKNESS OF 0.125", OR 1" TO 1 1/2" DIAMETER RIGID PVC CONDUIT/TUBING WITH 0.125" WALL THICKNESS

MOUNTING
THE STAFF SHALL BE MOUNTED WITH EITHER TWO 1/4" DIAMETER ALUMINUM BOLTS OR TWO 1/4" DIAMETER ALUMINUM RIVETS.

NOTES

SEE STANDARD SHEET E-100 FOR NOTES AND TEXT DETAILS
COLORS FOR SIGNS SHOWN ON THIS SHEET SHALL BE BLACK TEXT, BORDER AND SYMBOLS ON ASTM TYPE III OR TYPE VI RETROREFLECTORIZED ORANGE BACKGROUND, UNLESS OTHERWISE NOTED
SIGN DETAILS INDICATE THE APPROPRIATE COLOR.

OTHER STDS. E-100 REQUIRED:
NOTE: ALL DIMENSIONS SHOWN IN INCHES EXCEPT WHERE NOTED

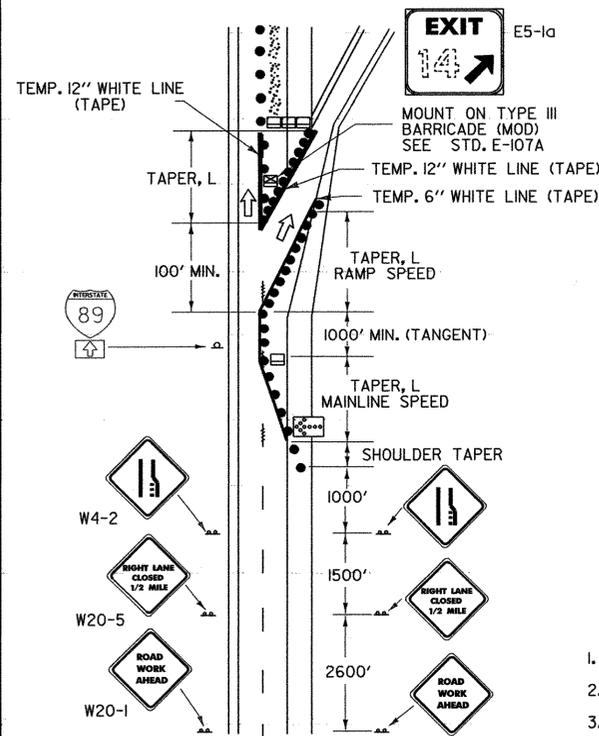
REVISIONS AND CORRECTIONS
OCT. 30, 1987 - DATE OF ORIGINAL ISSUE
JAN. 23, 1989 - DELETE MOTORCYCLE SYMBOL SIGN AND SPEED SIGN, ADDED TWO SIGNS
OCT. 21, 1992 - ADDED A SIGN, REVISED A SIGN DIMENSION & TYPE ERROR & REVISED TITLE BLOCK
AUG. 08, 1995 - ADDED FLAGGER GRID
JUNE 30, 2003 - CHANGED REFLECTIVE SHEETING TO ASTM TYPE III OR TYPE VI CHANGED TEXT ON W20-7b SIGN

APPROVED
[Signature]
DIRECTOR OF PROGRAM DEVELOPMENT
[Signature]
TRAFFIC OPERATIONS ENGINEER
[Signature]
FEDERAL HIGHWAY ADMINISTRATION

CONSTRUCTION SIGN
DETAILS



STANDARD
E-102



MAINLINE LANE CLOSURE AT AN EXIT RAMP

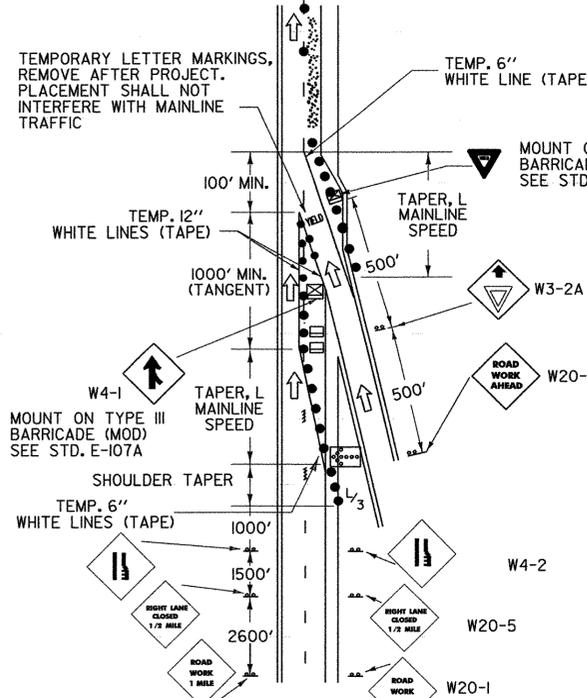
NOT TO SCALE
THIS DETAIL SHALL BE USED WHEN THE WORK ZONE BEGINS AT THE GORE OR THE MAINLINE LANE CLOSURE DRUM PLACEMENT INTERFERES WITH THE EXIT RAMP.

LEGEND

- REFL. PLASTIC DRUMS
- PAVEMENT MARKING REMOVAL
- ↑ INDICATES TRAFFIC FLOW
- WORK AREA
- FLASHING ARROW PANEL
- TYPE III BARRICADES
- TYPE III BARRICADES (MOD.)

NOTES

1. ALL SIGNS SHALL BE MOUNTED ON FIXED POSTS (YIELDING TYPE) UNLESS OTHERWISE NOTED.
2. CHANNELIZING DEVICES SHALL BE PLACED IN ACCORDANCE WITH THE TABLE ON THIS SHEET
3. ALL DISTANCES ARE DESIRABLE MINIMUMS, FIELD CONDITIONS SHALL CONTROL THE ACTUAL PLACEMENT.
4. TAPER RATES ARE BASED ON THE POSTED MAINLINE AND EXIT SPEEDS.
5. TEMPORARY PAVEMENT MARKINGS ARE REQUIRED WHEN THE LAYOUT IS TO BE IN EFFECT FOR THREE DAYS OR MORE.
6. LANE CLOSURES AND TAPER LENGTHS, L, AS DETAILED ON THIS SHEET.
7. EXIT SIGN SHALL BE MOUNTED A MINIMUM OF 7 FEET ABOVE THE GROUND AND HIGH ENOUGH TO BE SEEN ABOVE CHANNELIZING DEVICES.



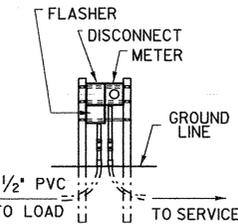
MAINLINE LANE CLOSURE AT AN ENTRANCE RAMP

NOT TO SCALE
THIS DETAIL SHALL BE USED WHEN THE WORK ZONE BEGINS AT THE END OF THE ACCELERATION LANE OR THE MAINLINE LANE CLOSURE DRUM PLACEMENT INTERFERES WITH THE ON-RAMP TRAFFIC. IF THE LENGTH OF THE ACCELERATION LANE IS NOT ADEQUATE, THE YIELD SIGN SHALL BE REPLACED WITH A STOP SIGN. IF A STOP SIGN IS USED, IT SHOULD BE ACCOMPANIED BY A STOP BAR.

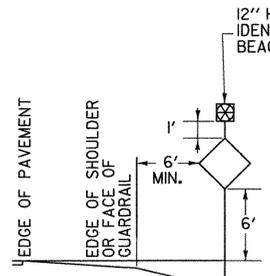
NOTES

1. AT THE CONTRACTOR'S OPTION:
 - A. THE POWER SUPPLY MAY BE AERIAL OR UNDERGROUND (SEE DETAIL).
 - B. POWER FOR A FLASHING BEACON MAY BE COMBINED WITH POWER FOR A TRAFFIC SIGNAL OR THEY MAY HAVE SEPARATE POWER SOURCES.
 - C. THE FLASHER MAY BE INSTALLED ON A STANCHION NEAR THE SIGN, ON A UTILITY POLE (WITH UTILITY COMPANY APPROVAL) OR AT THE SAME LOCATION AS A TRAFFIC SIGNAL CONTROLLER.
2. THE FLASHER UNIT SHALL BE ONE CIRCUIT AND INCLUDE A RADIO INTERFERENCE FILTER.
3. BATTERY OPERATED FLASHERS WILL NOT BE ALLOWED.
4. BOTTOM OF THE BEACON SHALL BE A MIN. OF 8' AND A MAX. OF 12' ABOVE THE EDGE OF THE PAVEMENT.
5. FOR URBAN AREA PLACEMENT SEE STD. E-121.
6. FOR POWER DROP STANCHIONS SEE STD. E-175.

UNDERGROUND SERVICE DETAIL



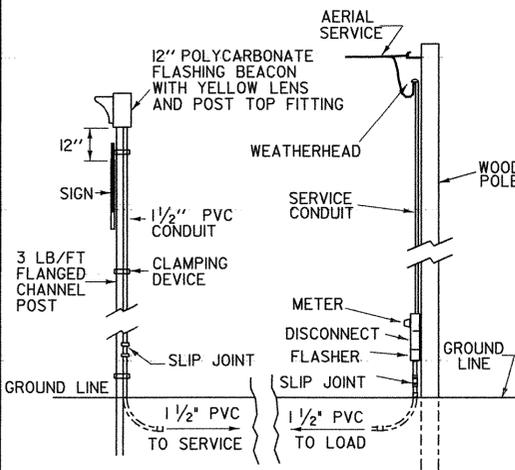
SIGN PLACEMENT DETAIL



CHANNELIZING DEVICES

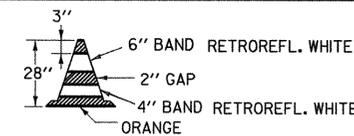
TAPER RATES ARE DETERMINED USING THE FOLLOWING EQUATION:
 $L = WS$ FOR DESIGN SPEEDS OF 45 MPH OR GREATER
 $L = WS^2/60$ FOR DESIGN SPEEDS OF 40 MPH OR LESS
 WHERE: L = MINIMUM LENGTH OF TAPER IN FEET
 W = WIDTH OF OFFSET (USUALLY LANE WIDTH) IN FEET
 S = DESIGN SPEED IN MPH

POSTED SPEED OR 85th PERCENTILE (mph)	DESIGN SPEED (mph)	TAPER LENGTHS (ft)			TANGENT SECTION LENGTHS (L/2) (ft)	MINIMUM BUFFER SPACE LENGTH (ft)	MAXIMUM CHANNELIZING DEVICE SPACING (ft)		BARRIER FLARE RATE (MIN)
		MERGING 12-ft LANE (L)	SHIFTING W=16ft (L/2)	SHOULDER W=10ft (L/3)			TAPER	ALONG LANE LINE & WORK ZONE	
≤40	40	320	215	90	160	160	35	70	1:9
45	45	540	360	150	270	270	40	80	1:9
50	50	600	400	170	300	300	50	100	1:11
55	55	660	440	185	330	330	55	110	1:13
60 & 65	60	720	480	200	360	360	60	120	1:13
70	70	840	560	235	420	440	65	130	1:13



FLASHING BEACON DETAIL

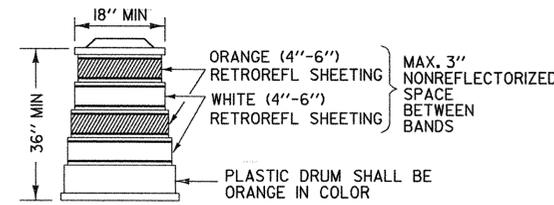
AERIAL SERVICE WITHOUT LUMINAIRE



28\"/>

NOTES

1. 28" CONES SHALL BE USED ON ROADWAYS WITH SPEED LIMITS OF 35 MPH OR MORE AND ON ALL ROADWAYS DURING HOURS OF DARKNESS.
2. CONES MAY BE WEIGHTED TO PREVENT OVERTURNING, HOWEVER THE WEIGHTS SHALL NOT PRESENT A HAZARD IF THE CONE IS STRUCK.
3. RETROREFLECTIVE SHEETING SHALL BE ASTM TYPE III OR TYPE VI.



