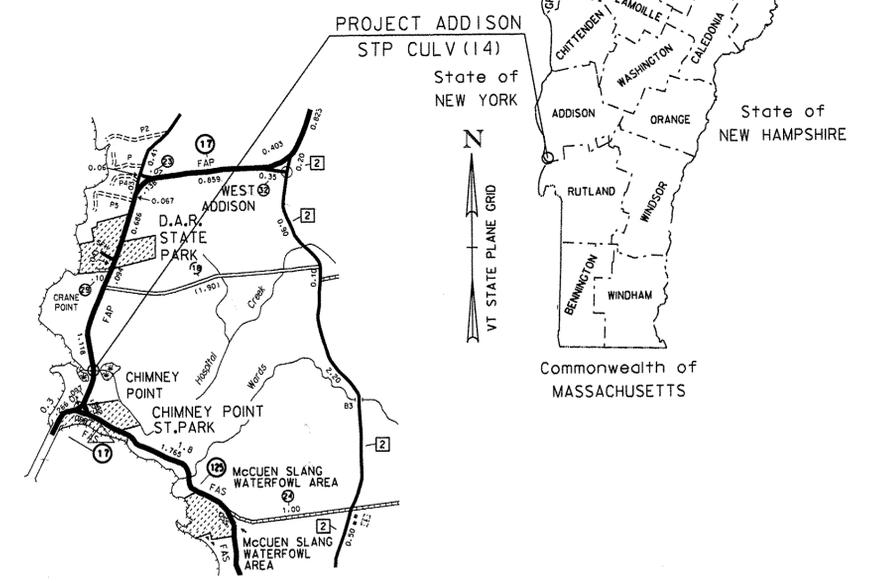


# STATE OF VERMONT AGENCY OF TRANSPORTATION



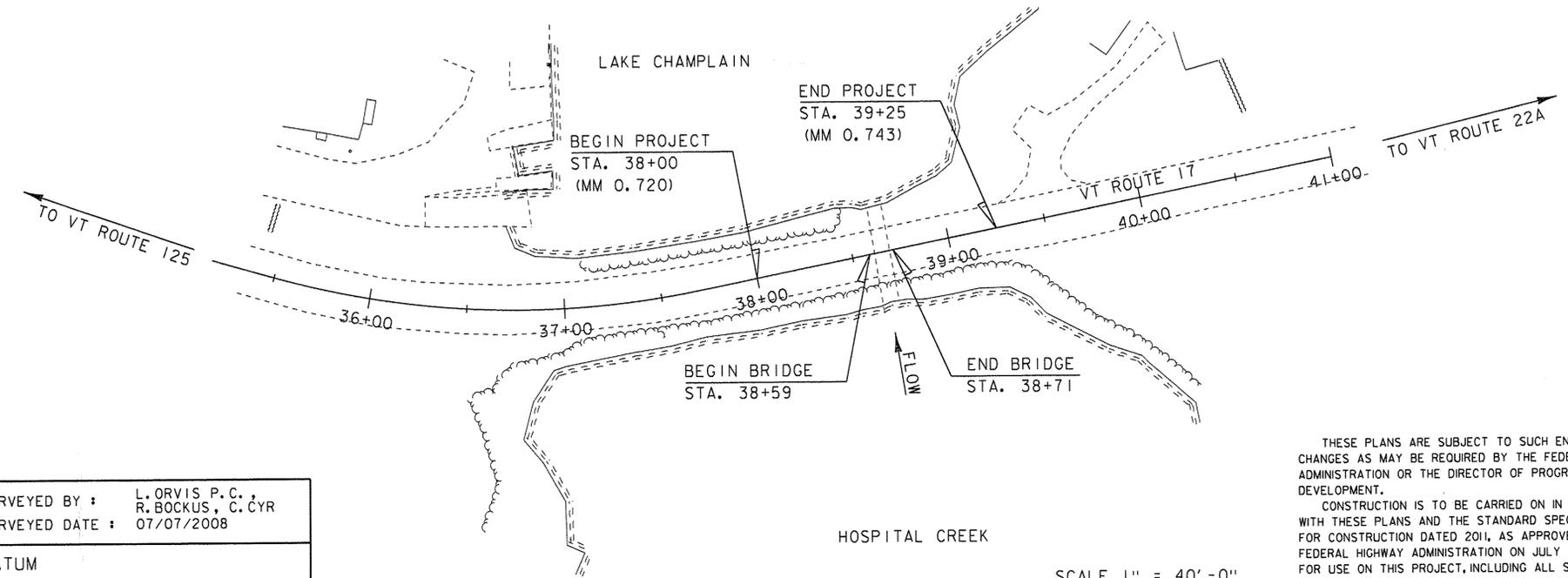
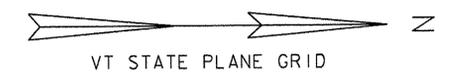
## PROPOSED IMPROVEMENT BRIDGE PROJECT TOWN OF ADDISON COUNTY OF ADDISON VT ROUTE 17 (RURAL MINOR ARTERIAL) - BRIDGE #2



**PROJECT LOCATION :** THE PROJECT IS LOCATED ON VERMONT ROUTE 17, APPROXIMATELY 0.4 MILES NORTH FROM THE INTERSECTION OF VERMONT ROUTE 125.

**PROJECT DESCRIPTION :** REMOVAL OF THE EXISTING TWIN REINFORCED CONCRETE CULVERTS AND REPLACING THEM WITH A NEW REINFORCED CONCRETE BOX CULVERT.

**LENGTH OF BRIDGE :** 12.00 FEET  
**LENGTH OF ROADWAY :** 113.00 FEET  
**LENGTH OF PROJECT :** 125.00 FEET



QUALITY ASSURANCE PROGRAM: LEVEL 2

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

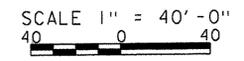
**SURVEYED BY :** L. ORVIS P.C., R. BOCKUS, C. CYR  
**SURVEYED DATE :** 07/07/2008

**DATUM**  
 VERTICAL NAVD 88  
 HORIZONTAL NAD 83 (07) CONUS

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 OPERATIONS**  
 APPROVED: DATE 3-11-13  
**PROJECT MANAGER : KRISTIN HIGGINS**

**PROJECT NAME :** ADDISON  
**PROJECT NUMBER :** STP CULV (14)  
**SHEET 1 OF 28 SHEETS**



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STANDARDS LIST

E-100	CONSTRUCTION APPROACH SIGNS	01-02-2004
E-101	CONSTRUCTION SIGN DETAILS	05-30-2003
E-102	CONSTRUCTION SIGN DETAILS	06-30-2003
E-102A	CONSTRUCTION SIGN DETAILS	05-01-2004
E-107	DELINEATION, BARRICADES AND DETOURS FOR CONSTRUCTION AREAS	06-30-2003
E-134	BRIDGE NUMBER PLAQUE	08-08-1995
E-164	SQUARE STEEL SIGN POST	06-08-2009
E-192	PAVEMENT MARKING DETAILS	10-12-2000
G-1	STEEL BEAM GUARDRAIL DETAILS (POST, DELINEATOR, TYPICALS)	01-03-2000
G-1D	STEEL BEAM GUARDRAIL DETAILS (END TERMINAL, ANCHOR, MEDIAN)	01-03-2000
G-19	GENERIC GRADING PLANS FOR GUARDRAIL END TERMINALS	11-15-2002

FINAL HYDRAULIC REPORT

HYDROLOGIC DATA

Date: Feb. 7, 2011

DRAINAGE AREA : 4.5 sq. mi.  
 CHARACTER OF TERRAIN : Relatively flat to small hills  
 STREAM CHARACTERISTICS : Backwater area to Lake Champlain  
 NATURE OF STREAMBED : Silt and sand

PEAK FLOW DATA

Q 2.33 =	90 cfs	Q 50 =	320cfs
Q 10 =	200 cfs	Q 100 =	400 cfs
Q 25 =	260cfs	Q 500 =	560 cfs

DATE OF FLOOD OF RECORD: Unknown  
 ESTIMATED DISCHARGE: Unknown  
 WATER SURFACE ELEV.: Unknown  
 NATURAL STREAM VELOCITY: @ Q50 = Less than 1 fps due to lake backwater  
 ICE CONDITIONS: Moderate to Heavy  
 DEBRIS: Light  
 DOES THE STREAM REACH MAXIMUM HIGHWATER ELEV. RAPIDLY? No  
 IS ORDINARY RISE RAPID? No  
 IS STAGE AFFECTED BY UPSTREAM OR DOWNSTREAM CONDITIONS? Yes  
 IF YES, DESCRIBE: Water surface elevations at this site are controlled by Lake Champlain.  
 This site is in a backwater bay of the lake.

WATERSHED STORAGE: 3% HEADWATERS:  
 UNIFORM:  
 IMMEDIATELY ABOVE SITE: X

EXISTING STRUCTURE INFORMATION

STRUCTURE TYPE: Two 5' RCP's  
 YEAR BUILT: 1949  
 CLEAR SPAN(NORMAL TO STREAM): 5' + 5' = 10' total  
 VERTICAL CLEARANCE ABOVE STREAMBED: 5'  
 WATERWAY OF FULL OPENING: two at 19.6 sq. ft. = 39.2 sq. ft. total  
 DISPOSITION OF STRUCTURE: Remove  
 TYPE OF MATERIAL UNDER SUBSTRUCTURE: See boring logs.

WATER SURFACE ELEVATIONS AT:

Q2.33 =	98.5'	VELOCITY =	2.3 fps
Q10 =	100.8'	"	5.1 fps
Q25 =	101.7'	"	6.6 fps
Q50 =	102.1'	"	7.0 fps
Q100 =	102.4'	"	7.0 fps

LONG TERM STREAMBED CHANGES: None noted

IS THE ROADWAY OVERTOPPED BELOW Q100: Yes  
 FREQUENCY: Just below Q25  
 RELIEF ELEVATION: 101.6'  
 DISCHARGE OVER ROAD @Q100: 126 cfs

UPSTREAM STRUCTURE

TOWN: Not Applicable DISTANCE:  
 HIGHWAY #: STRUCTURE #:  
 CLEAR SPAN: CLEAR HEIGHT:  
 YEAR BUILT: FULL WATERWAY:  
 STRUCTURE TYPE:

DOWNSTREAM STRUCTURE

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

LRFR LOAD RATING FACTORS

LOADING LEVELS	TRUCK						
	H-20	HL-93	3S2	6 AXLE	3A. STR.	4A. STR.	5A. SEMI
TONNAGE	20	36	36	66	30	34.5	38
INVENTORY							
POSTING							
OPERATING							

COMMENTS: TABLE TO BE COMPLETED BY CONTRACTOR'S DESIGNER

CULVERT DESIGN CRITERIA

- PROPOSED CULVERT IS A PRECAST CONCRETE STRUCTURE (10'-0" x 8'-0" x 7'-8" BOX).
- CULVERT ENDS ARE SKEWED BY AN ANGLE OF 90°
- CULVERT WILL BE SET AT A SLOPE OF 0.00 IN. ON 72 FT.
- CULVERT WILL REQUIRE FISH PASSAGE ACCOMODATIONS
- CULVERT CONSTRUCTION WILL REQUIRE A TEMPORARY PIPE

PROPOSED STRUCTURE

STRUCTURE TYPE: Pre-cast concrete box

CLEAR SPAN(NORMAL TO STREAM): 10'  
 VERTICAL CLEARANCE ABOVE STREAMBED: 8'  
 WATERWAY OF FULL OPENING: 80 sq. ft.

WATER SURFACE ELEVATIONS AT:

Q2.33 =	98.8'	VELOCITY=	1.2 fps
Q10 =	100.4'	"	2.5 fps
Q25 =	101.1'	"	3.3 fps
Q50 =	101.5'	"	4.0 fps
Q100 =	102.0'	"	5.0 fps

IS THE ROADWAY OVERTOPPED BELOW Q100: Yes  
 FREQUENCY: Just above Q50  
 RELIEF ELEVATION: 101.6'  
 DISCHARGE OVER ROAD @Q100: 40 cfs

AVERAGE LOW ELEVATION OF SUPERSTRUCTURE: 99.0' at inlet and outlet  
 VERTICAL CLEARANCE: @ Q50 = The box is submerged just above Q2.33.

SCOUR: Not applicable for a box structure.

REQUIRED CHANNEL PROTECTION: Stone Fill, Type III on roadway slopes.

PERMIT INFORMATION

AVERAGE DAILY FLOW: 9 cfs DEPTH OR ELEVATION:  
 ORDINARY LOW WATER: 4 cfs Elevation 94.0'  
 ORDINARY HIGH WATER: 39 cfs Elevation 98.0'

TEMPORARY BRIDGE REQUIREMENTS

STRUCTURE TYPE: No temporary bridge required.  
 CLEAR SPAN (NORMAL TO STREAM):  
 VERTICAL CLEARANCE ABOVE STREAMBED:  
 WATERWAY AREA OF FULL OPENING:

ADDITIONAL INFORMATION

Hydraulics at this site are controlled by Lake Champlain. All hydraulic information is based on equal frequency floods on the lake and Hospital Creek, and on NAVD88 vertical datum. Vel. will be higher when the lake is lower. (Box Q50 vel. = 8.2 fps with mean lake level of 94.9') Existing pipe hydraulics is approximate, due to the poor shape and condition of the pipes.

TRAFFIC MAINTENANCE NOTES

- MAINTAIN TRAFFIC ON AN OFF SITE DETOUR.
- TRAFFIC SIGNALS ARE NOT NECESSARY.
- SIDEWALKS ARE NOT NECESSARY

DESIGN VALUES

1. DESIGN LIVE LOAD	HL-93
2. FUTURE PAVEMENT	dp: 3.0 INCH
3. CULVERT OPENING	D: 10.0 FT FT
4. MIN. MID-SPAN POS. CAMBER @ RELEASE (PRESTRESSED UNITS)	Δ: ---
5. PRESTRESSING STRAND	fy: ---
6. PRESTRESSED CONCRETE STRENGTH	f'c: ---
7. PRESTRESSED CONCRETE RELEASE STRENGTH	f'ci: ---
8. CONCRETE, HIGH PERFORMANCE CLASS AA	f'c: ---
9. CONCRETE, HIGH PERFORMANCE CLASS A	f'c: ---
10. CONCRETE, HIGH PERFORMANCE CLASS B	f'c: ---
11. CONCRETE, CLASS C	f'c: ---
12. REINFORCING STEEL	fy: 60 KSI
13. STRUCTURAL STEEL AASHTO M270	fy: ---
14. SOIL UNIT WEIGHT	γ: 0.140 KCF
15. NOMINAL BEARING RESISTANCE OF SOIL	qn: 4.0 KSF
16. SOIL BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	φ: ---
17. NOMINAL BEARING RESISTANCE OF ROCK	qn: 10.0 KSF
18. ROCK BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	φ: ---
19. NOMINAL AXIAL PILE RESISTANCE	qp: ---
20. PILE YIELD STRENGTH ASTM A572	fy: ---
21. PILE SIZE	---
22. EST. PILE LENGTH	Lp: ---
23. PILE RESISTANCE FACTOR	φ: ---
24. LATERAL PILE DEFLECTION	Δ: ---
25. BASIC WIND SPEED	V3s: ---
26. MINIMUM GROUND SNOW LOAD	pg: ---
27. SEISMIC DATA	PGA: --- Ss: --- S1: ---

PROJECT NAME: ADDISON  
 PROJECT NUMBER: STP CULV (14)

FILE NAME: s08b062.xlsm PLOT DATE: 2/6/2013  
 PROJECT LEADER: K. HIGGINS DRAWN BY: J. SALVATORI  
 DESIGNED BY: J. SALVATORI CHECKED BY: W. LAMMER  
 PRELIMINARY INFORMATION SHEET SHEET 2 OF 28

TRAFFIC DATA

YEAR	ADT	DHV	% D	% T	ADTT	20 year ESAL for flexible pavement from 2009 to 2029 : 1562000
2009	2900	390	65	6.1	210	40 year ESAL for flexible pavement from 2009 to 2049 : 3833000
2029	3500	460	65	10	420	Design Speed : 50 mph

LEVEL I	LEVEL II	LEVEL III
TYPE:	TYPE:	TYPE:
GRADE:	GRADE:	GRADE:

**GENERAL NOTES**

1. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO THE AGENCY OF TRANSPORTATION'S STANDARD SPECIFICATIONS FOR CONSTRUCTION, DATED 2011, AND ITS LATEST REVISIONS, AND THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS 5th EDITION, AND ITS LATEST REVISIONS.
2. THE CONTRACTOR WILL BE ALLOWED TO CLOSE THE BRIDGE FOR ONE WEEKEND (TWO CONSECUTIVE DAYS) BEGINNING ON A FRIDAY AT 6PM AND REOPENING THE FOLLOWING MONDAY AT 6 AM, TO A MINIMUM OF ONE-WAY TRAFFIC. DURING THAT TIME THE CONTRACTOR WILL BE ALLOWED TO WORK 24 HOURS PER DAY. THE CONTRACTOR SHALL SCHEDULE THEIR WORK SUCH THAT THE BRIDGE IS NOT CLOSED DURING HOLIDAY PERIODS. SEE SPECIAL PROVISIONS FOR FURTHER DETAILS.
3. THE CONTRACTOR IS TO TAKE NOTICE THAT ACCORDING TO THE BORING, THERE IS A METAL PIPE OF UNKNOWN ORIGIN AT STATION 38+52. IF REMOVAL IS REQUIRED IT SHALL BE INCIDENTAL TO ITEM 208.30 "COFFERDAM EXCAVATION, EARTH".
4. ALL DIMENSIONS ARE HORIZONTAL OR VERTICAL AND ARE GIVEN AT 68 DEGREES F UNLESS OTHERWISE NOTED.
5. ITEM 529.15 "REMOVAL OF STRUCTURE SHALL BE USED FOR THE REMOVAL OF THE EXISTING TWIN PIPES UNDER VT ROUTE 17.
6. REINFORCING STEEL PLACEMENT TOLERANCES SHALL BE AS FOLLOWS:  
SPACING +/- 1"  
CLEARANCE +/- 1/4"
7. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 1" X 1".
8. ITEM 404.65 "EMULSIFIED ASPHALT" IS TO BE APPLIED AT A RATE OF 0.025 GAL/SY BETWEEN SUCCESSIVE COURSES OF PAVEMENT OR AS DIRECTED BY THE ENGINEER.
9. PAYMENT FOR TREATMENT OF DISCHARGE OF THE COFFERDAM WILL BE MADE UNDER CONTRACT ITEM 653.45.

**TRAFFIC CONTROL**

10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN AND IMPLEMENTATION OF A SITE SPECIFIC TRAFFIC CONTROL PLAN FOR ALL STAGES OF CONSTRUCTION. THE PLAN SHALL CLEARLY DETAIL HOW TRAFFIC WILL BE MAINTAINED PRIOR TO, DURING AND AFTER THE CLOSURE PERIOD. THE PLAN SHALL SPECIFY ALL CONSTRUCTION ACTIVITIES REQUIRING ALTERNATING ONE WAY TRAFFIC, RELATE THOSE ACTIVITIES TO THE CONSTRUCTION SCHEDULE AND SHOW APPROPRIATE TEMPORARY TRAFFIC CONTROL. THE CONTRACTOR SHALL SUBMIT DETAILED TRAFFIC CONTROL PLANS TO THE RESIDENT ENGINEER FOR APPROVAL PER SUBSECTION 105.03. ALL COSTS SHALL BE INCLUDED IN ITEM 900.645 SPECIAL PROVISION (TRAFFIC CONTROL, ALL-INCLUSIVE). SEE SPECIAL PROVISIONS.
11. ALL TEMPORARY TRAFFIC CONTROL SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MUTCD. FOR ADDITIONAL SIGNING INSTRUCTIONS SEE THE E SERIES OF THE STANDARDS. WHERE CONFLICTS EXIST, THE MUTCD SHALL GOVERN.
12. INSTALLATION OF TEMPORARY TRAFFIC CONTROL SIGNS SHALL NOT BLOCK ANY EXISTING TRAFFIC CONTROL SIGN ASSEMBLIES. THE CONTRACTOR SHALL TRY TO MAINTAIN AT LEAST 200 FEET BETWEEN SIGN ASSEMBLIES.
13. ACCESS TO ALL EXISTING DRIVES SHALL BE MAINTAINED AT ALL TIMES DURING ALL PHASES OF CONSTRUCTION.
14. ALL ITEMS REQUIRED TO IMPLEMENT THE CONTRACTOR'S TRAFFIC CONTROL PLAN, EXCEPT FOR ITEM 630.15 FLAGGERS WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED INCLUDED IN THE BID PRICE FOR ITEM 900.645 SPECIAL PROVISION (TRAFFIC CONTROL, ALL-INCLUSIVE).

**PRECAST CONCRETE NOTES**

15. DESIGN CRITERIA:
  - A. SOIL UNIT WEIGHT = 140 PCF
  - B. DESIGN LIVE LOAD = HL-93
  - C. NOMINAL BEARING RESISTANCE = 6.7 KSF
  - D. BEARING RESISTANCE FACTOR = 0.45
  - E. DESIGN FILL OVER BOX = 3 FEET
  - F. CONCRETE COMPRESSIVE STRENGTH = SEE SUBSECTION 540.05(e)
16. ALL CONCRETE SHALL BE PRECAST. ITEM 540.10 "PRECAST CONCRETE STRUCTURE" INCLUDES ALL BOX SEGMENTS, HEADWALLS, AND CUTOFF WALLS. ALL CONNECTIONS SHALL BE DESIGNED BY THE FABRICATOR AND SHALL BE CONSIDERED INCIDENTAL TO ITEM 540.10.
17. THE PRECAST BOX SECTIONS ARE SHOWN FOR REFERENCE ONLY. THE ACTUAL DIMENSIONS AND SHAPE WILL BE DEPENDENT ON THE FABRICATOR. THE MINIMUM INSIDE DIMENSIONS SHALL BE 8'-0" IN HEIGHT AND 10'-0" IN WIDTH. THE OVERALL LENGTH OF THE BOX SHALL BE 71'-8" ALONG THE STREAMBED GRADE. THE EXPOSED ENDS OF THE FIRST AND LAST UNITS SHALL BE VERTICAL.
18. THE EXTERIOR (TOP AND SIDES) OF ALL CONCRETE BOX JOINTS ALONG WITH ALL LIFTING HOLES SHALL BE FILLED WITH MORTAR TYPE IV AFTER BEING SET IN THEIR FINAL POSITION. THIS WORK WILL BE INCLUDED IN THE UNIT PRICE BID FOR ITEM 540.10.
19. MEMBRANE WATERPROOFING SHALL BE APPLIED TO THE ENTIRE TOP OF THE CONCRETE BOX. PAYMENT FOR MEMBRANE OVER THE TOP WILL BE INCLUDED IN THE UNIT PRICE BID FOR CONTRACT ITEM 520.10.
20. A TWO (2) FOOT WIDE STRIP OF MEMBRANE WATERPROOFING SHALL BE PLACED AT EACH VERTICAL JOINT (SIDES). MEMBRANE SHALL BE CENTERED ON THE JOINT AND COVER THE FULL HEIGHT. THE SIDES SHALL BE COVERED PRIOR TO THE TOP. ANY OVERLAPPING OF MEMBRANE SHALL BE DONE IN A SHINGLE TYPE STYLE TO SHED WATER AND SHALL OVERLAP A MINIMUM OF ONE FOOT. PAYMENT FOR MEMBRANE AT EACH VERTICAL JOINT WILL BE INCLUDED IN THE UNIT PRICE BID FOR CONTRACT ITEM 540.10.
21. WATER REPELLENT, SILANE SHALL FURNISHED IN ACCORDANCE WITH SECTION 514 AND SHALL BE SHOP APPLIED TO ALL EXPOSED CONCRETE SURFACES OF THE PRECAST CONCRETE STRUCTURE. PAYMENT FOR SILANE WILL BE INCLUDED IN THE UNIT PRICE BID FOR CONTRACT ITEM 540.10.
22. REINFORCING STEEL FOR THE PRECAST HEADWALLS SHALL BE LEVEL II REINFORCING STEEL IN ACCORDANCE WITH SECTION 507. ALL REMAINING REINFORCING STEEL SHALL BE LEVEL I REINFORCING STEEL IN ACCORDANCE WITH SECTION 507. PAYMENT FOR REINFORCING STEEL WILL BE INCLUDED IN THE UNIT PRICE BID FOR CONTRACT ITEM 540.10.

PROJECT NAME: ADDISON  
PROJECT NUMBER: STP CULV(I4)

FILE NAME: s08b062gen.dgn PLOT DATE: 15-MAR-2013  
PROJECT LEADER: K. HIGGINS DRAWN BY: J. SALVATORI  
DESIGNED BY: J. SALVATORI CHECKED BY: W. LAMMER  
GENERAL NOTES SHEET 3 OF 28

# QUANTITY SHEET 1

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				
							350				350		CY	COMMON EXCAVATION	203.15		350	CY	COMMON EXCAVATION (350 * 1.0)
									200		200		CY	UNCLASSIFIED CHANNEL EXCAVATION	203.27		60	CY	UNCLASSIFIED CHANNEL EXCAVATION (200 * 0.3)
							1				1		CY	TRENCH EXCAVATION OF EARTH, EXPLORATORY (N.A.B.I.)	204.22		146	CY	COFFERDAM EXCAVATION (485 * 0.3)
									225		225		CY	GRANULAR BACKFILL FOR STRUCTURES	204.30		556	CY	SUB TOTAL
									425		425		CY	COFFERDAM EXCAVATION, EARTH	208.30		556	CY	TOTAL FILL AVAILABLE
									60		60		CY	COFFERDAM EXCAVATION, ROCK	208.35		0	CY	TOTAL FILL REQUIRED
									1		1		LS	COFFERDAM	208.40		556	CY	TOTAL WASTE
							300				300		SY	COLD PLANING, BITUMINOUS PAVEMENT	210.10				
														BEGIN OPTION AA					
							275				275		CY	SUBBASE OF GRAVEL	301.15		105	TON	TYPE IIS
							275				275		CY	SUBBASE OF CRUSHED GRAVEL, COARSE GRADED	301.25		75	TON	TYPE IVS
							275				275		CY	SUBBASE OF DENSE GRADED CRUSHED STONE	301.35		180	TON	TOTAL SUPERPAVE
														END OPTION AA					
							3				3		CWT	EMULSIFIED ASPHALT	404.65				
							1				1		LU	PRICE ADJUSTMENT, ASPHALT CEMENT (N.A.B.I.)	406.50				
									95		95		SY	SHEET MEMBRANE WATERPROOFING, SPRAY APPLIED	520.10				
									2		2		EACH	REMOVAL OF STRUCTURE (5'-0" RCP)	529.15				
									1		1		LS	PRECAST CONCRETE STRUCTURE (10'-0" x 8'-0" x 71'-8" BOX)	540.10				
								1			1		MGAL	DUST CONTROL WITH WATER	609.10				
									5		5		CY	STONE FILL, TYPE II	613.11				
									250		250		CY	STONE FILL, TYPE III	613.12				
							2				2		EACH	STEEL MARKER POSTS	619.16				
							54				54		LF	HD STEEL BEAM GUARDRAIL, GALVANIZED W/8 FEET POSTS	621.215				
							200				200		LF	HD STEEL BEAM GUARDRAIL, GALVANIZED/NESTED W/8 FEET POSTS	621.217				
							2				2		EACH	ANCHOR FOR STEEL BEAM RAIL	621.60				
							50				50		LF	REMOVE AND RESET GUARDRAIL	621.75				
							250				250		LF	REMOVAL AND DISPOSAL OF GUARDRAIL	621.80				
									110		110		TON	CRUSHED STONE BEDDING	629.54				
							200				200		HR	FLAGGERS	630.15				
										1	1		LS	FIELD OFFICE, ENGINEERS	631.10				
										1	1		LS	TESTING EQUIPMENT, BITUMINOUS	631.17				
										2000	2000		DL	FIELD OFFICE TELEPHONE (N.A.B.I.)	631.26				
							1				1		LS	MOBILIZATION/DEMobilIZATION	635.11				
							450				450		LF	4 INCH WHITE LINE	646.20				
							450				450		LF	4 INCH YELLOW LINE	646.21				
									330		330		SY	GEOTEXTILE FOR ROADBED SEPARATOR	649.11				
									350		350		SY	GEOTEXTILE UNDER STONE FILL	649.31				
								90			90		SY	GEOTEXTILE FOR SILT FENCE, WOVEN WIRE REINFORCED	649.515				
								85	25		110		SY	GEOTEXTILE FOR FILTER CURTAIN	649.61				

PROJECT NAME: ADDISON  
PROJECT NUMBER: STP CULV(I4)  
FILE NAME: s08b062qnt.dgn  
PROJECT LEADER: K. HIGGINS  
DESIGNED BY: J. SALVATORI  
QUANTITY SHEET 1

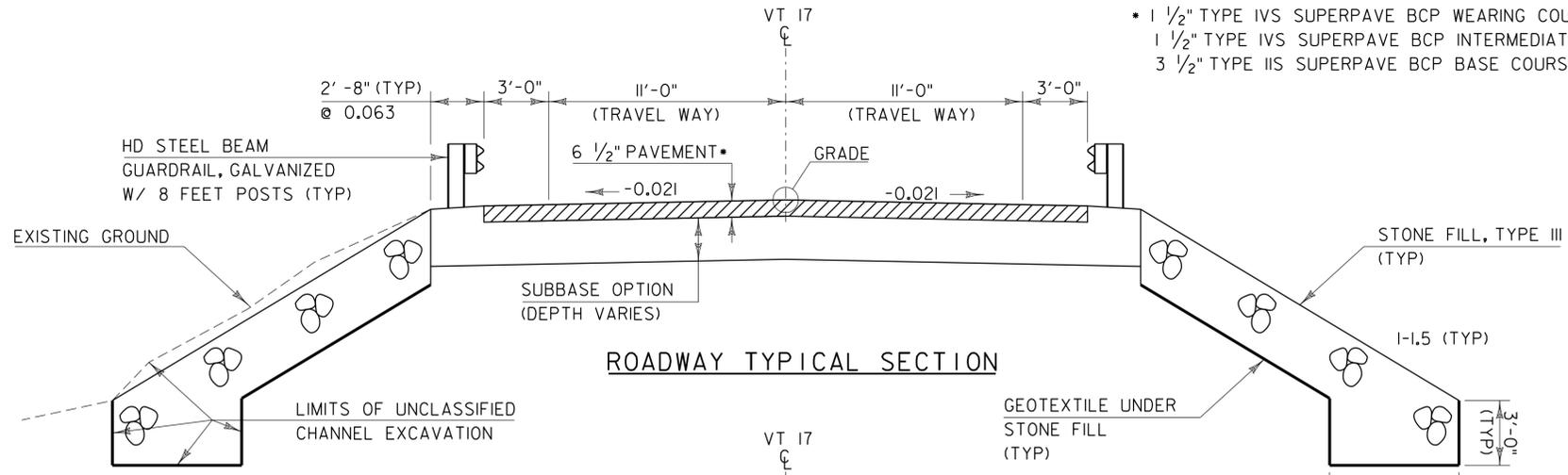
PLOT DATE: 09-MAR-2013  
DRAWN BY: J. GRIGAS  
CHECKED BY: J. SALVATORI  
SHEET 4 OF 28

# QUANTITY SHEET 2

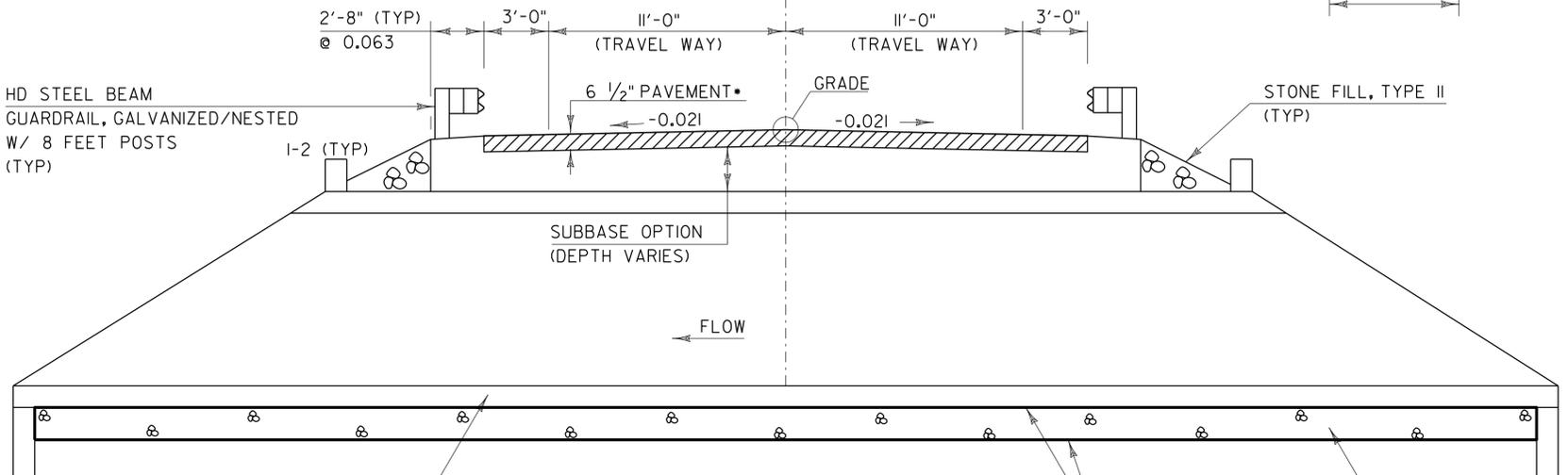
SUMMARY OF ESTIMATED QUANTITIES										TOTALS		DESCRIPTIONS				DETAILED SUMMARY OF QUANTITIES			
							ROADWAY	EROSION CONTROL	BRIDGE	FULL C.E. ITEMS	GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND	QUANTITIES	UNIT	ITEMS
								5			5		LB	SEED	651.15				
								40			40		LB	FERTILIZER	651.18				
								1			1		TON	AGRICULTURAL LIMESTONE	651.20				
								1			1		TON	HAY MULCH	651.25				
								5			5		CY	TOPSOIL	651.35				
								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				
								60			60		CY	VEHICLE TRACKING PAD	653.35				
								1			1		EACH	FILTER BAG	653.45				
								255			255		LF	PROJECT DEMARCATION FENCE	653.55				
							0.66				0.66		SF	TRAFFIC SIGNS, TYPE A	675.20				
							16				16		LF	SQUARE TUBE SIGN POST AND ANCHOR	675.341				
							1				1		LS	SPECIAL PROVISION (TEMPORARY RELOCATION OF STREAM)	900.645				
							1				1		LS	SPECIAL PROVISION (TRAFFIC CONTROL, ALL-INCLUSIVE)	900.645				
							1				1		LU	SPECIAL PROVISION (INCENTIVE/DISINCENTIVE)(N.A.B.I.)	900.650				
							1				1		LU	SPECIAL PROVISION (MAT DENSITY PAY ADJUSTMENT, SMALL QUANTITY)(N.A.B.I.)	900.650				
							1				1		LU	SPECIAL PROVISION (MIXTURE PAY ADJUSTMENT)(N.A.B.I.)	900.650				
							180				180		TON	SPECIAL PROVISION (BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY)	900.680				

PROJECT NAME:	ADDISON	PLOT DATE:	09-MAR-2013
PROJECT NUMBER:	STP CULV(I4)	DRAWN BY:	J. GRIGAS
FILE NAME:	s08b062qnt.dgn	CHECKED BY:	J. SALVATORI
PROJECT LEADER:	K. HIGGINS	QUANTITY SHEET	2
DESIGNED BY:	J. SALVATORI	SHEET	5 OF 28

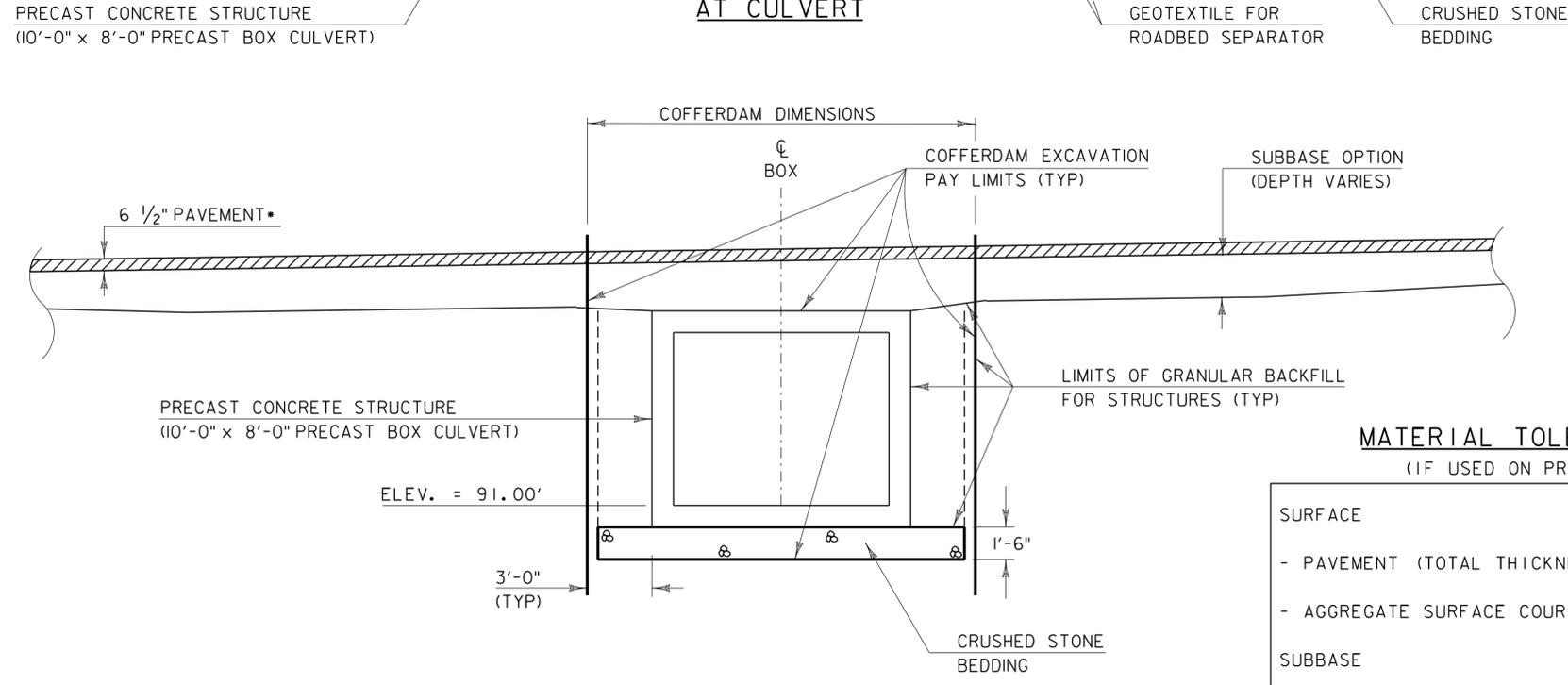
\* 1 1/2" TYPE IVS SUPERPAVE BCP WEARING COURSE, OVER  
 1 1/2" TYPE IVS SUPERPAVE BCP INTERMEDIATE COURSE, OVER  
 3 1/2" TYPE IIS SUPERPAVE BCP BASE COURSE



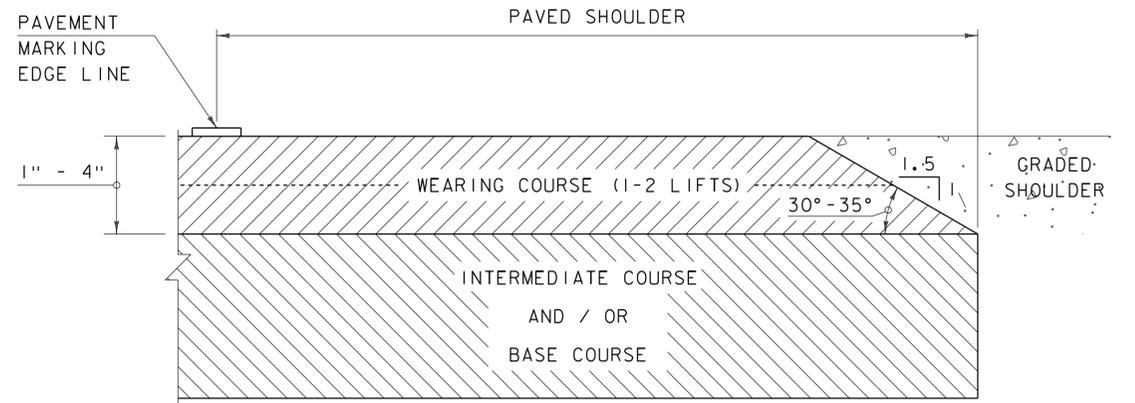
**ROADWAY TYPICAL SECTION**



**ROADWAY TYPICAL SECTION AT CULVERT**



**TYPICAL BOX SECTION**



**SAFETY EDGE DETAIL**

NOT TO SCALE

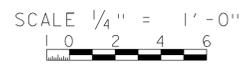
NOTE: LEVELING COURSE MAY INCLUDE THE "SAFETY EDGE" AT THE CONTRACTOR'S CHOICE.

