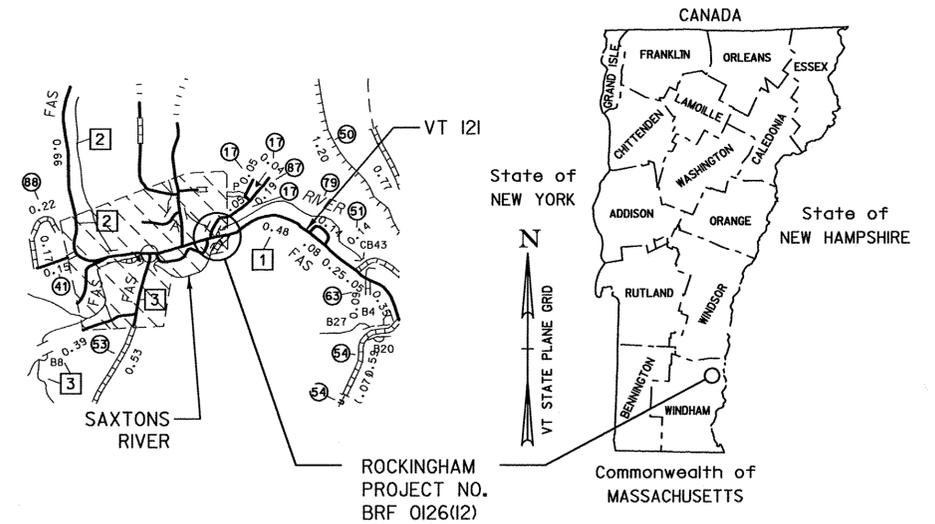


STATE OF VERMONT AGENCY OF TRANSPORTATION



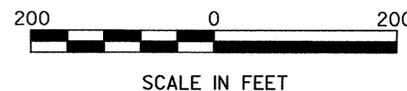
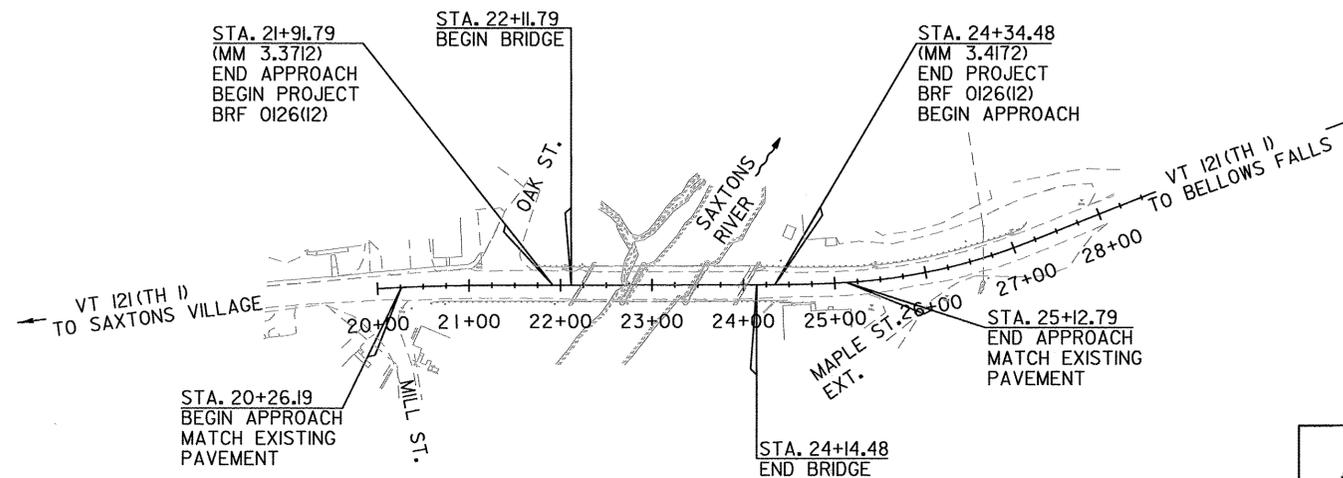
PROPOSED IMPROVEMENT BRIDGE PROJECT TOWN OF ROCKINGHAM COUNTY OF WINDHAM VT 121 (CL 2, TH 1) RURAL MAJOR COLLECTOR BRIDGE NO. 11R



PROJECT LOCATION: BEGINNING ON VT 121(CL2, TH 1)(FAS ROUTE 50126) APPROXIMATELY 4.1 MILES WEST OF THE JUNCTION WITH U.S. ROUTE 5 AND 68.0 FEET EAST OF THE JUNCTION WITH OAK STREET AND EXTENDING EASTERLY ALONG VT 121 APPROXIMATELY 243 FEET (0.04 MILES).

PROJECT DESCRIPTION: WORK TO BE PERFORMED UNDER THIS PROJECT INCLUDES REPLACEMENT OF BRIDGE NO. 11R SUPERSTRUCTURE WITH NEW SUPERSTRUCTURE ON EXISTING ALIGNMENT, PARTIAL REMOVAL OF EXISTING ABUTMENTS AND REPLACEMENT WITH NEW ABUTMENTS, REPAIR OF EXISTING PIERS AND CHANNEL WORK WITH OTHER RELATED HIGHWAY ITEMS.

STRUCTURE LENGTH: 202.69 FEET
ROADWAY LENGTH: 40.00 FEET
PROJECT LENGTH: 242.69 FEET



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.

QUALITY ASSURANCE PROGRAM : LEVEL 2	
SURVEYED BY : VERMONT SURVEY & ENGINEERING, INC.	
SURVEYED DATE : 12/2010	
DATUM	
VERTICAL	NAVD 88(GE01D09)FT
HORIZONTAL	NAD 83 (CORS) sFT

TYLIN INTERNATIONAL

DIRECTOR OF PROJECT DELIVERY	
APPROVED: <i>[Signature]</i>	DATE: 7/30/2014
PROJECT MANAGER : TODD SUMNER, P.E.	
PROJECT NAME : ROCKINGHAM	
PROJECT NUMBER : BRF 0126 (12)	
SHEET 1 OF 69 SHEETS	

PRELIMINARY INFORMATION SHEET (BRIDGE)

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STRUCTURES DETAIL SHEETS

SD-501.00	CONCRETE DETAILS AND NOTES	5/7/2010
SD-502.00	CONCRETE DETAILS AND NOTES	5/7/2010
SD-516.10	BRIDGE JOINT ASPHALTIC PLUG	8/29/2011

STANDARDS LIST

B-5	SLOPE GRADING, EMBANKMENTS, MUCK	06-01-1994
E-121	STANDARD SIGN PLACEMENT - CONVENTIONAL ROAD	08-08-1995
E-123	GUIDE SIGN PLACEMENT - MISCELLANEOUS DETAILS	03-16-2004
E-142	REGULATORY SIGN DETAILS	09-20-1995
E-143	REGULATORY SIGN DETAILS	06-15-2004
E-152	WARNING SIGN DETAILS	05-01-2004
E-160	FLANGED CHANNEL STEEL SIGN POST	05-20-1999
E-161	W-SHAPED STEEL SIGN POST	08-18-1995
E-171A	TRAFFIC CONTROL SIGNALS GENERAL NOTES & DETAILS	08-09-1995
E-171B	TRAFFIC CONTROL SIGNALS MISC. DETAILS	08-09-1995
E-171C	TRAFFIC CONTROL SIGNALS CANTILEVER MOUNTING DETAILS	08-09-1995
E-172	VEHICLE DETECTOR LOOP DETAILS	08-09-1995
E-173	PULL BOXES AND JUNCTION BOXES	08-09-1995
E-175	POWER DROP STANCHIONS	06-08-2009
E-191	PAVEMENT MARKING DETAILS	02-01-1999
E-193	PAVEMENT MARKING DETAILS	08-18-1995
G-1B	BOX BEAM GUARD RAIL	06-01-1994
S-364C	GUARDRAIL APPROACH SECTION, GALVANIZED 3 RAIL BOX BEAM	04-23-2012
S-364D	GUARDRAIL APPROACH SECTION, GALVANIZED 3 RAIL BOX BEAM	04-23-2012
T-1	TRAFFIC CONTROL GENERAL NOTES	08-08-2012
T-10	CONVENTIONAL ROADS CONSTRUCTION APPROACH SIGNING	08-06-2012
T-17	TRAFFIC CONTROL MISCELLANEOUS DETAILS	08-06-2012
T-24	TRAFFIC CONTROL FOR MAINTENANCE PAVEMENT MARKING OPERATION	08-06-2012
T-28	CONSTRUCTION SIGN DETAILS	08-06-2012
T-29	CONSTRUCTION SIGN DETAILS	08-06-2012
T-30	CONSTRUCTION SIGN DETAILS	08-06-2012
T-42	BRIDGE NUMBER PLAQUE	04-09-2014
T-44	MILE MARKER DETAILS STATE AND TOWN HIGHWAYS	04-09-2014
T-45	SQUARE TUBE SIGN POST AND ANCHOR	01-02-2013

FINAL HYDRAULIC REPORT

HYDROLOGIC DATA

DATE: _____

DRAINAGE AREA: 70.0 SQ. MI.

CHARACTER OF TERRAIN: HILLY TO MOUNTAINOUS VALLEY SETTING

STREAM CHARACTERISTICS: STRAIGHT TO SINUOUS, ALLUVIAL,
LITTLE TO NO FLOOD PLAN

NATURE OF STREAMBED: SAND, GRAVEL, SMALL COBBLES

Q 2.33 = 2850 CFS Q50 = 8680 CFS
Q 10 = 5170 CFS Q 100 = 10550 CFS
Q 25 = 7070 CFS Q 500 = 16000 CFS

DATE OF FLOOD OF RECORD: AUGUST 28, 2011

ESTIMATED DISCHARGE: 20942 CFS

WATER SURFACE ELEVATION: 414.6 FT AT GAGE STATION DOWNSTREAM OF BRIDGE

NATURAL STREAM VELOCITY: 11.2 FPS @ Q50 = 8680 CFS

ICE CONDITIONS: LIGHT TO MODERATE

DEBRIS: LIGHT TO MODERATE

DOES THE STREAM REACH MAXIMUM HIGHWATER ELEV. RAPIDLY? NO

IS ORDINARY RISE RAPID? NO

IS STAGE AFFECTED BY UPSTREAM OR DOWNSTREAM CONDITIONS? NO

IF YES, DESCRIBE N/A

WATERSHED STORAGE: <1% HEADWATERS: -
UNIFORM: X
IMMEDIATELY ABOVE SITE: -

EXISTING STRUCTURE INFORMATION

STRUCTURE TYPE: 3 SPAN STEEL GIRDER BRIDGE

YEAR BUILT: 1954

CLEAR SPAN (NORMAL TO STREAM): 157 FT

VERTICAL CLEARANCE ABOVE STREAMBED: 28.3 FT (AVG.)

WATERWAY OF FULL OPENING: 2220 SQ. FT

DISPOSITION OF STRUCTURE: REMOVE ABUTMENT BACKWALL AND SUPERSTRUCTURE

TYPE OF MATERIAL UNDER SUBSTRUCTURE: GRAVEL

WATER SURFACE ELEVATIONS AT: ONE BRIDGE LENGTH UPSTREAM

Q 2.33 = 428.7 FT VELOCITY = 10 FT/SEC
Q 10 = 431.0 FT " 10.7 FT/SEC
Q 25 = 432.8 FT " 11.2 FT/SEC
Q50 = 434.0 FT " 12.4 FT/SEC
Q 100 = 435.4 FT " 13.6 FT/SEC

LONG TERM STREAMBED CHANGES: LITTLE CHANGE SINCE 1953 PLANS

IS THE ROADWAY OVERTOPPED BELOW Q100? NO

FREQUENCY: >Q500

RELIEF ELEVATION: +/- 448.5 FT

DISCHARGE OVER ROAD @ Q100: N/A

UPSTREAM STRUCTURE

TOWN: ROCKINGHAM DISTANCE: 0.5 MI

HIGHWAY #: T.H. # 3 (HARTLEY HILL ROAD) STRUCTURE #: 9

CLEAR SPAN: 128 FT CLEAR HEIGHT: 15.3 FT

YEAR BUILT: 2004 FULL WATERWAY: 2130 SF

STRUCTURE TYPE: WELDED PLATE GIRDER

DOWNSTREAM STRUCTURE

TOWN: ROCKINGHAM DISTANCE: 1.0 MI

HIGHWAY #: T.H. # 51 (HALL BRIDGE ROAD) STRUCTURE #: 43

CLEAR SPAN: 113 CLEAR HEIGHT: +/- 12 FT

YEAR BUILT: 1982 FULL WATERWAY: +/- 1350 SF

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	2.87	1.89					
POSTING							
OPERATING	3.88	2.55	3.33	2.21	2.84	2.55	2.80
COMMENTS:							

PROPOSED STRUCTURE

STRUCTURE TYPE: 3 SPAN PRESTRESSED NEXT D BEAM BRIDGE

CLEAR SPAN (NORMAL TO STREAM): 170.21 FT

VERTICAL CLEARANCE ABOVE STREAMBED: 28.1 FT (AVG.)

WATERWAY OF FULL OPENING: 2460 SQ FT

WATER SURFACE ELEVATIONS AT: ONE BRIDGE LENGTH UPSTREAM

Q 2.33 = 428.7 FT VELOCITY = 10.0 FT/SEC
Q 10 = 430.8 FT " 11.1 FT/SEC
Q 25 = 432.6 FT " 11.2 FT/SEC
Q50 = 433.9 FT " 12.4 FT/SEC
Q 100 = 435.4 FT " 13.6 FT/SEC

IS THE ROADWAY OVERTOPPED BELOW Q100? NO

FREQUENCY: >Q500

RELIEF ELEVATION: +/- 448.5 FT

DISCHARGE OVER ROAD @ Q100: N/A

AVERAGE LOW ELEVATION OF SUPERSTRUCTURE: 446.7

VERTICAL CLEARANCE: 12.8 FT @ Q50 = 8,680 CFS

SCOUR: CONTRACTION SCOUR FOR Q100 IS 2 FT (Q500 IS 3 FT) TOTAL PIER
SCOUR FOR Q100 IS 23 FT (Q500 IS 26 FT) STONE FILL, TYPE IV AT ABUTMENTS TO BE LEFT IN PLACE.

REQUIRED CHANNEL PROTECTION: EXISTING SCOUR CRITICAL PIERS RETAINED WITHOUT ADDED REVETMENT

PERMIT INFORMATION

AVERAGE DAILY FLOW: 150 CFS DEPTH OR ELEVATION: 423.1 FT

ORDINARY LOW WATER: 70 CFS 426.6 FT

ORDINARY HIGH WATER: 1230 CFS

TEMPORARY BRIDGE REQUIREMENTS

STRUCTURE TYPE: N/A

CLEAR SPAN (NORMAL TO STREAM): N/A

VERTICAL CLEARANCE ABOVE STREAMBED: N/A

WATERWAY AREA OF FULL OPENING: N/A

ADDITIONAL INFORMATION

TRAFFIC MAINTENANCE NOTES

1. MAINTAIN SINGLE LANE ALTERNATING TRAFFIC USING PHASED CONSTRUCTION SEQUENCE
2. TEMPORARY TRAFFIC SIGNAL REQUIRED AT ROUTE 121 / OAK STREET INTERSECTION AND ON ROUTE 121 EASTERLY APPROACH

DESIGN VALUES

1. DESIGN LIVE LOAD HL-93
2. FUTURE PAVEMENT dp: 0.0 INCH
3. ABUTMENT BEARING TO BEARING LENGTH (THREE SPANS) L: 200.00 FT (65.50 - 69.00 - 65.50) FT
4. MIN. MID-SPAN POS. CAMBER @ RELEASE (PRESTRESSED UNITS) Δ: ---
5. PRESTRESSING STRAND (0.60 INCH DIAMETER - LOW RELAX) fy: 243 KSI
6. PRESTRESSED CONCRETE STRENGTH f'c: 8.0 KSI
7. PRESTRESSED CONCRETE RELEASE STRENGTH f'ci: 6.0 KSI
8. CONCRETE, HIGH PERFORMANCE CLASS AA f'c: 4.0 KSI
9. CONCRETE, HIGH PERFORMANCE CLASS A f'c: 4.0 KSI
10. CONCRETE, HIGH PERFORMANCE CLASS B f'c: 3.5 KSI
11. CONCRETE, CLASS C f'c: ---
12. REINFORCING STEEL fy: 60 KSI
13. STRUCTURAL STEEL AASHTO M270 fy: ---
14. NOMINAL BEARING RESISTANCE OF SOIL qn: ---
15. SOIL BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD) φ: ---
16. NOMINAL BEARING RESISTANCE OF ROCK qn: ---
17. ROCK BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD) φ: ---
18. PILE RESISTANCE FACTOR φ: 0.65
19. LATERAL PILE DEFLECTION Δ: 0.87 INCH
20. BASIC WIND SPEED V3s: 100 MPH
21. MINIMUM GROUND SNOW LOAD ps: ---
22. SEISMIC DATA Pga: 7.0% g Ss: 15% g S1: 4.4% g

TRAFFIC DATA

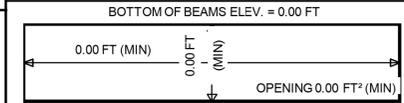
YEAR	ADT	DHV	% D	% T	ADTT
2014	3700	420	55	7.0	280
2034	4000	450	55	9.5	410

20 year ESAL for flexible pavement from 2014 to 2034 : 1621000

40 year ESAL for flexible pavement from 2014 to 2054 : 3584000

Design Speed : 25 mph

TEMPORARY BRIDGE PROFILE ALONG TEMP CL



PROJECT NAME: ROCKINGHAM

PROJECT NUMBER: BRF 0126(12)

FILE NAME: z10j072bdr_pi.xlsm PLOT DATE: 7/25/2014

PROJECT LEADER: R. HEBERT DRAWN BY: T. POULIN

DESIGNED BY: D. BURHANS CHECKED BY: R. HEBERT

PRELIMINARY INFORMATION SHEET SHEET 2 OF 69

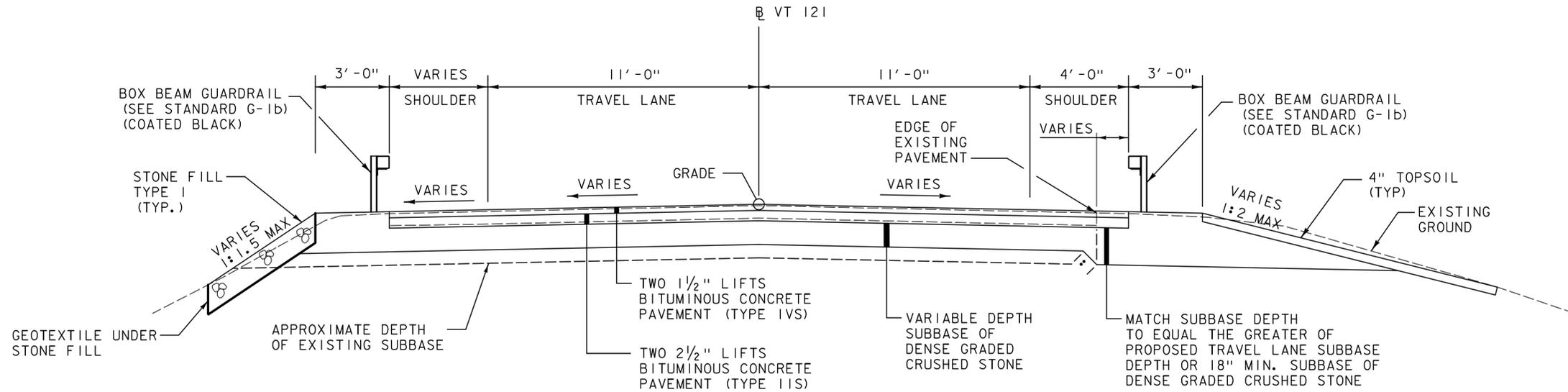
NOTES:

1. SLOPE ROUNDING: ALL CUT SLOPES TO BE ROUNDED IN ACCORDANCE WITH STANDARD SHEET B-5.
2. TACK COAT: EMULSIFIED ASPHALT SHALL BE APPLIED TO THE COLD PLANED BITUMINOUS CONCRETE PAVEMENT SURFACE AT THE RATE OF 0.040 GAL./SY. OR AS DIRECTED BY THE ENGINEER. EMULSIFIED ASPHALT SHALL ALSO BE APPLIED BETWEEN ALL LIFTS OF PAVEMENT. THE COST SHALL BE PAID UNDER ITEM 404.65, "EMULSIFIED ASPHALT".

MATERIAL TOLERANCES

(IF USED ON PROJECT)

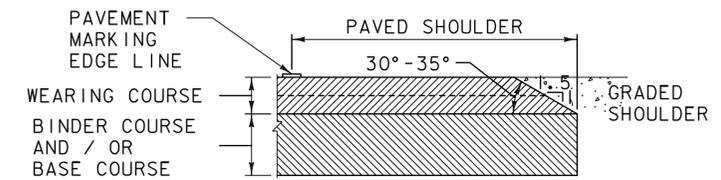
	TOTAL DEPTH
SURFACE	+/- 1/4"
- PAVEMENT	
SUBBASE	+/- 1"



**FULL DEPTH
TYPICAL ROADWAY SECTION - VT ROUTE 121**

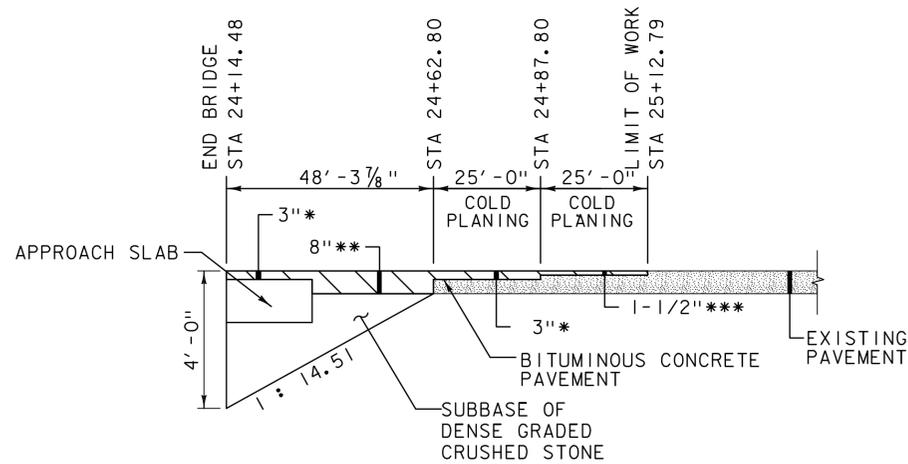
STA 21+61.79 TO STA 22+11.79
STA 24+14.48 TO STA 24+62.80

SCALE 3/8" = 1'-0"



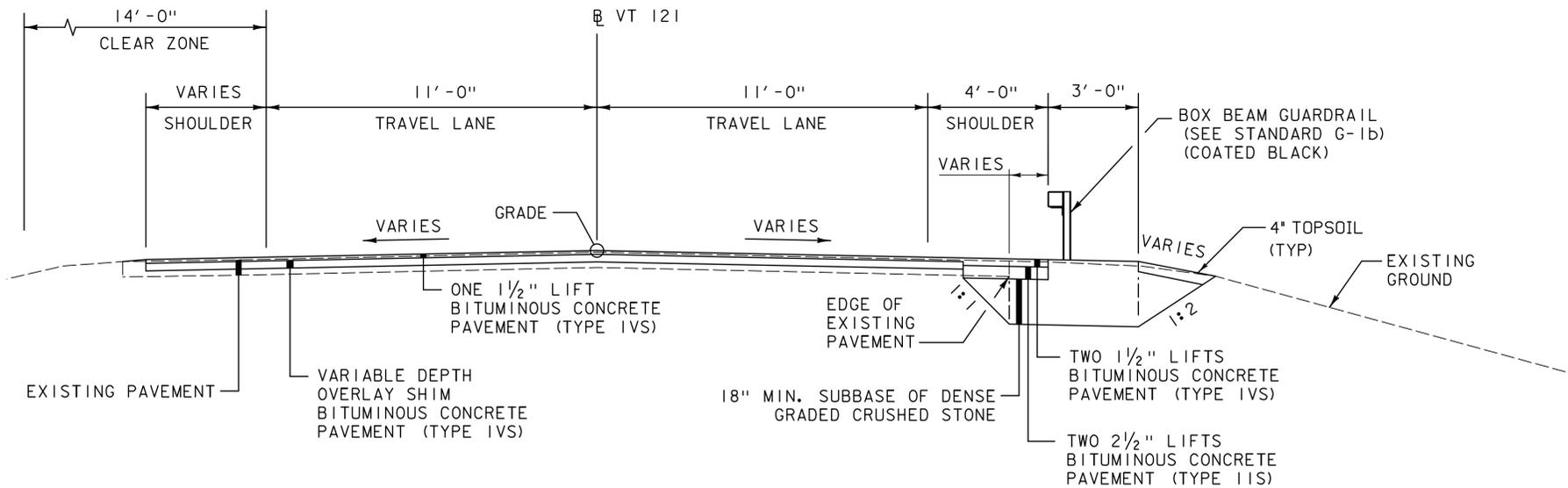
SAFETY EDGE DETAIL

NOT TO SCALE



SUBBASE TAPER - EAST APPROACH

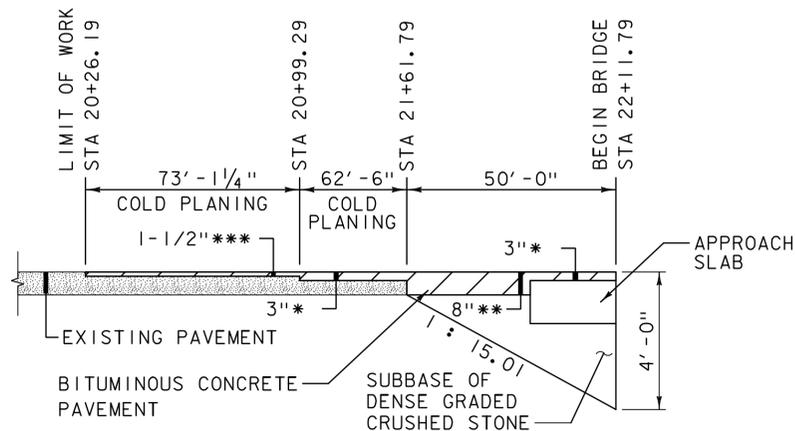
ALONG BASELINE
NOT TO SCALE



**COLD PLANE AND WIDENING
TYPICAL ROADWAY SECTION - VT ROUTE 121**

STA 20+26.19 TO STA 21+61.79
STA 24+62.80 TO STA 25+12.79

SCALE 3/8" = 1'-0"



SUBBASE TAPER - WEST APPROACH

ALONG BASELINE
NOT TO SCALE

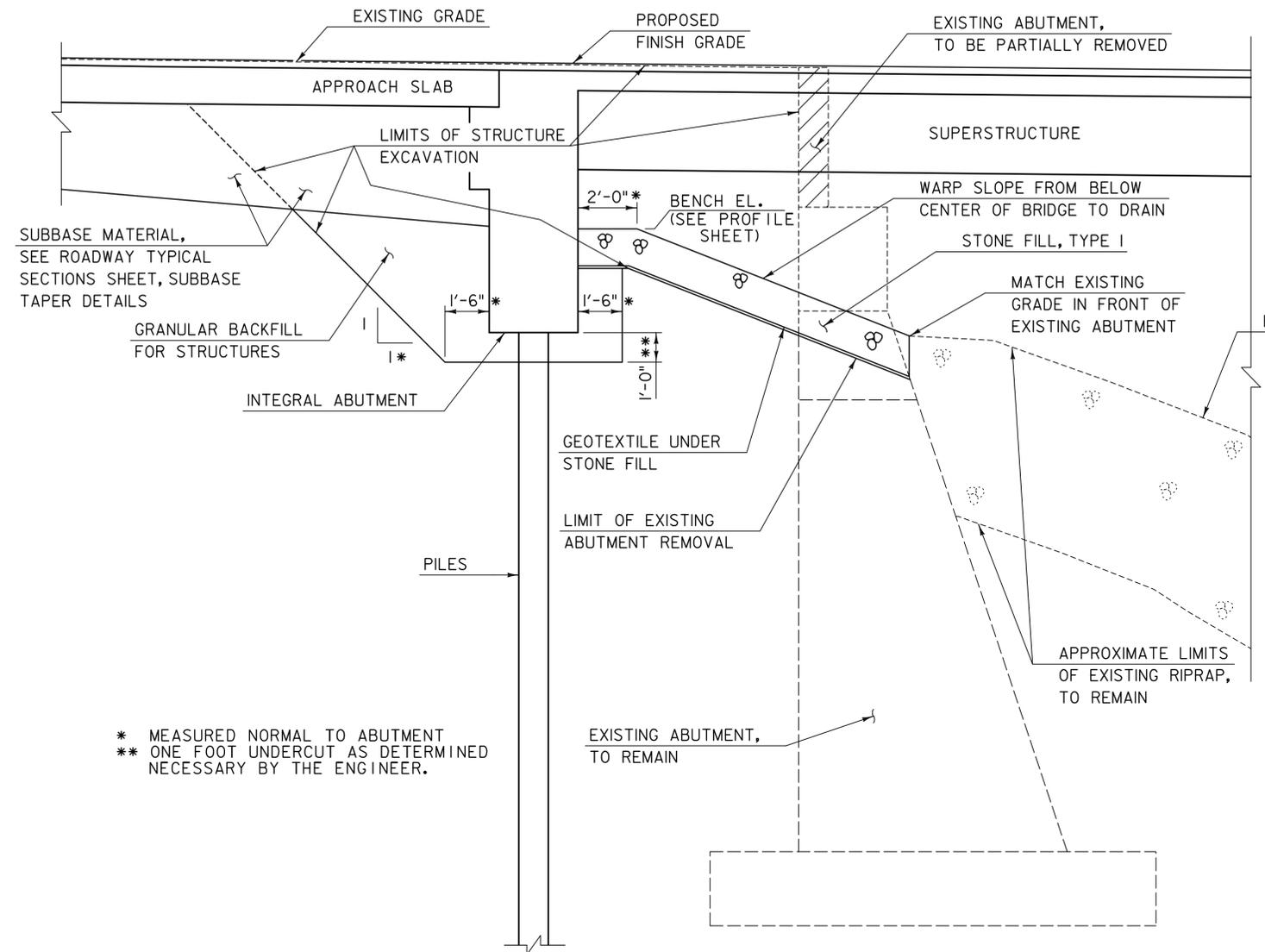
- * TWO 1 1/2" LIFTS BITUMINOUS CONCRETE PAVEMENT (TYPE IVS)
- ** TWO 1 1/2" LIFTS BITUMINOUS CONCRETE PAVEMENT (TYPE IVS) OVER TWO 2 1/2" LIFTS BITUMINOUS CONCRETE PAVEMENT (TYPE IIS)
- *** ONE 1 1/2" LIFT BITUMINOUS CONCRETE PAVEMENT (TYPE IVS)

PROJECT NAME: ROCKINGHAM
PROJECT NUMBER: BRF 0126(12)

TYLIN INTERNATIONAL

FILE NAME: z10J072bdr_typ.dgn
PROJECT LEADER: R. HEBERT
DESIGNED BY: C. SARGEANT
ROADWAY TYPICAL SECTIONS

PLOT DATE: 8/26/2014
DRAWN BY: C. SARGEANT
CHECKED BY: D. BURHANS
SHEET 3 OF 69



* MEASURED NORMAL TO ABUTMENT
 ** ONE FOOT UNDERCUT AS DETERMINED NECESSARY BY THE ENGINEER.

TYPICAL ABUTMENT SECTION

SCALE 3/8" = 1'-0"

PROJECT NAME:	ROCKINGHAM
PROJECT NUMBER:	BRF 0126(12)
FILE NAME:	z10J072bdr_bew.dgn
PROJECT LEADER:	R. HEBERT
DESIGNED BY:	S. KELLER
EARTHWORK TYPICAL SECTIONS	
PLOT DATE:	8/26/2014
DRAWN BY:	S. KELLER
CHECKED BY:	D. MYERS
SHEET	5 OF 69



GENERAL INFORMATION

SYMBOLGY LEGEND NOTE

THE SYMBOLGY ON THIS SHEET IS INTENDED TO COVER STANDARD CONVENTIONAL SYMBOLGY. THE SYMBOLGY IS USED FOR EXISTING & PROPOSED FEATURES WITH HEAVIER LINEWEIGHT, IN COMBINATION WITH PROJECT ANNOTATION, AS NOTED ON PROJECT PLAN SHEETS. THIS LEGEND SHEET COVERS THE BASICS. SYMBOLGY ON PLANS MAY VARY, PLAN ANNOTATIONS AND NOTES SHOULD BE USED TO CLARIFY AS NEEDED.

R.O.W. ABBREVIATIONS (CODES) & SYMBOLS

POINT CODE	DESCRIPTION
CH	CHANNEL EASEMENT
CONST	CONSTRUCTION EASEMENT
CUL	CULVERT EASEMENT
D&C	DISCONNECT & CONNECT
DIT	DITCH EASEMENT
DR	DRAINAGE EASEMENT
DRIVE	DRIVEWAY EASEMENT
EC	EROSION CONTROL
HWY	HIGHWAY EASEMENT
I&M	INSTALL & MAINTAIN EASEMENT
LAND	LANDSCAPE EASEMENT
R&RES	REMOVE & RESET
R&REP	REMOVE & REPLACE
SR	SLOPE RIGHT
UE	UTILITY EASEMENT
(P)	PERMANENT EASEMENT
(T)	TEMPORARY EASEMENT
■	BNDNS BOUND SET
▣	BNDNS BOUND TO BE SET
●	IPNS IRON PIN SET
◎	IPNS IRON PIN TO BE SET
⊠	CALC EXISTING ROW POINT
○	PROW PROPOSED ROW POINT
[LENGTH]	LENGTH CARRIED ON NEXT SHEET

COMMON TOPOGRAPHIC POINT SYMBOLS

POINT CODE	DESCRIPTION
⊗	APL BOUND APPARENT LOCATION
◻	BM BENCH MARK
▣	BND BOUND
▣	CB CATCH BASIN
⊕	COMB COMBINATION POLE
▣	DITHR DROP INLET THROATED DNC
⊕	EL ELECTRIC POWER POLE
◦	FPOLE FLAGPOLE
⊙	GASFIL GAS FILLER
⊙	GP GUIDE POST
⊗	GSO GAS SHUT OFF
◦	GUY GUY POLE
◦	GUYW GUY WIRE
⊗	GV GATE VALVE
⊗	H TREE HARDWOOD
△	HCTRL CONTROL HORIZONTAL
△	HVCTRL CONTROL HORIZ. & VERTICAL
◇	HYD HYDRANT
◦	IP IRON PIN
◦	IPIPE IRON PIPE
⊕	LI LIGHT - STREET OR YARD
⊕	MB MAILBOX
◦	MH MANHOLE (MH)
▣	MM MILE MARKER
◦	PM PARKING METER
▣	PMK PROJECT MARKER
◦	POST POST STONE/WOOD
⊕	RRSIG RAILROAD SIGNAL
⊕	RRSL RAILROAD SWITCH LEVER
⊕	S TREE SOFTWOOD
⊕	SAT SATELLITE DISH
⊕	SHRUB SHRUB
⊕	SIGN SIGN
⊕	STUMP STUMP
⊕	TEL TELEPHONE POLE
◦	TIE TIE
⊕	TSIGN SIGN W/DOUBLE POST
⊕	VCTRL CONTROL VERTICAL
◦	WELL WELL
⊗	WSO WATER SHUT OFF

THESE ARE COMMON VAOT SURVEY POINT SYMBOLS FOR EXISTING FEATURES, ALSO USED FOR PROPOSED FEATURES WITH HEAVIER LINEWEIGHT, IN COMBINATION WITH PROPOSED ANNOTATION.

PROPOSED GEOMETRY CODES

CODE	DESCRIPTION
PC	POINT OF CURVATURE
PI	POINT OF INTERSECTION
CC	CENTER OF CURVE
PT	POINT OF TANGENCY
PCC	POINT OF COMPOUND CURVE
PRC	POINT OF REVERSE CURVE
POB	POINT OF BEGINNING
POE	POINT OF ENDING
STA	STATION PREFIX
AH	AHEAD STATION SUFFIX
BK	BACK STATION SUFFIX
D	CURVE DEGREE OF (100FT)
R	CURVE RADUIS OF
T	CURVE TANGENT LENGTH
L	CURVE LENGTH OF
E	CURVE EXTERNAL DISTANCE

UTILITY SYMBOLGY

UNDERGROUND UTILITIES

— UT —	TELEPHONE
— UE —	ELECTRIC
— UC —	CABLE (TV)
— UEC —	ELECTRIC+CABLE
— UET —	ELECTRIC+TELEPHONE
— UCT —	CABLE+TELEPHONE
— UECT —	ELECTRIC+CABLE+TELEP.
— G —	GAS LINE
— W —	WATER LINE
— S —	SANITARY SEWER (SEPTIC)

ABOVE GROUND UTILITIES (AERIAL)

— T —	TELEPHONE
— E —	ELECTRIC
— C —	CABLE (TV)
— EC —	ELECTRIC+CABLE
— ET —	ELECTRIC+TELEPHONE
— AER E&T —	ELECTRIC+TELEPHONE
— CT —	CABLE+TELEPHONE
— ECT —	ELECTRIC+CABLE+TELEP.
—	UTILITY POLE GUY WIRE

PROJECT CONSTRUCTION SYMBOLGY

— — — CZ — — —	CLEAR ZONE
—————	PLAN LAYOUT MATCHLINE

PROJECT CONSTRUCTION FEATURES

△ — △ — △ — △	TOP OF CUT SLOPE
○ — ○ — ○ — ○	TOE OF FILL SLOPE
⊗ ⊗ ⊗ ⊗ ⊗ ⊗	STONE FILL
-----	BOTTOM OF DITCH
-----	CULVERT PROPOSED
-----	STRUCTURE SUBSURFACE
PDF — PDF —	PROJECT DEMARCATION FENCE
BF — BF —	BARRIER FENCE
XXXXXXXXXXXXXXXXXXXX	TREE PROTECTION ZONE (TPZ)
//////	STRIPING LINE REMOVAL
~~~~~	SHEET PILES

**CONVENTIONAL BOUNDARY SYMBOLGY**

**BOUNDARY LINES**

—————	TOWN BOUNDARY LINE
—————	COUNTY BOUNDARY LINE
—————	STATE BOUNDARY LINE
———	PROPOSED STATE R.O.W. (LIMITED ACCESS)
———	PROPOSED STATE R.O.W.
———	STATE ROW (LIMITED ACCESS)
———	STATE ROW
———	TOWN ROW
-----	PERMANENT EASEMENT LINE (P)
-----	TEMPORARY EASEMENT LINE (T)
-----	SURVEY LINE
— P — P —	PROPERTY LINE (P/L)
— L — L —	
△ — SR — SR — SR —	SLOPE RIGHTS
6f — 6f —	6F PROPERTY BOUNDARY
4f — 4f —	4F PROPERTY BOUNDARY
HAZ — HAZ —	HAZARDOUS WASTE

**EPSC LAYOUT PLAN SYMBOLGY**

**EPSC MEASURES**

ONNOONNOONNO	FILTER CURTAIN
— — — — —	SILT FENCE
— — — — —	SILT FENCE WOVEN WIRE
— — — — —	CHECK DAM
▣	DISTURBED AREAS REQUIRING RE-VEGETATION
▣	EROSION MATTING
ARCH	AREA OF ARCHAEOLOGICAL SIGNIFICANCE
▣	STABILIZED CONSTRUCTION ENTRANCE
▣	SURFACE ROUGHENING

**ENVIRONMENTAL RESOURCES**

———	WETLAND BOUNDARY
-----	RIPARIAN BUFFER ZONE
-----	WETLAND BUFFER ZONE
-----	SOIL TYPE BOUNDARY
— T&E —	THREATENED & ENDANGERED SPECIES
HAZ — HAZ —	HAZARDOUS WASTE AREA
— AG —	AGRICULTURAL LAND
— HABITAT —	FISH & WILDLIFE HABITAT
— FLOOD PLAIN —	FLOOD PLAIN
— OHW —	ORDINARY HIGH WATER (OHW)
— — — — —	STORM WATER
-----	USDA FOREST SERVICE LANDS
-----	WILDLIFE HABITAT SUIT/CONN

**ARCHEOLOGICAL & HISTORIC**

— ARCH —	ARCHEOLOGICAL BOUNDARY
— HISTORIC DIST —	HISTORIC DISTRICT BOUNDARY
— HISTORIC —	HISTORIC AREA
(H)	HISTORIC STRUCTURE

**CONVENTIONAL TOPOGRAPHIC SYMBOLGY**

**EXISTING FEATURES**

-----	ROAD EDGE PAVEMENT
-----	ROAD EDGE GRAVEL
-----	DRIVEWAY EDGE
-----	DITCH
-----	FOUNDATION
x — x — x — x —	FENCE (EXISTING)
□ — □ — □ — □ —	FENCE WOOD POST
○ — ○ — ○ — ○ —	FENCE STEEL POST
~~~~~	GARDEN
— — — — —	ROAD GUARDRAIL
	RAILROAD TRACKS
-----	CULVERT (EXISTING)
-----	STONE WALL
-----	WALL
-----	WOOD LINE
-----	BRUSH LINE
-----	HEDGE
-----	BODY OF WATER EDGE
-----	LEDGE EXPOSED

PROJECT NAME: ROCKINGHAM
PROJECT NUMBER: BRF 0126(12)

FILE NAME: z10J072bdr_legend.dgn
PROJECT LEADER: R. HEBERT
DESIGNED BY: R. HEBERT
CONVENTIONAL SYMBOLGY LEGEND

PLOT DATE: 8/26/2014
DRAWN BY: S. MORGAN
CHECKED BY: R. HEBERT
SHEET 6 OF 69

QUANTITY SHEET 1

SUMMARY OF ESTIMATED QUANTITIES										TOTALS		DESCRIPTIONS				DETAILED SUMMARY OF QUANTITIES			
						ROADWAY	TRAINING	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				507.11 REINFORCING STEEL, LEVEL I
						620					620		CY	COMMON EXCAVATION	203.15		8200 LB	APPROACH SLAB	
						20					20		CY	SOLID ROCK EXCAVATION	203.16		8200 LB	TOTAL	
						20					20		CY	SAND BORROW	203.31				507.12 REINFORCING STEEL, LEVEL II
						20					20		CY	TRENCH EXCAVATION OF EARTH, EXPLORATORY (N.A.B.I.)	204.22				
									635		635		CY	STRUCTURE EXCAVATION	204.25		11720 LB	DECK CLOSURE POURS	
									130		130		CY	GRANULAR BACKFILL FOR STRUCTURES	204.30		1340 LB	DIAPHRAMS	
						625					625		SY	COLD PLANING-BIT PAVEMENT	210.10		7110 LB	ABUTMENTS	
						450					450		CY	SUBBASE OF DENSE GRADED CRUSHED STONE	301.35		1330 LB	PIERS	
						4.8			1.8		6.6		CWT	EMULSIFIED ASPHALT	404.65		21500 LB	TOTAL	
						1					1		LU	PRICE ADJUSTMENT, ASPHALT CEMENT (N.A.B.I.)	406.50				
									56		56		CY	CONCRETE, HIGH PERFORMANCE CLASS A	501.33				
									124		124		CY	CONCRETE, HIGH PERFORMANCE CLASS B	501.34				
									1		1		LS	FURNISHING EQUIPMENT FOR DRIVING PILING	504.10				
									960		960		LF	STEEL PILING, HP 10 X 57	505.12				
									2740		2740		SF	TEMPORARY STEEL SHEET PILING	505.36				
									2		2		EACH	DYNAMIC PILE LOADING TEST	505.45				
									8200		8200		LB	REINFORCING STEEL, LEVEL I	507.11				
									21500		21500		LB	REINFORCING STEEL, LEVEL II	507.12				
									384		384		LF	DRILLING AND GROUTING DOWELS	507.16				
									84		84		EACH	MECHANICAL BAR CONNECTOR	507.19				
									80		80		GAL	WATER REPELLENT, SILANE	514.10				
									82		82		LF	BRIDGE EXPANSION JOINT, ASPHALTIC PLUG	516.10				
									790		790		SY	MEMBRANE WATERPROOFING, SPRAY APPLIED	520.10				
									82		82		LF	JOINT SEALER, HOT POURED	524.11				
									406		406		LF	BRIDGE RAILING, GALVANIZED STEEL TUBING/CONCRETE COMBINATION (COATED BLACK)	525.45				
									1		1		LS	MAINTENANCE OF STRUCTURES AND APPROACHES	527.10				
									600		600		SY	REMOVAL OF BRIDGE PAVEMENT	529.10				
									1		1		EACH	PARTIAL REMOVAL OF STRUCTURE	529.20				
									16		16		EACH	BEARING DEVICE ASSEMBLY, PLAIN ELASTOMERIC PAD	531.16				
									32		32		EACH	BEARING DEVICE ASSEMBLY, STEEL REINFORCED ELASTOMERIC PAD	531.17				
									50		50		SY	REPAIR OF CONCRETE SUBSTRUCTURE SURFACE, CLASS I	580.13				
									8		8		SY	REPAIR OF CONCRETE SUBSTRUCTURE SURFACE, CLASS II	580.14				
									2		2		CY	REPAIR OF CONCRETE SUBSTRUCTURE SURFACE, CLASS III	580.15				
								20			20		HR	POWER GRADER RENTAL	608.15				
								20			20		HR	ALL PURPOSE EXCAVATOR RENTAL, TYPE I	608.25				
								20			20		HR	TRUCK RENTAL	608.37				
								20			20		HR	LOADER RENTAL, TYPE I	608.40				
						40					40		MGAL	DUST CONTROL WITH WATER	609.10				
						50			50		100		CY	STONE FILL, TYPE I	613.10				

PROJECT NAME:	ROCKINGHAM
PROJECT NUMBER:	BRF 0126(12)
FILE NAME: z10j072bdr_qnty.xlsm	PLOT DATE: 07/28/2014
PROJECT LEADER: R. HEBERT	DRAWN BY: D. BURHANS
DESIGNED BY: D. BURHANS	CHECKED BY: R. HEBERT
QUANTITY SHEET #1	SHEET 7 OF 69

QUANTITY SHEET 2

SUMMARY OF ESTIMATED QUANTITIES										TOTALS		DESCRIPTIONS				DETAILED SUMMARY OF QUANTITIES			
						ROADWAY	TRAINING	EROSION CONTROL	BRIDGE	FULL C.E. ITEMS	GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND	QUANTITIES	UNIT	ITEMS
						440					440		LF	BOX BEAM GUARDRAIL (COATED BLACK)	621.30				
						1					1		EACH	MANUFACTURED TERMINAL SECTION, TANGENT (COATED BLACK)	621.51				
						4					4		EACH	ENERGY ABSORPTION ATTENUATOR	621.56				
						4					4		EACH	GUARDRAIL APPROACH SECTION, GALVANIZED 2 RAIL BOX BEAM (COATED BLACK)	621.72				
						570					570		LF	REMOVAL AND DISPOSAL OF GUARDRAIL	621.80				
						380					380		LF	TEMPORARY TRAFFIC BARRIER	621.90				
						360					360		LF	REMOVE AND RESET TEMPORARY TRAFFIC BARRIER	621.95				
						160					160		HR	UNIFORMED TRAFFIC OFFICERS	630.10				
						500					500		HR	FLAGGERS	630.15				
										1	1		LS	FIELD OFFICE-ENGINEERS	631.10				
										1	1		LS	TESTING EQUIPMENT, CONCRETE	631.16				
										1	1		LS	TESTING EQUIPMENT, BITUMINOUS	631.17				
										3000	3000		DL	FIELD OFFICE TELEPHONE (N.A.B.I.)	631.26				
							520				520		HR	EMPLOYEE TRAINEESHIP	634.10				
						1					1		LS	MOBILIZATION / DEMOBILIZATION	635.11				
						1					1		LS	TRAFFIC CONTROL	641.10				
						2					2		EACH	PORTABLE CHANGEABLE MESSAGE SIGN	641.15				
						960					960		LF	DURABLE 4 INCH WHITE LINE	646.400				
						900					900		LF	DURABLE 4 INCH YELLOW LINE	646.410				
						570					570		LF	DURABLE 12 INCH WHITE LINE	646.460				
						20					20		LF	DURABLE 24 INCH STOP BAR	646.480				
						4					4		EACH	DURABLE LETTER OR SYMBOL	646.490				
						130			150		280		SY	GEOTEXTILE UNDER STONE FILL	649.31				
								180			180		SY	GEOTEXTILE FOR SILT FENCE	649.51				
								18			18		LB	SEED	651.15				
								10			10		LB	SEED, WINTER RYE	651.17				
								55			55		LB	FERTILIZER	651.18				
								0.25			0.25		TON	AGRICULTURAL LIMESTONE	651.20				
								0.25			0.25		TON	HAY MULCH	651.25				
						60					60		CY	TOPSOIL	651.35				
								1			1		LS	EROSION PREVENTION & SEDIMENT CONTROL PLAN	652.10				
								80			80		HR	MONITORING EROSION PREVENTION & SEDIMENT CONTROL PLAN	652.20				
								1			1		LU	MAINTENANCE OF EROSION PREVENTION & SEDIMENT CONTROL PLAN (N.A.B.I.)	652.30				
								180			180		SY	TEMPORARY EROSION MATTING	653.20				
								30			30		CY	VEHICLE TRACKING PAD	653.35				
								310			310		LF	BARRIER FENCE	653.50				
								220			220		LF	PROJECT DEMARCATION FENCE	653.55				
						10					10		SF	TRAFFIC SIGNS, TYPE A	675.20				
						60					60		LF	SQUARE TUBE SIGN POST AND ANCHOR	675.341				
						4					4		EACH	REMOVING SIGNS	675.50				

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PROJECT LEADER: R. HEBERT DRAWN BY: D. BURHANS
DESIGNED BY: D. BURHANS CHECKED BY: R. HEBERT
QUANTITY SHEET #2 SHEET 8 OF 69

QUANTITY SHEET 3

SUMMARY OF ESTIMATED QUANTITIES										TOTALS		DESCRIPTIONS				DETAILED SUMMARY OF QUANTITIES			
						ROADWAY	TRAINING	EROSION CONTROL	BRIDGE	FULL C.E. ITEMS	GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND	QUANTITIES	UNIT	ITEMS
						2					2		EACH	ERECTING SALVAGED SIGNS	675.60				
						1					1		EACH	TEMPORARY TRAFFIC SIGNAL SYSTEM	678.40				
						3					3		EACH	TEMPORARY DETECTOR	678.42				
									30		30		CY	SPECIAL PROVISION (HIGH PERFORMANCE CONCRETE, RAPID SET)	900.608				
									811		811		LF	SPECIAL PROVISION (PRESTRESSED CONCRETE NEXT D BEAMS) (NEXT 40 D)	900.640				
									1		1		LS	SPECIAL PROVISION (CONSTRUCTION VIBRATION AND CRACK MONITORING)	900.645				
						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				
						280			140		420		TON	SPECIAL PROVISION (BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY)	900.680				

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 PROJECT LEADER: R. HEBERT DRAWN BY: D. BURHANS
 DESIGNED BY: D. BURHANS CHECKED BY: R. HEBERT
 QUANTITY SHEET #3 SHEET 9 OF 69

GENERAL

- ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO STATE OF VERMONT AGENCY OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION DATED 2011, WITH ITS LATEST REVISIONS, AND THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS 6TH EDITION, AND THE PCI NORTHEAST GUIDELINES FOR NEXT BEAM 1ST EDITION.
- THE BRIDGE IS DESIGNED FOR HL-93 LIVE LOADING.
- ALL DIMENSIONS ARE HORIZONTAL OR VERTICAL AND ARE BASED ON 68° F OR AS NOTED OTHERWISE.
- THE CONTRACTOR IS RESPONSIBLE FOR FIELD CHECKING ANY AND ALL DIMENSIONS AND ELEVATIONS APPLICABLE TO THIS WORK PRIOR TO COMMENCING WORK OR ORDERING MATERIAL.
- NO ADJUSTMENT TO THE BITUMINOUS WEARING SURFACE ON THE BRIDGE SHALL BE MADE TO ACCOUNT FOR THE DIFFERENCE BETWEEN BEAM CAMBER AND THE THEORETICAL ROADWAY PROFILE. THE WEARING SURFACE ON THE BRIDGE SHALL BE SHIMMED TRANSVERSELY AS NECESSARY TO ACCOUNT FOR POTENTIAL DIFFERENTIAL CAMBER OF ADJACENT BEAMS AND TO FORM THE ROADWAY CROWN.
- THE TOWN WILL MAINTAIN RESPONSIBILITY FOR SNOW REMOVAL ON THE EXISTING BRIDGE THROUGHOUT THE DURATION OF THE PROJECT.
- ALL WORK SHALL TAKE PLACE WITHIN THE EXISTING RIGHT-OF-WAY. NO PROVISIONS HAVE BEEN MADE FOR THE CONTRACTOR TO PERFORM WORK OR SETUP STAGING OUTSIDE THE EXISTING RIGHT-OF-WAY.
- EXISTING AERIAL ELECTRIC AND TELEPHONE LINES AND POLES SHALL BE REMOVED AND PERMANENTLY RELOCATED BY OTHERS. CONTRACTOR SHALL COORDINATE ALL BRIDGE REPLACEMENT AND APPROACH RECONSTRUCTION WORK WITH UTILITY RELOCATION WORK AS REQUIRED. SEE UTILITY SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
- EXISTING UTILITY CONDUIT ON THE BRIDGE IS ABANDONED AND WILL BE REMOVED TO LIMITS REQUIRED TO PERFORM THE WORK.
- THE CONTRACTOR IS HEREBY NOTIFIED THAT AGENCY PERSONNEL WILL PERFORM A VIDEO INSPECTION OF THE NEARBY BUILDINGS AND STRUCTURES ADJACENT TO THE PROJECT AND APPROACH LIMITS. A VIDEO INSPECTION WILL BE PERFORMED PRIOR TO THE BEGINNING OF CONSTRUCTION AND FOLLOWING THE COMPLETION OF CONSTRUCTION. THE CONTRACTOR SHALL REPAIR ANY DAMAGE TO THE BUILDINGS AND STRUCTURES AS A RESULT OF THE CONTRACTOR'S ACTIVITIES AT NO ADDITIONAL COMPENSATION.
- THE CONTRACTOR SHALL CONDUCT CONSTRUCTION VIBRATION AND CRACK MONITORING IN ACCORDANCE WITH SPECIAL PROVISION (CONSTRUCTION VIBRATION AND CRACK MONITORING). THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGE TO ADJACENT STRUCTURES OR BUILDINGS CAUSED BY THE CONTRACTOR'S ACTIVITIES. NO SEPARATE PAYMENT WILL BE MADE FOR ANY REPAIRS OF EXISTING STRUCTURES OR BUILDINGS. PAYMENT FOR CONSTRUCTION VIBRATION AND CRACK MONITORING SHALL BE MADE UNDER CONTRACT ITEM 900.645 SPECIAL PROVISION (CONSTRUCTION VIBRATION AND CRACK MONITORING).

EARTHWORK

- ITEM 613.10, "STONE FILL, TYPE I", UNDER THE BRIDGE AT THE ABUTMENTS AS SHOWN IN THE PLANS SHALL BE PLACED BEFORE THE NEW BEAMS ARE SET.
- ITEM 613.10, "STONE FILL, TYPE I" SHALL BE USED TO REPAIR AREAS OF EMBANKMENT AND SLOPE EROSION AS ORDERED BY THE ENGINEER.