REFLECTORIZED PLASTIC DRUM

SAND BAGS OR AN APPROPRIATE BALLASTING DEVICE, WHICH DOES NOT PRESENT A HAZARD TO THE IMPACTING VEHICLE OR BECOME A PROJECTILE UPON IMPACT, SHALL BE USED TO WEIGHT DRUMS. RETROREFLECTIVE SHEETING SHALL BE ASTM TYPE III OR TYPE VI.

ADVANCED WARNING SIGN PACKAGE FOR COLD PLANED (SCARIFIED) SURFACES 2 LANE ROADWAY

NOT TO SCALE

NOTES

1. ADVISORY SPEED AS DETERMINED BY THE RESIDENT ENGINEER (40 MPH MINIMUM RECOMMENDED).
2. ALL SIGNS SHALL BE MOUNTED ON FIXED POSTS (YIELDING TYPE).
3. ALL DISTANCES ARE DESIRABLE MINIMUMS, FIELD CONDITIONS SHALL CONTROL THE ACTUAL PLACEMENT.
4. THE BUMP SIGN MAY BE ELIMINATED WHEN THERE IS NO BUMP. WHEN THE CONTRACTOR IS WORKING IN THE CONSTRUCTION AREA THE APPROPRIATE ADVANCED WARNING SIGN PACKAGE SHALL BE USED, SEE STD. E-110.
5. GATE POSTING OF SIGNS IS AN OPTION AS DETERMINED BY THE RESIDENT ENGINEER (WHEN PASSING, TURNING OR CLIMBING LANES LIMIT VISIBILITY).

OTHER STDS. E-101, E-102, E-102A, E-103, E-107A, E-110, E-121, E-136, REQUIRED: E-150, E-175

REVISIONS AND CORRECTIONS
 APR 12, 1988 - DATE OF ORIGINAL ISSUE
 JAN 23, 1989 - REVISED EXIT SIGN - CLARIFIED EXIT TAPER
 SEPT 20, 1993 - REVISED RAMP CLOSURES, FLASHING BEACON DETAILS AND MOVED TYPE III BARRICADE (MOD) TO STDE-107A
 AUG 08, 1995 - REVISED BEACON SIZE
 MAR. 01, 2004 - ADDED ADVANCED WARNING SIGN PACKAGE FOR COLD PLANED TWO WAY HIGHWAYS, CHANNELIZING DEVICES CHART

APPROVED
 DIRECTOR OF PROGRAM DEVELOPMENT
 TRAFFIC OPERATIONS ENGINEER
 FEDERAL HIGHWAY ADMINISTRATION

TRAFFIC CONTROL MISCELLANEOUS DETAILS



STANDARD E-106

NOTES

REFLECTORIZAION

ALL SIGNS USED DURING THE HOURS OF DARKNESS SHALL BE REFLECTORIZED (TYPE II OR III). CONES USED FOR TRAFFIC CONTROL AT NIGHT SHALL COMPLY WITH STANDARD E-106.

COLORS

THE WARNING SIGNS SHOWN ON THIS SHEET SHALL HAVE BLACK TEXT, BORDER, AND SYMBOLS ON AN ORANGE BACKGROUND. THE TEXT AND BORDERS MAY BE SCREENED, LETTERING FILM, OR HAND PAINTED. THE ORANGE SHALL CONFORM WITH THE STANDARD COLORS ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS AND APPROVED BY THE U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION.

TEXT DESIGN

LETTERS, DIGITS, SPACING, AND TEXT DIMENSIONS SHALL CONFORM WITH THE "STANDARD ALPHABETS FOR HIGHWAY SIGNS" AS REFERENCED IN THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".

SPECIFICATIONS

WARNING SIGNS SHALL MEET THE STANDARD STATE SPECIFICATIONS FOR TRAFFIC SIGNS.

SIGN BASE MATERIAL

THE SIGN BASE MATERIAL USED FOR THE WARNING SIGNS ON THIS SHEET MAY BE OF ANY OF THE FOLLOWING, WITH MINIMUM THICKNESS AS NOTED:

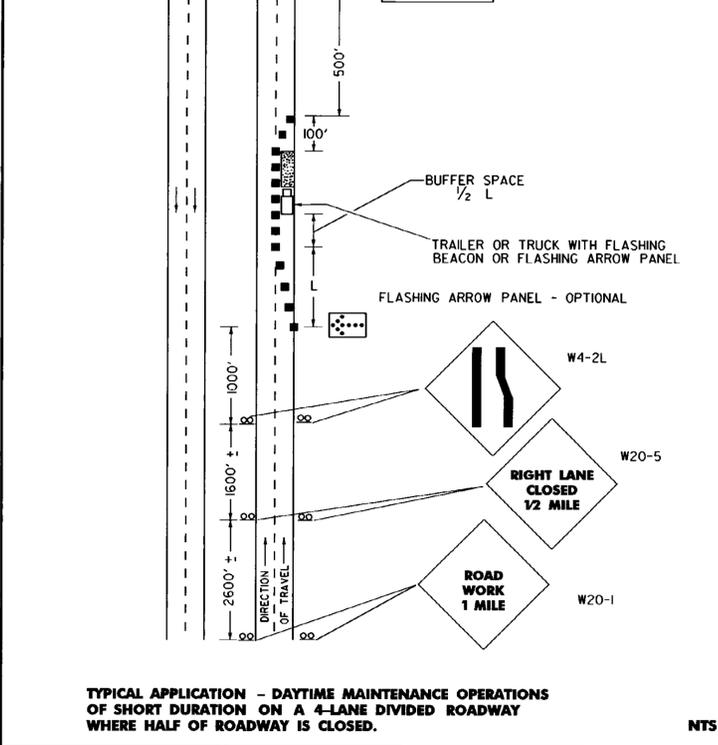
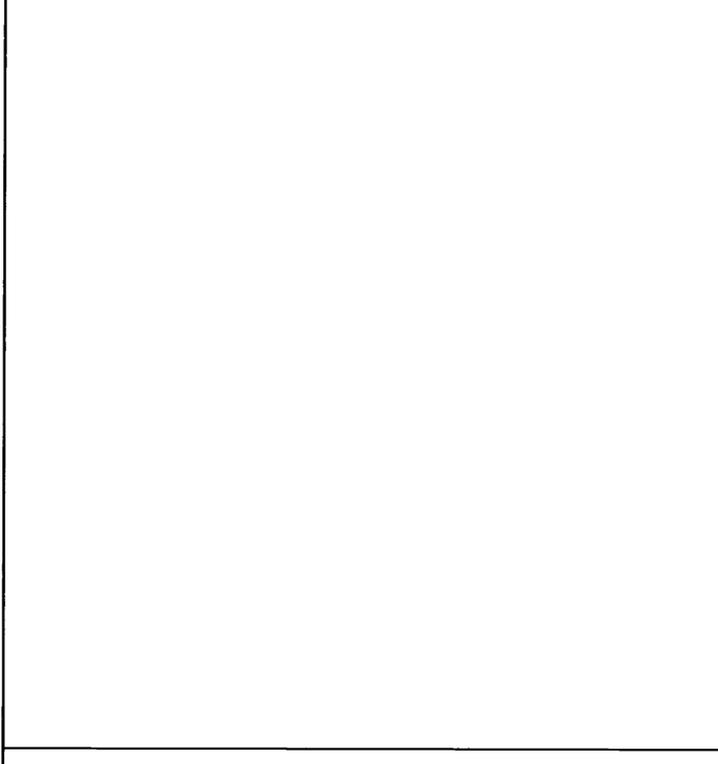
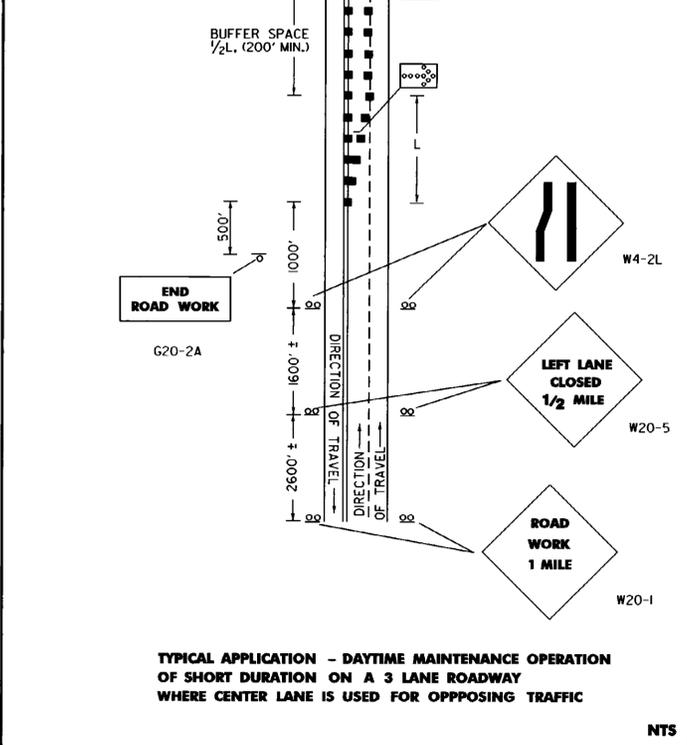
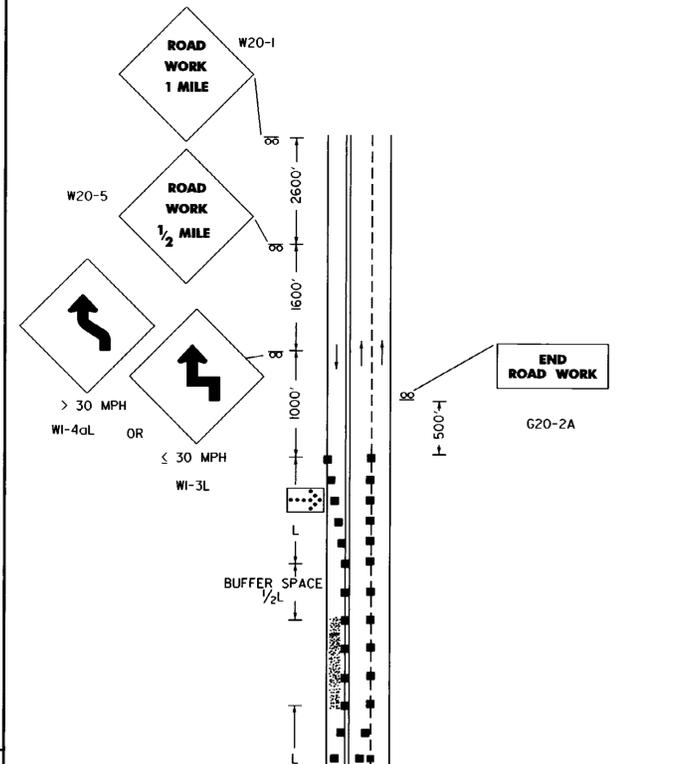
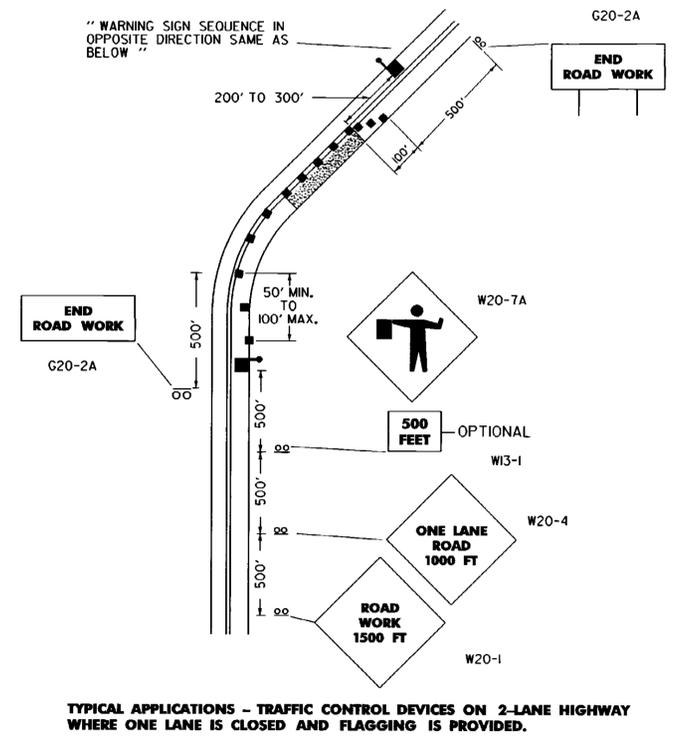
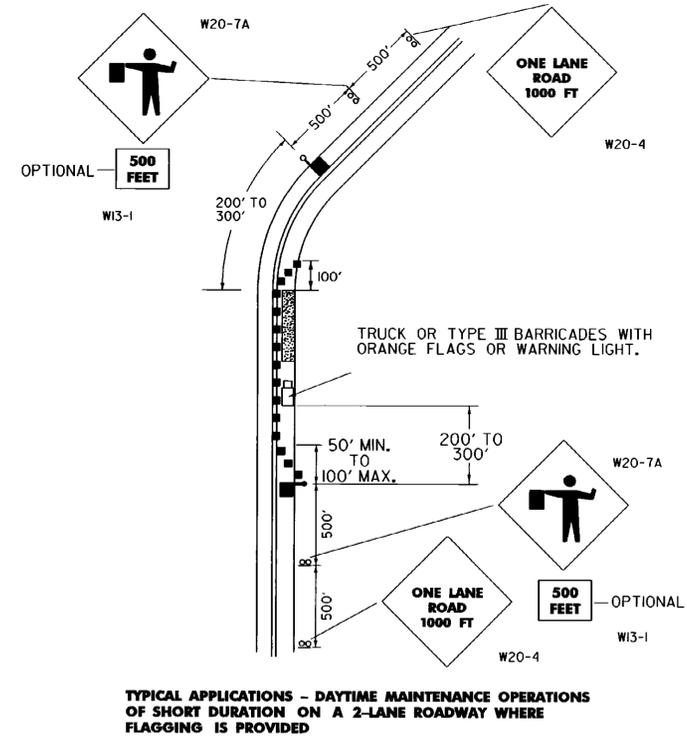
FLAT STEEL OR ALUMINUM	0.125 INCHES
HIGH DENSITY OVERLAPPED PLYWOOD	1/2, 5/8, OR 3/4 INCHES
GALVANIZED SHEET STEEL	12 GAGE

- SIGNS WITH "ROAD WORK 1500 FT. AND "END ROAD WORK" TEXT SHALL BE USED WHEN THE WORK IS NOT COMPLETE AND A HAZARD REMAINS OVERNIGHT.
- THE FLAGPERSON SHALL USE THE SIGN PADDLE DETAILED ON STANDARD SHEET E-102.
- ALL SIGNS SHALL BE COVERED OR REMOVED AT THE END OF THE WORKING DAY UNLESS REQUIRED FOR THE PROTECTION AND SAFETY OF THE TRAVELING PUBLIC.
- INSTALLATION: SIGNS AND BARRICADES SHALL BE IN PLACE PRIOR TO THE START OF THE MAINTENANCE OPERATION TO WHICH THEY APPLY AND SHALL BE REMOVED PROMPTLY WHEN THE NEED NO LONGER EXISTS. EACH SIGN SHALL BE ERECTED IN A NEAT AND WORKMANLIKE MANNER ON YIELDING WOOD OR METAL POSTS SET SECURELY IN THE GROUND (IN ACCORDANCE WITH STD. E-121), OR ON PORTABLE SUPPORTS WHEN APPROPRIATE. THE INSTALLATION OF SIGNS AND BARRICADES SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.
- ALTHOUGH LISTED AS A MAINTENANCE OPERATION STANDARD SIGN SHEET, THE APPROACH SIGNS SHOWN SHALL BE USED BY CONTRACTORS WHEN WORKING WITHIN OR OUTSIDE PROJECT LIMITS.
- ALL DISTANCES ARE DESIRABLE SPECIFICATIONS. FIELD CONDITIONS SHALL CONTROL THE ACTUAL PLACEMENT.
- SIGN DETAILS NOT SHOWN ON THIS SHEET CAN BE FOUND ON STANDARD SHEETS E-100, E-101, AND E-102.
- TAPER FORMULA
 $L = SXW$ FOR SPEEDS OF 45 OR MORE
 $L = \frac{WS^2}{60}$ FOR SPEEDS OF 40 OR LESS
 WHERE
 L = MINIMUM LENGTH OF TAPER
 S = NUMERICAL VALUE OF POSTED SPEED LIMIT PRIOR TO WORK OR 85 PERCENTILE SPEED.
 W = WIDTH OF OFFSET.
- THE MAXIMUM SPACING BETWEEN CHANNELIZING DEVICES IN A TAPER SHOULD BE APPROXIMATELY EQUAL IN FEET TO THE SPEED LIMIT IN M.P.H.. ON TANGENT SECTIONS THE MAXIMUM SPACING SHOULD BE APPROXIMATELY EQUAL TO TWICE THE POSTED SPEED LIMIT.
- FLOOD LIGHTS SHOULD BE PROVIDED TO MARK THE FLAGPERSON STATIONS AT NIGHT AS NEEDED.
- AT SHORT WORK ZONES WHERE ADEQUATE SIGHT DISTANCE IS AVAILABLE FOR THE SAFE HANDLING OF TRAFFIC ONE FLAGGER MAY BE USED WITH THE APPROVAL OF THE ENGINEER.
- CHANNELIZING DEVICES SHALL BE EXTENDED TO A POINT WHERE THEY ARE VISIBLE TO APPROACHING TRAFFIC.
- THE NUMBER OF CHANNELIZING AND OTHER TRAFFIC CONTROL DEVICES SHOWN ON THIS SHEET ARE FOR ILLUSTRATIVE PURPOSES ONLY. THE ACTUAL NUMBER REQUIRED SHALL BE DETERMINED BASED ON INDIVIDUAL DETOUR CONDITIONS (TAPERS, SPEED LIMITS, LENGTH OF DETOUR CURVE, ETC.).

LEGEND:

- FLAGPERSON
- CHANNELIZING DEVICES (CONES OR DRUMS)
- FLASHING ARROW PANEL
- WORK AREA
- SIGN & POSTS
- TYPE III BARRICADES

OTHER STDS. REQUIRED: E-100 E-101 E-102 E-106



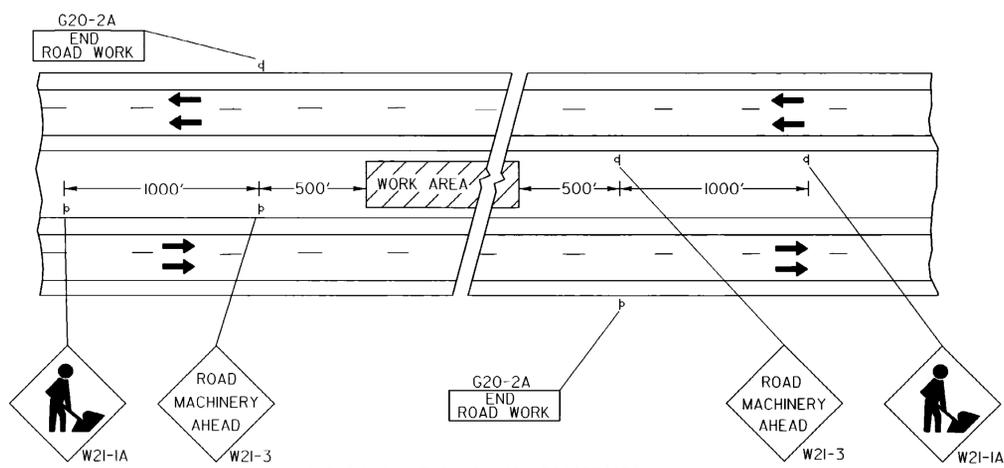
REVISIONS AND CORRECTIONS
 SEPT 10, 1987 - DATE OF ORIGINAL ISSUE
 MAR 01, 1988 - FHWA REVIEW COMMENTS
 SEP 20, 1993 - REVISED NOTES & MISC. DETAILS
 AUG 08, 1995 - DELETED SIGN DETAILS
 APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION, FHWA FINAL APPROVAL PENDING.