**COFFERDAM NOTES**

1. COFFERDAM DIMENSIONS TO BE DETERMINED BY THE CONTRACTOR.
2. THE PAY LIMITS OF EITHER "COFFERDAM EXCAVATION, EARTH" OR "COFFERDAM EXCAVATION, ROCK" SHALL BE 3'-0" OUTSIDE THE PERIMETER OF THE BOX CULVERT AND FROM BOTTOM OF EXCAVATION UP TO EXISTING GROUND OR BOTTOM OF SUBBASE, WHICHEVER IS LOWER.
3. IF A COFFERDAM IS CONSTRUCTED WHICH IS LARGER THAN THE INDICATED COFFERDAM EXCAVATION PAY LIMITS, PAYMENT FOR ALL UNCLASSIFIED CHANNEL EXCAVATION, INCLUDING THAT PORTION WHICH IS INSIDE THE COFFERDAM BUT OUTSIDE THE COFFERDAM PAY LIMITS, WILL BE MADE AT THE CONTRACT UNIT PRICE FOR UNCLASSIFIED CHANNEL EXCAVATION. NO MEASUREMENT AND PAYMENT WILL BE MADE FOR COFFERDAM EXCAVATION AND GRANULAR BACKFILL FOR STRUCTURES OUTSIDE THE PAY LIMITS DEFINED IN NOTE 2.

**MATERIAL TOLERANCES**  
(IF USED ON PROJECT)

SURFACE	
- PAVEMENT (TOTAL THICKNESS)	+/- 1/4"
- AGGREGATE SURFACE COURSE	+/- 1/2"
SUBBASE	+/- 1"
SAND BORROW	+/- 1"



PROJECT NAME: ADDISON	PLOT DATE: 09-MAR-2013
PROJECT NUMBER: STP CULV (I4)	DRAWN BY: J. SALVATORI
FILE NAME: s08b062+yp.dgn	DESIGNED BY: J. SALVATORI
PROJECT LEADER: K. HIGGINS	CHECKED BY: W. LAMMER
TYPICAL SECTIONS	SHEET 6 OF 28

GPS CONTROL POINTS

HVCTRL #1

WILLOW AZ MK RESET  
 NORTH = 556126.333  
 EAST = 1411019.783  
 ELEV. = 205.80

GENERAL LOCATION, BRIDPORT, VT.

TO REACH FROM THE INTERSECTION OF VT ROUTE 17 AND VT ROUTE 125 IN ADDISON, GO SOUTHEAST ALONG VT ROUTE 125 FOR 1.8 MI (2.3 KM) TO THE INTERSECTION OF TOWN LINE ROAD LEFT. TURN LEFT AND GO EAST ALONG TOWN LINE ROAD FOR 1.0 MI (1.6 KM) TO THE INTERSECTION OF JERSEY STREET LEFT, TOWN LINE ROAD STRAIGHT, AND BASIN HARBOR ROAD RIGHT. TURN RIGHT AND GO SOUTH ALONG BASIN HARBOR ROAD FOR 0.1 MI (0.2 KM) TO THE SITE OF THE MARK ON THE LEFT IN THE NORTHWEST CORNER OF A MOWED LAWN.

THE MARK IS SET 4 CM (2 INCHES) BELOW GROUND SURFACE IN THE TOP OF A FENO STYLE MONUMENT.

IT IS 4.8 M (15.7 FT) SOUTHEAST OF AND 0.1 M (0.3 FT) LOWER THAN THE CENTERLINE OF BASIN HARBOR ROAD, 35.8 M (117.5 FT) SOUTHWEST OF POLE NO 36/64, 5.3 M (17.4 FT) WEST OF THE WEST CORNER OF A WOVEN WIRE FENCE CORNER POST, 3.5 M (11.5 FT) WEST NORTHWEST OF THE WEST END OF A WOODEN FENCE END POST, AND 2.9 M (9.5 FT) WEST NORTHWEST OF A 1.0 CM (.375 INCHES) DIAMETER REBAR WITH PLASTIC CAP FOR A PROPERTY BOUND.

HVCTRL #2

WILLOW 2000  
 NORTH = 557235.067  
 EAST = 1404773.259  
 ELEV. = 111.43

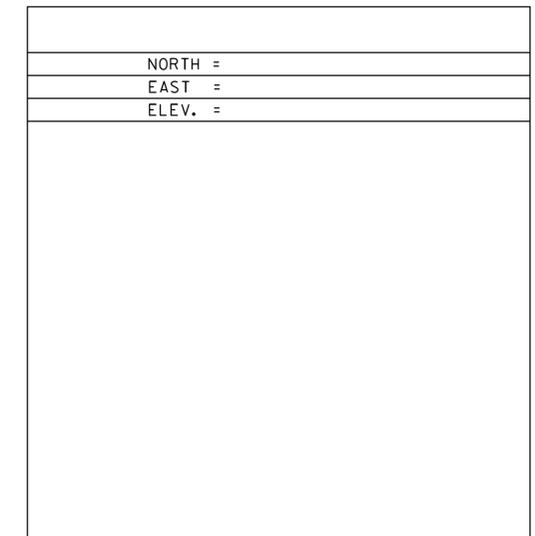
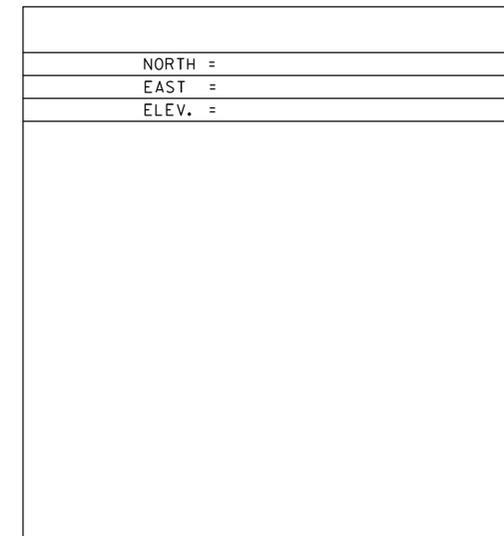
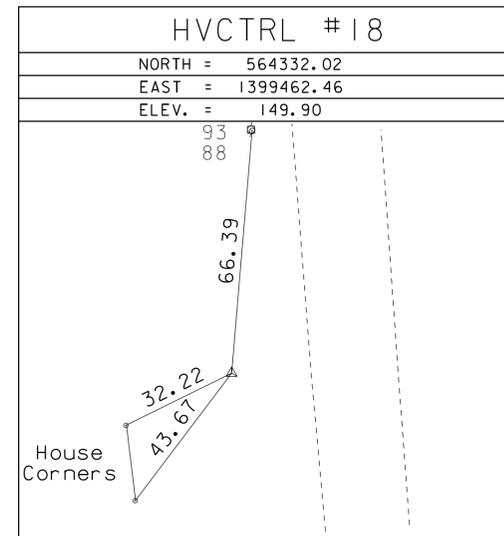
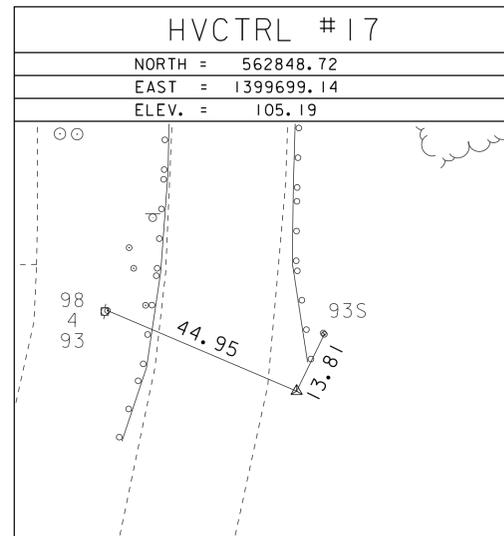
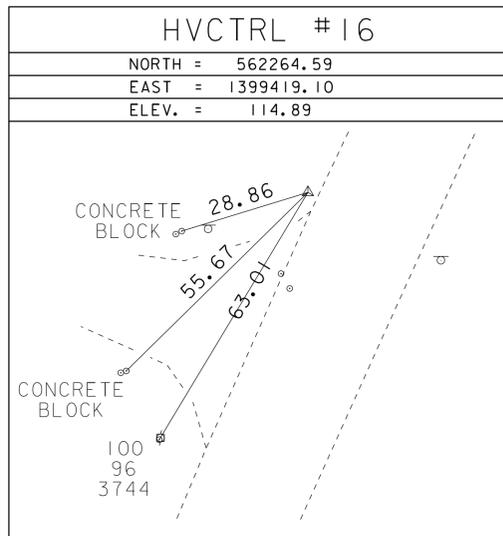
GENERAL LOCATION ADDISON, VT.

TO REACH FROM THE INTERSECTION OF VT ROUTE 17 AND VT ROUTE 125 IN ADDISON, GO SOUTHEAST ALONG VT ROUTE 125 FOR 1.4 MI (2.3 KM) TO THE SITE OF THE MARK ON THE LEFT. THE MARK IS ALSO 0.1 MI (0.2 KM) WEST OF THE WILLOW POINT BOAT LAUNCH.

THE MARK IS SET FLUSH WITH GROUND SURFACE IN THE TOP OF A FENO STYLE MONUMENT DRIVEN 0.9 M (3.0 FT) DEEP.

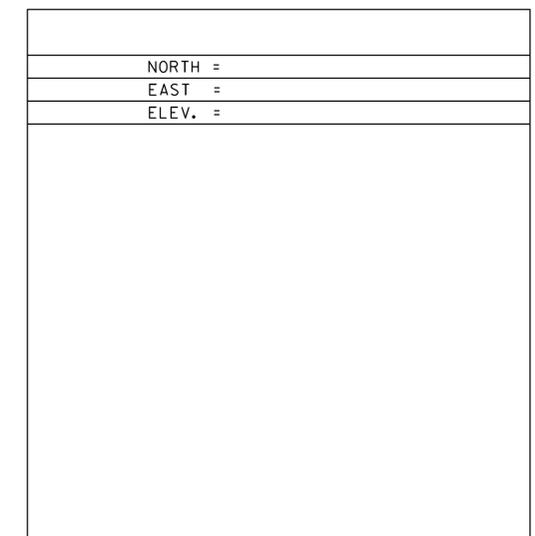
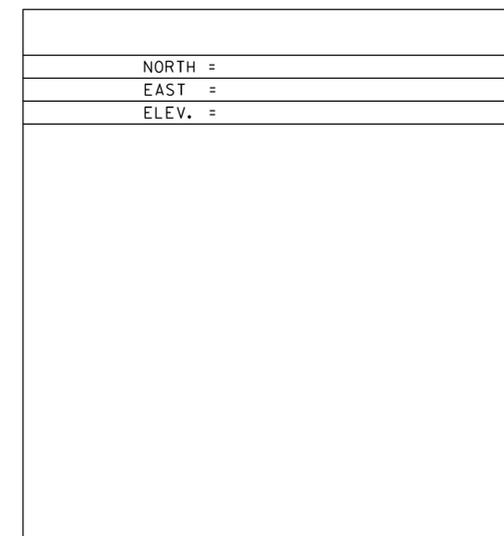
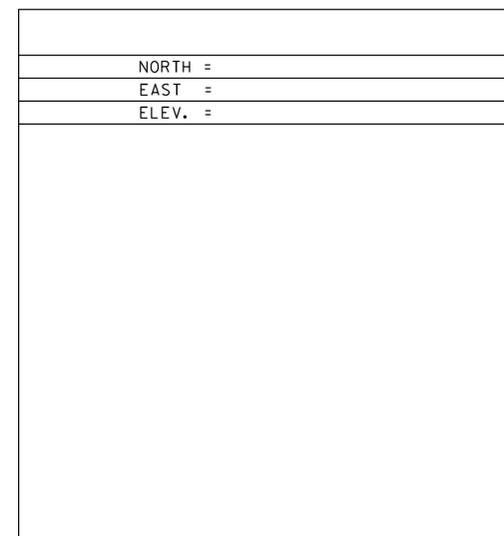
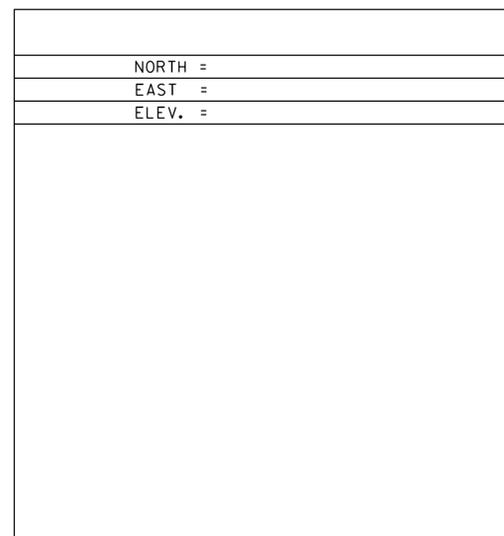
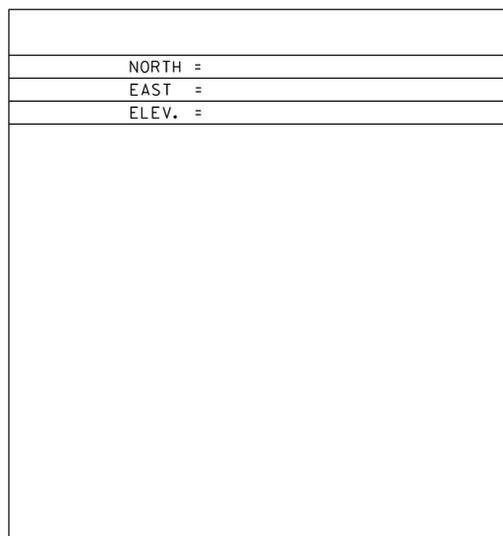
IT IS 34.5 M (113.2 FT) EAST-SOUTHEAST OF A BARBED WIRE FENCE CORNER, 5.7 M (18.7 FT) NORTH-NORTHEAST OF CENTERLINE OF VT ROUTE 125, 19.4 M (63.6 FT) NORTH-NORTHWEST OF SOUTHEASTERLY END OF A GUARDRAIL, AND 0.3 M (1.0 FT) SOUTH-SOUTHWEST OF FIBERGLASS WITNESS POST.

TRAVERSE TIES



\* Main Traverse Completed 7/1/08 by L. ORVIS P.C. & R. BOCKUS & C. CYR

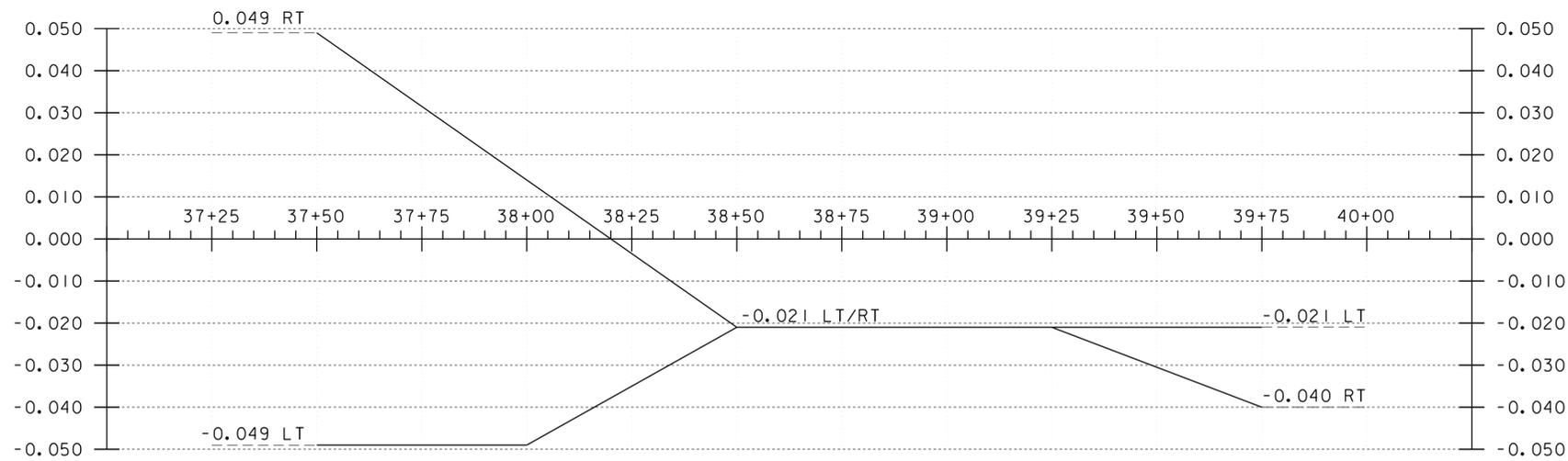
ALIGNMENT TIES



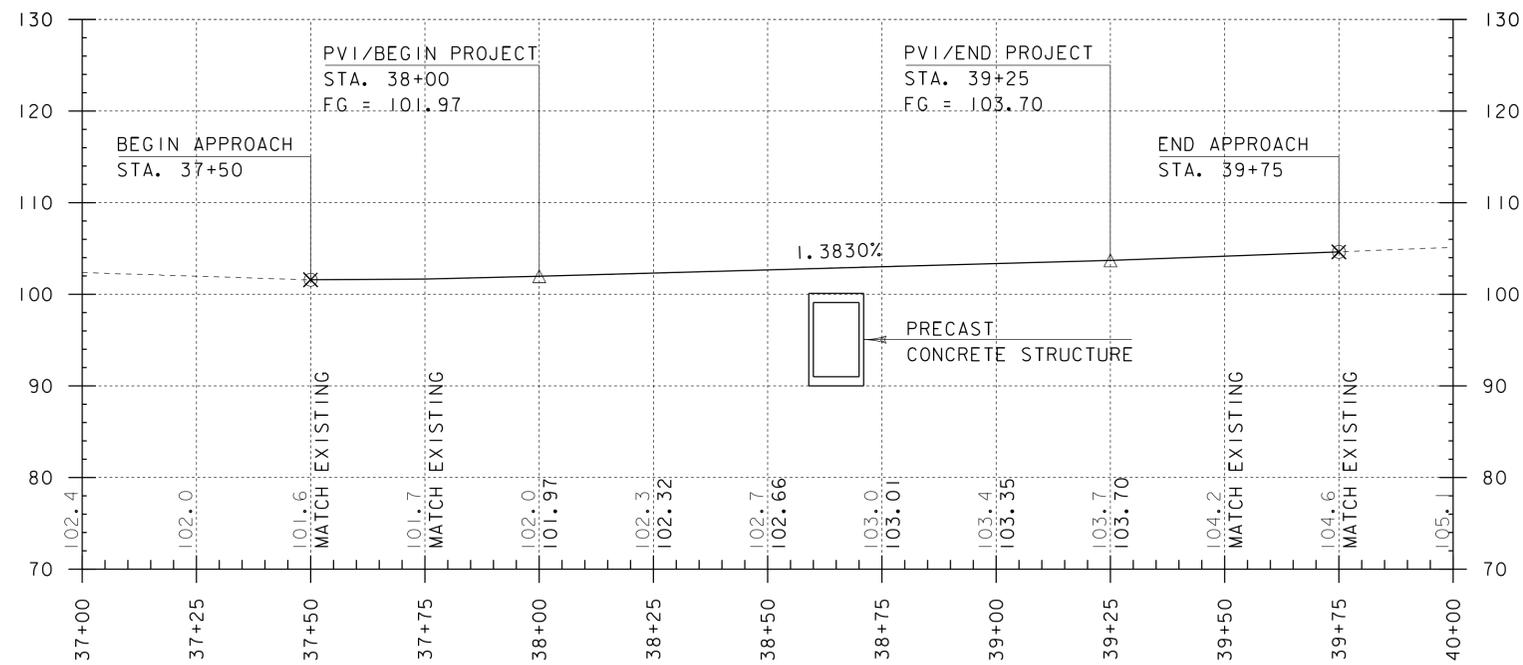
DATUM  
 VERTICAL NAVD 88  
 HORIZONTAL NAD 83(07) Conus  
 ADJUSTMENT Compass

PROJECT NAME: Addison  
 PROJECT NUMBER: STP CULV (I4)  
 FILE NAME: 08b062\survey\08b062t1.dg PLOT DATE: 09-MAR-2013  
 PROJECT LEADER: K. HIGGINS DRAWN BY: R. Bullock  
 DESIGNED BY: SURVEY CHECKED BY: SURVEY  
 TIE SHEET SHEET 7 OF 28



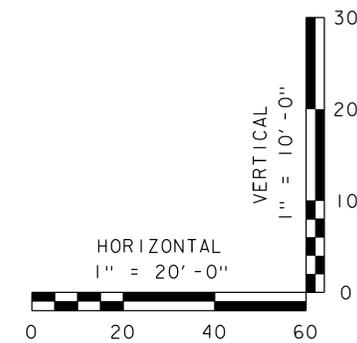


**BANKING DIAGRAM**  
NOT TO SCALE

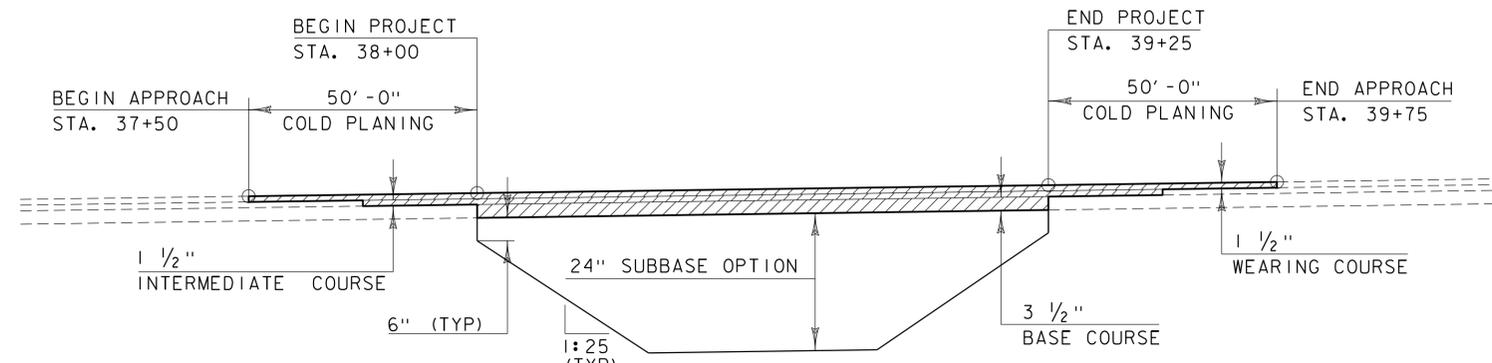


**MAINLINE PROFILE**

HORIZONTAL SCALE 1" = 20' - 0"  
VERTICAL SCALE 1" = 10' - 0"



THE GRADES SHOWN TO THE NEAREST TENTH ARE THE ORIGINAL GROUND ELEVATIONS ALONG THE PROPOSED ALIGNMENT.  
THE GRADES SHOWN TO THE NEAREST HUNDREDTH ARE THE PROPOSED GRADES FOR THE NEW ALIGNMENT.



**MATERIAL TRANSITION**  
NOT TO SCALE

PROJECT NAME: ADDISON  
PROJECT NUMBER: STP CULV(I4)

FILE NAME: s08b062xs.dgn  
PROJECT LEADER: K. HIGGINS  
DESIGNED BY: J. SALVATORI  
MAINLINE PROFILE

PLOT DATE: 09-MAR-2013  
DRAWN BY: J. SALVATORI  
CHECKED BY: W. LAMMER  
SHEET 9 OF 28

**SOIL CLASSIFICATION**

**AASHTO**

A1	Gravel and Sand
A3	Fine Sand
A2	Silty or Clayey Gravel and 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**

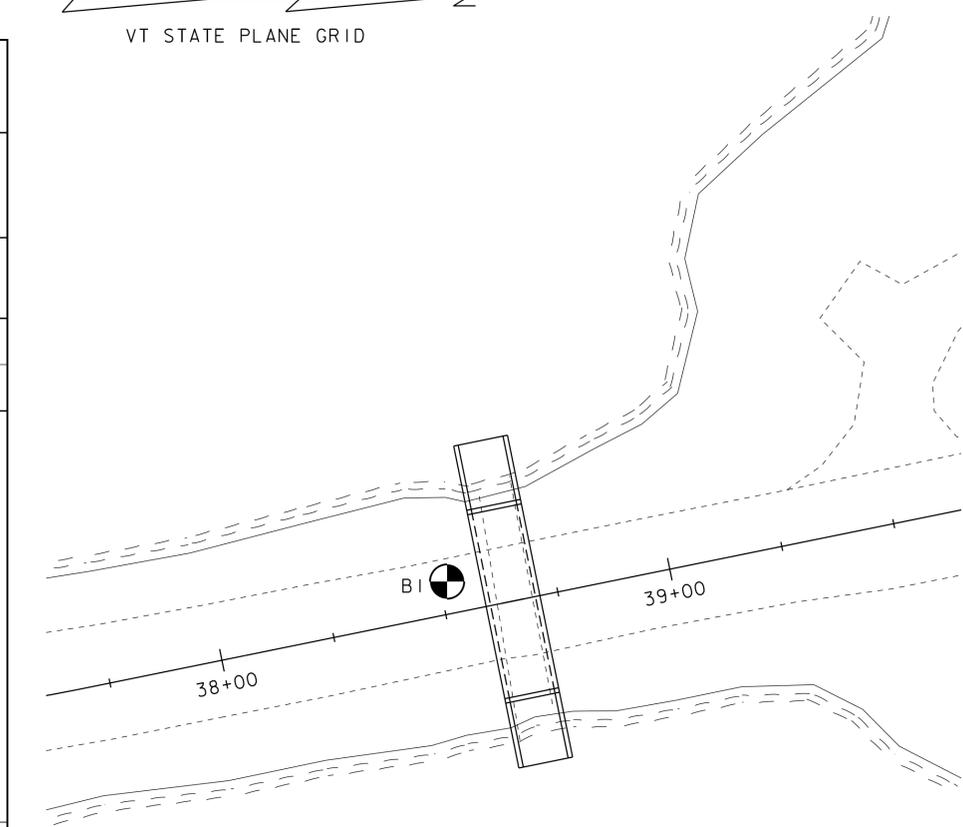
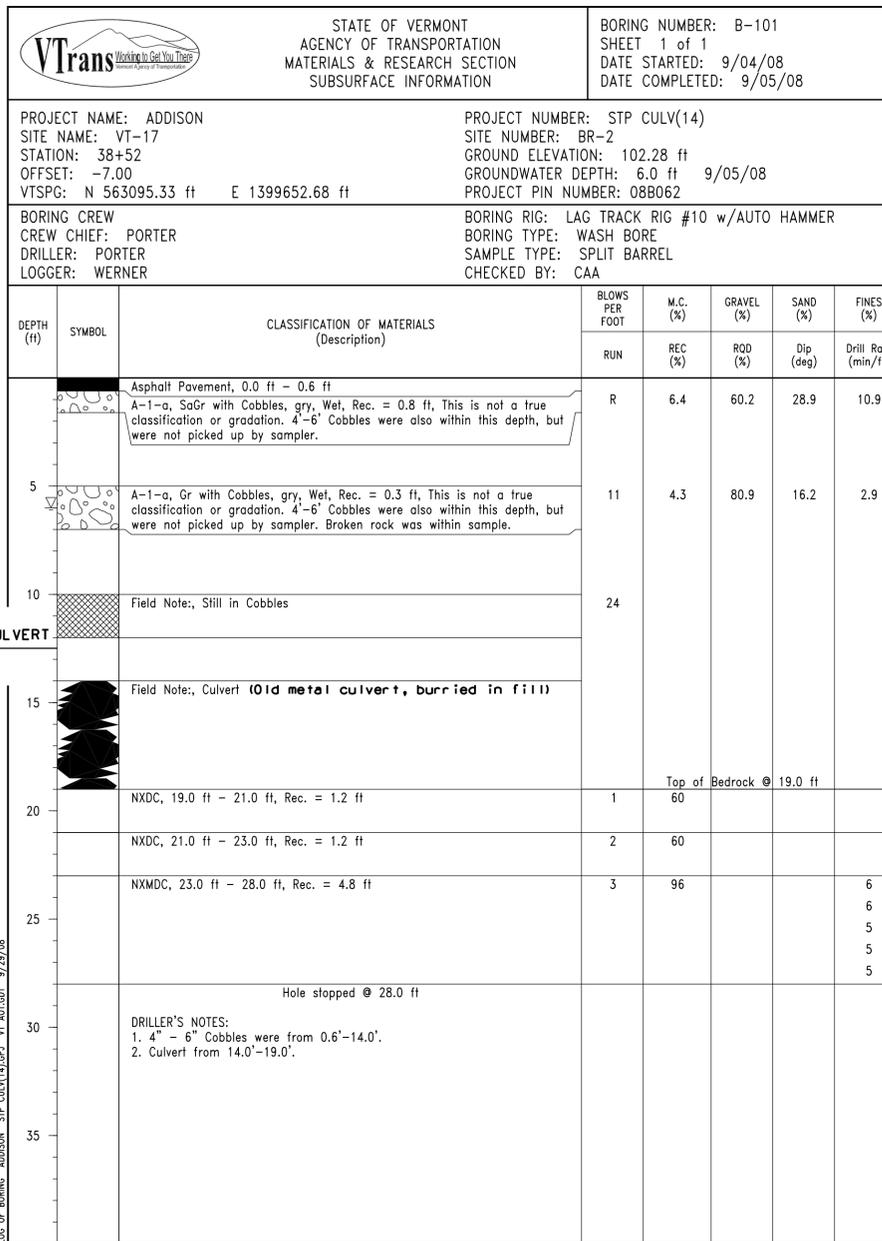
▼	Water Elevation
⊙	Standard Penetration Boring
⊕	Auger Boring
⊗	Rod Sounding
⊖	Sample
S	Standard Penetration Test
N	Blow Count Per Foot For: 2" O.D. Sampler
	1 3/8" I.D. Sampler
	Hammer Weight Of 140 Lbs.
	Hammer Fall Of 30"
VS	Field Vane Shear Test
US	Undisturbed Soil Sample
B	Blast
DC	Diamond Core
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
Si	Silt
Cl	Clay
HP	Hardpan
Le	Ledge
NLTD	No Ledge To Depth
CNPF	Can Not Penetrate Further
TLOB	To 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)

**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)**

<b>BEDROCK (LEDGE)</b> - Rock in its native location of indefinite thickness.	<b>VARVED</b> - Alternate layers of silt and clay.
<b>BOULDER</b> - A rock fragment with an average dimension > 12 inches.	<b>HARDPAN</b> - Extremely dense soil, cemented layer, not softened when wet.
<b>COBBLE</b> - Rock fragments with an average dimension between 3 and 12 inches.	<b>MUCK</b> - Soft organic soil (containing > 10% organic material).
<b>GRAVEL</b> - Rounded particles of rock < 3" and > 0.075" (#10 sieve).	<b>MOISTURE CONTENT</b> - Weight of water divided by dry weight of soil.
<b>SAND</b> - Particles of rock < 0.075" (#10 sieve) and > 0.0029" (#200 sieve).	<b>FLOWING SAND</b> - Granular soil so saturated (loose) that it flows into drill casing during extraction of wash rod.
<b>SILT</b> - Soil < 0.0029" (#200 sieve), non or slightly plastic and exhibits no strength when air-dried.	<b>STRIKE</b> - Angle from magnetic north to line of intersection of bed with a horizontal plane.
<b>CLAY</b> - Fine grained soil, exhibits plasticity when moist and considerable strength when air-dried.	<b>DIP</b> - Inclination of bed with a horizontal plane.



**BORING LAYOUT**  
SCALE 1" = 20' - 0  
20 0 20

**BORING CHART**

HOLE NO.	SURV. STATION	OFFSET	NORTHING (Y)	EASTING (X)
BI	38+52	-7.00	563095.3369	1399652.6832

**GENERAL NOTES**

- The subsurface explorations shown herein were made between 9/4/08 and 9/5/08 by the Agency.
- 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.

PROJECT NAME: ADDISON	PLOT DATE: 15-MAR-2013
PROJECT NUMBER: STP CULV(I4)	DRAWN BY: J. SALVATORI
FILE NAME: s08b062bor	CHECKED BY: W. LAMMER
PROJECT LEADER: K. HIGGINS	SHEET 10 OF 28
DESIGNED BY: J. SALVATORI	
BORING LAYOUT	

VT 17  
CLOSED

PORTABLE CHANGABLE SIGN - PHASE 1

NORTH OF  
CHIMNEY  
POINT

PORTABLE CHANGABLE SIGN - PHASE 2

\* MMM DD -  
\* MMM DD

PORTABLE CHANGABLE SIGN - PHASE 3

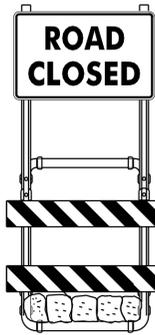
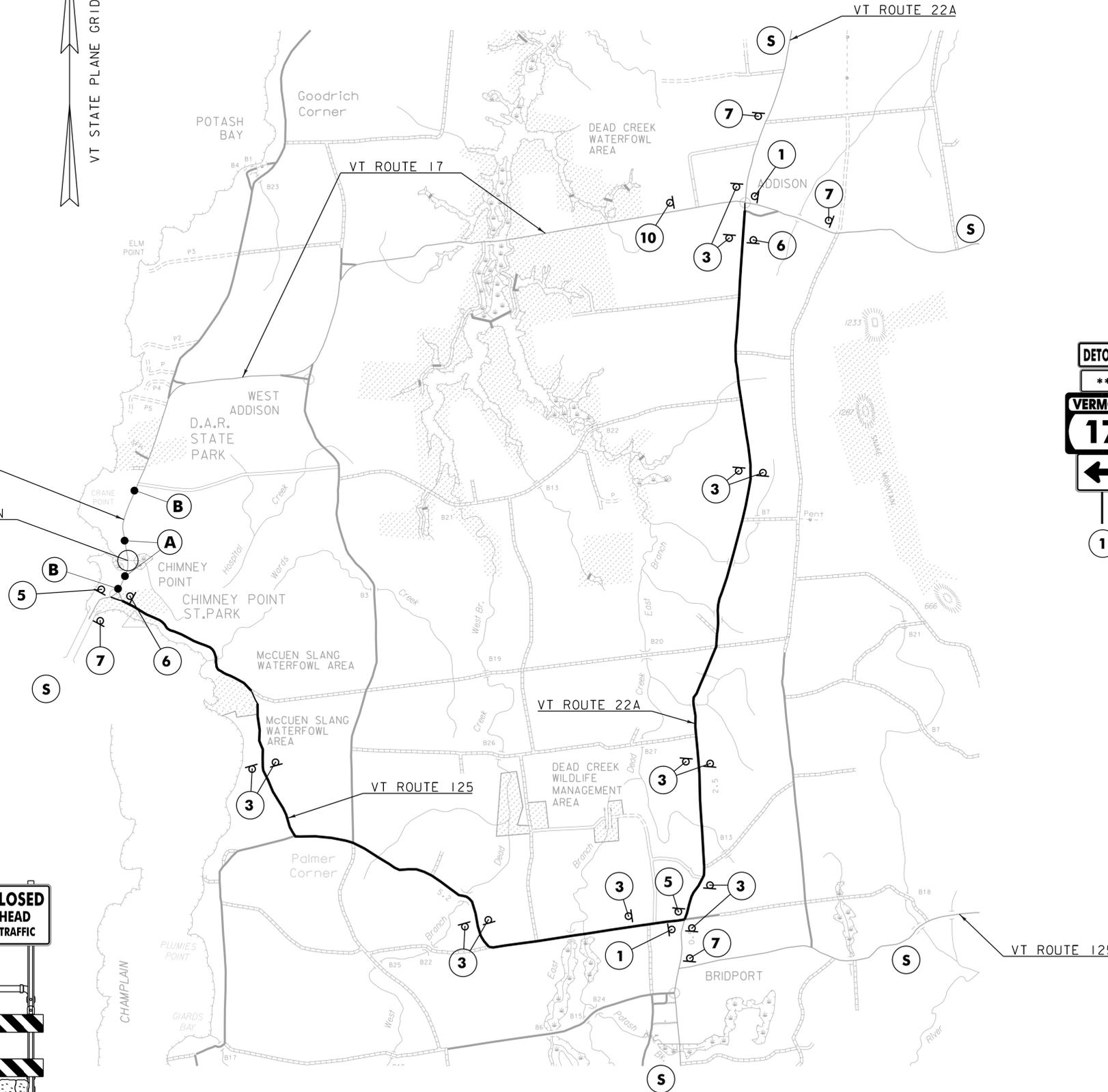
\* M=MONTH  
D=DAY

S



VT ROUTE 17

PROJECT LOCATION



SIGN MOUNTING ON  
TYPE III BARRICADE  
(MODIFIED)

A



SIGN MOUNTING ON  
TYPE III BARRICADE  
(MODIFIED)

B

ROAD CLOSED  
XX MILES AHEAD  
NO THRU TRAFFIC

10



2



4



6

\*\*E= EAST  
OR  
W= WEST



1



3



5



7

NOTES:

1. THE PORTABLE CHANGABLE MESSAGE SIGNS SHALL BE FULLY OPERATIONAL A MINIMUM OF TWO WEEKS PRIOR TO THE CLOSURE OF VT 17.
2. DURING ACTUAL CLOSURE, ELIMINATE PHASE 3 ONLY.
3. DETOUR SIGNS SHALL BE LOCATED ADJACENT TO EXISTING INTERSECTION ROUTE MARKER ASSEMBLIES WHERE APPLICABLE.
4. CONFIRMATION ROUTE MARKERS (SIGN 3) SHALL BE PLACED IMMEDIATELY AFTER EACH TURN AND AT ALL LOCATIONS ALONG THE DETOUR ROUTE WHERE ROUTE MARKERS FOR THE PARENT ROUTE EXIST.
5. DETOUR SIGNING IS THE RESPONSIBILITY OF THE CONTRACTOR. PAYMENT FOR ALL TEMPORARY TRAFFIC CONTROL DEVICES FOR IMPLEMENTING THE DETOUR, INCLUDING BUT NOT LIMITED TO SIGNS, BARRICADES AND MESSAGE BOARDS, WILL BE INCLUDED IN THE UNIT PRICE BID FOR CONTRACT ITEM 900.645 SPECIAL PROVISION (TRAFFIC CONTROL, ALL-INCLUSIVE).
6. THIS DETOUR PLAN IS AN OUTLINE ONLY AND THE CONTRACTOR SHALL SUBMIT A DETAILED PLAN OF EACH INTERSECTION SHOWING DETOUR SIGN LOCATIONS IN RELATION TO EXISTING SIGNS.