REMOVAL OF EXISTING STRUCTURE

- PARTIAL REMOVAL OF THE EXISTING STRUCTURE SHALL BE UNDER ITEM 529.20, "PARTIAL REMOVAL OF STRUCTURE". THIS WORK SHALL INCLUDE REMOVAL OF THE SUPERSTRUCTURE AND PARTIAL REMOVAL OF EXISTING ABUTMENTS. THE CONTRACTOR'S METHODS FOR PARTIAL REMOVAL OF THE EXISTING STRUCTURE SHALL BE APPROVED BY THE ENGINEER PRIOR TO ANY REMOVAL WORK.
- THE EXISTING BRIDGE SUPERSTRUCTURE AND REMOVED PORTIONS OF THE SUBSTRUCTURE AND APPROACH SHALL BECOME THE PROPERTY OF THE CONTRACTOR AFTER DEMOLITION. RECORD PLANS HAVE BEEN INCLUDED AS PART OF THIS PLAN SET.
- THE EXISTING STRUCTURAL STEEL IS PAINTED WITH A MATERIAL THAT MAY CONTAIN LEAD. THE CONTRACTOR SHALL FOLLOW ALL APPLICABLE REGULATIONS WHEN HANDLING AND WORKING WITH THIS STEEL. THE REMOVED STRUCTURAL STEEL IS THE PROPERTY OF THE CONTRACTOR. THE CONTRACTOR SHALL INDEMNIFY AND HOLD THE STATE, ITS OFFICERS, AND EMPLOYEES HARMLESS CONCERNING THE CONTRACTOR'S USE OR DISPOSITION OF THE REMOVED EXISTING STRUCTURAL STEEL.
- THE EXISTING PAVEMENT ON THE BRIDGE DECK SHALL BE REMOVED UNDER ITEM 529.10, REMOVAL OF BRIDGE PAVEMENT.
- PAYMENT FOR MAINTAINING THE EXISTING STRUCTURE AND ROADWAY FOR ACCEPTABLE USE DURING PHASED CONSTRUCTION WILL BE MADE UNDER CONTRACT ITEM 527.10 "MAINTENANCE OF STRUCTURES AND APPROACHES".

CONCRETE

- THE ABUTMENTS BELOW THE BRIDGE SEAT CONSTRUCTION JOINT, PIER PEDESTALS, AND APPROACH SLABS SHALL BE ITEM 501.34 "CONCRETE, HIGH PERFORMANCE - CLASS B".
- ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 1" X 1", UNLESS NOTED OTHERWISE.
- ITEM 514.10 "WATER REPELLENT, SILANE", SHALL BE APPLIED TO ALL EXPOSED CONCRETE SURFACES, INCLUDING EXISTING PIERS, EXCEPT THE UNDERSIDE OF THE NEXT D BEAMS BETWEEN DRIP NOTCHES.
- ALL REINFORCING STEEL IN THE NEXT D BEAMS, CLOSURE POURS, CONCRETE BRIDGE RAILING, ABUTMENTS AND PIERS SHALL BE LEVEL II IN ACCORDANCE WITH SECTION 507. APPROACH SLAB REINFORCING SHALL BE LEVEL I (EPOXY COATED) IN ACCORDANCE WITH SECTION 507. PAYMENT FOR STEEL REINFORCEMENT IN BRIDGE RAILING WILL BE INCLUDED IN THE UNIT PRICE BID FOR CONTRACT ITEM 525.45. PAYMENT FOR STEEL REINFORCEMENT IN NEXT D BEAMS WILL BE INCLUDED IN THE UNIT PRICE BID FOR CONTRACT ITEM 900.640. PAYMENT FOR STEEL REINFORCEMENT IN APPROACH SLABS WILL BE MADE UNDER CONTRACT ITEM 507.11. PAYMENT FOR STEEL REINFORCEMENT IN DECK CLOSURE POURS, CONCRETE DIAPHRAGMS, ABUTMENTS, AND PIERS WILL BE MADE UNDER CONTRACT ITEM 507.12.
- REINFORCEMENT PLACEMENT TOLERANCES SHALL BE AS FOLLOWS:
 - SPACING +/- 1"
 - CLEARANCE +/- ¼"
- MINIMUM CLEAR COVER FOR REINFORCING STEEL SHALL BE AS FOLLOWS:
 - CONCRETE BRIDGE RAILING 3.0 INCH
 - SURFACES CAST AGAINST EARTH 3.0 INCH
 - ELSEWHERE, UNLESS NOTED OTHERWISE 2.0 INCH
- THE KEY-IN CONSTRUCTION JOINTS SHALL BE MONOLITHIC AND CONTINUOUS FOR THE FULL LENGTH OF THE JOINTS.
- JOINTS AND SCORE MARKS IN CONCRETE SHALL BE CONSTRUCTED AS INDICATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
- JOINTS IN CONCRETE BRIDGE RAILING SHALL BE SPACED AT 15' - 0" MAXIMUM. POUR SEQUENCE SHALL BE IN ALTERNATING SECTIONS.
- REINFORCING STEEL SHALL CONFORM TO AASHTO M 31, GRADE 420 (GRADE 60) AND SHALL BE DETAILED AND FABRICATED USING PROCEDURES AND TOLERANCES IN ACCORDANCE WITH APPLICABLE PUBLICATIONS OF THE CONCRETE REINFORCING STEEL INSTITUTE (CRSI).
- PIER CONCRETE REPAIRS SHALL BE PERFORMED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. A THOROUGH INSPECTION BY THE ENGINEER WILL BE MADE OF ALL PIER SUBSTRUCTURE AREAS PRIOR TO COMMENCING ANY WORK AND THOSE AREAS FOUND TO HAVE SPALLED, DELAMINATED, OR TO OTHERWISE BE UNSOUND CONCRETE WILL BE REPAIRED. THE CONTRACTOR SHALL SUPPLY ANY STAGING REQUIRED FOR THIS INSPECTION, THE COST FOR WHICH SHALL BE INCIDENTAL TO ALL OTHER ITEMS IN THE CONTRACT.
- ALL REINFORCING STEEL LAP LENGTHS WERE DESIGNED ASSUMING DUAL-COATED STEEL.
- MECHANICAL CONNECTORS SHALL CONFORM TO THE REQUIREMENTS OF SECTION 507 FOR LEVEL II REINFORCING.
- UNLESS OTHERWISE NOTED, ALL CAST-IN-PLACE PORTIONS OF THE SUPERSTRUCTURE AND THE PORTION OF THE ABUTMENTS ABOVE THE HORIZONTAL CONSTRUCTION JOINT LOCATED BELOW THE BEAMS SHALL BE ITEM 501.33 "CONCRETE, HIGH PERFORMANCE CLASS A".
- FORM A 1" V-GROOVE ON THE FASCIAS AT THE HORIZONTAL JOINT BETWEEN THE CONCRETE BRIDGE RAILING AND THE PRECAST PRESTRESSED CONCRETE NEXT D BEAM FLANGE
- CONSTRUCTION JOINTS SHALL BE PROVIDED IN THE CONCRETE PARAPET PORTION OF THE BRIDGE RAILING CONSISTENT WITH THE REQUIREMENTS AND DETAILS FOR CONCRETE CURBS AS SHOWN ON STRUCTURES DETAIL SHEET SD-502.00

NEXT D BEAMS

- NEXT D BEAMS ARE A NONPROPRIETARY SHAPE DEVELOPED BY PCI NORTHEAST (PCINE). STANDARDIZED SECTION PROPERTIES AND DETAILS MAY BE FOUND AT WWW.PCINE.ORG.
- DESIGN VALUES
 - CONCRETE COMPRESSIVE STRENGTH: $f'_c = 8000$ PSI.
 - CONCRETE COMPRESSIVE STRENGTH AT RELEASE: $f'_{cl} = 6000$ PSI.
 - PRESTRESSING STRANDS: 0.6 INCH DIAMETER, 270 KSI, LOW RELAXATION, 7-WIRE STRANDS.
 - APPARENT MODULUS OF ELASTICITY = 28,500 KSI.
 - JACKING FORCE PER STRAND = 44 KIPS.
- EXCEPT AS NOTED OTHERWISE FLANGE CLOSURE POURS SHALL BE HPC RAPID SET CONCRETE IN ACCORDANCE WITH ITEM 900.608, "SPECIAL PROVISION (HIGH PERFORMANCE CONCRETE, RAPID SET)." CONCRETE SHALL HAVE A 28 DAY MINIMUM COMPRESSIVE STRENGTH OF 7000 PSI.

- FLANGE KEYWAYS SHALL BE SANDBLASTED PRIOR TO DELIVERY AND POWER WASHED WITH WATER PRIOR THE ERECTION OF THE BEAMS.
- METHOD OF FORMING THE FLANGE CONNECTION SHALL BE DETERMINED BY THE CONTRACTOR. THE FORMS SHALL BE REMOVABLE AND ABLE TO ACCOMMODATE DIFFERENTIAL CAMBER. FORM SUPPORTS SHALL NOT PENETRATE THROUGH THE TOP OF THE POUR UNLESS APPROVED BY THE ENGINEER.
- THE DRILLING OF HOLES IN THE PRECAST BEAMS AND THE USE OF POWER ARTICULATED TOOLS ON THE BEAMS WILL NOT BE PERMITTED.
- PRODUCT DIMENSIONAL TOLERANCES FOR THE PRESTRESSED CONCRETE NEXT D BEAMS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS FOR B-11 BOX BEAMS OF THE LATEST EDITION OF PCI MNL-116 MANUAL FOR QUALITY CONTROL FOR PLANTS AND PRODUCTION OF PRECAST AND PRESTRESSED PRODUCTS.

PILE FOUNDATIONS

- THE PILES SHALL BE HP 10x57.
- PILE SHOES ARE REQUIRED AND SHALL CONFORM TO SUBSECTION 505.04(F) OF THE STANDARD SPECIFICATIONS.
- THE TOPS OF PILES AFTER DRIVING SHALL NOT VARY FROM THE PLAN POSITION BY MORE THAN 3 INCHES. THE PILE ORIENTATION SHALL NOT VARY BY MORE THAN 5 DEGREES. THE CONTRACTOR SHALL DEMONSTRATE HOW THE TOLERANCES WILL BE MET TO THE SATISFACTION OF THE ENGINEER REGARDLESS OF INSTALLATION METHOD.
- TO ENSURE THAT THE NOMINAL RESISTANCE HAS BEEN ATTAINED AND TO PREVENT THE OVERSTRESSING OF THE PILES DURING DRIVING OPERATIONS, DYNAMIC TESTING SHALL BE PERFORMED IN ACCORDANCE WITH SUBSECTION 505.04(D)-2 OF THE STANDARD SPECIFICATIONS. PAYMENT FOR ONE PILE TEST SHALL BE CONDUCTED ON THE FIRST PILE DRIVEN AT EACH ABUTMENT, FOR A TOTAL OF 2 TESTS. MORE TESTS MAY BE REQUIRED BY THE ENGINEER. PAY ITEM FOR TESTING, INCLUDING ANY ADDITIONAL TESTS ORDERED BY THE ENGINEER IS 505.45 "DYNAMIC PILE LOAD TEST."
- THE PILES SHALL BE DRIVEN TO A REQUIRED NOMINAL RESISTANCE OF 265 KIPS AS DETERMINED BY THE RESULTS OF DYNAMIC TESTING, AS INTERPRETED BY THE ENGINEER PROVIDED A MINIMUM PENETRATION OF 15 FEET BELOW THE BOTTOM OF PILE CAP HAS BEEN ACHIEVED.
- FOR ESTIMATING PURPOSES, THE PILE TIP ELEVATIONS WERE ASSUMED AS SHOWN ON THE BORING LOGS. THE ACTUAL LENGTHS MAY VARY.

ELASTOMERIC BEARINGS

- ELASTOMER COMPOUND SHALL HAVE A NOMINAL HARDNESS OF 60 ON THE SHORE A SCALE, AND SHALL CONFORM TO SUBSECTION 731.03.
- STEEL REINFORCEMENT FOR THE ELASTOMERIC BEARING PADS SHALL CONFORM TO SECTION 506 FOR GRADE 50 STEEL.
- THE ELEVATION OF THE BEARING PEDESTALS ARE DETAILED CONSIDERING PREDICTED BEAM CAMBER AND BEAM END ROTATIONS AT ERECTION (30-60 DAYS AFTER STRESSING).
- THE CONTRACTOR IS ADVISED TO HAVE A MINIMUM OF 32 - ¼" X 11 ½" X 1'-0 ½", 16 - 1/8" X 11 ½" X 1'-0 ½", AND 32 - TAPERED 1/8" TO 3/8" X 11 ½" X 1'-0 ½" (TAPERED ALONG 1'-0 ½" DIRECTION) RECTANGULAR GALVANIZED STEEL SHIMS AVAILABLE FOR USE FOR ELEVATION ADJUSTMENTS UPON SETTING OF THE SUPERSTRUCTURE UNITS AT THE PIER LOCATIONS. A 1/8" THICK NEOPRENE SHEET WILL BE PROVIDED BETWEEN CONCRETE SURFACES AND THE STEEL SHIMS. THE SHIMS SHALL BE FABRICATED ACCORDING TO SECTION 531 AND SHALL BE INCLUDED IN THE UNIT BID PRICE FOR ITEM 531.17, 'BEARING DEVICE ASSEMBLY, STEEL REINFORCED ELASTOMERIC PAD".
- THE CONTRACTOR IS ADVISED TO HAVE A MINIMUM OF 16 - ¼" X 10" X 1'-2", 8 - 1/8" X 10" X 1'-2", AND 16 - TAPERED 1/8" TO 3/8" X 10" X 1'-2" (TAPERED ALONG 1'-2" DIRECTION) RECTANGULAR GALVANIZED STEEL SHIMS AVAILABLE FOR USE FOR ELEVATION ADJUSTMENTS UPON SETTING OF THE SUPERSTRUCTURE UNITS AT THE ABUTMENT LOCATIONS. A 1/8" THICK NEOPRENE SHEET WILL BE PROVIDED BETWEEN CONCRETE SURFACES AND THE STEEL SHIMS. THE SHIMS SHALL BE FABRICATED ACCORDING TO SECTION 531 AND SHALL BE INCLUDED IN THE UNIT BID PRICE FOR ITEM 531.16, 'BEARING DEVICE ASSEMBLY, PLAIN ELASTOMERIC PAD".

BRIDGE RAILING, APPROACH RAILING, AND GUARDRAIL

- ALL STEEL COMPONENTS OF THE BRIDGE RAILING, APPROACH RAILING, AND GUARDRAIL SHALL BE COATED BLACK IN ACCORDANCE WITH ASTM D7803 FOLLOWING GALVANIZING.

PROJECT NAME: ROCKINGHAM
PROJECT NUMBER: BRF 0126(12)

TYLIN INTERNATIONAL

FILE NAME: z10J072bdr_not.es.dgn
PROJECT LEADER: R. HEBERT
DESIGNED BY: S. KELLER
PROJECT NOTES

PLOT DATE: 8/26/2014
DRAWN BY: D. AXTELL
CHECKED BY: T. POULIN
SHEET 10 OF 69

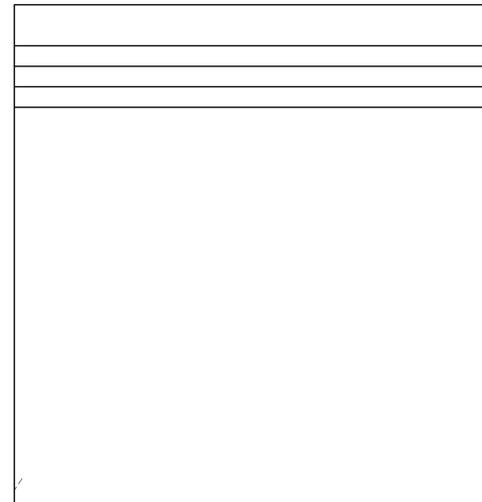
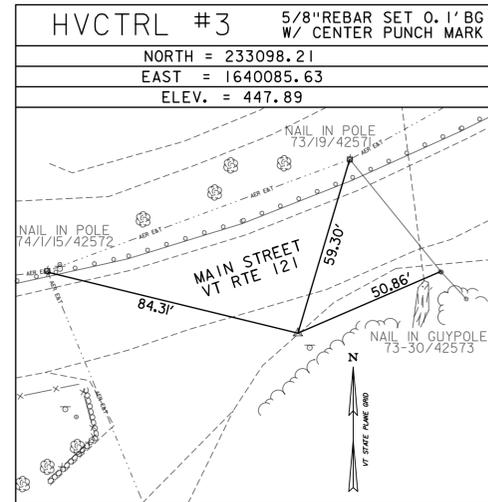
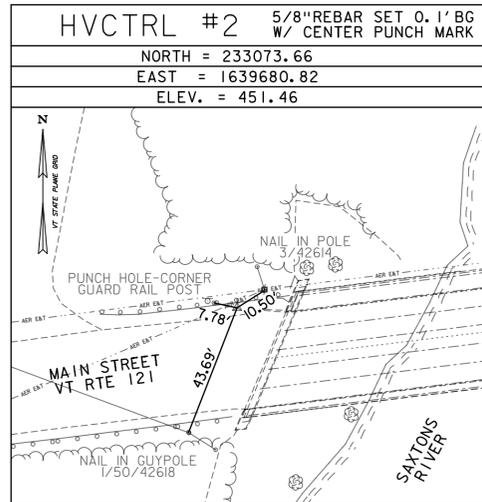
GPS/NGS CONTROL POINTS

SPRINGFIELD VT CORS ARP

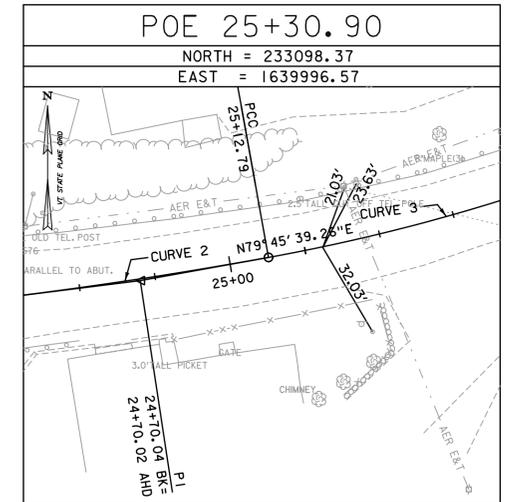
PID DJ8961
 N = 284807.69
 E = 1646390.48
 ELLIP HEIGHT = 513.30

STATION IS A GPS CONTINUOUSLY OPERATING REFERENCE STATION. STATION IS THE ANTENNA REFERENCE POINT OF THE GPS ANTENNA. LOCATED AT THE SPRINGFIELD, VERMONT HIGH SCHOOL, THE MONUMENT IS ATTACHED TO A TWO STORY CONCRETE & BRICK BUILDING WITH AN 8 FT CONCRETE FOUNDATION BUILT IN 1967. THE MAST IS A 1.75 INCH DIA. GALV PIPE THAT IS 108 INCHES LONG. THE MAST IS ATTACHED TO A STEEL MOUNTING FRAME WITH THREE ATTACHMENTS CONSISTING OF 3/8 INCH SS THROUGH BOLTS. THE MOUNTING FRAME IS ATTACHED TO THE BUILDING USING 8 ATTACHMENT POINTS. THE TOP 2 AND THIRD 2 ARE 1/2 INCH SS BOLTS SECURED TO THE BRICK OR CONC WITH LEAD ANCHORS. THE SECOND 2 AND BOTTOM 2 ATTACHMENTS ARE THROUGH BOLTED AND CONSIST OF 1/2 INCH SS THREADED ROD AND NUTS.

TRAVERSE TIES

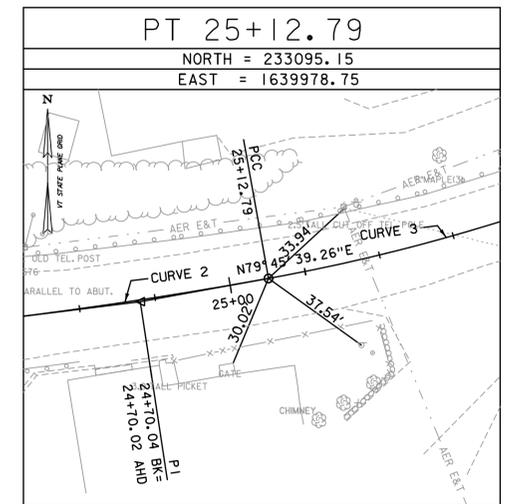
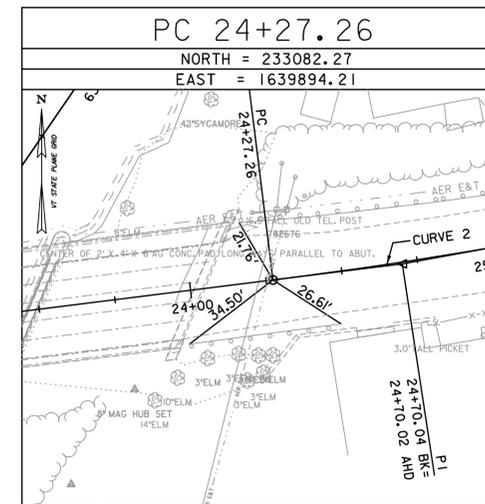
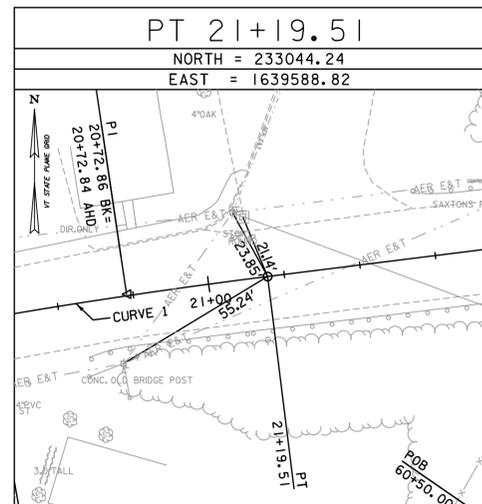
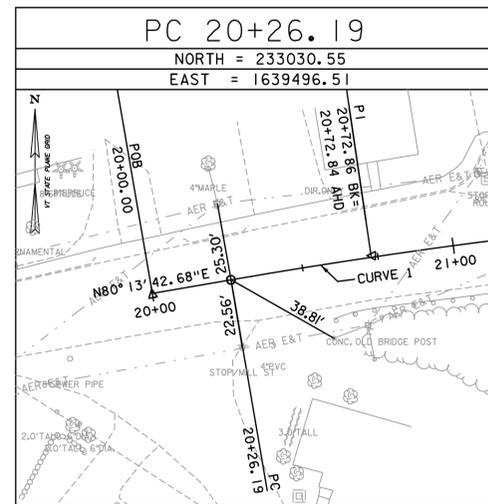
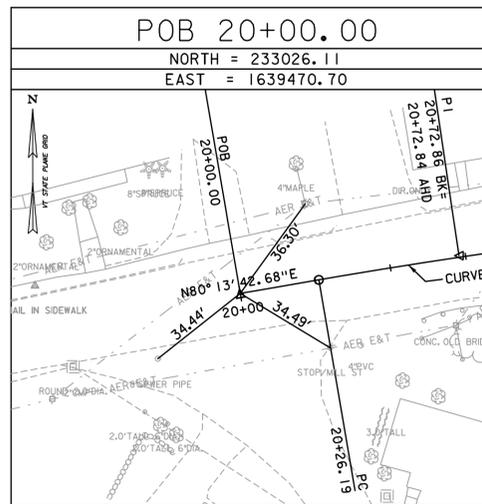


ALIGNMENT TIES



* MAIN TRAVERSE COMPLETED: DECEMBER 1, 2011 BY VSE, M. HUDSON-PC, M. YEFCHAK

ALIGNMENT TIES



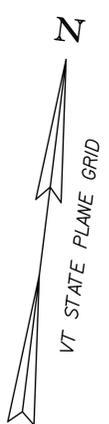
DATUM	
VERTICAL	NAVD 88(GEIOD09) FT
HORIZONTAL	NAD 83(CORS) sFT
ADJUSTMENT	LSQ



PROJECT NAME: ROCKINGHAM
 PROJECT NUMBER: BRF 0126(12)

FILE NAME: z10J072bdr_t1.dgn
 PROJECT LEADER: R. HEBERT
 DESIGNED BY: D. BURHANS
 TIE SHEET

PLOT DATE: 8/26/2014
 DRAWN BY: D. BURHANS
 CHECKED BY: R. HEBERT
 SHEET II OF 69



GUARDRAIL APPROACH SECTION,
GALVANIZED 2 RAIL BOX BEAM
(COATED BLACK)

21+69.32, RT - 22+03.33, RT
21+90.01, LT - 22+24.01, LT
24+05.15, RT - 24+38.98, RT
24+25.84, LT - 24+60.21, LT

BRIDGE RAILING, GALVANIZED STEEL
TUBING/CONCRETE COMBINATION
(COATED BLACK)

22+03.33, RT - 24+05.15, RT
22+24.01, LT - 24+25.84, LT

DURABLE 4" YELLOW LINE

20+26.19 - 21+12.28 (CENTERLINE)
21+52.28 - 25+12.79 (CENTERLINE)

DURABLE 4" WHITE LINE

20+26.19, LT - 21+20.38, LT (EDGE LINE)
20+26.19, RT - 25+12.79, RT (EDGE LINE)
21+57.35, LT - 25+12.79, LT (EDGE LINE)

REMOVAL AND DISPOSAL OF GUARDRAIL

21+69.52, LT - 22+31.98, LT
20+57.50, RT - 22+08.42, RT
24+18.55, LT - 24+62.21, LT
23+97.48, RT - 24+47.48, RT

MANUFACTURED TERMINAL SECTION, TANGENT
(COATED BLACK)

20+50.69, 16.00', RT - 21+00.21, 15.50' RT

BOX BEAM GUARDRAIL (COATED BLACK)

21+67.88, LT - 21+78.01, LT (30' RADIUS)
21+78.01, LT - 21+90.01, LT
21+00.21, RT - 21+19.51, RT
21+19.51, RT - 21+51.32, RT
21+51.32, RT - 21+69.32, RT
24+60.21, LT - 24+96.97, LT
24+96.97, LT - 27+15.01, LT
27+15.01, LT - 27+83.30, LT
27+83.30, LT - 28+01.09, LT (20' RADIUS)
24+38.98, RT - 24+43.76, RT

DURABLE 24 INCH STOP BAR

21+15.37, LT - 21+35.37, LT

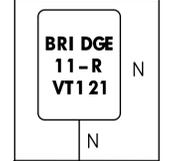
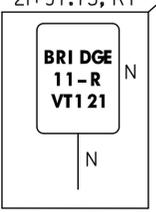
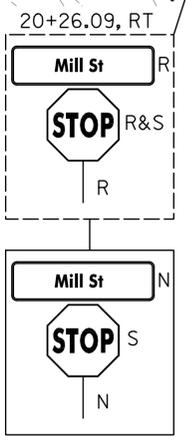
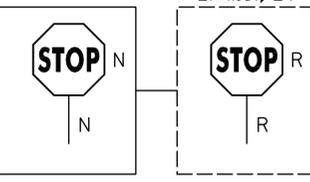
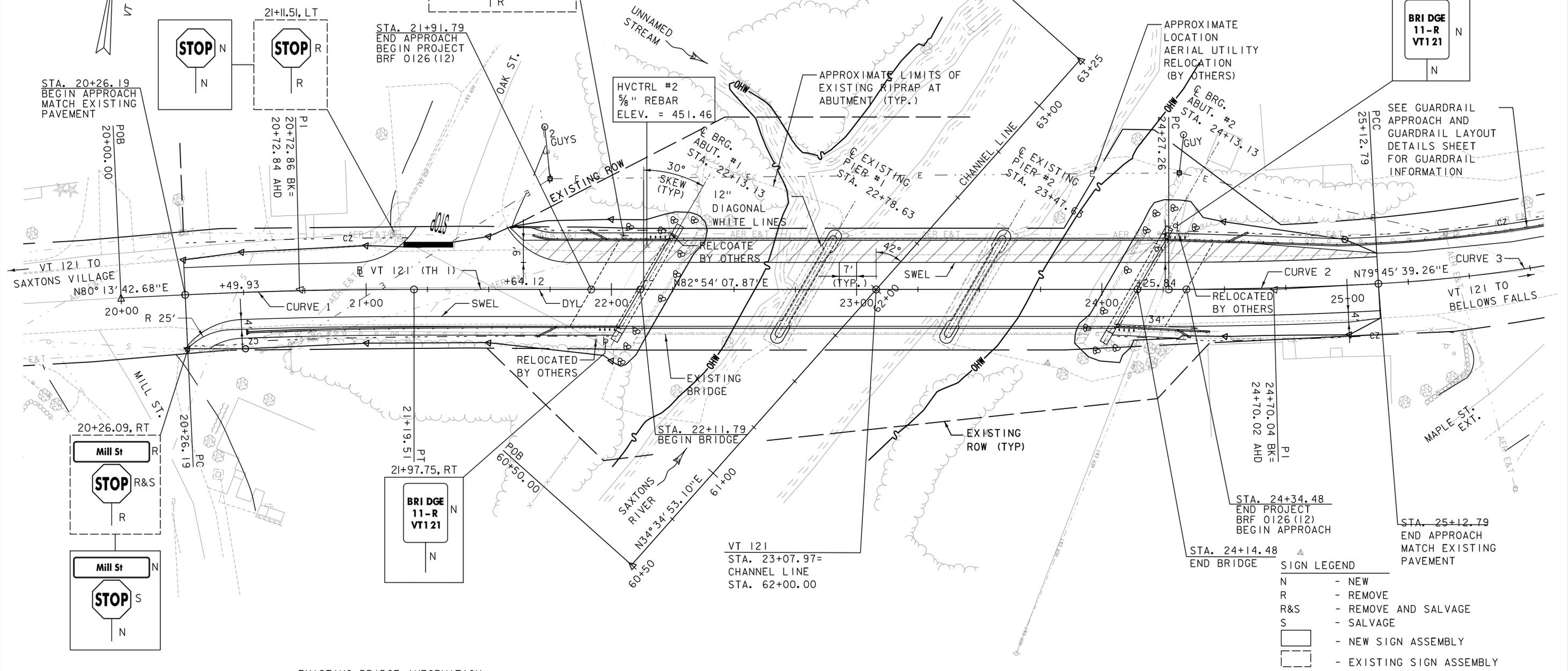
DURABLE LETTER OR SYMBOL

21+28.00, LT (STOP)

DURABLE 12 INCH WHITE LINE

21+69.09, LT - 25+09.76, LT (DIAGONAL STRIPING)

24+30.02, LT



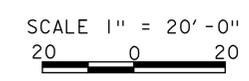
EXISTING BRIDGE INFORMATION

BUILT 1954
CONTINUOUS, STEEL BEAM, CONCRETE DECK
3 SPANS @ 55.00', 69.00', AND 55.00'
30'-0" ROADWAY (CURB TO CURB)
CONCRETE POST AND STEEL RAILING

CURVE (1)
PI STA. = 20+72.86
DELTA = 2°40'25"
D = 2°51'53"
R = 2000.00'
T = 46.67'
L = 93.33'
E = 0.54'

CURVE (2)
PI STA. = 24+70.04
DELTA = 3°08'29"
D = 3°40'22"
R = 1560.00'
T = 42.77'
L = 85.53'
E = 0.59'

CURVE (3)
PI STA. = 26+14.75
DELTA = 18°06'13"
D = 8°57'09"
R = 640.00'
T = 101.96'
L = 202.22'
E = 8.07'



- SIGN LEGEND**
- N - NEW
 - R - REMOVE
 - R&S - REMOVE AND SALVAGE
 - S - SALVAGE
 - [Solid Box] - NEW SIGN ASSEMBLY
 - [Dashed Box] - EXISTING SIGN ASSEMBLY
- STRIPING LEGEND**
- DYL - 4" DOUBLE YELLOW LINE
 - SWEL - 4" SOLID WHITE EDGE LINE

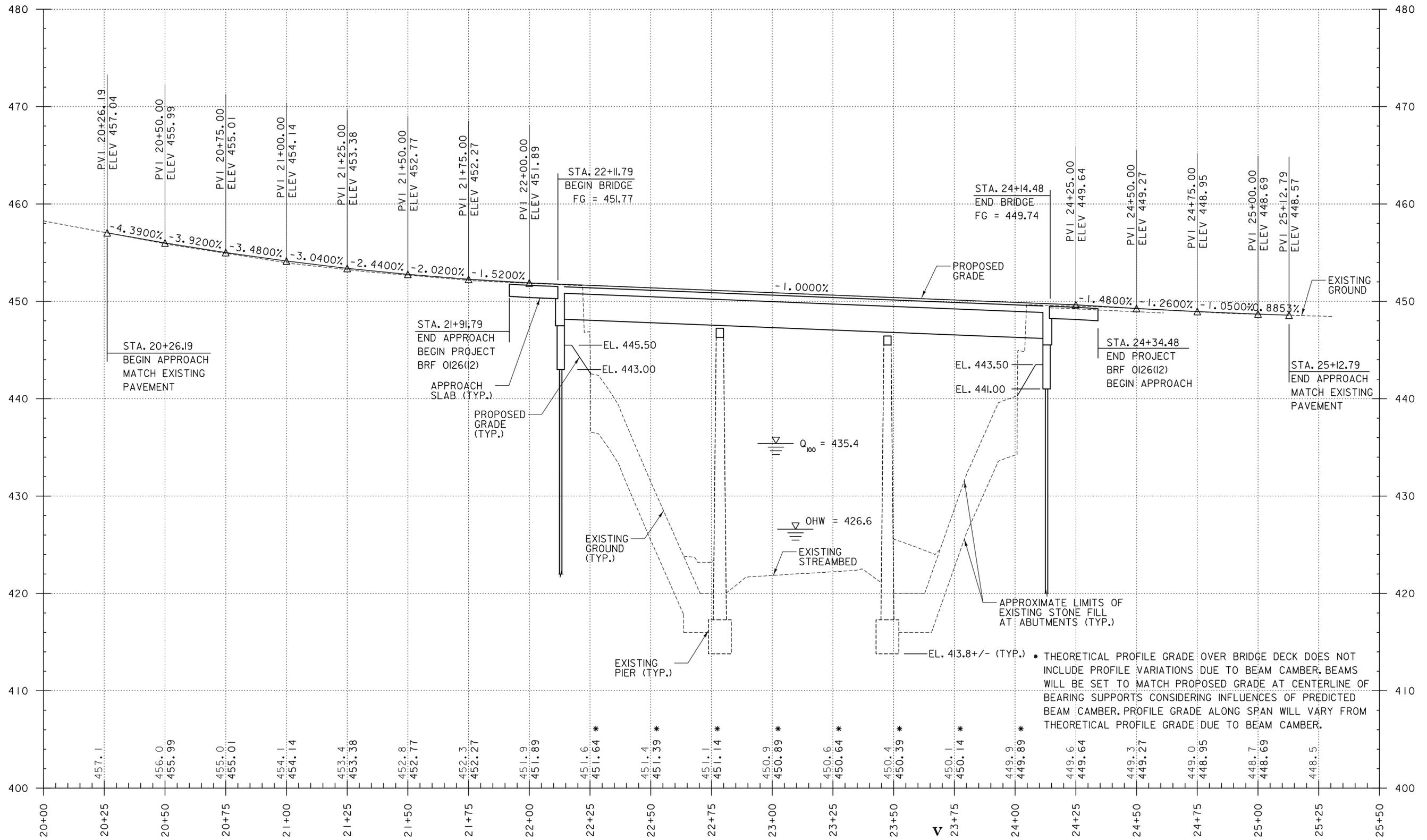
DATUM
VERTICAL NAVD 88(GEIOD09) FT
HORIZONTAL NAD 83(CORS) sFT
ADJUSTMENT LSQ

PROJECT NAME: ROCKINGHAM
PROJECT NUMBER: BRF 0126(12)

FILE NAME: z10J072bdr_nul.dgn
PROJECT LEADER: R. HEBERT
DESIGNED BY: D. BURHANS
LAYOUT SHEET

PLOT DATE: 8/26/2014
DRAWN BY: D. BURHANS
CHECKED BY: D. BRYANT
SHEET 12 OF 69

TYLIN INTERNATIONAL



PROFILE: VT ROUTE 121

DATUM
 VERTICAL NAVD 88(GE01D09) FT
 HORIZONTAL NAD 83(CORS) sFT
 ADJUSTMENT LSQ

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

SCALES:
 HORIZ: 1" = 20'
 VERT: 1" = 5'
 HORIZONTAL SCALE IN FEET
 VERTICAL SCALE IN FEET

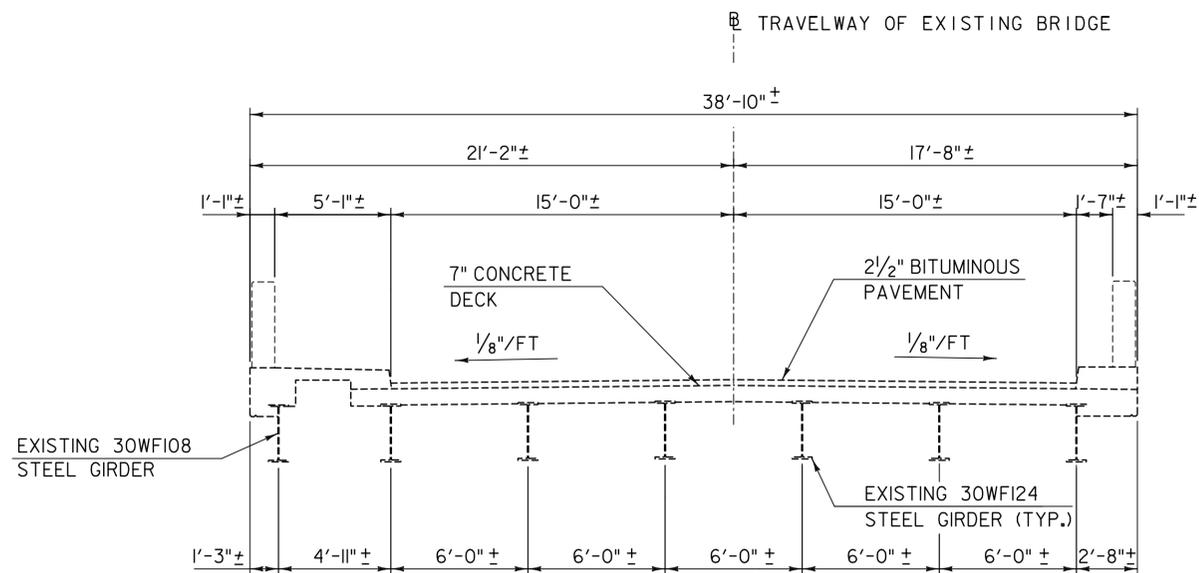
TYLINTERNATIONAL

PROJECT NAME: ROCKINGHAM
 PROJECT NUMBER: BRF 0126(12)

FILE NAME: z10J072bdr_pro.dgn
 PROJECT LEADER: R. HEBERT
 DESIGNED BY: D. BURHANS
 PROFILE SHEET

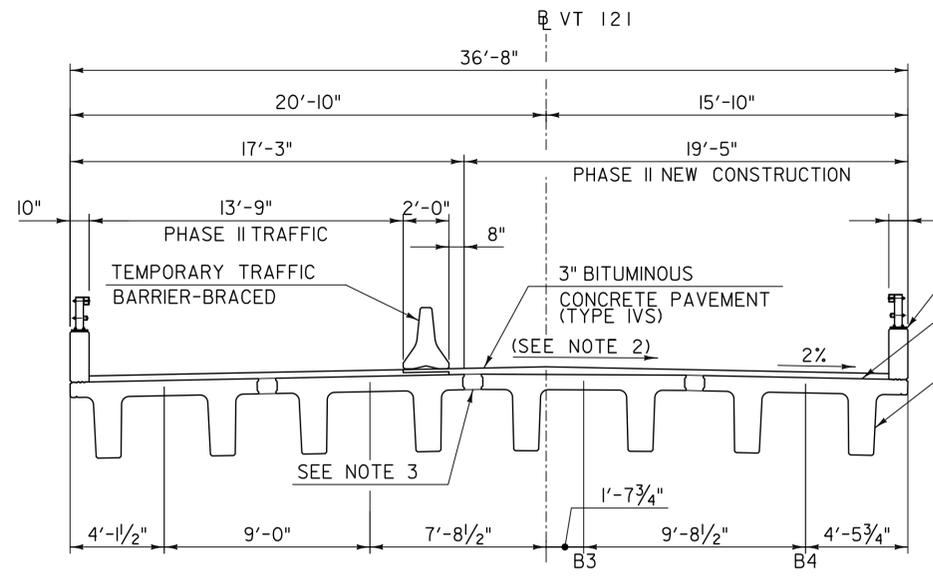
PLOT DATE: 8/26/2014
 DRAWN BY: J. DAVIS
 CHECKED BY: D. BRYANT
 SHEET 13 OF 69

* THEORETICAL PROFILE GRADE OVER BRIDGE DECK DOES NOT INCLUDE PROFILE VARIATIONS DUE TO BEAM CAMBER. BEAMS WILL BE SET TO MATCH PROPOSED GRADE AT CENTERLINE OF BEARING SUPPORTS CONSIDERING INFLUENCES OF PREDICTED BEAM CAMBER. PROFILE GRADE ALONG SPAN WILL VARY FROM THEORETICAL PROFILE GRADE DUE TO BEAM CAMBER.



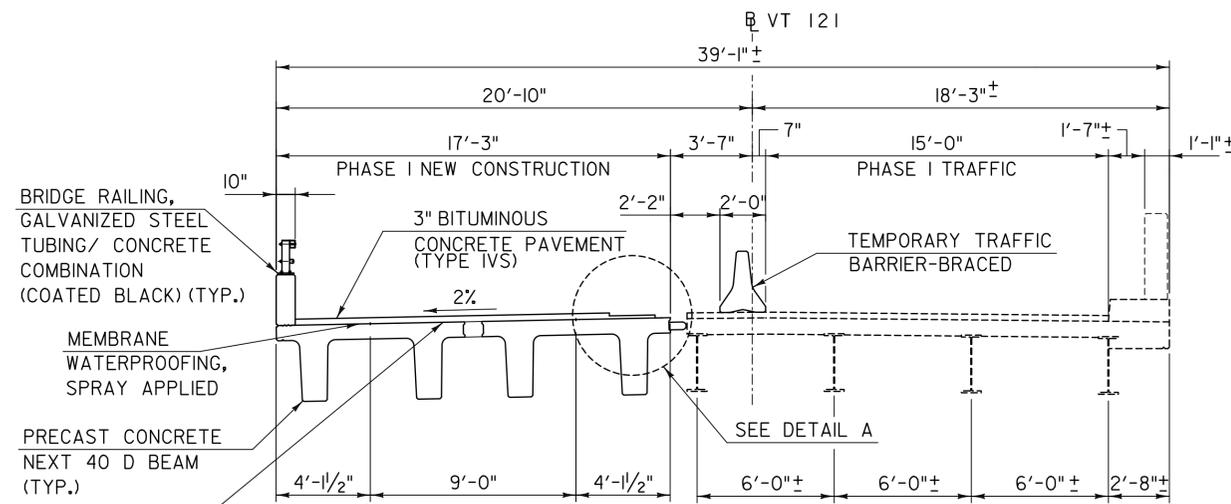
TYPICAL SECTION - EXISTING

SCALE 1/4" = 1'-0"



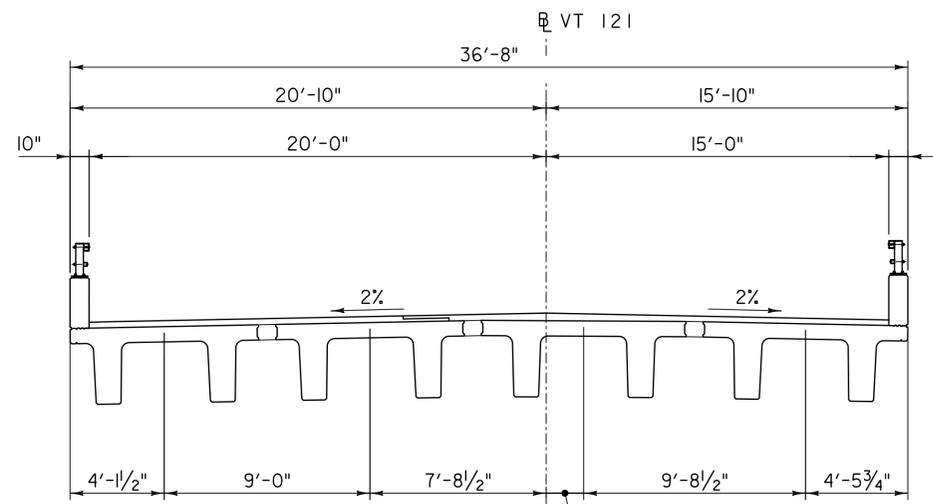
TYPICAL SECTION - CONSTRUCTION PHASE II

SCALE 1/4" = 1'-0"



TYPICAL SECTION - CONSTRUCTION PHASE I

SCALE 1/4" = 1'-0"



TYPICAL SECTION - FINAL BUILD

SCALE 1/4" = 1'-0"

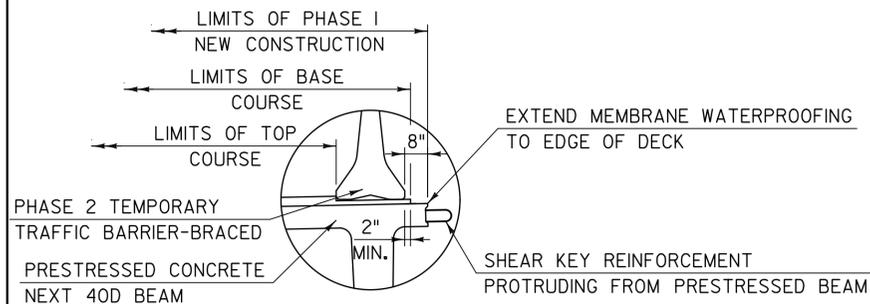
- BRIDGE RAILING, GALVANIZED STEEL TUBING/ CONCRETE COMBINATION (COATED BLACK) (TYP.)
- MEMBRANE WATERPROOFING, SPRAY APPLIED
- PRESTRESSED CONCRETE NEXT 40 D BEAM (TYP.)

SUGGESTED BRIDGE CONSTRUCTION SEQUENCE NOTES:

- PHASE I - NORTH HALF OF BRIDGE:
1. REMOVE EXISTING BRIDGE SUPERSTRUCTURE AND ABUTMENT BACKWALLS DOWN TO TOP OF EXISTING ABUTMENT BRIDGE SEATS.
 2. INSTALL ABUTMENT PILES AND CONSTRUCT ABUTMENTS UP TO HORIZONTAL JOINT BELOW BEAMS.
 3. CONSTRUCT ABUTMENT AND PIER PEDESTALS.
 4. INSTALL BEARINGS AND PRESTRESSED CONCRETE BEAMS.
 5. CONSTRUCT DIAPHRAGMS AT PIERS AND ABUTMENTS ABOVE HORIZONTAL JOINT BELOW BEAMS.
 6. PLACE CLOSURE POURS OVER PIERS.
 7. PLACE CLOSURE POUR BETWEEN BEAM LINES 1 AND 2.
 8. CONSTRUCT APPROACH SLABS, BRIDGE RAILING, INSTALL SHEET MEMBRANE WATERPROOFING, AND PAVEMENT.
- PHASE 2 - SOUTH HALF OF BRIDGE:
1. REMOVE EXISTING BRIDGE SUPERSTRUCTURE AND ABUTMENT BACKWALLS DOWN TO TOP OF EXISTING ABUTMENT BRIDGE SEATS.
 2. INSTALL ABUTMENT PILES AND CONSTRUCT ABUTMENTS UP TO HORIZONTAL JOINT BELOW BEAMS.
 3. CONSTRUCT ABUTMENT AND PIER PEDESTALS.
 4. INSTALL BEARINGS AND PRESTRESSED CONCRETE BEAMS.
 5. CONSTRUCT DIAPHRAGMS AT PIERS AND ABUTMENTS ABOVE HORIZONTAL JOINT BELOW BEAMS.
 6. PLACE CLOSURE POURS OVER PIERS.
 7. PLACE CLOSURE POUR BETWEEN BEAM LINES 3 AND 4.
 8. PLACE CLOSURE POUR BETWEEN BEAM LINES 2 AND 3.
 9. CONSTRUCT APPROACH SLABS, BRIDGE RAILING, INSTALL SHEET MEMBRANE WATERPROOFING, AND PAVEMENT.

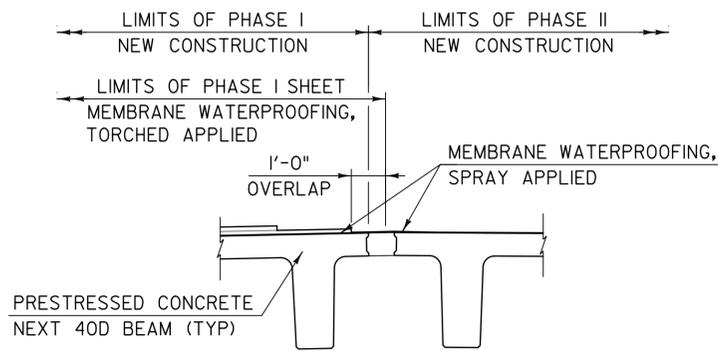
NOTES:

1. TEMPORARY TRAFFIC BARRIER SHALL MEET THE REQUIREMENTS FOR BRIDGE RAIL PERFORMANCE LEVEL TL3 OF NCHRP 350. TEMPORARY BARRIER CONNECTIONS SHALL BE DEVELOPED BY CONTRACTOR AND SHALL BE SUBMITTED TO VTRANS FOR REVIEW AND APPROVAL. TEMPORARY TRAFFIC BARRIER MAY BE ANCHORED TO EXISTING DECK BUT NOT TO PROPOSED DECK.
2. BEAM 3 SHALL BE SLOPED TRANSVERSELY TO MATCH ADJACENT BEAMS AND SHEAR KEYS. SEE "BRIDGE TYPICAL SECTION" SHEET FOR DETAIL.
3. HIGH PERFORMANCE CONCRETE, RAPID SET BETWEEN BEAMS B2 AND B3 SHALL MEET A 3 HOUR COMPRESSIVE STRENGTH OF 3000 PSI AND A 28 DAY COMPRESSIVE STRENGTH OF 7000 PSI.
4. PAYMENT FOR TEMPORARY TRAFFIC BARRIER-BRACED SHALL BE MADE UNDER ITEM 621.90 TEMPORARY TRAFFIC BARRIER.



DETAIL A

SCALE 3/8" = 1'-0"



MEMBRANE OVERLAP DETAIL

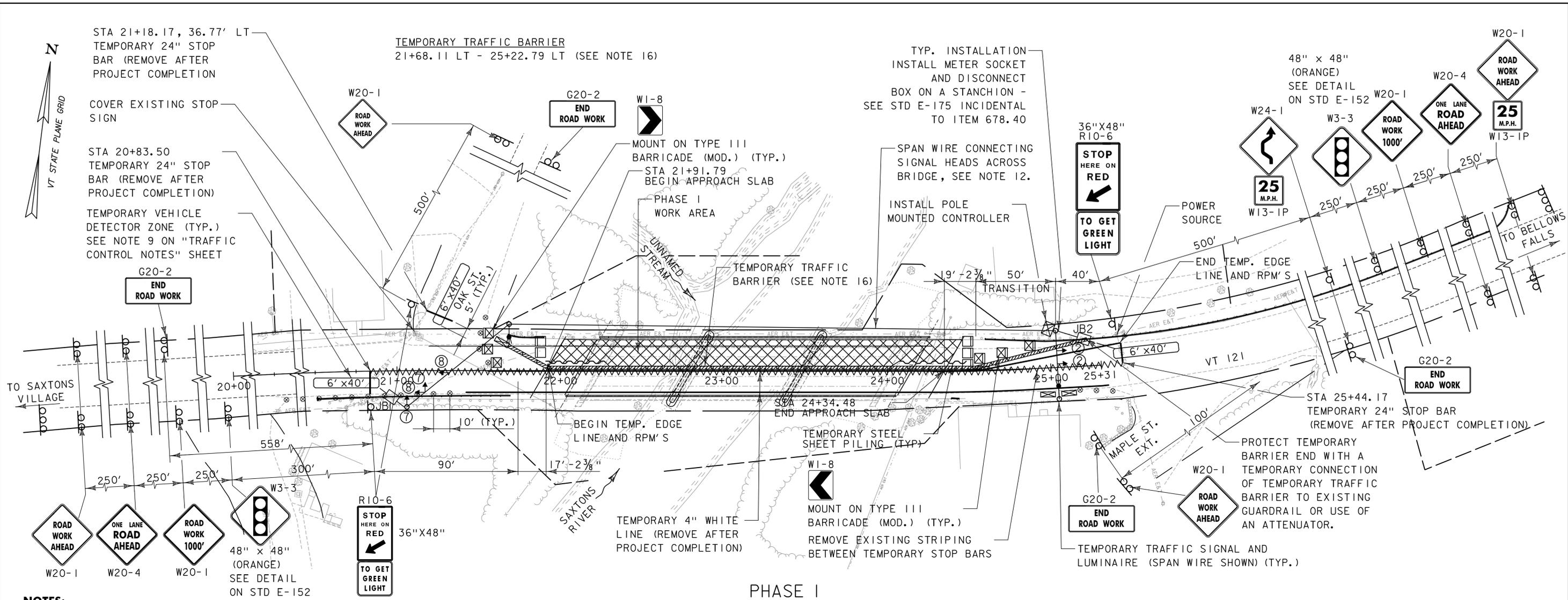
SCALE 3/8" = 1'-0"

TYLIN INTERNATIONAL

PROJECT NAME: ROCKINGHAM
PROJECT NUMBER: BRF 0126(12)

FILE NAME: z10J072bdr_bphase.dgn
PROJECT LEADER: R. HEBERT
DESIGNED BY: S. KELLER
BRIDGE CONSTRUCTION STAGING

PLOT DATE: 8/26/2014
DRAWN BY: D. AXTELL
CHECKED BY: T. POULIN
SHEET 14 OF 69



PHASE I

NOTES:

- SEE SHEET ENTITLED "TRAFFIC CONTROL NOTES" FOR ADDITIONAL NOTES.
- ALL SIGNAL RELATED SIGNS SHALL BE REMOVED OR COVERED WHEN THE SIGNAL IS NOT OPERATING.
- ITEM LOCATIONS ARE APPROXIMATE.
- THE CONTRACTOR SHALL BE RESPONSIBLE TO CONFIRM ALL MEASUREMENTS IN THE FIELD.
- BRIDGE WORK SHALL BE CONSTRUCTED IN TWO PHASES:
 - PHASE I: NORTH SIDE OF BRIDGE
 - PHASE II: SOUTH SIDE OF BRIDGE
- APPROACH CONSTRUCTION SIGNING SHALL REMAIN IN PLACE DURING THE ENTIRE CONSTRUCTION PERIOD.
- REMOVE ALL TEMPORARY PAVEMENT MARKINGS AFTER COMPLETION OF PROJECT.
- THE CONTRACTOR SHALL REPLACE ALL EXISTING PAVEMENT MARKINGS IN KIND AFTER COMPLETION OF PROJECT. SEE LAYOUT SHEET FOR DETAILS.
- TEMPORARY TRAFFIC SIGNAL POLES MAY BE CANTILEVER OR STRAIN POLE AT THE CONTRACTOR'S OPTION. POSITION TEMPORARY SIGNAL POLES FOR MAXIMUM VISIBILITY.
- INSTALLATION OF TEMPORARY CONSTRUCTION SIGNS SHALL NOT OBSTRUCT EXISTING SIGNS.
- LOCATIONS OF CONSTRUCTION APPROACH SIGNS ARE NOT SHOWN TO SCALE. USE THE DIMENSIONING SHOWN UNLESS DIRECTED OTHERWISE BY THE ENGINEER.
- AT CONTRACTOR'S OPTION, TEMPORARY SIGNAL WIRING ACROSS RIVER MAY BE LOCATED IN TEMPORARY CONDUIT ATTACHED TO BRIDGE.