APPROVED
Stephen D. McCullough
 DIRECTOR OF ENGINEERING
David A. Ross
 TRAFFIC AND SAFETY ENGINEER

MAJOR MAINTENANCE OPERATION LANE CLOSURE

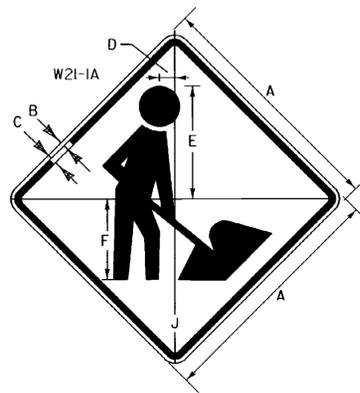
STANDARD E-110

/traf/std/stdell0.dgn : stdell0.i

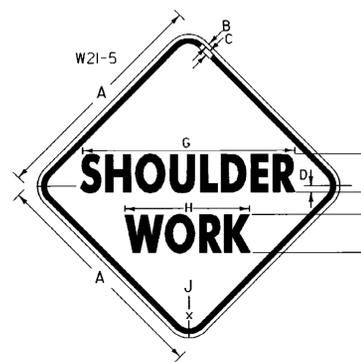


**4 - LANE HIGHWAY
MEDIAN MAINTENANCE**

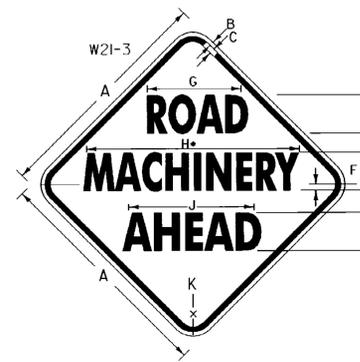
MOVE SIGNS AHEAD AS WORK PROGRESSES



SIGN	DIMENSIONS (INCHES)						
	A	B	C	D	E	F	J
2 LANE	36	5/8	7/8	5 3/4	15 3/4	4 1/4	2 1/4
4 LANE	48	3/4	1 1/4	7 1/2	20	5	3

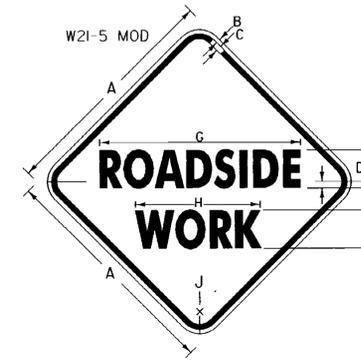


SIGN	DIMENSIONS (INCHES)								
	A	B	C	D	E	F	G	H	J
2 LANE	36	5/8	7/8	1	5-D	3 1/2	34 3/8	17 3/8	2 1/4
4 LANE	48	3/4	1 1/4	1	7-C	4	38 3/8	20 1/4	3

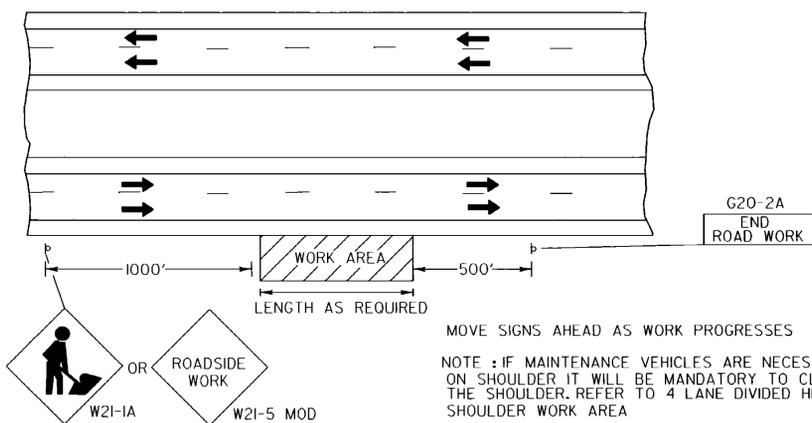


SIGN	DIMENSIONS (INCHES)									
	A	B	C	D	E	F	G	H	J	K
2 LANE	36	5/8	7/8	5-D	4	2 1/2	17 1/4	34 3/8	2 3/4	2 1/4
4 LANE	48	3/4	1 1/4	7-D	5	3 1/2	24 1/8	48 1/4	3 1/4	3

* REDUCE SPACING BY 40 %

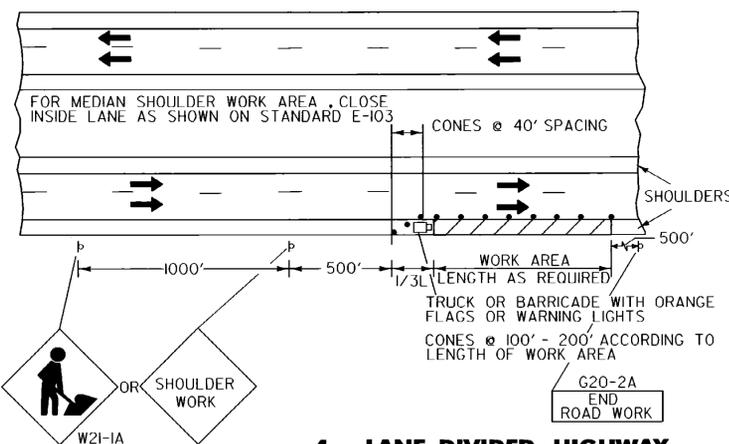


SIGN	DIMENSIONS (INCHES)						
	A	B	C	D	E	F	J
2 LANE	36	5/8	7/8	1/2	5-D	3 1/2	17 3/8
4 LANE	48	3/4	1 1/4	1	7-C	4	35 7/8

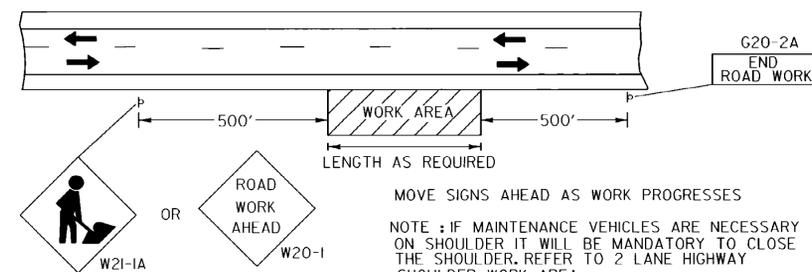


**4 - LANE HIGHWAY
MAINTENANCE OUTSIDE SHOULDER**

NOTE: IF MAINTENANCE VEHICLES ARE NECESSARY ON SHOULDER IT WILL BE MANDATORY TO CLOSE THE SHOULDER. REFER TO 4 LANE DIVIDED HIGHWAY SHOULDER WORK AREA

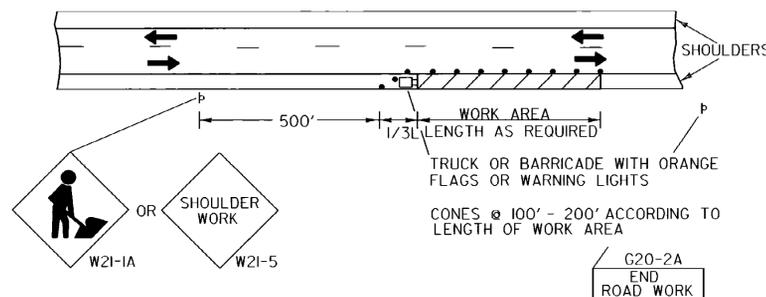


**4 - LANE DIVIDED HIGHWAY
SHOULDER WORK AREA**



**2 - LANE HIGHWAY
MAINTENANCE OUTSIDE SHOULDER**

NOTE: IF MAINTENANCE VEHICLES ARE NECESSARY ON SHOULDER IT WILL BE MANDATORY TO CLOSE THE SHOULDER. REFER TO 2 LANE HIGHWAY SHOULDER WORK AREA



**2 - LANE HIGHWAY
SHOULDER WORK AREA**

NOTES:

REFLECTORIZATION:
ALL REFLECTIVE MATERIAL SHALL CONSIST OF ENCAPSULATED LENS REFLECTIVE SHEETING. THE TEXT AND BORDERS MAY BE SCREENED, LETTERING FILM, OR HAND PAINTED.

COLORS:
THE WARNING SIGNS SHOWN ON THIS SHEET SHALL HAVE A BLACK TEXT AND BORDER ON A REFLECTORIZED ORANGE BACKGROUND. THE ORANGE SHALL CONFORM WITH THE STANDARD COLORS ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS AND APPROVED BY THE U.S. DEPT. OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION.

TEXT DESIGN:
LETTERS, SPACING, AND TEXT DIMENSIONS SHALL CONFORM TO THE LATEST VERSION OF FHWA'S STANDARD ALPHABETS FOR HIGHWAY SIGNS AND PAVEMENT MARKINGS.

SPECIFICATIONS:
WARNING SIGNS SHALL MEET THE STANDARD STATE SPECIFICATIONS FOR SIGNS.