PROJECT NAME: ADDISON  
PROJECT NUMBER: STP CULV(14)

FILE NAME: s08b062detour.dgn  
PROJECT LEADER: K. HIGGINS  
DESIGNED BY: J. SALVATORI  
DETOUR PLAN

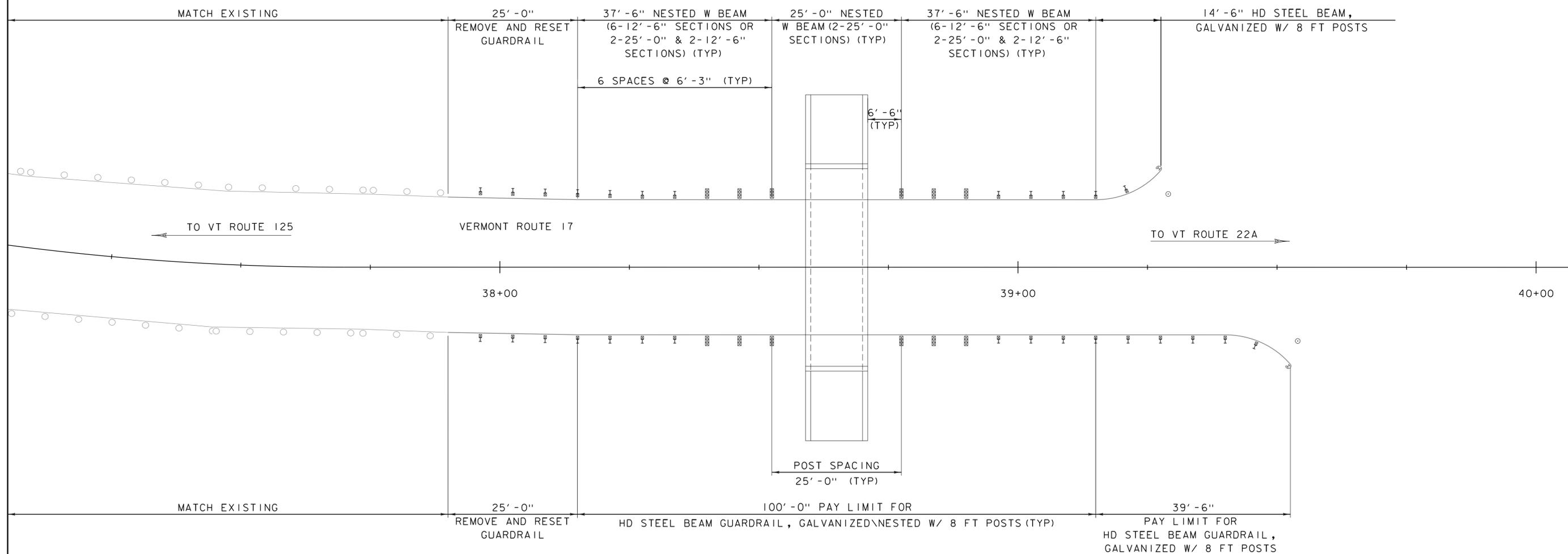
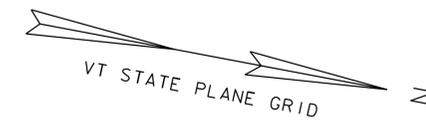
PLOT DATE: 15-MAR-2013  
DRAWN BY: J. SALVATORI  
CHECKED BY: W. LAMMER  
SHEET II OF 28

DETOUR PLAN  
NOT TO SCALE

REMOVAL AND DISPOSAL OF GUARDRAIL  
 STA 38+15 - 39+31 LT  
 STA 38+15 - 39+42 RT  
REMOVE AND RESET GUARDRAIL  
 STA 37+90 - 38+15 LT/RT

HD STEEL BEAM GUARDRAIL, GALV/NESTED  
W/ 8 FEET POSTS  
 STA 38+15 - 39+15 LT/RT  
HD STEEL BEAM GUARDRAIL, GALV. W/ 8 FEET POSTS  
 STA 39+15 - 39+27 LT  
 STA 39+15 - 39+52 RT

ANCHOR FOR STEEL BEAM RAIL  
 STA 39+29 LT  
 STA 39+54 RT  
STEEL MARKER POSTS  
 STA 39+29 LT  
 STA 39+54 RT



GUARDRAIL LAYOUT SHEET  
 SCALE 1" = 10'-0"

PROJECT NAME: ADDISON	PLOT DATE: 15-MAR-2013
PROJECT NUMBER: STP CULV(14)	DRAWN BY: J. GRIGAS
FILE NAME: s08b062rail.dgn	CHECKED BY: J. SALVATORI
PROJECT LEADER: K. HIGGINS	SHEET 12 OF 28
DESIGNED BY: J. SALVATORI	
GUARDRAIL LAYOUT SHEET	

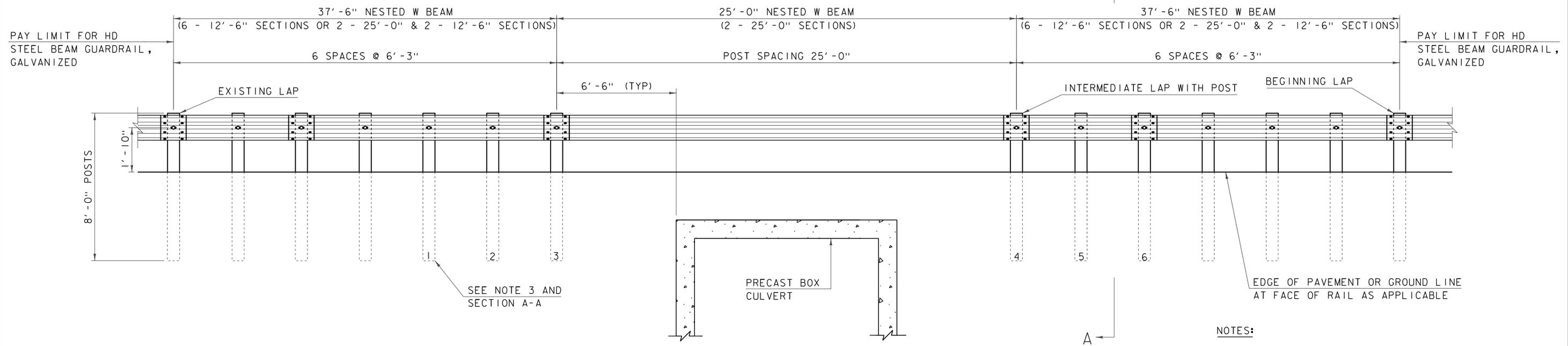
PAY LIMITS FOR HD STEEL BEAM GUARDRAIL, GALVANIZED/NESTED

W/8 FEET POSTS



NESTED RAILING PLAN VIEW

(NOT TO SCALE)

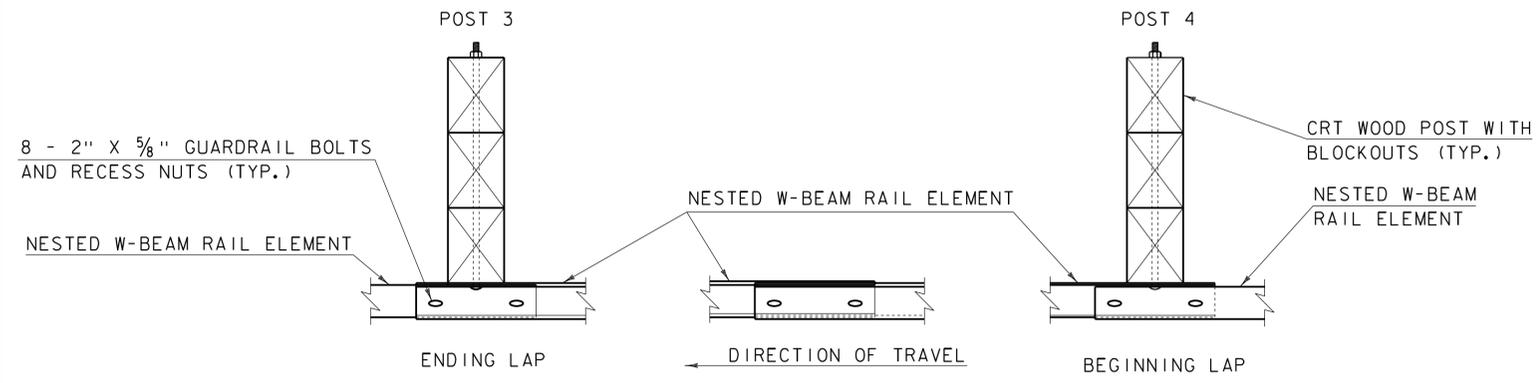


NESTED RAILING ELEVATION VIEW

(NOT TO SCALE)

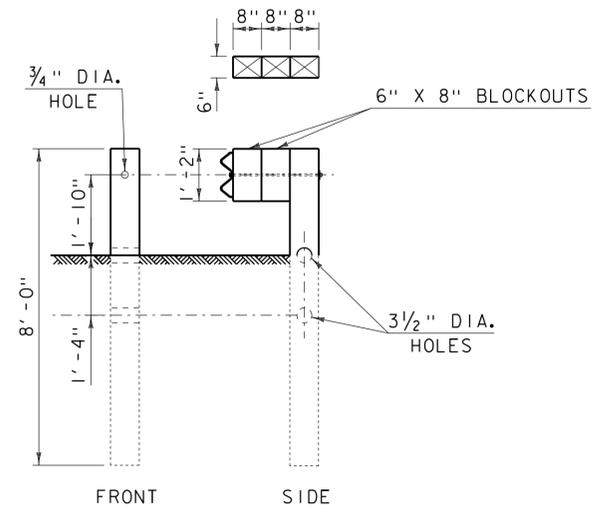
NOTES:

1. RAIL MEETS TEST LEVEL 3 REQUIREMENTS OF NCHRP REPORT 350.
2. 25'-0" RAIL LENGTH WILL BE USED TO ELIMINATE THE INTERMEDIATE LAP WITHOUT A POST.
3. POSTS 1 THRU 6 ARE BREAKAWAY CONTROLLED RELEASING TERMINAL (CRT) POSTS, SEE SECTION A-A FOR DETAILS.
4. POSTS 1 THRU 6 HAVE TWO, 6" X 8" BLOCKOUTS. SEE SECTION A-A FOR DETAILS.
5. ON POSTS 1 THRU 6, GUARDRAIL BOLT "D", AS SHOWN ON STD G1, SHALL BE 26" LONG.
6. ON ALL POSTS WHERE THE RAIL IS DOUBLE-NESTED GUARDRAIL BOLT "A", AS SHOWN ON STD G1, SHALL BE 2" LONG.
7. ALL POSTS WHERE THE RAIL IS DOUBLE-NESTED SHALL BE 8 FEET LONG TO PROVIDE FOR A 2'-8" SLOPE BREAKLINE.
8. SEE STD G1 FOR ADDITIONAL GUARDRAIL DETAILS.



INTERMEDIATE LAP WITHOUT POST

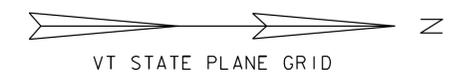
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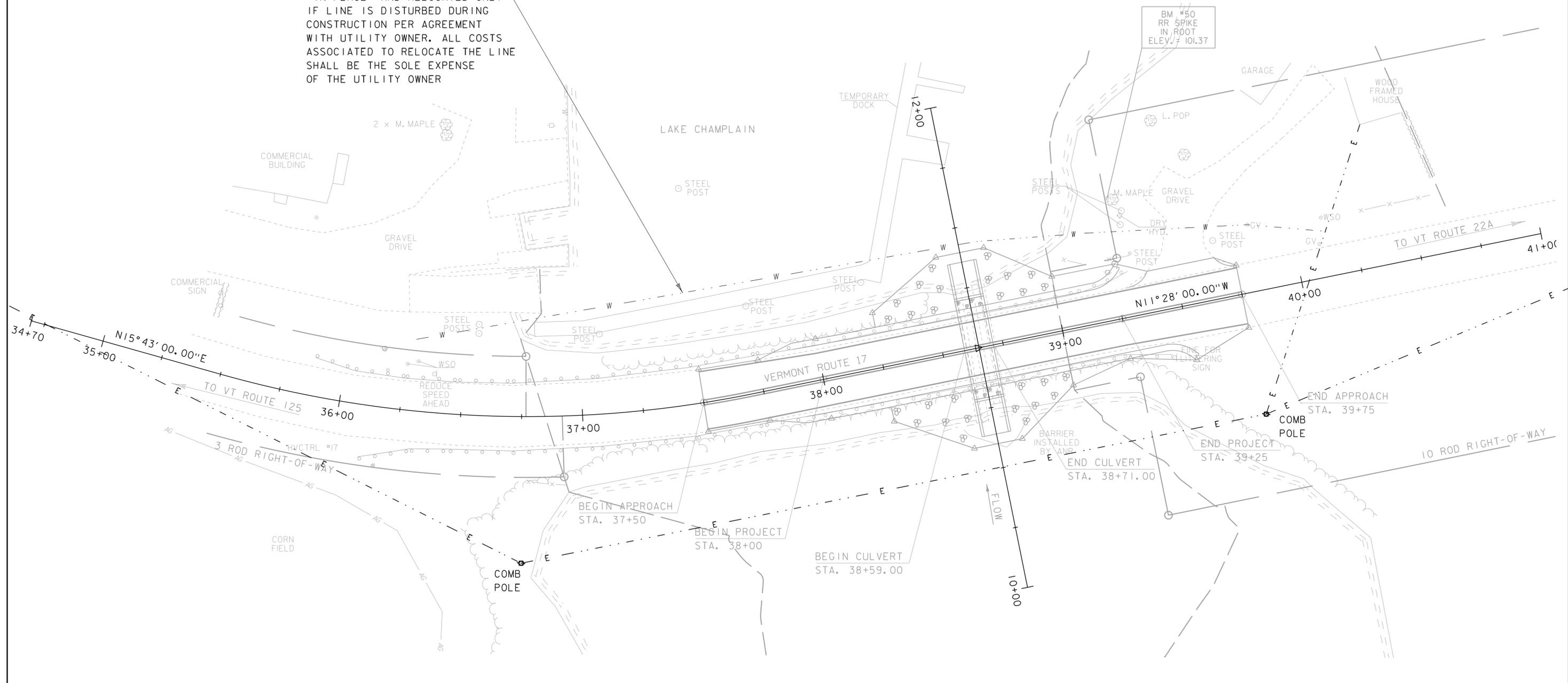
SECTION A-A  
(POSTS 1 THRU 6)

(SEE NOTES 3 & 4)

PROJECT NAME:	ADDISON	FILE NAME:	s08b062rail_det.dgn	PLOT DATE:	15-MAR-2013
PROJECT NUMBER:	STP CULV (14)	PROJECT LEADER:	K. HIGGINS	DRAWN BY:	J. SALVATORI
		DESIGNED BY:	J. SALVATORI	CHECKED BY:	W. LAMMER
		NESTED HDSB GUARDRAIL DETAILS		SHEET	13 OF 28



EXISTING WATER LINE TO REMAIN "IN-PLACE" AND RELOCATED ONLY IF LINE IS DISTURBED DURING CONSTRUCTION PER AGREEMENT WITH UTILITY OWNER. ALL COSTS ASSOCIATED TO RELOCATE THE LINE SHALL BE THE SOLE EXPENSE OF THE UTILITY OWNER



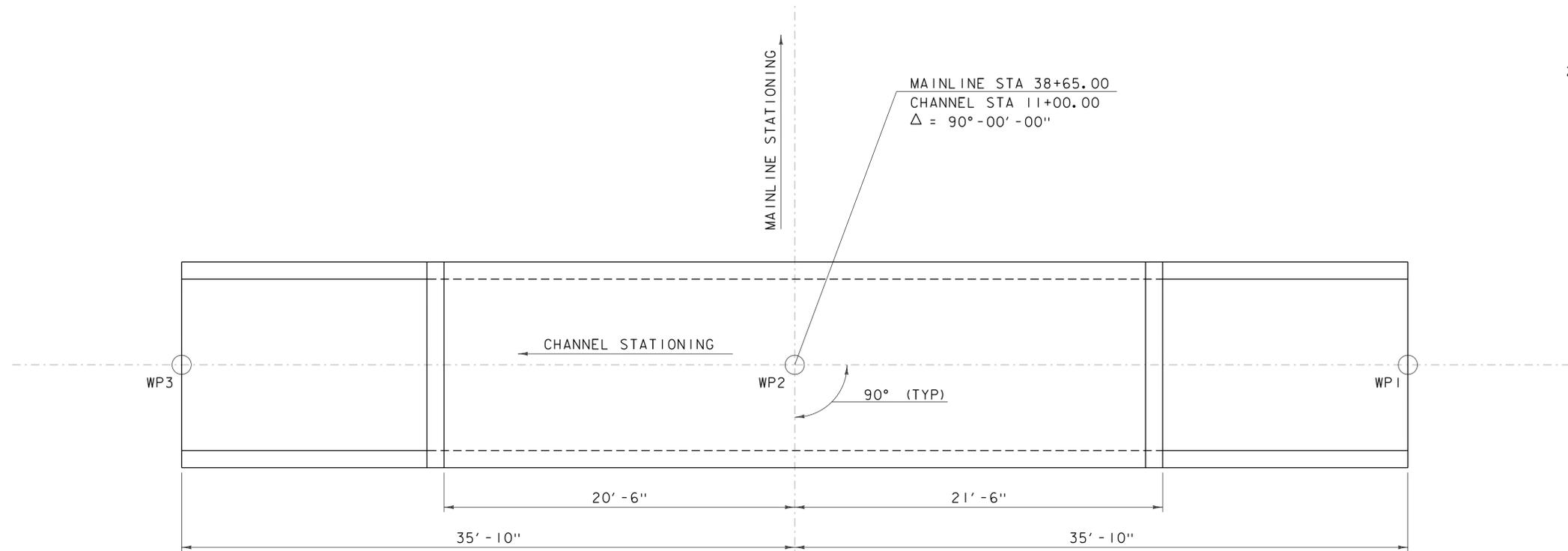
**UTILITY LAYOUT SHEET**

SCALE 1" = 20' - 0"  
 20 0 20

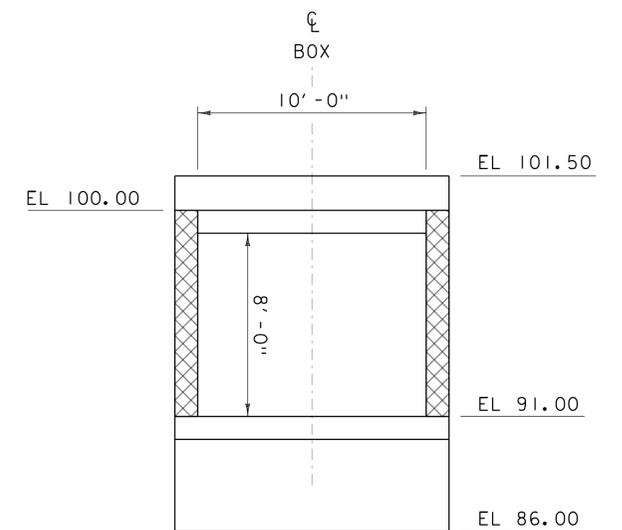
PROJECT NAME: ADDISON	
PROJECT NUMBER: STP CULV(I4)	
FILE NAME: s08b062util.dgn	PLOT DATE: 15-MAR-2013
PROJECT LEADER: K. HIGGINS	DRAWN BY: J. SALVATORI
DESIGNED BY: J. SALVATORI	CHECKED BY: W. LAMMER
UTILITY LAYOUT SHEET	SHEET 14 OF 28

NOTES:

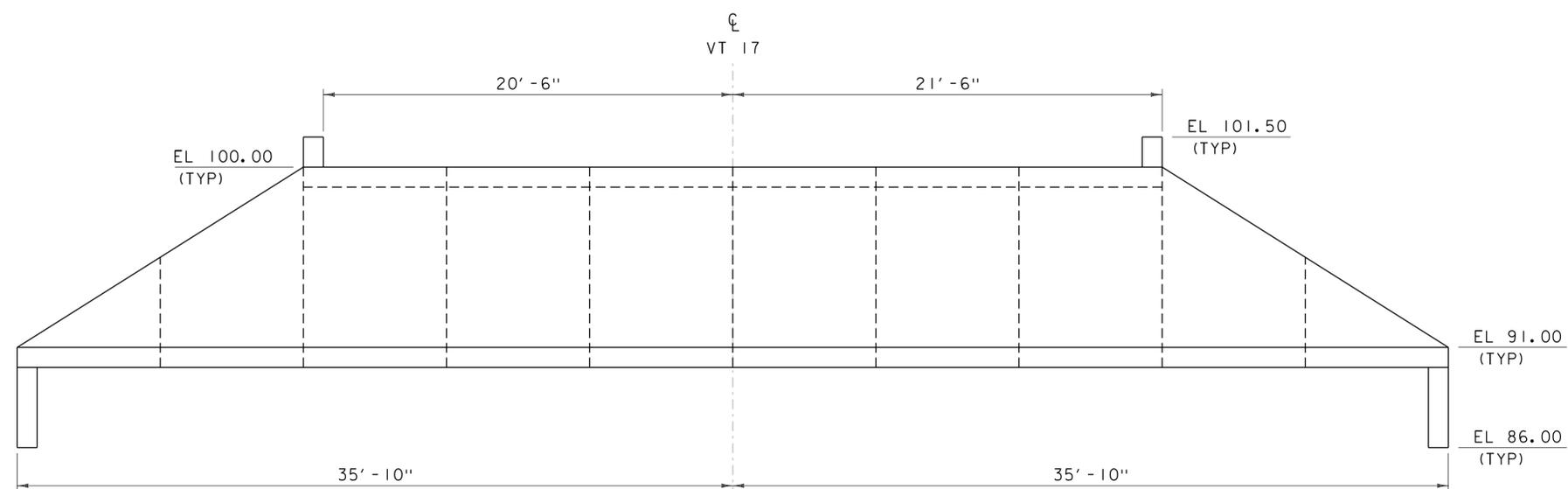
1. DIMENSIONS SHOWN ARE BASED ON AN ASSUMED WALL THICKNESS OF 1'-0"
2. THE PRECAST BOX SECTIONS ARE SHOWN FOR REFERENCE ONLY. THE ACTUAL DIMENSIONS AND SHAPE WILL BE DEPENDENT ON THE FABRICATOR.



**BOX LAYOUT**  
SCALE 1/4" = 1'-0"



**END TYPICAL**  
SCALE 1/4" = 1'-0"



**BOX ELEVATION**  
SCALE 1/4" = 1'-0"

PROJECT NAME:	ADDISON	PLOT DATE:	09-MAR-2013
PROJECT NUMBER:	STP CULV(I4)	DRAWN BY:	J. SALVATORI
FILE NAME:	s08b062sub.dgn	CHECKED BY:	J. GRIGAS
PROJECT LEADER:	K. HIGGINS	SHEET	15 OF 28
DESIGNED BY:	J. SALVATORI		
BOX LAYOUT			

## **EPSC NARRATIVE**

### **1.1 PROJECT DESCRIPTION**

THIS PROJECT CONSISTS OF THE REMOVAL OF THE EXISTING TWIN REINFORCED CONCRETE CULVERTS AND REPLACING THEM WITH A NEW REINFORCED CONCRETE BOX CULVERT.

NOTE: AREA OF DISTURBANCE SHALL INCLUDE LIMITS OF EARTH DISTURBANCE WITHIN THE PROJECT AREA, INCLUDING ANY WASTE, STAGING AND BORROW AREAS WITHIN OR DIRECTLY ADJACENT TO THE PROJECT LIMITS.

THE TOTAL AREA OF DISTURBANCE IS APPROXIMATELY 0.23 ACRES.

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

### **1.2 SITE INVENTORY**

#### **1.2.1 OFF SITE DRAINAGE CHARACTERISTICS (UP AND DOWN-GRADIENT)**

THE WATER RUNOFF SHOULD BE MINIMAL AND BE LIMITED TO THE PROJECT AREAS DUE TO THE NATURE OF THE SURROUNDING TERRAIN.

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

THIS PROJECT IS LOCATED ALONG A CAUSEWAY THAT DIVIDES LAKE CHAMPLAIN TO THE WEST AND HOSPITAL CREEK TO THE EAST.

#### **1.2.3 TOPOGRAPHY, EXISTING ROADS, BUILDINGS, UTILITIES**

THE TOPOGRAPHY OF THE AREA IS RELATIVELY FLAT, WITH STEEP SLOPES OCCURRING ONLY AT VERMONT ROUTE 17 SIDE SLOPES.

#### **1.2.4 VEGETATION**

THE VEGETATION IN THE PROJECT AREA CONSISTS OF MOSTLY OPEN LAWN AREAS WITH PATCHES OF TREES AND OTHER VEGETATION. THE IMPACT TO VEGETATION WILL BE LIMITED TO THAT WHICH IS DIRECTLY AFFECTED BY THE PROPOSED PROJECT.

DISTURBED VEGETATION WILL BE REESTABLISHED WITH STANDARD SEED AND MULCH PRACTICES.

#### **1.2.5 SOILS**

ALL SOIL DATA CAME FROM THE U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE FOR THE COUNTY OF ADDISON, VERMONT. SOILS IN THE PROJECT SITE ARE AS FOLLOWS:

MrA - MELROSE FINE SANDY LOAM, 0 -3% SLOPE, "K FACTOR" = 0.28

VgC - VERGENNES CLAY, 6-12% SLOPE, "K FACTOR" = 0.49

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.

#### **1.2.6 SENSITIVE RESOURCE AREAS**

CRITICAL HABITATS: NO  
HISTORICAL OR ARCHEOLOGICAL AREAS: NO  
PRIME AGRICULTURAL LAND: NO  
THREATENED AND ENDANGERED SPECIES: NO  
WATER RESOURCE: YES. LAKE CHAMPLAIN AND HOSPITAL CREEK.  
WETLANDS: NO

### **1.3 RISK EVALUATION**

THIS PROJECT DOES NOT FALL UNDER THE JURISDICTION OF GENERAL PERMIT 3-9020 FOR STORMWATER 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 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.

(REFER TO THE LOW RISK SITE HANDBOOK AND APPROPRIATE DETAIL SHEETS FOR EACH PRACTICE REQUIRED ON THE PROJECT TO INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING.)

EROSION CONTROL DETAILS MAY ALSO BE FOUND ON THE FOLLOWING WEBSITE:  
[www.aot.state.vt.us/Caddhelp](http://www.aot.state.vt.us/Caddhelp)

#### **1.4.1 MARK SITE BOUNDARIES**

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

PROJECT DEMARCATION FENCING (PDF) SHALL BE USED TO PHYSICALLY MARK SITE BOUNDARIES AS SHOWN ON THE EROSION CONTROL PLANS.

#### **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 CONTRACTORS PROGRESS SCHEDULE.

STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED ANYWHERE EQUIPMENT WILL BE GOING FROM AREAS OF EXPOSED SOILS TO PAVED SURFACES AS DIRECTED BY THE ENGINEER. AT A MINIMUM A CONSTRUCTION ENTRANCE SHALL BE PLACED ON EITHER END OF THE PROJECT AS SHOWN ON THE EROSION CONTROL PLANS.

#### **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, WOVEN WIRE REINFORCED WILL BE INSTALLED AS SHOWN ON THE EROSION CONTROL PLANS.

FILTER CURTAINS SHALL BE INSTALLED ON THE INLET AND OUTLET ENDS OF THE PROPOSED BOX AS SHOWN IN THE EROSION CONTROL 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.

THE PROJECT AREA IS RELATIVELY FLAT. THEREFORE IT IS NOT ANTICIPATED THAT CHECK STRUCTURES WILL BE NECESSARY.

#### **1.4.7 CONSTRUCT PERMANENT CONTROLS**

PERMANENT STORM WATER TREATMENT DEVICES SHALL BE INSTALLED AS SHOWN ON THE PLANS AND IN ACCORDANCE WITH PERMIT CONDITIONS.

#### **1.4.8 STABILIZE EXPOSED SOILS DURING CONSTRUCTION**

ALL AREAS OF DISTURBANCE MUST HAVE TEMPORARY STABILIZATION IN PLACE WITHIN 48 HOURS OF DISTURBANCE OR IN ACCORDANCE WITH THE CONSTRUCTION GENERAL PERMIT 3-9020 AUTHORIZATION.

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.

IT IS NOT ANTICIPATED THAT EROSION CONTROL MATTING WILL BE NECESSARY.

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. A FILTER BAG LOCATION FOR TREATMENT HAS BEEN PROPOSED AND IS SHOWN ON THE PLANS. HOWEVER 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 SUBSECTION 105.25- 105.29 OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION.

PROJECT NAME: ADDISON  
PROJECT NUMBER: STP CULV(I4)

FILE NAME: s08b062epsc\_nar.dgn  
PROJECT LEADER: K. HIGGINS  
DESIGNED BY: J. SALVATORI  
EPSC NARRATIVE

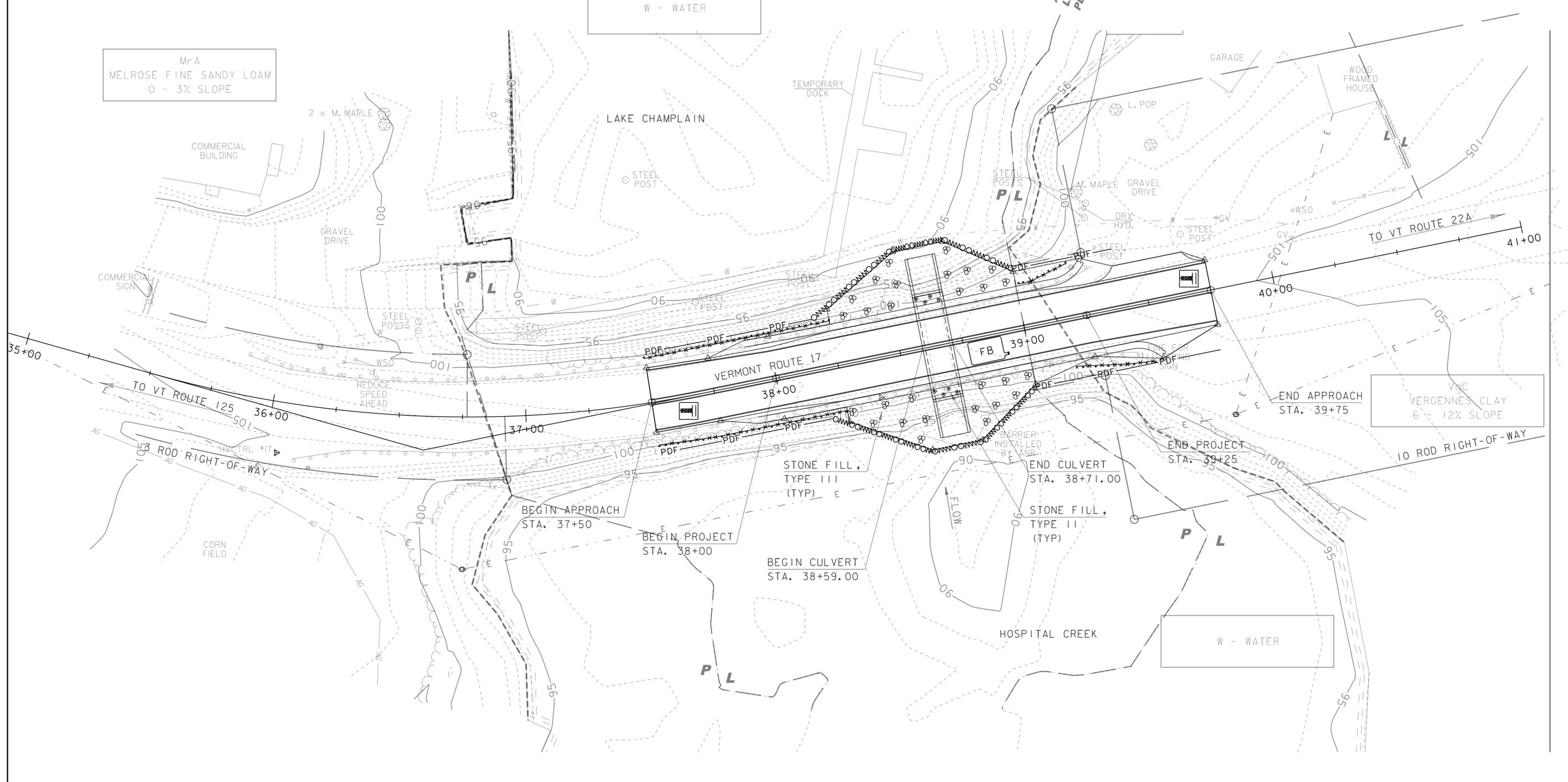
PLOT DATE: 15-MAR-2013  
DRAWN BY: J. SALVATORI  
CHECKED BY: W. LAMMER  
SHEET 16 OF 28



M-A  
MELROSE FINE SANDY LOAM  
0 - 3% SLOPE

W - WATER

APPROXIMATE LOW  
LAKE ELEVATION 93.0'  
PER LAKE CHART NO. 174

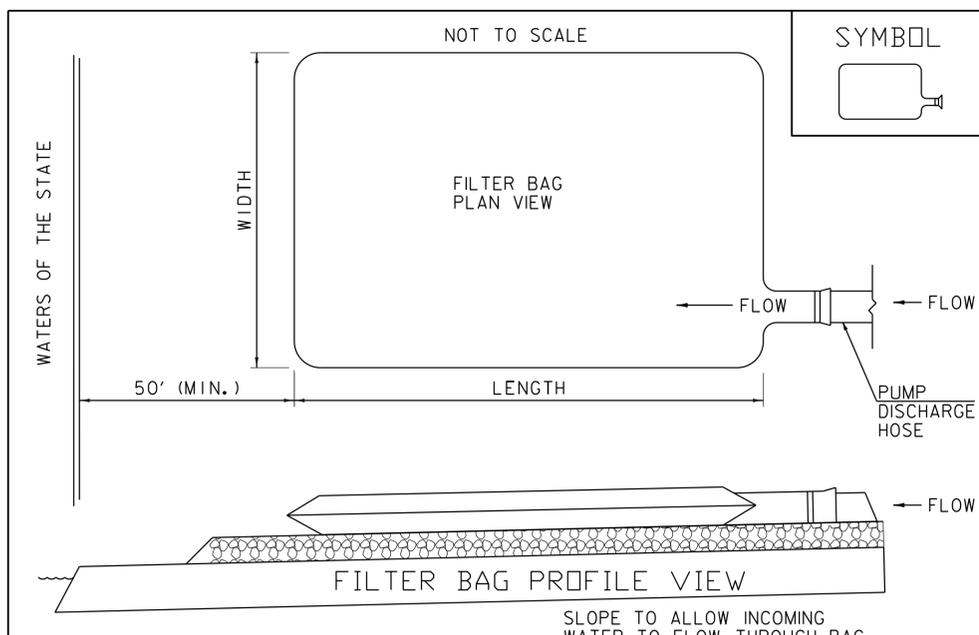


VSC  
VERGENNES CLAY  
6 - 12% SLOPE

EPSC SITE PLAN  
SCALE 1" = 20'-0"  
20 0 20

PROJECT NAME:	ADDISON	PLOT DATE:	09-MAR-2013
PROJECT NUMBER:	STP CULV(I4)	DRAWN BY:	J. SALVATORI
FILE NAME:	s08b062epsc.dur.dgn	DESIGNED BY:	J. SALVATORI
PROJECT LEADER:	K. HIGGINS	CHECKED BY:	W. LAMMER
EPSC SITE PLAN		SHEET	17 OF 28





**APPLICATION NOTES:**

THE PRIMARY PURPOSE OF THE FILTER BAG IS TO RETAIN SILT, SAND, AND FINES DURING DEWATERING OPERATIONS WHILE ALLOWING WATER TO PASS THROUGH THE BAG.