- PAYMENT FOR INSTALLATION OF TEMPORARY TRAFFIC SIGNAL SYSTEM, INCLUDING PAVEMENT MARKINGS AND PAVEMENT MARKING REMOVAL, AND ALL RELATED TRAFFIC CONTROL DEVICES AS SPECIFIED IN SECTION 678 WILL BE MADE UNDER THE APPROPRIATE SECTION 678 ITEMS IN THE CONTRACT. PAYMENT FOR FURNISHING AND MAINTAINING ALL REMAINING TRAFFIC CONTROL DEVICES, INCLUDING BUT NOT LIMITED TO CONSTRUCTION APPROACH SIGNING, WILL BE MADE UNDER CONTRACT ITEM 641.10
- PAYMENT FOR TEMPORARY PAVEMENT MARKINGS AND RAISED PAVEMENT MARKERS ASSOCIATED WITH THE TEMPORARY SIGNAL SYSTEM WILL BE MADE UNDER CONTRACT ITEM 678.40.
- A SHORT TERM FULL ROADWAY CLOSURE, WITHIN THE PROJECT LIMITS, WILL BE REQUIRED FOR COMPLETION OF THE KEYWAY CLOSURE POUR BETWEEN BEAMS B2 AND B3. CLOSURE SHALL NOT EXCEED 6 HOURS. THE CONTRACTOR SHALL PROVIDE A PLAN FOR THE SHORT TERM FULL ROAD CLOSURE TO THE ENGINEER FOR APPROVAL A MINIMUM OF 14 DAYS PRIOR TO THE CLOSURE. THE CONTRACTOR SHALL PROVIDE TWO (2) PORTABLE CHANGEABLE MESSAGE SIGNS. THEY SHALL BE PLACED ON VT RTE 121 IN ADVANCE OF THE PROJECT, ONE TO THE EAST AND ONE TO THE WEST. THE PORTABLE CHANGEABLE MESSAGE SIGNS SHALL BE PLACED 14 DAYS PRIOR TO THE CLOSURE TO GIVE ADVANCED NOTICE TO THE PUBLIC. THE ADVANCED NOTICE MESSAGE SHALL BE APPROVED BY THE ENGINEER. FOR CLOSURE PERIOD THE MESSAGE SHALL READ "BRIDGE CLOSED - SEEK ALTERNATE ROUTE". THESE SIGNS WILL BE PAID FOR UNDER ITEM 641.15. ALL OTHER ITEMS SPECIFIC TO THE FULL CLOSURE SHALL BE PAID FOR UNDER ITEM 641.10 TRAFFIC CONTROL.
- TEMPORARY TRAFFIC BARRIER-BRACED SHALL BE USED EXCEPT FLARED ENDS MAY BE TEMPORARY TRAFFIC BARRIER IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 621.07. SEE "TEMPORARY TRAFFIC BARRIER-BRACED" SHEETS FOR DETAILS.

LEGEND

- TEMPORARY TRAFFIC BARRIER
- TYPE III BARRICADES
- TYPE III BARRICADES (MOD.)
- REFLECTORIZED PLASTIC DRUM
- PAVEMENT MARKING REMOVAL
- TRAFFIC SIGNAL POLE WITH LUMINAIRE
- SIGNAL HEAD AND STEP
- CONTROLLER
- JUNCTION BOX
- ATTENUATOR
- PORTABLE CHANGEABLE MESSAGE SIGN
- SIGN WITH ONE POST
- SIGN WITH TWO POSTS

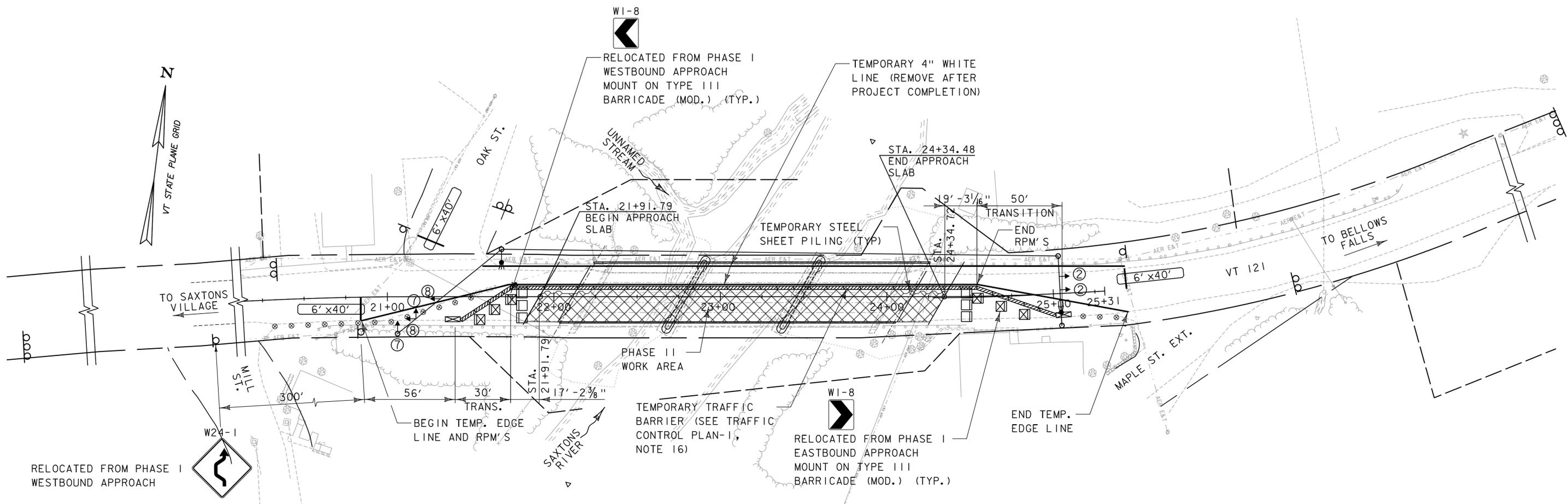
SIGNING NOTES:

- INSTALL SIGNS WITH THE FLOW OF TRAFFIC.
- ADJUST SIGN SPACINGS TO ACCOMODATE EXISTING SIGNS OR OBSTRUCTIONS - TRIM BRANCHES AS NECESSARY. PAYMENT FOR TRIMMING BRANCHES SHALL BE INCIDENTAL TO ITEM 641.10 TRAFFIC CONTROL
- COVER CONTRADICTORY EXISTING SIGNING.
- SEE LEGEND ON TRAFFIC CONTROL PLAN -2.

SCALE 1" = 30'-0"
 30 0 30

TYLIN INTERNATIONAL

PROJECT NAME:	ROCKINGHAM	FILE NAME:	z10J072bdr_mot_01.dgn	PLOT DATE:	8/26/2014
PROJECT NUMBER:	BRF 0126(12)	PROJECT LEADER:	R. HEBERT	DRAWN BY:	C. SARGEANT
		DESIGNED BY:	C. SARGEANT	CHECKED BY:	D. BURHANS
		TRAFFIC CONTROL PLAN - 1		SHEET 15	OF 69



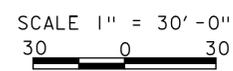
PHASE II

- NOTES:**
- FOR ADDITIONAL NOTES SEE TRAFFIC CONTROL PLAN - 1.
 - SEE TRAFFIC CONTROL PLAN - 1 FOR CONSTRUCTION APPROACH SIGNING.

SIGN #	DESCRIPTION	SIZE	QTY	SUPPORT
W20-1	ROAD WORK AHEAD	48x48	4	8 - POSTS (2/SIGN ASSEMBLY)
W13-IP	25 M.P.H.	24x30	2	
W20-1	ROAD WORK 1000 FT	48x48	2	4 - POSTS (2/SIGN)
W20-4	ONE LANE ROAD AHEAD	48x48	4	8 - POSTS (2/SIGN)
W3-3	TRAFFIC SIGNAL	48x48	2	4 - POSTS (2/SIGN)
RI0-6	STOP HERE ON RED	36x48	2	2 - POSTS (1/SIGN)
G20-2	END ROAD WORK	48x24	4	8 - POSTS (2/SIGN)
W1-8	CHEVRON	24X30	2	ON BARRICADE
W24-1	DOUBLE REVERSE CURVE (1 LANE)	48x48	1	1 - POSTS (1/SIGN ASSEMBLY)
W13-IP	25 M.P.H.	24x30	1	

REMOVE AND RESET
 TEMPORARY TRAFFIC BARRIER
 21+40.71 RT - 24+88.45 RT
 TEMPORARY TRAFFIC BARRIER
 24+88.45 RT - 25+00.71 RT

SQUARE SIGN POSTS	35
POST ANCHORS	35



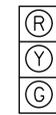
TYLIN INTERNATIONAL	PROJECT NAME: ROCKINGHAM	PLOT DATE: 8/26/2014
	PROJECT NUMBER: BRF 0126(12)	DRAWN BY: C. SARGEANT
	FILE NAME: z10J072bdr_mot_02.dgn	CHECKED BY: D. BURHANS
	PROJECT LEADER: R. HEBERT	SHEET 16 OF 69
	DESIGNED BY: C. SARGEANT	
	TRAFFIC CONTROL PLAN - 2	

SEE TRAFFIC CONTROL PLAN FOR PHASED CONSTRUCTION PLANS.

CONTROLLER TIMING CHART

PHASE	1	2	3	4	5	6	7	8	9
IN USE	-	X	-	-	-	-	X	X	-
TRAFFIC MOVEMENT		WBT					SBLR	EBLT	
MIN GREEN		8					8	8	
MAX GREEN		23					20	24	
YELLOW CLEARANCE		5					5	5	
ALL RED CLEARANCE		6					6	6	
VEHICLE EXTENSION		3					3	3	
RECALL MODE		SOFT					NONE	SOFT	

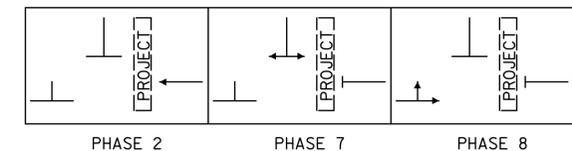
SIGNAL FACE ARRANGEMENT (12" LENSES)



ALL

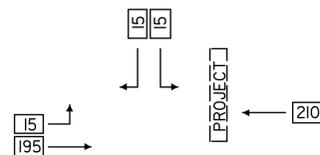
NOTE:
RED BALL AND RED ARROW INDICATIONS REQUIRE LED LAMPS WITH A VISIBLE BEAM SPREAD OF 80 DEGREES OFF AXIS

PHASING DIAGRAM



COLORS: BLACK TEXT & BORDER
WHITE REFL. BACKGROUND
MATERIALS: PER STD. E-142

MOVEMENT VOLUME ASSUMPTIONS



NOTES:

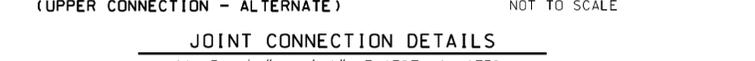
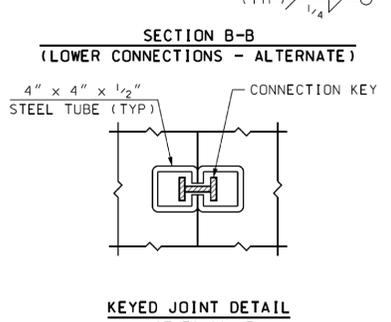
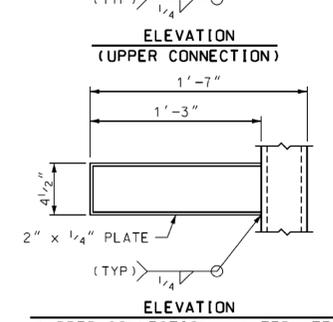
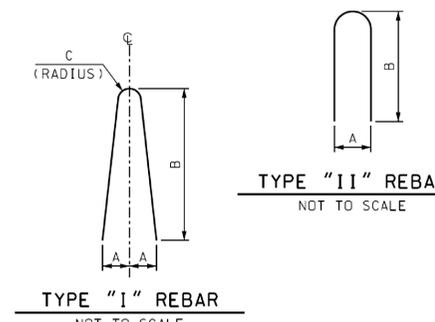
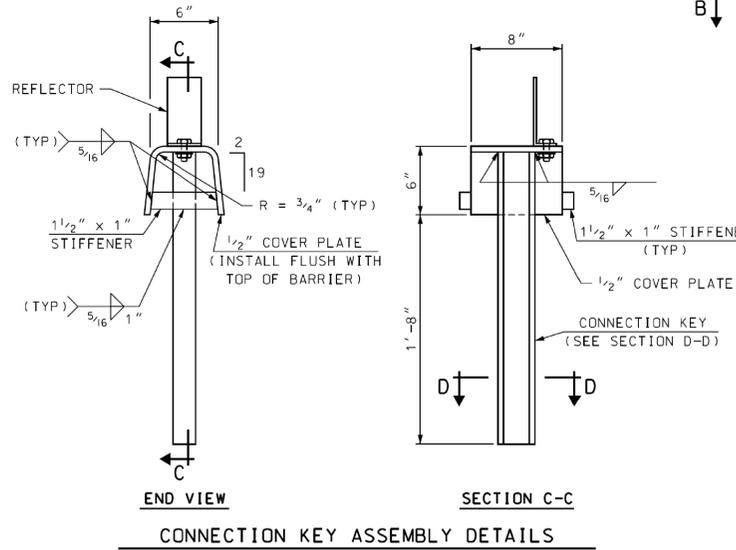
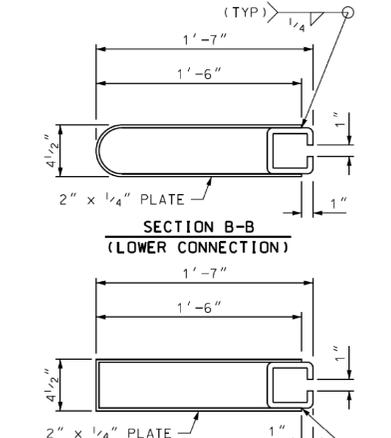
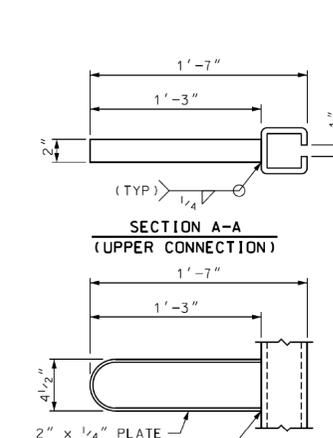
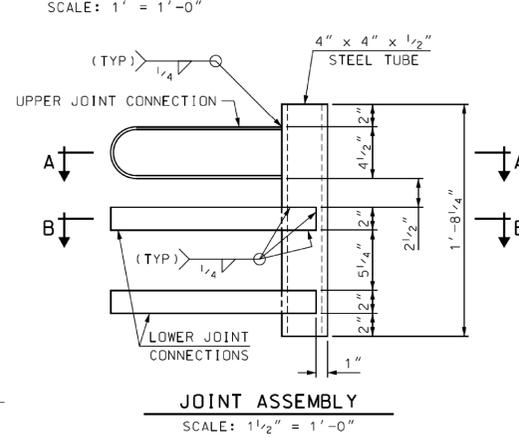
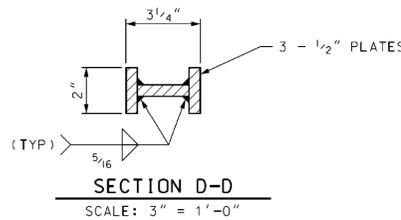
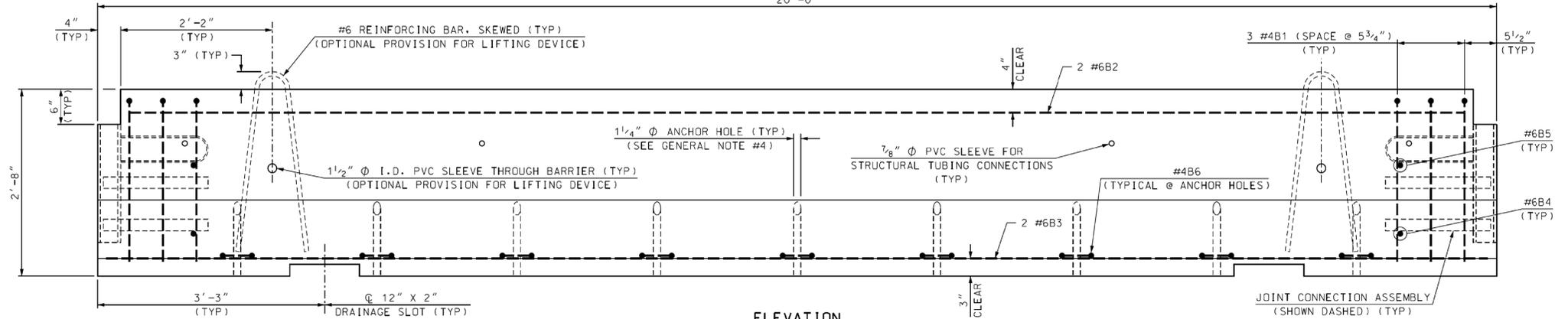
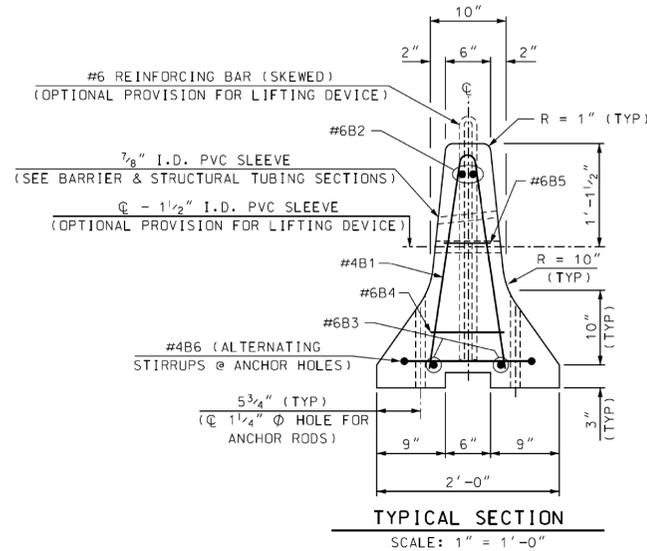
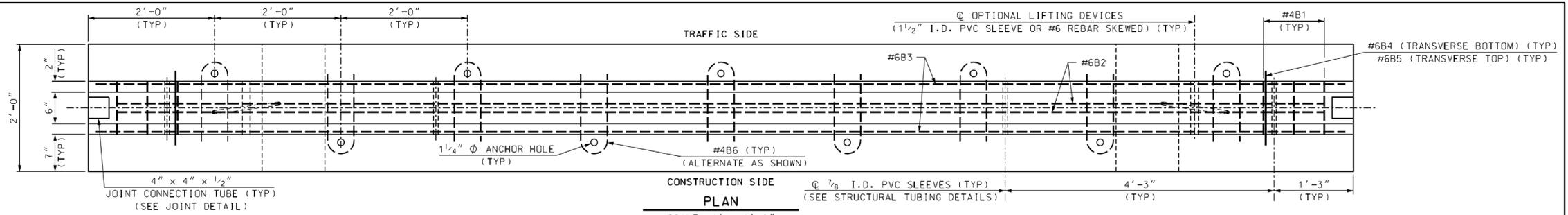
- DESIGN OF THE SIGNAL SUPPORT(S) AND ANY REQUIRED GUYING IS THE RESPONSIBILITY OF THE CONTRACTOR. ALL WORK SHALL BE COMPLETED WITHIN THE EXISTING ROW.
- SIGNAL TIMING/TIMING ADJUSTMENTS REQUESTED BY THE ENGINEER SHALL BE ACCOMPLISHED AS DIRECTED BY THE ENGINEER AND PAYMENT SHALL BE INCIDENTAL TO THE TRAFFIC SIGNAL ITEM. THE ALL-RED CLEARANCE INTERVAL IS BASED ON AN ASSUMED SPEED OF 10-20 MPH, THE ENGINEER SHALL MAKE SEVERAL TRIAL RUNS TO DETERMINE THE PROPER ALL-RED CLEARANCE INTERVAL.
- SIGNAL FACES SHALL CONSIST OF 12" LENSES. (RED, YELLOW, AND GREEN)
- THE BOTTOM OF THE HOUSING OF A SIGNAL FACE SUSPENDED OVER A ROADWAY SHALL NOT BE LESS THAN 16 1/2 FEET NOR MORE THAN 19 FEET ABOVE THE PAVEMENT GRADE AT THE CENTER OF THE ROADWAY. THE BOTTOM OF A SIGNAL FACE NOT MOUNTED OVER A ROADWAY, SHALL NOT BE LESS THAN 8 FEET NOR MORE THAN 15 FEET ABOVE THE GROUND. CAUTION SHOULD BE USED TO ENSURE COMPLIANCE WITH THE HEIGHT REQUIREMENTS IN THE EVENT THE NEW APPROACH GRADES DIFFER SIGNIFICANTLY FROM THE OLD ROAD GRADE.
- SIGNAL FACES FOR ANY ONE APPROACH SHALL NOT BE LESS THAN 8 FEET APART MEASURED HORIZONTALLY BETWEEN CENTER OF FACES.
- SIGNAL HEADS MAY BE HUNG ON A SPAN WIRE OR ON A CANTILEVER MAST ARM. AT LEAST ONE SIGNAL HEAD SHALL BE UNMISTAKABLY IN LINE WITH THE CENTER OF APPROACHING TRAFFIC AT ALL TIMES. THE SECOND SIGNAL HEAD MAY BE POST MOUNTED, LOCATED AT A DISTANCE NO GREATER THAN 14 1/2 FEET FROM THE CENTER OF THE APPROACH LANE WHEN THE STOP BAR IS 40 FEET FROM THE SIGNAL HEAD. CONSULT THE M.U.T.C.D. FOR ADDITIONAL INFORMATION CONCERNING SIGNAL PLACEMENT.
- SIGNAL HEAD PLACEMENT IS CRITICAL. HEADS SHALL BE ADJUSTED TO REFLECT LANE LOCATION CHANGES.
- THE CONTRACTOR SHALL PROVIDE AN ACTUATED CONTROLLER. THE APPROACHES NOTED SHALL HAVE A TEMPORARY VEHICLE DETECTOR (VIA MICROWAVE EQUIPMENT). LOOPS ARE SHOWN FOR PLACEMENT PURPOSES ONLY. THE CONTROLLER, DETECTOR AND ALL OTHER SIGNAL EQUIPMENT SHALL MEET OR EXCEED ALL NEMA STANDARDS.
- VEHICLE DETECTION SHALL BE VIA MICROWAVE DETECTION AND SHALL BE 6' X 40' FOR PRESENCE DETECTION AT THE STOP BAR WITH THE NEAR PORTION LOCATED 5 FEET BEYOND THE STOP BAR.
- INTERVAL TIMING SHOWN IN SECONDS.
- INTERCONNECT BETWEEN SIGNAL POLES BY WHATEVER MEANS POSSIBLE OR CONVENIENT TO PROVIDE FOR A SAFE INSTALLATION.
- PLACE TEMPORARY POLES BEHIND GUARDRAIL WHERE POSSIBLE.
- POLES SUPPORTING SPAN WIRES AND/OR MAST ARMS SHALL BE ADEQUATELY BRACED OR GUYED AND SHALL NOT BE PLACED SO AS TO CREATE A HAZARD TO THE TRAVELLING PUBLIC.
- ALL TEMPORARY SIGNAL EQUIPMENT, SIGNS, ETC., SHALL BELONG TO THE CONTRACTOR AT THE END OF THE PROJECT AND THE CONTRACTOR SHALL BE RESPONSIBLE FOR ITS REMOVAL, INCLUDING ANY TEMPORARY PAVEMENT MARKINGS, UTILITY POLES, WIRES, ETC.
- A 250 WATT MER/150 WATT HPS LUMINAIRE AND MAST ARM SHALL BE PROVIDED ON A POLE ON EACH APPROACH AT A MOUNTING HEIGHT OF 30' ABOVE ROADWAY CENTERLINE. THE INTENT IS TO LIGHT UP THE AREA AROUND THE SIGNAL HEADS AND STOP BAR FOR INCREASED VISIBILITY. THE ENGINEER SHALL DETERMINE THE ADEQUACY OF THE LIGHTING AND DIRECT CHANGES IF THE LIGHTING IS INSUFFICIENT.
- STOP BARS SHALL BE LOCATED A MINIMUM OF 40' AND A MAXIMUM OF 120' FROM THE NEAREST SIGNAL HEAD.
- PAYMENT FOR THE VEHICLE DETECTORS SHALL BE FOR EACH UNIT INSTALLED UNDER ITEM 678.42.
- SEE STANDARDS E-171A, E171B, AND E-171C FOR ADDITIONAL INFORMATION ON SIGNALS AND DETECTORS.
- A "SIGNAL AHEAD" SIGN SHALL BE PLACED AT LEAST 500' FROM THE SIGNAL OR AT A POSITION TO BE DETERMINED BY THE ENGINEER. THE COST OF THIS SIGN SHALL BE INCLUDED IN THE UNIT PRICE BID FOR ITEM 678.40.
- ADDITIONAL PROJECT CONSTRUCTION SIGNS SHALL BE INSTALLED AS REQUIRED BY THE ENGINEER PER STANDARDS T-10, T-28, T-29 AND T-30. PAYMENT FOR THESE SIGNS, THE REFLECTORIZED PLASTIC DRUMS, ETC, SHALL BE INCLUDED IN THE UNIT PRICE BID FOR CONTRACT ITEM 641.10.
- THE "TO GET GREEN LIGHT" SIGN IS TO BE USED ONLY ON APPROACHES WITH VEHICLE DETECTORS.
- WHEN TEMPORARY BARRIER IS USED, BARRIER ENDS FACING ONCOMING TRAFFIC SHALL BE TAPERED BEYOND THE CLEAR ZONE, OR PROTECTED WITH AN APPROVED END TREATMENT DESIGNED FOR THE 85TH PERCENTILE SPEED OR THE POSTED SPEED LIMIT OF THE ROAD WAY.
- THE CONTRACTOR SHALL NOTIFY ENGINEER PRIOR TO ACTIVATING THE TRAFFIC SIGNALS SUCH THAT THEY CAN FIELD REVIEW CONDITIONS. THE SIGNAL SYSTEM SHALL BE PAID FOR UNDER ITEM 678.40 AND SHALL CONSIST OF POLES, SIGNS AND POSTS, WARNING SIGNS, LUMINAIRES (IF USED) AND SIGNAL EQUIPMENT TO PROVIDE FOR AN ADEQUATE DESIGN. ALSO INCLUDED ARE PERMITS AND COSTS ASSOCIATED WITH PROVIDING ELECTRICAL POWER.
- PAYMENT FOR ALL TEMPORARY TRAFFIC CONTROL DEVICES NOT ASSOCIATED DIRECTLY WITH THE TEMPORARY TRAFFIC SIGNAL SYSTEM, INCLUDING BUT NOT LIMITED TO CONSTRUCTION APPROACH SIGNING, SHALL BE MADE UNDER ITEM 641.10.
- SIGNS, POSTS, TEMPORARY PAVEMENT MARKINGS, RAISED PAVEMENT MARKINGS AND PAVEMENT MARKING REMOVAL RELATED TO THE TEMPORARY TRAFFIC SIGNAL SYSTEM INSTALLATION AS SHOWN ON THE TRAFFIC CONTROL PLAN ("STOP HERE ON RED", "SIGNAL AHEAD", "TO GET GREEN LIGHT", ETC.) ARE INCLUDED IN THE UNIT PRICE BID FOR CONTRACT ITEM 678.40.
- PAYMENT FOR TEMPORARY TRAFFIC BARRIER, REMOVING AND RESETING TEMPORARY TRAFFIC BARRIER, AND ASSOCIATED ENERGY ABSORPTION ATTENUATORS USED, SHALL BE MADE UNDER THE APPROPRIATE ITEMS. PAYMENT FOR THE REMOVING AND RESETING OF THE ENERGY ABSORPTION ATTENUATORS SHALL BE INCIDENTAL TO THE ENERGY ABSORPTION ATTENUATOR ITEM.

PROJECT NAME: ROCKINGHAM
PROJECT NUMBER: BRF 0126(12)

TYLIN INTERNATIONAL

FILE NAME: z10J072bdr_mot_03.dgn
PROJECT LEADER: R. HEBERT
DESIGNED BY: C. SARGEANT
TRAFFIC CONTROL NOTES

PLOT DATE: 8/26/2014
DRAWN BY: C. SARGEANT
CHECKED BY: D. BRYANT
SHEET 17 OF 69



JOINT CONNECTION DETAILS
SCALE: 1 1/2" = 1'-0" (EXCEPT AS NOTED)

GENERAL NOTES

- TEMPORARY TRAFFIC BARRIER-BRACED SHALL BE FURNISHED BY THE CONTRACTOR AND PAID FOR AS ITEM 621.90 TEMPORARY TRAFFIC BARRIER. CONCRETE BARRIER AND ALL ATTACHMENTS SHALL BE FABRICATED IN ACCORDANCE WITH SECTION 621. ALL BARRIER UNITS FOR BRACED SYSTEMS SHALL BE 20' LONG.
- TEMPORARY TRAFFIC BARRIER-BRACED DETAILS, AS SHOWN IN THESE PLANS, ARE IN COMPLIANCE WITH REQUIREMENTS PER UPDATED NCHRP REPORT 350 FOR TEST NO. 3-II, TL-3 CRASH TESTED BY MIDWEST ROADSIDE SAFETY; NY BOX BEAM STIFFENING OF UNANCHORED TCB, MARCH 2008. THE BARRIER SYSTEM TESTED WITH A 27.6" DYNAMIC DEFLECTION AND ALLOWS FOR PLACEMENT AT A MINIMUM 12" DISTANCE BETWEEN BARRIERS AND EDGE OF BRIDGE DECK.
- A MINIMUM OF TWO BARRIER UNITS WITH BRACED JOINTS ARE REQUIRED TO BE PLACED BEYOND BOTH ENDS OF THE BRIDGE WORK AREA FOR SPEED GREATER THAN 45 MPH. FOR SPEEDS ≤ 45 MPH, A MINIMUM OF ONE BRACED BARRIER IS REQUIRED TO BE FULLY SET BEYOND EACH END OF BRIDGE WORK AREA.
- THE LAST CONCRETE BARRIER UNIT, AT EACH END OF BARRIER LAYOUT, SHALL BE ANCHORED A MINIMUM 18" BELOW THE ROADWAY SURFACE. REQUIRED 1" DIA. ANCHOR RODS (A36 STEEL) SHALL BE INSTALLED WITH 5 ANCHORS ON THE TRAFFIC SIDE OF BARRIER AND 4 ON THE CONSTRUCTION SIDE. IF THE END(S) OF THE BRACED CONCRETE BARRIER SYSTEM EXTENDS 50' OR MORE BEYOND LIMITS OF BRIDGE WORK THE LAST BARRIER UNIT DOES NOT REQUIRE ANCHORAGE.
- TEMPORARY TRAFFIC BARRIER - BRACED, MAY BE INSTALLED WITH A 230' MINIMUM RADIUS. GAPS CREATED BETWEEN STRUCTURAL TUBES AND CONCRETE BARRIER, DURING A RADIAL LAYOUT, SHALL BE SHIMMED WITH 8"x8"x1/2" PLATES & FENDER WASHERS TO FIRMLY ATTACH STRUCTURAL TUBING TO BARRIER.
- THE CONTRACTOR SHALL FURNISH AND INSTALL APPROVED RETROREFLECTIVE DELINEATORS AT 25-FOOT INTERVALS ALONG TOP AND/OR ONE FOOT DOWN THE SIDE OF PORTABLE CONCRETE BARRIER. PAYMENT FOR DELINEATORS SHALL BE MADE UNDER ITEM 621.90 TEMPORARY TRAFFIC BARRIER. THE COLOR OF DELINEATORS SHALL, IN ALL INSTANCES, CONFORM TO THE COLOR OF EDGE LINE MARKINGS. DELINEATORS SUPPLEMENT, BUT DO NOT REPLACE, THE NEED FOR RETROREFLECTIVE SOLID EDGE LINE MARKINGS.

MATERIAL NOTES

- BARRIERS SHALL BE LIGHT COLORED CLASS AA CONCRETE, WITH MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI, AND SHALL HAVE A SMOOTH UNIFORM SURFACE FREE OF DEFECTS AND IRREGULARITIES. CASTING DATE SHALL BE SHOWN ON BARRIER. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 3/4", UNLESS OTHERWISE NOTED.
- ALL REINFORCING STEEL SHALL BE AASHTO M31 (ASTM A615) GRADE 60. ALL REINFORCEMENT SHALL HAVE 1/2" MINIMUM CLEAR COVER, UNLESS OTHERWISE NOTED.
- STRUCTURAL STEEL, EXCEPT THE STEEL TUBES, SHALL BE ASTM A36 GRADE 345. ALL STEEL SHALL BE FABRICATED IN ACCORDANCE WITH SECTION 506.
- STEEL TUBES, 6x6x3/8 & 4x4x1/2, SHALL BE ASTM A 500 GRADE B OR C. THE 6x6x3/8 TUBES SHALL BE 12' LONG AND GALVANIZED IN ACCORDANCE WITH SUBSECTION 726.08.
- A MINIMUM OF 2 RECESSED LIFTING DEVICES, EACH WITH THE CAPACITY TO LIFT A MASS OF 6 TONS (MINIMUM), SHALL BE INSTALLED TO EACH BARRIER UNIT. TWENTY FOOT LONG CONCRETE BARRIER UNITS ARE APPROXIMATELY 400 LBS./FT.
- DELINEATORS SHALL BE ATTACHED TO BARRIER USING AN APPROVED ADHESIVE MATERIAL OR AS SHOWN ON THIS SHEET.

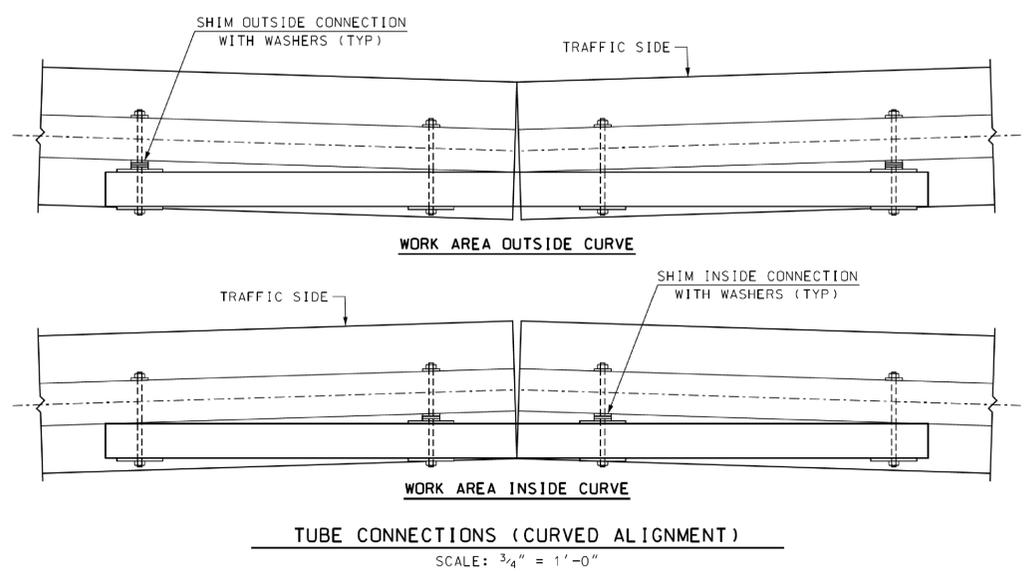
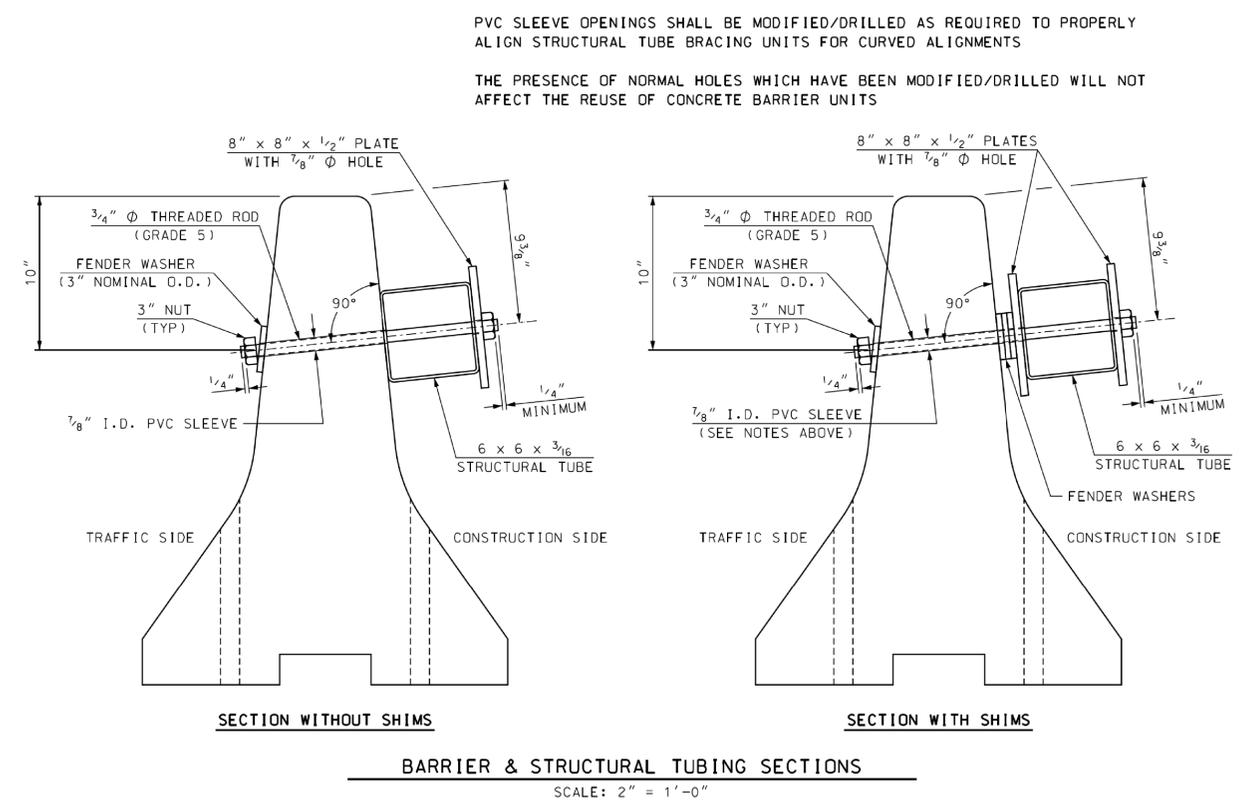
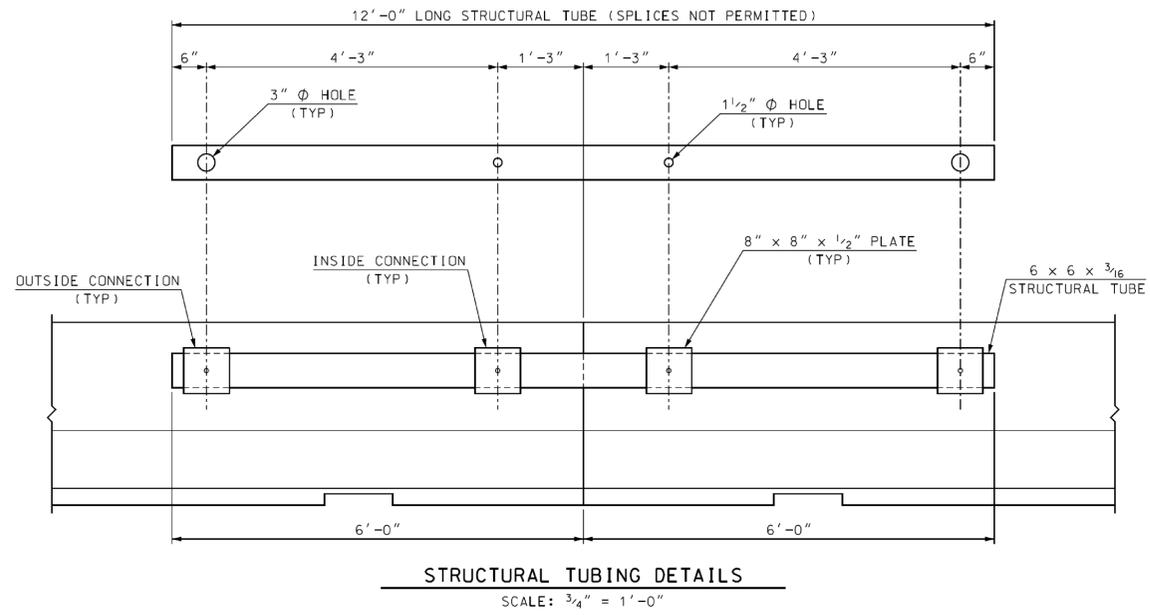
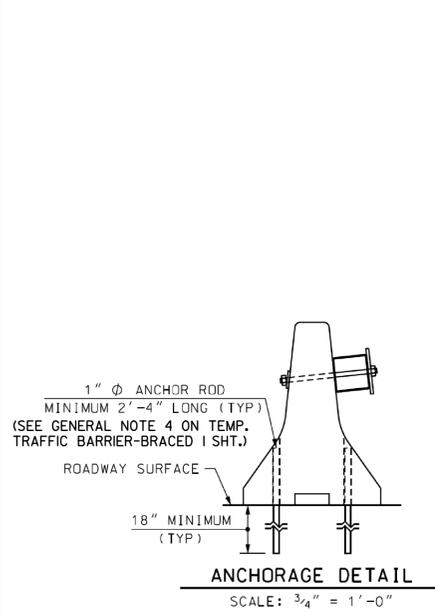
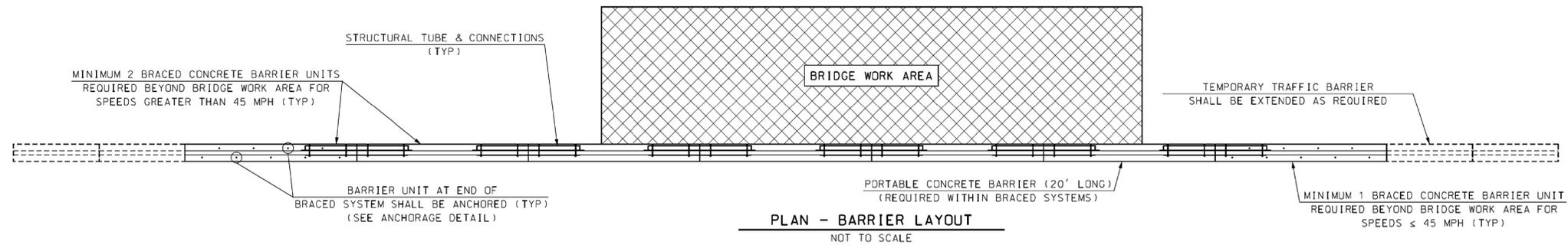
REINFORCING SCHEDULE (PER 20' BARRIER UNIT)								
MARK	SIZE	LENGTH	# PIECES	TYPE	A	B	C	LOCATION
B1	#4	4'-10"	6	I	5"	2'-4"	1"	STIRRUPS
B2	#6	19'-1"	2	---	---	---	---	LONGITUDINAL (TOP)
B3	#6	19'-9"	2	---	---	---	---	LONGITUDINAL (BOTTOM)
B4	#6	1'-2"	2	---	---	---	---	TRANSVERSE (BOTTOM)
B5	#6	6"	2	---	---	---	---	TRANSVERSE (TOP)
B6	#4	2'-9"	9	II	5"	1'-3"	---	STIRRUPS

TYLIN INTERNATIONAL

PROJECT NAME: ROCKINGHAM
PROJECT NUMBER: BRF 0126(12)

FILE NAME: x10J072bdr_ttb.dgn
PROJECT LEADER: R. HEBERT
DESIGNED BY: -
TEMPORARY TRAFFIC BARRIER-BRACED (1 OF 2) SHEET 18 OF 69

PLOT DATE: 8/26/2014
DRAWN BY: P. MCCLURE
CHECKED BY: D. BURHANS



TYLININTERNATIONAL

PROJECT NAME:	ROCKINGHAM
PROJECT NUMBER:	BRF 0126(12)
FILE NAME:	x10J072bdr_ttb.dgn
PROJECT LEADER:	R. HEBERT
DESIGNED BY:	-
TEMPORARY TRAFFIC BARRIER-BRACED (2 OF 2) SHEET	19 OF 69
PLOT DATE:	8/26/2014
DRAWN BY:	P. MCLURE
CHECKED BY:	D. BURHANS

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.Q.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

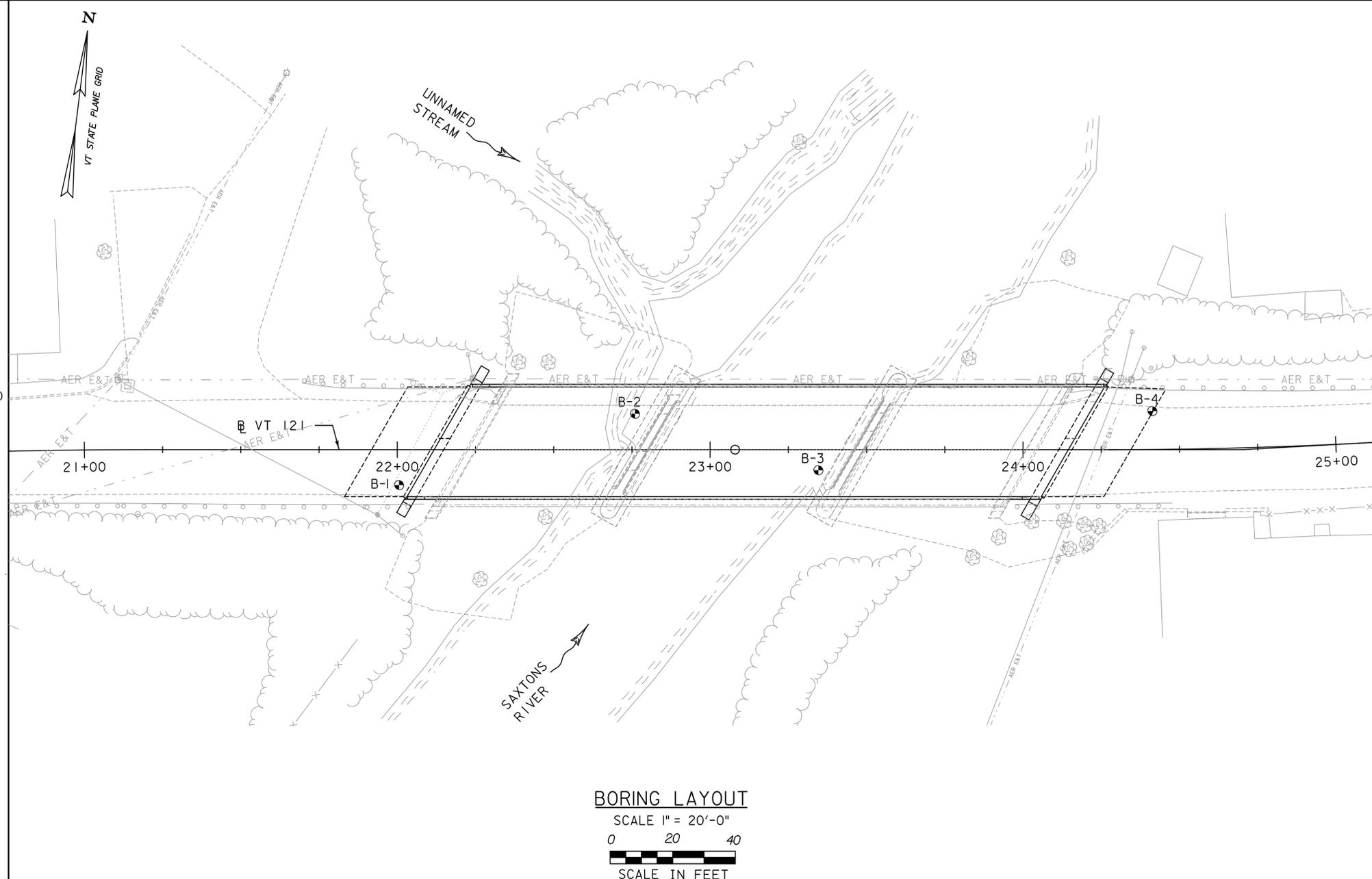
DENSITY (GRANULAR SOILS)		CONSISTENCY (COHESIVE SOILS)	
N	DESCRIPTIVE TERM	N	DESCRIPTIVE TERM
<5	Very Loose	<2	Very Soft
5-10	Loose	2-4	Soft
11-24	Med. Dense	5-8	Med. Stiff
25-50	Dense	9-15	Stiff
>50	Very Dense	16-30	Very Stiff
		31-60	Hard
		>60	Very Hard

COMMONLY USED SYMBOLS

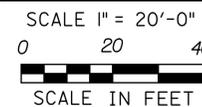
▼	Water Elevation
⊕	Standard Penetration Boring
⊗	Auger Boring
⊙	Rod Sounding
○	Sample
N	Standard Penetration Test
	Blow Count Per Foot For:
	2" O.D. Sampler
	1 3/8" I.D. Sampler
	Hammer Weight Of 140 Lbs.
	Hammer Fall Of 30"
VS	Field Vane Shear Test
US	Undisturbed Soil Sample
B	Blast
DC	Diamond Core
MD	Mud Drill
WA	Wash Ahead
HSA	Hollow Stem Auger
AX	Core Size 1 1/8"
BX	Core Size 1 5/8"
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
%Rec.	Percent Recovery
RQD	Rock Quality Designation
CBR	California Bearing Ratio
<	Less Than
>	Greater Than
R	Refusal (N > 100)

COLOR

bkl	Black	pnk	Pink
bl	Blue	pu	Purple
brn	Brown	rd	Red
dk	Dark	tn	Tan
gry	Gray	wh	White
gn	Green	yel	Yellow
lt	Light	mltc	Multicolored
or	Orange		



BORING LAYOUT



BORING LAYOUT

HOLE NO.	STATION	OFFSET	NORTHING	EASTING	GROUND ELEVATION	ELEVATION TLOB
B-1	22+00.6	11.3 RT	233043.05	1639670.68	452.0	356.0
B-2	22+76.0	11.4 LT	233074.93	1639742.67	451.0	-
B-3	23+34.6	6.6 RT	233064.31	1639803.36	450.0	-
B-4	24+41.5	12.3 LT	233096.24	1639906.66	449.0	-

GENERAL NOTES

- The subsurface explorations shown herein were made between November 11, 2011 and November 12, 2011 and between December 15, 2011 and December 16, 2011 by S.W. Cole Engineering, Inc.
- Soil and rock classifications, properties and descriptions are based on engineering interpretation from available subsurface information by S.W. Cole Engineering and may not necessarily reflect actual variations in sub-surface 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 judgement 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 judgement 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.