SIGN BASE MATERIAL:
THE SIGN BASE MATERIAL USED FOR THE WARNING SIGNS SHOWN ON THIS SHEET MAY BE OF ANY OF THE FOLLOWING, WITH MINIMUM THICKNESS AS NOTED:

(1) FLAT SHEET ALUMINUM	36X36	48X48	INCHES
(2) HIGH DENSITY OVERLAYED PLYWOOD	0.100	0.125	INCHES
(3) GALVANIZED SHEET STEEL	5/8	3/4	INCHES
	14	12	GAGE

**OTHER STDS. E-100 E-103
REQUIRED:**

REVISIONS AND CORRECTIONS
 JAN. 26, 1972 - DATE OF ORIGINAL ISSUE
 FEB. 29, 1972 - REVISED PER DIRECTION OF THE FEDERAL HIGHWAY ADMINISTRATION
 MAY 14, 1974 - REFLECTIVE MATERIAL CHANGE
 JUN. 8, 1977 - REFLECTIVE MATERIAL NOTE CHANGE SIGNS REFERENCED TO NUMBERS IN M.U.T.C.D.
 AUG. 10, 1977 - PERSON WORKING SIGN CHANGED TO SYMBOL
 DEC. 9, 1981 - MINOR SIGN DIMENTION CHANGES
 FEB. 3, 1986 - UPDATED TO 1986 SPECIFICATIONS
 AUG. 08, 1995 - UPDATED TO 1993 CHAPTER 6 - M.U.T.C.D.
 MAR. 11, 1997 - NUMBER CHANGE FROM E-10 TO E-111
 REMOVED ROAD WORK AND END ROAD WORK

APPROVED

 DIRECTOR OF ENGINEERING

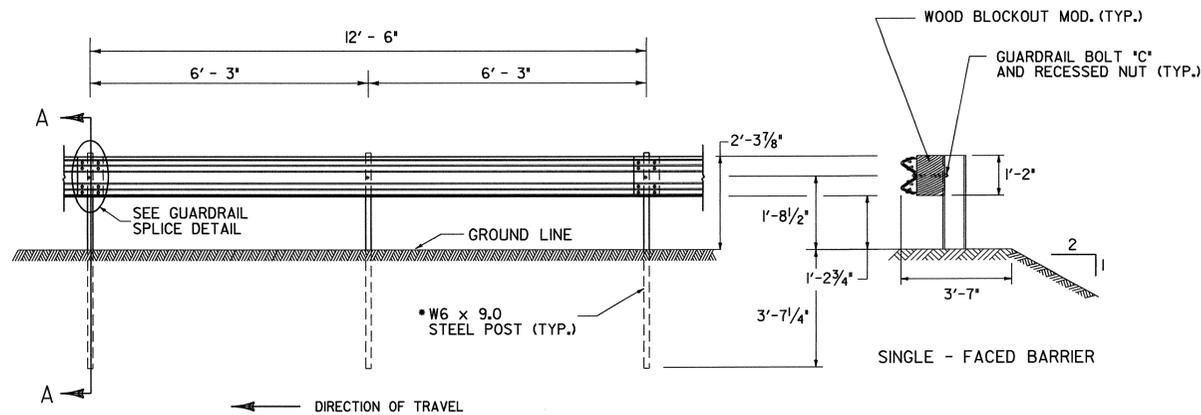
 DIRECTOR OF CONSTRUCTION AND MAINTENANCE

**MINOR
MAINTENANCE OPERATION**



**STANDARD
E-111**

"W" BEAM GUARDRAIL WITH STEEL POSTS



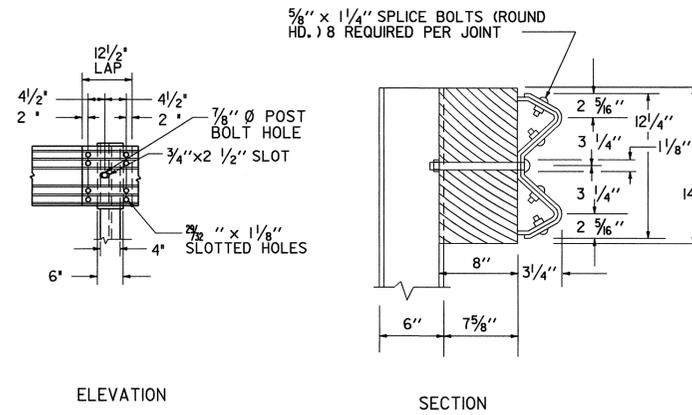
ELEVATION FROM ϕ OF ROAD

SECTION A - A

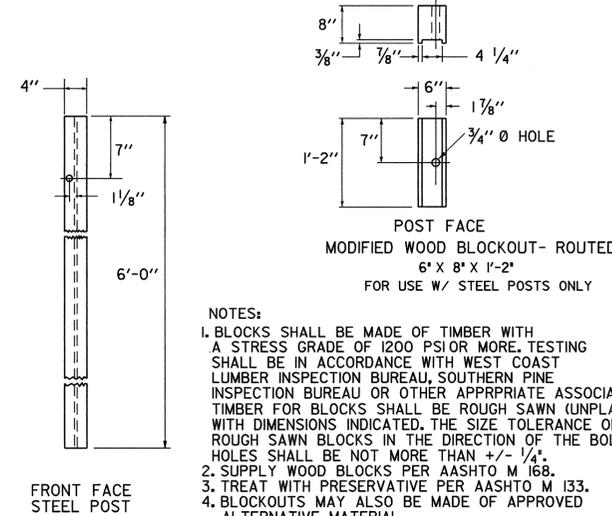
SINGLE - FACED BARRIER

DOUBLE - FACED BARRIER

PLAN

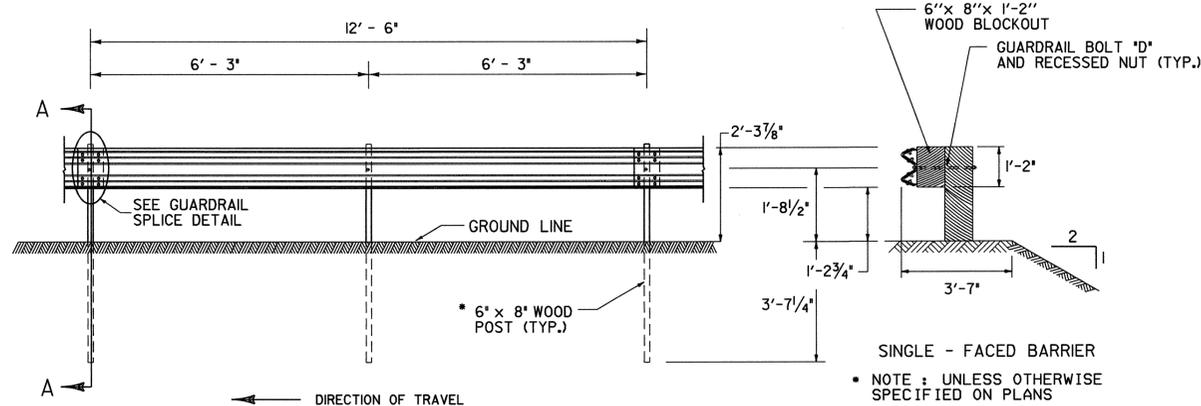


GUARDRAIL SPLICE DETAIL



- POST FACE
MODIFIED WOOD BLOCKOUT - ROUTED
6" X 8" X 1'-2"
FOR USE W/ STEEL POSTS ONLY
- NOTES:
1. BLOCKS SHALL BE MADE OF TIMBER WITH A STRESS GRADE OF 1200 PSIOR MORE. TESTING SHALL BE IN ACCORDANCE WITH WEST COAST LUMBER INSPECTION BUREAU, SOUTHERN PINE INSPECTION BUREAU OR OTHER APPROPRIATE ASSOCIATION. TIMBER FOR BLOCKS SHALL BE ROUGH SAWN (UNPLANED) WITH DIMENSIONS INDICATED. THE SIZE TOLERANCE OF ROUGH SAWN BLOCKS IN THE DIRECTION OF THE BOLT HOLES SHALL BE NOT MORE THAN +/- 1/4".
2. SUPPLY WOOD BLOCKS PER AASHTO M 168.
3. TREAT WITH PRESERVATIVE PER AASHTO M 133.
4. BLOCKOUTS MAY ALSO BE MADE OF APPROVED ALTERNATIVE MATERIAL.