**GENERAL NOTES:**

1. FILTER BAG SHALL BE INSTALLED ON A VEGETATED SLOPE TO ALLOW INCOMING WATER TO FLOW THROUGH THE BAG.
2. FILTER BAGS MAY ALSO BE PLACED ON COARSE AGGREGATE, STONE, OR HAYBALES TO INCREASE FILTRATION EFFICIENCY.
3. FILTER BAG SHALL BE LOCATED A MINIMUM OF 50 FEET FROM WATERS OF THE STATE UNLESS OTHERWISE APPROVED BY THE ENGINEER.
4. THE NECK OF THE FILTER BAG SHALL BE STRAPPED TIGHTLY TO THE DISCHARGE HOSE.
5. A FILTER BAG IS FULL WHEN IT NO LONGER CAN EFFICIENTLY FILTER SEDIMENT OR ALLOW WATER TO PASS AT A REASONABLE RATE.
6. FILTER BAG SHALL BE DISPOSED OF AS APPROVED IN THE EPSC PLAN OR AS DIRECTED BY THE ENGINEER.

SLOPE TO ALLOW INCOMING WATER TO FLOW THROUGH BAG

FILTER BAG

THIS ITEM SHALL BE PAID FOR UNDER ITEM 653.45 FILTER BAG

REVISIONS	
SEPTEMBER 18, 2007	WHF
DECEMBER 13, 2007	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

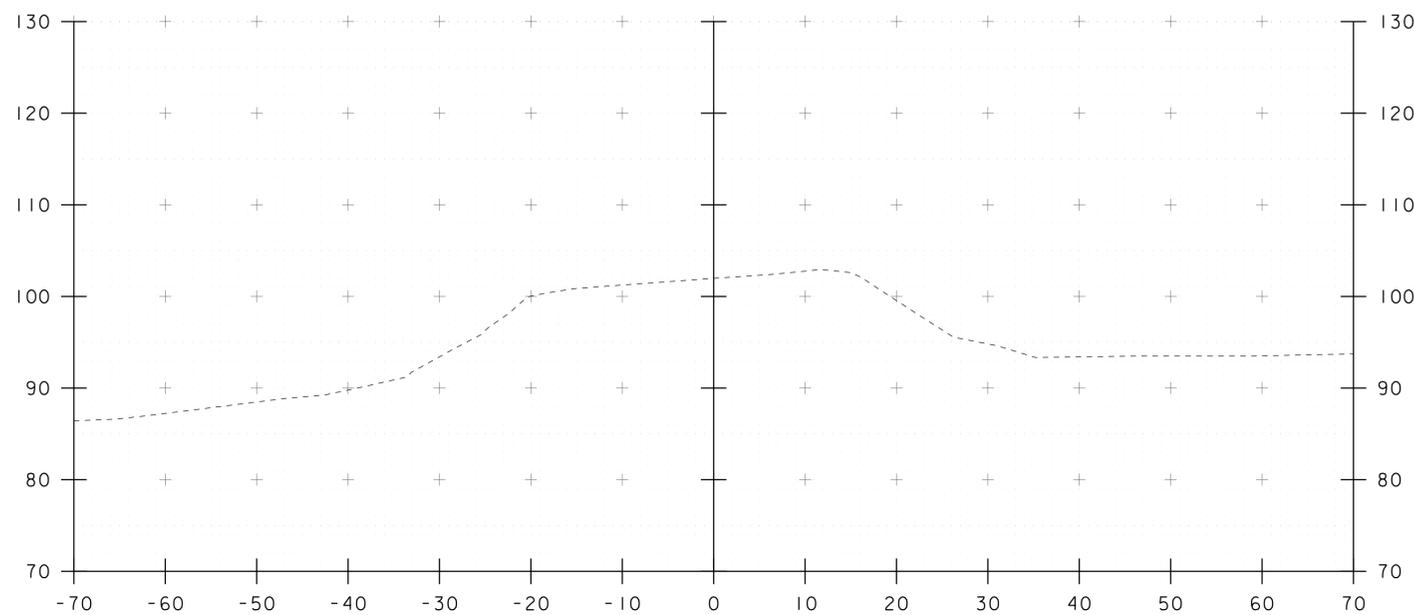
TURF ESTABLISHMENT

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

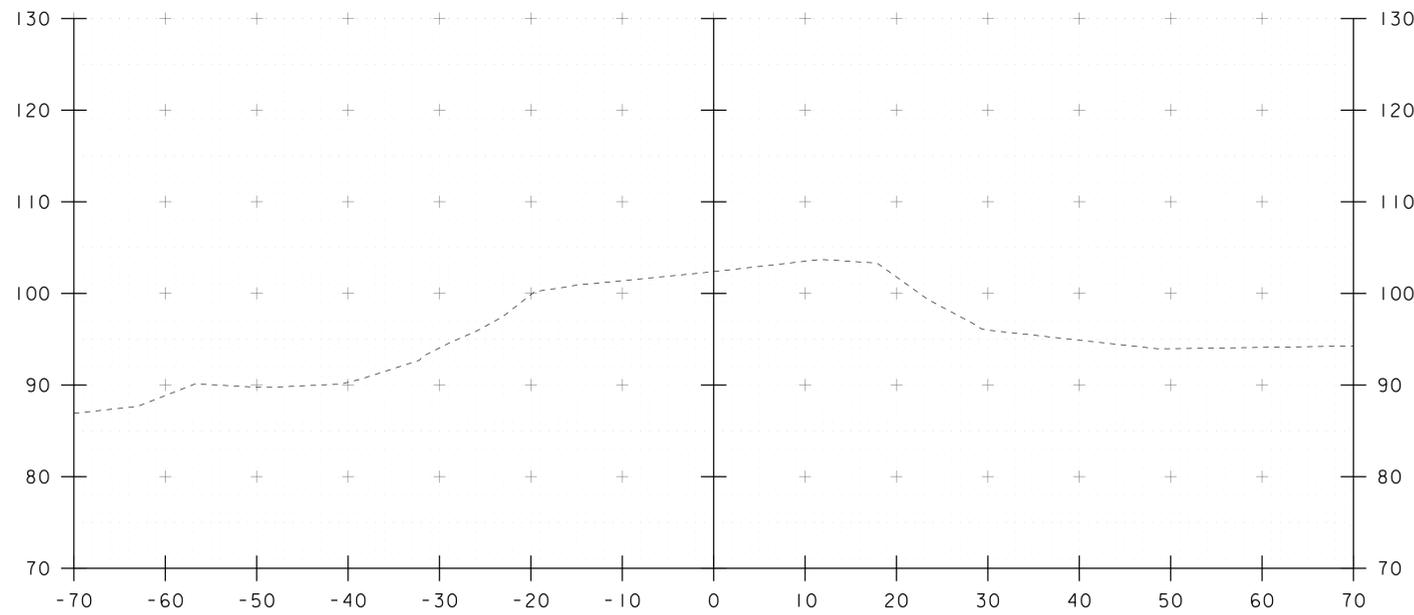
PROJECT NAME: ADDISON  
PROJECT NUMBER: STP CULV(I4)

FILE NAME: s08b062  
PROJECT LEADER: K. HIGGINS  
DESIGNED BY: J. SALVATORI  
EPSC DETAILS 2

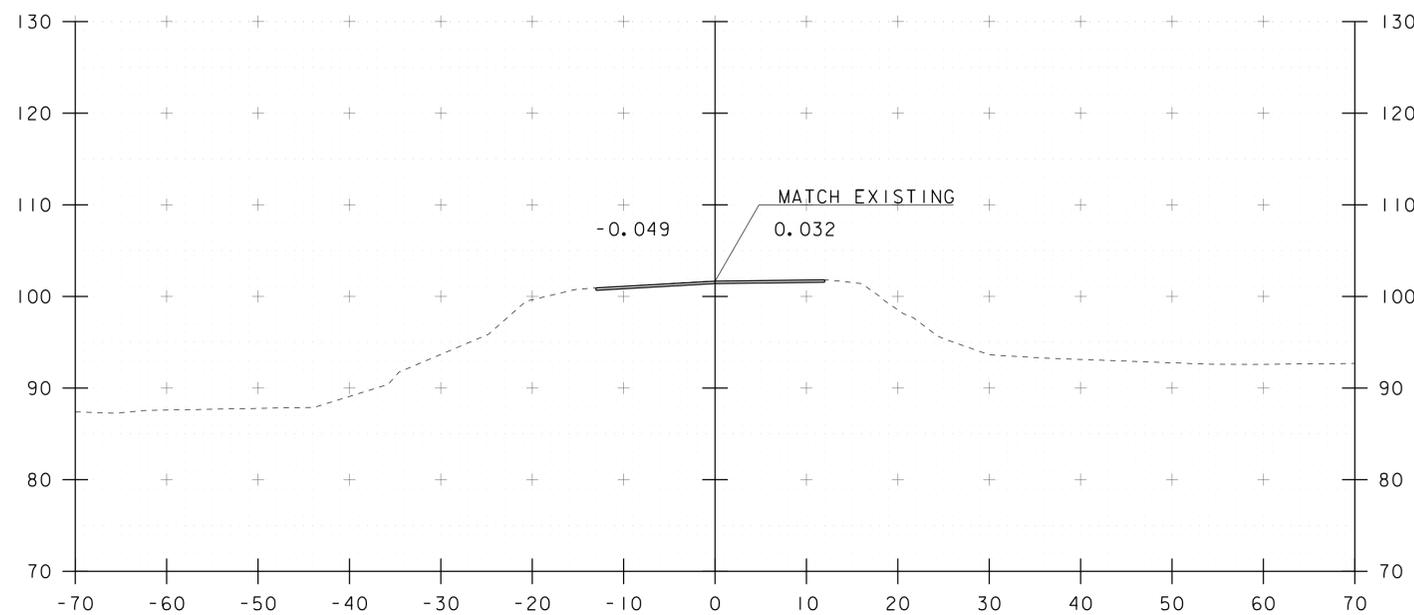
PLOT DATE: 09-MAR-2013  
DRAWN BY: J. SALVATORI  
CHECKED BY: W. LAMMER  
SHEET 19 OF 28



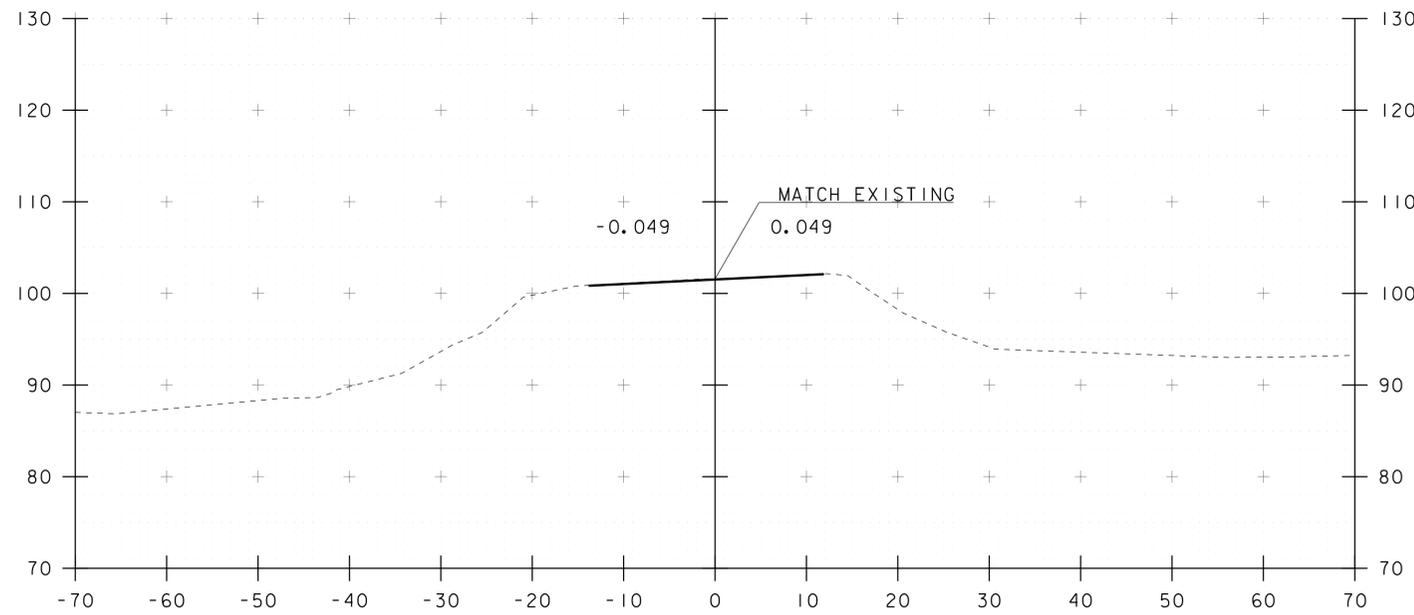
37+25



37+00



37+75

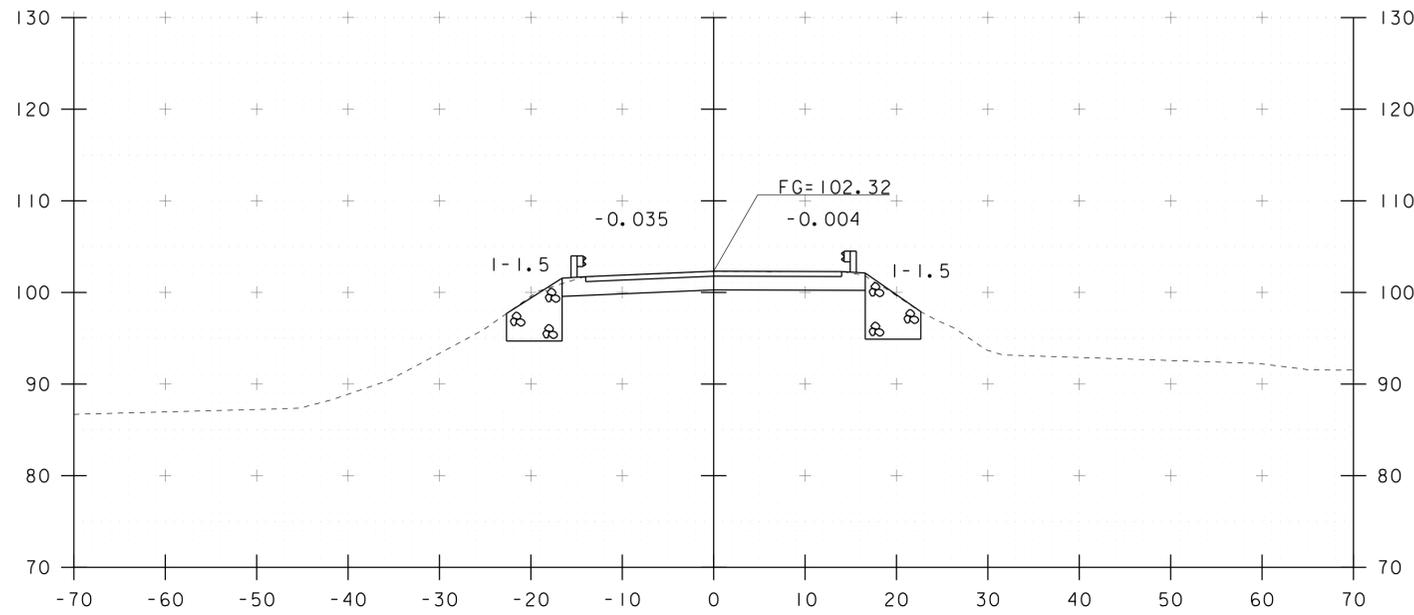


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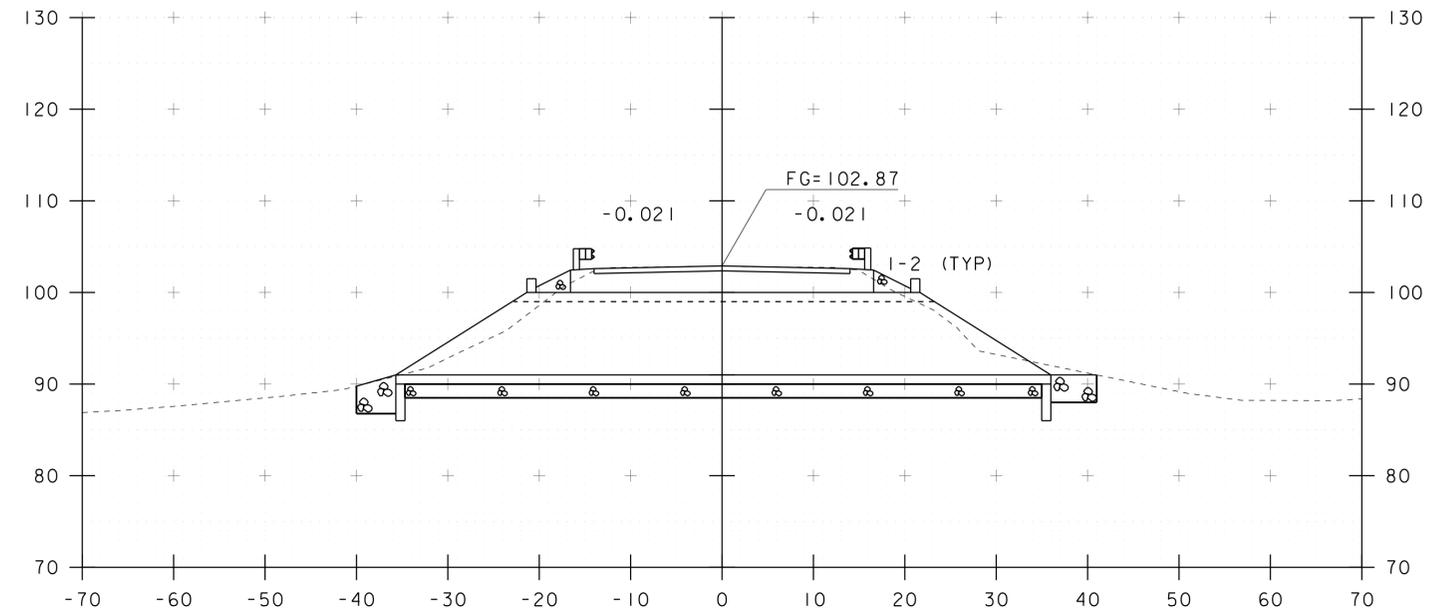
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STA. 37+00 TO STA. 37+75

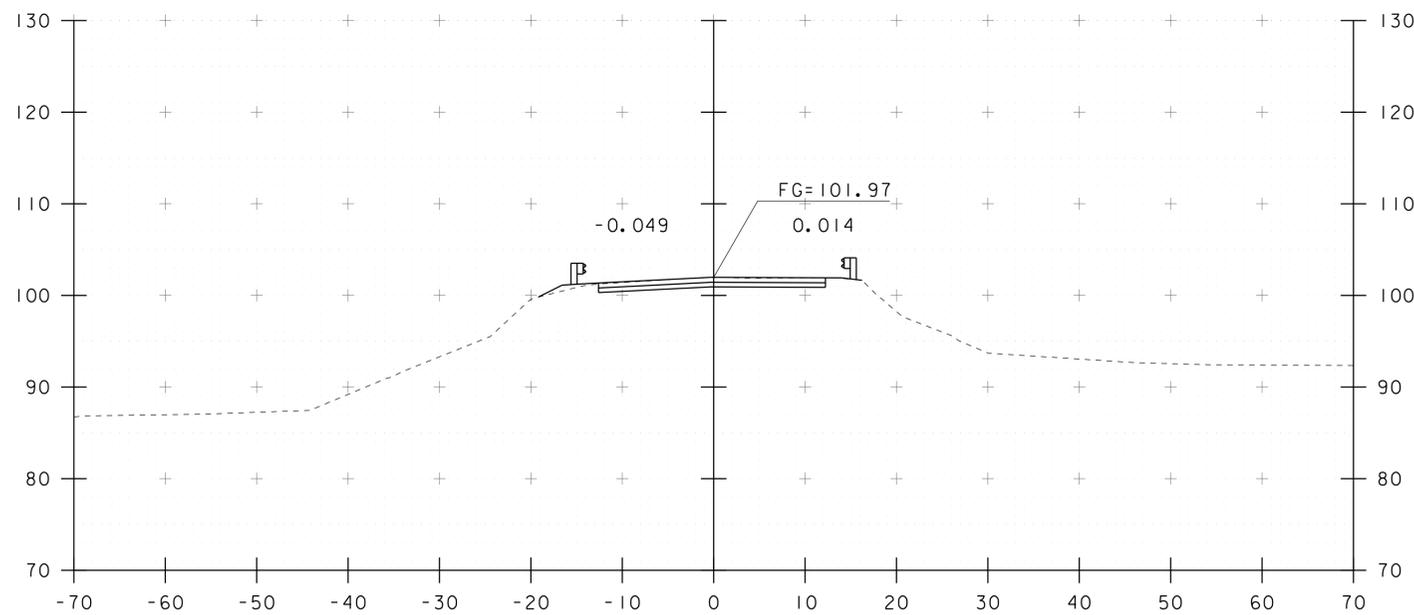
PROJECT NAME:	ADDISON	PLOT DATE:	09-MAR-2013
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FILE NAME:	s08b062xs.dgn	DESIGNED BY:	J. SALVATORI
PROJECT LEADER:	K. HIGGINS	CHECKED BY:	W. LAMMER
MAINLINE SECTIONS	- 1	SHEET	20 OF 28



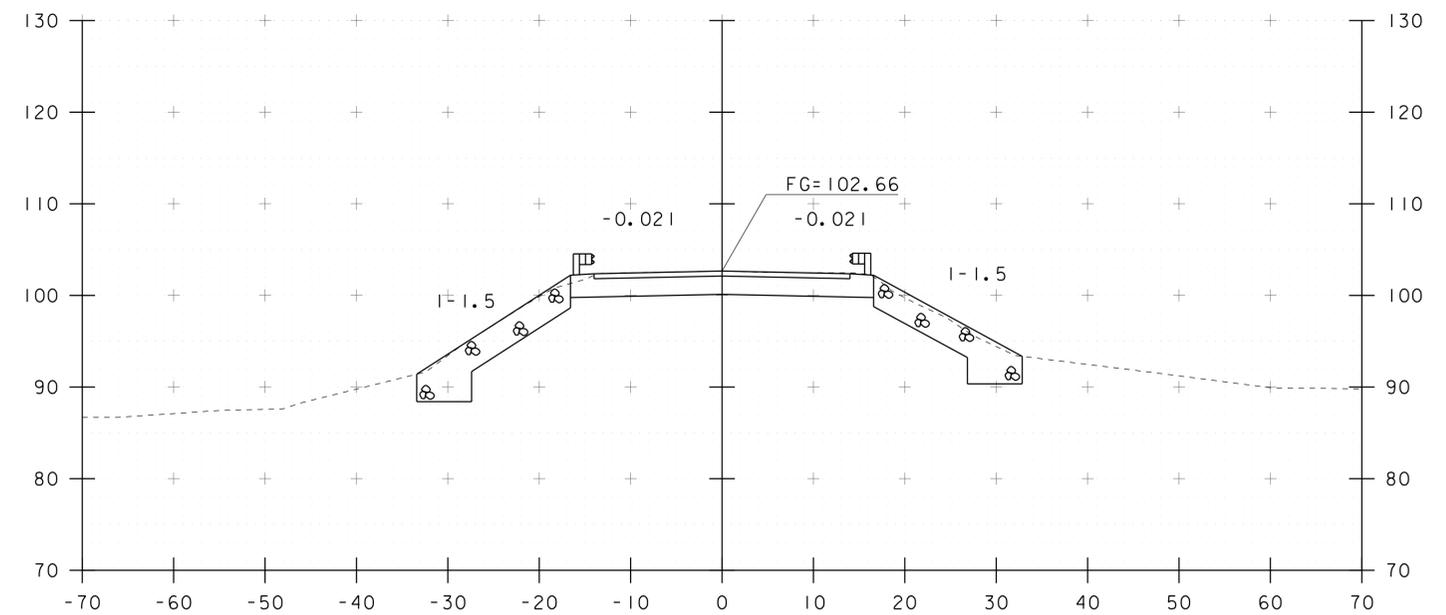
38+25



☉ BOX CULVERT  
 38+65



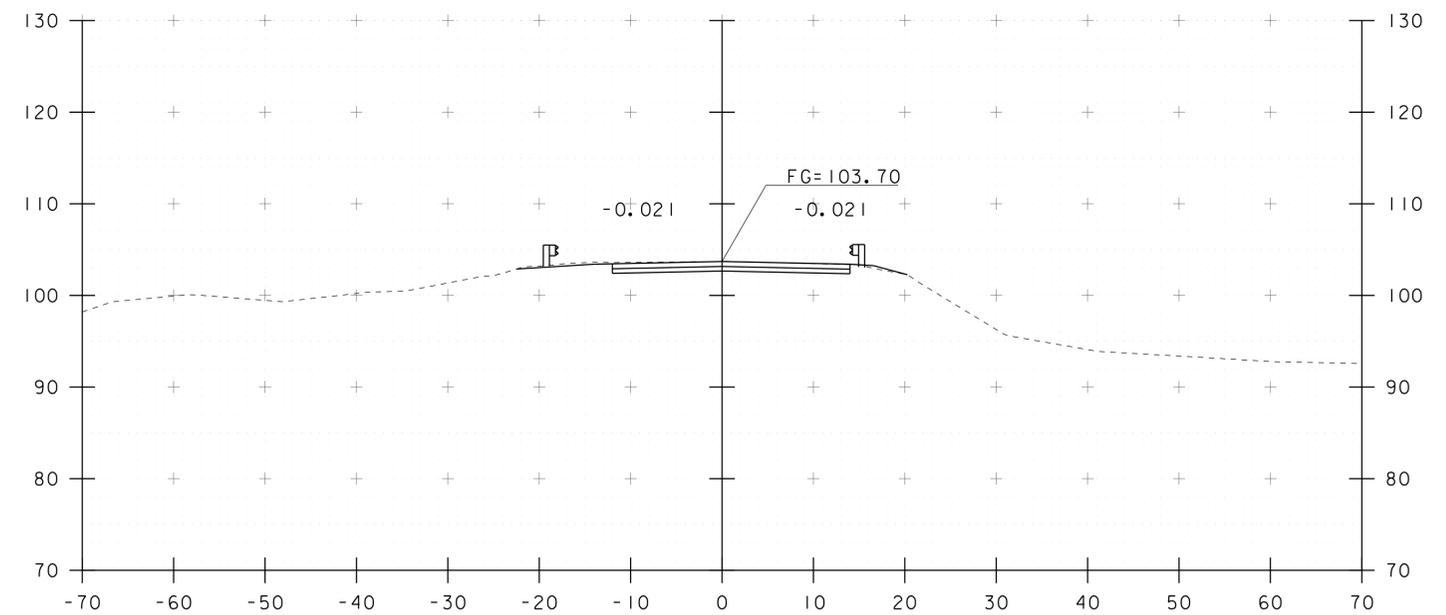
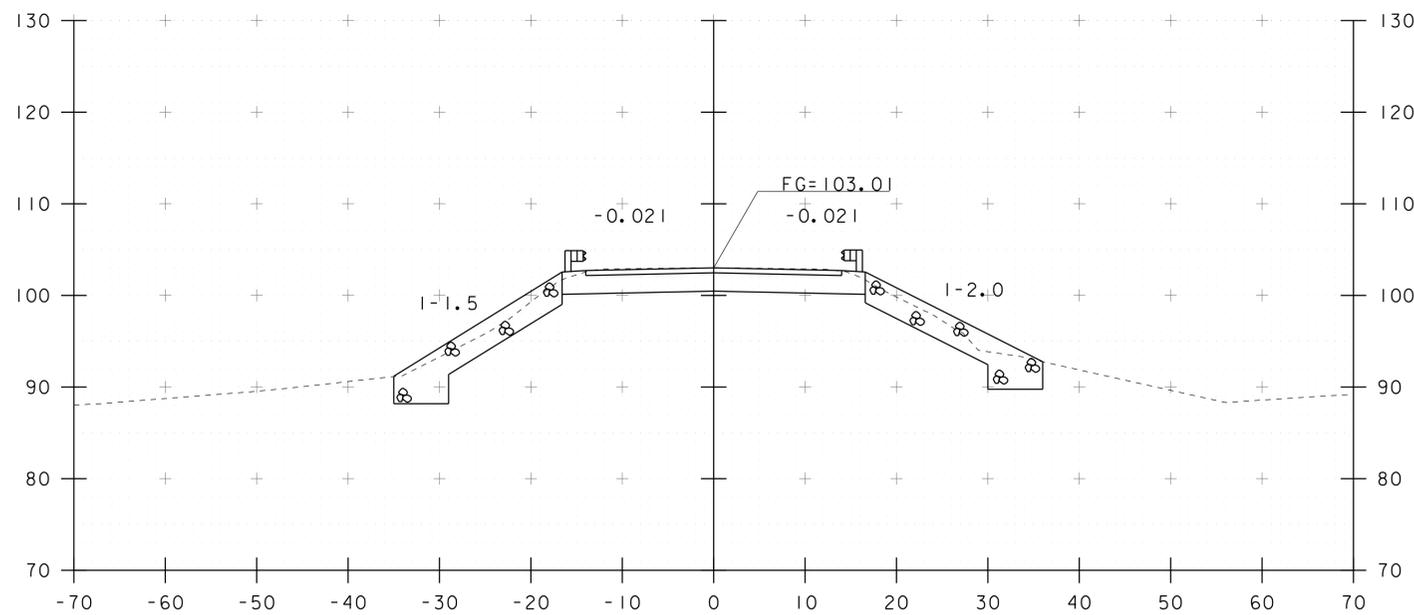
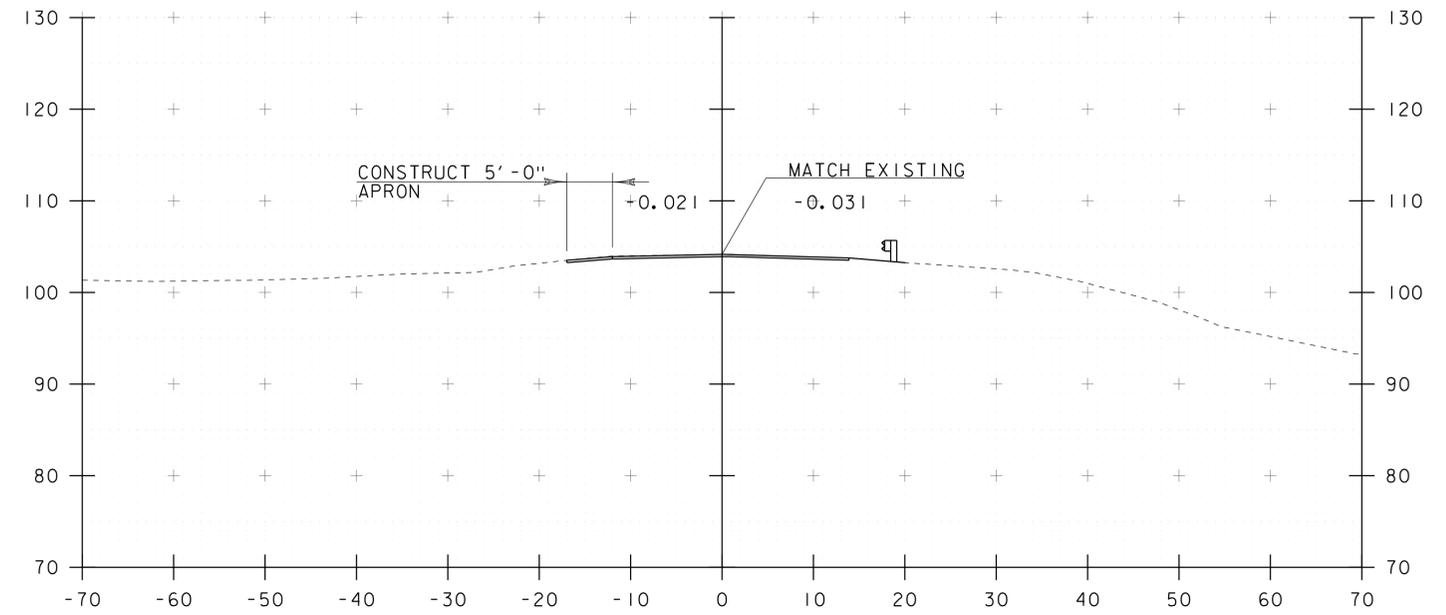
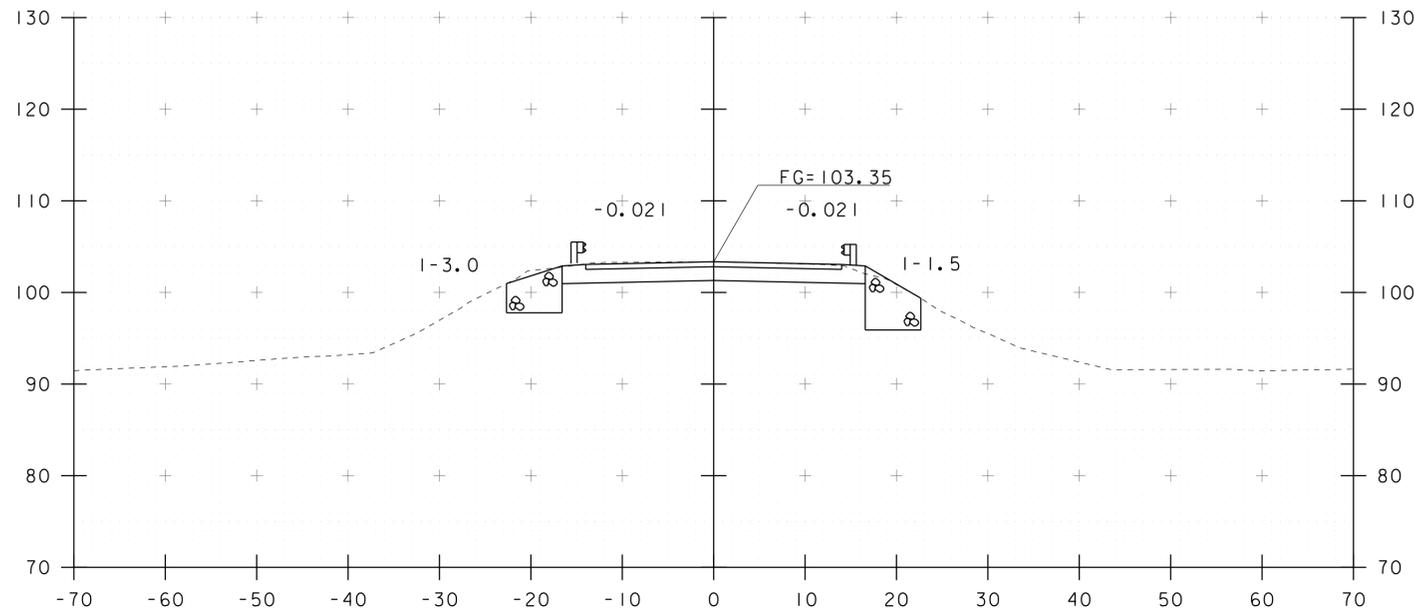
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38+50

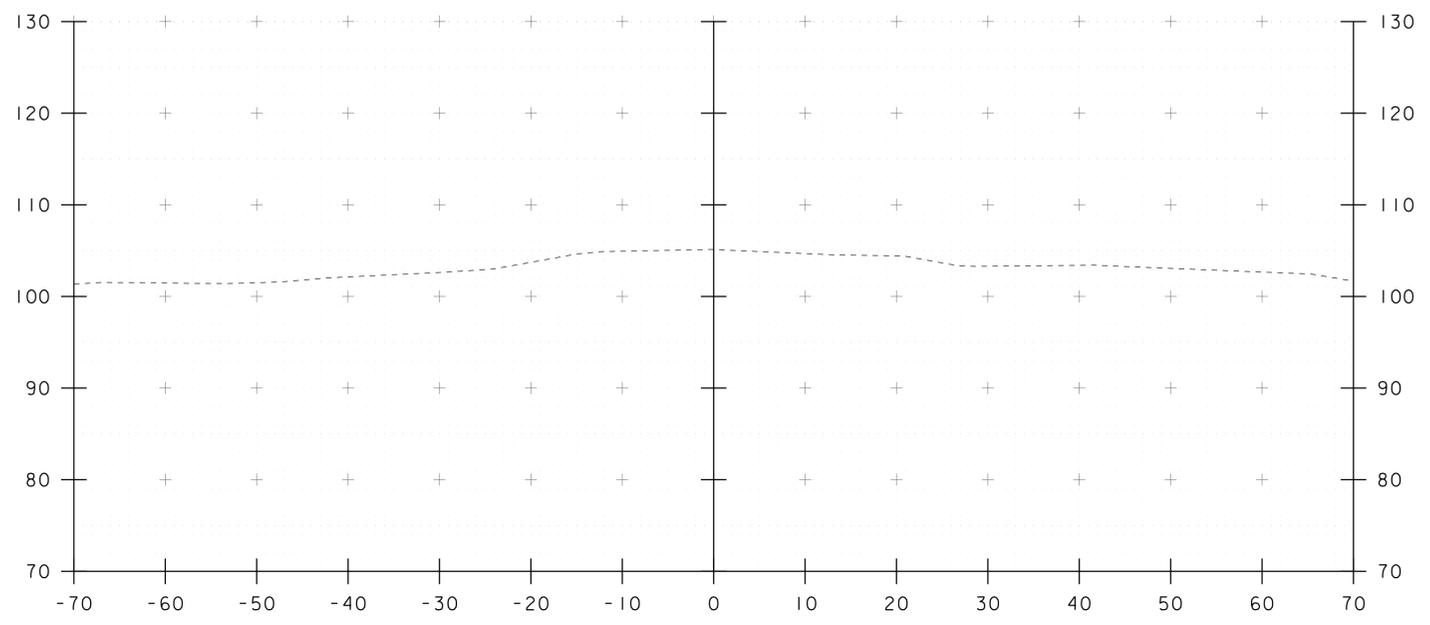
STA. 38+00 TO STA. 38+65

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MAINLINE SECTIONS:	- 2	SHEET	21 OF 28