DEFINITIONS (AASHTO)

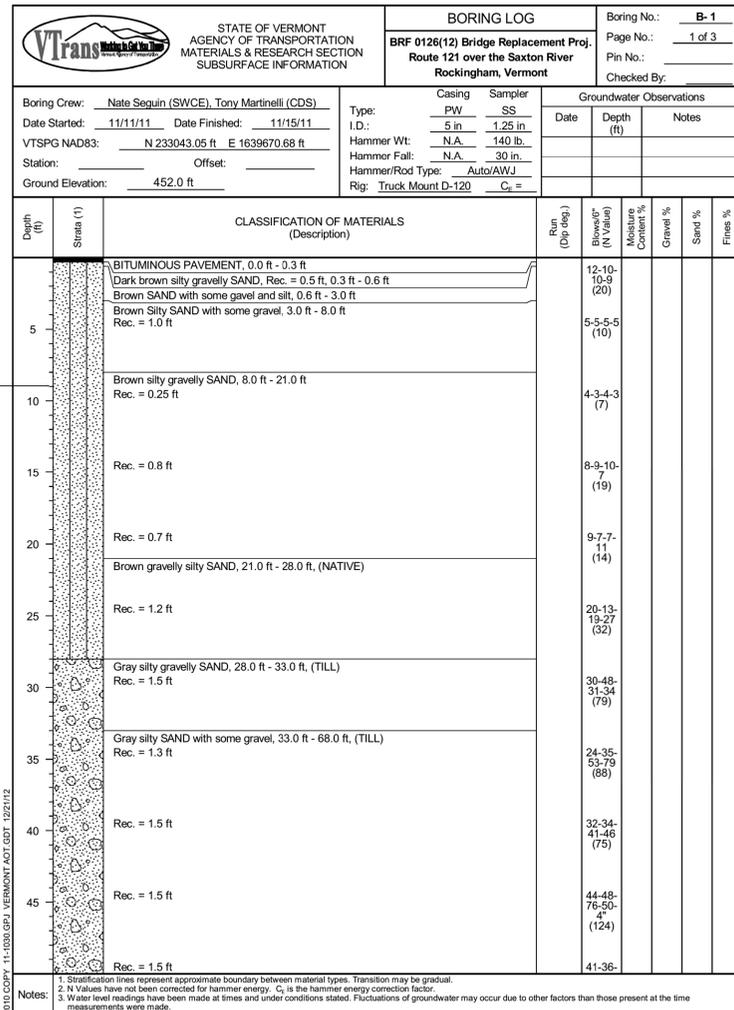
BEDROCK (LEDGE) - Rock in its native location of indefinite thickness.	VARVED - Alternate layers of silt and clay.
BOULDER - A rock fragment with an average dimension > 12 inches.	HARDPAN - Extremely dense soil, cemented layer, not softened when wet.
COBBLE - Rock fragments with an average dimension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

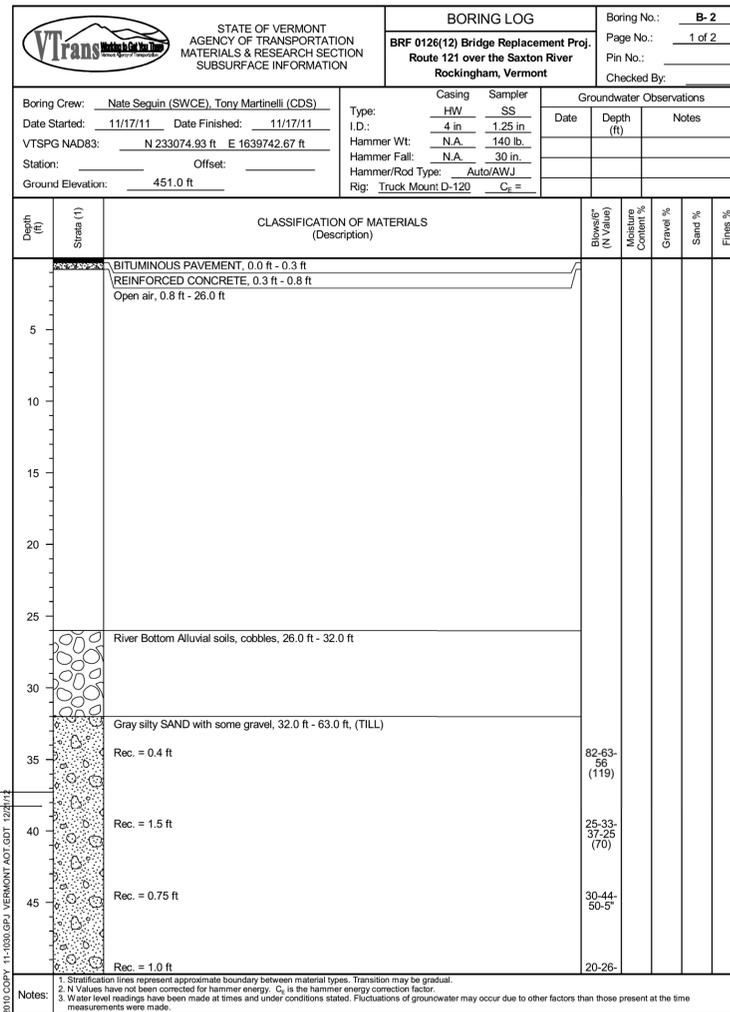
PROJECT NAME: ROCKINGHAM
PROJECT NUMBER: BRF 0126(12)

TYLIN INTERNATIONAL

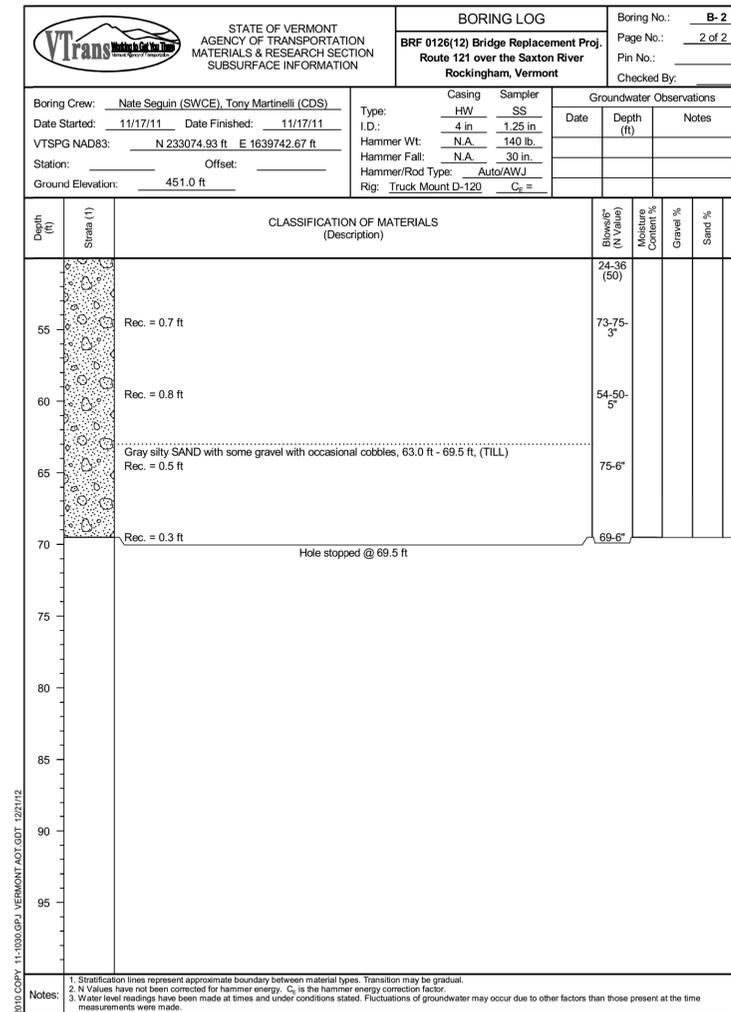
FILE NAME: z10J072bdr_bor_Inf.dgn
PROJECT LEADER: R. HEBERT
DESIGNED BY: T. POULIN
BORING INFORMATION & LAYOUT SHEET

PLOT DATE: 8/26/2014
DRAWN BY: S. MORGAN
CHECKED BY: R. HEBERT
SHEET 21 OF 69





BOTTOM OF EXISTING
PIER, NO. 1
ELEV. = 413.8 ±

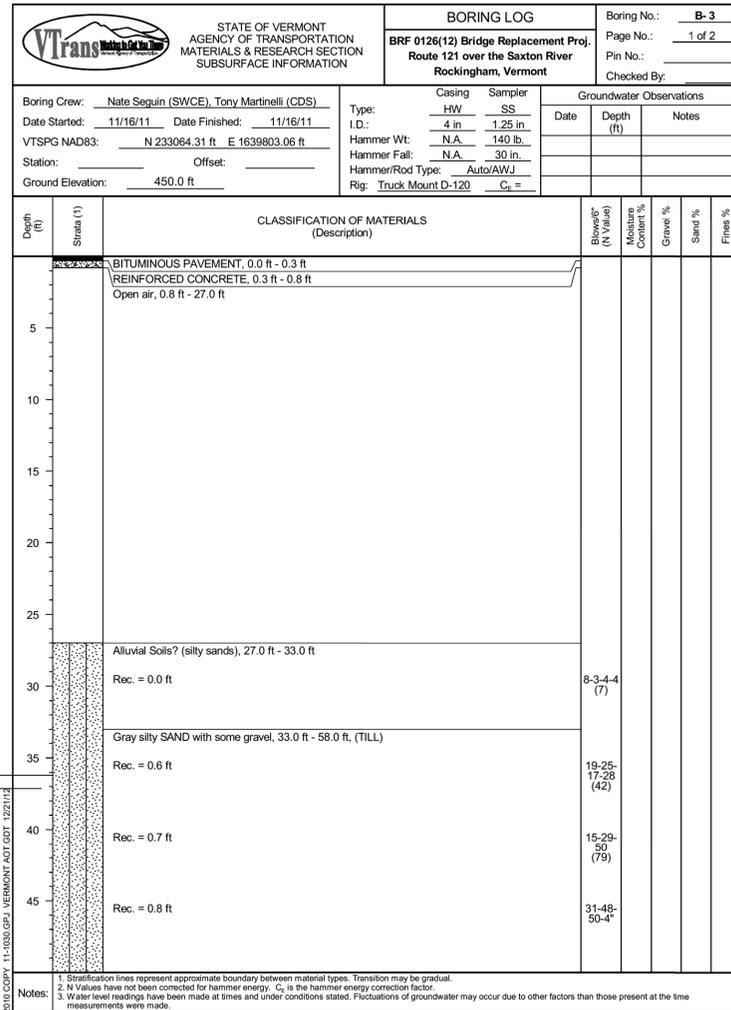


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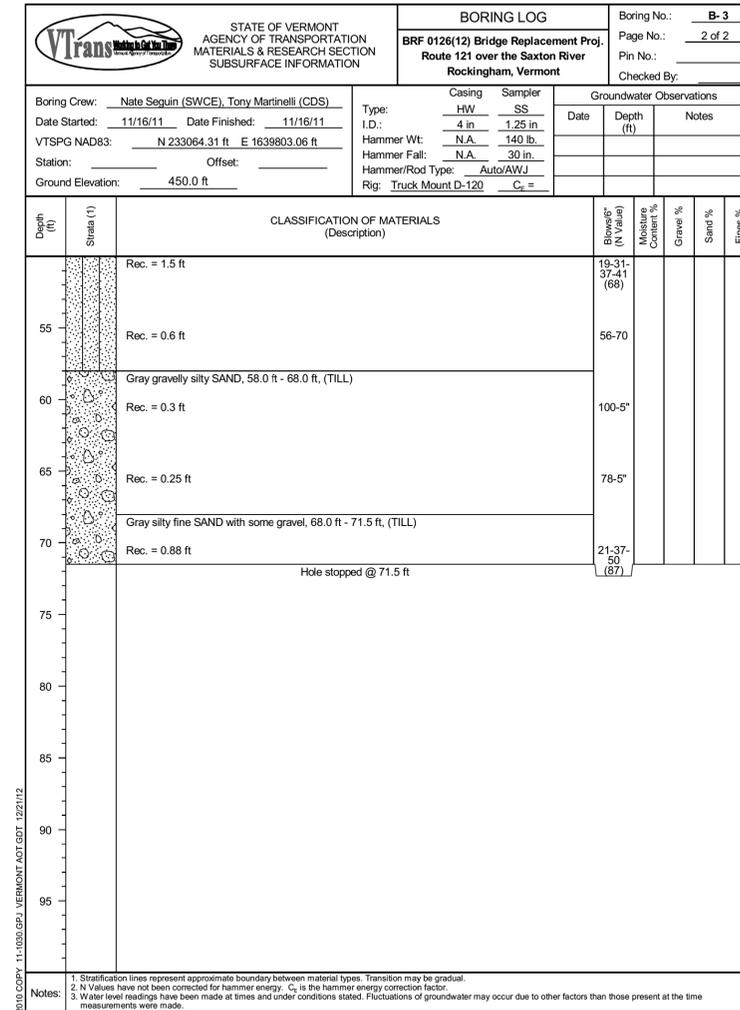
TYLINTERNATIONAL

FILE NAME: z10J072bdr_bor2.dgn
PROJECT LEADER: R. HEBERT
DESIGNED BY: S. KELLER
BORING LOG (2 OF 4)

PLOT DATE: 8/26/2014
DRAWN BY: T. KELLEY
CHECKED BY: S. KELLER
SHEET 23 OF 69



BOTTOM OF EXISTING
PIER, NO. 2
ELEV. = 413.8 ±

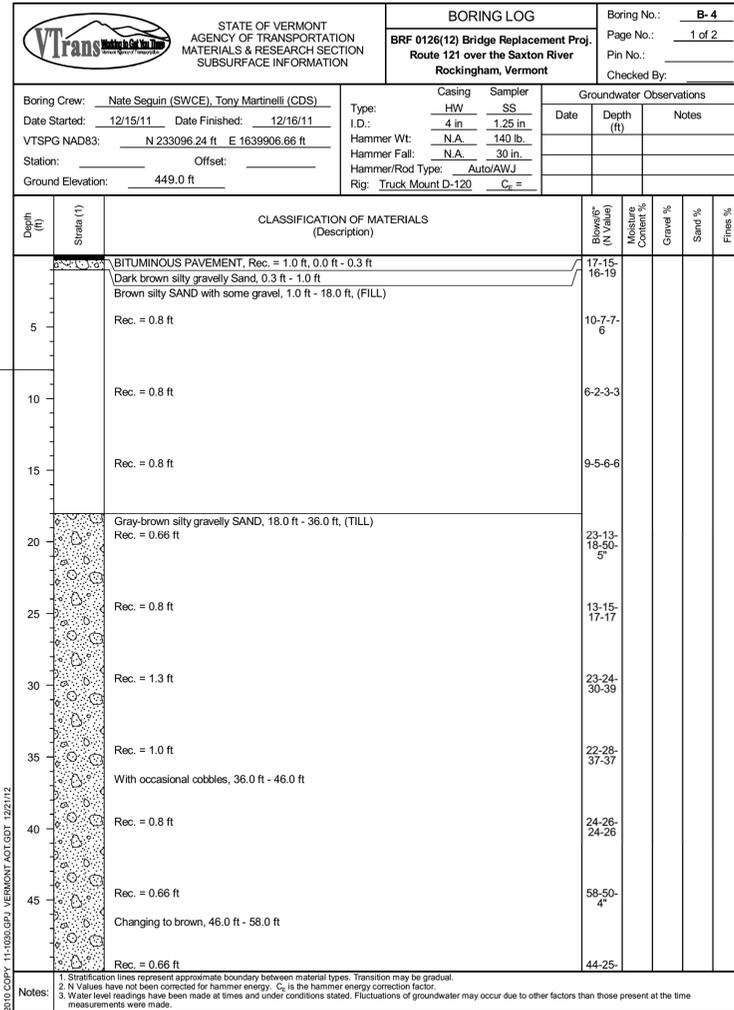


PROJECT NAME: ROCKINGHAM
PROJECT NUMBER: BRF 0126(12)



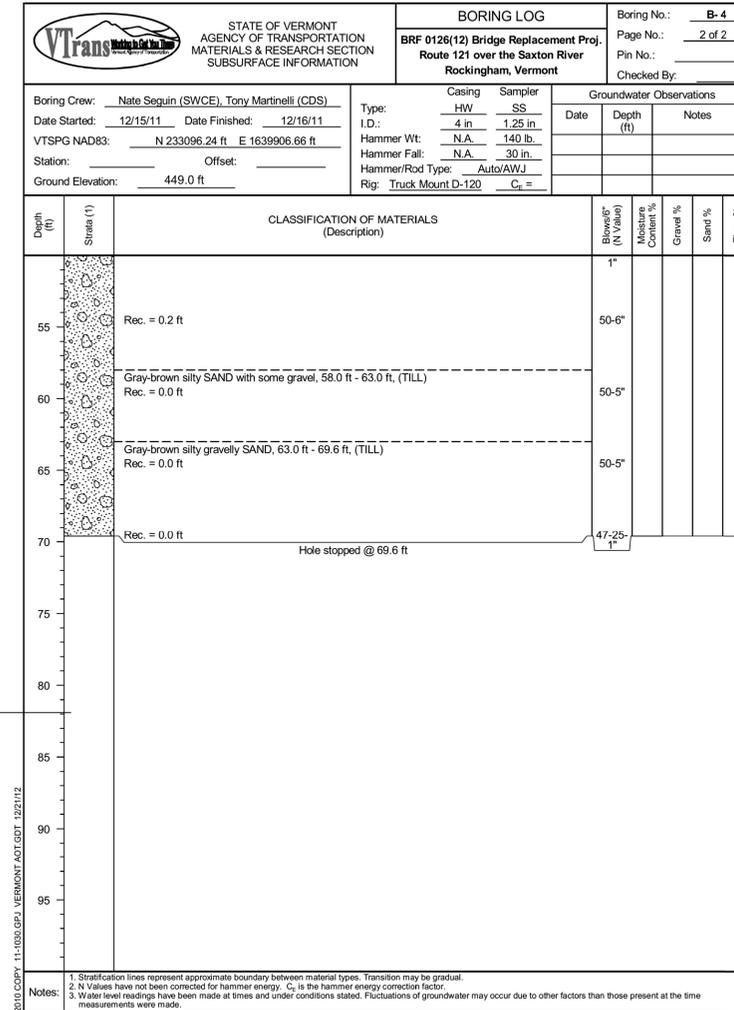
FILE NAME: z10J072bdr_bor3.dgn
PROJECT LEADER: R. HEBERT
DESIGNED BY: S. KELLER
BORING LOG (3 OF 4)

PLOT DATE: 8/26/2014
DRAWN BY: T. KELLEY
CHECKED BY: S. KELLER
SHEET 24 OF 69



BOTTOM OF
ABUT. NO. 2
ELEV. = 441.00

ESTIMATED PILE TIP
@ ABUT. NO. 2
ELEV. = 367.00

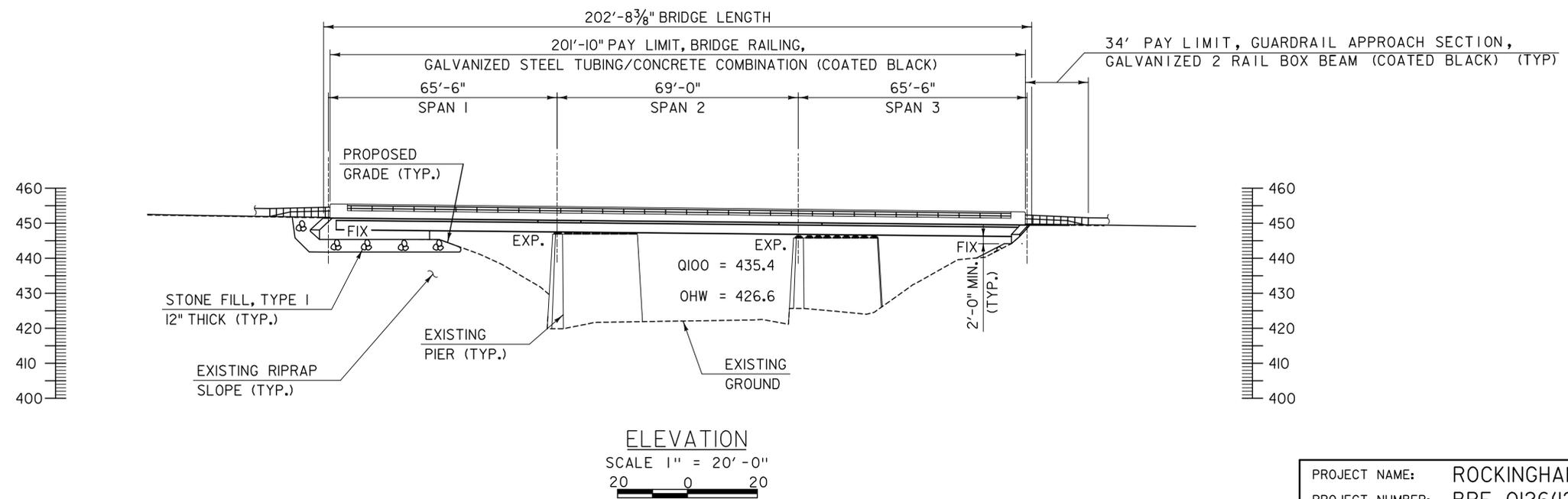
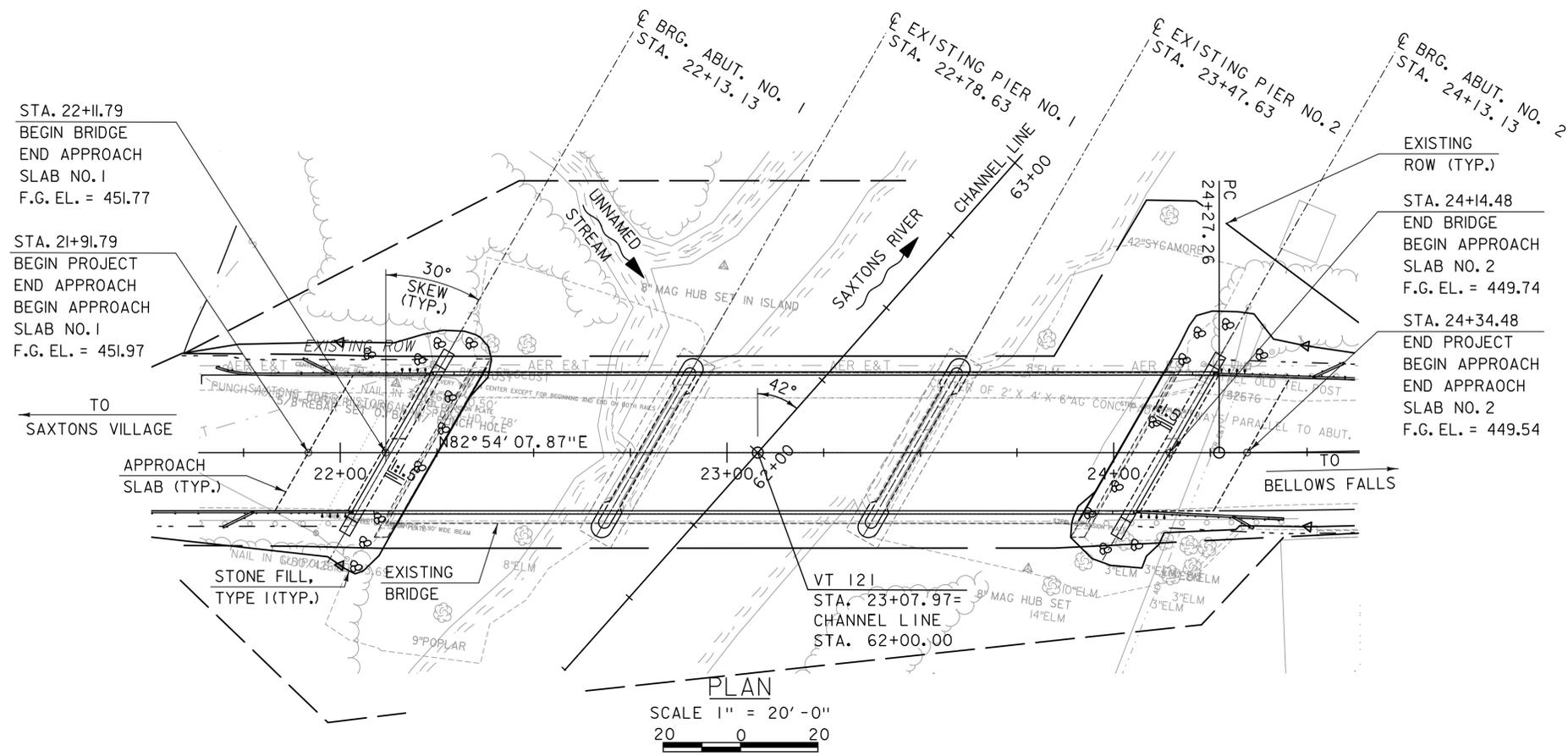
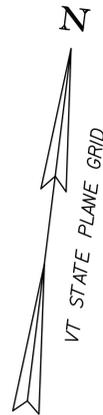


PROJECT NAME: ROCKINGHAM
PROJECT NUMBER: BRF 0126(12)

TYLIN INTERNATIONAL

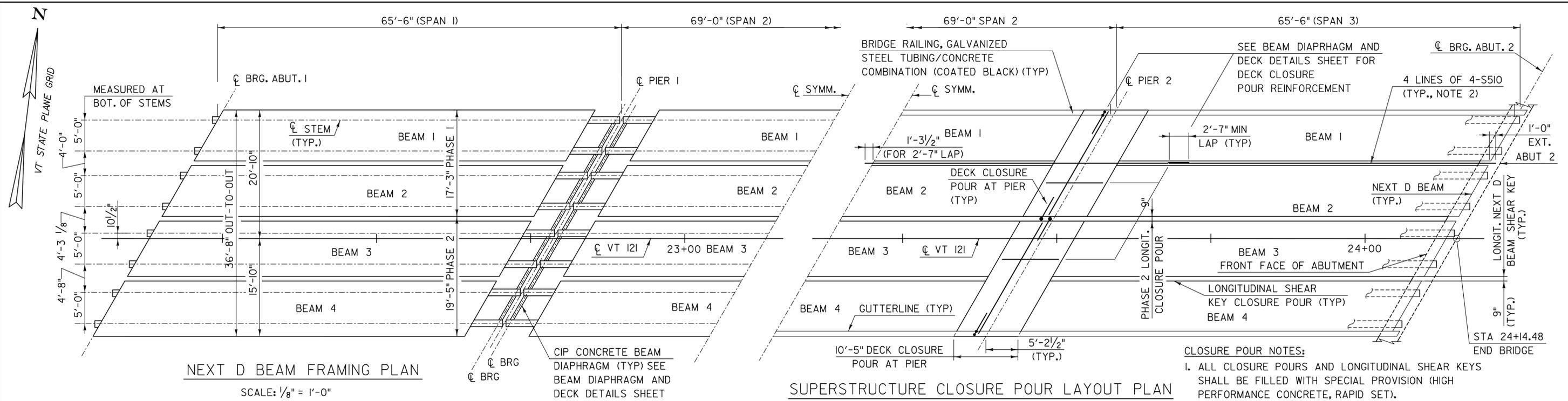
FILE NAME: z10J072bdr_bor4.dgn
PROJECT LEADER: R. HEBERT
DESIGNED BY: S. KELLER
BORING LOG (4 OF 4)

PLOT DATE: 8/26/2014
DRAWN BY: T. KELLEY
CHECKED BY: S. KELLER
SHEET 25 OF 69

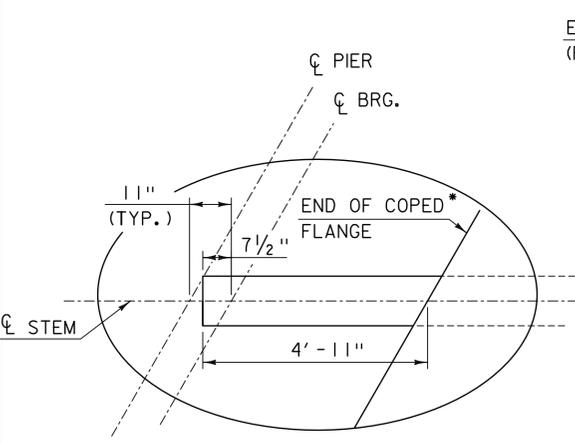


PROJECT NAME:	ROCKINGHAM
PROJECT NUMBER:	BRF 0126(12)
FILE NAME:	z10J072bdr_gpe.dgn
PROJECT LEADER:	R. HEBERT
DESIGNED BY:	S. KELLER
BRIDGE PLAN AND ELEVATION	
PLOT DATE:	8/26/2014
DRAWN BY:	D. AXTELL
CHECKED BY:	T. POULIN
SHEET	26 OF 69

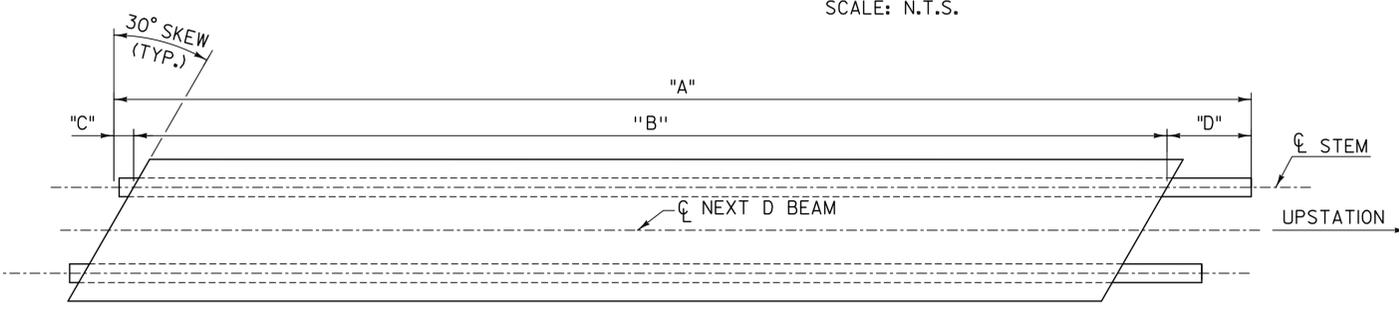
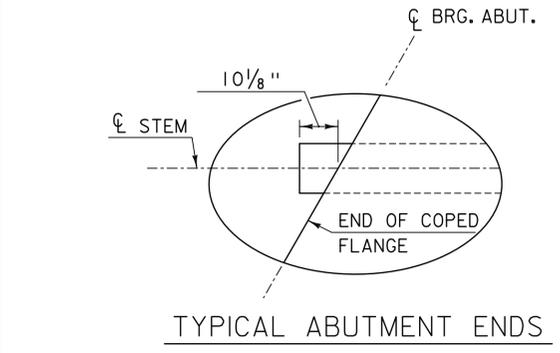
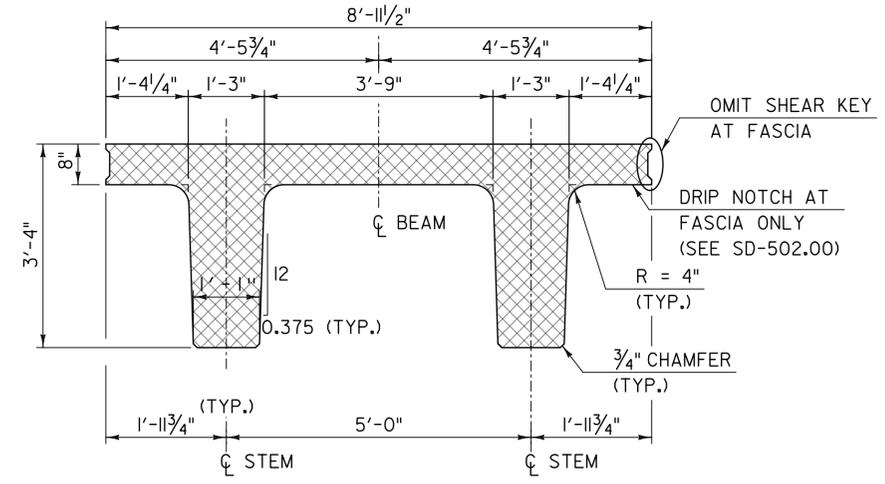
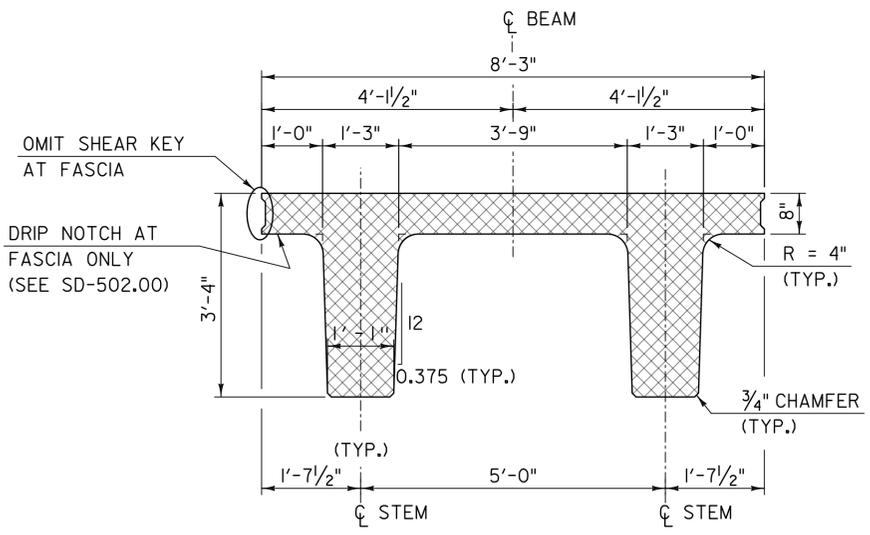
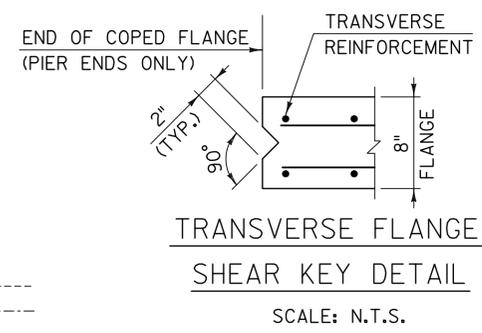




- CLOSURE POUR NOTES:**
- ALL CLOSURE POURS AND LONGITUDINAL SHEAR KEYS SHALL BE FILLED WITH SPECIAL PROVISION (HIGH PERFORMANCE CONCRETE, RAPID SET).
 - FOUR LINES OF 4-S510 BARS REQUIRED IN EACH LONGITUDINAL NEXT D BEAM SHEAR KEY AND IN LONGITUDINAL PHASE 2 CLOSURE POUR (3 LOCATIONS TOTAL). SEE 'NEXT D BEAM DETAILS' (3 OF 3)' SHEET FOR DETAILED LOCATION OF S510 BARS.



*SEE TRANSVERSE SHEAR KEY DETAIL FOR COPED ENDS OF NEXT BEAM FLANGES (PIER ENDS ONLY).



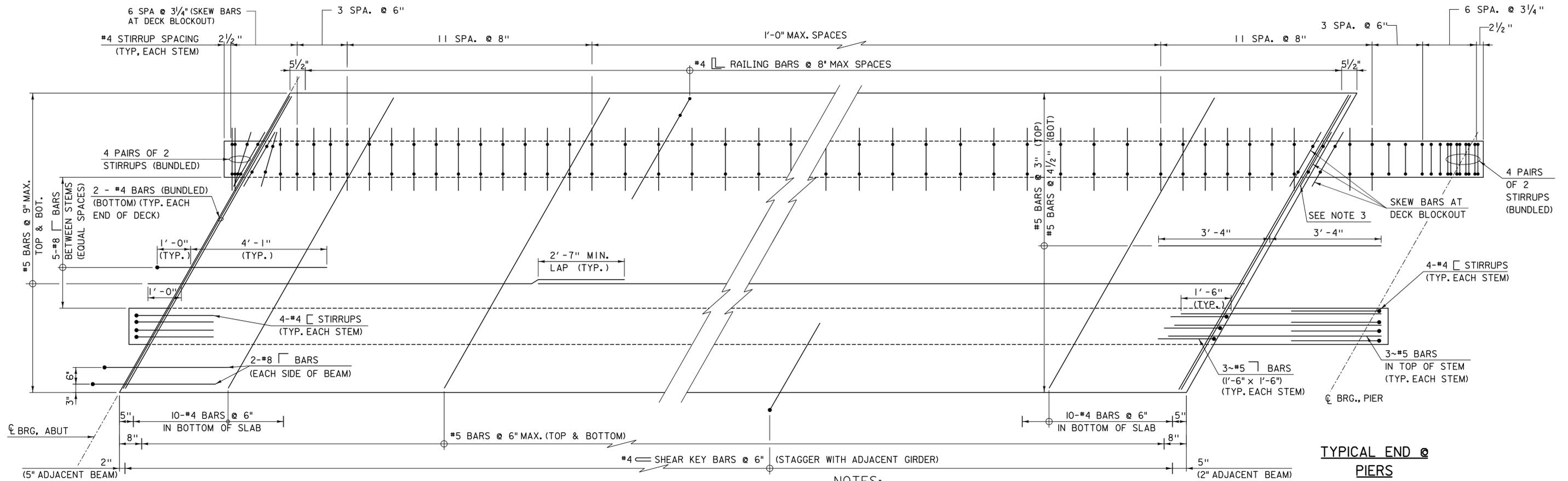
SPAN	NEXT D BEAM PLAN DIMENSIONS			
	"A"	"B"	"C"	"D"
1	66'-0 5/8"	60'-3 1/2"	0'-10 1/8"	4'-11"
2	68'-5 1/8"	58'-7"	4'-11"	4'-11"
3	66'-0 5/8"	60'-3 1/2"	4'-11"	0'-10 1/8"

PROJECT NAME: ROCKINGHAM
PROJECT NUMBER: BRF 0126(12)

FILE NAME: z10J072bdr_glrder.l.dgn
PROJECT LEADER: R. HEBERT
DESIGNED BY: S. KELLER
NEXT D BEAM DETAILS (1 OF 3)

PLOT DATE: 8/26/2014
DRAWN BY: D. AXTELL
CHECKED BY: T. POULIN
SHEET 27 OF 69

TYLININTERNATIONAL



**TYPICAL END @
ABUTMENTS**

NEXT BEAM D REINFORCEMENT PLAN
(BEAM 1, SPAN 1 SHOWN, BEAMS 2, 3 AND 4 AND SPANS 2 AND 3 SIMILAR)
SCALE: 1"=1'-0"

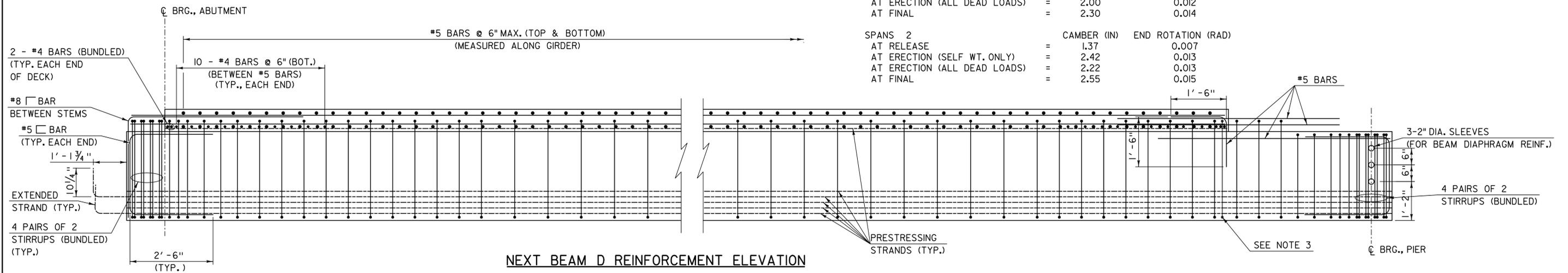
**TYPICAL END @
PIERS**

NOTES:

- BEAM REINFORCEMENT DETAILED IN PLAN AND ELEVATION IS TYPICAL ABOUT THE MIDSPAN OF EACH BEAM.
- SEE 'NEXT D BEAM DETAILS (3 OF 3)' SHEET FOR PRESTRESSING STRAND LAYOUT AND DEBONDING.
- PLACE EXTRA STIRRUP AT END OF COPED FLANGE (PIER ENDS ONLY).
- PREDICTED BEAM CAMBER AND END ROTATION:

SPANS 1 & 3	CAMBER (IN)	END ROTATION (RAD)
AT RELEASE	= 1.23	0.007
AT ERECTION (SELF WT. ONLY)	= 2.18	0.013
AT ERECTION (ALL DEAD LOADS)	= 2.00	0.012
AT FINAL	= 2.30	0.014

SPANS 2	CAMBER (IN)	END ROTATION (RAD)
AT RELEASE	= 1.37	0.007
AT ERECTION (SELF WT. ONLY)	= 2.42	0.013
AT ERECTION (ALL DEAD LOADS)	= 2.22	0.013
AT FINAL	= 2.55	0.015



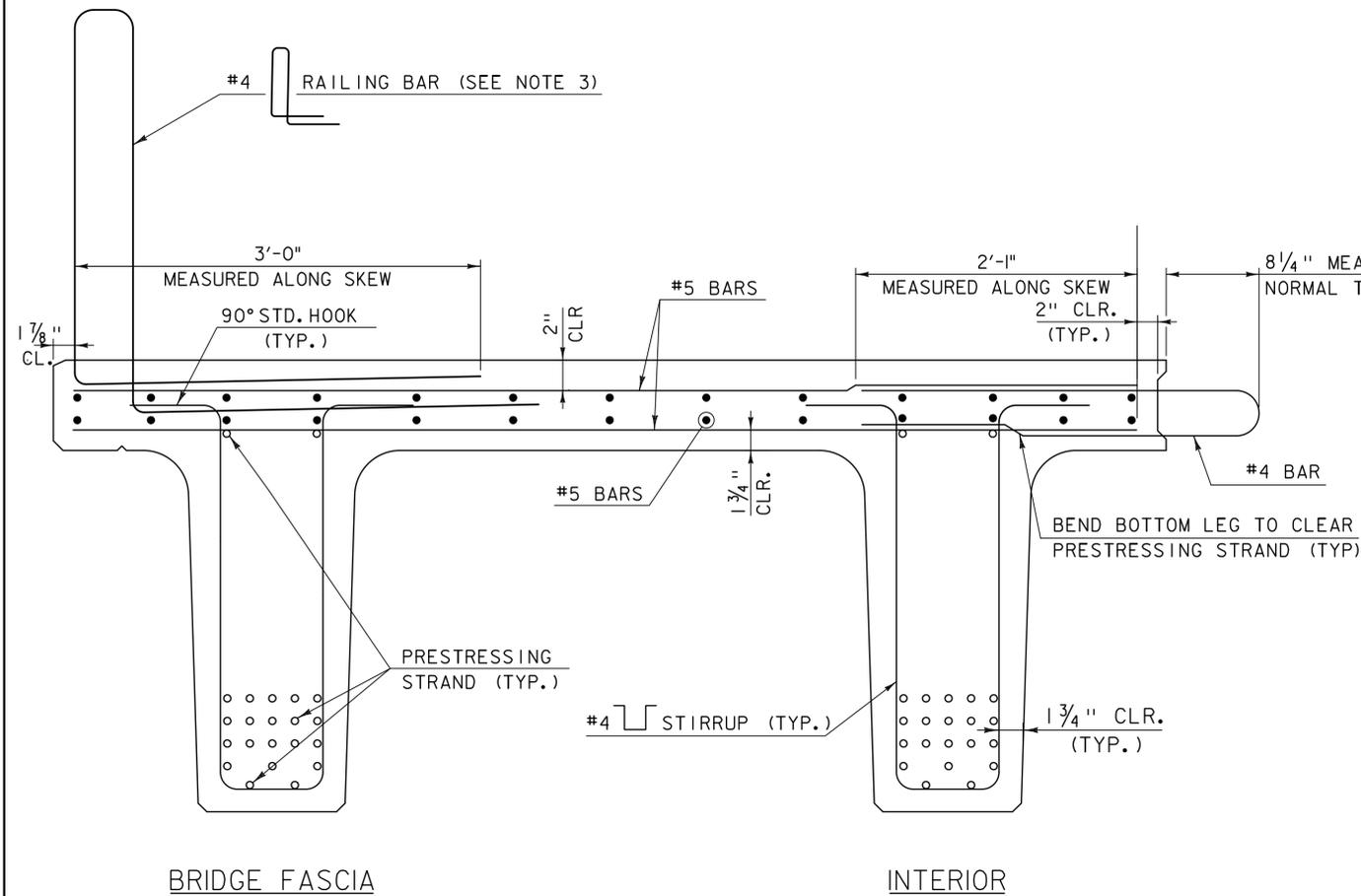
NEXT BEAM D REINFORCEMENT ELEVATION
NOTE: #4 HAIRPIN SHEAR KEY BARS NOT SHOWN FOR CLARITY
SCALE: 1"=1'-0"

TYLIN INTERNATIONAL

PROJECT NAME: ROCKINGHAM
PROJECT NUMBER: BRF 0126(12)

FILE NAME: z10J072bdr_girder_2.dgn
PROJECT LEADER: R. HEBERT
DESIGNED BY: S. KELLER
NEXT D BEAM DETAILS (2 OF 3)

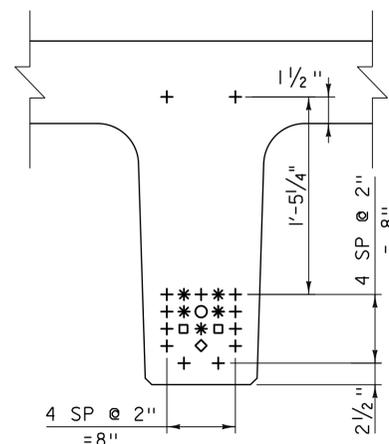
PLOT DATE: 8/26/2014
DRAWN BY: D. AXTELL
CHECKED BY: T. POULIN
SHEET 28 OF 69



NEXT D BEAM REINFORCEMENT SECTION

(SECTION IS SHOWN NORMAL TO BEAM, BUT REINFORCEMENT IS PARALLEL TO CL BRG.)
(BEAM 1 SPAN 2 SHOWN, END SPANS AND OTHER BEAMS SIMILAR)

SCALE: 1 1/2" = 1'-0"



TYPICAL NEXT BEAM STRAND PATTERN

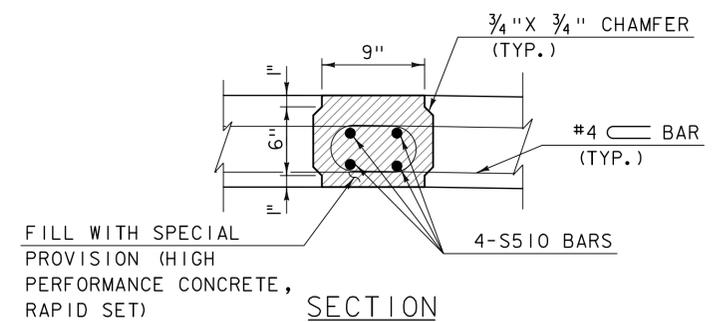
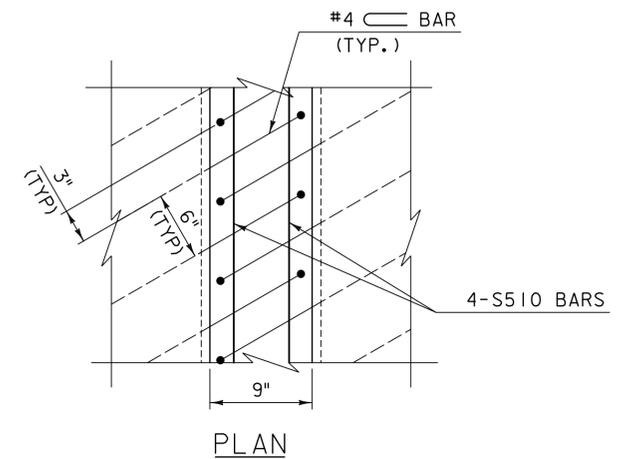
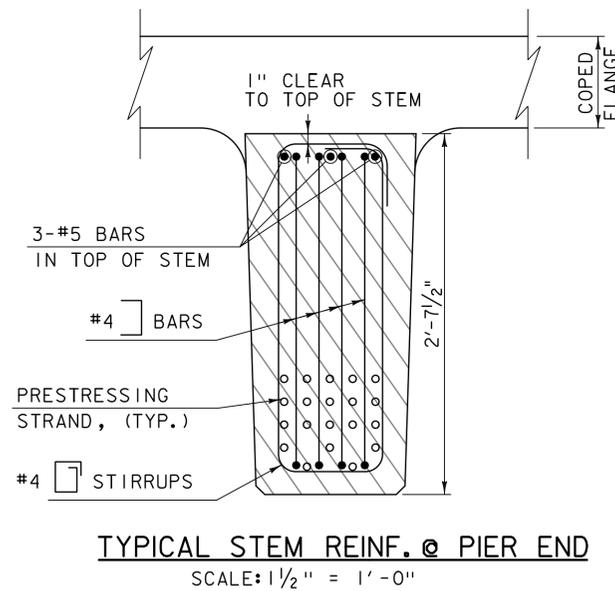
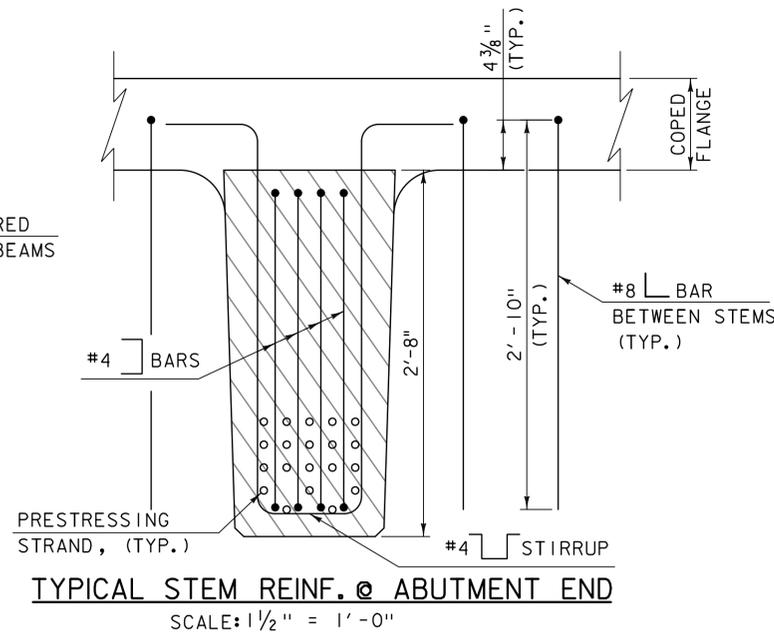
N. T. S.

PRESTRESSING LEGEND:

- × FULLY BONDED. EXTENDED 2' - 0" BEYOND END OF BEAM AT ABUTMENT ENDS ONLY. (BEND UP 90° @ 1' - 1 3/4" BEYOND END OF BEAM)
- + FULLY BONDED
- * DEBONDED 0.5 FEET
- DEBONDED 6 FEET
- DEBONDED 8 FEET
- ◇ DEBONDED 10 FEET

PRECAST BEAM NOTES:

1. PRESTRESSING STRANDS SHALL BE 0.6 INCH DIAMETER.
2. ALL STRANDS SHALL BE TENSIONED TO 44 KIPS EACH.
3. ANGLE VERTICAL LEGS OF RAILING BAR TO MAKE THEM PLUMB IN PLACE. REFER TO 'BRIDGE RAILING DETAILS (1 OF 3)' FOR ADDITIONAL RAILING DETAILS.
4. SHEAR KEY FACES SHALL BE SAND BLASTED AT THE PRECAST PLANT TO IMPROVE CLOSURE POUR GROUT BOND. IF VISUAL INSPECTION REVEALS LAITANCE OR DEBRIS WITHIN THE SHEAR KEYS WHEN THE BEAMS ARRIVE ON-SITE, THEN THE SHEAR KEY FACES SHALL BE CLEANED BY POWER WASHING OR OTHER METHOD APPROVED BY THE ENGINEER.



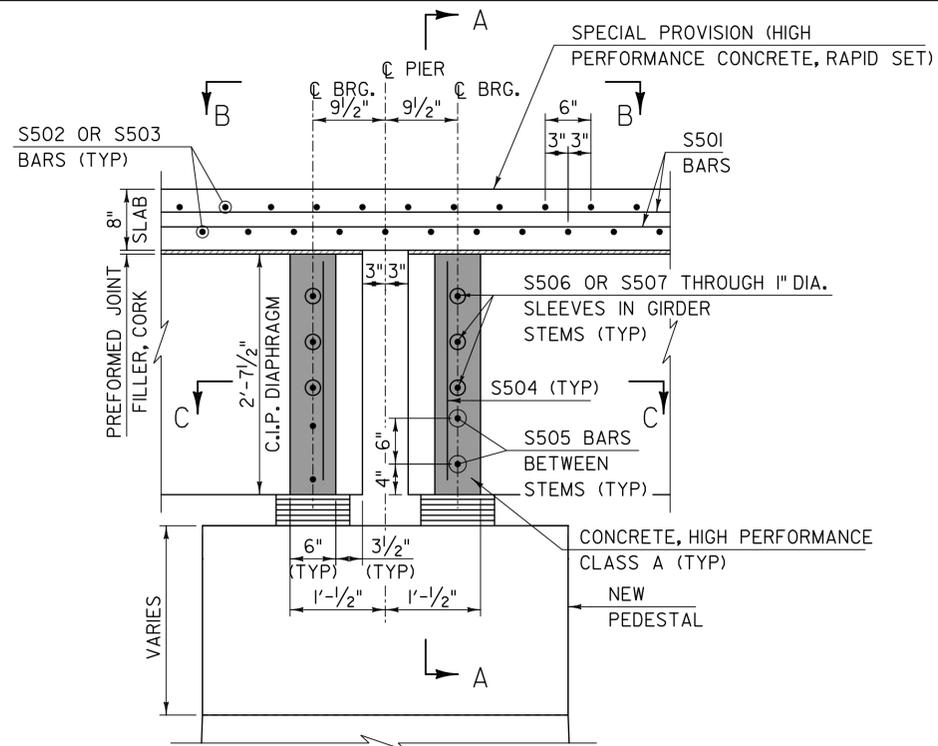
SHEAR KEY DETAILS

SCALE: 1 1/2" = 1'-0"

PROJECT NAME: ROCKINGHAM
PROJECT NUMBER: BRF 0126(12)

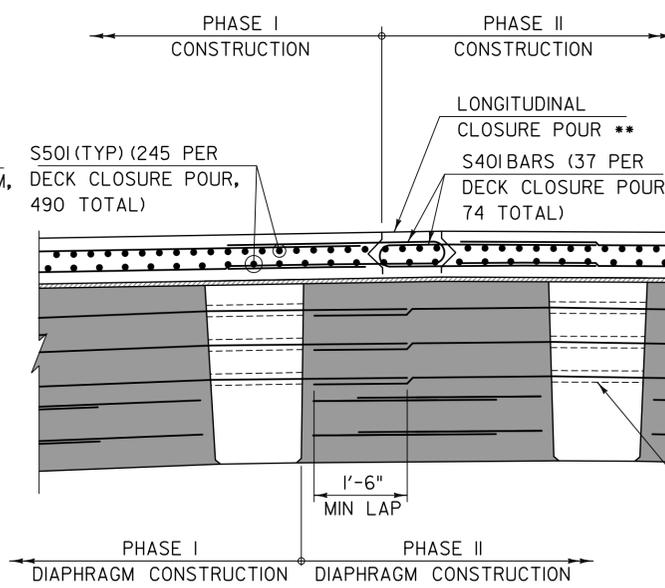
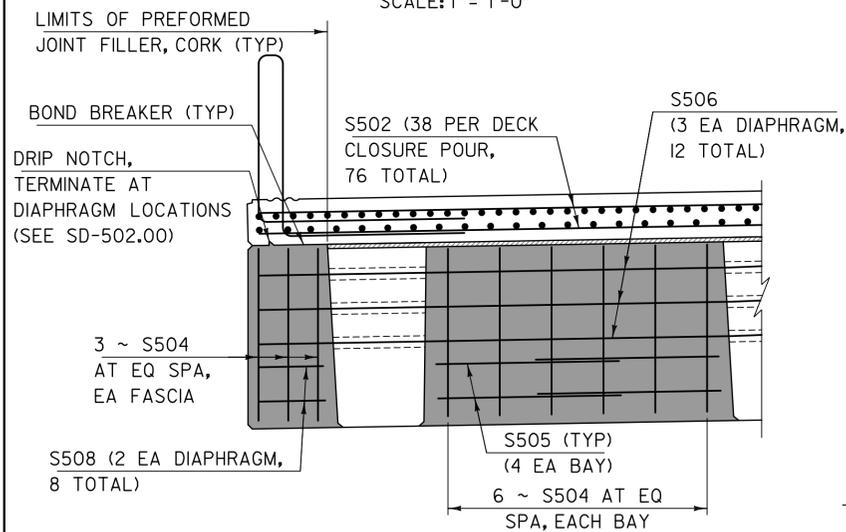
FILE NAME: z10J072bdr_glrder_3.dgn
PROJECT LEADER: R. HEBERT
DESIGNED BY: S. KELLER
NEXT D BEAM DETAILS (3 OF 3)

PLOT DATE: 8/26/2014
DRAWN BY: D. AXTELL
CHECKED BY: T. POULIN
SHEET 29 OF 69



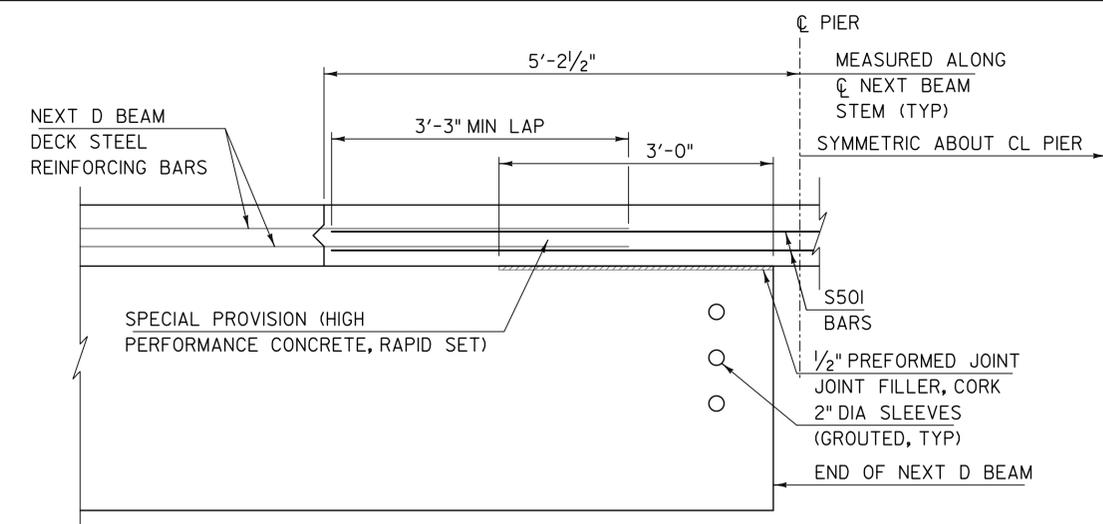
SECTION NORMAL TO PIER

SCALE: 1" = 1'-0"



SECTION A-A: DIAPHRAGM ELEVATION

SCALE: 3/4" = 1'-0"



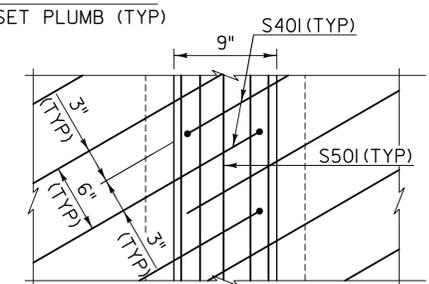
DECK CLOSURE POUR AT PIERS

SCALE: 1" = 1'-0"

** LONGITUDINAL CLOSURE POUR BETWEEN PHASED DECK CLOSURE POUR CONSTRUCTION TO BE CAST SIMULTANEOUSLY WITH FLANGE CLOSURE POUR BETWEEN PHASED NEXT BEAM CONSTRUCTION.