"W" BEAM GUARDRAIL WITH WOOD POSTS



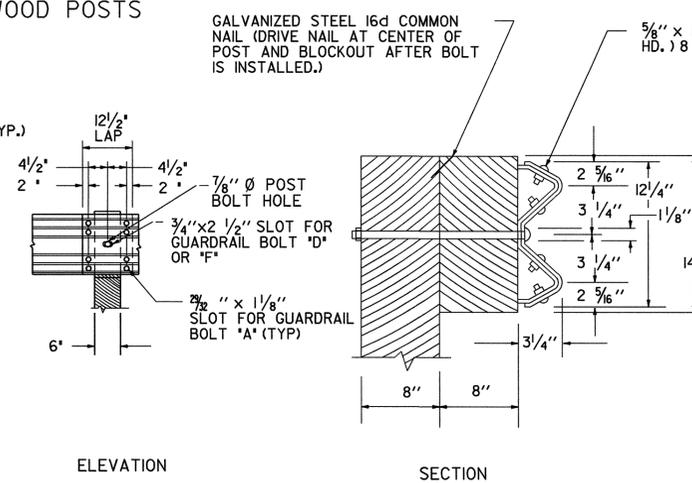
ELEVATION FROM ϕ OF ROAD

SECTION A - A

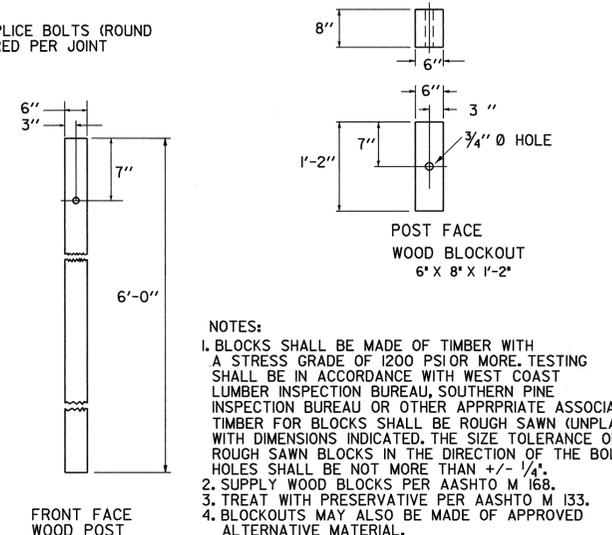
SINGLE - FACED BARRIER

DOUBLE - FACED BARRIER

PLAN

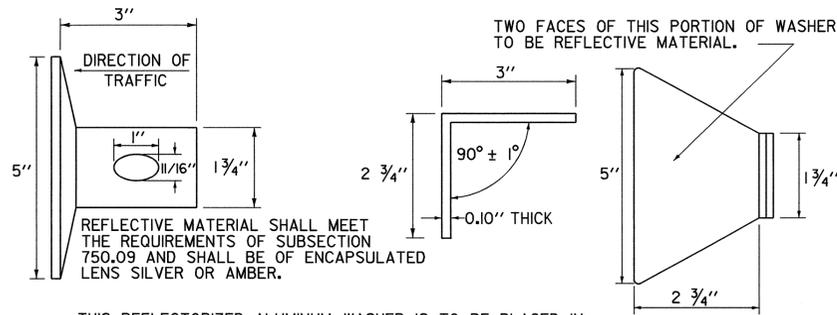


GUARDRAIL SPLICE DETAIL

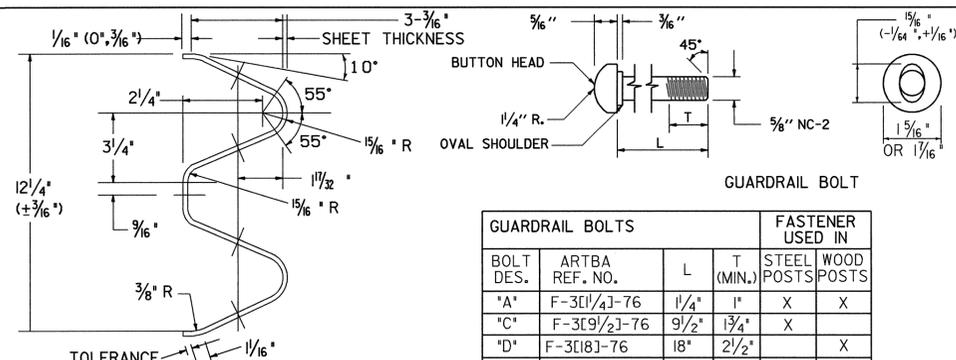


- POST FACE
WOOD BLOCKOUT
6" X 8" X 1'-2"
- NOTES:
1. BLOCKS SHALL BE MADE OF TIMBER WITH A STRESS GRADE OF 1200 PSIOR MORE. TESTING SHALL BE IN ACCORDANCE WITH WEST COAST LUMBER INSPECTION BUREAU, SOUTHERN PINE INSPECTION BUREAU OR OTHER APPROPRIATE ASSOCIATION. TIMBER FOR BLOCKS SHALL BE ROUGH SAWN (UNPLANED) WITH DIMENSIONS INDICATED. THE SIZE TOLERANCE OF ROUGH SAWN BLOCKS IN THE DIRECTION OF THE BOLT HOLES SHALL BE NOT MORE THAN +/- 1/4".
2. SUPPLY WOOD BLOCKS PER AASHTO M 168.
3. TREAT WITH PRESERVATIVE PER AASHTO M 133.
4. BLOCKOUTS MAY ALSO BE MADE OF APPROVED ALTERNATIVE MATERIAL.

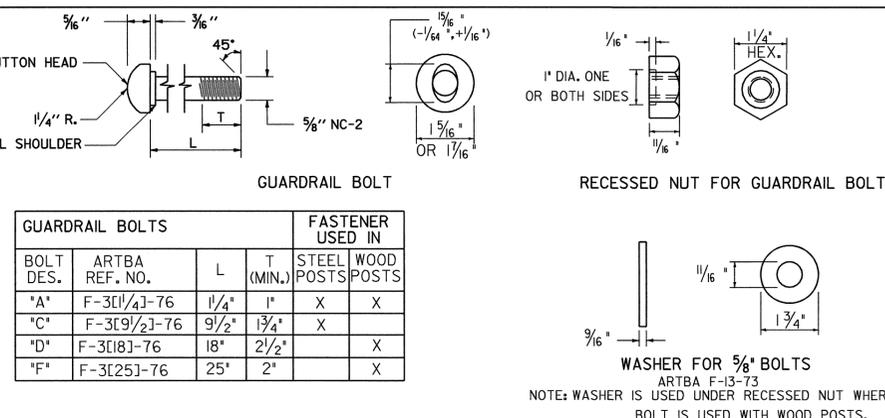
GUARDRAIL DELINEATOR



THIS REFLECTORIZED ALUMINUM WASHER IS TO BE PLACED IN VALLEY OF BEAM WHEN MOUNTING BEAM ONTO EACH FIFTH POST. WASHER SHALL MEET SPECIFICATION REQUIREMENTS FOR A.S.T.M. B-209 ALLOY 5052-H32



ARTBA RE-3[286]-3'=12'-6" CLASS A, TYPE IJ-73
TYPICAL GUARDRAIL SECTION



GENERAL NOTES:

- GUARDRAIL SHALL MEET THE REQUIREMENTS OF AASHTO M 180, CLASS A, TYPE I, UNLESS OTHERWISE DESIGNATED
- GUARDRAIL SHALL BE SINGLE FACED UNLESS OTHERWISE DESIGNATED
- GUARDRAIL SECTIONS SHALL BE LAPPED IN THE DIRECTION OF TRAFFIC FLOW FOR THE LANE NEAREST THE GUARDRAIL.
- FOR DESCRIPTION AND SPECIFICATION OF PARTS IDENTIFIED BY (ARTBA ...) AND OTHER DETAILS OF POSTS, POST ACCESSORIES, FASTENERS & RAIL ELEMENTS, SEE AASHTO-AGC-ARTBA JOINT TASK FORCE NO. 13, TITLED "A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE", LATEST EDITION.
- STANDARD STEEL BEAM TO BE 1/8" AND THE HEAVY DUTY TO BE 3/8" THICK.

OTHER STANDARD REQUIRED G-1d

REVISIONS AND CORRECTIONS
JUNE 1, 1994 - REISSUED, WITHOUT CHANGE,
UNDER NEW SIGNATURES.
JAN. 3, 2000 - UPDATED TO REFLECT METRIC STD.
CHANGES

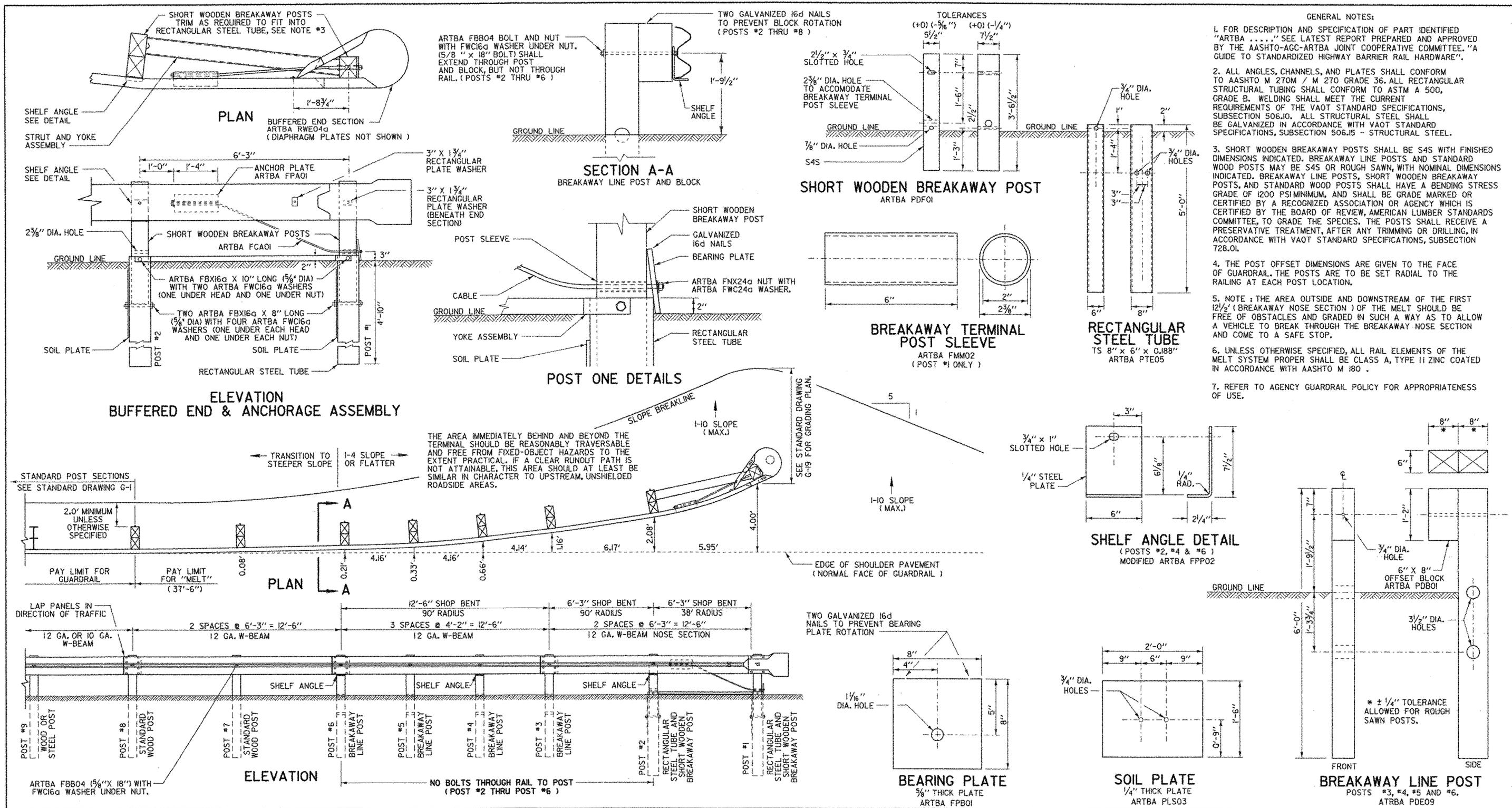
APPROVED

[Signature]
DIRECTOR OF PROJECT DEVELOPMENT
[Signature]
ROADWAY AND TRAFFIC DESIGN ENGINEER