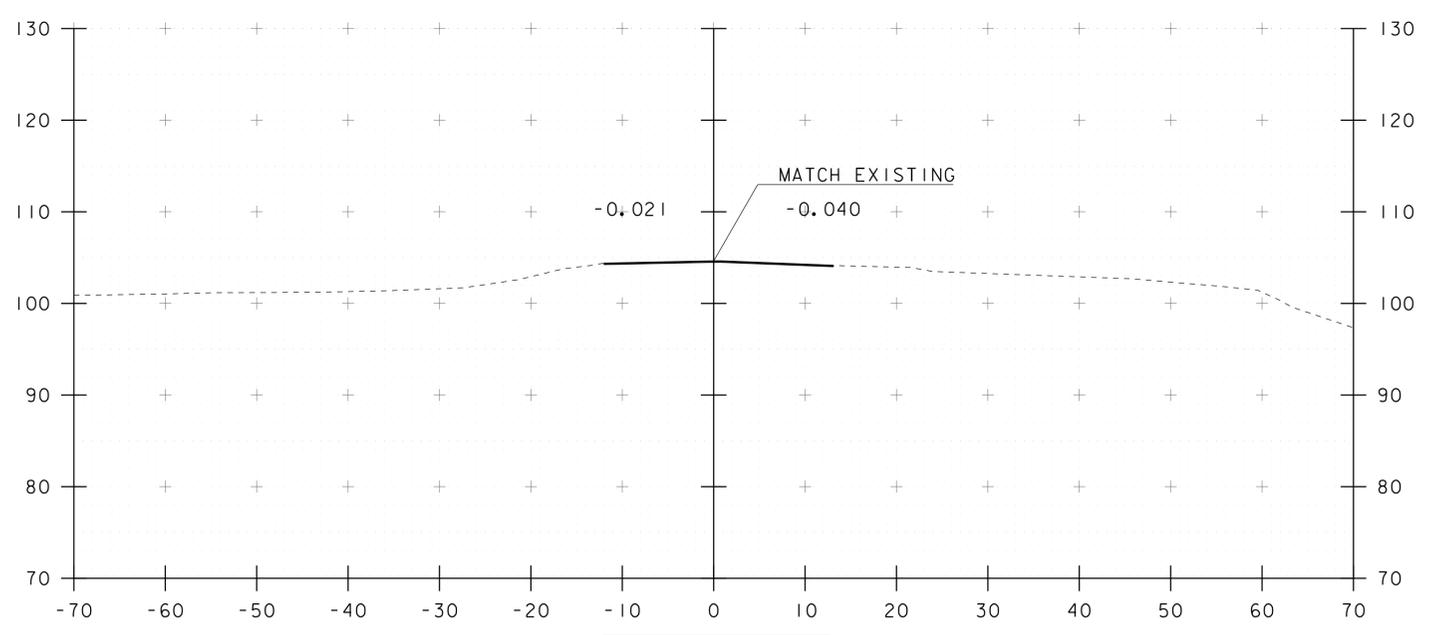


STA. 38+75 TO STA. 39+50

PROJECT NAME: ADDISON	
PROJECT NUMBER: STP CULV(14)	
FILE NAME: s08b062xs.dgn	PLOT DATE: 09-MAR-2013
PROJECT LEADER: K. HIGGINS	DRAWN BY: J. SALVATORI
DESIGNED BY: J. SALVATORI	CHECKED BY: W. LAMMER
MAINLINE SECTIONS - 3	SHEET 22 OF 28



40+00



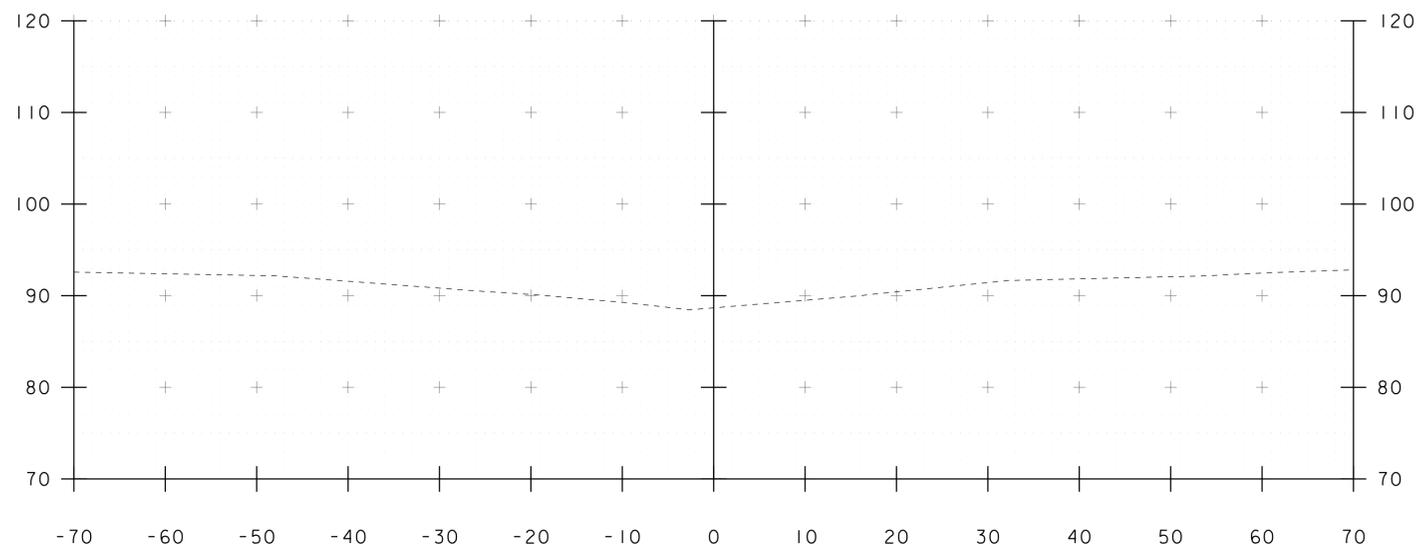
END APPROACH

39+75

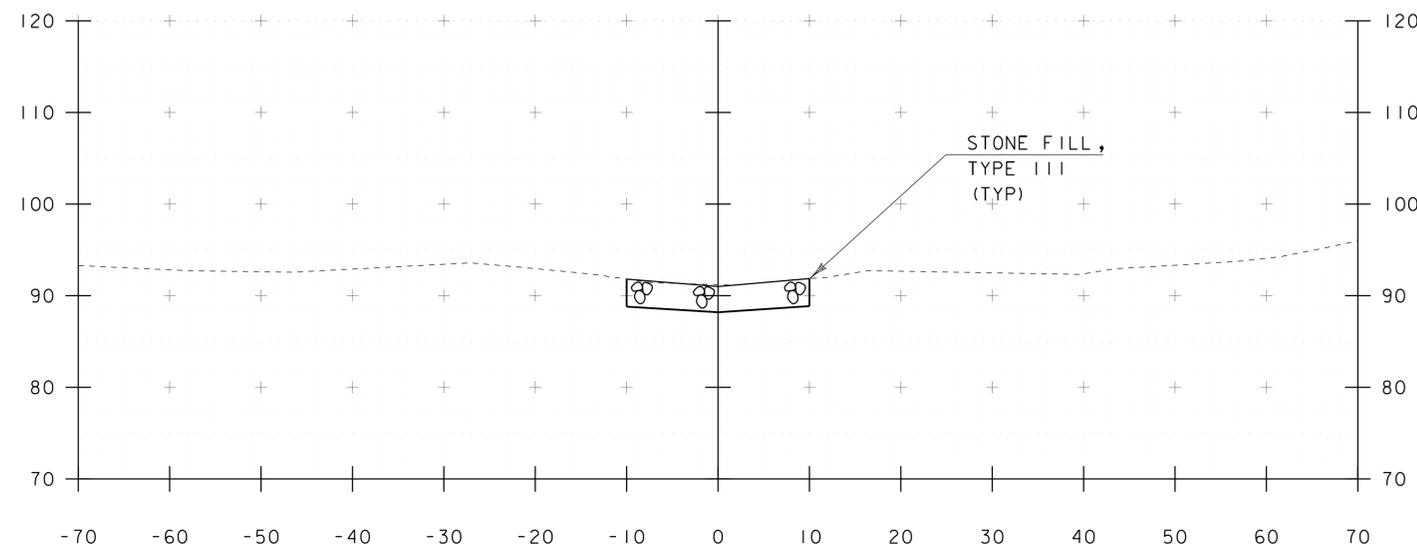
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PROJECT NAME: ADDISON	
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DESIGNED BY: J. SALVATORI	CHECKED BY: W. LAMMER
MAINLINE SECTIONS - 4	SHEET 23 OF 28

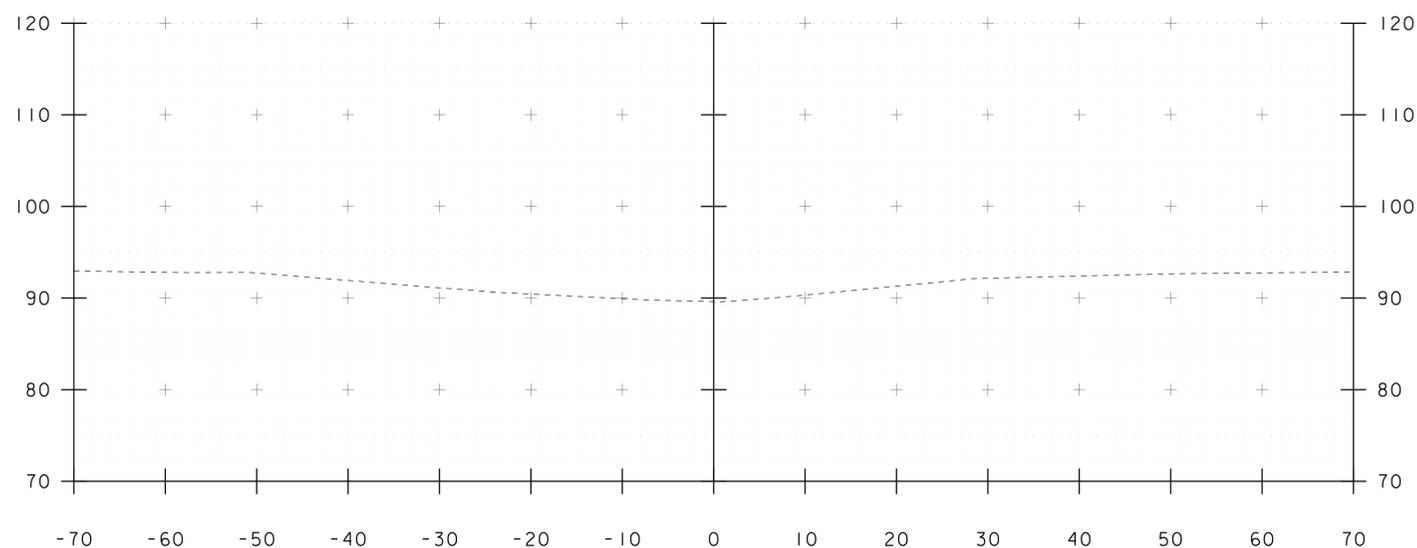
STA 10+60.00  
 BEGIN UNCLASSIFIED CHANNEL EXCAVATION  
 GEOTEXTILE UNDER STONE FILL  
 STONE FILL, TYPE III



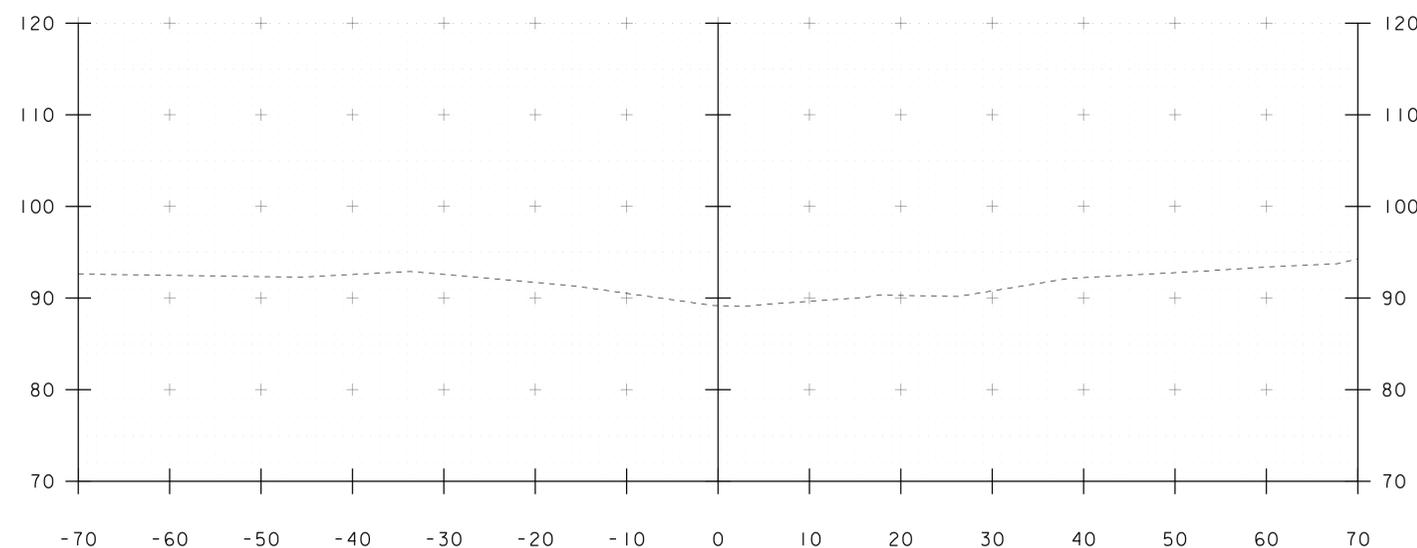
10+25



10+60



10+00

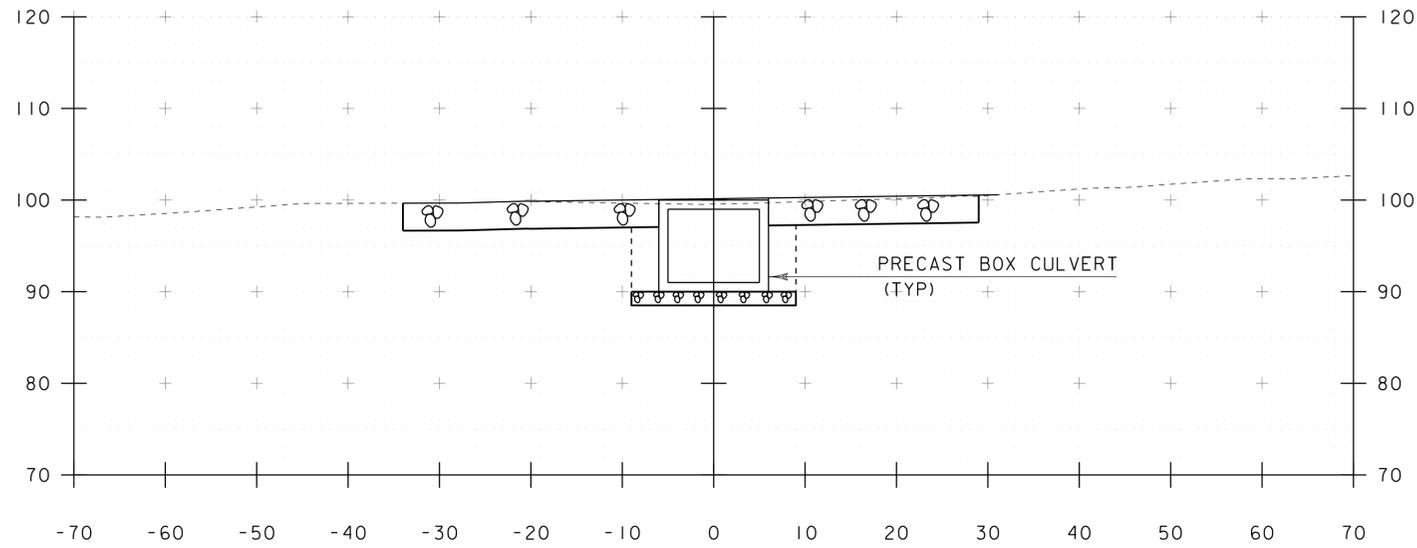


10+50

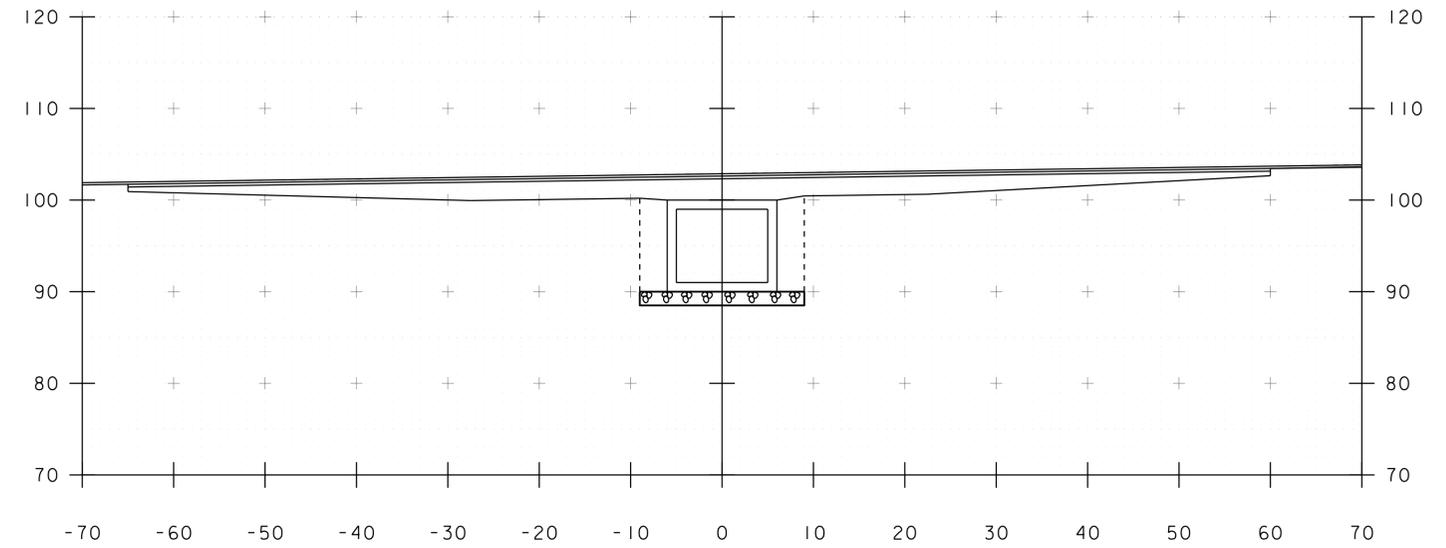
STA. 10+00 TO STA. 10+60

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PROJECT LEADER:	K. HIGGINS	CHANNEL SECTIONS:	- 1
		CHECKED BY:	J. SALVATORI
		SHEET	24 OF 28

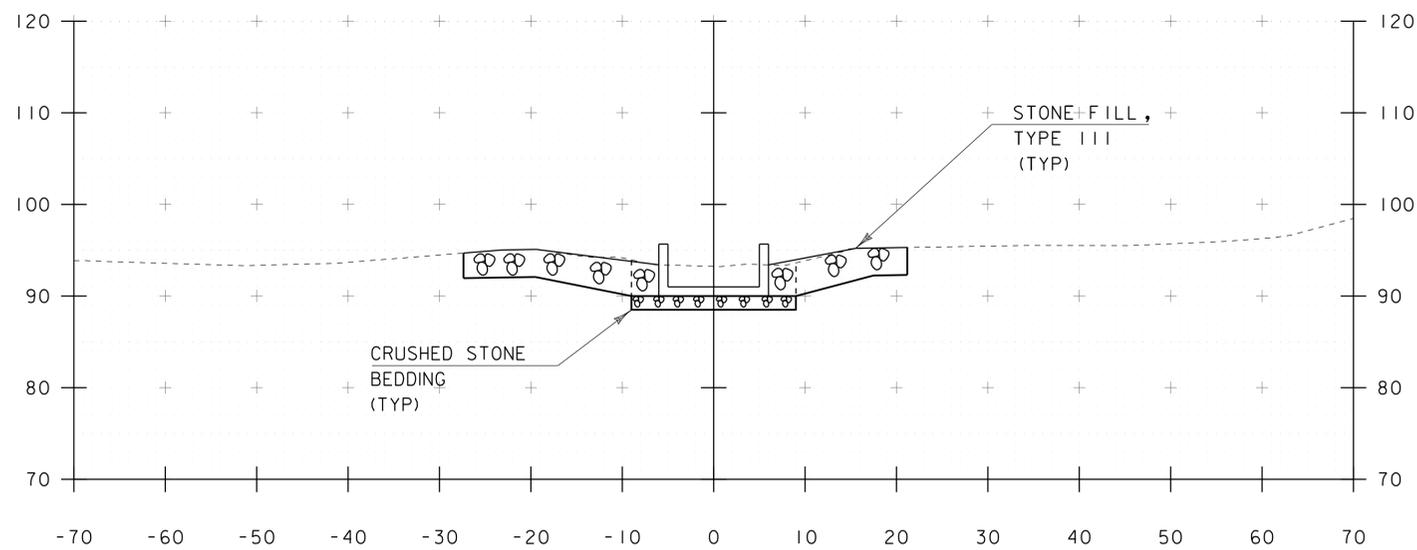
STA 10+83.40  
 END UNCLASSIFIED CHANNEL EXCAVATION  
 GEOTEXTILE UNDER STONE FILL  
 STONE FILL, TYPE III



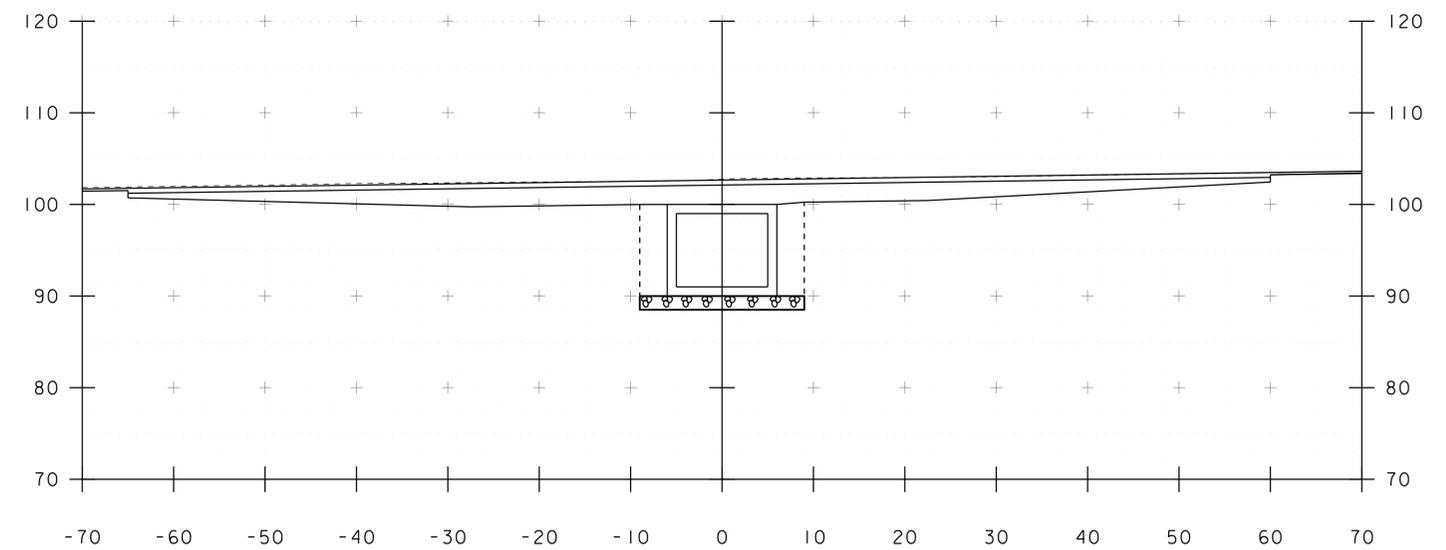
10+80



11+00



10+70

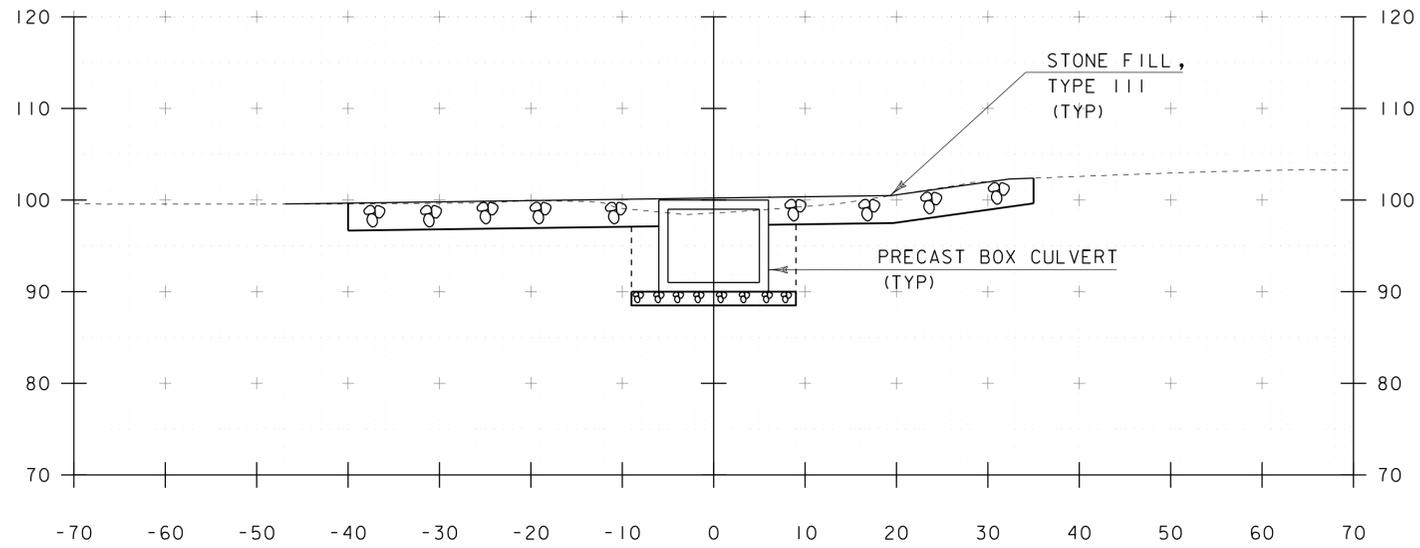


10+90

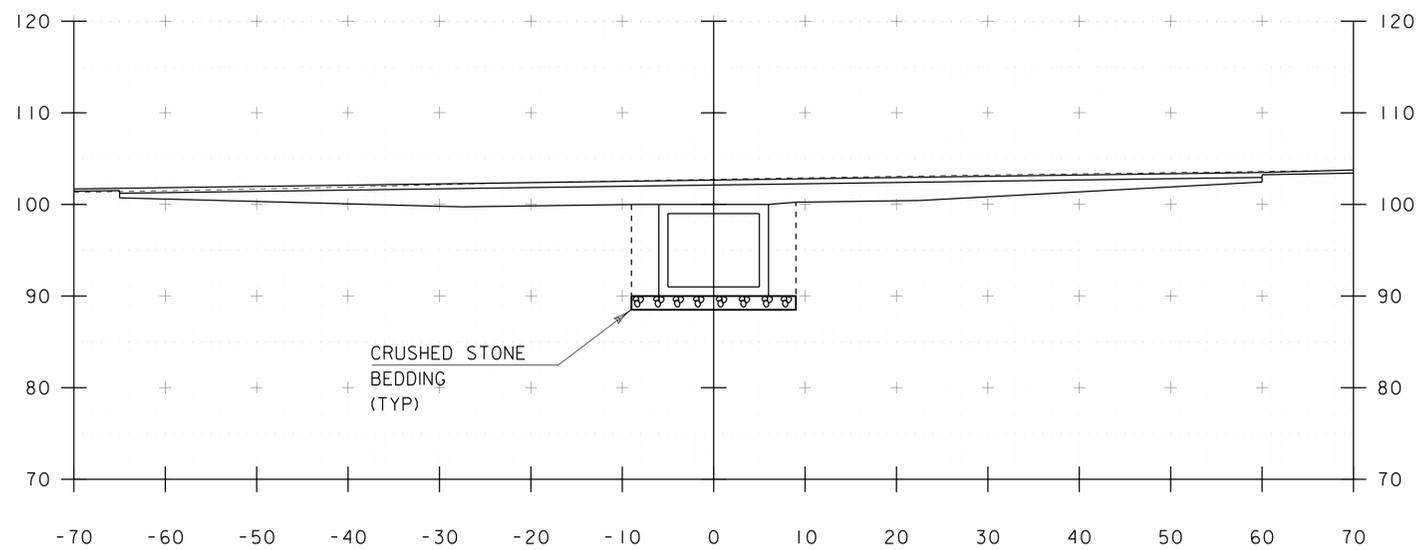
STA. 10+70 TO STA. 11+00

PROJECT NAME:	ADDISON	PLOT DATE:	09-MAR-2013
PROJECT NUMBER:	STP CULV(I4)	DRAWN BY:	J. GRIGAS
FILE NAME:	s08b062xs.dgn	DESIGNED BY:	J. SALVATORI
PROJECT LEADER:	K. HIGGINS	CHECKED BY:	J. SALVATORI
CHANNEL SECTIONS:	- 2	SHEET	25 OF 28

STA 11+16.70  
 BEGIN UNCLASSIFIED CHANNEL EXCAVATION  
 GEOTEXTILE UNDER STONE FILL  
 STONE FILL, TYPE III

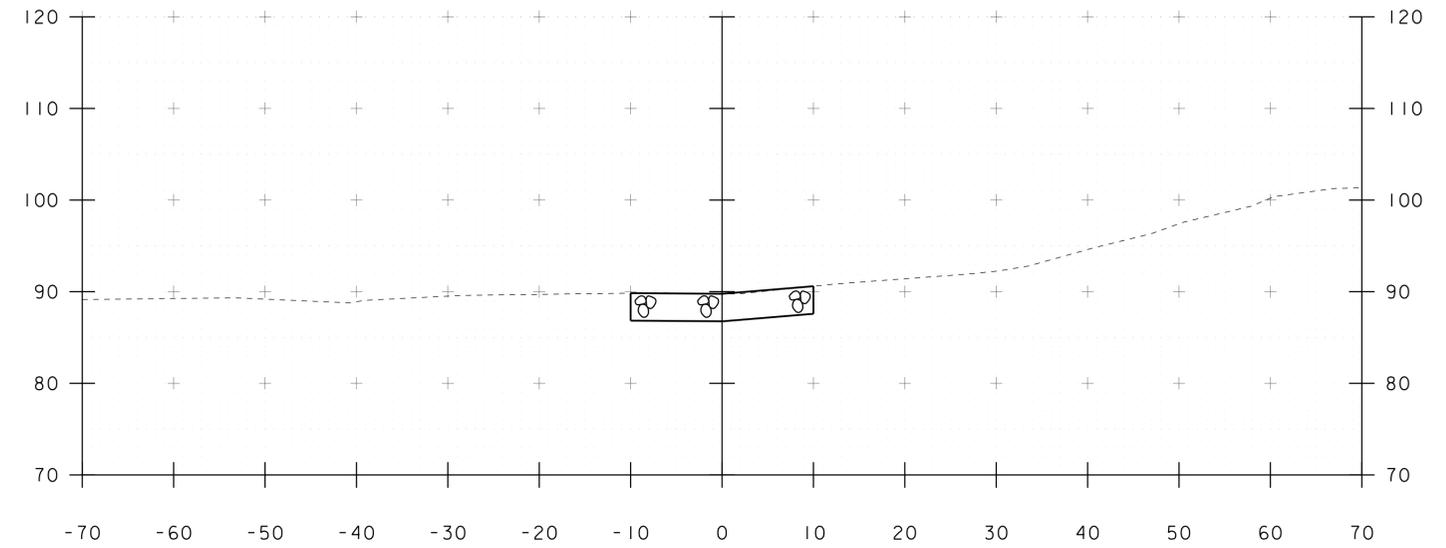


11+20

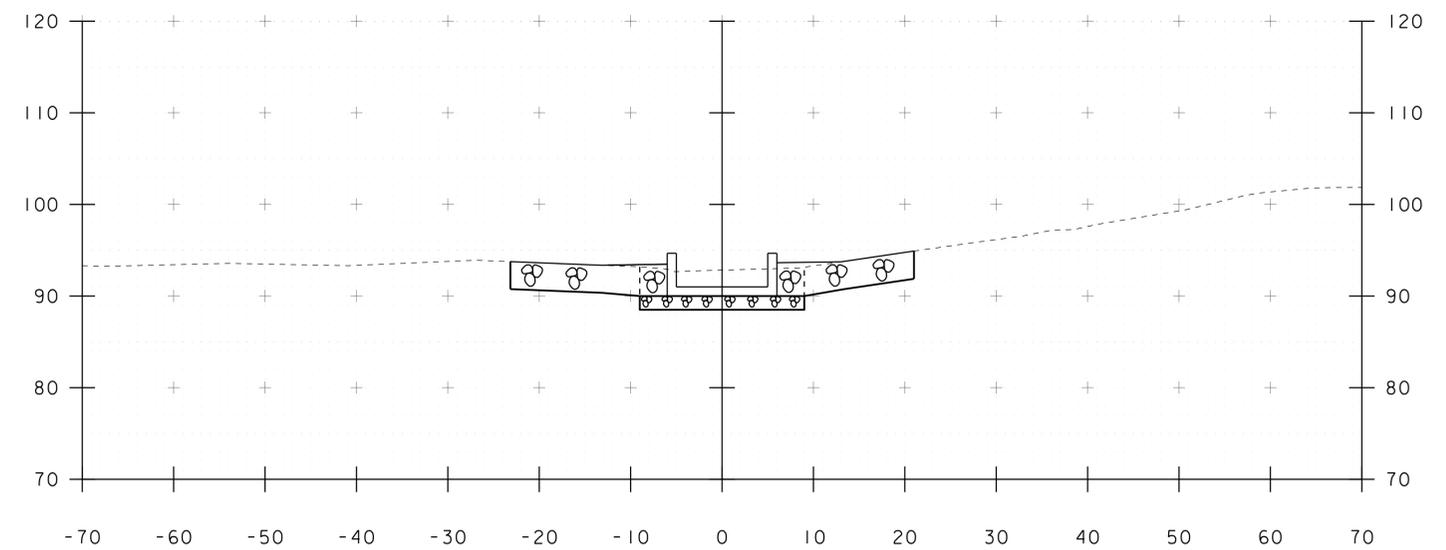


11+10

STA 11+40.00  
 END UNCLASSIFIED CHANNEL EXCAVATION  
 GEOTEXTILE UNDER STONE FILL  
 STONE FILL, TYPE III



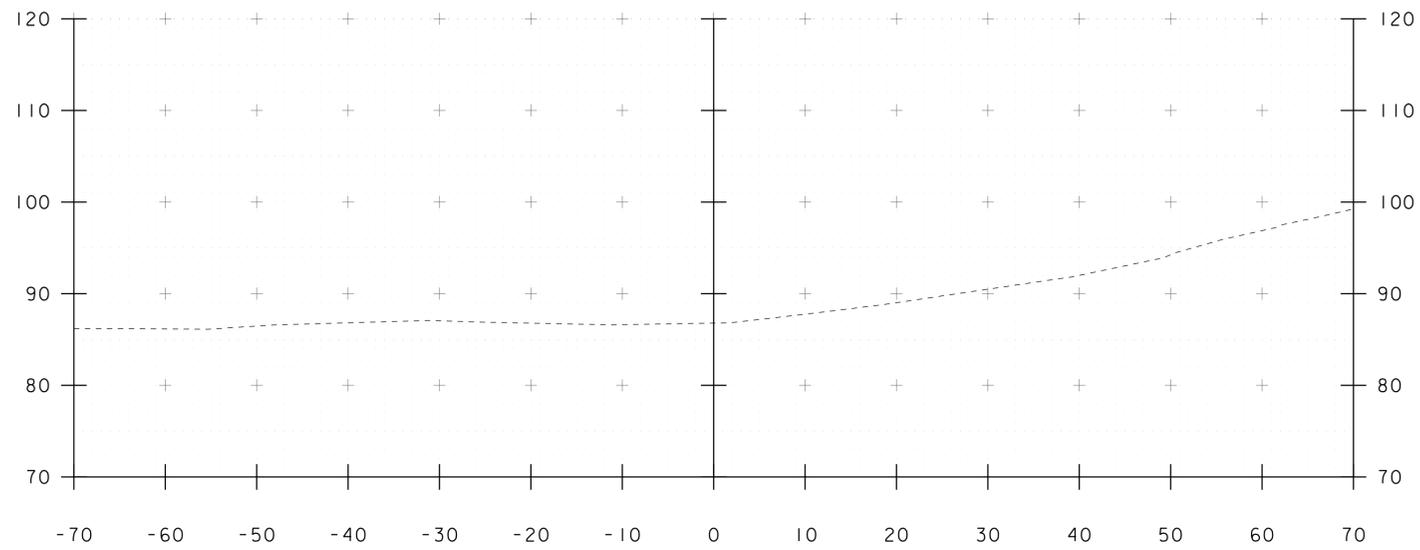
11+40



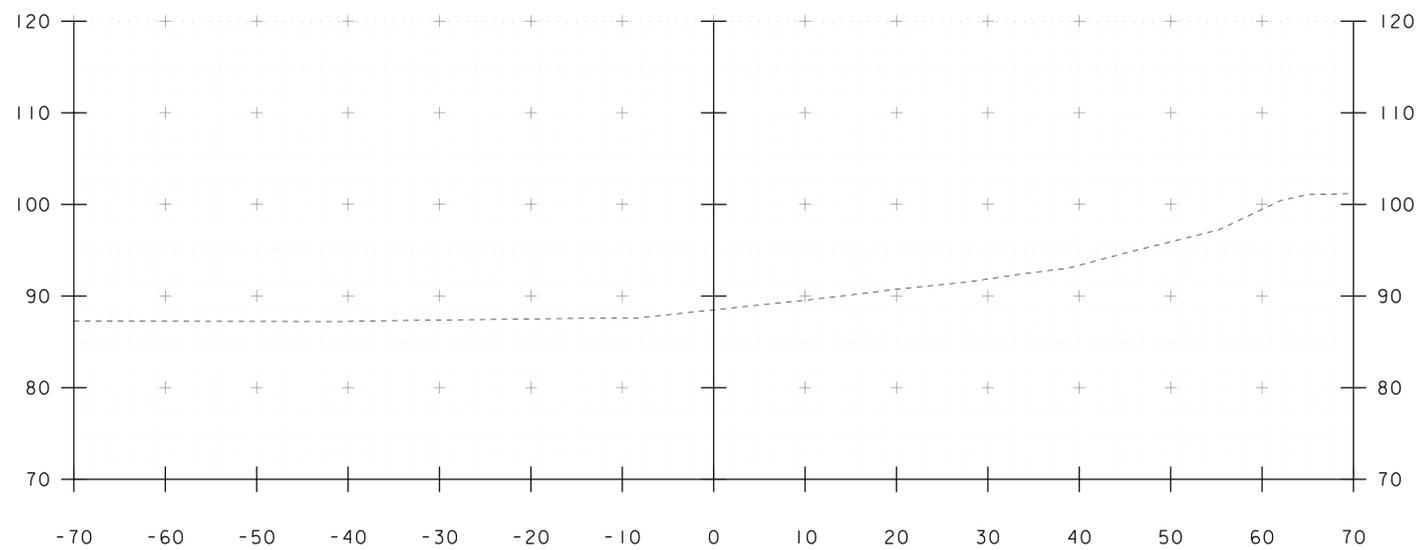
11+30

STA. 11+10 TO STA. 11+40

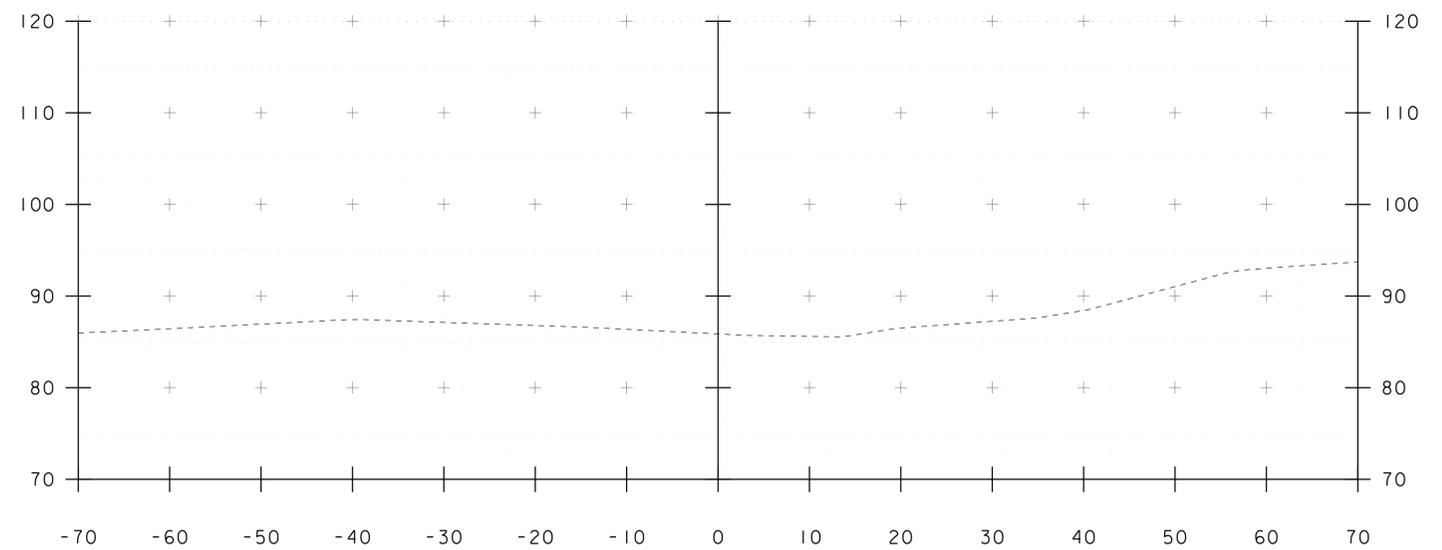
PROJECT NAME: ADDISON	PLOT DATE: 09-MAR-2013
PROJECT NUMBER: STP CULV(I4)	DRAWN BY: J. GRIGAS
FILE NAME: s08b062xs.dgn	DESIGNED BY: J. SALVATORI
PROJECT LEADER: K. HIGGINS	CHECKED BY: J. SALVATORI
CHANNEL SECTIONS - 3	SHEET 26 OF 28