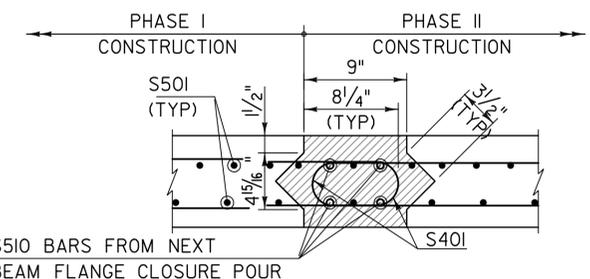
S402 BARS @ 8" MAX MEASURED ALONG FASCIA THROUGH DECK CLOSURE POUR REGIONS, EA SIDE (68 TOTAL)

VERTICAL LEGS TO BE SET PLUMB (TYP)



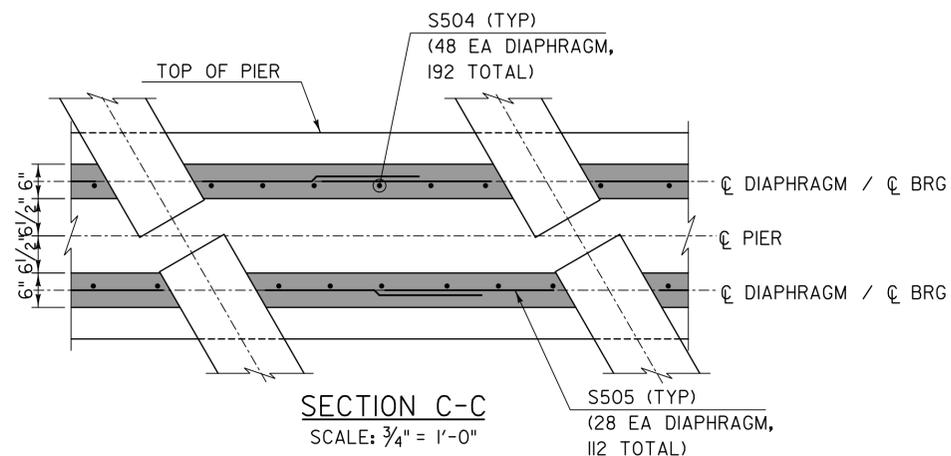
LONGITUDINAL CLOSURE POUR PLAN THROUGH DECK CLOSURE POUR REGIONS

SCALE: 1 1/2" = 1'-0"



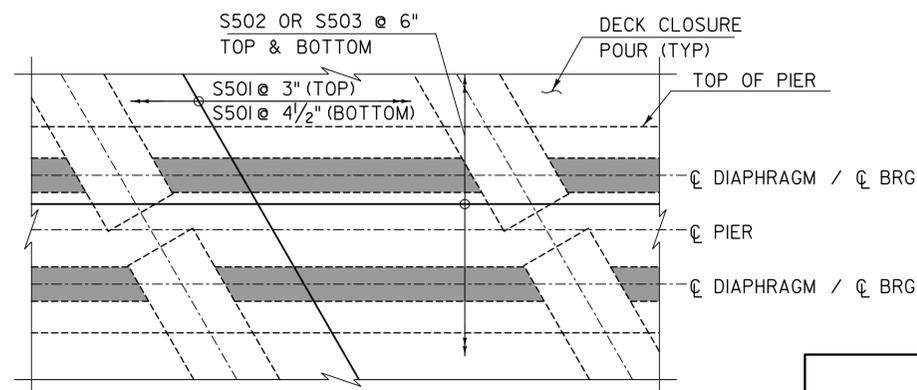
LONGITUDINAL CLOSURE POUR SECTION THROUGH DECK CLOSURE POUR REGIONS

SCALE: 1 1/2" = 1'-0"



SECTION C-C

SCALE: 3/4" = 1'-0"



SECTION B-B

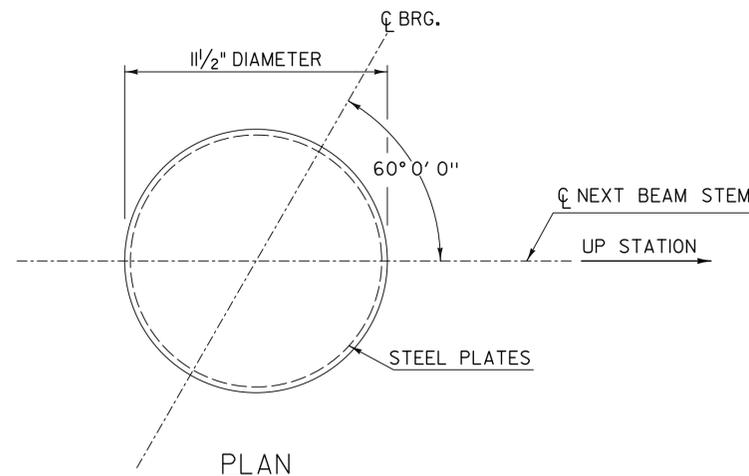
SCALE: 3/4" = 1'-0"

PROJECT NAME: ROCKINGHAM
PROJECT NUMBER: BRF 0126(12)

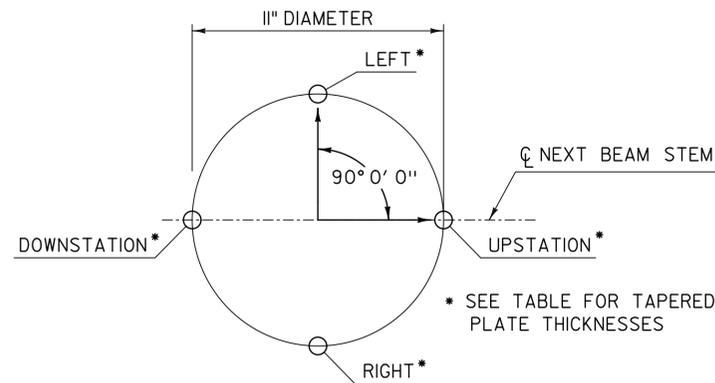
FILE NAME: z10J072bdr_PierdIaph.dgn
PROJECT LEADER: R. HEBERT
DESIGNED BY: J. OLUND
BEAM DIAPHRAGM AND DECK DETAILS

PLOT DATE: 8/26/2014
DRAWN BY: S. MORGAN
CHECKED BY: S. KELLER
SHEET 30 OF 69

TYLIN INTERNATIONAL



PLAN

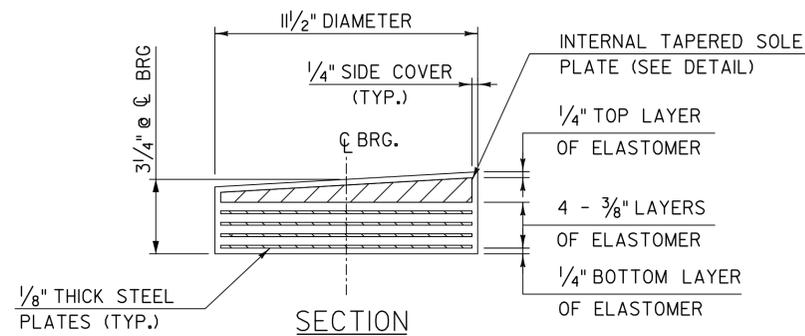


TAPERED SOLE PLATE DETAIL

SCALE: 3" = 1'-0"

NOTES:

- INTERNAL TAPERED SOLE PLATES ARE DETAILED CONSIDERING THE INFLUENCES OF BRIDGE CROSS SLOPE, PROFILE GRADE, AND PREDICTED BEAM CAMBER AND END ROTATION AT ERECTION.
- THE CENTER ELEVATION OF THE BEARINGS ARE DETAILED CONSIDERING PREDICTED BEAM CAMBER AND BEAM END ROTATIONS AT ERECTION (30-60 DAYS AFTER STRESSING).



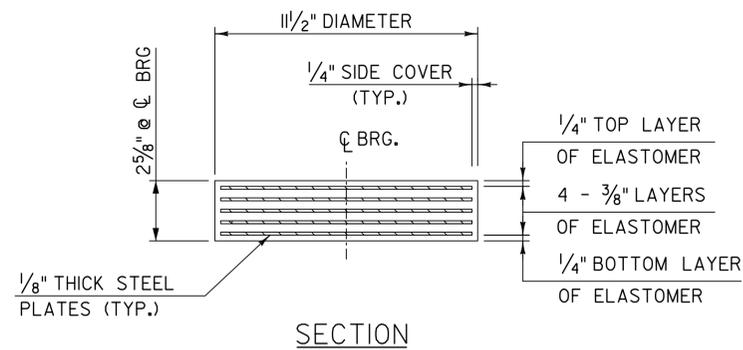
SECTION

REINFORCED ELASTOMERIC PAD - PIERS (TYPE B-F)

SCALE: 3" = 1'-0"

BEARING	INTERNAL SOLE PLATE THICKNESS (INCHES)				QUANTITY
	UPSTATION	DOWNSTATION	LEFT	RIGHT	
A	-	-	-	-	4
B	0.750	0.750	0.640	0.860	8
C	0.750	0.750	0.860	0.640	4
D	0.876	0.624	0.750	0.750	4
E	0.876	0.624	0.640	0.860	8
F	0.876	0.624	0.860	0.640	4

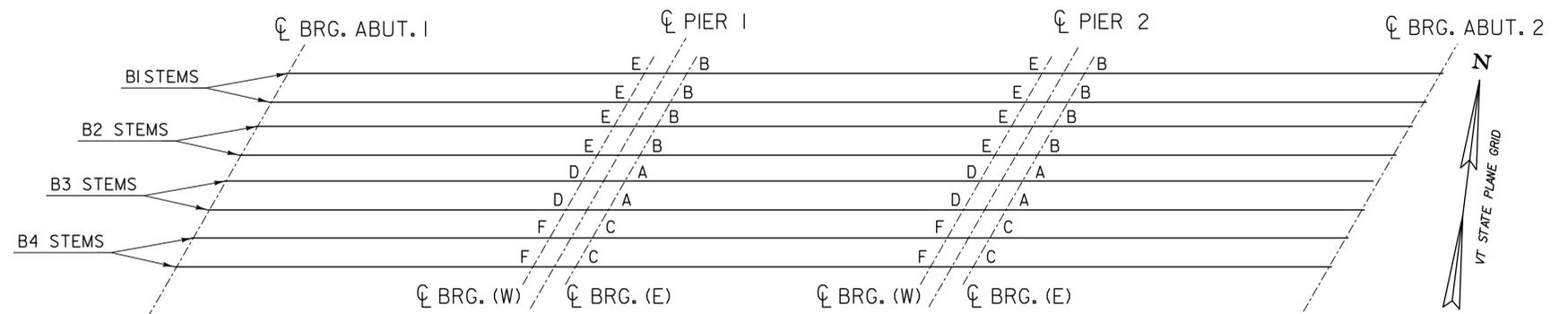
TAPERED PLATE ELEVATIONS



SECTION

REINFORCED ELASTOMERIC PAD - PIERS (TYPE A)

SCALE: 3" = 1'-0"



BEARING LAYOUT

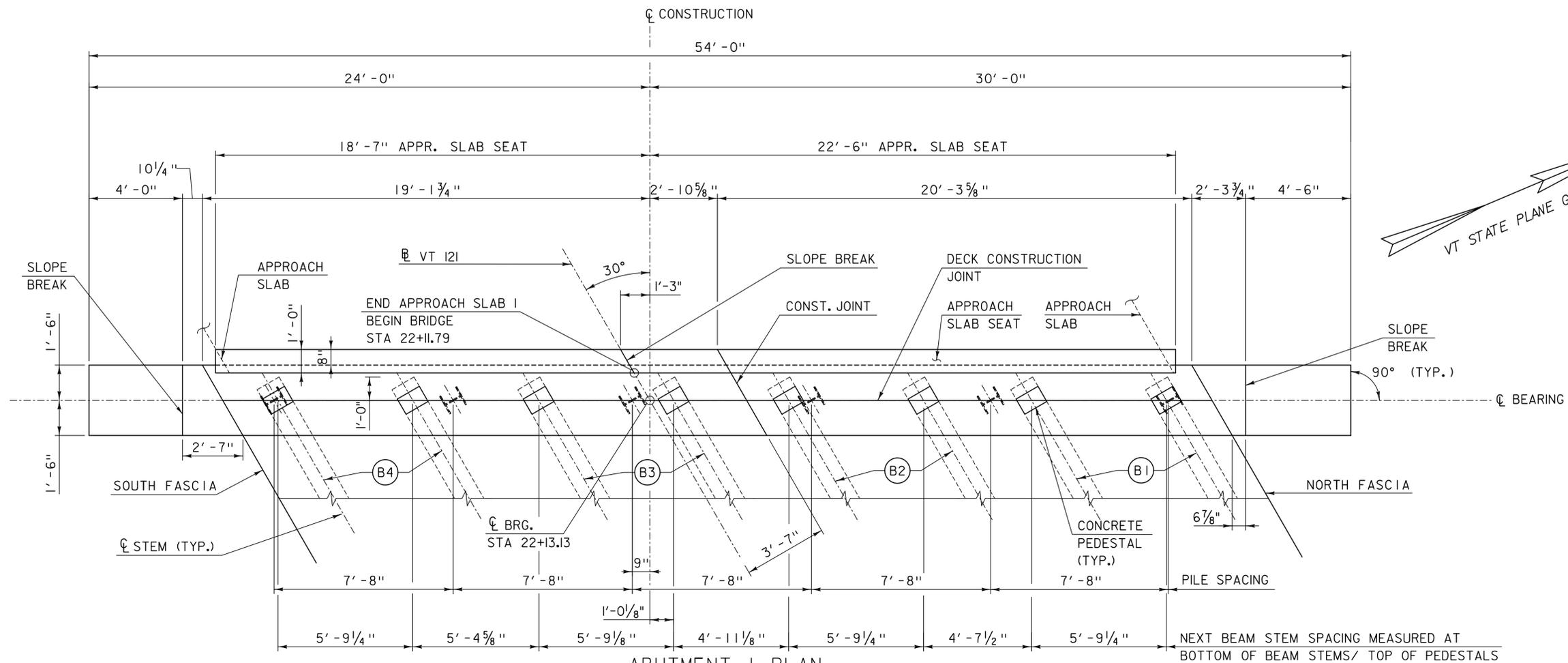
NOT TO SCALE

TYLIN INTERNATIONAL

PROJECT NAME: ROCKINGHAM
PROJECT NUMBER: BRF 0126(12)

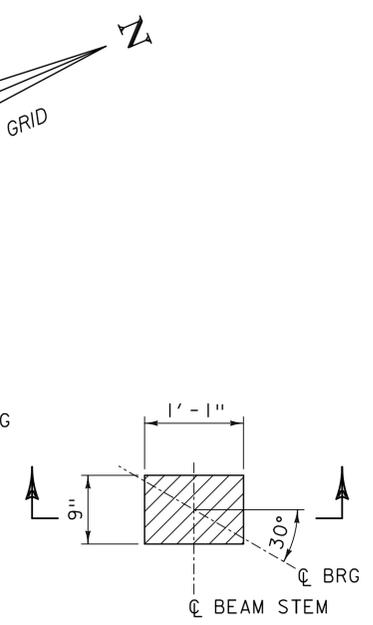
FILE NAME: z10J072bdr_brgdets.dgn
PROJECT LEADER: R. HEBERT
DESIGNED BY: S. KELLER
ELASTOMERIC BEARING DETAILS

PLOT DATE: 8/26/2014
DRAWN BY: D. AXTELL
CHECKED BY: T. POULIN
SHEET 31 OF 69

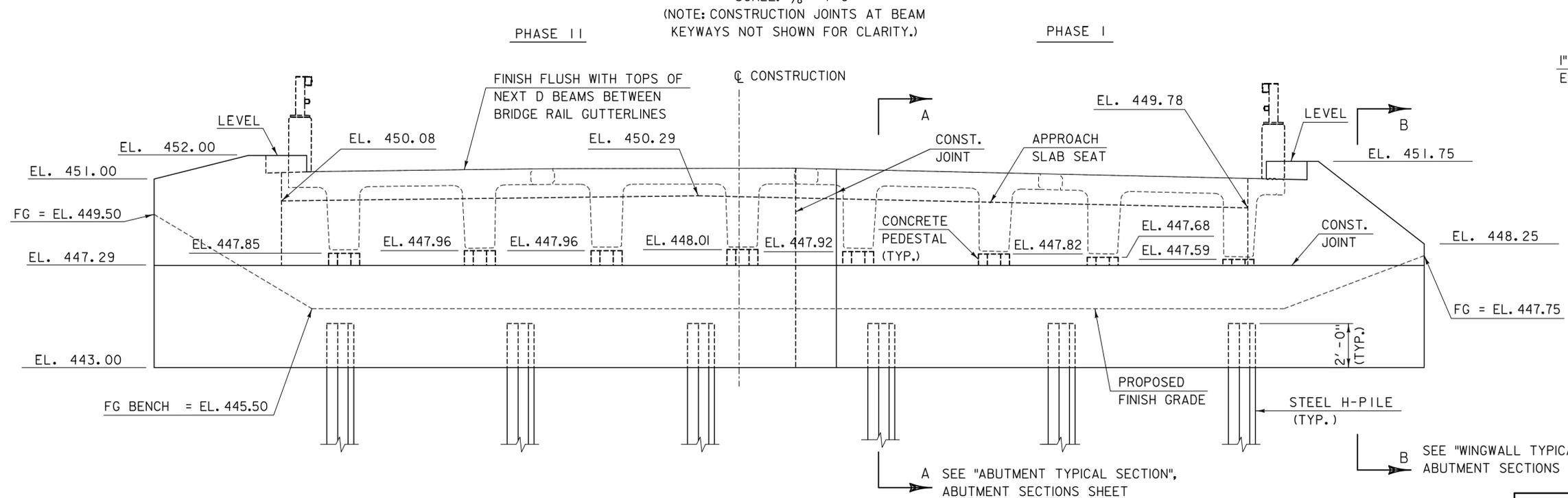


ABUTMENT I PLAN

SCALE: 3/8" = 1'-0"
 (NOTE: CONSTRUCTION JOINTS AT BEAM KEYWAYS NOT SHOWN FOR CLARITY.)

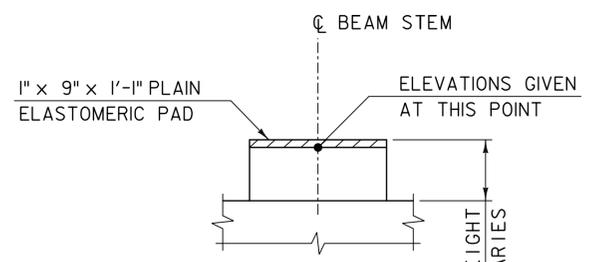


PEDESTAL PLAN
 SCALE: 1" = 1'-0"



ABUTMENT I ELEVATION

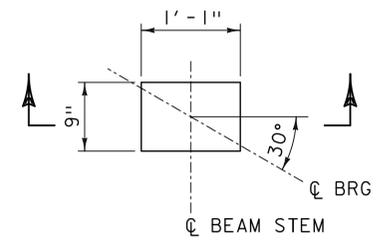
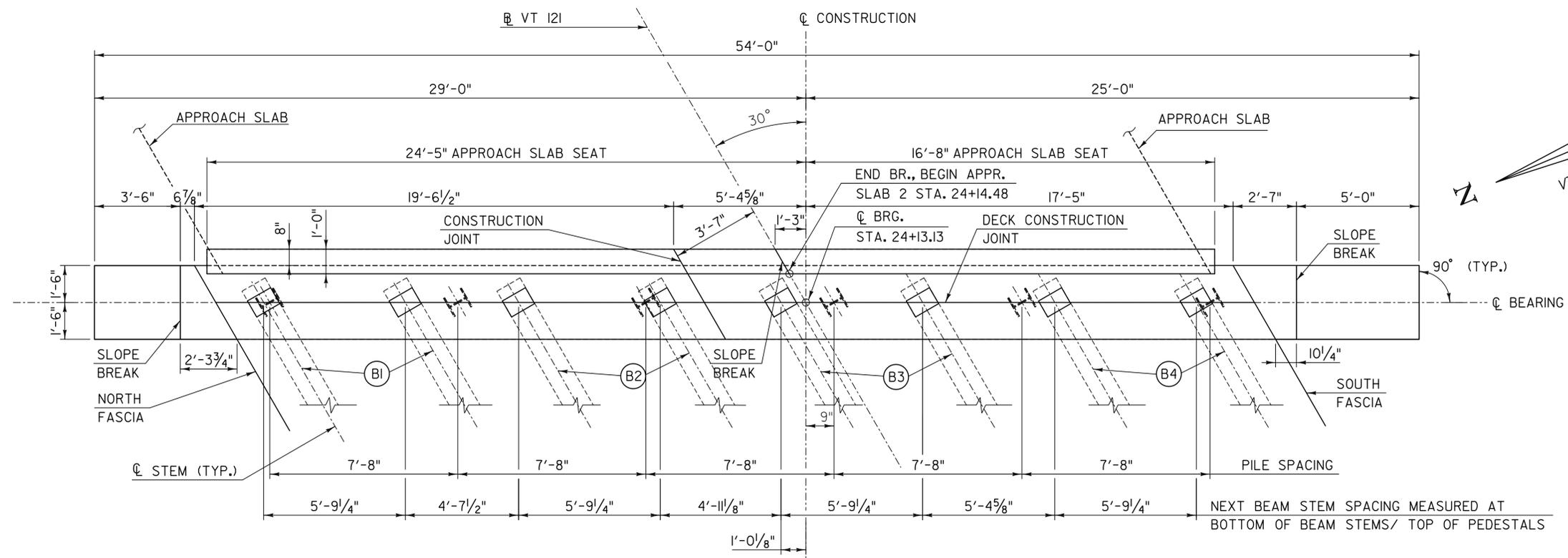
SCALE: 3/8" = 1'-0"



PEDESTAL SECTION
 SCALE: 1" = 1'-0"

PROJECT NAME:	ROCKINGHAM
PROJECT NUMBER:	BRF 0126(12)
FILE NAME:	z10J072bdr_abut1.dgn
PROJECT LEADER:	R. HEBERT
DESIGNED BY:	S. KELLER
ABUTMENT I MASONRY	
PLOT DATE:	8/26/2014
DRAWN BY:	D. AXTELL
CHECKED BY:	T. POULIN
SHEET	32 OF 69

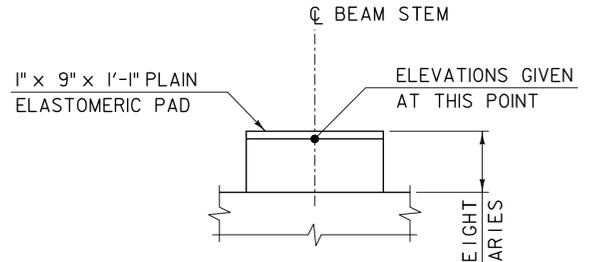
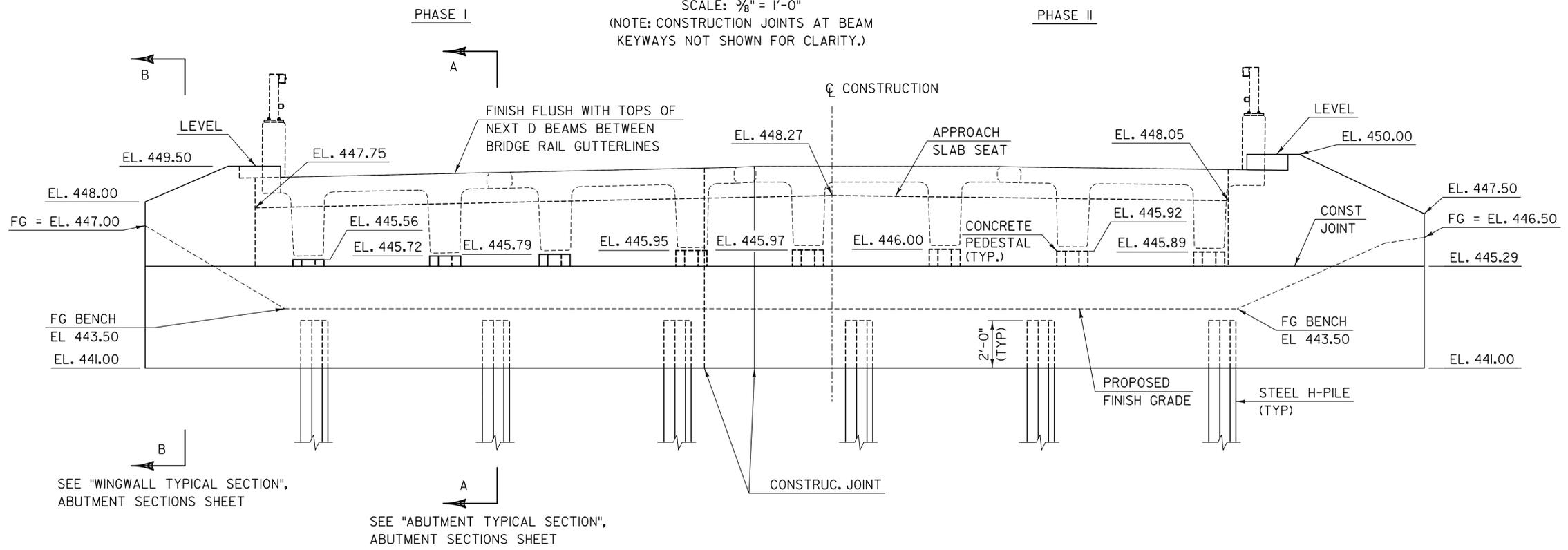




PEDESTAL PLAN
SCALE: 1" = 1'-0"

ABUTMENT 2 PLAN

SCALE: 3/8" = 1'-0"
(NOTE: CONSTRUCTION JOINTS AT BEAM
KEYWAYS NOT SHOWN FOR CLARITY.)



PEDESTAL SECTION
SCALE: 1" = 1'-0"

ABUTMENT 2 ELEVATION

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

SEE "WINGWALL TYPICAL SECTION",
ABUTMENT SECTIONS SHEET

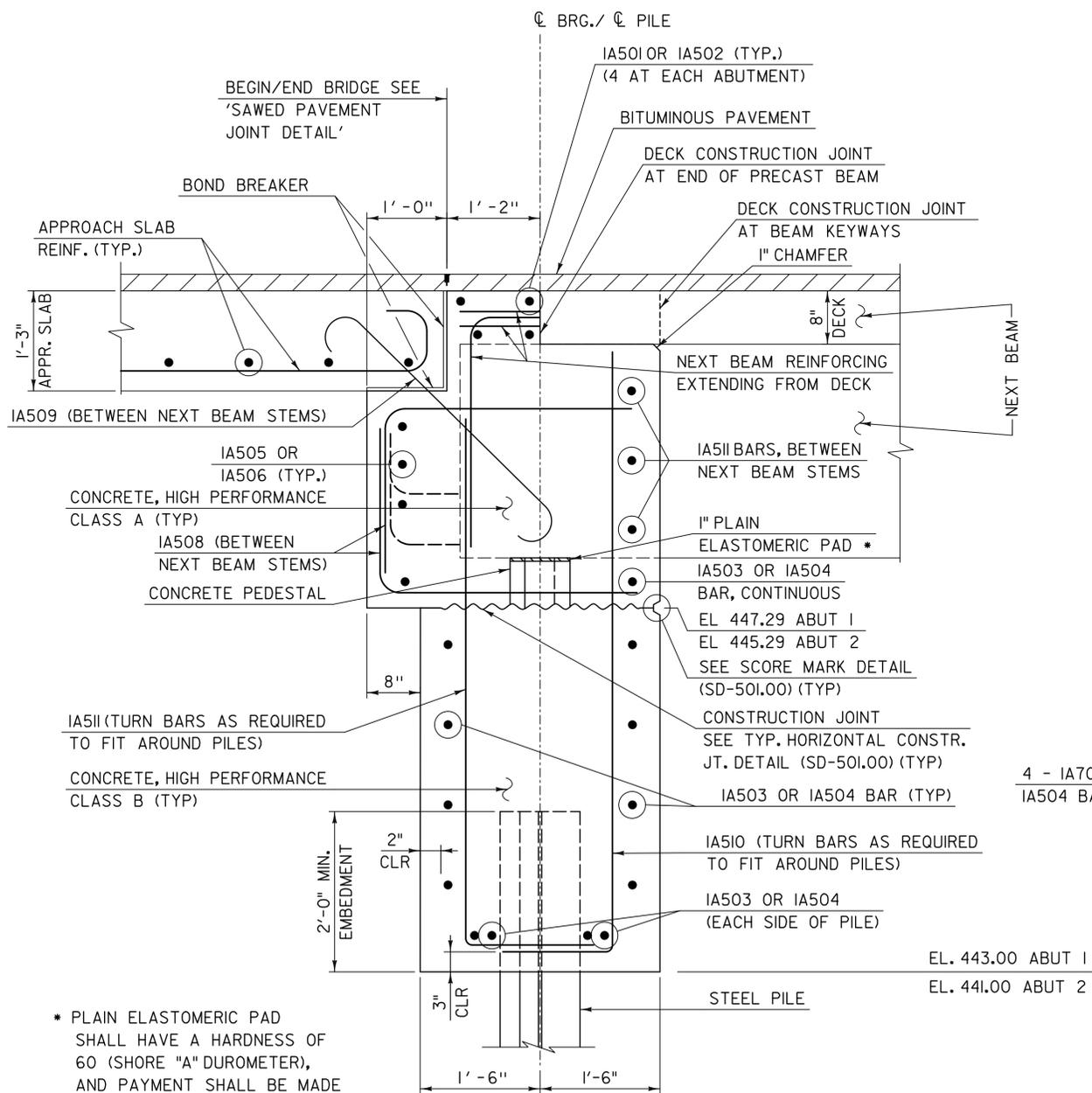
SEE "ABUTMENT TYPICAL SECTION",
ABUTMENT SECTIONS SHEET

TYLINT INTERNATIONAL

PROJECT NAME: ROCKINGHAM
PROJECT NUMBER: BRF 0126(12)

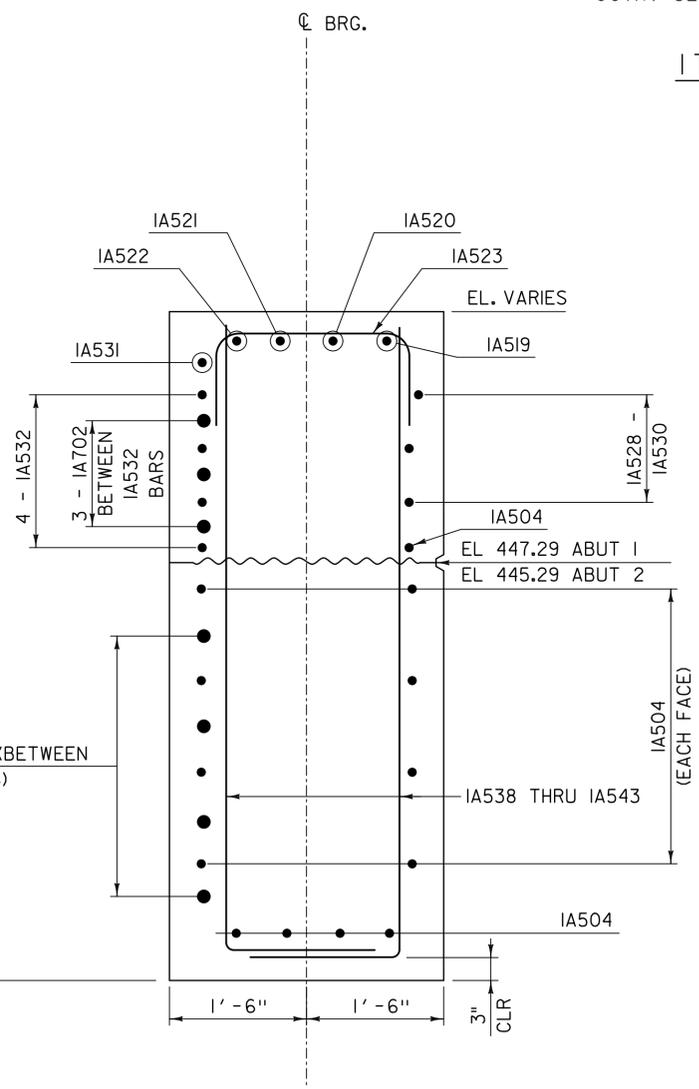
FILE NAME: z10J072bdr_abut2.dgn
PROJECT LEADER: R. HEBERT
DESIGNED BY: S. KELLER
ABUTMENT 2 MASONRY

PLOT DATE: 8/26/2014
DRAWN BY: B. CARTER
CHECKED BY: T. POULIN
SHEET 34 OF 69

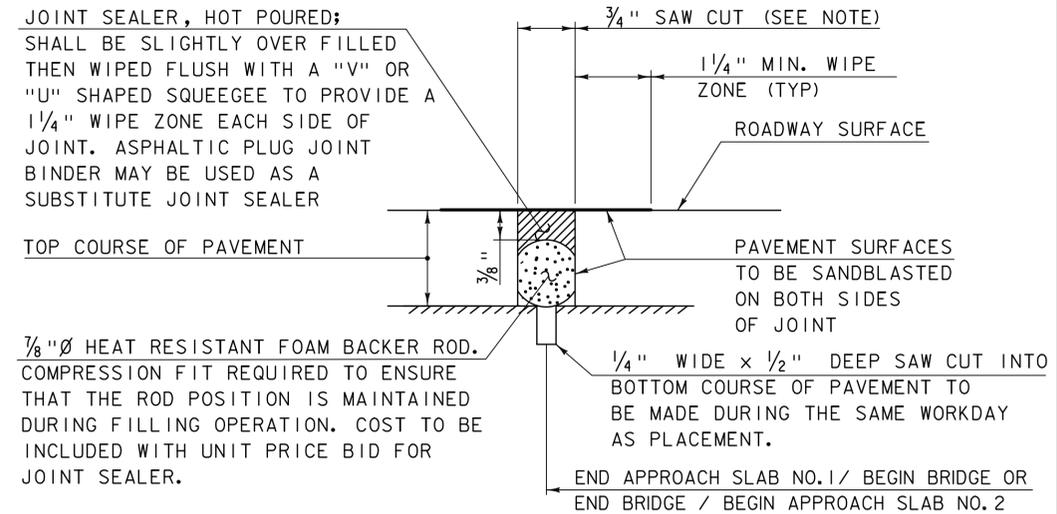


ABUTMENT TYPICAL SECTION
 NOT TO SCALE
 (REINFORCEMENT FOR ABUTMENT 1 SHOWN.
 REINFORCEMENT FOR ABUTMENT 2 SIMILAR.)

* PLAIN ELASTOMERIC PAD SHALL HAVE A HARDNESS OF 60 (SHORE "A" DUROMETER), AND PAYMENT SHALL BE MADE UNDER ITEM 531.16.

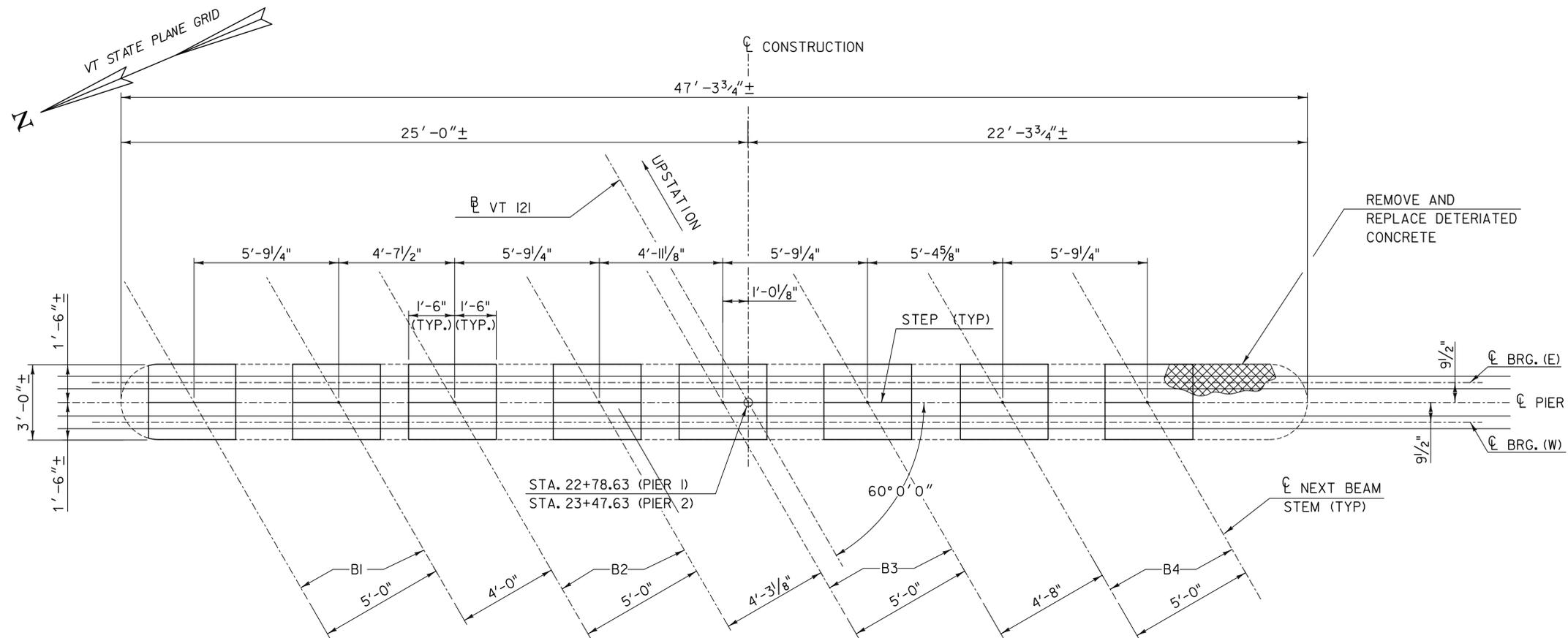


WINGWALL TYPICAL SECTION
 NOT TO SCALE
 (REINFORCEMENT FOR NW WINGWALL SHOWN.
 REINFORCEMENT FOR OTHER WINGWALLS SIMILAR.)

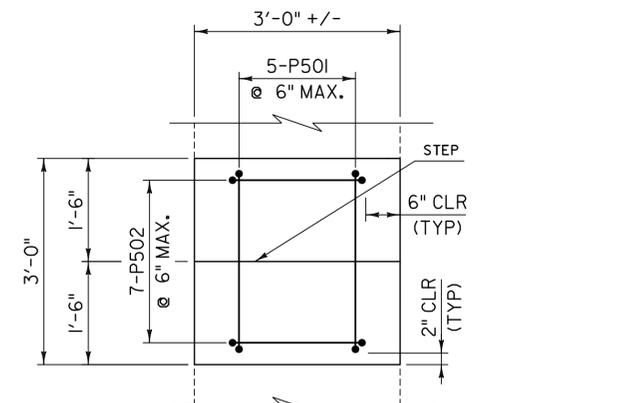


ITEM 524.11, "JOINT SEALER, HOT POURED"
SAWED PAVEMENT JOINT DETAIL
 N. T. S.

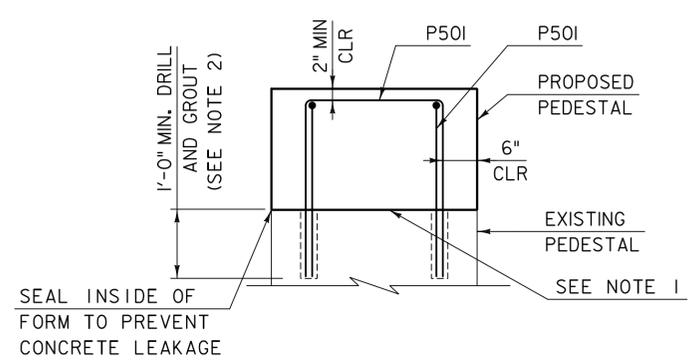
NOTE: JOINT IS TO BE LOCATED ACCURATELY BY STRING LINING, OR OTHER MEANS, PRIOR TO PAVING, SO THAT THE SAW CUTS WILL BE MADE DIRECTLY OVER THE END OF CONCRETE DECK. JOINT SHALL BE CUT DRY IN A SINGLE PASS AND BE SEALED WITHIN 24 HOURS OR PRIOR TO EXPOSURE TO TRAFFIC. JOINT SHALL BE CLEANED PRIOR TO APPLYING THE JOINT SEALER.



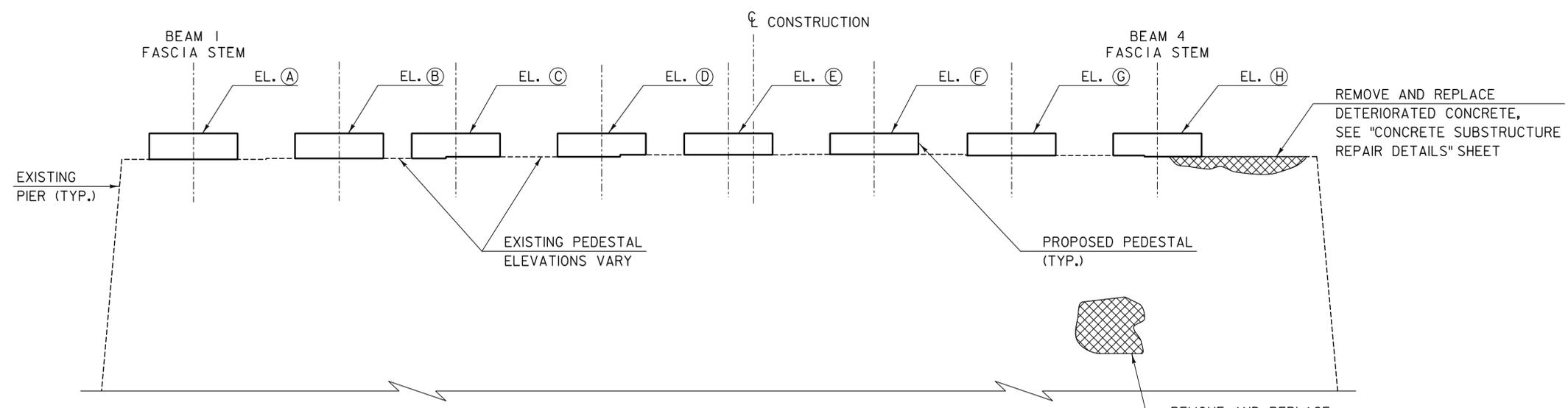
PIERS 1 AND 2 - PLAN
SCALE 3/8" = 1'-0"



PEDESTAL REINFORCEMENT PLAN
SCALE 3/4" = 1'-0"



PEDESTAL REINFORCEMENT ELEVATION
SCALE 3/4" = 1'-0"



PIERS 1 AND 2 - PARTIAL ELEVATION
SCALE 3/8" = 1'-0"

ELEVATION TABLE				
LOCATION	PIER 1 WEST	PIER 1 EAST	PIER 2 WEST	PIER 2 EAST
A	446.72	446.74	446.03	446.05
B	446.89	446.83	446.20	446.14
C	446.95	446.97	446.26	446.28
D	447.12	446.06	446.43	446.37
E	447.14	447.21	446.45	446.52
F	447.17	447.17	446.48	446.48
G	447.09	447.11	446.40	446.42
H	447.06	447.00	446.37	446.31
EXISTING PEDESTAL ELEVATIONS VARY	446.0* TO 446.3*	445.2* TO 445.5*	445.2* TO 445.5*	445.2* TO 445.5*

- NOTES:
- FOR A PERIOD OF AT LEAST ONE HOUR BEFORE THE PLACEMENT OF PEDESTAL CONCRETE MATERIAL, THE PREPARED SURFACE SHALL BE FLOODED WITH WATER. AFTER REMOVAL OF ALL FREE WATER, THE PEDESTAL CONCRETE MATERIAL SHALL BE DEPOSITED ON THE DAMPENED SURFACE.
 - DIAMETER OF DRILLED HOLE SHALL BE DETERMINED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.

TYLIN INTERNATIONAL

PROJECT NAME: ROCKINGHAM
 PROJECT NUMBER: BRF 0126(12)
 FILE NAME: z10J072bdr_Pier1.dgn
 PROJECT LEADER: R. HEBERT
 DESIGNED BY: S. KELLER
 PIER MODIFICATION
 PLOT DATE: 8/26/2014
 DRAWN BY: D. AXTELL
 CHECKED BY: T. POULIN
 SHEET 37 OF 69

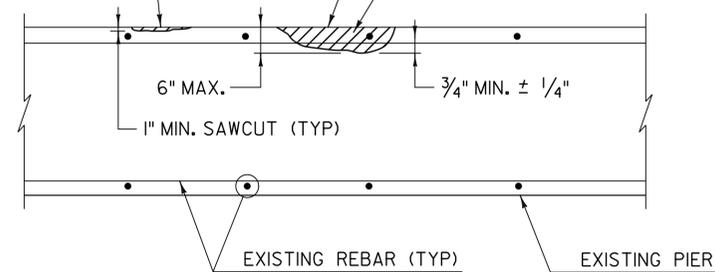
EXISTING SUBSTRUCTURE CONCRETE REPAIR NOTES:

1. WHEN "OVERHEAD AND VERTICAL CONCRETE REPAIR MATERIAL" CONFORMING TO SUBSECTION 780.02 IS USED, THE BONDING AGENT, (IF ANY REQUIRED) AND ITS APPLICATION PROCEDURE SHALL COMPLY WITH THE REQUIREMENTS OF THE PATCHING MATERIAL MANUFACTURER. PAYMENT FOR BONDING AGENT WILL BE INCIDENTAL TO ITEM 580.I3, 580.I4 OR 580.I5.
2. ALL WORK AND MATERIALS NECESSARY FOR PREPARING A PATCH AND FILLING IT SHALL BE INCLUDED IN THE UNIT PRICE BID FOR ITEM 580.I3, 580.I4 OR 580.I5
3. ITEM 580.I4 FILLING MATERIAL SHALL BE "RAPID SETTING CONCRETE REPAIR MATERIAL" CONFORMING TO SUBSECTION 780.03.
4. ITEM 580.I5 FILLING MATERIAL SHALL BE "RAPID SETTING CONCRETE REPAIR MATERIAL WITH COARSE AGGREGATE" CONFORMING TO SUBSECTION 780.04.
5. IF PNEUMATICALLY APPLIED CONCRETE IS SELECTED FOR REPAIR OF CONCRETE SUBSTRUCTURE SURFACE, CLASS II OR III, THEN THIS TYPE OF CONCRETE REPAIR SHALL BE CONFINED ONLY TO VERTICAL AND OVERHEAD SURFACES OF THE SUBSTRUCTURE. ALSO, THE BRIDGE AND BEAMS SHOULD BE COMPLETELY PROTECTED FROM REBOUND MATERIAL DURING PNEUMATICALLY APPLIED CONCRETE APPLICATION PROCEDURES.
6. THE ENGINEER SHALL ORDER REPLACEMENT OF ANY SUBSTRUCTURE REINFORCING STEEL THAT IS DETERIORATED (WITH MORE THAN 25% SECTION LOSS) WITH NEW REINFORCING STEEL OF THE SAME SIZE. ALL REINFORCING STEEL SHALL HAVE AN APPROPRIATE LAP SPLICE. SUBSTRUCTURE REINFORCING STEEL REPLACED WILL BE PLAIN BAR REINFORCING STEEL, LEVEL I OR BETTER AND WILL BE INCIDENTAL TO ITEM 580.I4 "REPAIR OF CONCRETE SUBSTRUCTURE SURFACE CLASS II" OR ITEM 580.I5 "REPAIR OF CONCRETE SUBSTRUCTURE SURFACE CLASS III".

LIMITS OF ITEM 580.I3
MATERIAL USED TO REPAIR
THIS AREA SHALL BE "OVERHEAD
AND VERTICAL CONCRETE
REPAIR MATERIAL"

EXISTING SPALLED OR DELAMINATED AREA
(SHOWN FOR ILLUSTRATIVE PURPOSES ONLY)
(TYP)

LIMITS OF ITEM 580.I4 (MAX. 6" DEPTH)
MATERIAL SHALL BE "RAPID SETTING
CONCRETE REPAIR MATERIAL".



NOTES:

1. PLAN VIEW OF EXISTING PIER SHOWN.
2. REMOVAL OF EXISTING CONCRETE TO A DEPTH GREATER THAN SPECIFIED FOR ITEM 580.I4 SHALL BE PAID UNDER ITEM 580.I5, "REPAIR OF CONCRETE SUBSTRUCTURE SURFACE, CLASS III".
3. DETAIL SHOWS LIMIT OF ITEMS 580.I3, 580.I4 AND 580.I5 REPAIR OF CONCRETE SUBSTRUCTURE SURFACE, CLASS I, CLASS II, OR CLASS III.

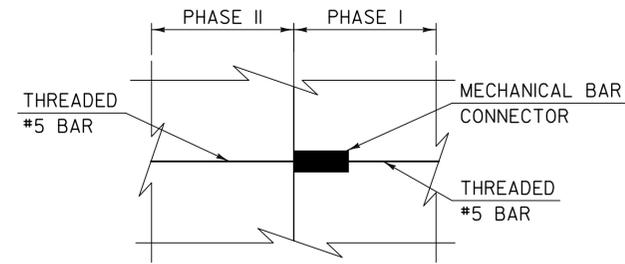
CONCRETE SUBSTRUCTURE REPAIR DETAIL
NOT TO SCALE

PROJECT NAME: ROCKINGHAM
PROJECT NUMBER: BRF 0126(12)

TYLININTERNATIONAL

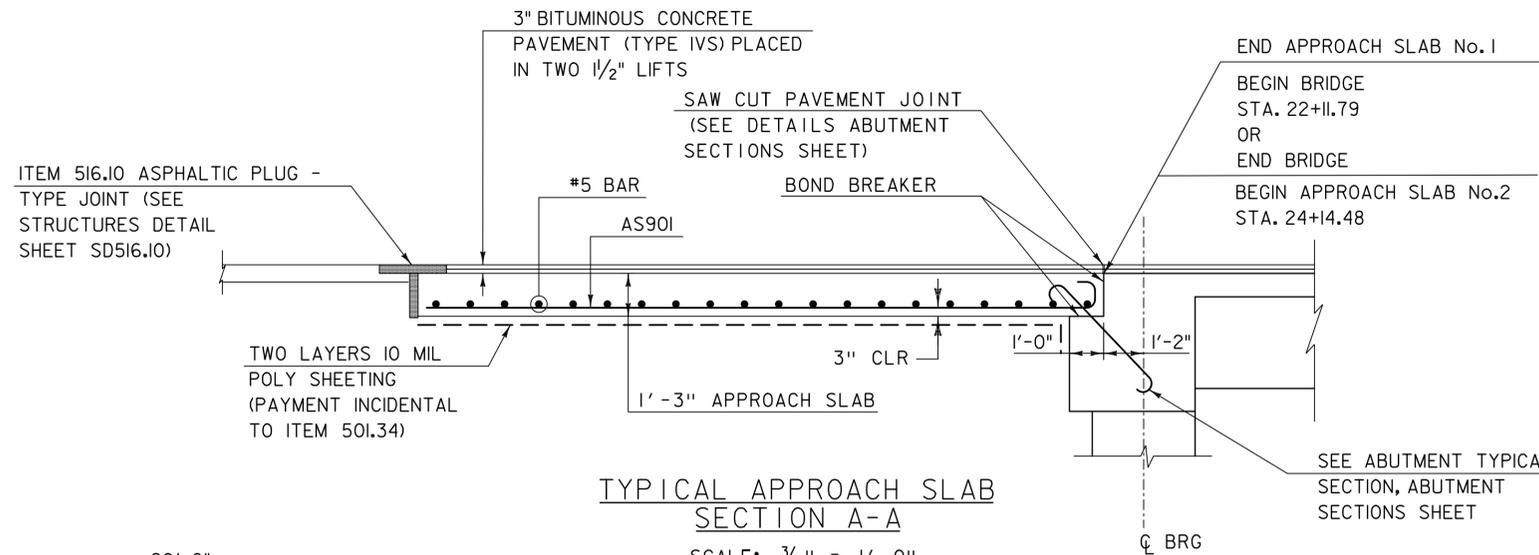
FILE NAME: z10J072bdr_repair.dgn
PROJECT LEADER: R. HEBERT
DESIGNED BY: S. KELLER
CONCRETE SUBSTRUCTURE REPAIR DETAILS

PLOT DATE: 8/26/2014
DRAWN BY: D. AXTELL
CHECKED BY: T. POULIN
SHEET 38 OF 69



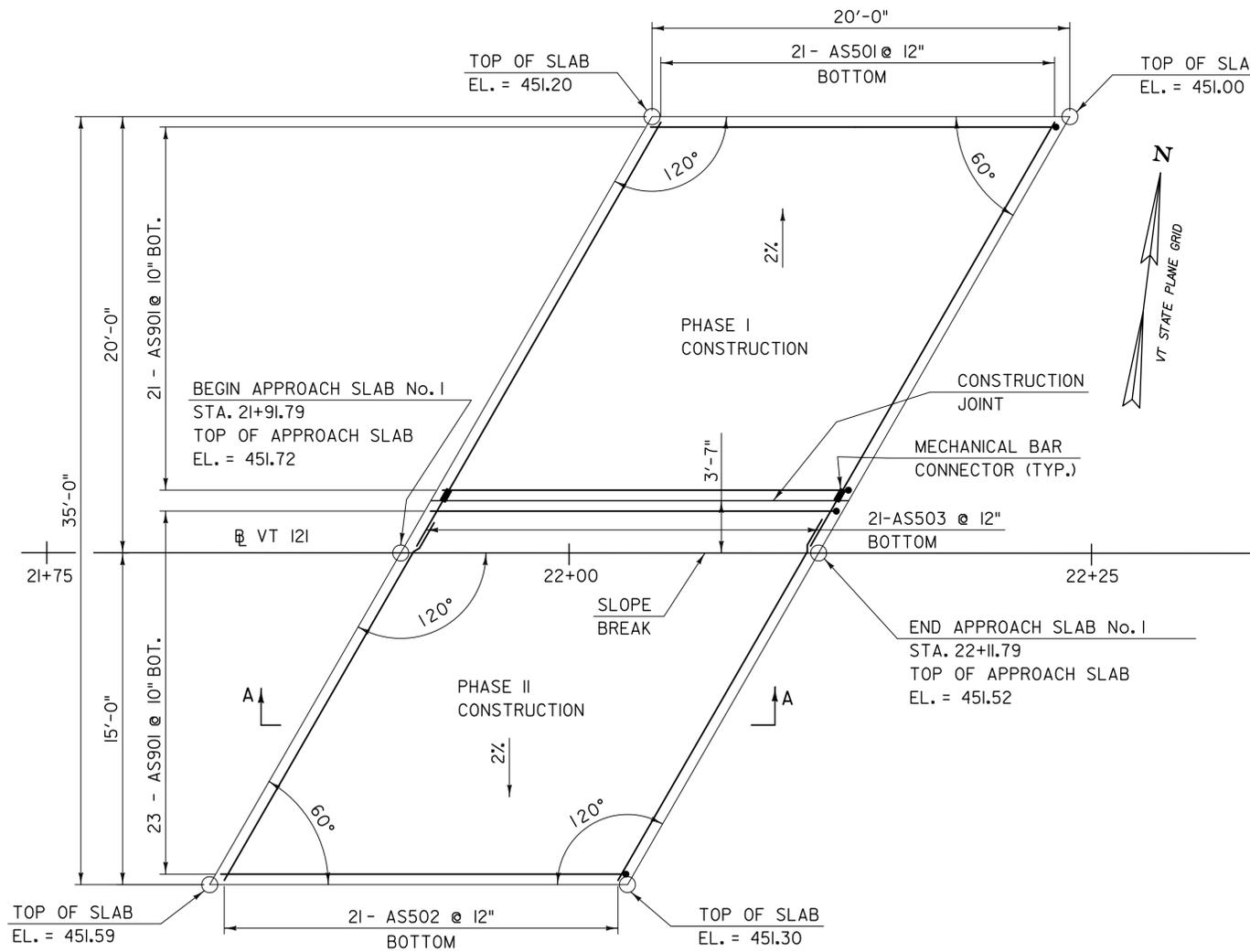
TYPICAL MECHANICAL CONNECTOR DETAIL

SCALE: 1/2" = 1'-0"