STEEL BEAM GUARDRAIL WITH STEEL POSTS
STEEL BEAM GUARDRAIL WITH WOOD POSTS



STANDARD
G-1



- GENERAL NOTES:**
1. FOR DESCRIPTION AND SPECIFICATION OF PART IDENTIFIED "ARTBA" SEE LATEST REPORT PREPARED AND APPROVED BY THE AASHTO-ACC-ARTBA JOINT COOPERATIVE COMMITTEE. "A GUIDE TO STANDARDIZED HIGHWAY BARRIER RAIL HARDWARE".
 2. ALL ANGLES, CHANNELS, AND PLATES SHALL CONFORM TO AASHTO M 270M / M 270 GRADE 36. ALL RECTANGULAR STRUCTURAL TUBING SHALL CONFORM TO ASTM A 500, GRADE B. WELDING SHALL MEET THE CURRENT REQUIREMENTS OF THE VAOT STANDARD SPECIFICATIONS, SUBSECTION 506.10. ALL STRUCTURAL STEEL SHALL BE GALVANIZED IN ACCORDANCE WITH VAOT STANDARD SPECIFICATIONS, SUBSECTION 506.15 - STRUCTURAL STEEL.
 3. SHORT WOODEN BREAKAWAY POSTS SHALL BE S4S WITH FINISHED DIMENSIONS INDICATED. BREAKAWAY LINE POSTS AND STANDARD WOOD POSTS MAY BE S4S OR ROUGH SAWN, WITH NOMINAL DIMENSIONS INDICATED. BREAKAWAY LINE POSTS, SHORT WOODEN BREAKAWAY POSTS, AND STANDARD WOOD POSTS SHALL HAVE A BENDING STRESS GRADE OF 1200 PSIMINIMUM, AND SHALL BE GRADE MARKED OR CERTIFIED BY A RECOGNIZED ASSOCIATION OR AGENCY WHICH IS CERTIFIED BY THE BOARD OF REVIEW, AMERICAN LUMBER STANDARDS COMMITTEE, TO GRADE THE SPECIES. THE POSTS SHALL RECEIVE A PRESERVATIVE TREATMENT, AFTER ANY TRIMMING OR DRILLING, IN ACCORDANCE WITH VAOT STANDARD SPECIFICATIONS, SUBSECTION 728.01.
 4. THE POST OFFSET DIMENSIONS ARE GIVEN TO THE FACE OF GUARDRAIL. THE POSTS ARE TO BE SET RADIAL TO THE RAILING AT EACH POST LOCATION.
 5. NOTE: THE AREA OUTSIDE AND DOWNSTREAM OF THE FIRST 12 1/2' (BREAKAWAY NOSE SECTION) OF THE MELT SHOULD BE FREE OF OBSTACLES AND GRADED IN SUCH A WAY AS TO ALLOW A VEHICLE TO BREAK THROUGH THE BREAKAWAY NOSE SECTION AND COME TO A SAFE STOP.
 6. UNLESS OTHERWISE SPECIFIED, ALL RAIL ELEMENTS OF THE MELT SYSTEM PROPER SHALL BE CLASS A, TYPE II ZINC COATED IN ACCORDANCE WITH AASHTO M 180.
 7. REFER TO AGENCY GUARDRAIL POLICY FOR APPROPRIATENESS OF USE.

REVISIONS AND CORRECTIONS

JUNE 30, 1995 ORIGINAL APPROVAL
 JANUARY 18, 1996 CHANGED DIAMETER AND LENGTH OF BOLT (SECTION A-A)
 SEPT. 27, 2002 UPDATED TO AGREE WITH METRIC DRAWING.

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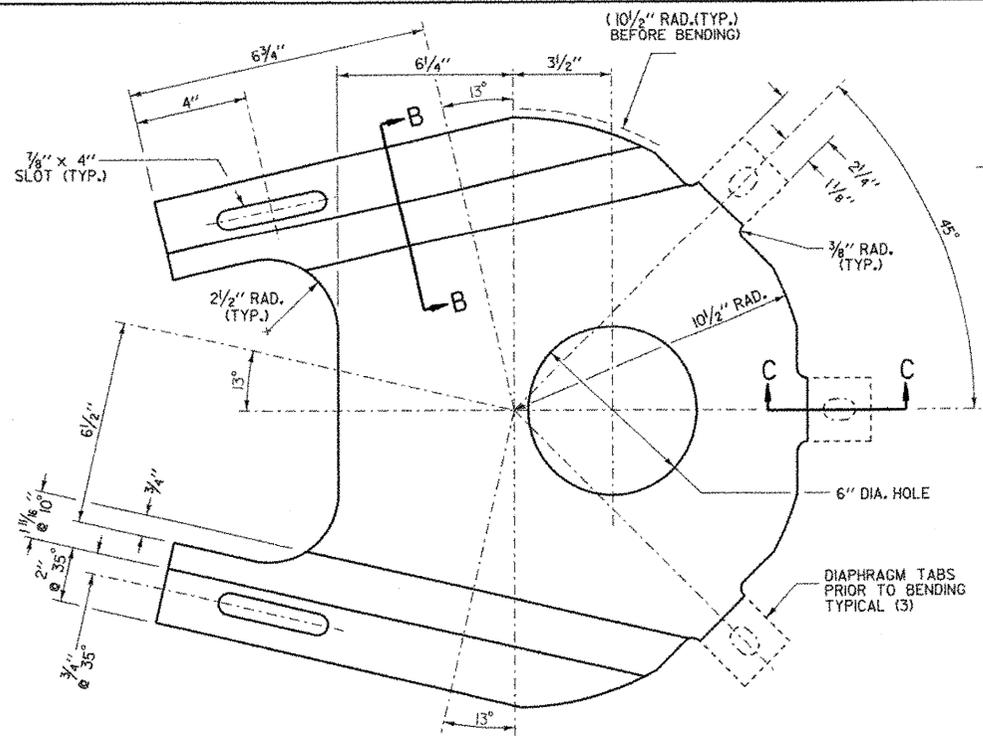
[Signature]
 ROADWAY DESIGN ENGINEER

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 FEDERAL HIGHWAY ADMINISTRATION

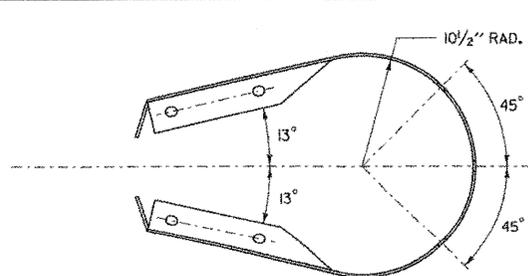
MODIFIED ECCENTRIC LOADER TERMINAL WITH WOOD POSTS (MELT)

VERMONT AGENCY OF
TRANSPORTATION

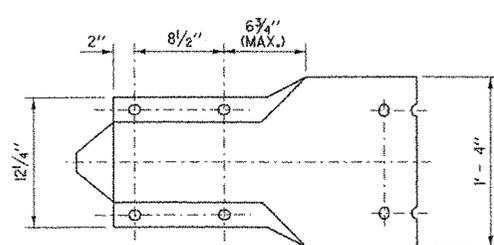
STANDARD G-17 a



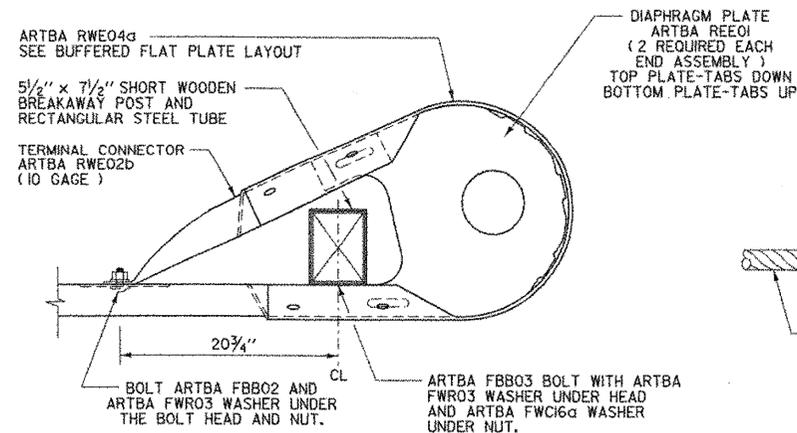
DIAPHRAGM PLATE DETAIL
12 GAGE - (2 REQUIRED EACH TERMINAL)



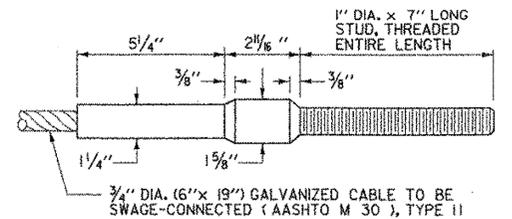
BUFFERED END SECTION PLAN



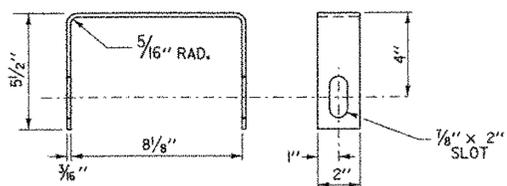
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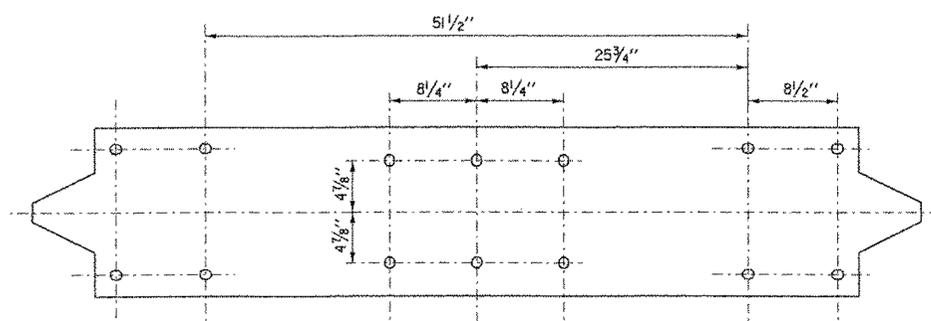
BUFFERED END ASSEMBLY



STANDARD SWAGED FITTING AND STUD CABLE ASSEMBLY
ARTBA FCA01

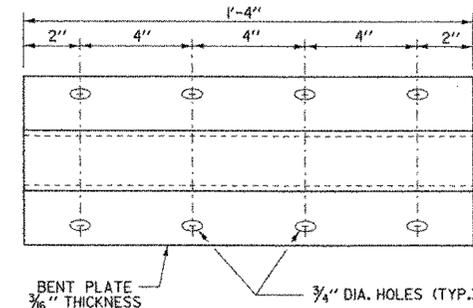


YOKE DETAILS

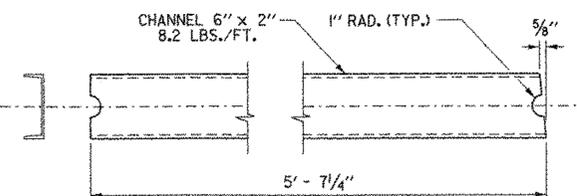


BUFFERED END SECTION FLAT PLATE LAYOUT
ARTBA RWE04g

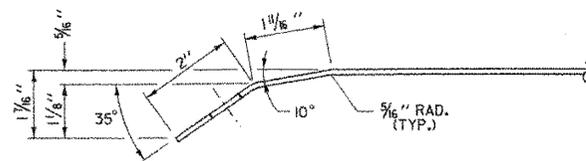
ALL SLOTS 29/32 inch x 1/8 inch
ALL BOLTS ARTBA FBBO1