11+75



11+50



12+00

STA. 11+50 TO STA. 12+00

PROJECT NAME:	ADDISON	PLOT DATE:	09-MAR-2013
PROJECT NUMBER:	STP CULV(I4)	DRAWN BY:	J. GRIGAS
FILE NAME:	s08b062xs.dgn	DESIGNED BY:	J. SALVATORI
PROJECT LEADER:	K. HIGGINS	CHECKED BY:	J. SALVATORI
CHANNEL SECTIONS -	4	SHEET	27 OF 28

COLD PLANING, BITUMINOUS PAVEMENT

STA 37+50 - 38+00  
STA 39+25 - 39+75

4" WHITE LINE  
STA 37+50 - 39+75 LT & RT

4" YELLOW LINE (DOUBLE)  
STA 37+50 - 39+75

CONSTRUCT FIVE FOOT APRON (3 IN)

STA 39+25 - 39+75 LT

TRAFFIC SIGNS, TYPE A

STA 39+00 LT  
STA 38+80 RT

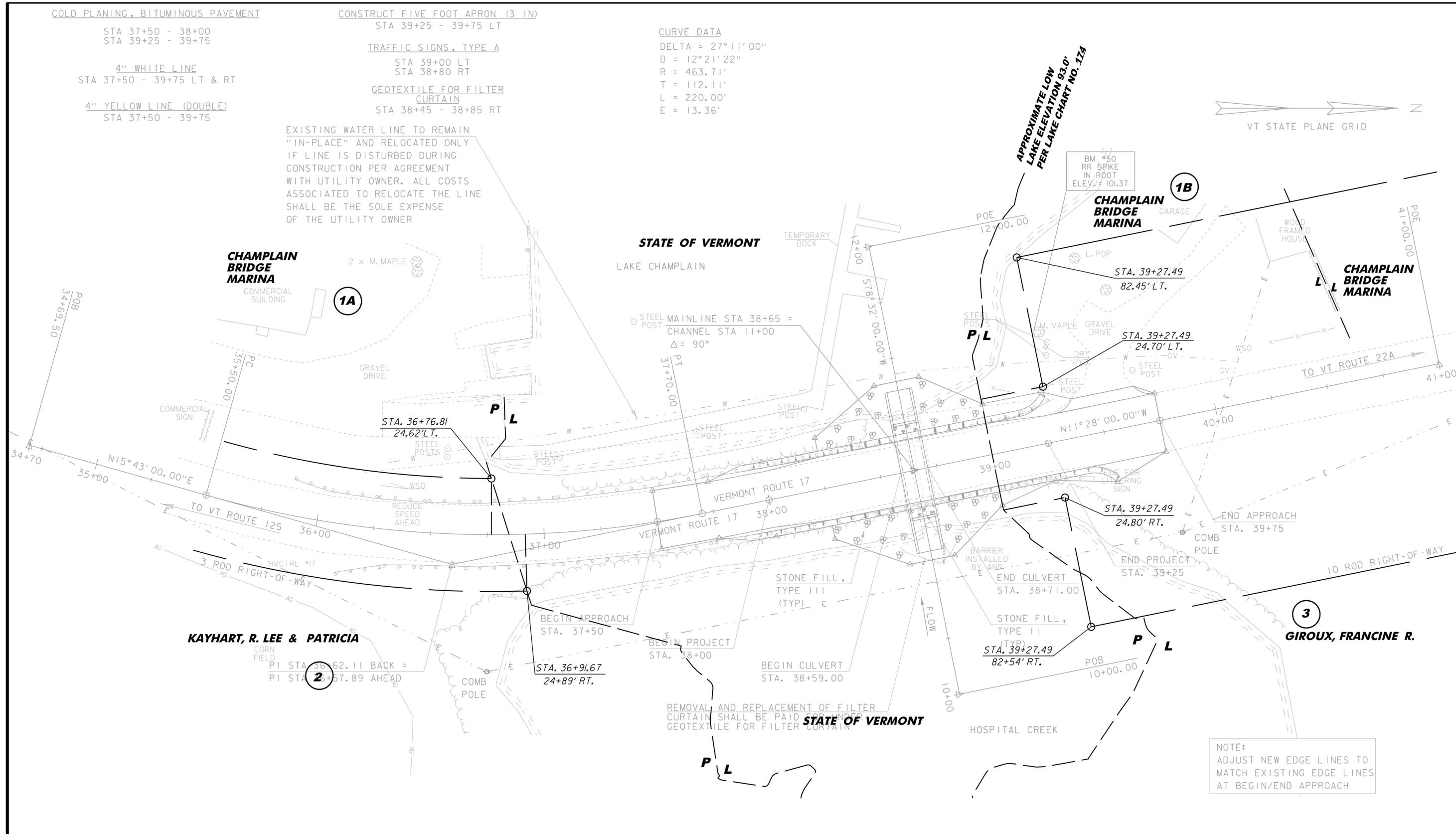
GEOTEXTILE FOR FILTER CURTAIN

STA 38+45 - 38+85 RT

CURVE DATA

DELTA = 27°11'00"  
D = 12°21'22"  
R = 463.71'  
T = 112.11'  
L = 220.00'  
E = 13.36'

EXISTING WATER LINE TO REMAIN "IN-PLACE" AND RELOCATED ONLY IF LINE IS DISTURBED DURING CONSTRUCTION PER AGREEMENT WITH UTILITY OWNER. ALL COSTS ASSOCIATED TO RELOCATE THE LINE SHALL BE THE SOLE EXPENSE OF THE UTILITY OWNER



**CHAMPLAIN BRIDGE MARINA**  
COMMERCIAL BUILDING

1A

STATE OF VERMONT  
LAKE CHAMPLAIN

**CHAMPLAIN BRIDGE MARINA**

1B

**CHAMPLAIN BRIDGE MARINA**

**KAYHART, R. LEE & PATRICIA**  
CORN FIELD

2

STATE OF VERMONT

**GIROUX, FRANCINE R.**

3

LAYOUT SHEET

SCALE 1" = 20'-0"  
20 0 20

NOTE:  
ADJUST NEW EDGE LINES TO MATCH EXISTING EDGE LINES AT BEGIN/END APPROACH

PROJECT NAME:	ADDISON
PROJECT NUMBER:	STP CULV(14)
FILE NAME:	r08b062zzz.dgn
PROJECT LEADER:	K. HIGGINS
DESIGNED BY:	J. SALVATORI
ROW LAYOUT SHEET	
PLOT DATE:	09-MAR-2013
DRAWN BY:	J. BLANCHARD
CHECKED BY:	H. PETROVS
SHEET	28 OF 28

**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.

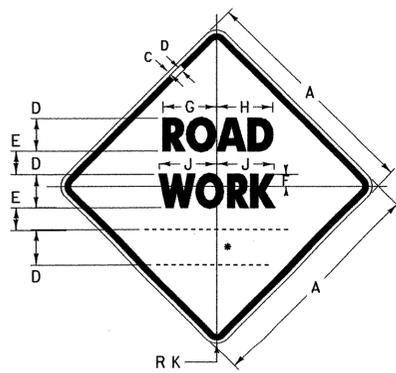
ALL WOODEN POSTS SHALL HAVE AN EMBEDMENT DEPTH OF 4 FEET. NO CROSS-BRACING OR BACK-BRACING TO KEEP THE POSTS PLUMB WILL BE ALLOWED. CONCRETE FOUNDATIONS, COLLARS, OR SOIL BEARING PLATES ARE NOT PERMITTED. CONSTRUCTION SIGNS SHALL BE PLACED ON TWO OR MORE POSTS WHEN ANY OF THE FOLLOWING CONDITIONS GOVERN:

- 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

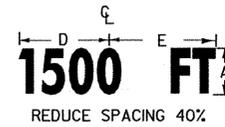
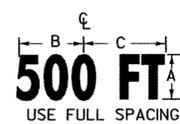


**STANDARD  
E-100**

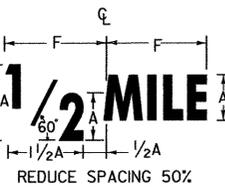
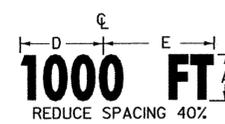


**W20-1**

• SEE DISTANCE DETAILS



REDUCE SPACING 40%



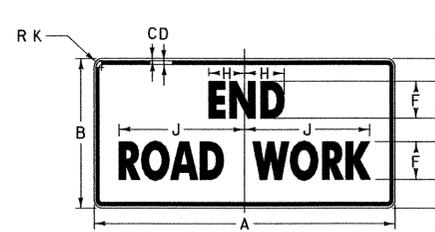
USE FULL SPACING

**DISTANCE DETAILS**

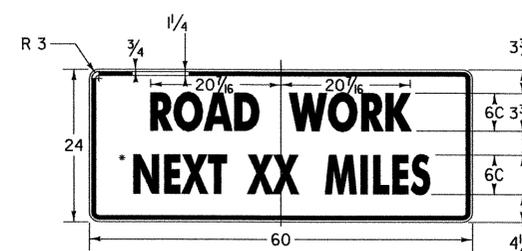
SIGN	DIMENSIONS (INCHES)									
	A	B	C	D	E	F	G	H	J	K
MIN.	36	3/8	7/8	5D	3 1/2	3 1/4	8 3/8	8 7/8	9	2 1/4
STD.	48	3/4	1 1/4	7D	4 3/4	4 1/2	11 1/8	12 1/8	12 5/8	3

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**

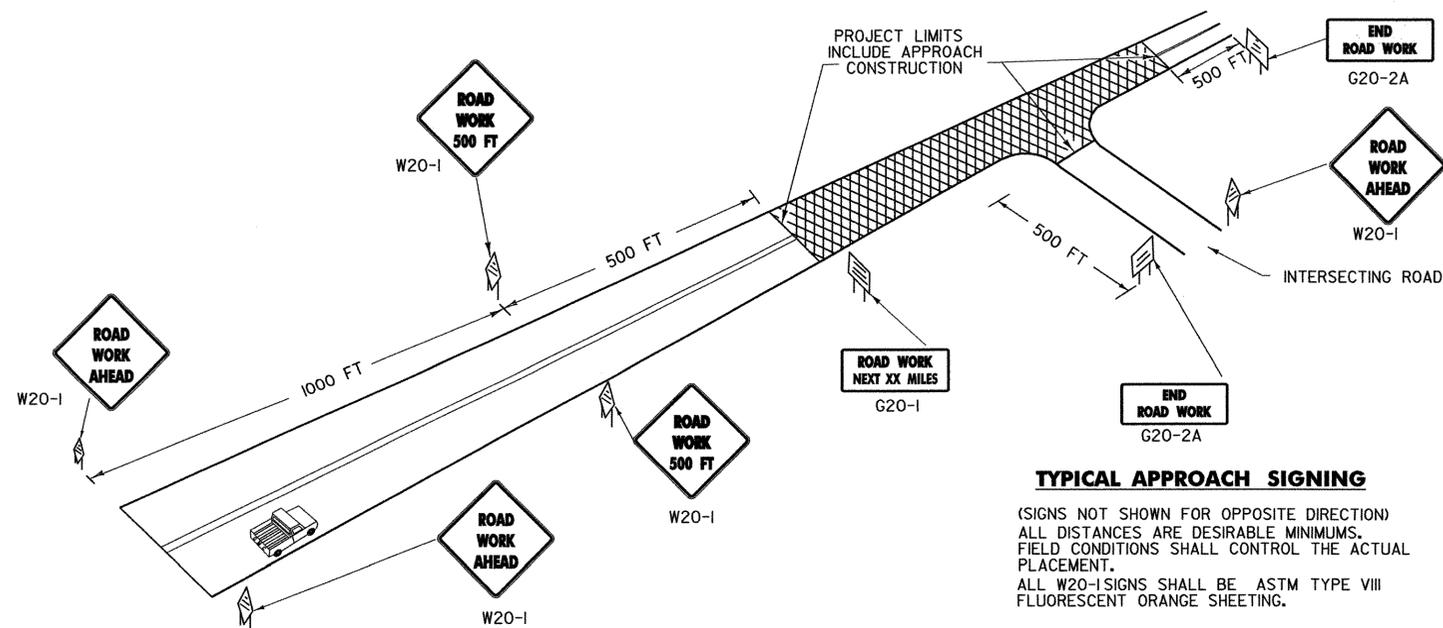
ALL LEAD SIGNS (W20-1) ON THIS SHEET SHALL BE ASTM TYPE VIII FLUORESCENT ORANGE SHEETING. ALL OTHER SIGNS ON THIS SHEET SHALL BE ASTM TYPE III RETROREFLECTORIZED SHEETING.

**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.

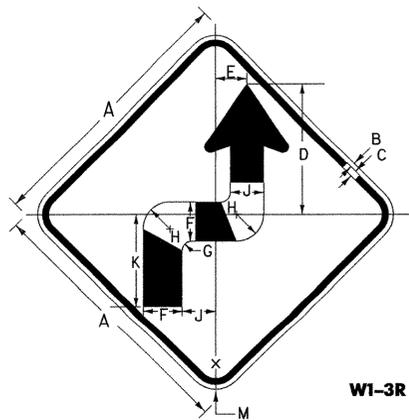
**REVISIONS AND CORRECTIONS**

- 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

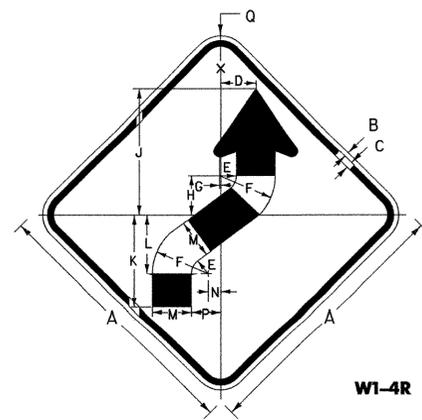
**APPROVED**

DIRECTOR OF PROGRAM DEVELOPMENT  
TRAFFIC OPERATIONS ENGINEER  
FEDERAL HIGHWAY ADMINISTRATION

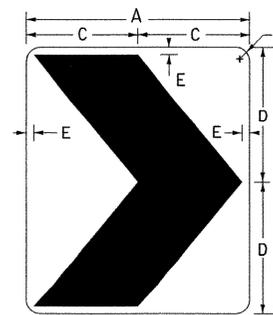
**CONSTRUCTION APPROACH  
SIGNS**



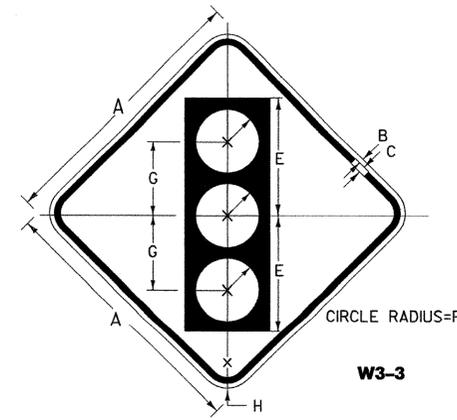
W1-3R



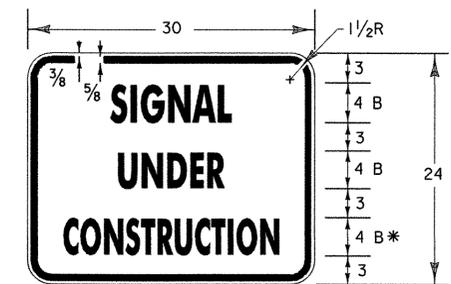
W1-4R



W1-8



W3-3



\* 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	

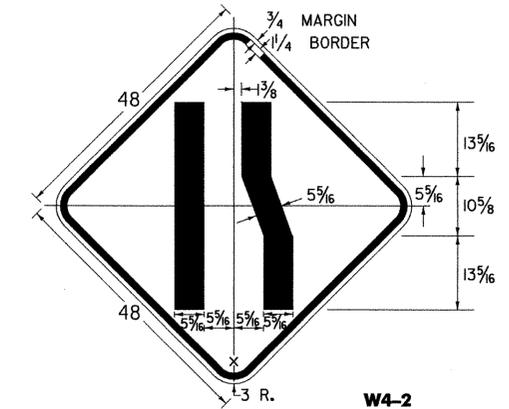
SIGN	DIMENSIONS ( INCHES )															
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	
STD. & MIN.	36	5/8	7/8	4 27/32	2 1/4	7 1/2	5 3/32	5 1/4	16 7/8	12 3/8	7 7/8	5 1/4	1 1/16	3 15/16	2 1/4	
SPECIAL	48	3/4	1 1/4	6 5/16	3	10	3 1/16	7	22 1/2	16 1/2	10 1/2	7	2 1/4	5 1/4	3	

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. FRWY.	30	36	15	18	1	1 7/8
FRWY.	36	48	18	24	1 1/8	2 1/4

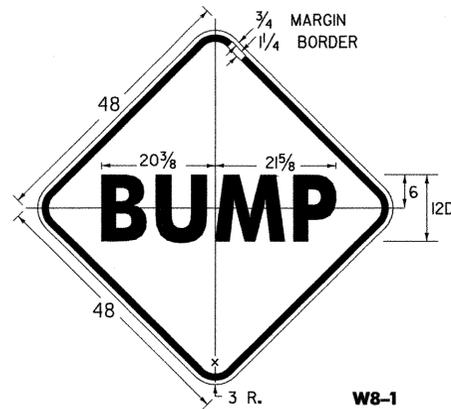
SIGN	DIMENSIONS ( INCHES )							
	A	B	C	D	E	F	G	H
STD. & MIN.	36	5/8	7/8	5 3/4	15 3/4	4 1/4	10	2 1/4
SPECIAL	48	3/4	1 1/4	7 1/2	20	5	12 1/2	3

**COLORS**

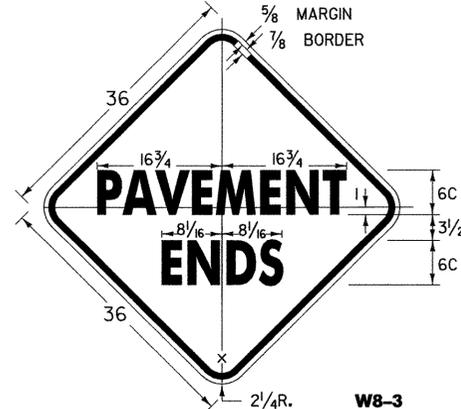
SYMBOL & LEGEND - BLACK ( NON-REFL )  
 BACKGROUND - ORANGE ( REFL )  
 TOP CIRCLE - RED ( REFL )  
 MIDDLE CIRCLE - YELLOW ( REFL )  
 BOTTOM CIRCLE - GREEN ( REFL )



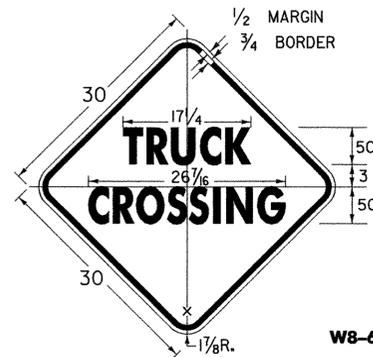
W4-2



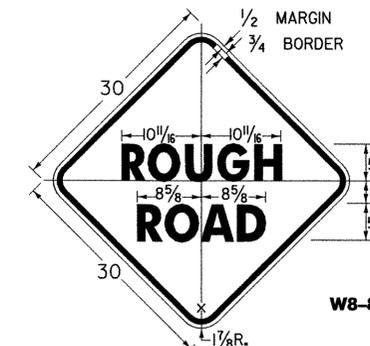
W8-1



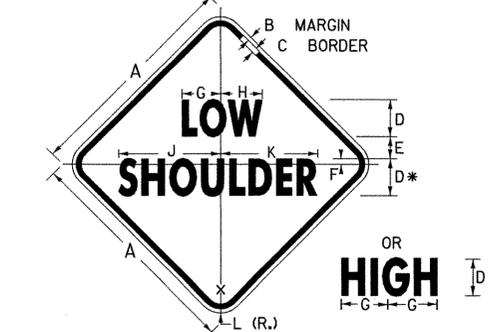
W8-3



W8-6



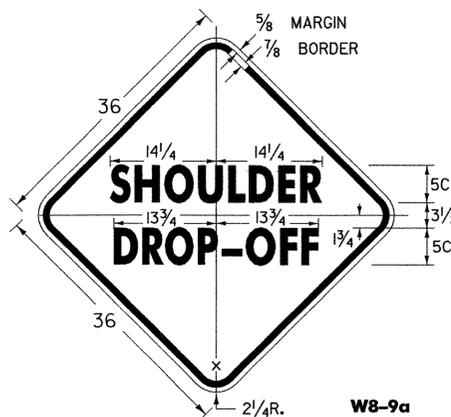
W8-8



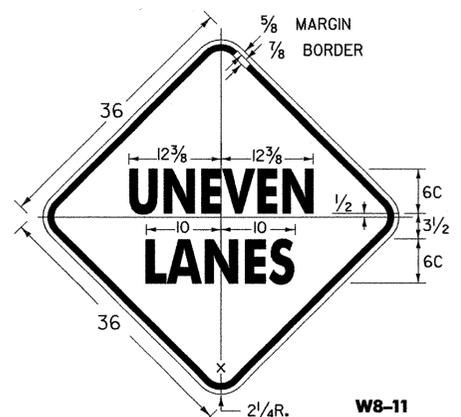
W8-9

SIGN	DIMENSIONS ( INCHES )										
	A	B	C	D	E	F	G	H	J	K	L
STD.	30	1 1/2	3/4	5C	3	3/4	5 5/8	5 5/8	13 11/16	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 3/8	3

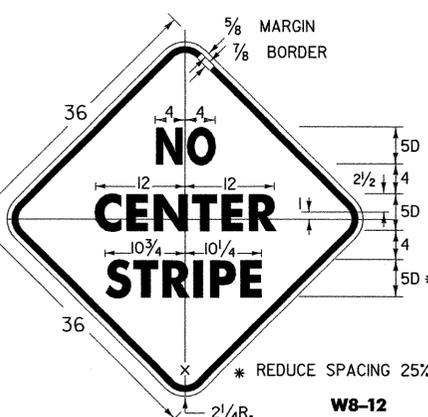
\* REDUCE SPACING 25%



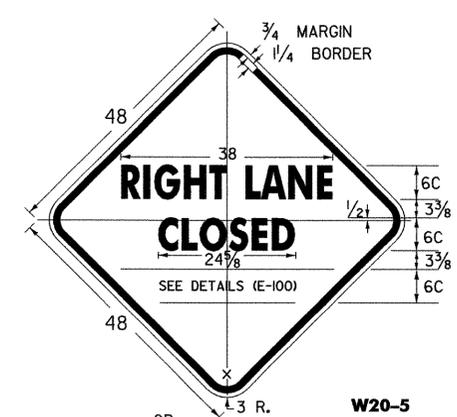
W8-9a



W8-11



W8-12



W20-5

( ALL DIMENSIONS SHOWN IN INCHES ) LEFT LANE

OTHER STDS. E-100 REQUIRED:

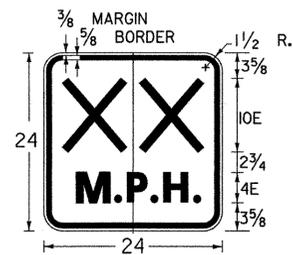
REVISIONS AND CORRECTIONS  
 OCT. 30, 1987 - DATE OF ORIGINAL ISSUE  
 OCT. 21, 1992 - ADDED ADDITIONAL SIGN DIMENSIONS, REVISED CHEVRON BACKGROUND TO ORANGE, & REVISED TITLE BLOCK  
 AUG. 08, 1995 - ADDED AND DELETED VARIOUS SIGN DETAILS  
 MAR., 10 1997 - REVISED SIGN DETAILS  
 MAY 30, 2003 - CHANGED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

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

CONSTRUCTION SIGN DETAILS

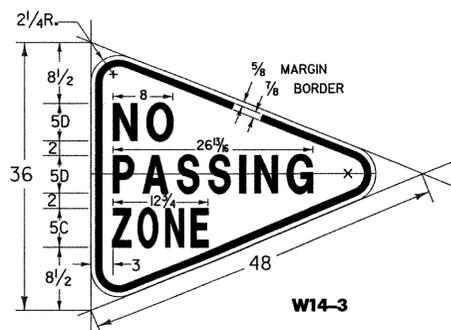


STANDARD E-101

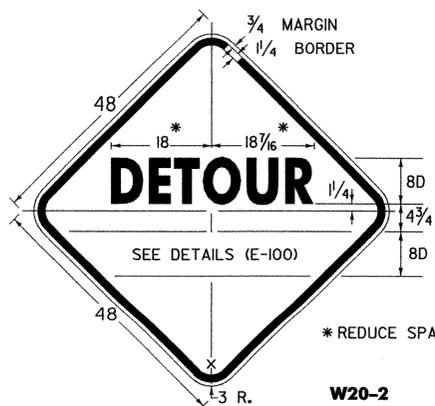


\*XX\* DENOTES ADVISORY SPEED AS SHOWN ON THE PLANS

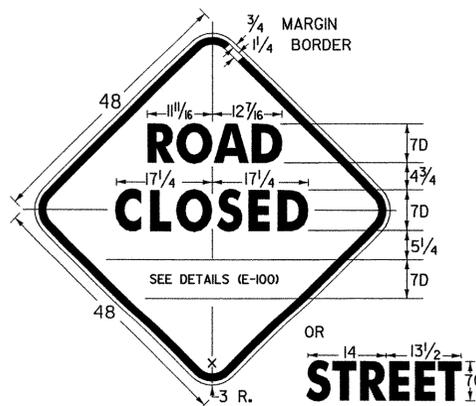
W13-1



W14-3



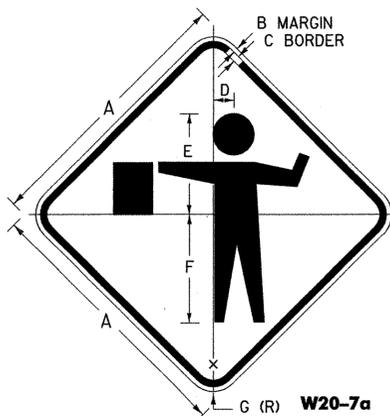
W20-2



W20-3



W20-4



W20-7a

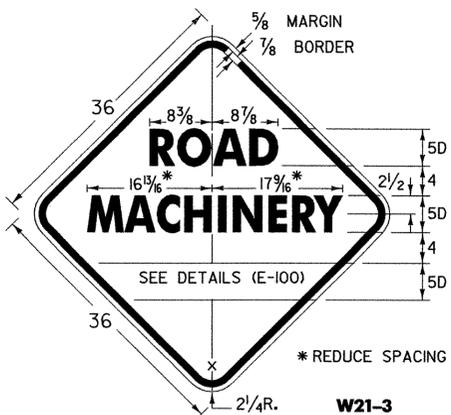


W20-7b

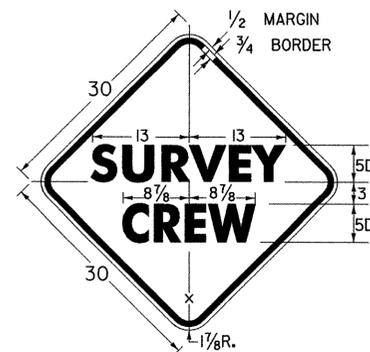
COLORS:  
BLACK BORDER AND TEXT (NON RETRORFL.)  
ORANGE BACKGROUND (RETRORFL.)

W3-4

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



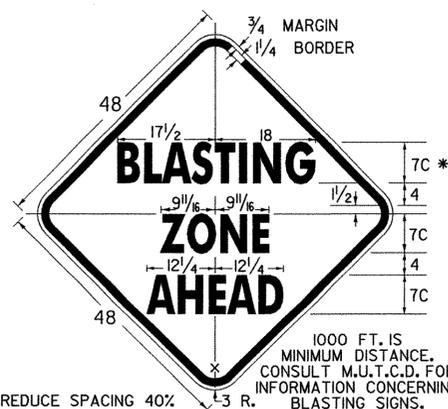
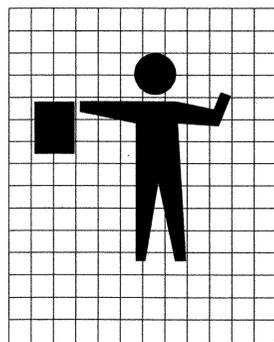
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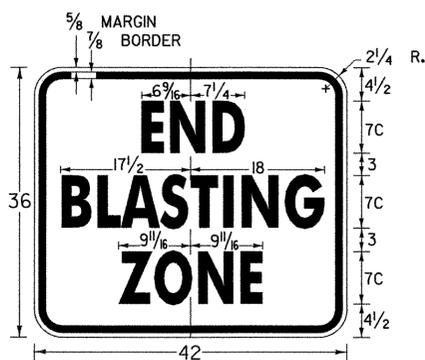
W21-6

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

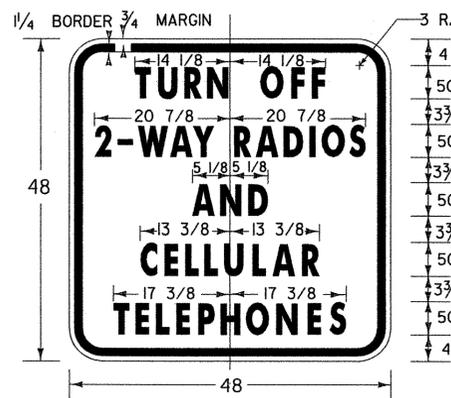
SIGN	DIMENSIONS ( INCHES )											
	A	B	C	D	E	F	G	H	J	K	L	
MIN.	36	5/8	7/8	6C	3 3/8	7/8	3 3/4	16 3/8	13	13 3/8	2 1/4	
STD.	48	3/4	1 1/4	8C	4 7/8	1 1/4	5	21 7/8	17 3/8	18 1/2	3	
EXPWY.	60	3/4	1 1/4	9C	5 3/8	1 3/8	5 5/8	24 3/4	19 3/8	20 1/4	3	



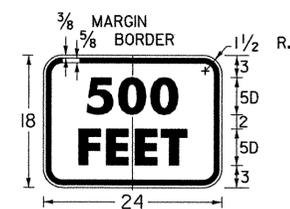
W22-1



W22-3



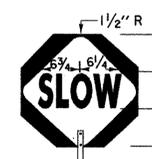
VW22-1



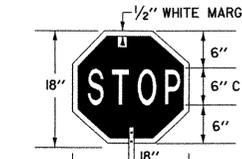
W16-2a

**SIGN PADDLE FOR FLAGPERSON**

ORANGE ASTM TYPE III OR TYPE VI RETROREFLECTORIZED DIAMOND WITH BLACK TEXT AND BORDER

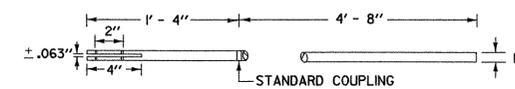


RED ASTM TYPE III OR TYPE VI RETROREFLECTORIZED OCTAGON WITH WHITE ASTM TYPE III OR TYPE VI RETROREFLECTORIZED TEXT



STANDARD COUPLING

**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

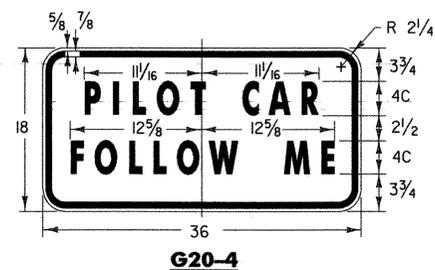
*[Signature]*  
TRAFFIC OPERATIONS ENGINEER

*[Signature]*  
FEDERAL HIGHWAY ADMINISTRATION

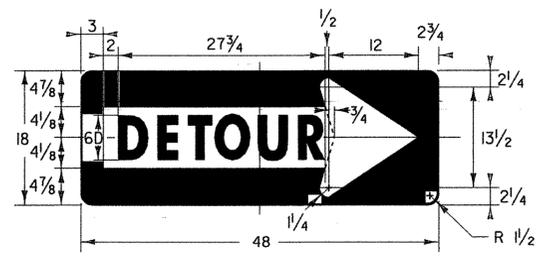
**CONSTRUCTION SIGN DETAILS**



**STANDARD E-102**



**G20-4**

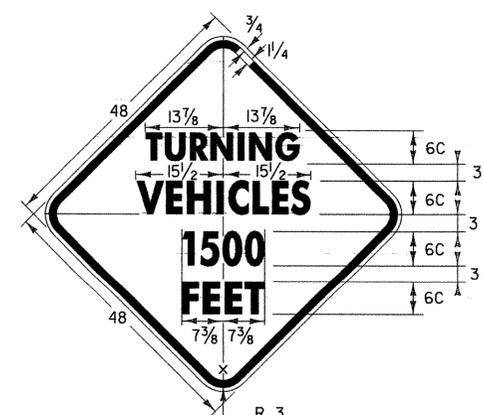


**M4-10(R)**

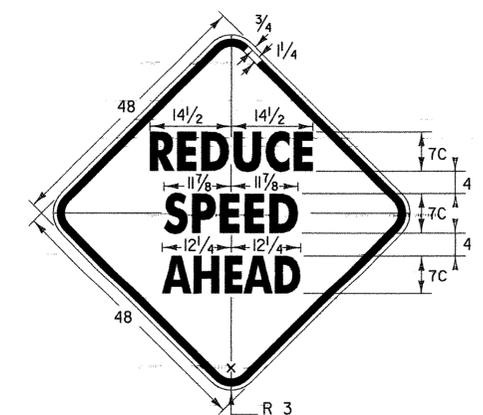


**R11-2**

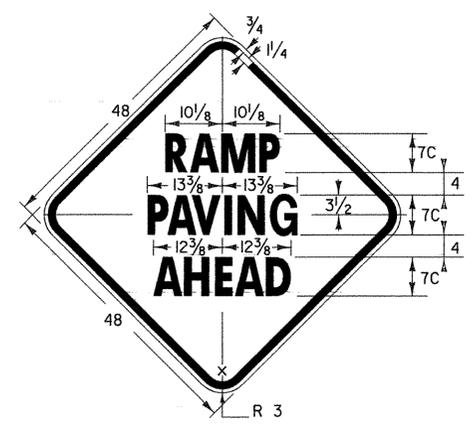
COLORS:  
BLACK TEXT AND BORDER  
WHITE RETROREFLECTORIZED BACKGROUND



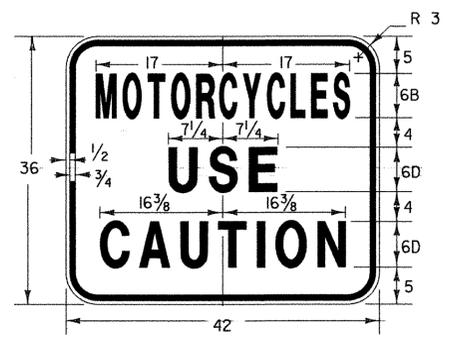
**VC-001**



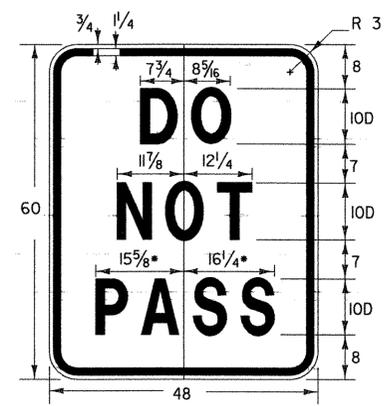
**VC-002**



**VC-003**

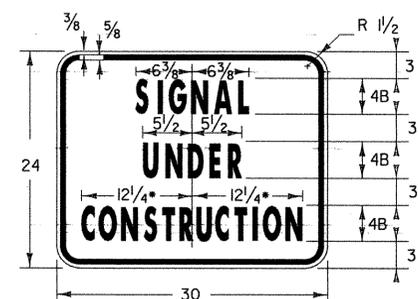


**VC-004**



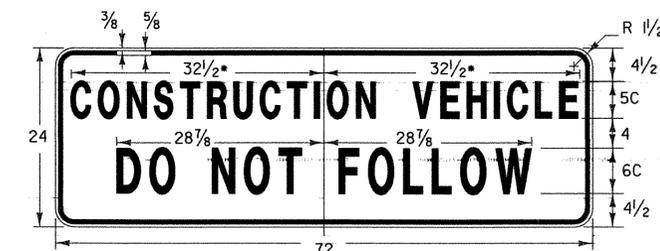
**VC-005**

\* REDUCE SPACING BY 40%



**VC-820**

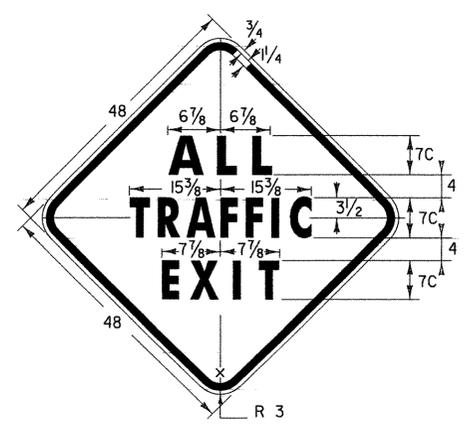
\* REDUCE SPACING 25%



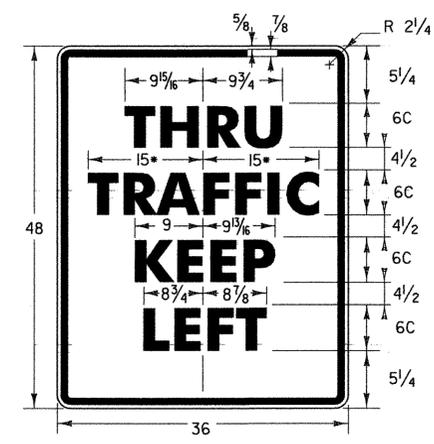
**VC-007**

\* REDUCE SPACING 20%

IT IS SUGGESTED THAT THIS SIGN BE DESIGNED TO FOLD, (DOWN OR ACROSS), BE COVERED, OR BE REMOVED WHEN NOT IN USE. THE SIGN SHOULD ALSO BE MOUNTED AS TO NOT INTERFERE WITH THE VISIBILITY OF DIRECTIONAL OR TAIL LIGHTS AS REQUIRED BY LAW.