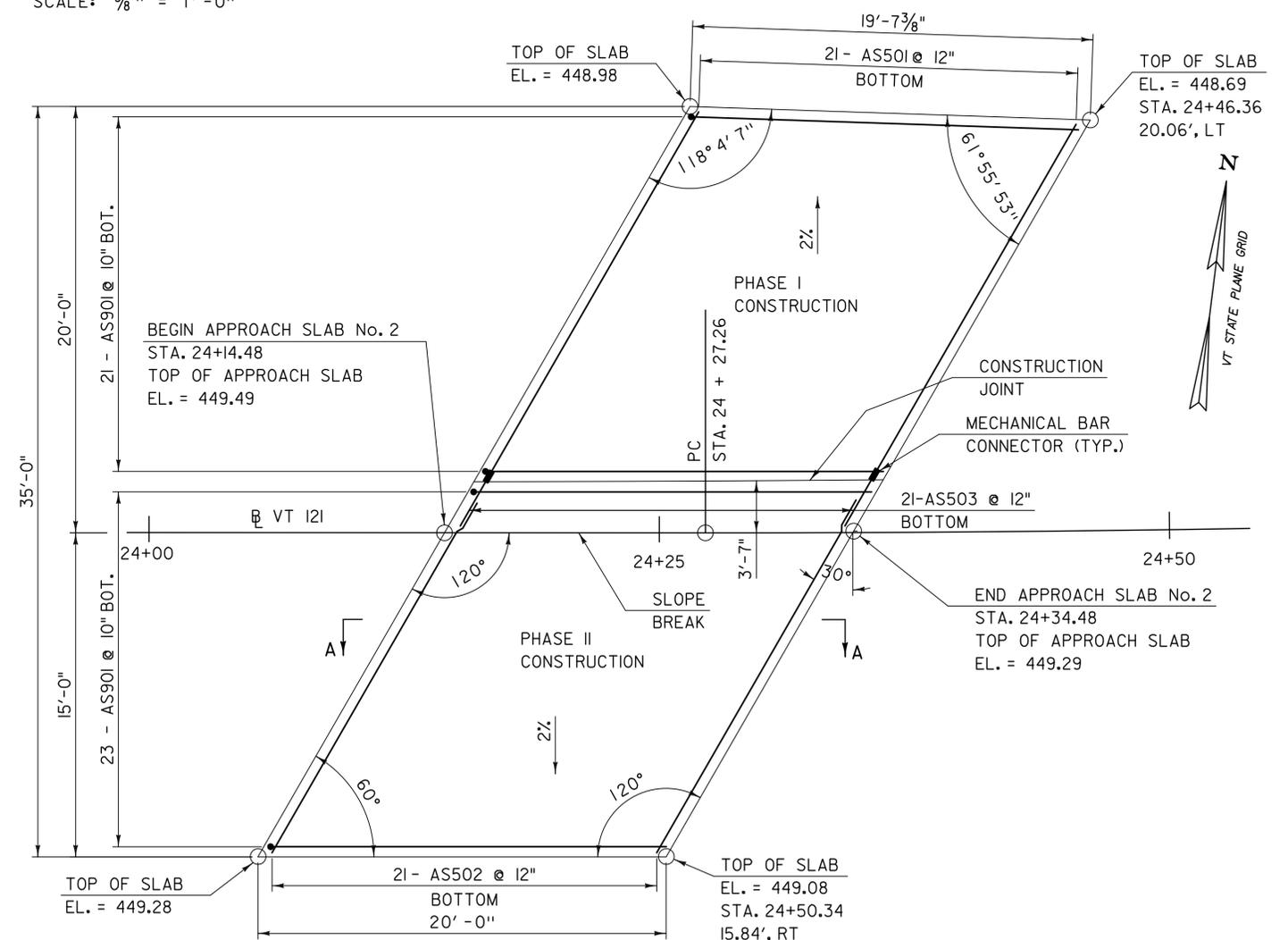
TYPICAL APPROACH SLAB SECTION A-A

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



APPROACH SLAB No. 1 PLAN

SCALE: 1/4" = 1'-0"



APPROACH SLAB No. 2 PLAN

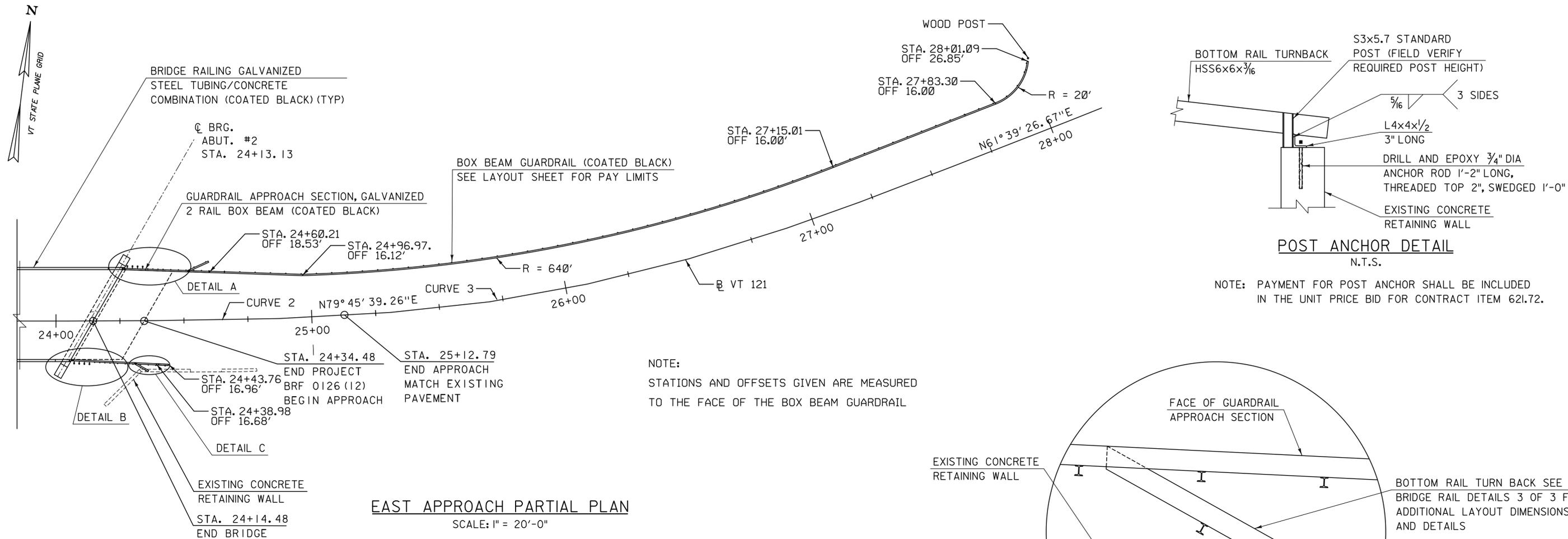
SCALE: 1/4" = 1'-0"

PROJECT NAME: ROCKINGHAM
PROJECT NUMBER: BRF 0126(12)

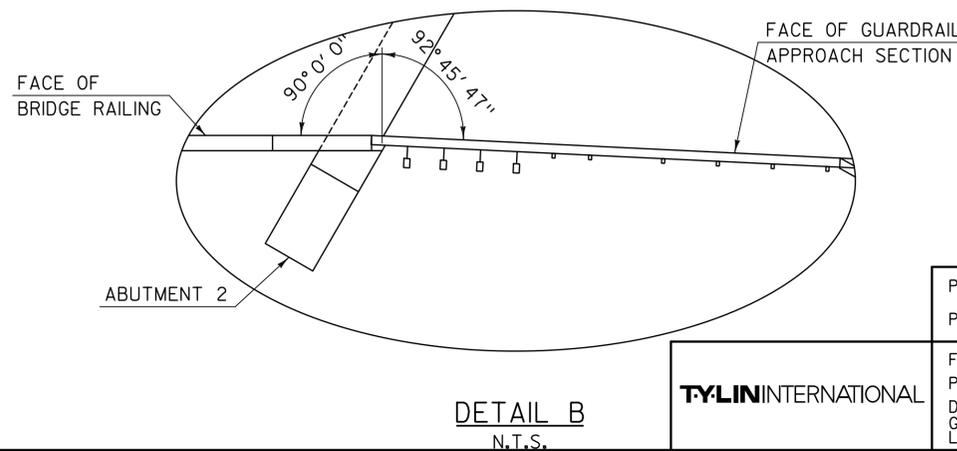
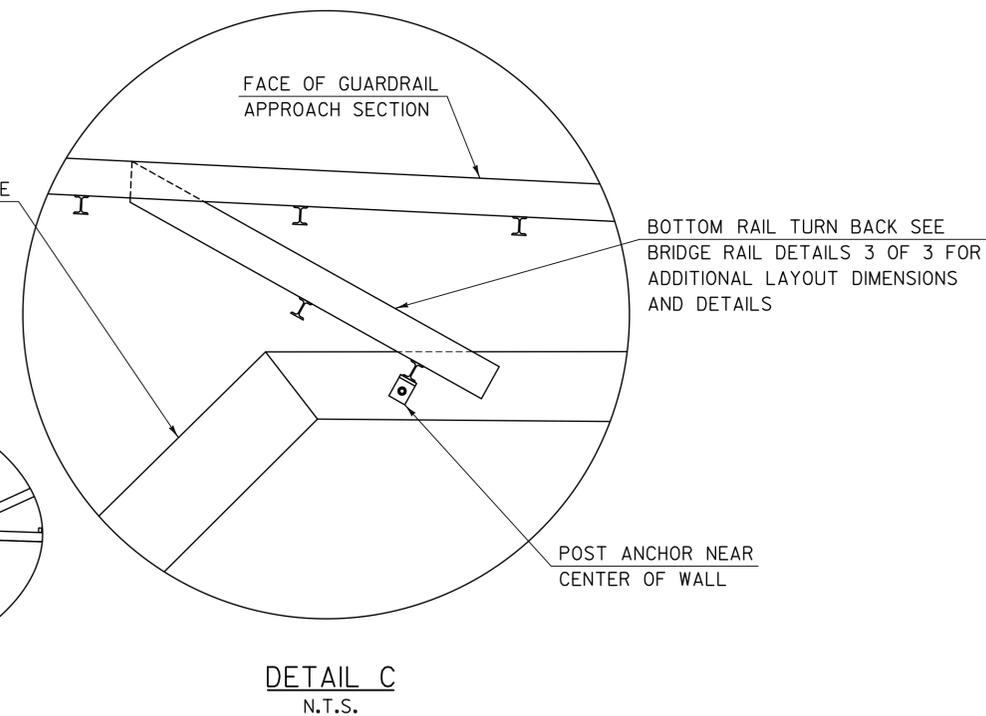
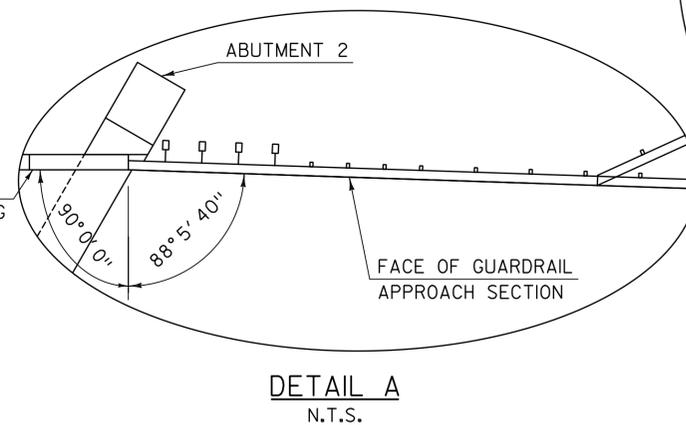
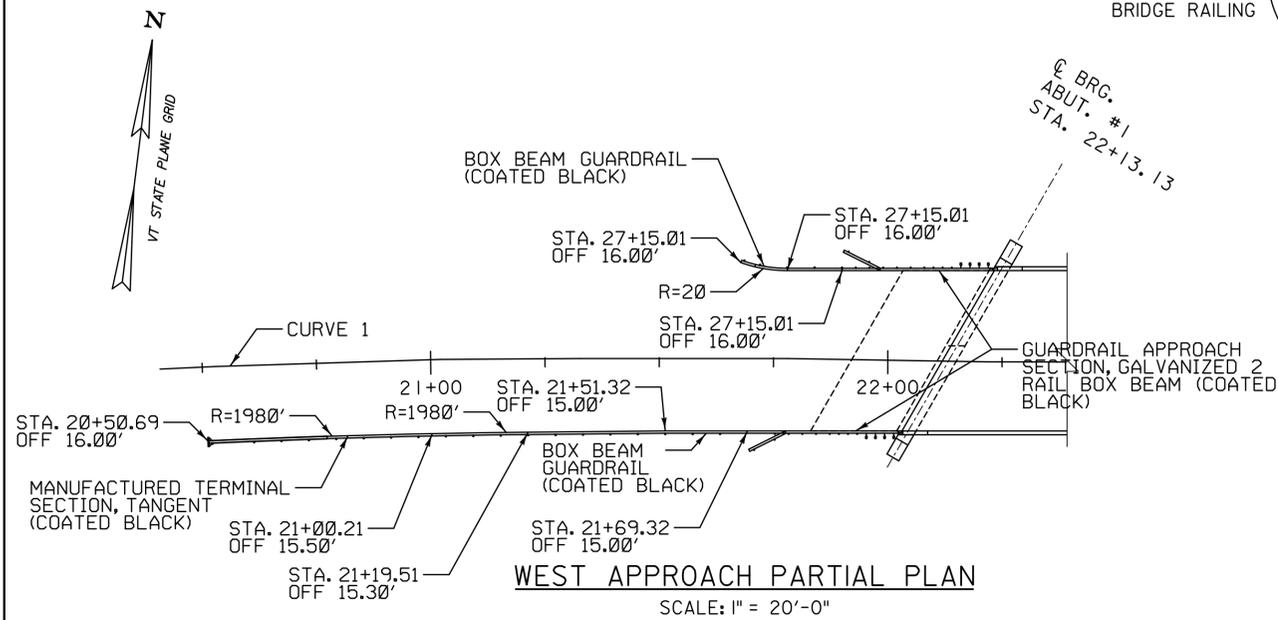
TYLIN INTERNATIONAL

FILE NAME: z10J072bdr_apprslab.dgn
PROJECT LEADER: R. HEBERT
DESIGNED BY: S. KELLER
APPROACH SLAB DETAILS

PLOT DATE: 8/26/2014
DRAWN BY: D. AXTELL
CHECKED BY: T. POULIN
SHEET 39 OF 69



NOTE:
STATIONS AND OFFSETS GIVEN ARE MEASURED TO THE FACE OF THE BOX BEAM GUARDRAIL

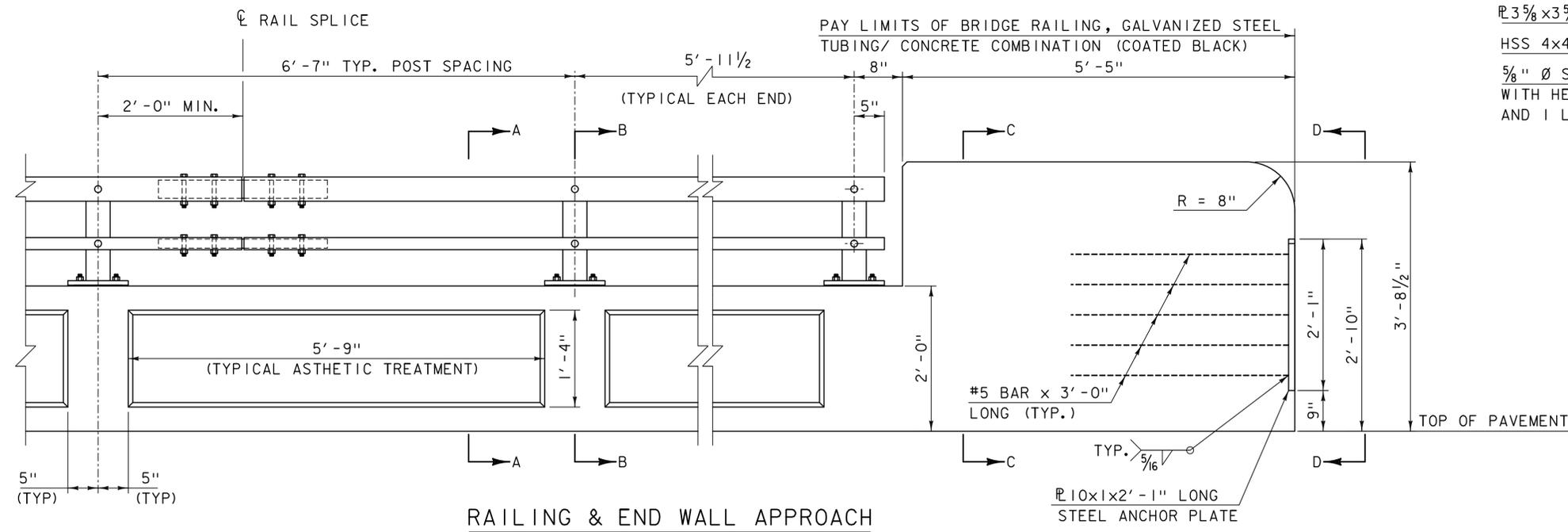


PROJECT NAME: ROCKINGHAM
PROJECT NUMBER: BRF 0126(12)

FILE NAME: z10J072bdr_r_all_pln.dgn
PROJECT LEADER: R. HEBERT
DESIGNED BY: S. KELLER
GUARDRAIL APPROACH AND GUARDRAIL LAYOUT DETAILS

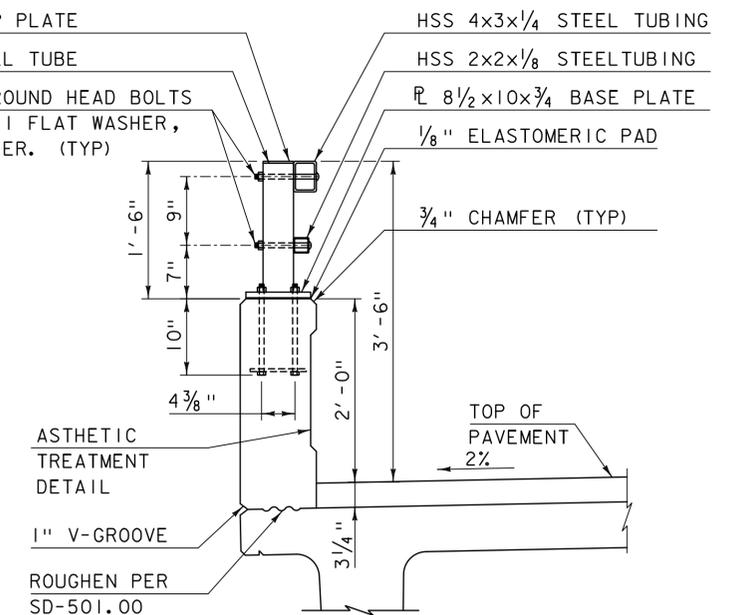
PLOT DATE: 8/26/2014
DRAWN BY: S. KELLER
CHECKED BY: D. BURHANS
SHEET 40 OF 69

TYLIN INTERNATIONAL



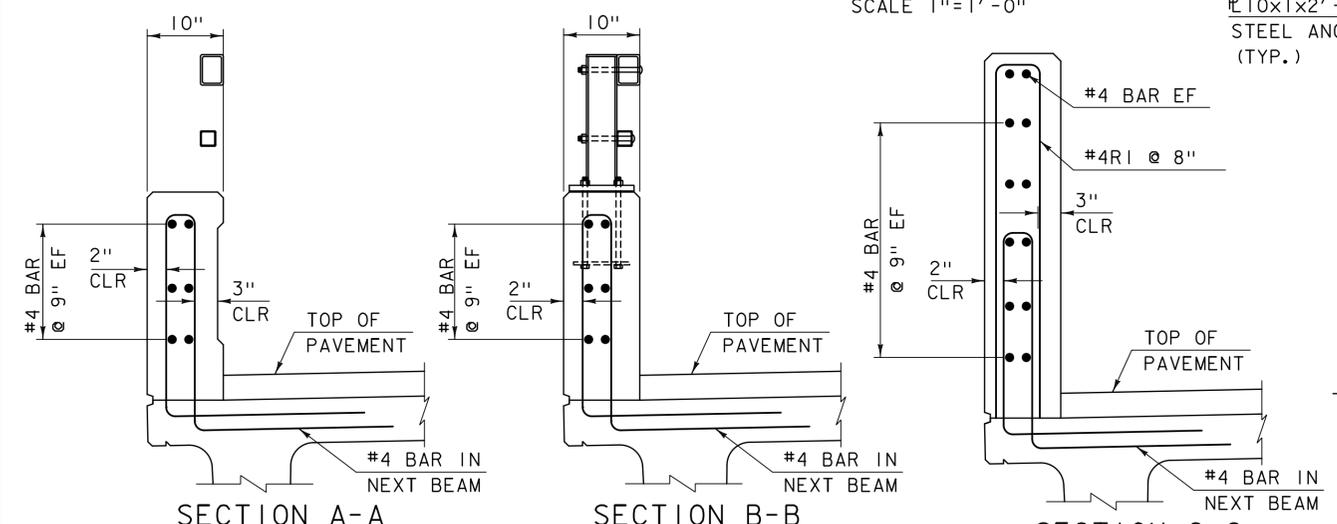
RAILING & END WALL APPROACH

SCALE 1"=1'-0"



RAIL TYPICAL SECTION

SCALE 1"=1'-0"



SECTION A-A

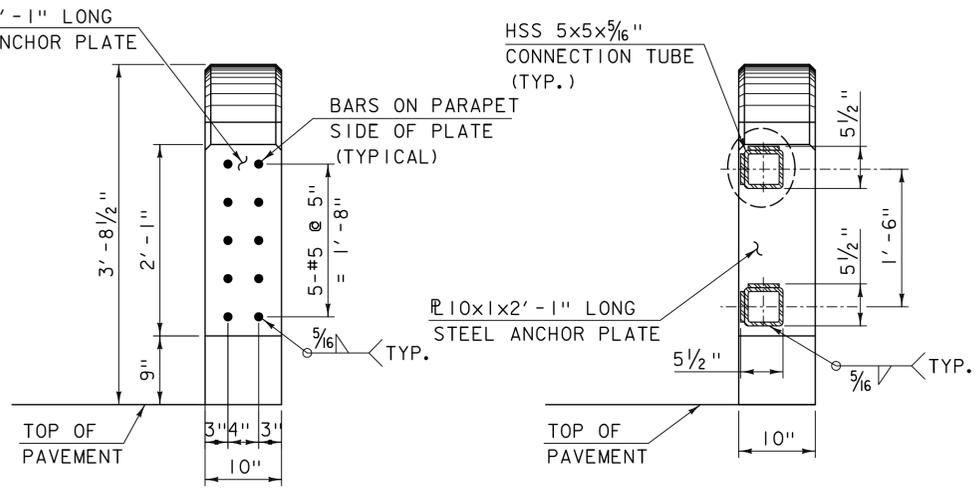
SCALE 1"=1'-0"

SECTION B-B

SCALE 1"=1'-0"

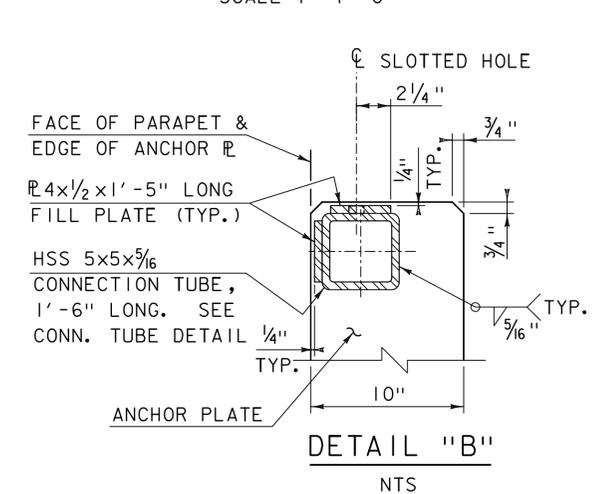
SECTION C-C

SCALE 1"=1'-0"



SHOWING EMBEDDED REBAR

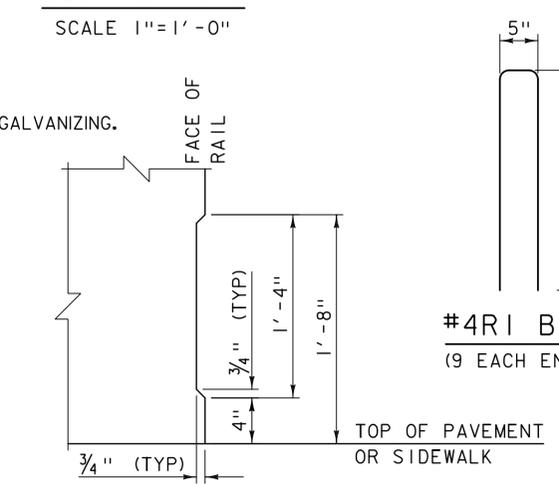
WITH HSS CONNECTOR TUBE



DETAIL "B"

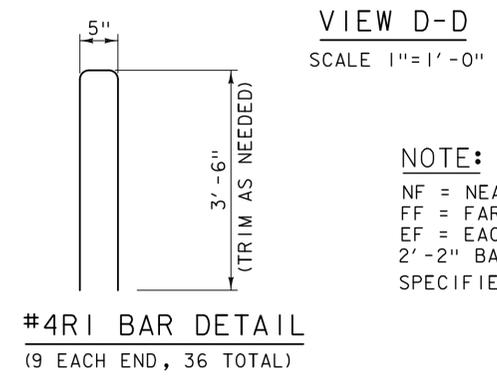
NTS

- NOTES:**
- BRIDGE RAIL SHALL HAVE A RUBBED FINISH IN ACCORDANCE WITH SECTION 501.
 - HOLES AND RECESSES ARE TO BE FORMED OR CORED, PERCUSSION DRILLING IS NOT ALLOWED.
 - ALL STEEL COMPONENTS SHALL BE COATED BLACK IN ACCORDANCE WITH ASTM D7803 FOLLOWING GALVANIZING.
 - ALL REINFORCEMENT SHALL BE LEVEL II.
 - ALL LONGITUDINAL BARS SHALL HAVE A MINIMUM LAP LENGTH OF 2'-1".
 - ALL WORK AND MATERIALS SHALL CONFORM TO SECTION 525.
 - PRIOR TO GALVANIZING THE ASSEMBLED POST, GRIND ALL EDGES TO A MINIMUM RADIUS OF 1/16".
 - ALL POSTS SHALL BE SET NORMAL TO GRADE.
 - SECTIONS OF RAIL TUBE SHALL BE ATTACHED TO A MINIMUM OF TWO BRIDGE POSTS AND PREFERABLY TO AT LEAST 4 POSTS.
 - HOLES IN RAILS FOR TUBE ATTACHMENT MAY BE FIELD-DRILLED. HOLES SHALL BE COATED WITH AN APPROVED ZINC-RICH PAINT PRIOR TO INSTALLATION.
 - BOLTS SHALL BE TORQUED SNUG TIGHT (APPROXIMATELY 100 FT-LB).
 - RAIL TUBES SHALL BE ATTACHED USING 5/8" FULL DIAMETER BODY ASTM A 449 (TYPE I) ROUND HEAD BOLTS INSERTED THROUGH THE FACE OF THE TUBE.
 - SEE STANDARD DRAWING G-1 FOR DETAILS OF DELINEATORS. A DELINEATOR SHALL BE INSTALLED AT 30 FOOT SPACING OR THE NEAREST POST. WHITE IS TO BE INSTALLED ON THE DRIVER'S RIGHT. PAYMENT FOR DELINEATORS SHALL BE INCIDENTAL TO OTHER ITEMS.
 - SEE "GUARDRAIL APPROACH AND GUARDRAIL LAYOUT DETAILS" SHEET FOR ADDITIONAL EAST APPROACH CONNECTION TUBE DETAILS.



ASTHETIC TREATMENT DETAIL

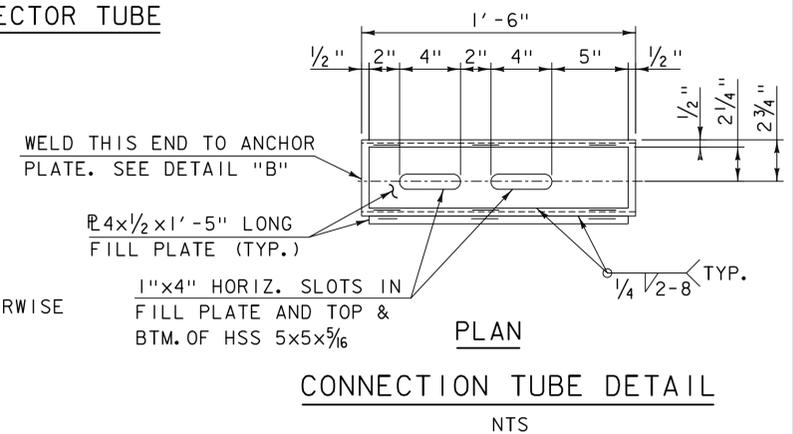
SCALE 1 1/2"=1'



VIEW D-D

SCALE 1"=1'-0"

NOTE:
 NF = NEAR FACE
 FF = FAR FACE
 EF = EACH FACE
 2'-2" BAR LAP UNLESS OTHERWISE SPECIFIED ON THE PLANS.

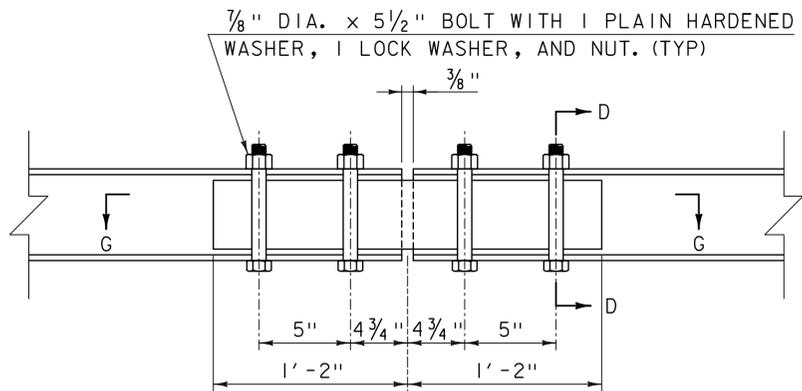


CONNECTION TUBE DETAIL

NTS

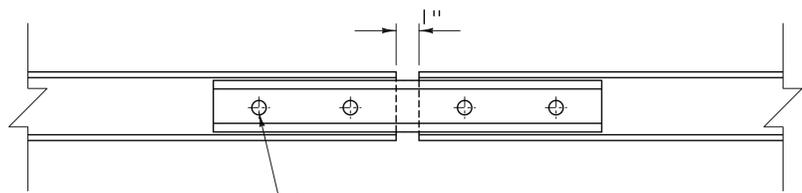
TYLIN INTERNATIONAL

PROJECT NAME:	ROCKINGHAM	FILE NAME:	z10J072bdr_r_all_01.dgn	PLOT DATE:	8/26/2014
PROJECT NUMBER:	BRF 0126(12)	PROJECT LEADER:	R. HEBERT	DRAWN BY:	D. AXTELL
		DESIGNED BY:	S. KELLER	CHECKED BY:	T. POULIN
		BRIDGE RAILING DETAILS (1 OF 3)		SHEET	41 OF 69



TOP RAIL SPLICE DETAIL

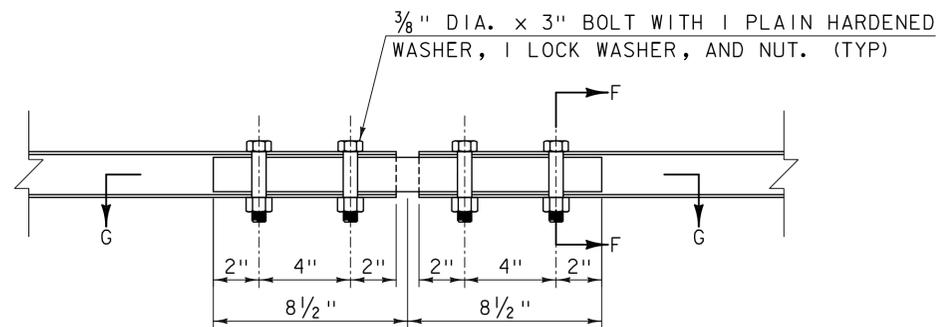
N. T. S.



1/2" DIA. HOLE IN SPLICE ELEMENT AND HSS 4" x 3" x 1/4". (TYP)

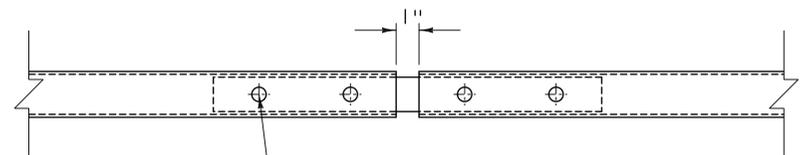
SECTION E-E

N. T. S.



BOTTOM RAIL SPLICE DETAIL ELEVATION VIEW

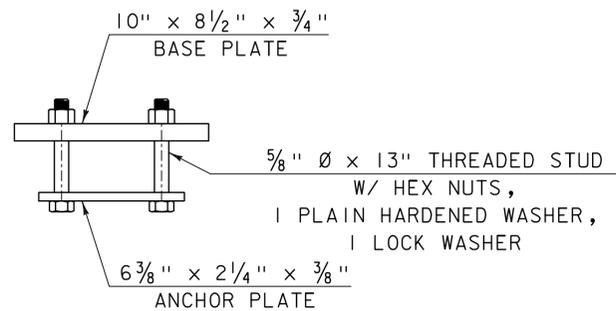
N. T. S.



1/2" DIA. HOLE IN SPLICE ELEMENT AND HSS 2" x 2" x 1/8". (TYP)

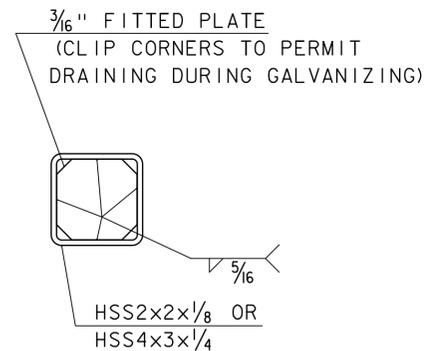
SECTION G-G

N. T. S.



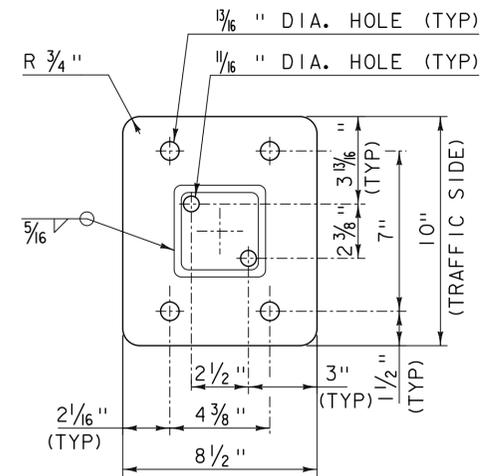
RAIL POST ANCHORAGE

N. T. S.



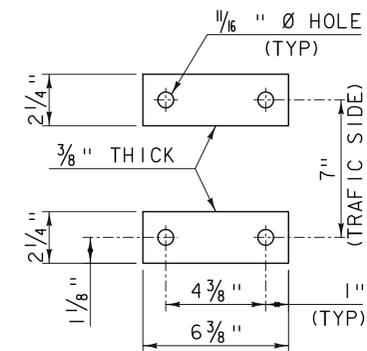
END OF RAIL DETAIL

N. T. S.



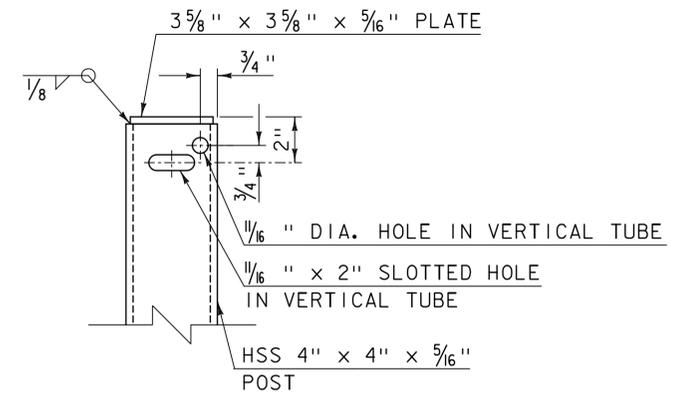
BASE PLATE

N. T. S.



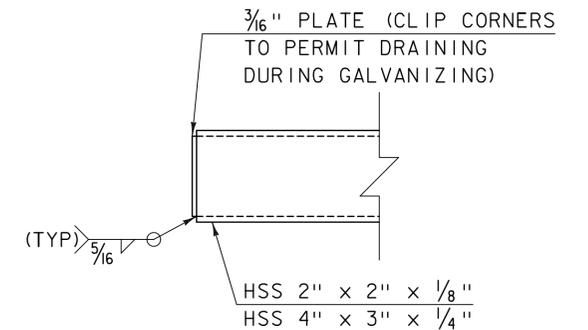
ANCHOR PLATES

N. T. S.



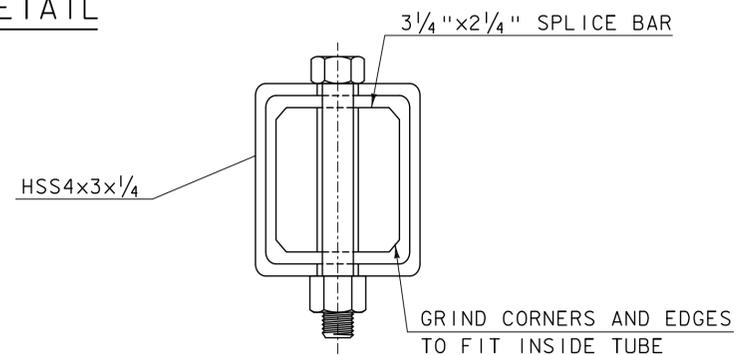
VERTICAL TUBE DETAIL (FRONT VIEW)

N. T. S.



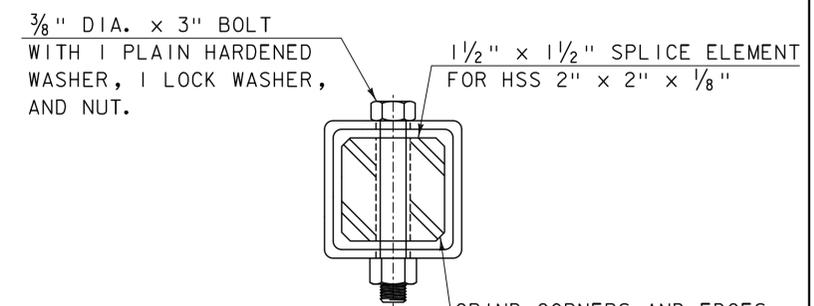
END OF RAIL DETAIL

N. T. S.



SECTION D-D

N. T. S.



SECTION F-F

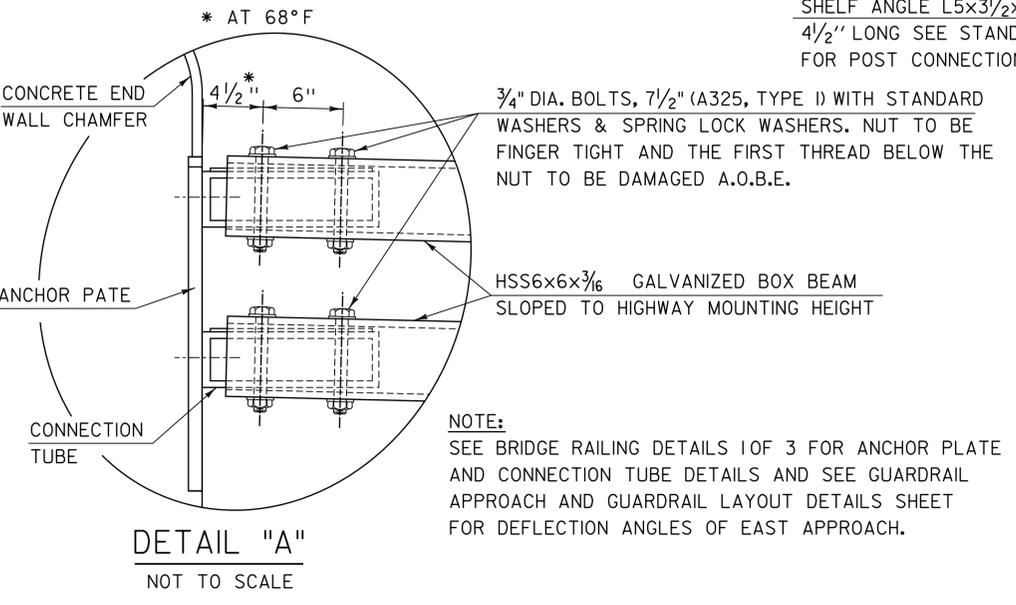
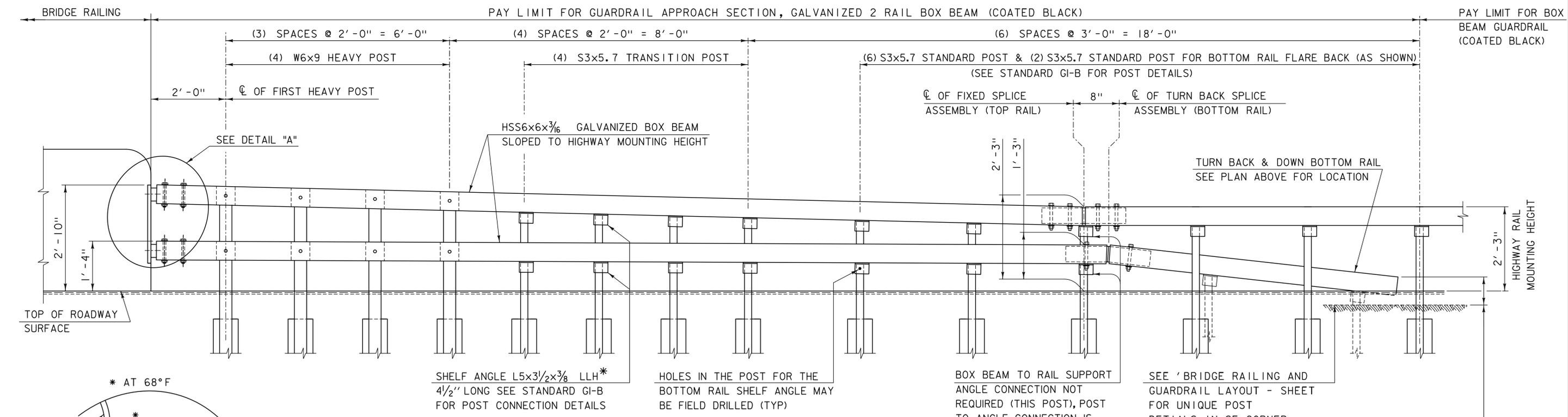
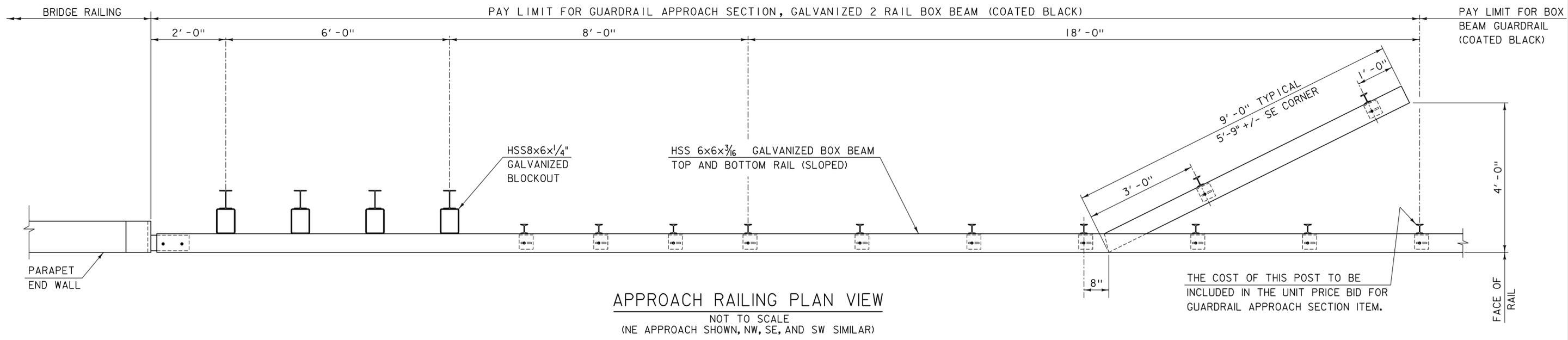
N. T. S.

TYLIN INTERNATIONAL

PROJECT NAME: ROCKINGHAM
PROJECT NUMBER: BRF 0126(12)

FILE NAME: z10J072bdr_r-all_02.dgn
PROJECT LEADER: R. HEBERT
DESIGNED BY: S. KELLER
BRIDGE RAILING DETAILS (2 OF 3)

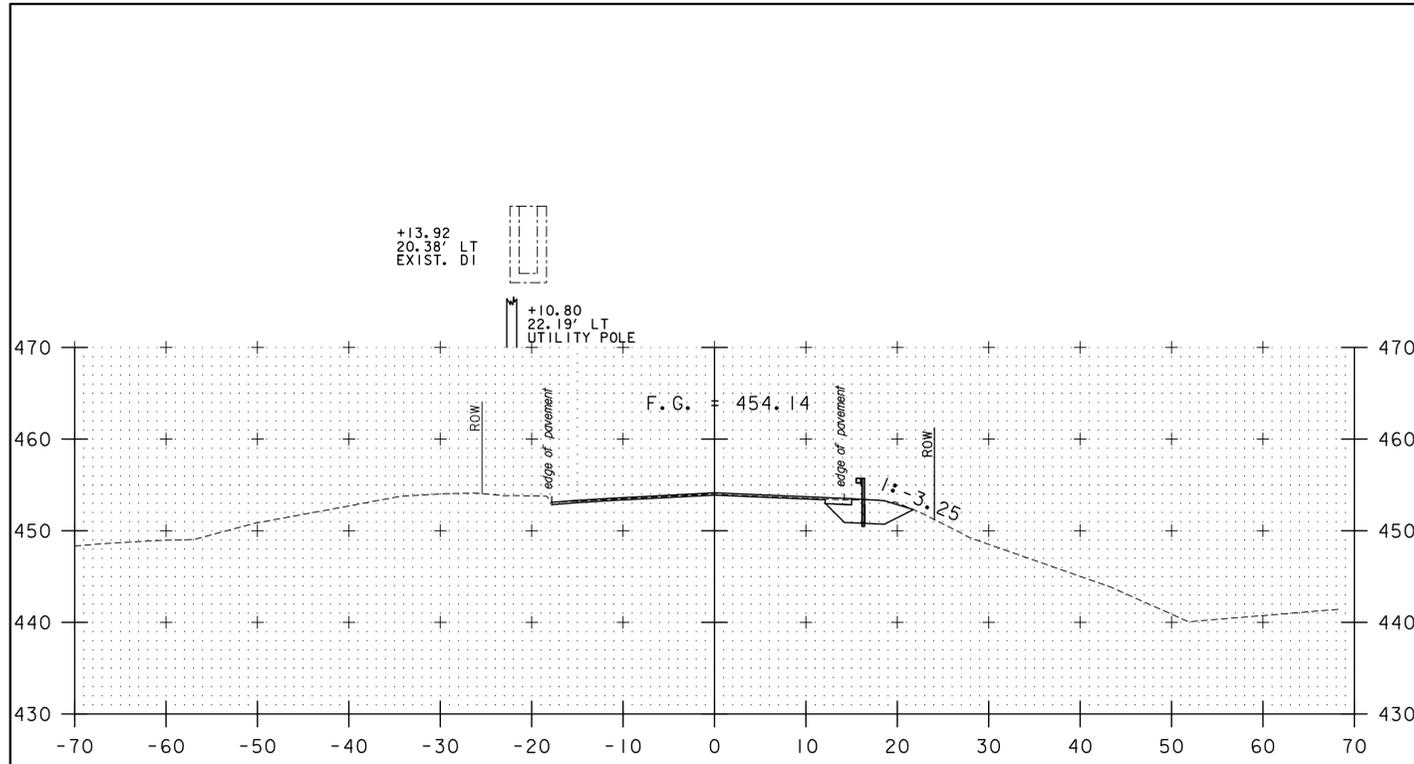
PLOT DATE: 8/26/2014
DRAWN BY: B. CARTER
CHECKED BY: T. POULIN
SHEET 42 OF 69



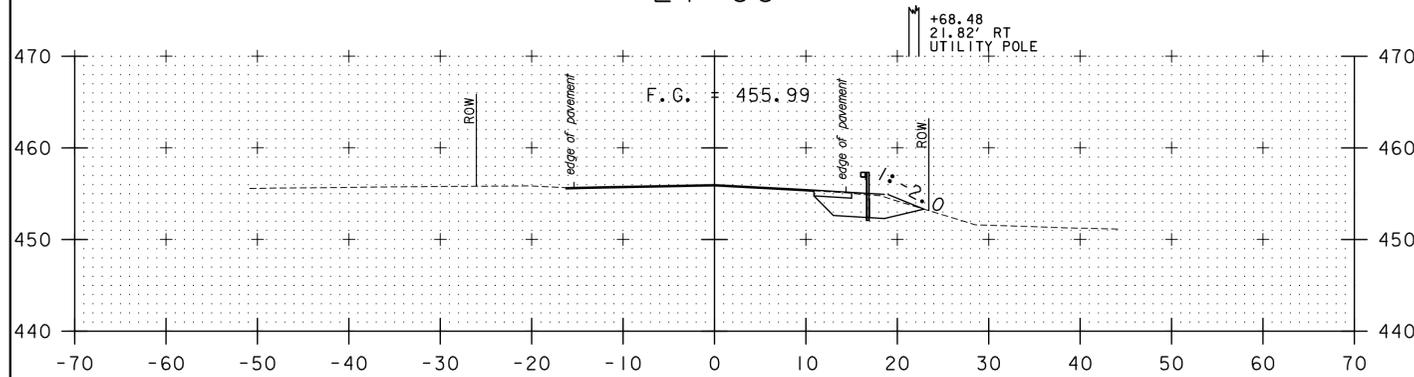
- NOTES:**
- ALL STEEL COMPONENTS SHALL BE COATED BLACK IN ACCORDANCE WITH ASTM D7803 FOLLOWING GALVANIZING.
 - FOR "FIXED SPLICE TUBE", "FIXED SPLICE BAR", "FIXED SPLICE TUBE ASSEMBLY", AND "FIXED SPLICE BAR ASSEMBLY" DETAILS, SEE STANDARD S-364C.
 - FOR "TURN BACK SPLICE TUBE DETAIL" AND "TURN BACK SPLICE TUBE ASSEMBLY" DETAILS, SEE STANDARD S-364D.
 - FOR "HEAVY POST DETAIL" AND "TRANSITION POST DETAIL", SEE STANDARD S-364D.
 - FOR SE CORNER MODIFICATION DETAILS, SEE 'BRIDGE RAILING AND GUARDRAIL LAYOUT' SHEET.
 - SEE "GUARDRAIL APPROACH AND GUARDRAIL LAYOUT DETAILS" SHEET FOR ADDITIONAL EAST APPROACH RAILING DETAILS.