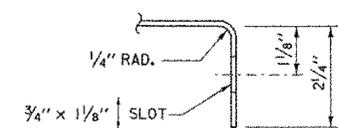
ANCHOR PLATE
ARTBA FPA01



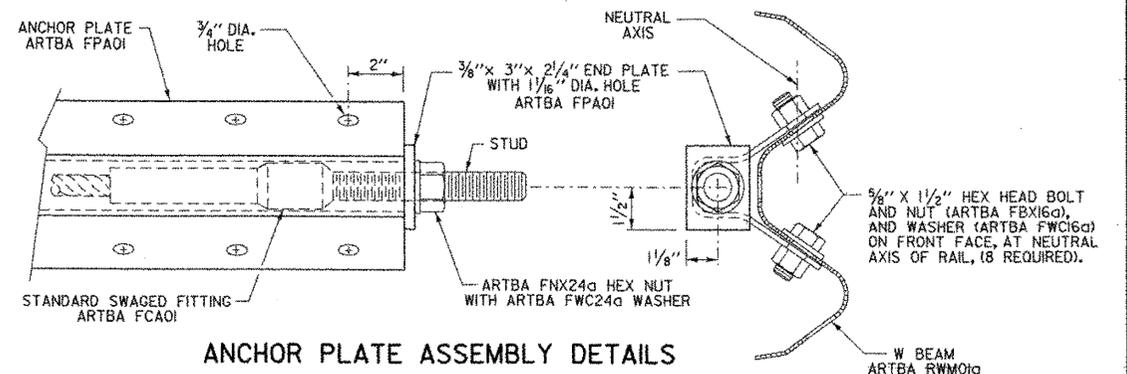
STRUT DETAILS



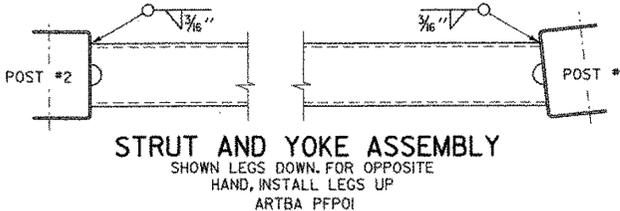
DIAPHRAGM PLATE DETAIL SECTION B-B



DIAPHRAGM PLATE DETAIL SECTION C-C



ANCHOR PLATE ASSEMBLY DETAILS



STRUT AND YOKE ASSEMBLY
SHOWN LEGS DOWN. FOR OPPOSITE HAND, INSTALL LEGS UP
ARTBA PFP01

REVISIONS AND CORRECTIONS

JUNE 30, 1995 ORIGINAL APPROVAL
SEPT. 27, 2002 UPDATED TO AGREE WITH METRIC DRAWING.

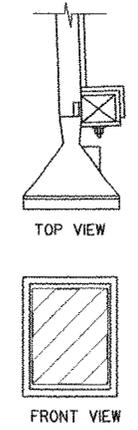
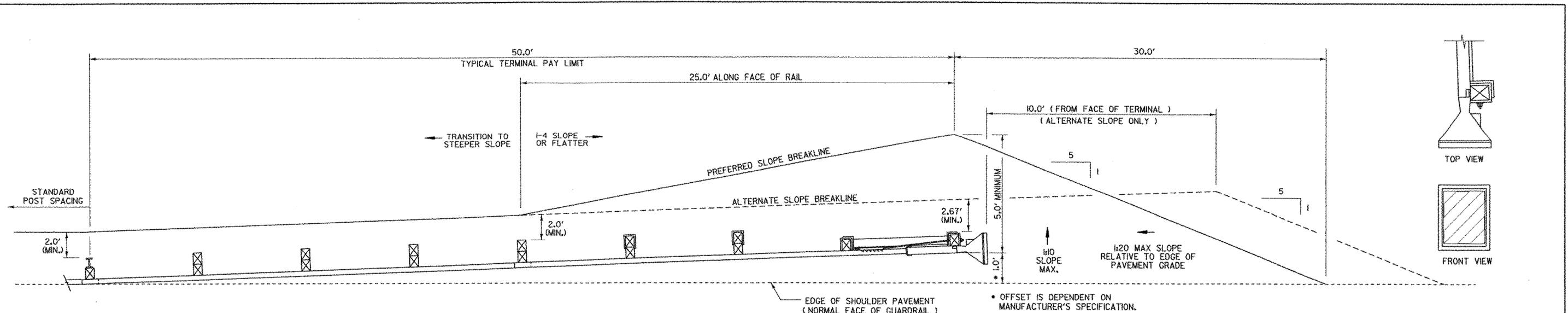
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[Signature]
DIRECTOR OF PROJECT DEVELOPMENT
[Signature]
ROADWAY DESIGN ENGINEER
[Signature]
FEDERAL HIGHWAY ADMINISTRATION

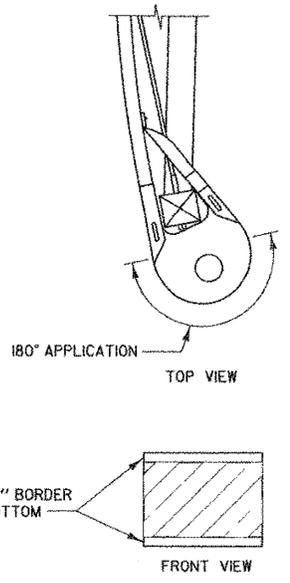
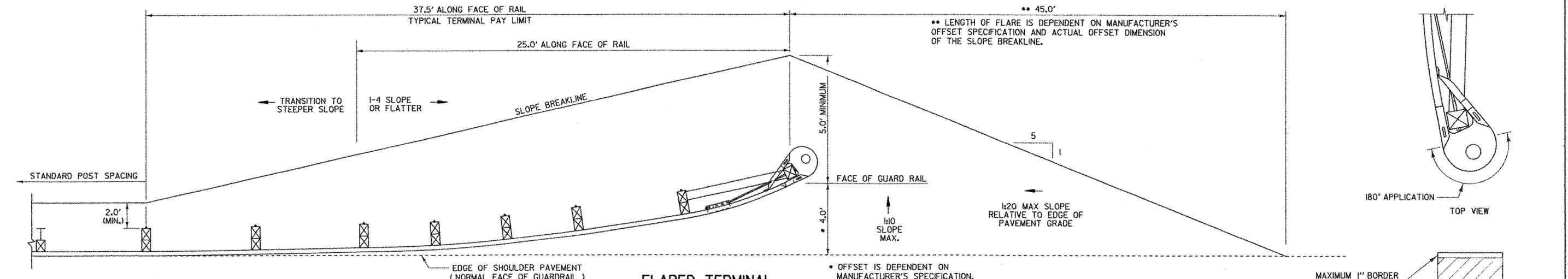
MODIFIED ECCENTRIC LOADER TERMINAL WITH WOOD POSTS (MELT)



STANDARD G-17 b



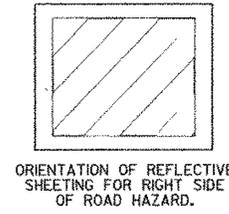
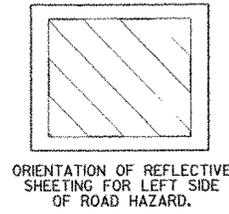
TANGENTIAL TERMINAL



FLARED TERMINAL

GENERAL NOTES

- ① THE AREA IMMEDIATELY BEHIND AND BEYOND THE TERMINAL SHOULD BE REASONABLY TRAVERSABLE AND FREE FROM FIXED-OBJECT HAZARDS TO THE EXTENT PRACTICABLE. IF A CLEAR RUNOUT PATH IS NOT ATTAINABLE, THIS AREA SHOULD AT LEAST BE SIMILAR IN CHARACTER TO UPSTREAM/UNSHIELDED ROADSIDE AREAS.
- ② REFLECTIVE SHEETING SHALL BE PLACED ON THE TERMINAL END OF ALL TANGENT END TERMINALS. THIS SHALL BE OBJECT MARKER MATERIAL (TYPE 3 - STRIPED MARKER OM-3L AND OM-3R) CONSISTING OF A SQUARE OR RECTANGULAR SHAPE WITH ALTERNATING BLACK AND RETROREFLECTIVE YELLOW STRIPES SLOPING DOWNWARD AT AN ANGLE OF 45 DEGREES TOWARDS TRAFFIC. THE MINIMUM WIDTH OF THE YELLOW STRIPE SHALL BE 3 INCHES. THE DIMENSIONS OF THE MARKER SHALL EXTEND FOR THE FULL WIDTH OF THE FACE PLATE ON THE TERMINAL HEAD AND BE SUFFICIENT IN HEIGHT (DEPENDENT ON THE TYPE OF END TERMINAL AND HEAD SIZE). REFLECTIVE MATERIAL SHALL MEET THE REQUIREMENTS OF SUBSECTION 750.08 (B)(3) TYPE III OR HIGHER (AASHTO M 268 (ASTM 4956)). THE COST SHALL BE INCLUDED IN THE COST OF THE END TERMINAL.
- ③ REFLECTIVE SHEETING SHALL BE PLACED ON THE END OF FLARED TERMINALS WHICH ARE LOCATED 6 FEET OR LESS FROM THE EDGE OF SHOULDER (NORMAL FACE OF GUARDRAIL). THIS SHALL BE THE SAME OBJECT MARKER MATERIAL SPECIFIED IN NOTE 2. THE COST OF THE REFLECTIVE SHEETING SHALL BE INCLUDED IN THE COST OF THE END TERMINAL.
- ④ FOR THE FLARED TERMINAL, WITH AN OFFSET BETWEEN 4 FEET AND 6 FEET FROM THE NORMAL FACE OF GUARDRAIL, THE FOLLOWING SHALL PERTAIN: A REFLECTIVE BUTTON, MOUNTED ON A STANDARD DELINEATOR POST, SHALL BE INSTALLED AT THE NORMAL FACE OF GUARDRAIL, DIRECTLY OPPOSITE THE LEAD END OF THE TERMINAL. THE BUTTON SHALL BE WHITE FOR THE RIGHT SIDE OF THE ROAD AND YELLOW FOR THE LEFT SIDE. ANY DELINEATORS INSTALLED SHALL BE PAID FOR BY THE APPROPRIATE PAY ITEMS.



NOT TO SCALE

REVISIONS AND CORRECTIONS
 OCT. 21, 1998 ORIGINAL APPROVAL
 NOV. 15, 2002 MODIFIED SLOPE BREAKLINE,
 REFLECTIVE SHEETING ADDED

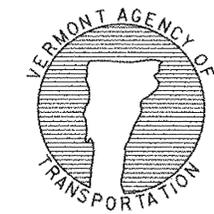
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 ROADWAY DESIGN ENGINEER

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**GENERIC PLANS FOR
 GUARDRAIL END TERMINALS**



STANDARD
 G-19