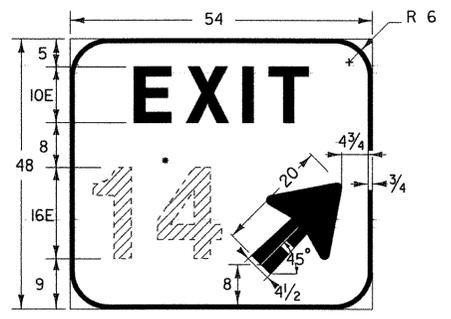
**VC-008**



**VR-118L**

\* REDUCE SPACING 25 %

COLORS:  
BLACK TEXT AND BORDER  
WHITE (RETROREFLECTORIZED) BACKGROUND



**E5-1a**

\* EXIT NUMBER AS PER PLANS OPTICALLY SPACED  
COLORS:  
WHITE RETROREFLECTORIZED BORDER, ARROW AND LEGEND  
GREEN RETROREFLECTORIZED BACKGROUND

(ALL DIMENSIONS SHOWN IN INCHES EXCEPT WHERE NOTED)

**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 VIII RETROREFLECTIVE ORANGE BACKGROUND, UNLESS OTHERWISE NOTED.

SIGN DETAILS INDICATE THE PROPER COLOR.

**OTHER STDS. E-100, E-151 REQUIRED:**

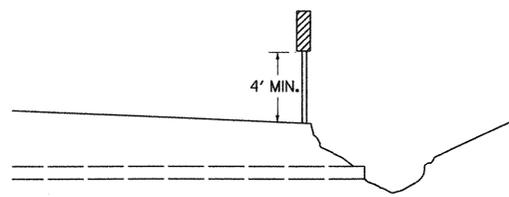
REVISIONS AND CORRECTIONS  
AUG 08, 1995 - DATE OF ORIGINAL ISSUE  
MAY 01, 2004 - CHANGED REFLECTIVE SHEETING TO TYPE III

APPROVED  
DIRECTOR OF PROGRAM DEVELOPMENT  
TRAFFIC OPERATIONS ENGINEER  
FEDERAL HIGHWAY ADMINISTRATION

CONSTRUCTION SIGN  
DETAILS



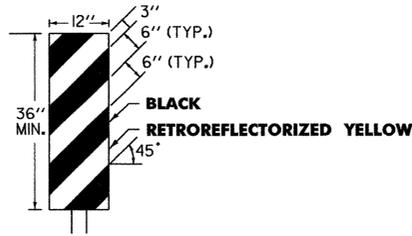
STANDARD  
E-102A



**DELINEATOR TYPICAL**

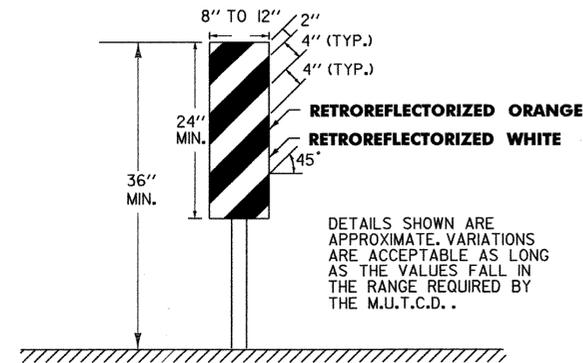
THE STANDARD COLOR FOR DELINEATORS USED ALONG BOTH SIDES OF TWO-WAY STREETS AND HIGHWAYS AND THE RIGHT SIDE OF ONE-WAY STREETS SHALL BE WHITE. DELINEATORS USED ALONG THE LEFT SIDE OF ONE-WAY ROADWAYS SHALL BE YELLOW THEY SHALL HAVE A MINIMUM AREA OF 7 SQUARE INCHES. THEY MAY BE ROUND, SQUARE OR OBLONG, FOR ALTERNATES SEE STD. E-198

SYMBOL



**OBJECT MARKER TYPICAL**

OBJECTS MARKERS ARE USED TO MARK OBSTRUCTIONS WITHIN OR ADJACENT TO THE ROADWAY. IN SOME CASES THERE MAY NOT BE A PHYSICAL OBJECT INVOLVED, BUT OTHER ROADSIDE CONDITIONS SUCH AS NARROW SHOULDER DROP-OFFS, GORES, D.I. EXCAVATIONS, AND ABRUPT CHANGES IN THE ROADWAY ALIGNMENT MAY MAKE IT UNDESIRABLE FOR A DRIVER TO LEAVE THE ROADWAY. THE INSIDE EDGE OF THE OBJECT MARKER SHALL BE IN LINE WITH THE INNER EDGE OF THE OBSTRUCTION, WHENEVER POSSIBLE. OBJECT MARKERS SHALL HAVE ALTERNATING BLACK AND RETROREFLECTORIZED YELLOW STRIPES. (SLOPING DOWNWARD IN THE DIRECTION TRAFFIC IS TO PASS).

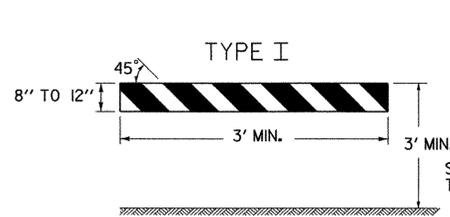


**VERTICAL PANEL**

VERTICAL PANELS SHALL HAVE ALTERNATING ORANGE AND WHITE RETROREFLECTORIZED STRIPES (SLOPING DOWNWARD IN THE DIRECTION TRAFFIC IS TO PASS). THESE DEVICES MAY BE USED FOR TRAFFIC SEPARATION, CHANNELIZING OR BARRICADING WHERE SPACE IS AT A MINIMUM.

DETAILS SHOWN ARE APPROXIMATE. VARIATIONS ARE ACCEPTABLE AS LONG AS THE VALUES FALL IN THE RANGE REQUIRED BY THE M.U.T.C.D..

**DELINEATOR, VERTICAL PANEL AND OBJECT MARKER DETAILS FOR CONSTRUCTION AREAS WHERE TRAFFIC IS MAINTAINED**



STRIPING IS SHOWN WITH TRAFFIC PASSING TO THE RIGHT.



A TYPE III (MODIFIED) BARRICADE SHALL CONSIST OF TYPE II RAILS MOUNTED ON A BREAKAWAY BARRICADE AS SHOWN ON STANDARD SHEET E-107A.

BARRICADE CHARACTERISTICS			
	I	II	III
WIDTH OF RAIL	8" MIN. 12" MAX.	8" MIN. 12" MAX.	8" MIN. 12" MAX.
LENGTH OF RAIL	3' MIN.	3' MIN.	4' MIN.
WIDTH OF STRIPES	6"	6"	6"
HEIGHT	3' MIN.	3' MIN.	5' MIN.
TYPE OF FRAME	SEE E-107A	SEE E-107A	SEE E-107A
FLEXIBILITY	PORTABLE	PORTABLE	PORTABLE
ANGLE OF STRIPE	45°	45°	45°
COLOR OF STRIPES	ORANGE AND WHITE	ORANGE AND WHITE	ORANGE AND WHITE

**BARRICADE CHARACTERISTICS**

DETOUR DESIGN SPEED (M.P.H.)	MINIMUM RADIUS (FT.) <sup>a</sup>				
	SUPERELEVATION (FT./FT.)				
	0.00 <sup>b</sup>	0.02	0.04	0.06	0.08
20	160	140	130	120	110
25	245	220	200	185	170
30	375	335	305	275	255
35	510	455	410	375	340
40	715	630	575	510	470
50	1190	1045	955	850	765

a. PER AASHTO REQUIREMENTS  
b. 0.00 SUPERELEVATION SHOULD BE AVOIDED IF POSSIBLE

**BARRICADES**

**APPLICATION NOTES**

TYPE I BARRICADES SHALL BE USED ON CONVENTIONAL ROADS OR URBAN STREETS AND ARTERIALS TO MARK A SPECIFIC HAZARD.

TYPE II BARRICADES SHALL BE USED ON EXPRESSWAYS AND FREEWAYS, SERVING THE SAME FUNCTIONS AS TYPE I BARRICADES.

TYPE III BARRICADES (SEE STD. E-107A) SHALL ONLY BE USED WHEN A ROAD SECTION OR LANE IS CLOSED TO TRAFFIC AND ARE TO BE ERRECTED AT THE POINT OF CLOSURE.

**MATERIALS**

THE BARRICADES SHOWN ON THIS SHEET SHOULD BE OF LIGHTWEIGHT MATERIAL. IF WOOD IS USED THE FOLLOWING CONDITIONS SHALL APPLY:

- WOODEN BARRICADES (TYPE I AND II)
  - SHALL NOT BE USED TO CHANNELIZE OR DELINEATE WORK AREAS WITHIN THE CLEAR ZONE OF ANY HIGHWAY WHERE OPERATING SPEEDS IN EXCESS OF 20 M.P.H. ARE EXPECTED UNLESS INSTALLED FOR PEDESTRIAN CONTROL BEHIND APPROVED POSITIVE BARRIERS.
  - MAY BE USED WHERE OPERATING SPEEDS OF 20 M.P.H. OR LESS ARE EXPECTED.
- TYPE III WOODEN BARRICADES SHALL NOT BE USED.

**COLORS**

THE BARRICADE PANELS SHOWN ON THIS SHEET SHALL HAVE ALTERNATING RETROREFLECTORIZED WHITE AND ORANGE STRIPES. THE ORANGE SHALL CONFORM WITH THE STANDARD COLORS ADOPTED BY AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS AND APPROVED BY THE US DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION. THE BARRICADE COMPONENTS SHALL BE WHITE UNLESS UNPAINTED METAL OR ALUMINUM IS USED.

**REFLECTORIZATION**

THE RETROREFLECTIVE SHEETING ON BARRICADE PANELS SHALL BE ASTM TYPE III.

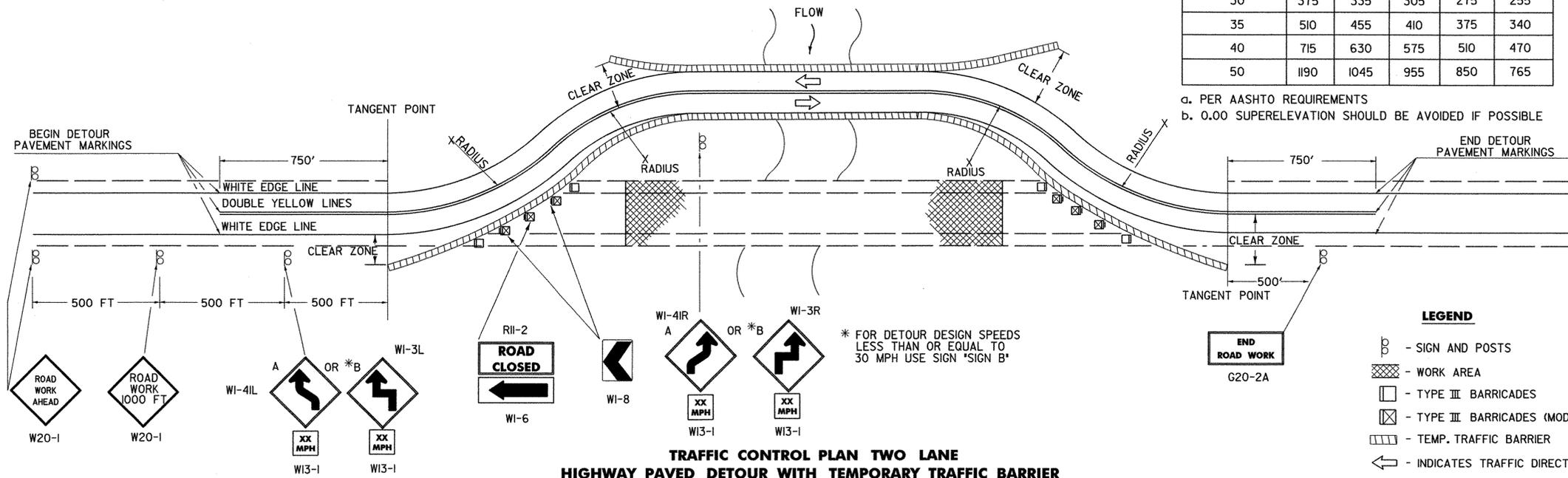
**LOCATION**

THE BARRICADES SHOWN ON THIS SHEET WILL BE LOCATED BY THE RESIDENT ENGINEER IN THE FIELD OR AS SHOWN ON THE PLANS. THE LOCATION OF THE BARRICADES SHALL FOLLOW THE PROCEDURES SET FORTH IN THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", OR AS OTHERWISE NOTED.

**MAINTENANCE**

BARRICADES SHALL BE MAINTAINED IN CLEAN CONDITION, SATISFACTORY TO THE RESIDENT ENGINEER. THEY SHALL BE COMPLETELY VISIBLE TO THE APPROACHING TRAFFIC AT ALL TIMES. DAMAGED, DAFACED, OR DIRTY BARRICADES SHALL BE REPAIRED, CLEANED, OR REPLACED AS ORDERED BY THE RESIDENT ENGINEER.

ALL SIGN PLACEMENT DISTANCES ARE DESIRABLE SPECIFICATIONS. FIELD CONDITIONS SHALL CONTROL THE ACTUAL PLACEMENT. PROJECT CONSTRUCTION APPROACH SIGNING PLACEMENT SHALL TAKE INTO CONSIDERATION SPACING REQUIREMENTS FOR THE DETOUR SIGN LAYOUT REQUIREMENTS.



**TRAFFIC CONTROL PLAN TWO LANE HIGHWAY PAVED DETOUR WITH TEMPORARY TRAFFIC BARRIER**

**DETOUR NOTES**

- SIGNS AND DELINEATION SHOWN FOR ONE DIRECTION OF TRAFFIC ONLY.
- THE CONTRACTOR IS RESPONSIBLE FOR PAVEMENT MARKING AND SHALL REMOVE ANY CONFLICTING OR CONFUSING EXISTING MARKINGS.
- ADDITIONAL SIGNING MAY BE REQUIRED AT THE DISCRETION OF THE RESIDENT ENGINEER.
- UNPAVED DETOURS REQUIRE PAVEMENT MARKINGS FOR TRANSITIONS FROM EXISTING PAVEMENT.
- THE NUMBER OF CHANNELIZING DEVICES, BARRICADES 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.).
- AASHTO CLEAR ZONE REQUIREMENTS SHOULD BE MET. IF NOT THEN AN APPROVED ENERGY ABSORPTION ATTENUATOR (SUITABLE FOR THE TEMPORARY TRAFFIC BARRIER USED AND FOR THE DESIGN SPEED) SHALL BE INSTALLED PER THE CURRENT AASHTO ROADSIDE DESIGN GUIDE.
- THE DETOUR DESIGN SPEED SHOULD BE NO LESS THAN 10 M.P.H. BELOW THE POSTED SPEED LIMIT, UNLESS PHYSICAL RESTRICTIONS PREVENT THIS.
- SEE STANDARD SHEETS E-100, E-101 AND E-102 FOR SIGN DETAIL AND MATERIAL REQUIREMENTS.
- IF THE USE OF TEMPORARY TRAFFIC BARRIER IS NOT REQUIRED, THEN REFLECTORIZED PLASTIC DRUMS SHALL BE USED.

**OTHER STDS. REQUIRED:** E-100 E-101 E-102 E-102a E-107a E-198

**REVISIONS AND CORRECTIONS**  
 SEPT. 10, 1987 - DATE OF ORIGINAL ISSUE  
 APRIL 29, 1988 - FHWA REVIEW COMMENTS  
 SEPT. 20, 1993 - NEW RADIUS CHART, BARRICADE ALIGNMENT AND USE OF TEMPORARY TRAFFIC BARRIER  
 AUG. 08, 1995 - REVISED SIGNING PER MUTCD  
 JUNE 30, 2003 - CHANGED REFLECTIVE SHEETING TO TYPE III

APPROVED  
 DIRECTOR OF PROGRAM DEVELOPMENT  
 TRAFFIC OPERATIONS ENGINEER  
 FEDERAL HIGHWAY ADMINISTRATION

**DELINEATION, BARRICADES AND DETOURS FOR CONSTRUCTION AREAS**

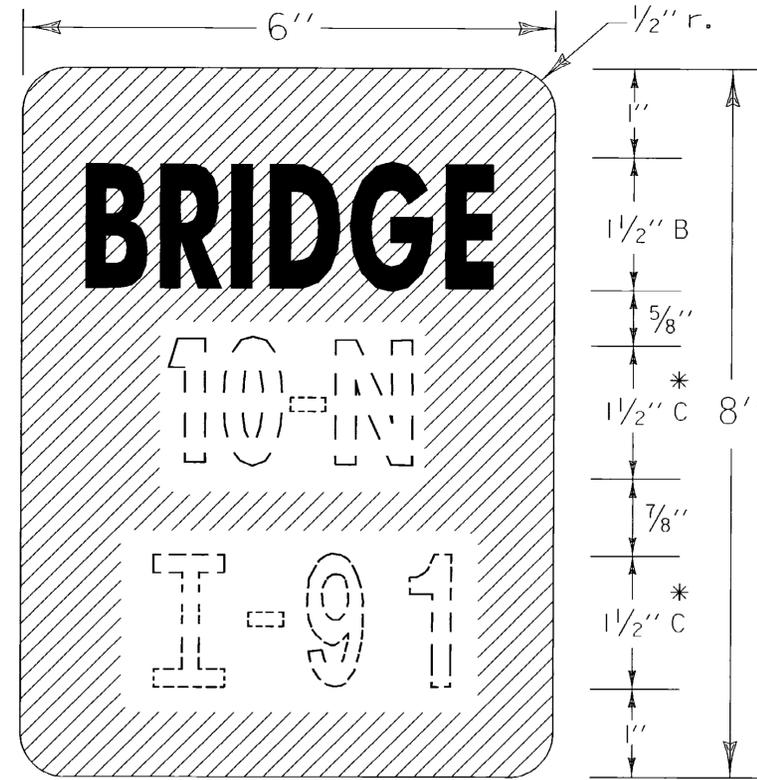
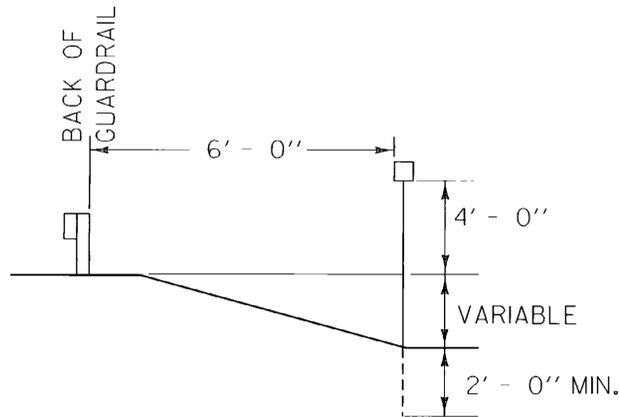
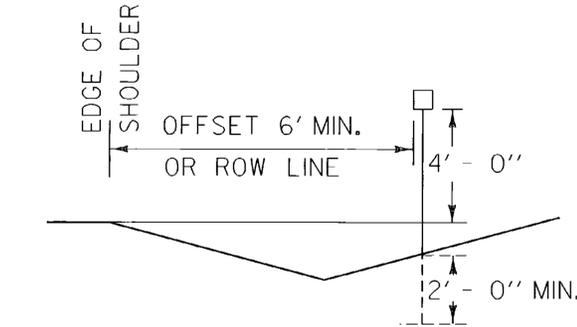


**STANDARD E-107**

I-91  
 ← 2" →

**HYPHENATED WORD DETAIL**

FOR EXAMPLE, ROUTE NUMBERS  
 SHALL APPEAR AS: I-91, US5, VT22



**VD-701**

\* OPTICALLY SPACE BRIDGE  
 AND ROUTE NUMBERS.  
 SERIES B LETTERS MAY  
 BE USED TO MAINTAIN  
 VISUAL INTEGRITY.

**NOTES:**

- GENERAL:  
 DOTTED LINES AND NUMERALS INDICATE TEXT THAT VARIES.
- PAYMENT:  
 BRIDGE PLAQUES SHALL BE PAID AS TRAFFIC SIGNS, TYPE "A",  
 AND POSTS PAID AS FLANGED CHANNEL STEEL SIGN POSTS.
- MATERIAL:  
 THE SIGN BASE MATERIAL SHALL BE 0.04" FLAT SHEET ALUMINUM.
- COLORS:  
 THE SIGN SHALL HAVE A REFLECTORIZED WHITE TEXT ON REFLECTORIZED  
 GREEN BACKGROUND. THE COLORS SHALL CONFORM WITH THOSE FOUND  
 IN STANDARD COLOR TOLERANCE CHARTS AS APPROVED BY THE U.S.  
 DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION.
- LETTERING:  
 LETTERS AND DIGITS SHALL CONFORM WITH THE STANDARD ALPHABETS  
 FOR HIGHWAY SIGNS AS PRINTED BY THE FEDERAL HIGHWAY ADMINISTRATION.
- POSTS:  
 FLANGED CHANNEL STEEL 2"/FT POSTS SHALL BE USED WHEN THE POST LENGTH  
 EXCEEDS 7 FEET. FOR LENGTH OF 7 FEET OR LESS, A 1.12"/FT STEEL SIGN POST  
 SHALL BE USED.

**OTHER STDS.  
 REQUIRED:**

**REVISIONS AND CORRECTIONS**

DEC. 17, 1989 - DATE OF ORIGINAL ISSUE  
 AUG. 08, 1995 - MISC. NOTE REVISIONS

**APPROVED**

*Gordon J. MacArthur*   
 DIRECTOR OF ENGINEERING

*David A. Ross*   
 TRAFFIC AND SAFETY ENGINEER

**BRIDGE NUMBER PLAQUE**

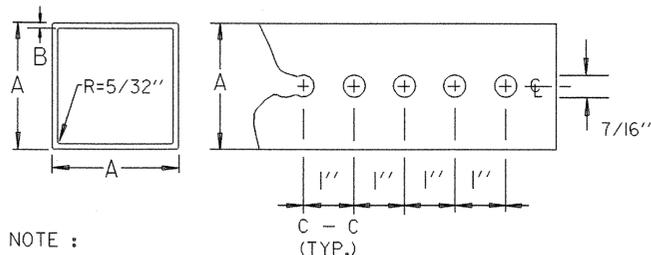


**STANDARD  
 E-134**

APPROVED FOR THIS PROJECT  
 AND/OR DESIGN IMPLEMENTATION.  
 FHWA FINAL APPROVAL PENDING.

GUARDRAIL DEFLECTION CHART (PER AASHTO - ROADSIDE DESIGN GUIDE - LATEST EDITION)		
TYPE	GR POST SPACING	DEFLECTION
THREE CABLE W/STEEL POSTS	16' - 0"	11" - 6"
W/WOODEN POSTS	12' - 6"	11" - 6"
W-BEAM W/STRONG POST	6' - 3"	3'
BOX BEAM	6' - 0"	5'
THRIE BEAM W/STRONG POST	6' - 3"	2'

THIS CHART LISTS THE THEORETICAL MAXIMUM DEFLECTION DISTANCE, UPON IMPACT, OF DIFFERENT TYPES OF GUARDRAIL AND VARIOUS POST SPACINGS.



NOTE :

THE POSTS SHALL BE CAREFULLY FORMED OF STEEL WITH A MINIMUM YIELD OF 55,000 PSI, INTO A SIZE AND SHAPE WITH CORNERS INDUCTION WELDED IN SUCH A MANNER THAT NEITHER FLASH NOR WELD SHALL INTERFERE WITH THE TELESCOPING PROPERTIES, NOR DAMAGE THE GALVANIZING.

\* THE WALL THICKNESS TOLERANCES SHALL BE +.005" AND -.010" FOR THE 12 GAUGE.

\* THE WALL THICKNESS TOLERANCES SHALL BE +.002" AND -.008" FOR THE 14 GAUGE.

### DIMENSION DETAILS AND POST SELECTION CHART

POST SELECTION CHART								
SIGN AREA ( FT <sup>2</sup> ) X H ( FT ) ≤ SV ( SELECTION VALUE )								
POST SIZE LBS./FT.	DIMENSIONS			SECTION MODULUS IN <sup>3</sup>	ONE POST S <sub>v</sub>	TWO POST S <sub>v</sub>	THREE POST S <sub>v</sub>	NUMBER PERMITTED IN 8' PATH
	A	*B	GAUGE					
1.88	1-3/4"	.083	14	0.230	46	92	138	TWO
2.42	2"	.083	12	0.380	77	154	231	TWO
3.35	2-1/2"	.105	12	0.642	130	260	390	ONE

DESIGN CRITERIA:

WIND SPEED = 70 MPH (10 -YEAR MEAN RECURRENCE INTERVAL)  
WIND PRESSURE = 19 PSF  
STEEL MINIMUM YIELD = 55,000 PSI  
ALLOWABLE STRESS = (1.4) 0.60 FY

REVISIONS AND CORRECTIONS  
APR. 27, 1994 - ORIGINAL APPROVAL DATE  
JUL. 21, 1994 - REVISED POST GAUGES  
AUG. 18, 1995 - ADDED TWO PIECE ANCHOR DETAIL  
MAR. 26, 1996 - REVISED POST SELECTION CHART  
MAY 20, 1999 - REPLACE LOST ORIGINAL  
JUN. 08, 2009 - POST SELECTION REVISIONS

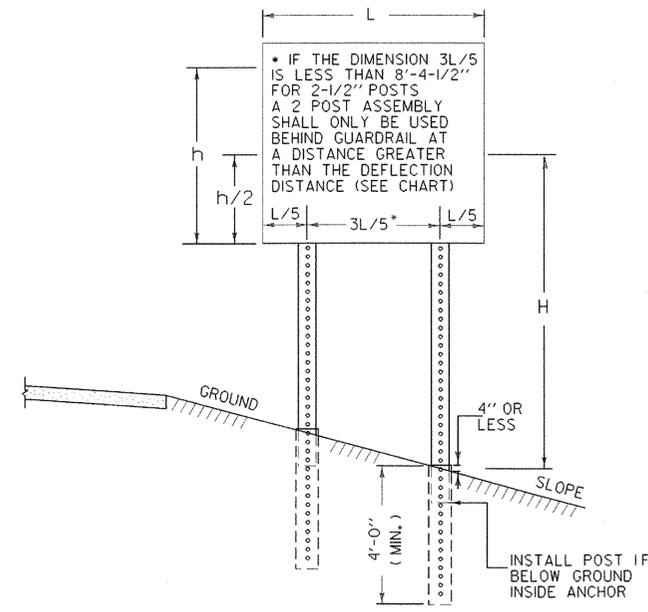
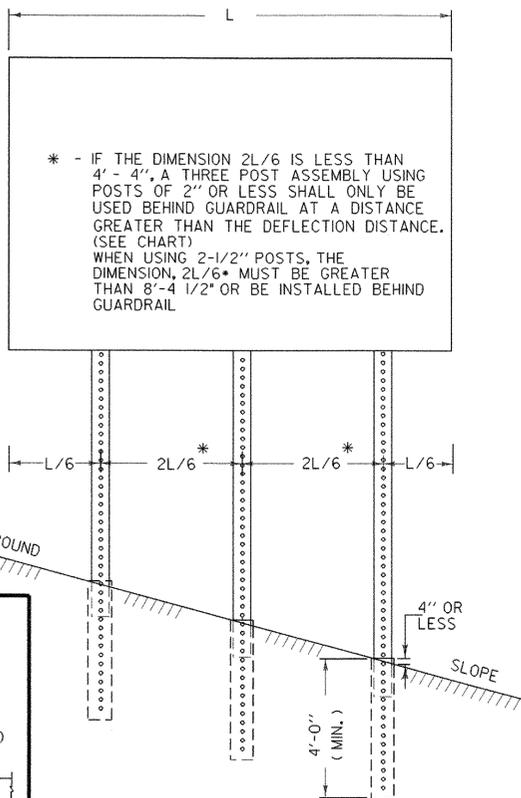
APPROVED

*Kevin S. Masbie*  
HIGHWAY, SAFETY & DESIGN ENGINEER  
*Richard J. Peterson*  
DIRECTOR OF PROGRAM DEVELOPMENT  
*Mark B. Riedler*  
FEDERAL HIGHWAY ADMINISTRATION

# SQUARE STEEL SIGN POST

/traf/english/std/e164.dgn

### MULTI-POST INSTALLATIONS



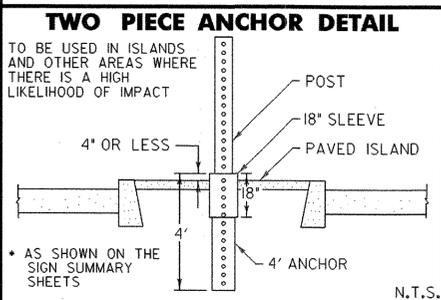
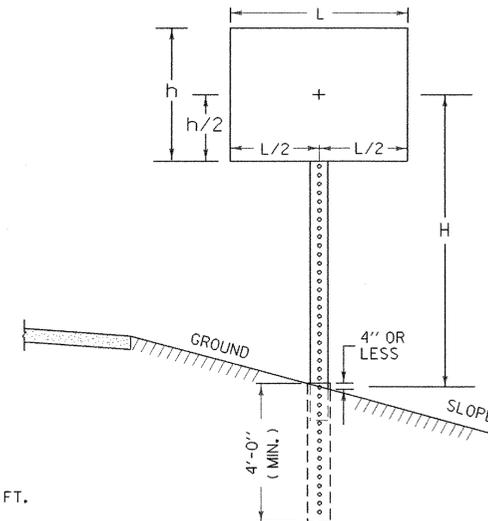
### POST SPACING DETAILS

### GENERAL NOTES

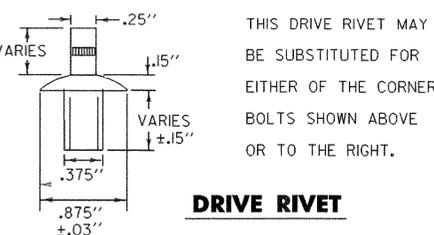
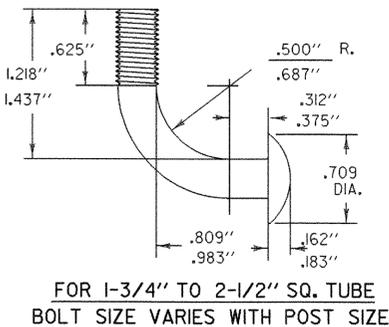
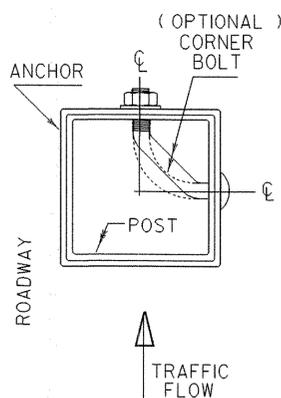
CONSTRUCTION METHODS - POSTS MAY BE DRIVEN OR SET IN A DUG HOLE AND BACKFILLED. IF DRIVEN, A DRIVING CAP SHALL BE USED. THE DUG HOLE INSTALLATION SHALL BE USED IN AREAS OF POOR SOIL CONDITIONS OR AS DIRECTED BY THE RESIDENT ENGINEER. BACKFILL SHALL BE COMPACTED AS DIRECTED BY THE RESIDENT ENGINEER.

SIGN CLEARANCES - HORIZONTAL AND VERTICAL SIGN CLEARANCES SHALL BE SHOWN ON THE PLANS OR THE APPROPRIATE STD. SHEETS.

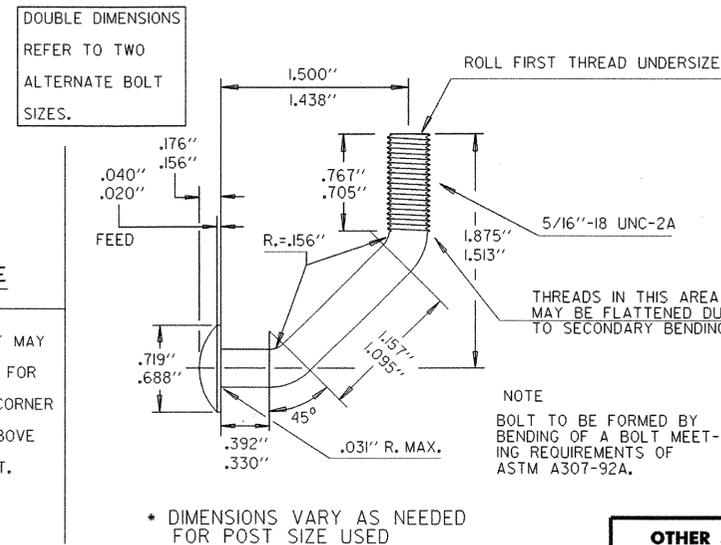
SINGLE POST INSTALLATIONS SHALL BE LIMITED TO A SIGN AREA OF 20 SQ. FT. OR LESS



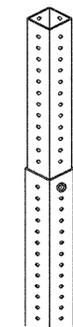
### TOP VIEW OF ANCHOR, POST AND BOLT



### OPTIONAL CORNER BOLT DETAILS



### CONNECTION DETAIL



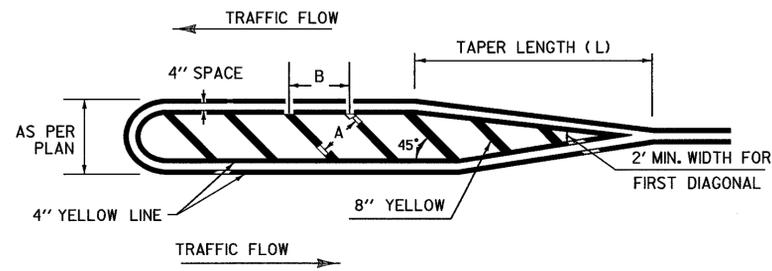
POST IS TO BE INSERTED INTO ANCHOR ONE FOOT BELOW GROUND LEVEL. ANCHOR IS TO BE 4'-0" MINIMUM LENGTH WITH NO MORE THAN 4" ABOVE GROUND. ANCHOR IS ONE SIZE (1/4") GREATER THAN THE POST AND ALL ANCHORS ARE TO BE 12 GAGE, EXCEPT ANCHORS FOR 2-1/2" POSTS ARE TO BE 3" AND 7 GAGE. CONNECTION IS TO BE MADE USING THE BOLT PROVIDED WITH THE SIGN SYSTEM (SEE DETAILS LEFT). AT THE TOP HOLE IN THE ANCHOR (APPROXIMATELY 3-1/2" ABOVE GROUND), THREE INCH ANCHORS WHICH DO NOT HAVE HOLES ON 1" CENTERS WILL REQUIRE DRILLING OF 7/16" HOLES FOR CONNECTIONS.