PROJECT NAME:	ROCKINGHAM
PROJECT NUMBER:	BRF 0126(12)
FILE NAME:	z10j072bdr_r_all_03.dgn
PROJECT LEADER:	R. HEBERT
DESIGNED BY:	S. KELLER
BRIDGE RAILING DETAILS (3 OF 3)	
PLOT DATE:	8/26/2014
DRAWN BY:	D. AXTELL
CHECKED BY:	T. POULIN
SHEET	43 OF 69

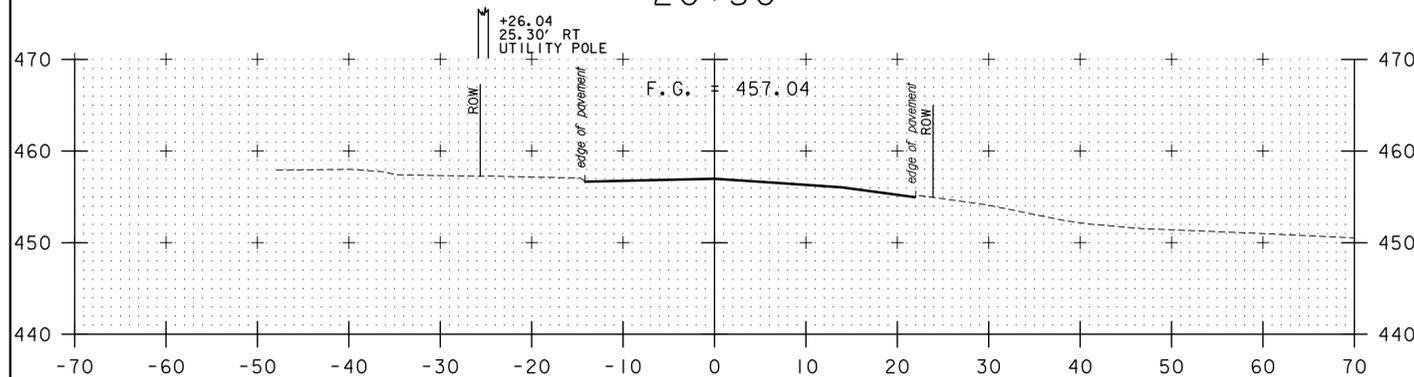




21+00

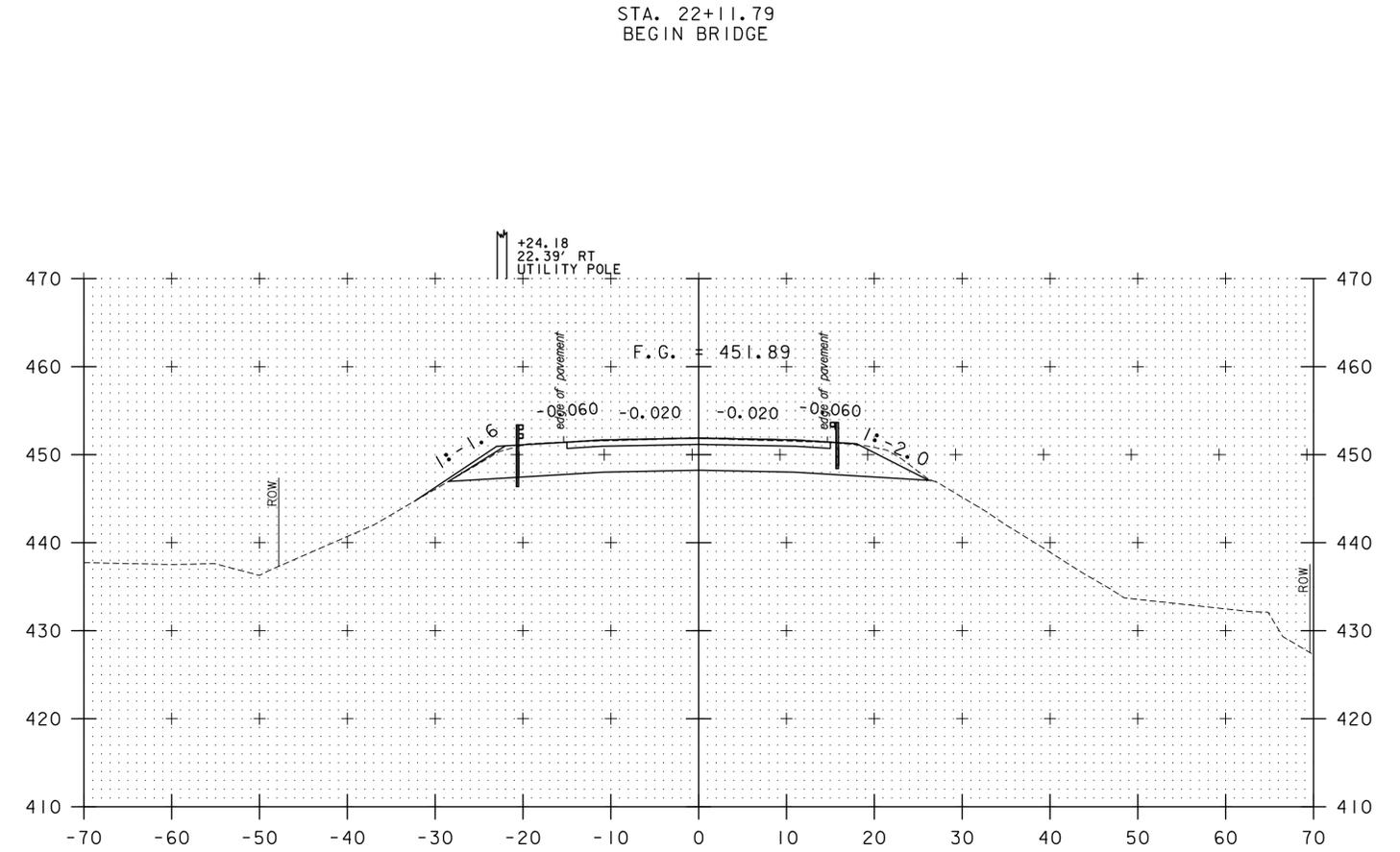


20+50

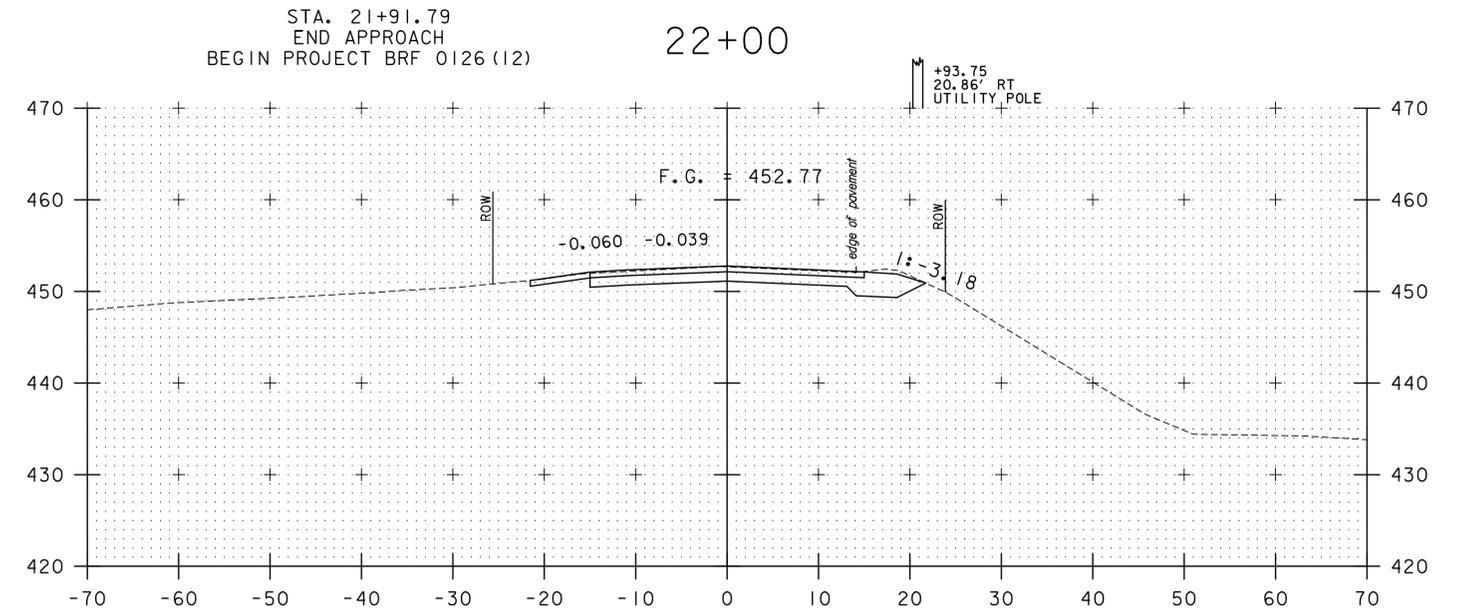


20+26

STA. 20+26.19
BEGIN APPROACH
MATCH EXISTING PAVEMENT



22+00



21+50

STA. 21+91.79
END APPROACH
BEGIN PROJECT BRF 0126 (12)

SCALE 1" = 10' - 0"

TYLINTERNATIONAL

STA. 20+26 TO STA. 22+00

PROJECT NAME: ROCKINGHAM

PROJECT NUMBER: BRF 0126(12)

FILE NAME: z10J072bdr_xs.dgn

PROJECT LEADER: R. HEBERT

DESIGNED BY: D. BRYANT

VT ROUTE 121 - CROSS SECTIONS - 1

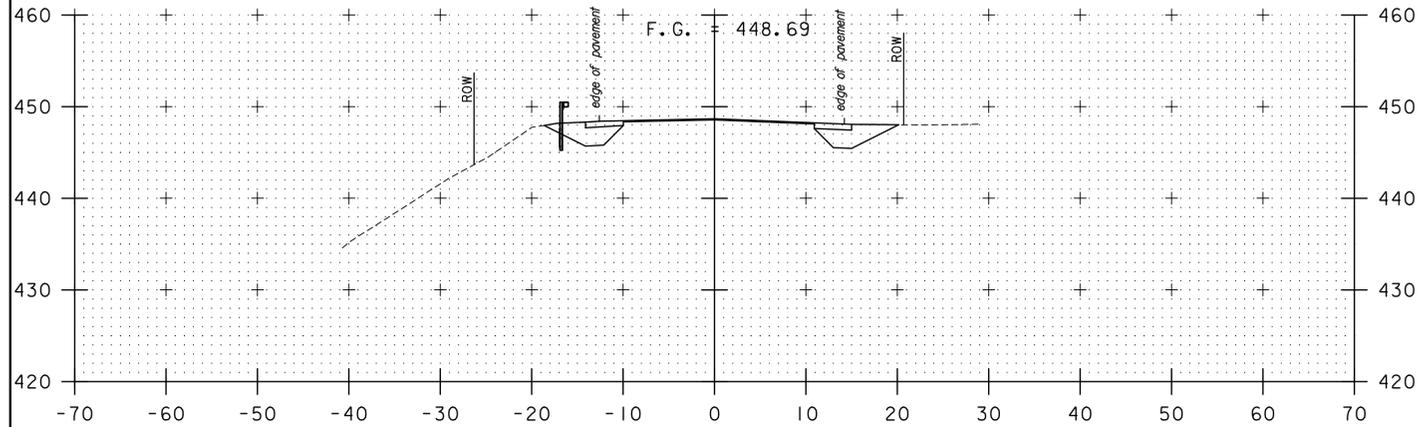
PLOT DATE: 8/26/2014

DRAWN BY: D. BRYANT

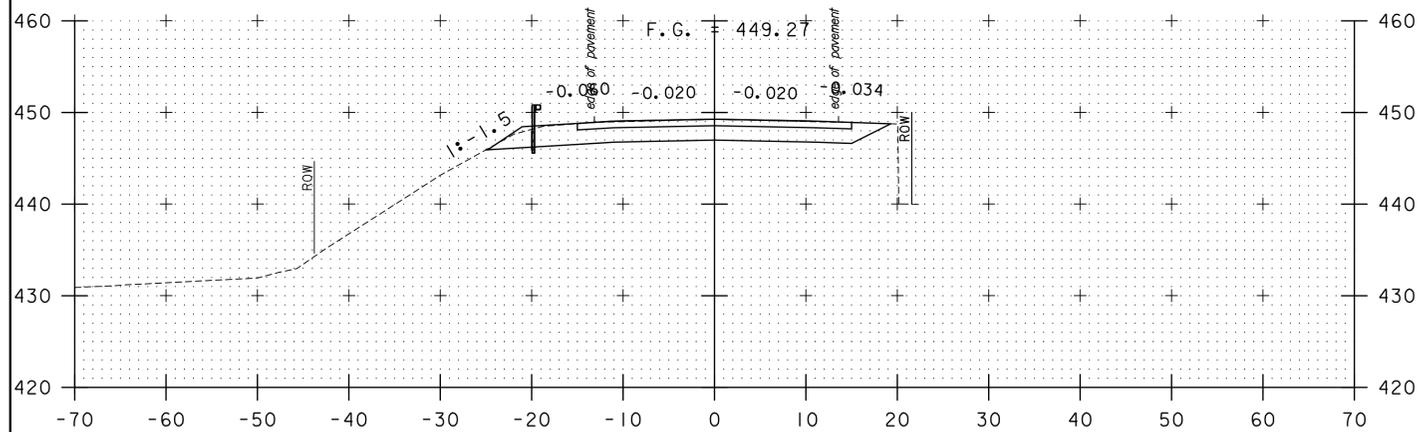
CHECKED BY: D. BURHANS

SHEET 45 OF 69

STA. 25+12.79
 END APPROACH
 MATCH EXISTING PAVEMENT



25+00



24+50

STA. 24+34.48
 END PROJECT BRF 0126 (12)
 BEGIN APPROACH

STA. 24+14.48
 END BRIDGE

SCALE 1" = 10' - 0"

TYLININTERNATIONAL

STA. 24+50 TO STA. 25+00

PROJECT NAME: ROCKINGHAM

PROJECT NUMBER: BRF 0126(12)

FILE NAME: z10J072bdr_xs.dgn

PROJECT LEADER: R. HEBERT

DESIGNED BY: D. BRYANT

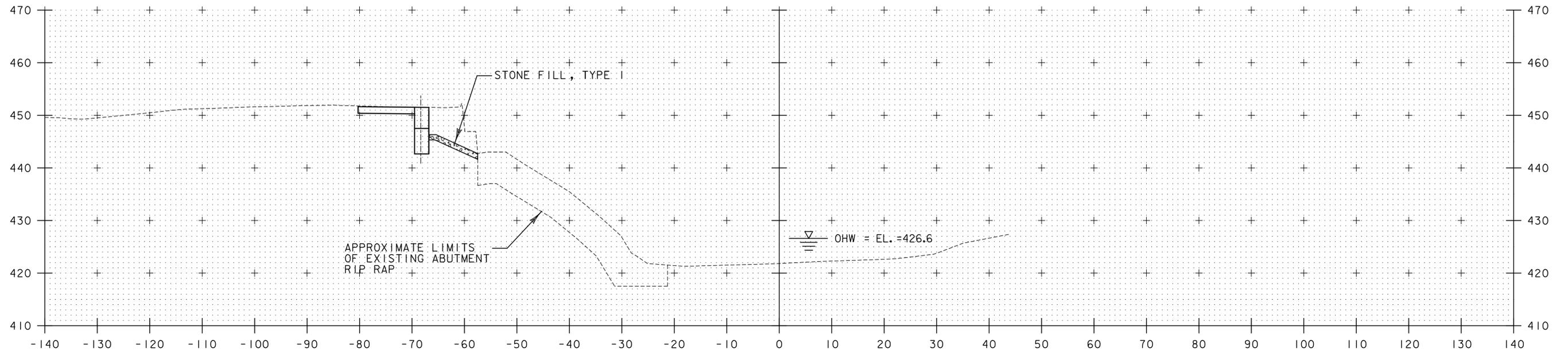
VT ROUTE 121 - CROSS SECTIONS - 2

PLOT DATE: 8/26/2014

DRAWN BY: D. BRYANT

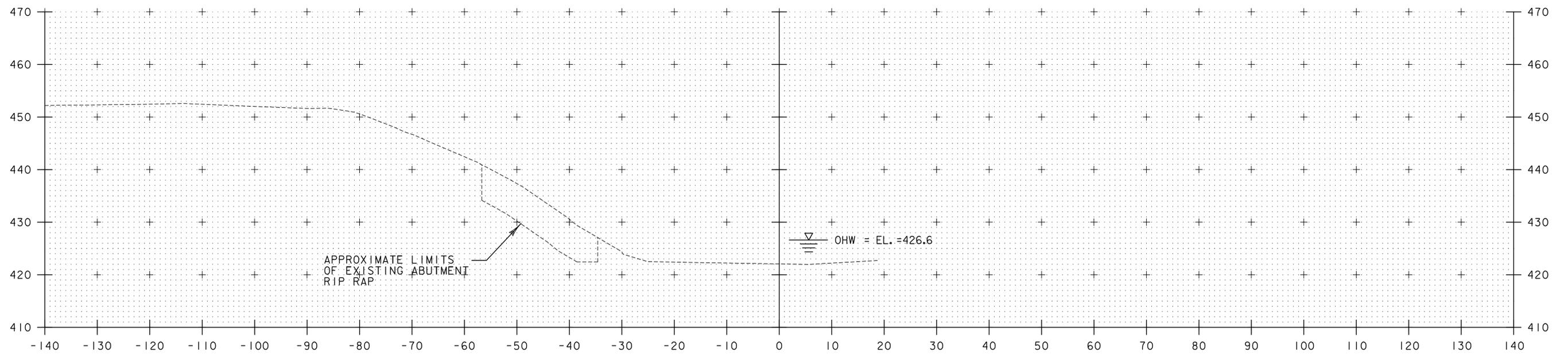
CHECKED BY: D. BURHANS

SHEET 46 OF 69



STA 61+07.38 LEFT
 BEGIN GEOTEXTILE UNDER STONE FILL
 STONE FILL, TYPE I

61+25



61+00

STA. 61+00 TO STA. 61+25

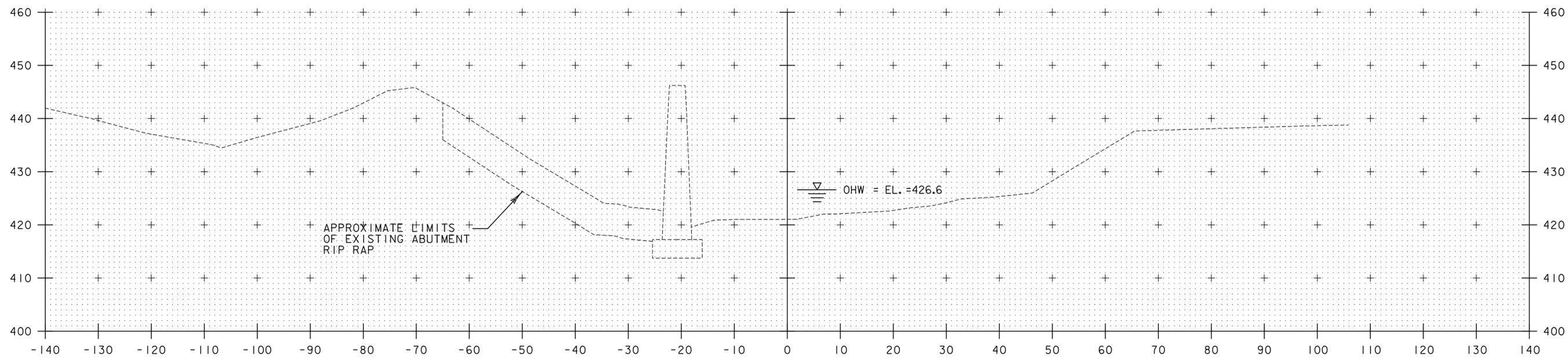
PROJECT NAME: ROCKINGHAM
 PROJECT NUMBER: BRF 0126(12)

SCALE 1" = 10' - 0"

TYLIN INTERNATIONAL

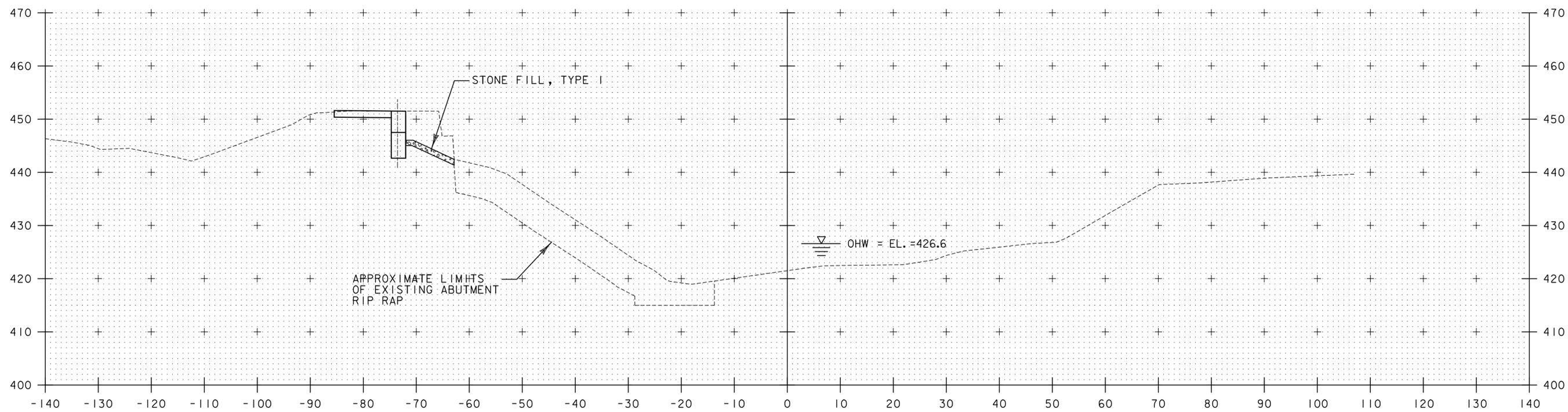
FILE NAME: z10J072bdr_xs02.dgn
 PROJECT LEADER: R. HEBERT
 DESIGNED BY: D. BURHANS
 CHANNEL CROSS SECTIONS - I

PLOT DATE: 8/26/2014
 DRAWN BY: D. BURHANS
 CHECKED BY: D. BRYANT
 SHEET 47 OF 69



STA 61+74.48 LEFT
 END GEOTEXTILE UNDER STONE FILL
 STONE FILL, TYPE I

61+75



APPROXIMATE LIMITS
 OF EXISTING ABUTMENT
 RIP RAP

STONE FILL, TYPE I

OHW = EL. = 426.6

61+50

STA. 61+50 TO STA. 61+75

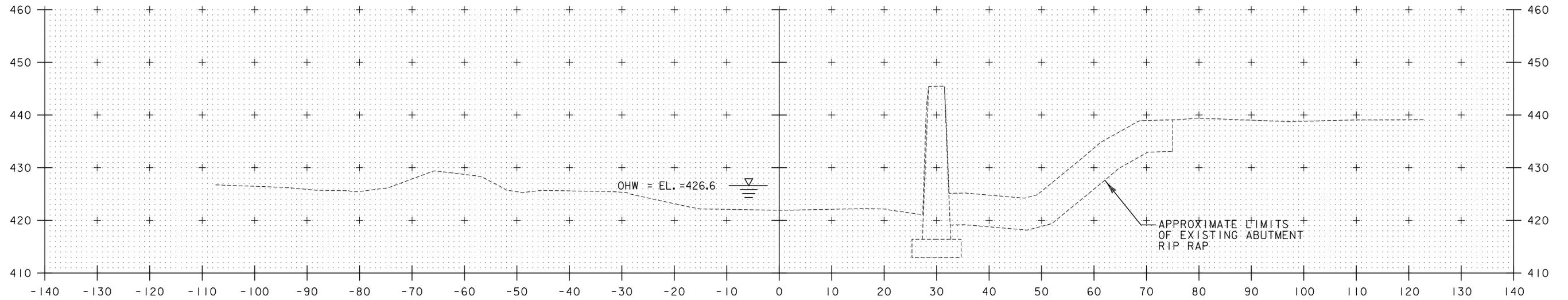
PROJECT NAME: ROCKINGHAM
 PROJECT NUMBER: BRF 0126(12)

SCALE 1" = 10' - 0"

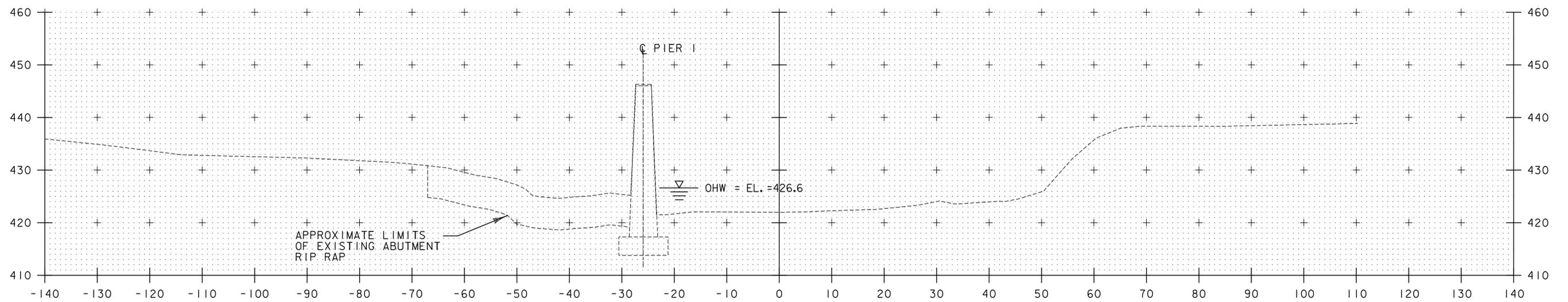
TYLINTERNATIONAL

FILE NAME: z10J072bdr_xs02.dgn
 PROJECT LEADER: R. HEBERT
 DESIGNED BY: D. BURHANS
 CHANNEL CROSS SECTIONS - 2

PLOT DATE: 8/26/2014
 DRAWN BY: D. BURHANS
 CHECKED BY: D. BRYANT
 SHEET 48 OF 69



62+25



62+00

STA. 62+00 TO STA. 62+25

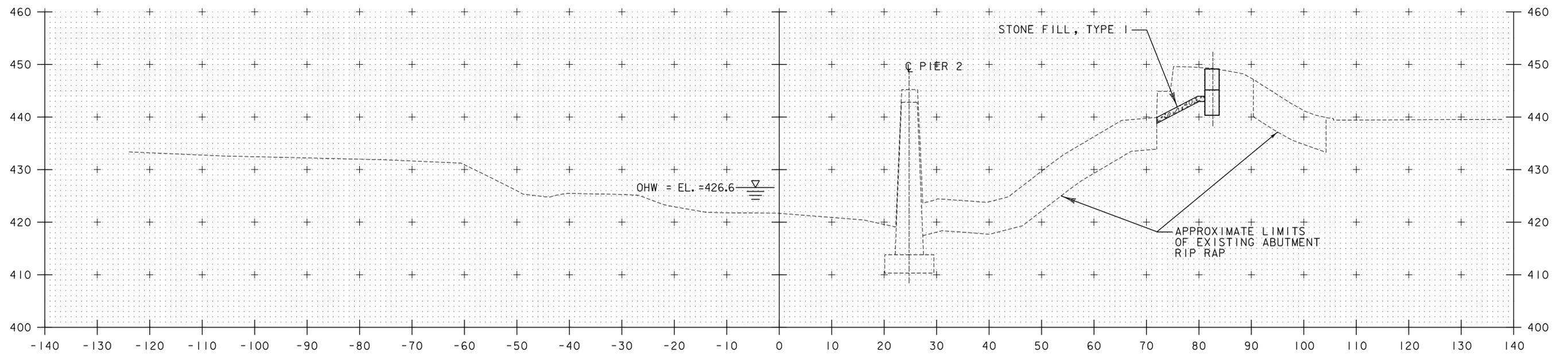
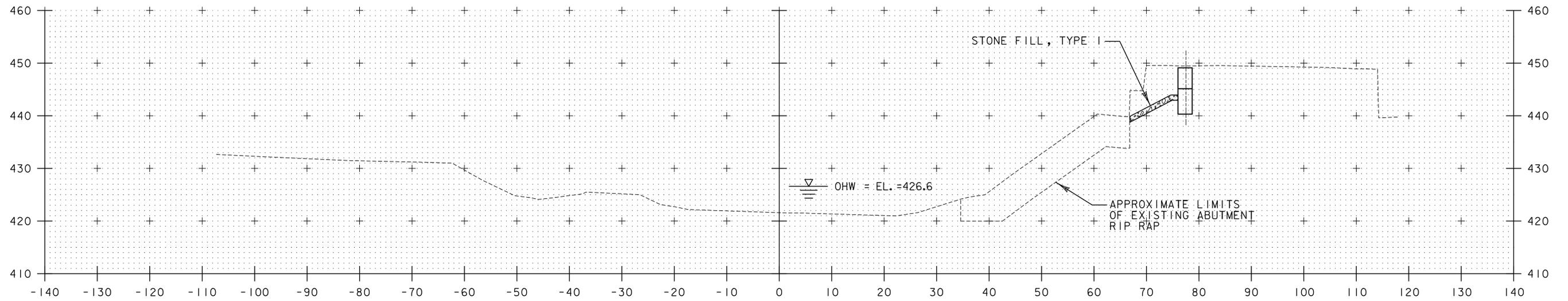
PROJECT NAME: ROCKINGHAM
PROJECT NUMBER: BRF 0126(12)

SCALE 1" = 10'-0"

TYLINTERNATIONAL

FILE NAME: z10J072bdr_xs02.dgn
PROJECT LEADER: R. HEBERT
DESIGNED BY: D. BURHANS
CHANNEL CROSS SECTIONS - 3

PLOT DATE: 8/26/2014
DRAWN BY: D. BURHANS
CHECKED BY: D. BRYANT
SHEET 49 OF 69



STA 62+37.05 RIGHT
 BEGIN GEOTEXTILE UNDER STONE FILL
 STONE FILL, TYPE I

STA. 62+50 TO STA. 62+75

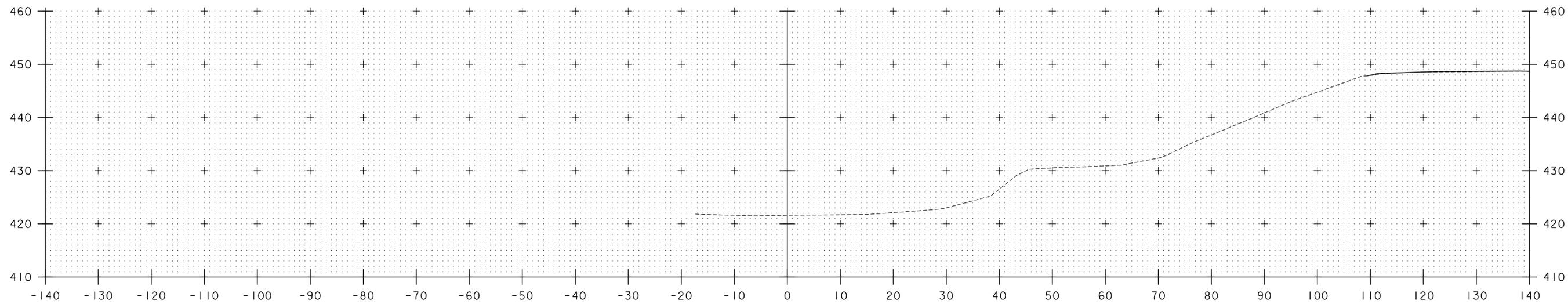
PROJECT NAME: ROCKINGHAM
 PROJECT NUMBER: BRF 0126(12)

SCALE 1" = 10'-0"

TYLINTERNATIONAL

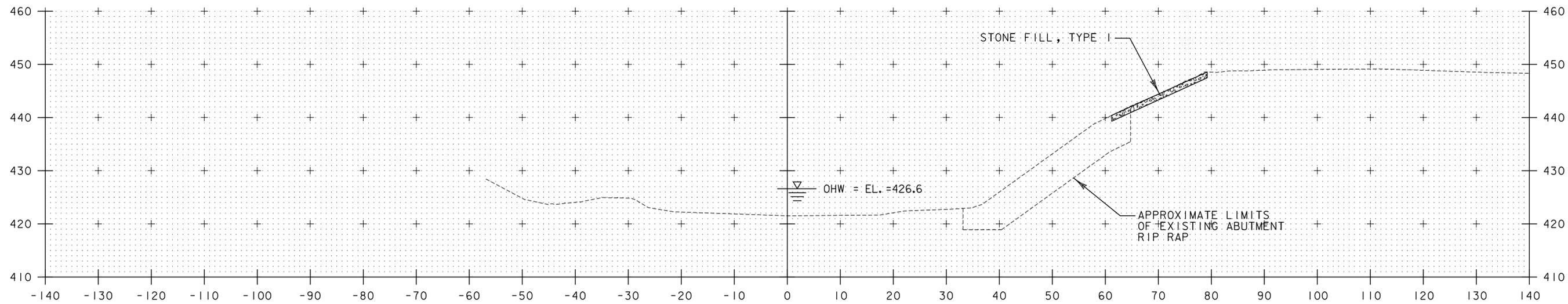
FILE NAME: z10J072bdr_xs02.dgn
 PROJECT LEADER: R. HEBERT
 DESIGNED BY: D. BURHANS
 CHANNEL CROSS SECTIONS - 4

PLOT DATE: 8/26/2014
 DRAWN BY: D. BURHANS
 CHECKED BY: D. BRYANT
 SHEET 50 OF 69



63+25

STA 63+12.02 RIGHT
 END GEOTEXTILE UNDER STONE FILL
 STONE FILL, TYPE I



63+00

STA. 63+00 TO STA. 63+25

PROJECT NAME: ROCKINGHAM
 PROJECT NUMBER: BRF 0126(12)

SCALE 1" = 10' - 0"

TYLINTINTERNATIONAL

FILE NAME: z10J072bdr_xs02.dgn
 PROJECT LEADER: R. HEBERT
 DESIGNED BY: D. BURHANS
 CHANNEL CROSS SECTIONS - 5

PLOT DATE: 8/26/2014
 DRAWN BY: D. BURHANS
 CHECKED BY: D. BRYANT
 SHEET 51 OF 69

EROSION CONTROL NARRATIVE

1.1 PROJECT DESCRIPTION

THIS PROJECT INVOLVES THE REPLACEMENT OF THE BRIDGE ON STATE ROUTE 121 SPANNING OVER THE BODY OF WATER KNOWN AS SAXTONS RIVER IN THE TOWN OF ROCKINGHAM. WORK WILL INVOLVE REPLACEMENT OF BOTH ABUTMENTS AND THE BRIDGE SUPERSTRUCTURE ON THE EXISTING ALIGNMENT. EXISTING ABUTMENTS WILL BE PARTIALLY REMOVED TO THE LIMITS SHOWN ON THE EARTHWORK TYPICAL SECTION SHEET. ALSO INCLUDED WILL BE RELATED CHANNEL AND APPROACH WORK. THE LENGTH OF THE PROJECT IS APPROXIMATELY 243 FEET ALONG VT ROUTE 121. THE SITE IS LOCATED, BASED ON NAD 83/92 AT 233073.66 N, 1639680.82 E (POINT HVCTRL #2- SEE TIE SHEET).

NOTE: AREA OF DISTURBANCE INCLUDES LIMITS OF EARTH DISTURBANCE WITHIN THE PROJECT AREA AS SHOWN ON THE ATTACHED EPSC PLAN. THE AREA OF DISTURBANCE DOES NOT INCLUDE WASTE, BORROW AND STAGING AREAS. THE CONTRACTOR IS RESPONSIBLE FOR SUBMITTING TO VTRANS ENVIRONMENTAL SECTION FOR APPROVAL, THE LOCATION OF THE WASTE, BORROW AND STAGING AREAS, AS WELL AS THE MATERIAL STOCKPILE, REFUELING AND MAINTENANCE AREAS. A MAP SHALL BE ATTACHED IF NECESSARY.

TOTAL AREA OF DISTURBANCE IS APPROXIMATELY 17,067 SF (0.39 ACRES).

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

1.2 SITE INVENTORY

1.2.1 TOPOGRAPHY, EXISTING ROADS, UTILITIES

THE TOPOGRAPHY SURROUNDING THE PROJECT SITE CONSISTS MOSTLY OF LIGHTLY WOODED AREAS AND RESIDENTIAL PROPERTIES WITH WELL ESTABLISHED LAWNS. PORTIONS NEAR THE WATER BODY INCLUDE LIGHTLY WOODED AREAS WITH MODERATE SLOPES. THE GENERAL TOPOGRAPHY OF THE AREA SLOPES FROM THE SOUTH TO THE NORTH. ALL ROAD SURFACES IN THE PROJECT AREA ARE BITUMINOUS CONCRETE PAVEMENT. THERE IS ONE COMMERCIAL BUILDING AND ONE RESIDENTIAL BUILDING ON THE SOUTH AND NORTH SIDES OF THE EAST APPROACH ROADWAY RESPECTIVELY. THERE IS ONE RESIDENTIAL BUILDING ON EACH SIDE OF THE WEST APPROACH ROADWAY.

THERE ARE OVERHEAD ELECTRICAL AND TELEPHONE LINES ON THE EAST AND WEST ENDS OF THE PROJECT THAT SPAN THE FULL LENGTH OF THE BRIDGE ON THE NORTH SIDE. OVERHEAD LINES ALSO CROSS ROUTE 121 ON THE EAST AND WEST ENDS OF THE PROJECT.

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

THE BRIDGE SPANS THE BODY OF WATER KNOWN AS SAXTONS RIVER. THE STREAM IS CHARACTERIZED AS STRAIGHT TO SINUOUS, ALLUVIAL, PROBABLY INCISED AND STABLE WITH A GRAVEL AND COBBLE STREAMBED. THERE IS ALSO AN UNNAMED STREAM NEAR THE NORTHWEST CORNER OF THE BRIDGE.

THE FOLLOWING DESCRIPTIONS ARE FOR THE EXISTING SITE PLANS: SURFACE DRAINAGE FROM STATE ROUTE 121 FLOWS DOWN EXISTING VEGETATED AND WOODED SIDESLOPES AND INTO SAXTONS RIVER.

1.2.3 VEGETATION

THE VEGETATION IN THE PROJECT AREA CONSISTS MOSTLY OF LIGHTLY WOODED AREAS. THE IMPACT TO VEGETATION WILL BE LIMITED TO THAT WHICH IS REQUIRED FOR REPLACEMENT OF THE EXISTING BRIDGE. DISTURBED VEGETATION WILL BE REESTABLISHED WITH STANDARD SEED AND MULCH PRACTICES OR REPLACED WITH STONE FILL.

1.2.4 SOILS

SOIL DATA CAME FROM THE U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE FOR THE COUNTY OF WINDHAM, VERMONT. SOILS ON THE PROJECT SITE ARE:

THROUGHOUT THE PROJECT THE SOIL TYPE IS QUONSET AND WARWICK, 2 TO 8 PERCENT SLOPE, "K FACTOR" = 0.16. THE EROSION HAZARD IS "LOW" DUE TO ITS K FACTOR.

1.2.4 SENSITIVE RESOURCE AREAS

CRITICAL HABITATS: SAXTONS RIVER IS DEFINED AS ESSENTIAL FISH HABITAT.
HISTORICAL OR ARCHAEOLOGICAL AREAS: THERE ARE SEVERAL AREAS OF ARCHAEOLOGICAL SIGNIFICANCE ON BOTH THE EAST AND WEST ENDS OF THE PROJECT. THE WEST BANK OF THE RIVER IS A NATIONAL REGISTERED LANDMARK DESIGNATED HISTORIC VILLAGE DISTRICT.
PRIME AGRICULTURE LAND: NO
THREATENED AND ENDANGERED SPECIES: NO
WATER RESOURCE: SAXTONS RIVER AND UNNAMED BROOK
WETLANDS: NO

1.3 RISK EVALUATION

THE PROJECT DOES NOT FALL UNDER THE JURISDICTION OF GENERAL PERMIT 3-9020 FOR STORMWATER RUNOFF FROM CONSTRUCTION SITES FOR LOW RISK PROJECTS. ANY MODIFICATIONS TO THE PROJECT THAT INCREASE THE RISK TO ENVIRONMENTAL RESOURCES SHALL BE EVALUATED IN ACCORDANCE WITH THE PERMIT REQUIREMENTS. 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 CONSISTS OF APPLYING MEASURES THROUGHOUT THE LIFE OF THE PROJECT TO AVOID SEDIMENT TRANSPORT TO THE RECEIVING WATERS. THE MEASURES INCLUDE STABILIZATION AND STRUCTURAL PRACTICES, STORM WATER CONTROLS AND OTHER POLLUTION PREVENTION PRACTICES. THEY HAVE BEEN PROPOSED BY THE DESIGNER AS A BASIS FOR PROTECTING RESOURCES AND WILL NEED TO BE BUILT UPON BASED ON THE SPECIFIC MEANS AND METHODS OF THE CONTRACTOR. REFER TO THE LOW RISK SITE HANDBOOK AND APPROPRIATE DETAIL SHEETS FOR SPECIFIC GUIDANCE AND CONSTRUCTION DETAILING.

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

1.4.1 MARK SITE BOUNDARIES

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

THE SITE BOUNDARIES SHALL BE PHYSICALLY MARKED. THE CONTRACTOR MAY CHOOSE PROJECT DEMARCATION FENCING (PDF) AND/OR BARRIER FENCE TO MARK THE SITE BOUNDARIES.

1.4.2 LIMIT DISTURBANCE AREA

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

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

1.4.3 SITE ENTRANCE/EXIT STABILIZATION

TRACKING OF SEDIMENT ONTO PUBLIC HIGHWAYS SHALL BE MINIMIZED TO REDUCE THE POTENTIAL FOR RUNOFF ENTERING RECEIVING WATERS. INSTALLATION SHALL COINCIDE WITH THE CONTRACTOR'S PROGRESS SCHEDULE. STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED ANYWHERE EQUIPMENT WILL BE GOING FROM AREAS OF EXPOSED SOILS TO PAVED SURFACES.

1.4.4 INSTALL SEDIMENT BARRIERS

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

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

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.

DIVERSION OF UPLAND RUNOFF NOT ANTICIPATED.

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 USE OF STONE CHECK DAMS IS NOT ANTICIPATED FOR THIS PROJECT.

1.4.7 CONSTRUCT PERMANENT CONTROLS

PERMANENT STORMWATER TREATMENT DEVICES SHALL BE INSTALLED AS SHOWN ON THE PLANS.

SEED AND MULCH WILL BE USED AS PERMANENT CONTROLS TO STABILIZE EXPOSED SOIL. STONE FILL WILL BE USED TO STABILIZE THE STREAMBED SLOPES AROUND ABUTMENTS.

1.4.8 STABILIZE EXPOSED SOILS DURING CONSTRUCTION

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

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

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

1.4.9 WINTER STABILIZATION

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

1.4.10 STABILIZE SOIL AT FINAL GRADE

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

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

1.4.11 DE-WATERING ACTIVITIES

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

TREATMENT OF DEWATERING COFFERDAM IS NOT ANTICIPATED.

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.

1.5.2 OFF-SITE ACTIVITIES

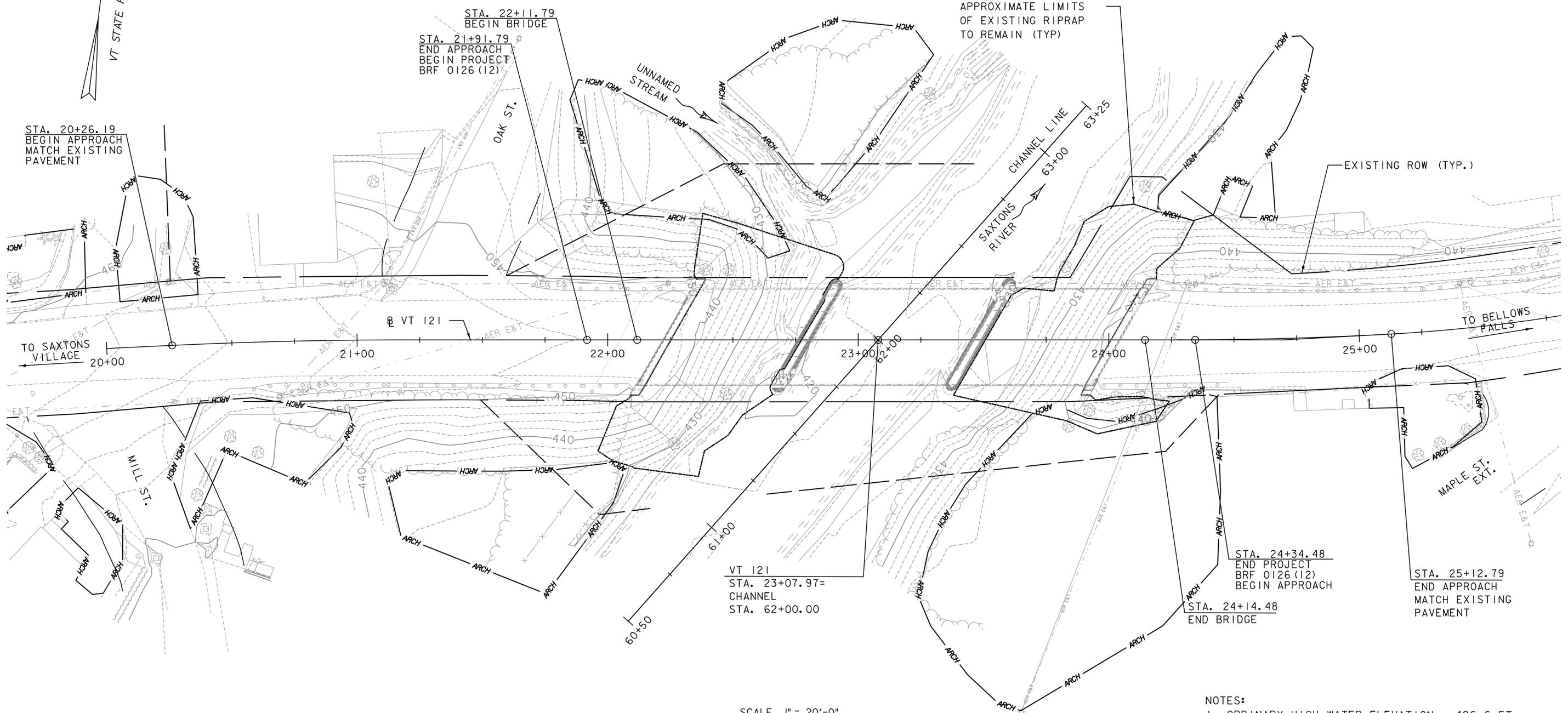
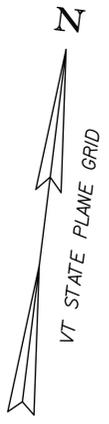
IN ADDITION TO THE CONTRACTOR CHECKLIST ANY ACTIVITIES OUTSIDE THE CONSTRUCTION LIMITS SHALL FOLLOW SUBSECTIONS 105.25- 105.29 OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION.

PROJECT NAME: ROCKINGHAM
PROJECT NUMBER: BRF 0126(12)

TYLININTERNATIONAL

FILE NAME: z10J072bdr_epscn.dgn
PROJECT LEADER: R. HEBERT
DESIGNED BY: S. AMOROSO
EPSC NARRATIVE

PLOT DATE: 8/26/2014
DRAWN BY: S. AMOROSO
CHECKED BY: D. BRYANT
SHEET 52 OF 69



STA. 20+26.19
BEGIN APPROACH
MATCH EXISTING
PAVEMENT

STA. 21+91.79
END APPROACH
BEGIN PROJECT
BRF 0126 (12)

STA. 22+11.79
BEGIN BRIDGE

APPROXIMATE LIMITS
OF EXISTING RIPRAP
TO REMAIN (TYP)

EXISTING ROW (TYP.)

TO SAXTONS
VILLAGE
20+00

VT 121

TO BELLOWS
FALLS

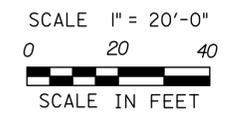
MILL ST.

MAPLE ST.
EXT.

VT 121
STA. 23+07.97=
CHANNEL
STA. 62+00.00

STA. 24+34.48
END PROJECT
BRF 0126 (12)
BEGIN APPROACH
STA. 24+14.48
END BRIDGE

STA. 25+12.79
END APPROACH
MATCH EXISTING
PAVEMENT



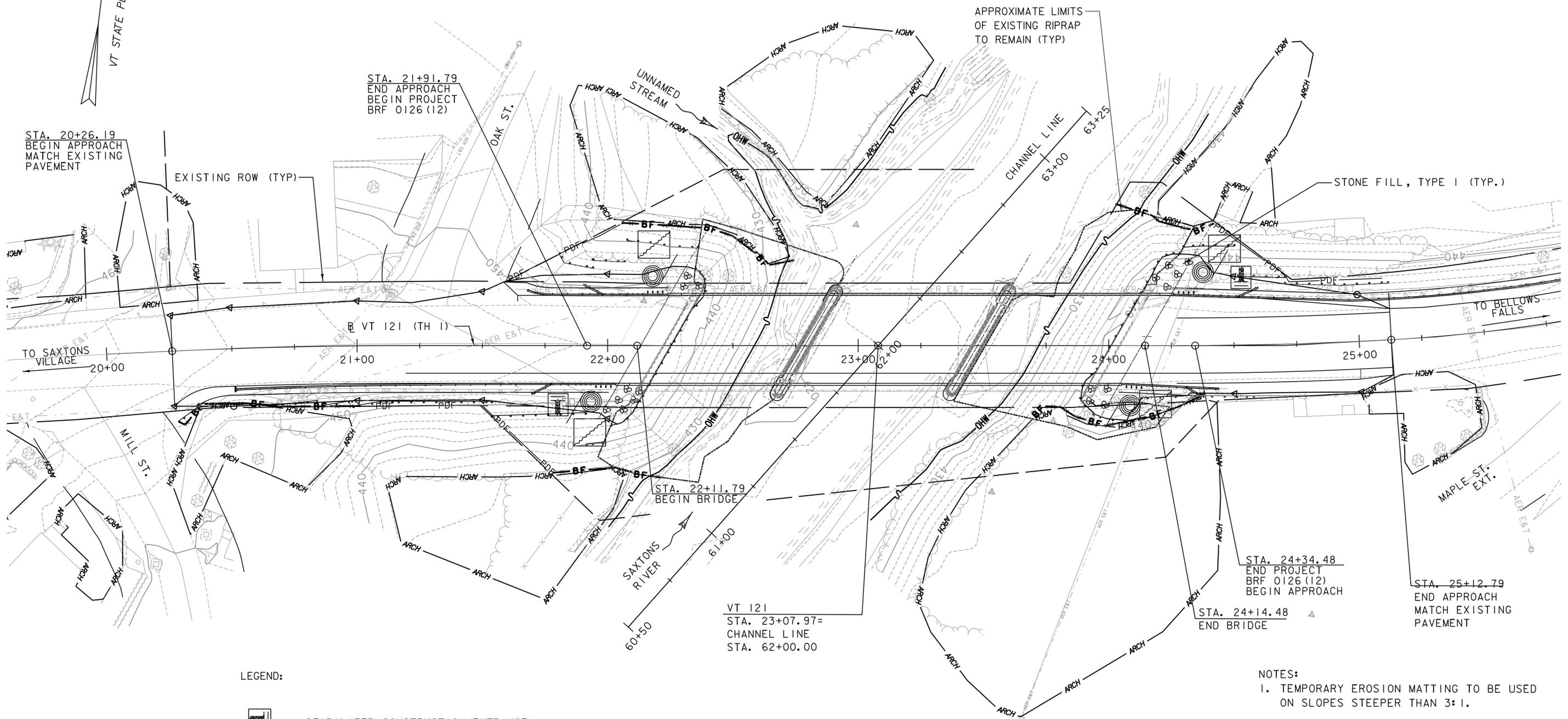
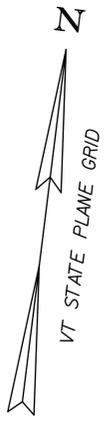
- NOTES:
1. ORDINARY HIGH WATER ELEVATION = 426.6 FT
 2. CONTOURS REFLECT CONDITIONS PRIOR TO TROPICAL STORM IRENE, AUGUST 2011.

PROJECT NAME: ROCKINGHAM
PROJECT NUMBER: BRF 0126(12)



FILE NAME: z10J072bdr_ece01.dgn
PROJECT LEADER: R. HEBERT
DESIGNED BY: S. AMOROSO
EPSC EXISTING CONDITIONS SITE PLAN

PLOT DATE: 8/26/2014
DRAWN BY: S. AMOROSO
CHECKED BY: D. BRYANT
SHEET 53 OF 69



STA. 20+26.19
BEGIN APPROACH
MATCH EXISTING
PAVEMENT

STA. 21+91.79
END APPROACH
BEGIN PROJECT
BRF 0126 (12)

STA. 22+11.79
BEGIN BRIDGE

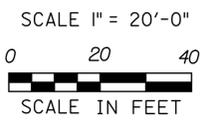
STA. 24+34.48
END PROJECT
BRF 0126 (12)
BEGIN APPROACH

STA. 25+12.79
END APPROACH
MATCH EXISTING
PAVEMENT

VT 121
STA. 23+07.97=
CHANNEL LINE
STA. 62+00.00

LEGEND:

-  STABILIZED CONSTRUCTION ENTRANCE
-  SURFACE ROUGHENING



NOTES:

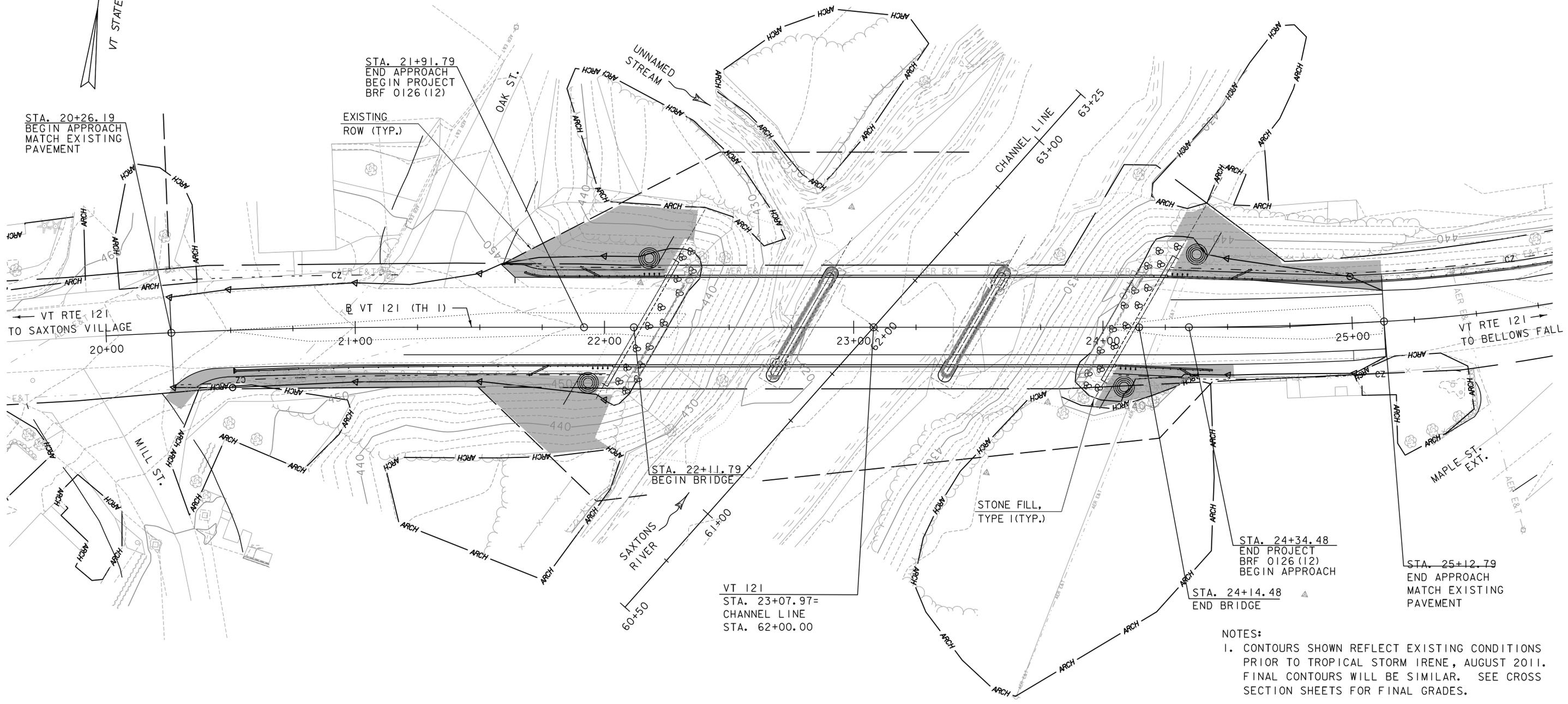
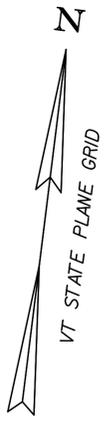
1. TEMPORARY EROSION MATTING TO BE USED ON SLOPES STEEPER THAN 3:1.
2. CONTOURS REFLECT CONDITIONS PRIOR TO TROPICAL STORM IRENE, AUGUST 2011.
3. ORDINARY HIGH WATER ELEVATION = 426.6 FT.

PROJECT NAME: ROCKINGHAM
PROJECT NUMBER: BRF 0126(12)



FILE NAME: z10J072bdr_ect01.dgn
PROJECT LEADER: R. HEBERT
DESIGNED BY: S. AMOROSO
EPSC CONSTRUCTION CONDITIONS SITE PLAN

PLOT DATE: 8/26/2014
DRAWN BY: S. AMOROSO
CHECKED BY: D. BRYANT
SHEET 54 OF 69



STA. 20+26.19
BEGIN APPROACH
MATCH EXISTING
PAVEMENT

STA. 21+91.79
END APPROACH
BEGIN PROJECT
BRF 0126(12)

EXISTING
ROW (TYP.)

OAK ST.

UNNAMED
STREAM

CHANNEL LINE
63+00

VT RTE 121
TO SAXTONS VILLAGE

VT 121 (TH 1)

VT RTE 121
TO BELLOWS FALL

STA. 22+11.79
BEGIN BRIDGE

STONE FILL,
TYPE I (TYP.)

STA. 24+34.48
END PROJECT
BRF 0126(12)
BEGIN APPROACH

STA. 25+12.79
END APPROACH
MATCH EXISTING
PAVEMENT

VT 121
STA. 23+07.97=
CHANNEL LINE
STA. 62+00.00

STA. 24+14.48
END BRIDGE

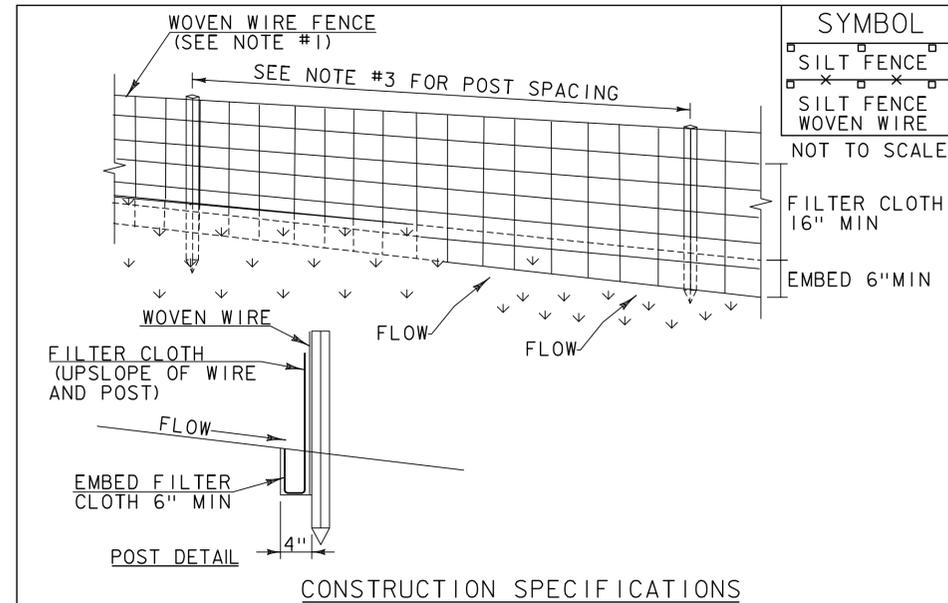
- NOTES:
1. CONTOURS SHOWN REFLECT EXISTING CONDITIONS PRIOR TO TROPICAL STORM IRENE, AUGUST 2011. FINAL CONTOURS WILL BE SIMILAR. SEE CROSS SECTION SHEETS FOR FINAL GRADES.
 2. TEMPORARY EROSION MATTING TO BE USED ON SLOPES STEEPER THAN 3:1.
 3. ORDINARY HIGH WATER ELEVATION = 426.6 FT.



PROJECT NAME: ROCKINGHAM
PROJECT NUMBER: BRF 0126(12)

TYLIN INTERNATIONAL

FILE NAME: z10J072bdr_ecf01.dgn	PLOT DATE: 8/26/2014
PROJECT LEADER: R. HEBERT	DRAWN BY: S. AMOROSO
DESIGNED BY: S. AMOROSO	CHECKED BY: D. BRYANT
EPSC FINAL CONDITIONS SITE PLAN	SHEET 55 OF 69



- CONSTRUCTION SPECIFICATIONS**
1. WOVEN WIRE REINFORCED FENCE IS REQUIRED WITHIN 100' UPSLOPE OF RECEIVING WATERS WHEN THE PROJECT FALLS UNDER A CONSTRUCTION STORMWATER PERMIT. WOVEN WIRE SHALL BE A MIN. 14 GAUGE WITH A 6" MAX. MESH OPENING.
 2. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI100X, STABILINKA T140N OR APPROVED EQUIVALENT.
 3. POST SPACING FOR WIRE-BACKED FENCE SHALL BE 10' MAXIMUM. FOR FILTER-CLOTH FENCE, WHEN ELONGATION IS >50%, POST SPACING SHALL NOT EXCEED 4' AND WHEN ELONGATION IS <50%, POST SPACING SHALL NOT EXCEED 6'.
 4. WOVEN WIRE FENCE IS TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES. FILTER CLOTH IS TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.
 5. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY 6" AND FOLDED.
 6. PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE, OR APPROVED EQUIVALENT.
 7. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN SEDIMENT REACHES HALF OF FABRIC HEIGHT.