(SEE DETAIL LEFT FOR BOLT PLACEMENT)

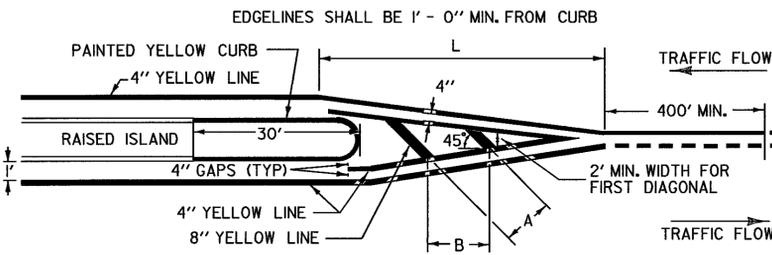
OTHER STDS. E-120, E-160 REQUIRED



# STANDARD E-164



**PAINTED ISLAND DETAIL**



**ISLAND APPROACH MARKINGS**

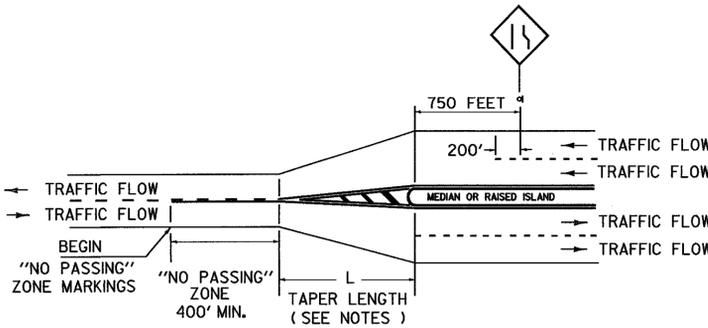
DIMENSIONS		CONDITIONS FOR USE	
A	B		
5'	7'	LOW SPEED OR HIGH SPEED/W POOR SIGHT DISTANCE, <200'	WHERE LENGTH OF DIAGONAL AREA IS 75' MAX.
10'	14'	HIGH SPEED AND GOOD SIGHT DISTANCE, ≥200'	WHERE LENGTH OF DIAGONAL AREA EXCEEDS 75'

**TAPER LENGTH NOTES**

- FOR DESIGN OF LEFT OR RIGHT TURN LANES REFER TO VTRANS \*GUIDELINE FOR DETERMINING STORAGE, TAPER AND DECELERATION LENGTHS FOR LEFT AND RIGHT-TURN LANES AT INTERSECTIONS\*
- MINIMUM LENGTH OF TAPER = ( L )  
 L = 100 FEET < 30 mph  
 L = 180 FEET > 30 mph
- THE ENTIRE TAPER LENGTH MAY BE USED FOR DECELERATION.

**NOTE:**  
 A SOLID LINE IN THE DIRECTION OF TRAVEL IS BEGUN AT A LOCATION 400 FEET MIN. IN ADVANCE OF THE BEGIN TAPER FOR THE PAVEMENT WIDTH TRANSITION.

PASSING ZONE SHOWN FOR REFERENCE ONLY, ACTUAL MARKINGS BASED ON FIELD CONDITIONS.



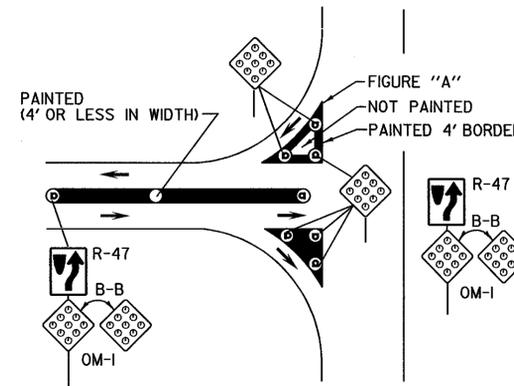
**"NO PASSING" ZONE LAYOUT IN PAVEMENT WIDTH TRANSITIONS, TWO LANE HIGHWAY TO DIVIDED HIGHWAY**

THE FOLLOWING GUIDELINES WILL BE USED WHEN PAINTING ISLAND ON STATE HIGHWAYS AND RECOMMENDED FOR ISLANDS ON OTHER SYSTEMS WITHIN THE STATE.

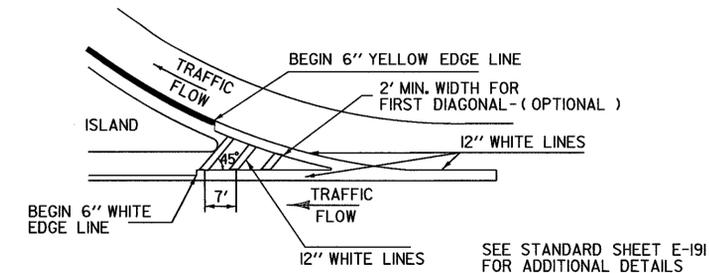
I. PAINTING: ISLANDS WHICH ARE FOUR FEET IN WIDTH AND TRIANGLE ISLANDS WHICH ARE LESS THAN FOUR HUNDRED AND FIFTY SQUARE FEET SHALL BE PAINTED ENTIRELY. TRIANGLES WHICH ARE FOUR HUNDRED AND FIFTY SQUARE FEET AND LARGER SHALL BE PAINTED WITH A FOUR FOOT BORDER AS SHOWN ON FIGURE "A" OF THE PAINTED ISLAND DETAIL.

II. SIGNS: ALL APPROACH NOSES TO THE ISLANDS IN THE LINE OF TRAFFIC WILL BE SIGNED WITH A KEEP RIGHT (R-47) SIGN AS WELL AS OBJECT MARKERS PLACED BACK TO BACK TO INDICATE THE BEGINNING (END) OF THE ISLAND.

III. EXCEPTIONS: THERE WILL BE SPECIAL CASES WHICH REQUIRE AN EXCEPTION TO, OR MODIFICATION OF THIS GUIDELINE. THESE QUESTIONS SHOULD BE REFERRED TO THE TRAFFIC DESIGN ENGINEER OR DELEGATED REPRESENTATIVE.

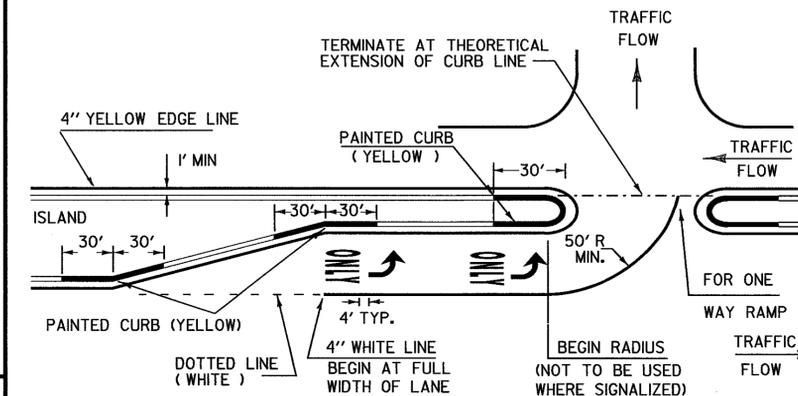


**PAINTED ISLANDS**

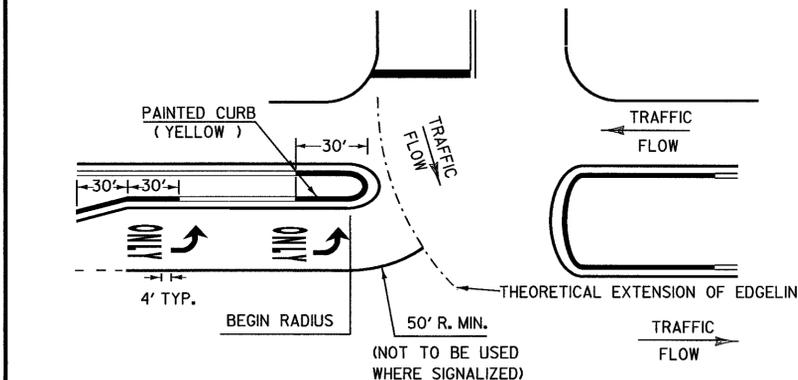


**GORE MARKING DETAIL - EXIT**

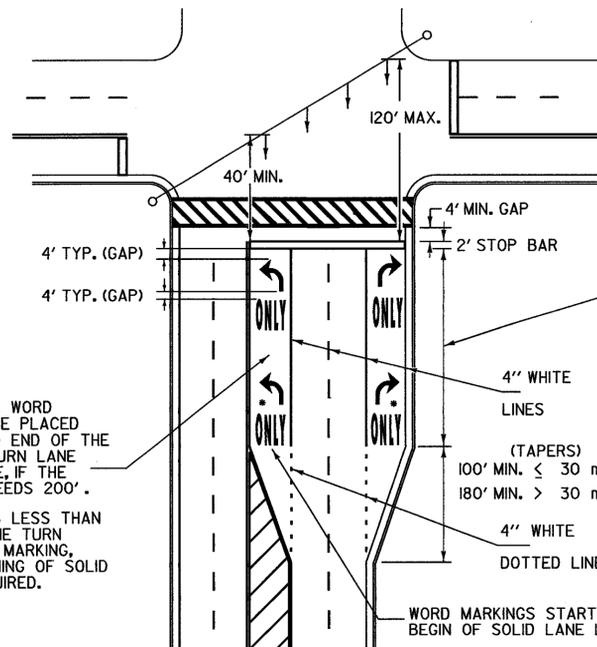
**TRANSVERSE LINES**



**TURN LANE AND PAINTED CURB DETAIL**



**CURB PAINTING:** CURB SHALL BE PAINTED ON THE ISLAND NOSE AND TO A POINT 30 FEET FROM THE END OF THE ISLAND. IN ADDITION, CURB SHALL BE PAINTED 30 FEET FROM ANY CHANGE IN CURB DIRECTION.



**TYPICAL MARKINGS FOR SIGNALIZED INTERSECTION**

EXCLUSIVE TURN LANES (LEFT OR RIGHT) LANE LINES SHALL BE SOLID AND EXTEND BACK FROM THE STOP LINE TO THE POINT OF FULL LANE WIDTH OF THE TURN LANE.

FOR DESIGN OF LEFT OR RIGHT TURN LANES REFER TO VTRANS \*GUIDELINE FOR DETERMINING STORAGE, TAPER AND DECELERATION LENGTHS FOR LEFT AND RIGHT-TURN LANES AT INTERSECTIONS\*

TURN ARROWS AND WORD MARKINGS SHALL BE PLACED AT THE BEGIN AND END OF THE LEFT (OR RIGHT) TURN LANE AND IN THE MIDDLE, IF THE LANE LENGTH EXCEEDS 200'.

\* IF LANE LENGTH IS LESS THAN 100 FEET, ONLY ONE TURN ARROW AND WORD MARKING, PLACED AT BEGINNING OF SOLID LANE LINE, IS REQUIRED.

**THIS SHEET NOT TO SCALE**

**OTHER STDS. E-191 E-193 REQUIRED**

**REVISIONS AND CORRECTIONS**

- AUG. 18, 1995 - DATE OF ORIGINAL ISSUE
- OCT. 14, 1998 - CHANGED GORE MARKING DETAIL
- DEC. 28, 1998 - CHANGED GORE MARKING HATCHING TO 12" PER FHWA
- OCT. 12, 2000 - CHANGED TURN LANE CRITERIA

**APPROVED**

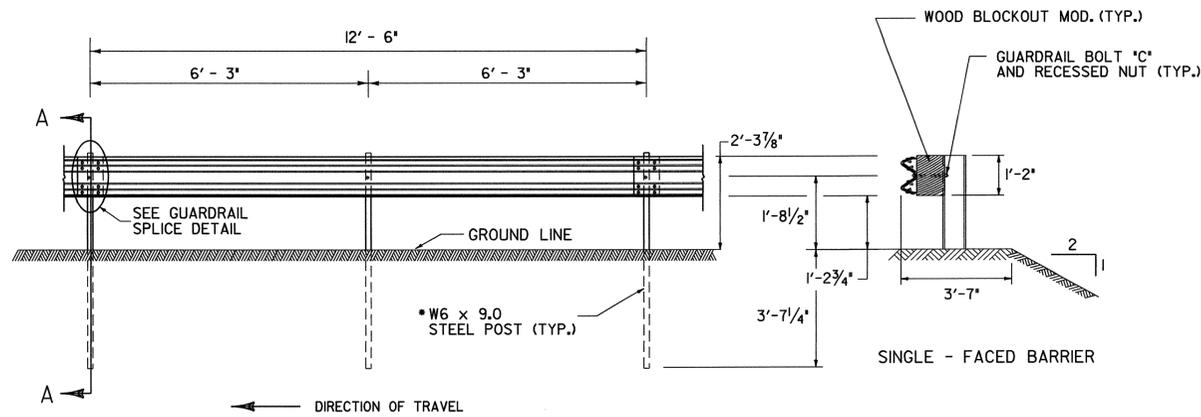
*[Signature]*  
 DIRECTOR OF PROJECT DEVELOPMENT  
*[Signature]*  
 ROADWAY & TRAFFIC DESIGN ENGINEER

**PAVEMENT MARKING DETAILS**



**STANDARD E-192**

"W" BEAM GUARDRAIL WITH STEEL POSTS

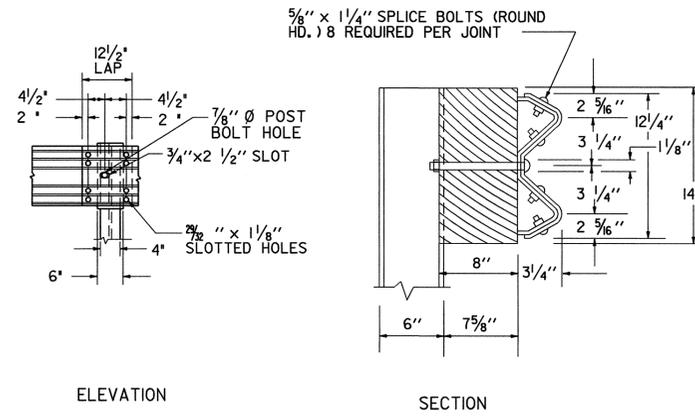


ELEVATION FROM Q OF ROAD

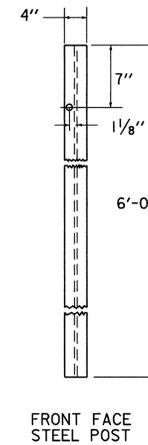
SECTION A - A



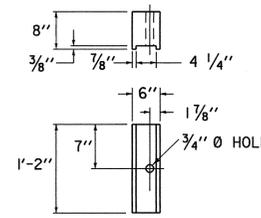
DOUBLE - FACED BARRIER



GUARDRAIL SPLICE DETAIL



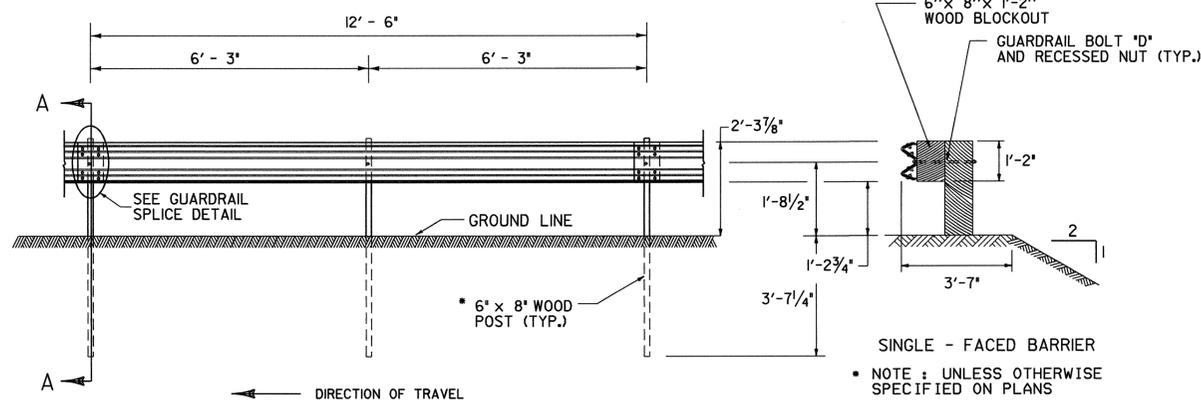
FRONT FACE STEEL POST



POST FACE  
MODIFIED WOOD BLOCKOUT - ROUTED  
6" X 8" X 1'-2"  
FOR USE W/ STEEL POSTS ONLY

- NOTES:
- 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".
  - SUPPLY WOOD BLOCKS PER AASHTO M 168.
  - TREAT WITH PRESERVATIVE PER AASHTO M 133.
  - BLOCKOUTS MAY ALSO BE MADE OF APPROVED ALTERNATIVE MATERIAL.

"W" BEAM GUARDRAIL WITH WOOD POSTS

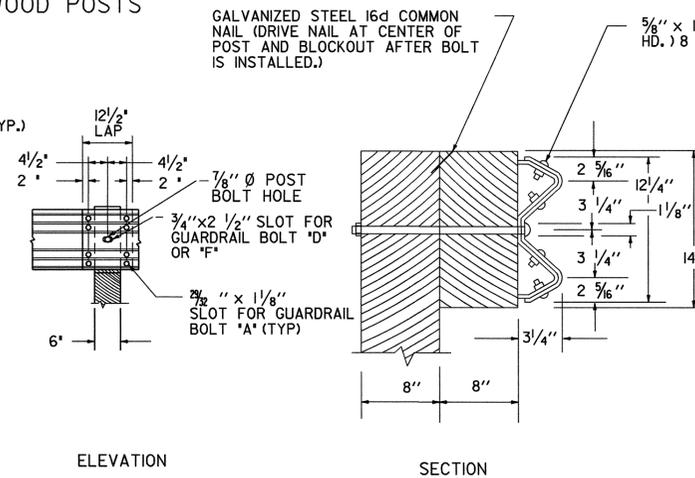


ELEVATION FROM Q OF ROAD

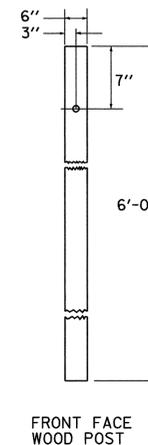
SECTION A - A



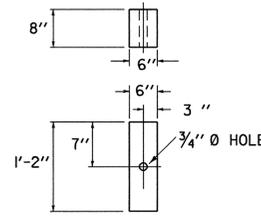
DOUBLE - FACED BARRIER



GUARDRAIL SPLICE DETAIL



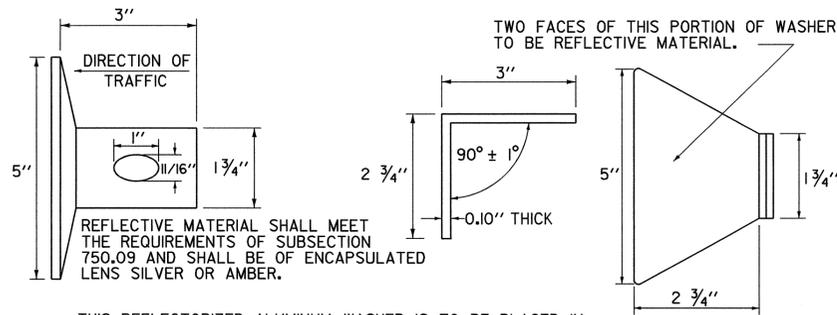
FRONT FACE WOOD POST



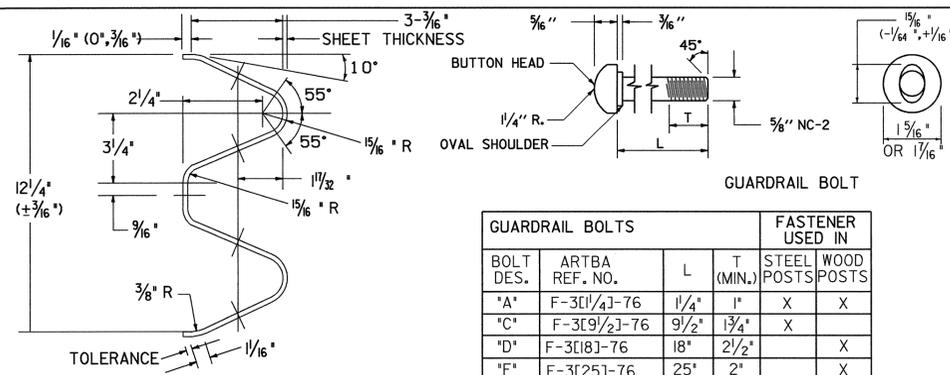
POST FACE  
WOOD BLOCKOUT  
6" X 8" X 1'-2"

- NOTES:
- 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".
  - SUPPLY WOOD BLOCKS PER AASHTO M 168.
  - TREAT WITH PRESERVATIVE PER AASHTO M 133.
  - BLOCKOUTS MAY ALSO BE MADE OF APPROVED ALTERNATIVE MATERIAL.

GUARDRAIL DELINEATOR

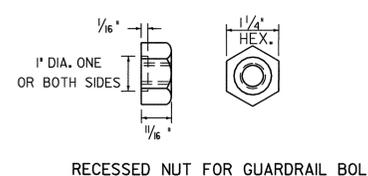


THIS REFLECTORIZED ALUMINUM WASHER IS TO BE PLACED IN VALLEY OF BEAM WHEN MOUNTING BEAM ONTO EACH FIFTH POST. WASHER SHALL MEET SPECIFICATION REQUIREMENTS FOR A.S.T.M. B-209 ALLOY 5052-H32

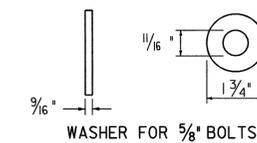


ARTBA RE-3[206]-3[12]-6" CLASS A, TYPE IJ-73  
TYPICAL GUARDRAIL SECTION

GUARDRAIL BOLTS		FASTENER USED IN			
BOLT DES.	ARTBA REF. NO.	L	T (MIN.)	STEEL POSTS	WOOD POSTS
*A*	F-3[1/4]-76	1 1/4"	1"	X	X
*C*	F-3[9/2]-76	9/2"	1 3/4"	X	
*D*	F-3[18]-76	18"	2 1/2"		X
*F*	F-3[25]-76	25"	2"		X



RECESSED NUT FOR GUARDRAIL BOLT



WASHER FOR 5/8" BOLTS  
ARTBA F-13-73

NOTE: WASHER IS USED UNDER RECESSED NUT WHERE GUARDRAIL BOLT IS USED WITH WOOD POSTS.

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 BOLTS, 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 3/4" 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

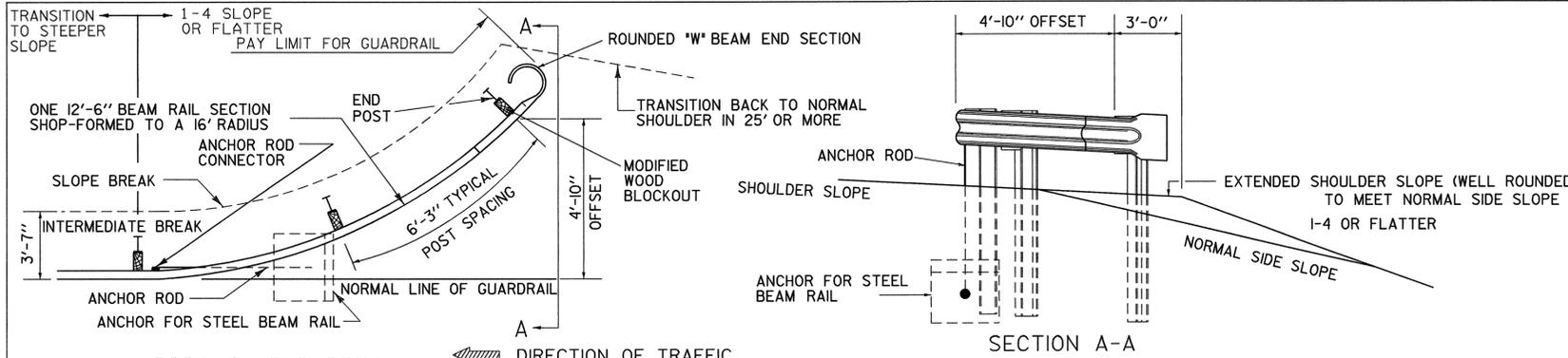
APPROVED

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

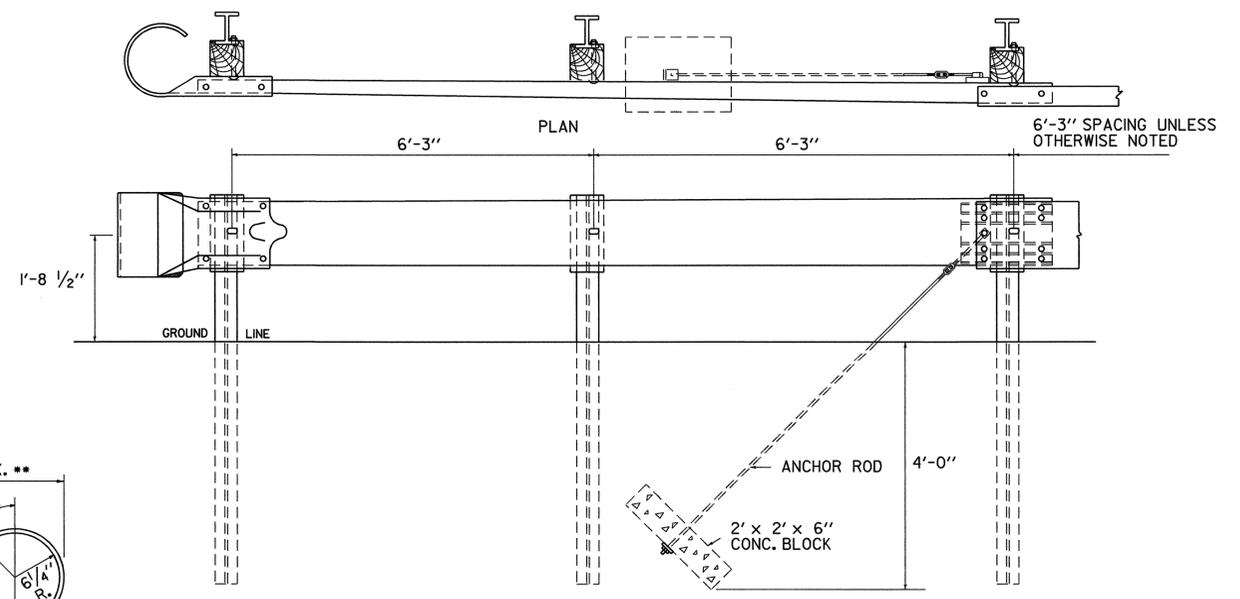
STEEL BEAM GUARDRAIL WITH STEEL POSTS  
STEEL BEAM GUARDRAIL WITH WOOD POSTS



STANDARD  
G-1



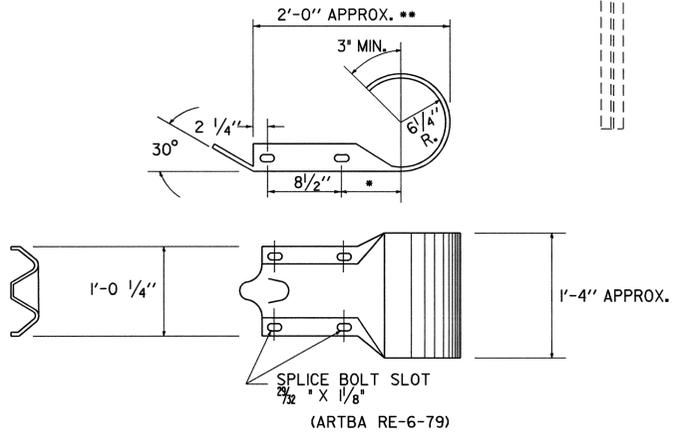
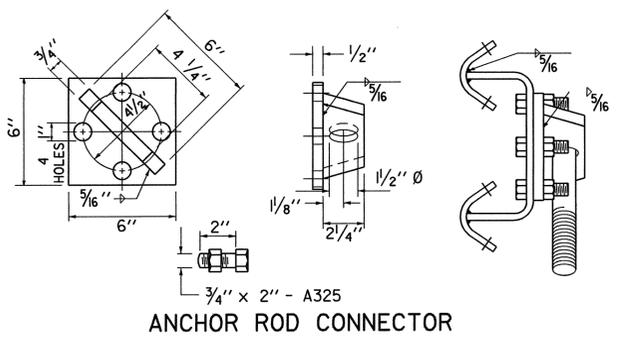
APPROACH END DETAIL  
NHS APPROVED FOR USE WHERE DESIGN SPEED IS 40 OR LESS MPH  
NON-NHS APPROVED FOR USE WHERE DESIGN SPEED IS 50 OR LESS MPH



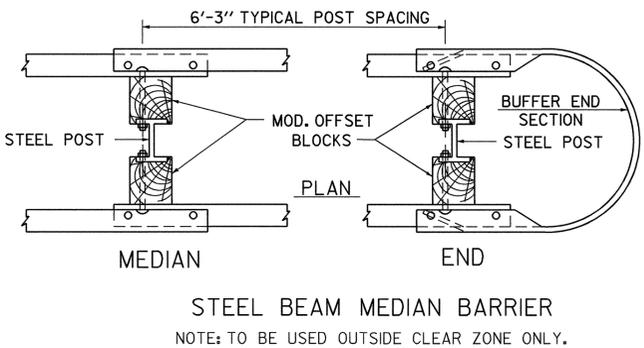
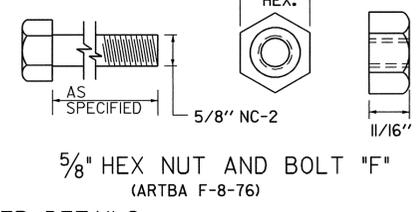
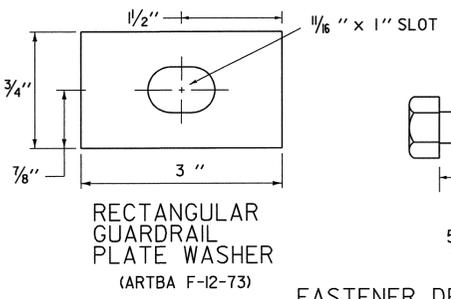
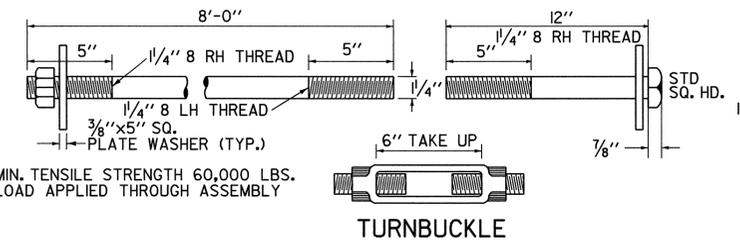
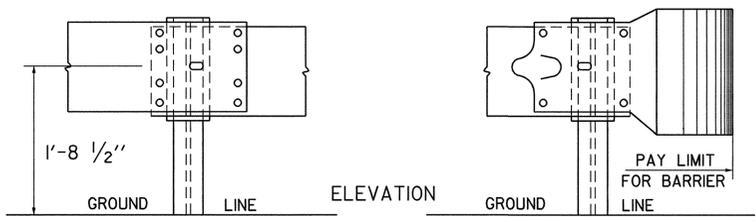
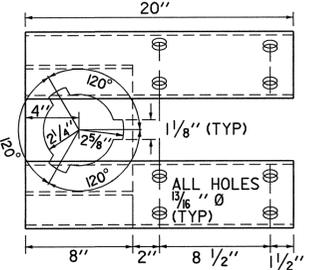
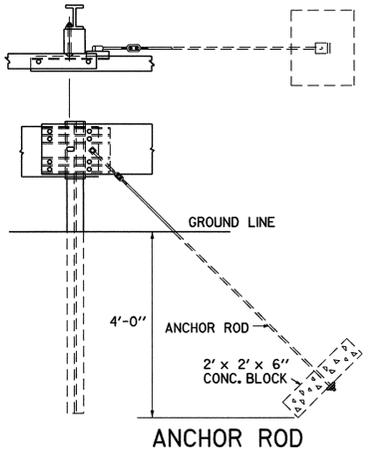
TRAILING END TERMINAL FOR USE ON ONE-WAY HIGHWAYS

GENERAL NOTES:

1. ALL METAL PARTS SHALL BE GALVANIZED.
2. ALL WOOD POSTS SHALL BE GIVEN A PRESERVATIVE TREATMENT.
3. DETAILS PERTINENT TO THE STANDARD INSTALLATION OF "W" BEAM SECTIONS WILL BE FOUND ON STANDARD DRAWING G-1.
4. FOR DESCRIPTION AND SPECIFICATIONS OF PARTS IDENTIFIED BY "ARTBA..." AND OTHER DETAILS OF POSTS, POST ACCESSORIES, FASTENERS AND RAIL ELEMENTS, SEE AASHTO-AGC-ARTBA JOINT TASK FORCE NO. 13, TITLED "A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE", LATEST EDITION.



\* THIS DIMENSION IS 7 1/2" INRE-7-79. IF THE DIMENSION IS USED IN THIS PART, IT WILL GIVE AN ACCEPTABLE OVERALL LENGTH (\*\*) OF APPROXIMATELY 2'- 11/2."



OTHER STANDARD REQUIRED G-1

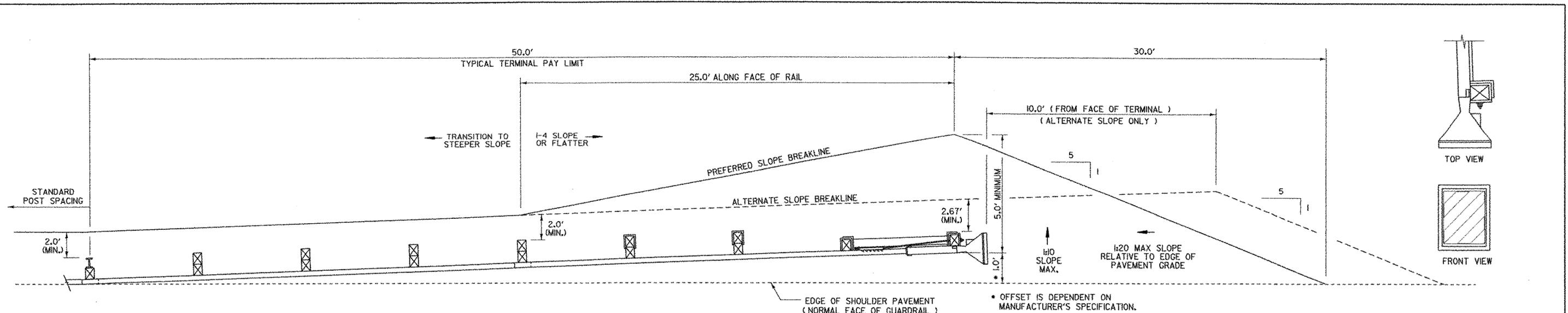
REVISIONS AND CORRECTIONS  
JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.  
JAN.3,2000 - UPDATED TO REFLECT METRIC STD. CHANGES

APPROVED  
DIRECTOR OF PROJECT DEVELOPMENT  
ROADWAY AND TRAFFIC DESIGN ENGINEER

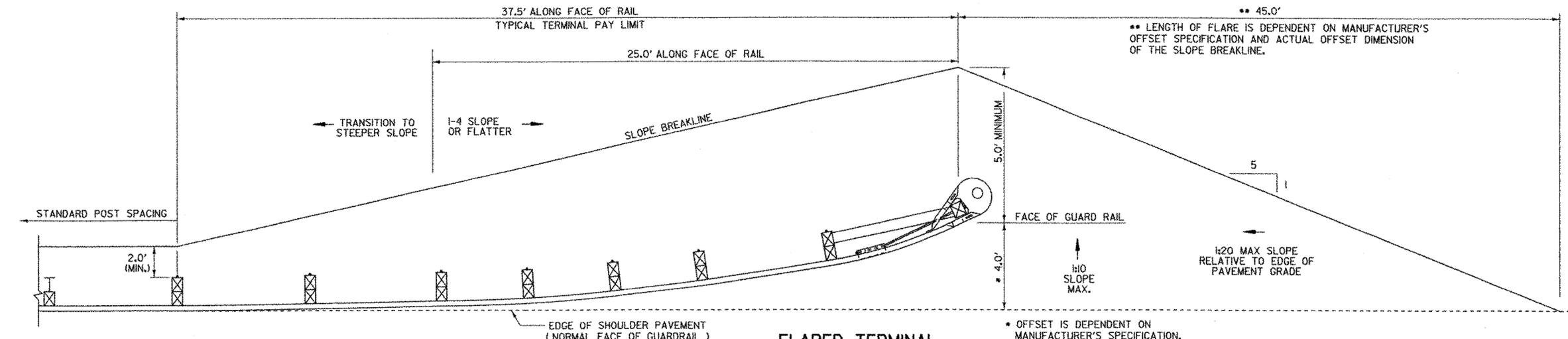
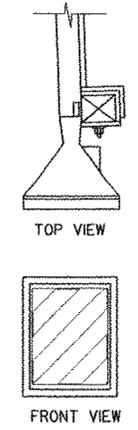
STEEL BEAM GUARDRAIL APPROACH END TERMINAL  
STEEL BEAM GUARDRAIL TRAILING END TERMINAL  
ANCHOR FOR STEEL BEAM GUARDRAIL  
STEEL BEAM MEDIAN BARRIER



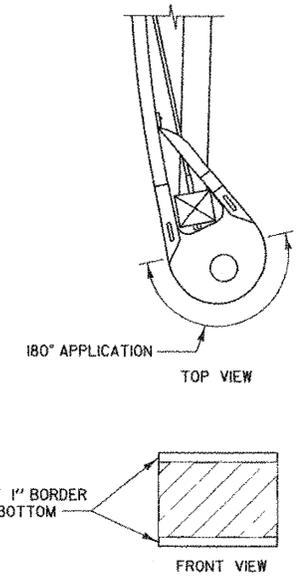
STANDARD  
G-1d



**TANGENTIAL TERMINAL**

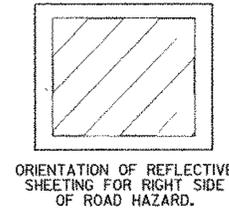
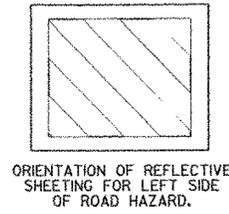


**FLARED TERMINAL**



**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.

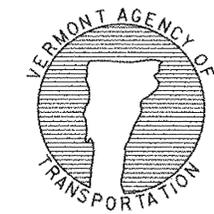


NOT TO SCALE

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

APPROVED  
  
 DIRECTOR OF PROJECT DEVELOPMENT  
  
 ROADWAY DESIGN ENGINEER  
  
 FEDERAL HIGHWAY ADMINISTRATION

**GENERIC PLANS FOR  
 GUARDRAIL END TERMINALS**



STANDARD  
 G-19