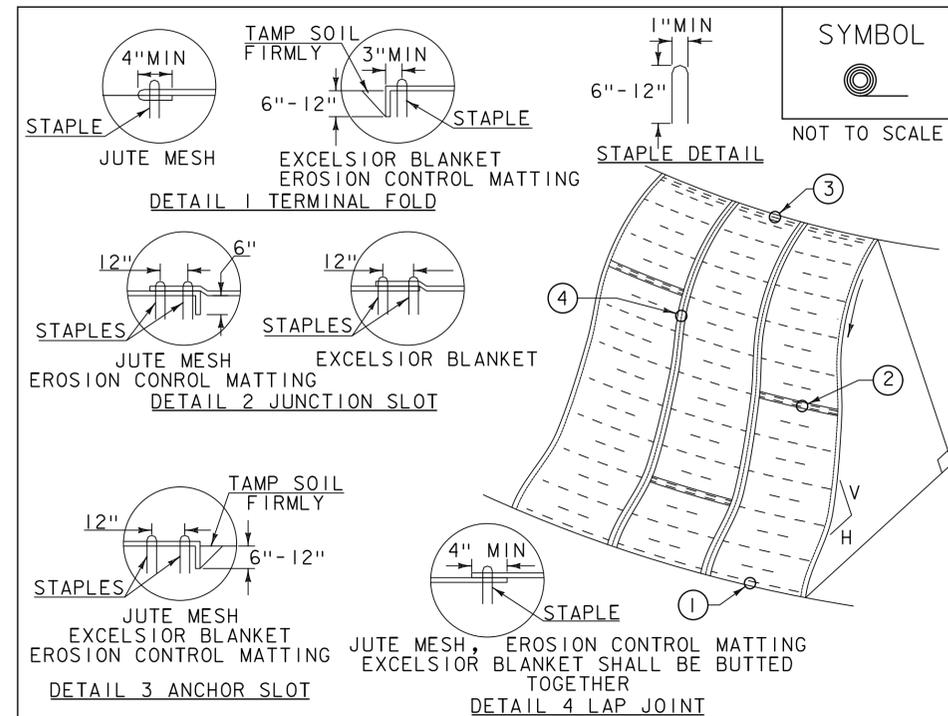
ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC
ORIGINALLY DEVELOPED BY USDA-NRCS
VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SILT FENCE

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

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

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



- CONSTRUCTION SPECIFICATIONS**
1. APPLY TO SLOPES GREATER THAN 3H: 1V OR WHERE NECESSARY TO AID IN ESTABLISHING VEGETATION.
 2. APPLY FERTILIZER, LIME SEED PRIOR TO PLACING MATTING.
 3. STAPLES ARE TO BE PLACED ALTERNATELY, IN COLUMNS APPROXIMATELY 2' APART AND IN ROWS APPROXIMATELY 3' APART. APPROXIMATELY 175 STAPLES ARE REQUIRED PER 4' X 225' ROLL OF MATERIAL AND 125 STAPLES ARE REQUIRED PER 4' X 150' ROLL OF MATERIAL.
 4. DISTURBED AREAS SHALL BE SMOOTHLY GRADED. EROSION CONTROL MATERIAL SHALL BE PLACED LOOSELY OVER GROUND SURFACE. DO NOT STRETCH.
 5. ALL TERMINAL ENDS AND TRANSVERSE LAPS SHALL BE STAPLED AT APPROXIMATELY 12" INTERVALS.

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

ROLLED EROSION CONTROL PRODUCT (RECP) SIDE SLOPE

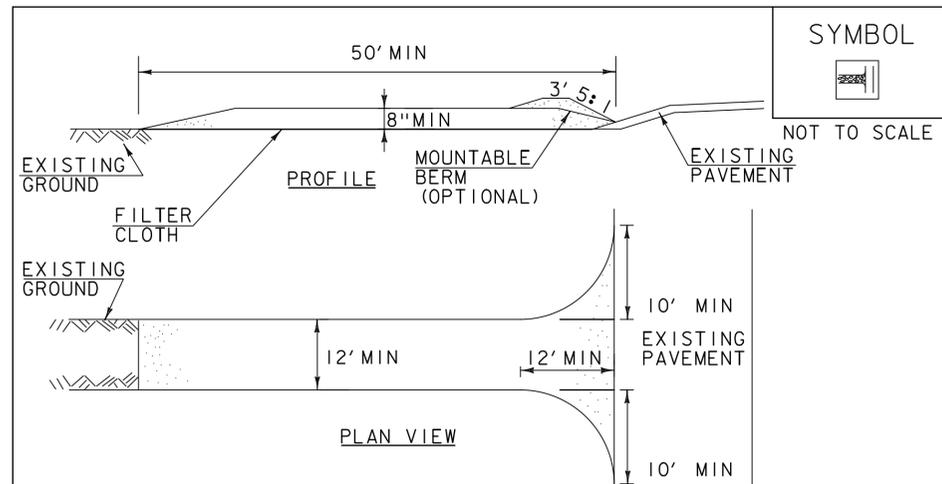
NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006-" FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.
THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 653 AND AS SHOWN IN THE PLANS FOR TEMPORARY EROSION MATTING (PAY ITEM 653.20) OR PERMANENT EROSION MATTING (PAY ITEM 653.21).

REVISIONS	
APRIL 16, 2007	JMF
JANUARY 13, 2009	WHF

PROJECT NAME: ROCKINGHAM
PROJECT NUMBER: BRF 0126(12)

FILE NAME: z10J072bdr_erodet.dgn
PROJECT LEADER: R. HEBERT
DESIGNED BY: Const. Env. Section
EPSC DETAIL SHEET 1 OF 3

PLOT DATE: 8/26/2014
DRAWN BY: S. AMOROSO
CHECKED BY: D. BRYANT
SHEET 56 OF 69



SYMBOL



NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

1. STONE SIZE- USE 1-4" STONE, RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH- NOT LESS THAN 50' (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30' MINIMUM LENGTH APPLIES).
3. THICKNESS- NOT LESS THAN 8".
4. WIDTH- 12' MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. 24' IF SINGLE ENTRANCE TO SITE.
5. GEOTEXTILE MUST BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING STONE.
6. SURFACE WATER- ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE- THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY, ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED ACCORDING TO PERMIT REQUIREMENTS.

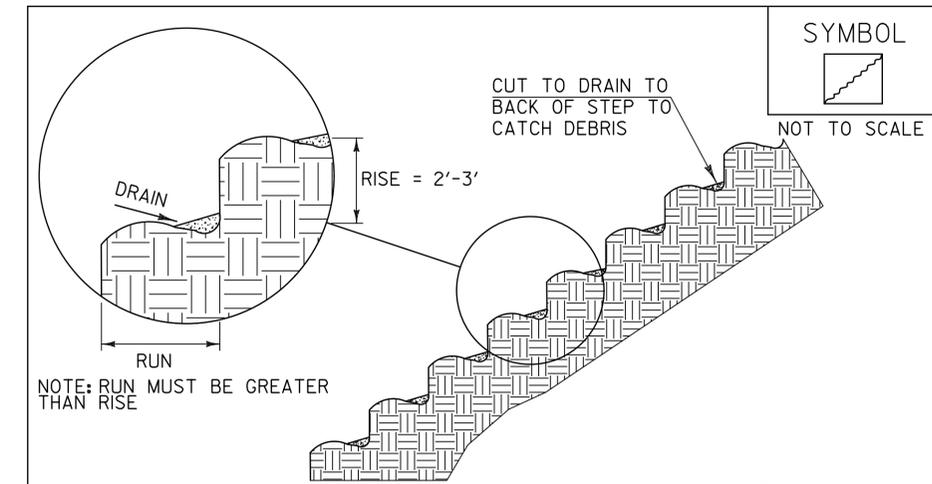
ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC
ORIGINALLY DEVELOPED BY USDA-NRCS
VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**STABILIZED
CONSTRUCTION
ENTRANCE**

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

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 653 FOR VEHICLE TRACKING PAD (PAY ITEM 653.35) OR AS SPECIFIED IN THE CONTRACT.

REVISIONS	
MARCH 24, 2008	WHF
JANUARY 13, 2009	WHF

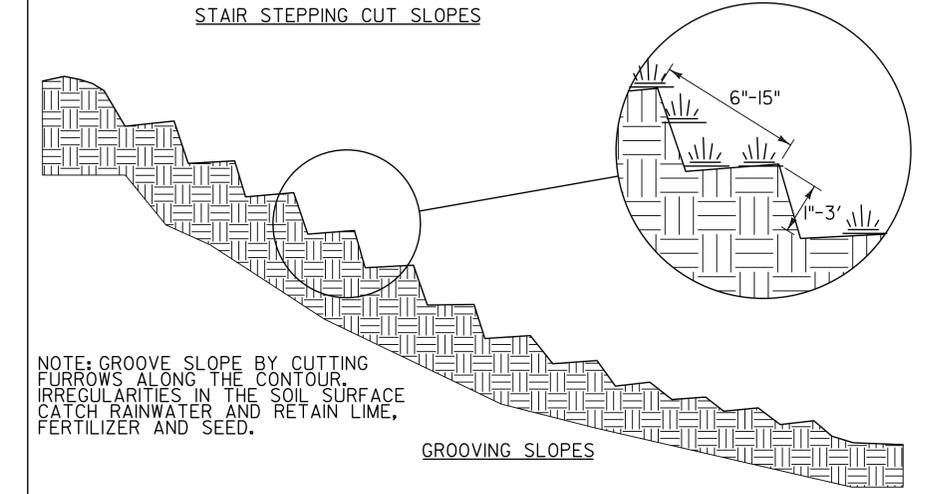


SYMBOL



NOT TO SCALE

STAIR STEPPING CUT SLOPES



GROOVING SLOPES

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

SURFACE ROUGHENING

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

THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE CONTRACT

REVISIONS	
APRIL 1, 2008	WHF
JANUARY 13, 2009	WHF

PROJECT NAME: ROCKINGHAM
PROJECT NUMBER: BRF 0126(12)

FILE NAME: z10J072bdr_erodet.dgn
PROJECT LEADER: R. HEBERT
DESIGNED BY: Const. Env. Section
EPSC DETAIL SHEET 2 OF 3

PLOT DATE: 8/26/2014
DRAWN BY: S. AMOROSO
CHECKED BY: D. BRYANT
SHEET 57 OF 69

VAOT RURAL AREA MIX					
LBS/AC					
% WEIGHT	BROADCAST	HYDROSEED	NAME	GERM %	PURITY %
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					
LBS/AC					
% WEIGHT	BROADCAST	HYDROSEED	NAME	GERM %	PURITY %
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	<i>FOLLOW</i>	PELLETIZED	<i>FOLLOW</i>
500 LBS/AC	<i>MANUFACTURER</i>	2 TONS/AC	<i>MANUFACTURER</i>

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

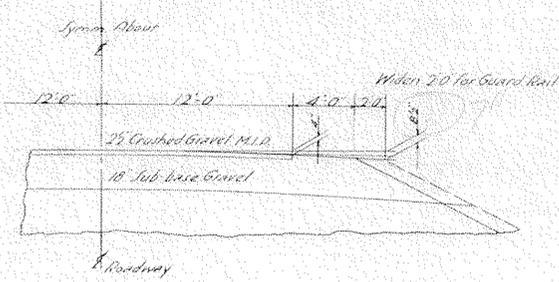
TURF ESTABLISHMENT

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

PROJECT NAME: ROCKINGHAM
PROJECT NUMBER: BRF 0126(12)

FILE NAME: z10J072bdr_erodet.dgn
PROJECT LEADER: R. HEBERT
DESIGNED BY: Const. Env. Section
EPSC DETAIL SHEET 3 OF 3

PLOT DATE: 8/26/2014
DRAWN BY:
CHECKED BY:
SHEET 58 OF 69



NEW HIGHWAY SECT. STA. TO STA. SCALE

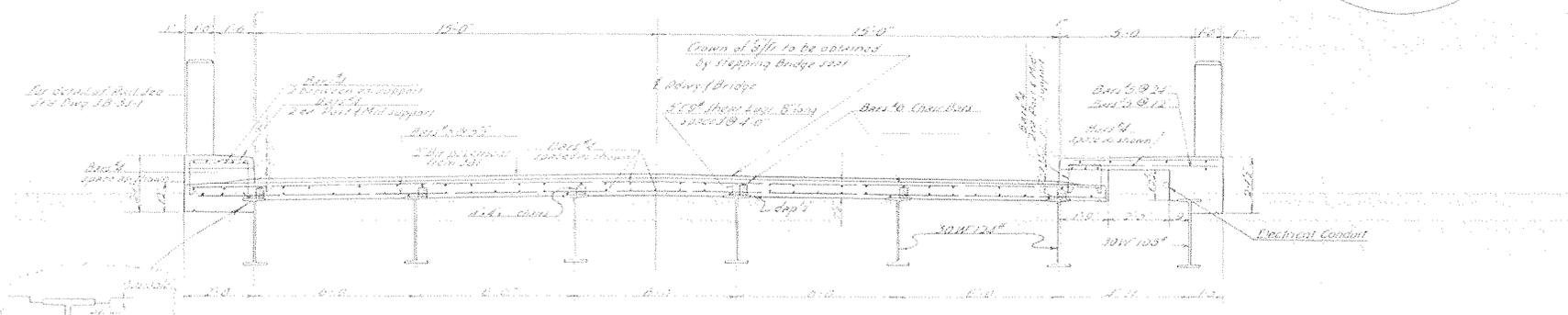
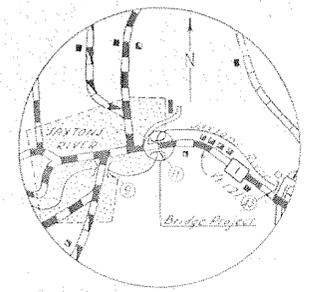
See Plan & Profile Sheet

NEW HIGHWAY PROFILE ALONG \bar{C} SCALE

Highway No. VT 121 Name of Highway _____
 Structure No. 11 County WINDHAM Town ROCKINGHAM
 Approved _____ Date _____
 Bridge Engineer, Dist No 9

- EXISTING STRUCTURE**
1. Posted loading of existing structure 20,000 lbs.
 2. Location and type of existing structure 106 Miles from Westminster Town Line - Steel Truss
 3. Underclearance elevation of existing structure 25'-0"
 4. What disposition should be made of the existing structure and probable cost of removal 1,400.
 5. Should existing structure be utilized to maintain traffic during construction of new structure No.
 6. Should new temporary structure be built Yes.
 7. Ordinary high water surface elevation of existing structure 479.0'
 8. Extreme high water at existing structure 480.0'
 9. Span and waterway area below ordinary high water surface elevation of existing structure or structures up or down stream Up Str. 3 spans @ 50'-0" - 1650' Down Str. Single span 100' - 2100'
 10. Type of foundation under existing abutments Gravel with Clay Filler - Nearly Hardpan
 11. If existing structure is to be widened or extended attach sketch containing complete data to prepare plans for widening or extending and to determine safe loading capacity, substructure and superstructure No.

- NEW STRUCTURE**
1. Recommended type of structure Standard W-Beam Bridge Continuous
 2. Recommended clear span or spans
 Measured parallel to \bar{C} new highway 52'-1 1/2", 65'-6 1/2", 92'-1 1/2"
 Measured at right angles to \bar{C} stream 45'-1 1/2", 56'-9", 45'-1 1/2"
 3. Are there objections to a pier in the stream, answer yes or no No.
 4. Ordinary high water elevation of new structure 479.0'
 5. Ordinary elevation of water at new structure 467.5'
 6. Extreme high water elevation of new structure 489.0'
 7. Does stream reach its maximum high water elevation rapidly No. Is ordinary rise rapid No.
 8. Low water elevation at new structure 463.0'
 9. Drainage area in acres above structure 45,440. Character of terrain Hilly.
 10. Is stream ever dry No.
 11. Velocity of stream at high water stage 6.11/sec.
 12. Recommended waterway area below ordinary high water elevation measured at 1/2 mile of stream No.
 13. Does erosion occur No.
 14. Does stream carry light, medium or heavy drift and ice Light.
 15. Should roadway be banked? If so how much per foot No.
 16. Are sidewalks required? If so, on what side Downstream both sides? No.
 17. Recommended type of pavement Reinforced Concrete Slab with Bituminous Surface
 18. Traffic to be maintained under what span no. 1 and 2. One or two ways? One. Probable cost 5000.00.
 19. Probable cost of clearing and grubbing stream channel at structure site _____.
 20. Should provisions be made for public utilities Yes.
 21. Estimated allowable load on foundations 4 run. Should piles be used? No. Est. lgh. _____.



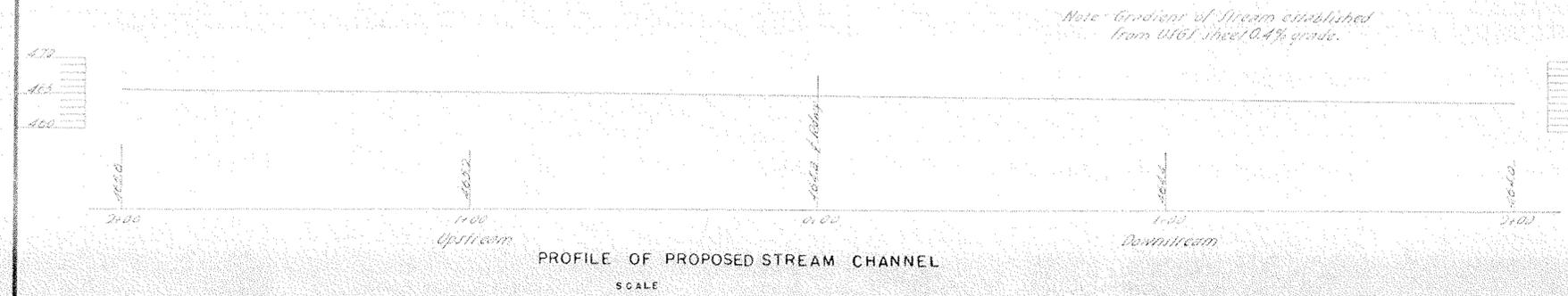
TYPICAL SECTION (LOOKING EAST) Scale 3/4"=1'-0"

PLAN See Sheet of sheets SCALE

FOUNDATION INFORMATION

Obtained for design purposes only and State assumes no responsibility whatsoever for sufficiency or accuracy of the information shown. Boulders may be encountered at either Abutment location.

See Sheet 1 of 4 sheets for Boring Information



PROFILE OF PROPOSED STREAM CHANNEL SCALE

STATE OF VERMONT
DEPT. OF HIGHWAYS

FOR REFERENCE ONLY

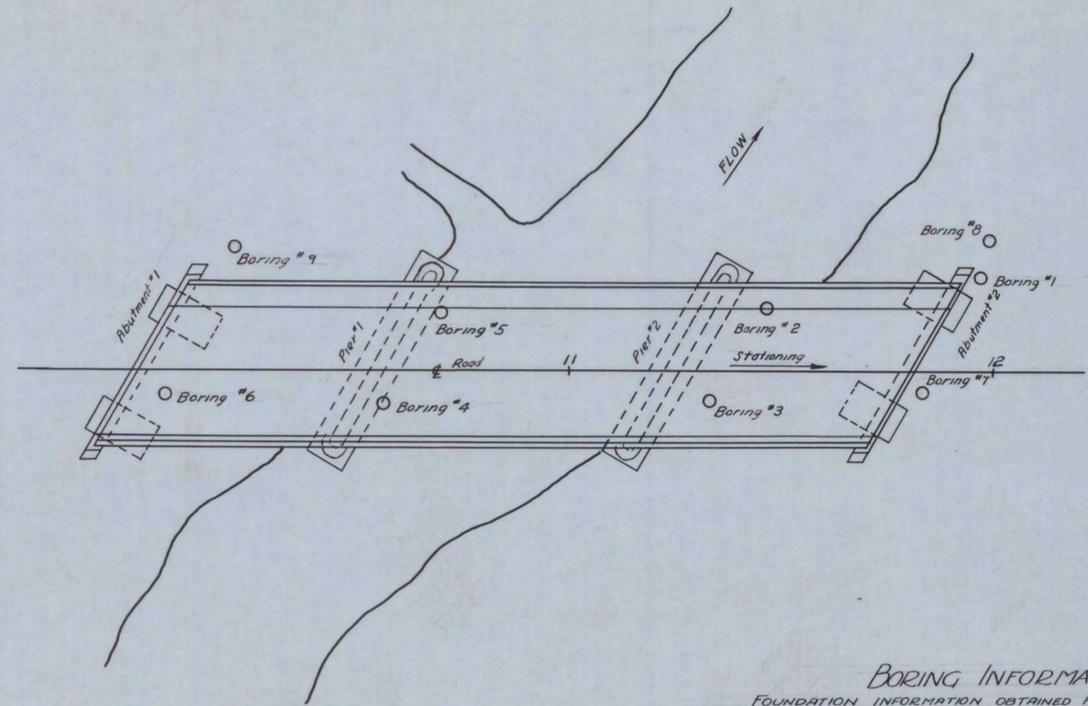
RECOMMENDED FOR APPROVAL

APPROVED

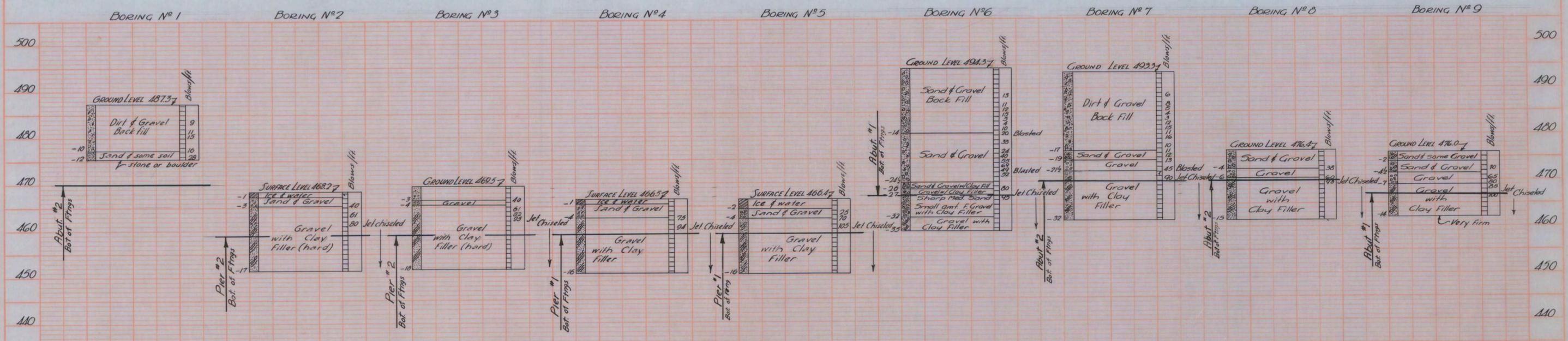
State of Vermont
Department of Transportation
Regional Office Agency

CORRECT _____ APPROVED _____
 BRIDGE ENGINEER CHIEF ENGINEER
 ROCKINGHAM 1156(3)
 Sheet 6 of 49

PLAN
 CHECKED
 PLOTTED
 ALIGNED
 CHECKED
 DATE
 NO.



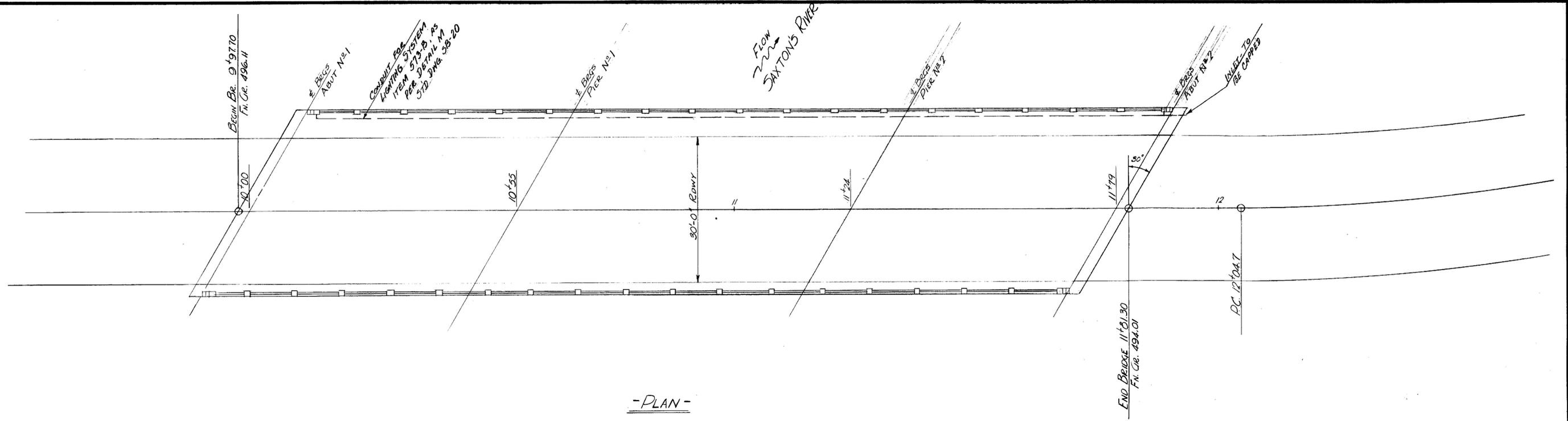
BORING INFORMATION
 FOUNDATION INFORMATION OBTAINED FOR DESIGN PURPOSES ONLY,
 AND THE STATE ASSUMES NO RESPONSIBILITY WHATSOEVER FOR
 THE SUFFICIENCY OR ACCURACY OF THE INFORMATION SHOWN.
 BOULDERS MAY BE ENCOUNTERED AT ANY PIER OR ABUT-
 MENT LOCATION.



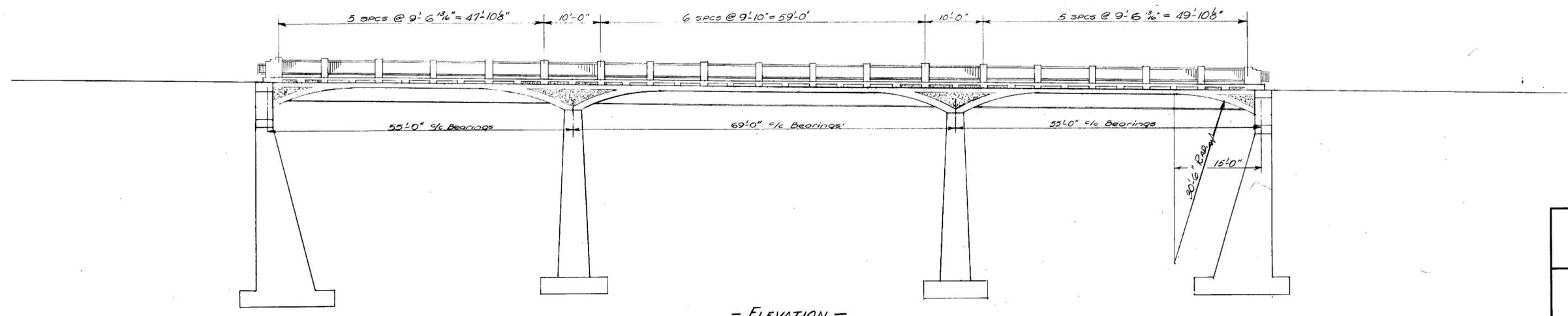
OUTSIDE DIAMETER OF PIPE CASING = 2 1/2"
 THICKNESS OF SHELL = 3/8"
 WEIGHT OF HAMMER = 350#
 DROP OF HAMMER = 24"

ROCKINGHAM
 5-156 (3)
 Sheet 7 of 49 Sheets

FILE
 CHECKED
 PLOTTED
 CHECKED
 DATE
 NO.



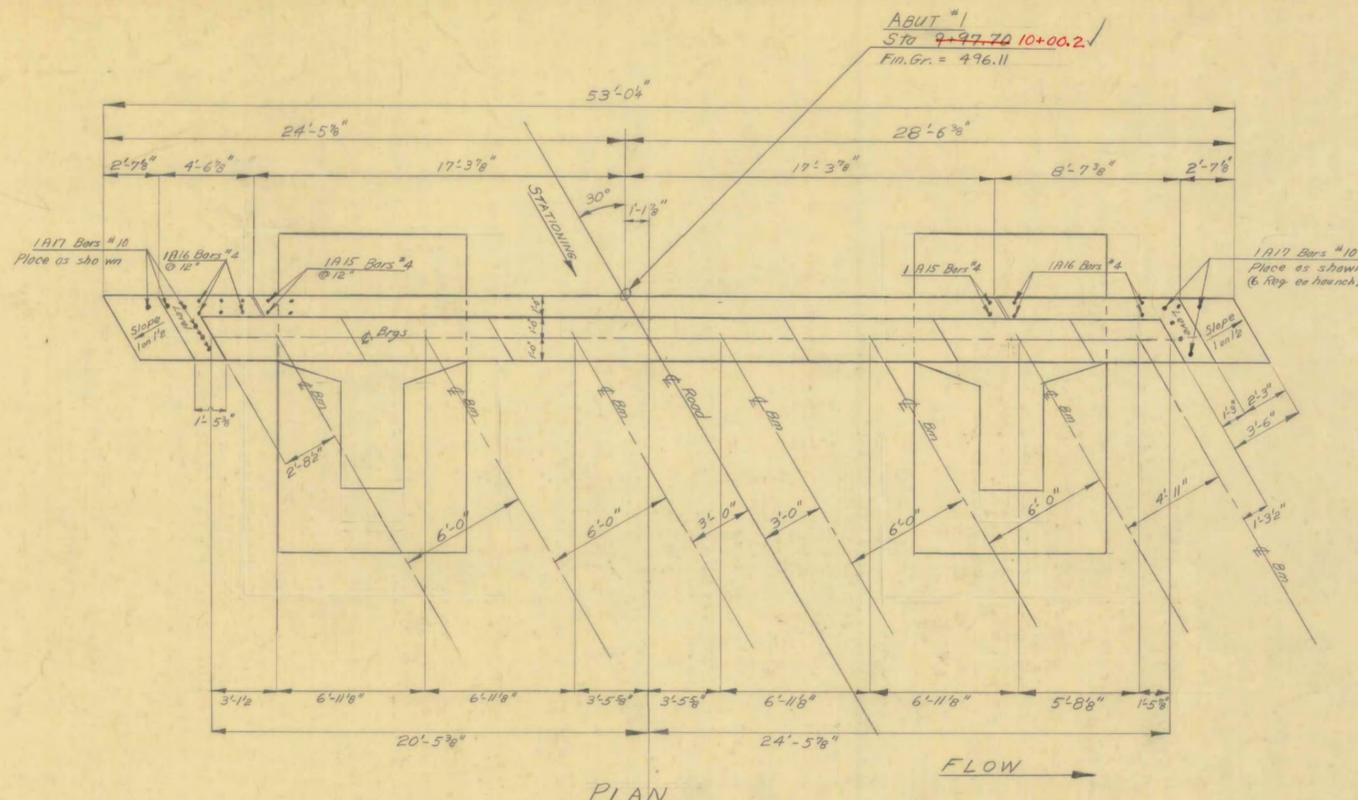
- PLAN -



- ELEVATION -

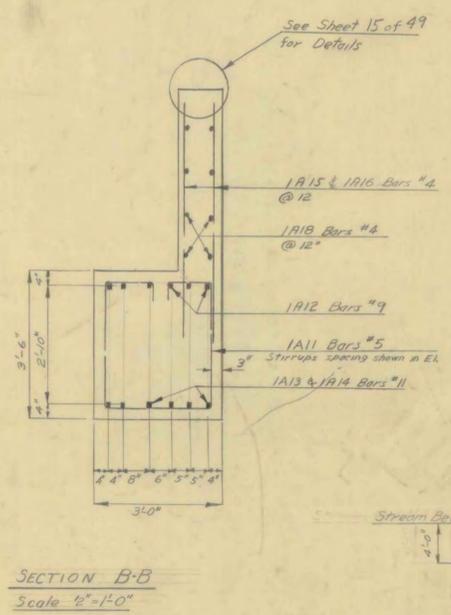
FOR REFERENCE ONLY

STATE OF VERMONT DEPARTMENT OF HIGHWAYS	
TOWN OF <u>ROCKINGHAM</u>	
ROAD NO. <u>Vt. 121</u> BRIDGE NO. <u>11</u>	
BRIDGE PLAN & ELEVATION	
SCALE <u>1"=10'-0"</u>	
SURVEYED BY <u>POGAR</u>	
DRAWN BY <u>J.R.J.</u> CHECKED BY <u>E.F.P.</u>	
PROJECT NO. <u>5126(3)</u>	
SHEET <u>8</u> OF <u>49</u>	

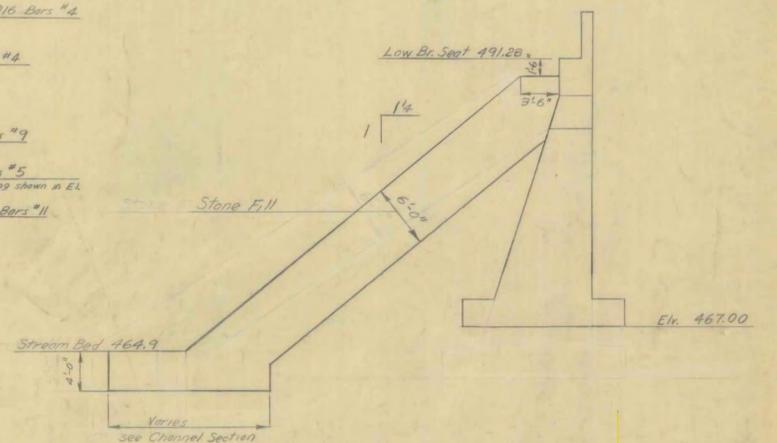


PLAN

FLOW →

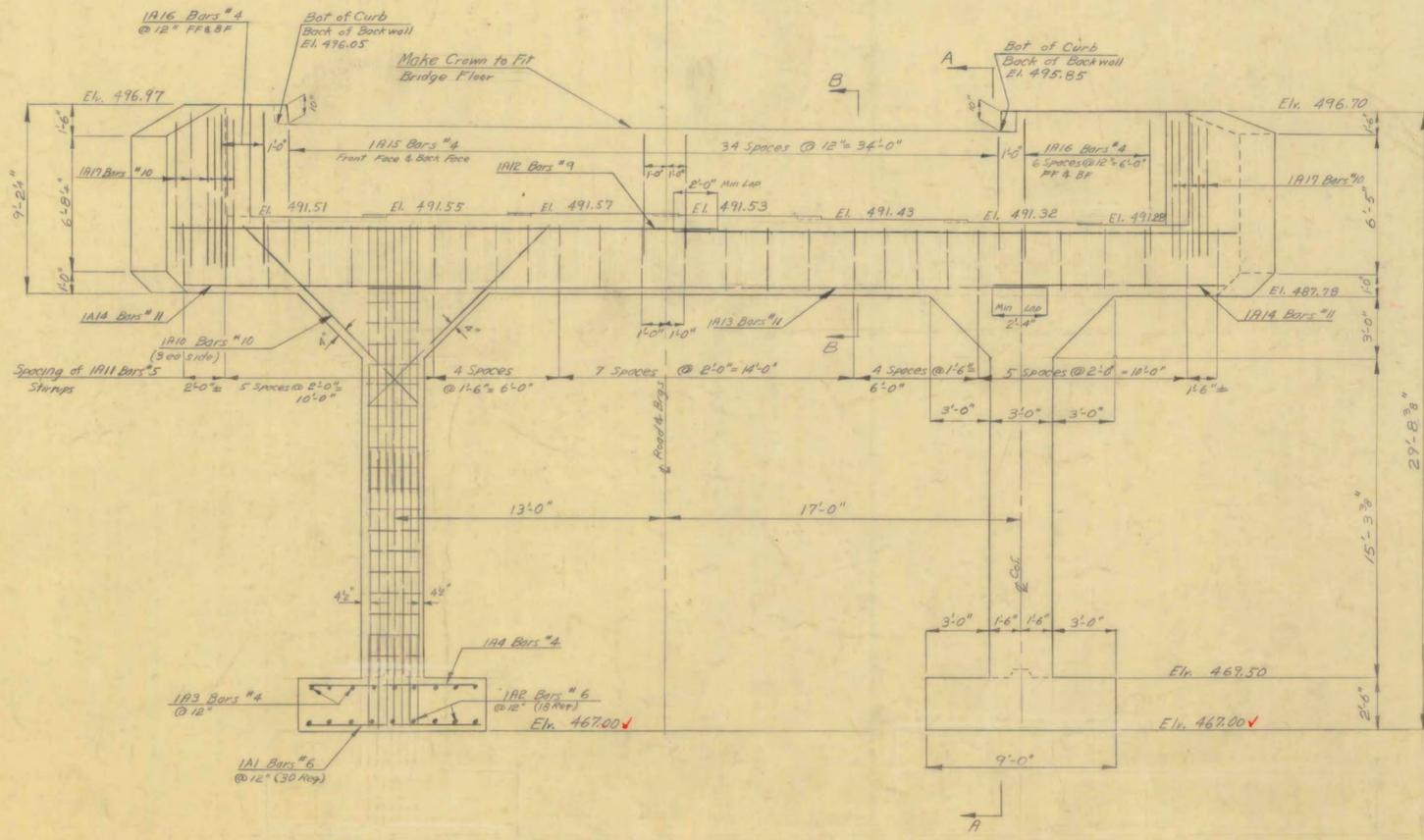


SECTION B-B
Scale 1/2" = 1'-0"

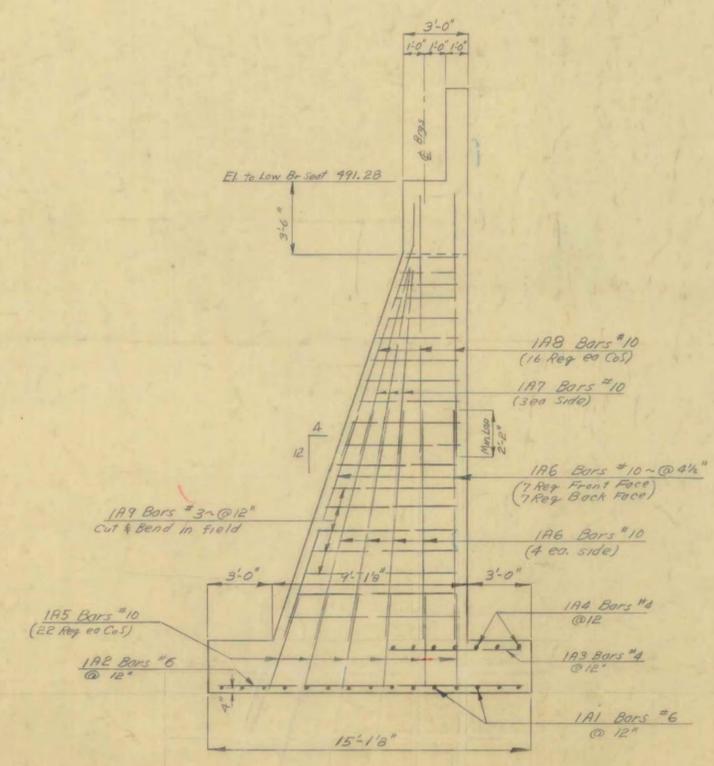


TYPICAL SECTION
Scale 1/8" = 1'-0"

Note: All Laps 2'-0" except as noted.
Max. Foundation Pressure - 3.7 kips per sq. ft.



ELEVATION



SECTION A-A

ESTIMATED QUANTITIES		
106C Unclassified Channel Excavation	1,700	C.Y.
107 Structure Excavation	275	C.Y.
401B Concrete Class B	86	C.Y.
521 Stone Fill	1,200	C.Y.

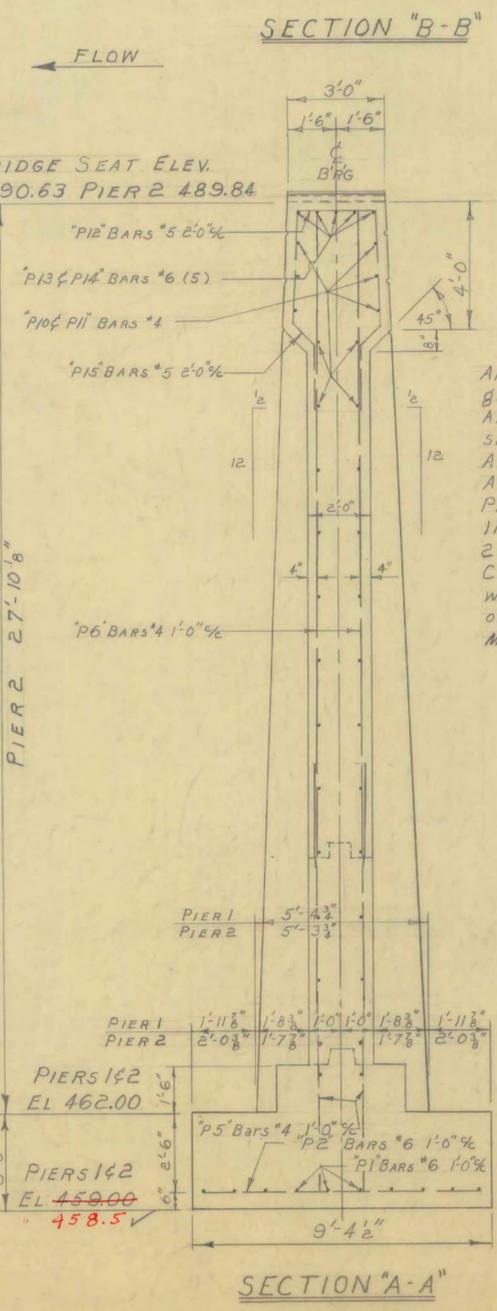
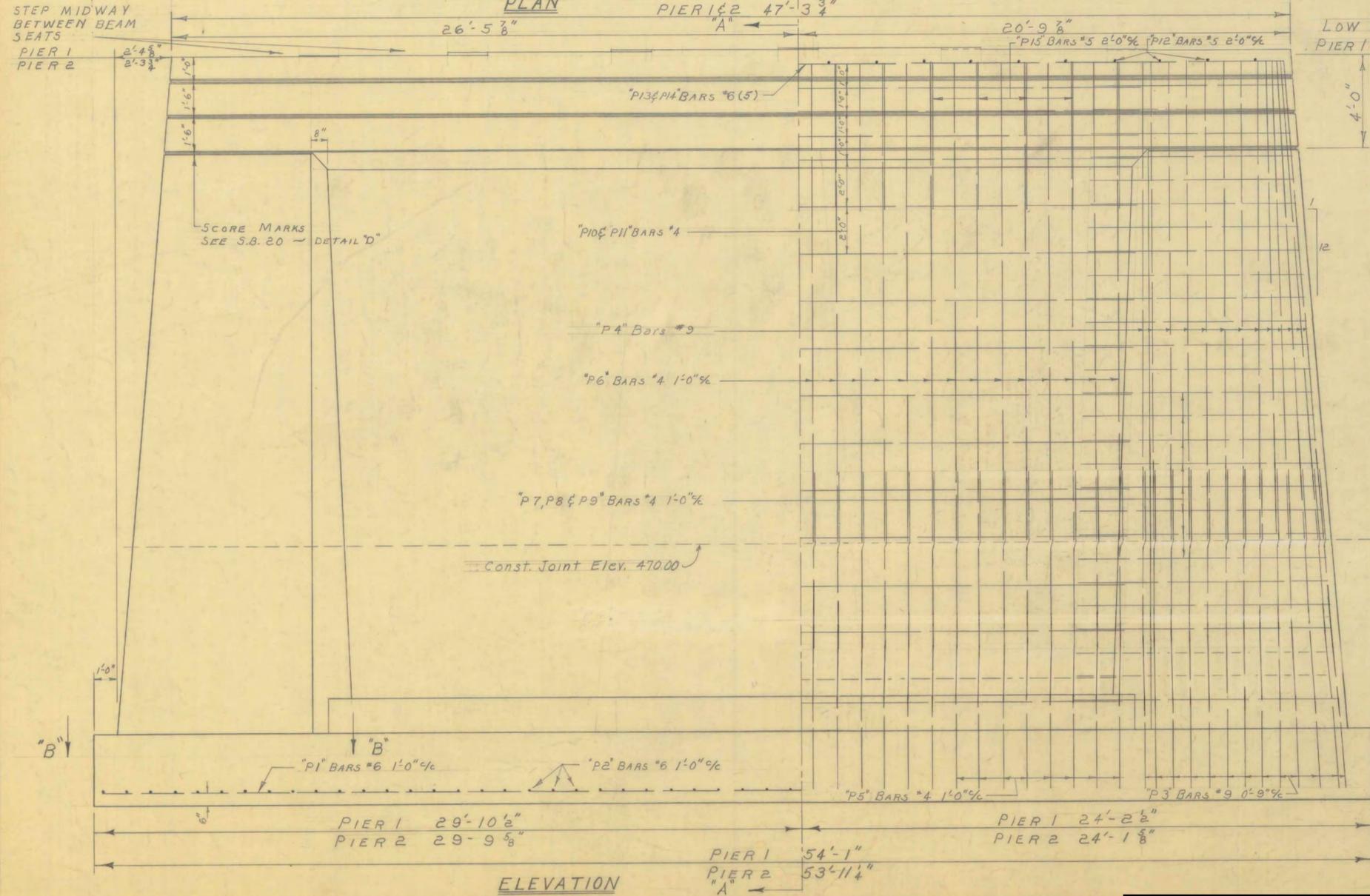
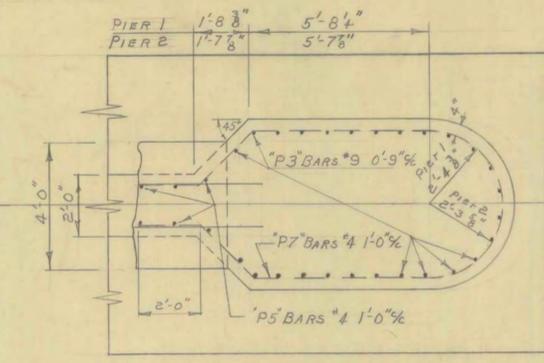
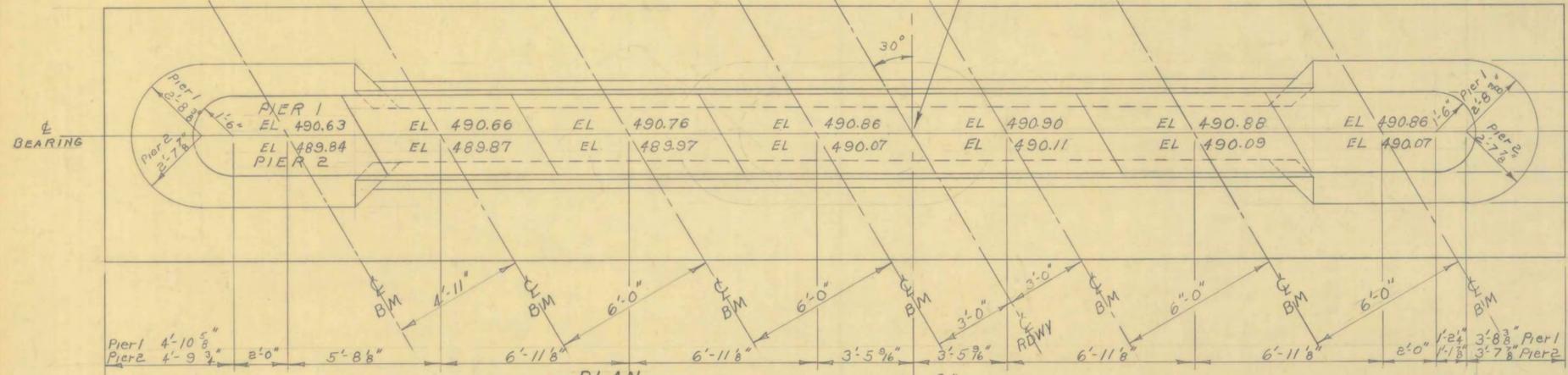
STATE OF VERMONT
DEPARTMENT OF HIGHWAYS

TOWN OF ROCKINGHAM
ROAD NO. VT 121 BRIDGE NO. 11
DETAILS of ABUTMENT #1

SCALE 1/4" = 1'-0" or as noted
SURVEYED BY Pegar
DRAWN BY C.F.H. CHECKED BY Des. M.H.
PROJECT NO. 5 156 (3)
SHEET 9 OF 49

FOR REFERENCE ONLY

10+57.5
 STA. 10+55.0 PIER 1 FN. GR. EL. 495.46 - EXPANSION JOINT
 STA. 11+24.0 PIER 2 FN. GR. EL. 494.67 - FIXED
 11+26.5



NOTES
 All reinforcing steel to be Intermediate grade
 All reinforcing steel dimensions on this sheet to $\frac{1}{8}$ of bars
 All concrete to be Class "B"
 Pier 1 drawn here. Pier 2 similar
 P1 denotes reinforcing steel bar in Pier 1
 P2 denotes reinforcing steel bar in Pier 2
 Construction joints to be in accordance with Det. "D" DWG. S.B. 20 under direction of the Engineer
 Max. Foundation Pressure - 4.8 kips per sq. ft.

ESTIMATED QUANTITIES	PIER 1	PIER 2
107 Structure Excavation	140 c.y.	152 c.y.
401B Concrete Class "B"	205 c.y.	200 c.y.

STATE OF VERMONT
 DEPARTMENT OF HIGHWAYS

TOWN OF ROCKINGHAM

ROAD NO. VT 121 BRIDGE NO. 11

DETAILS PIER 1
 PIER 2 SIMILAR

SCALE $\frac{3}{8}'' = 1'$

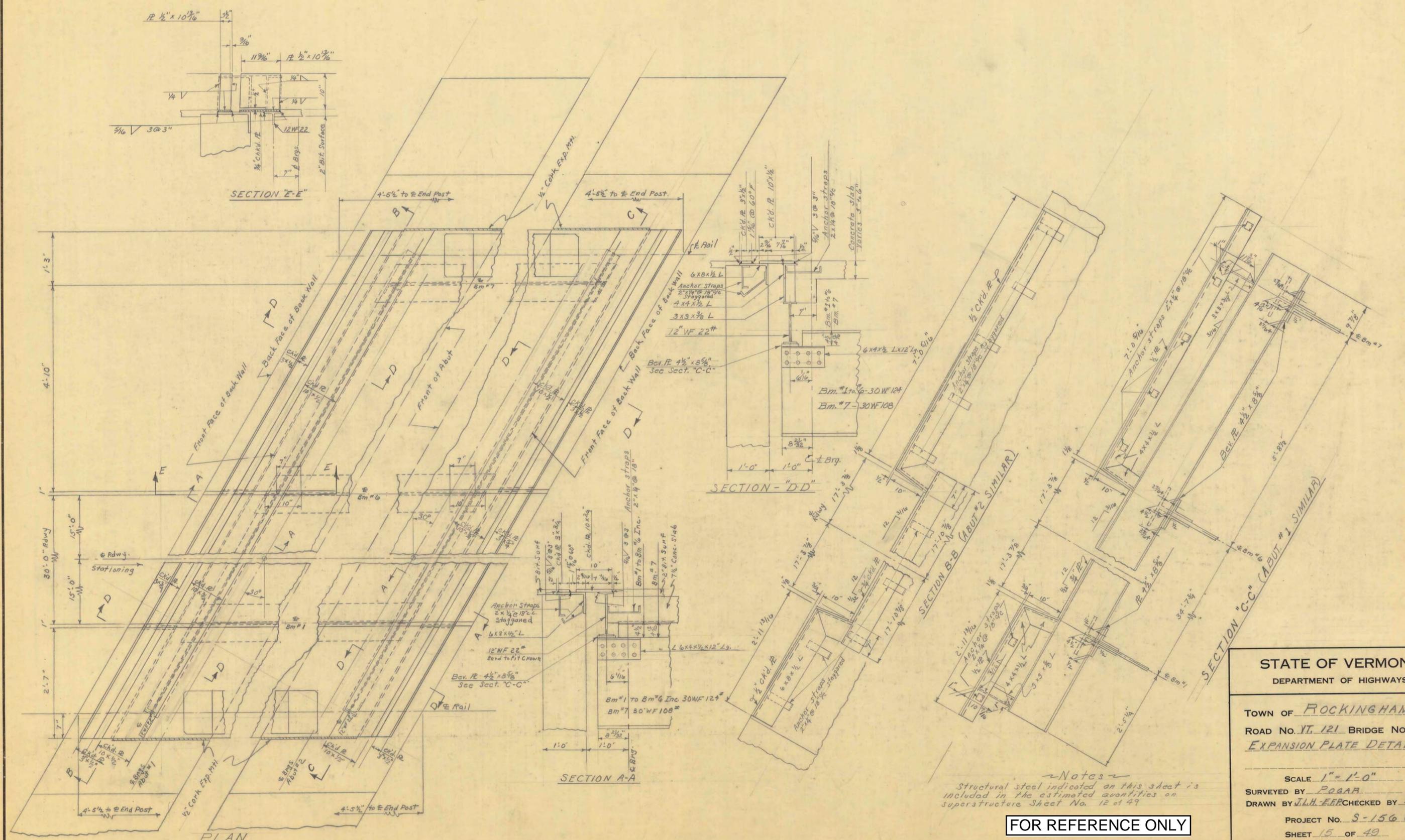
SURVEYED BY FOGAR

DRAWN BY WMS CHECKED BY E.F.P.

PROJECT NO. S 156(3)

SHEET 10 OF 49

FOR REFERENCE ONLY



Notes
 Structural steel indicated on this sheet is included in the estimated quantities on superstructure sheet No. 12 of 49

FOR REFERENCE ONLY

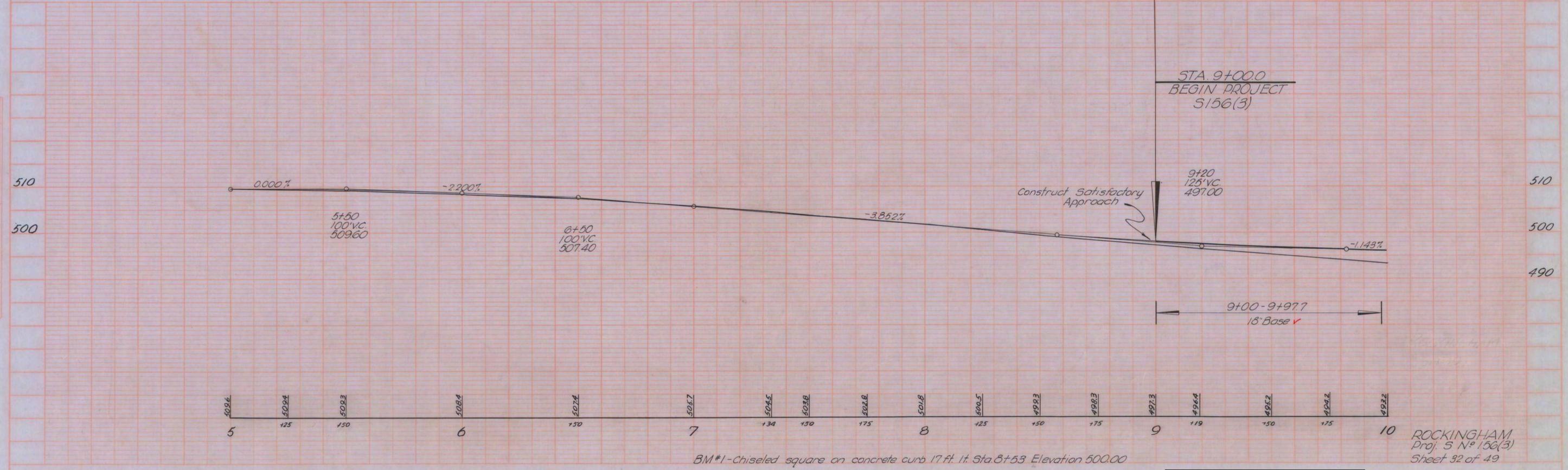
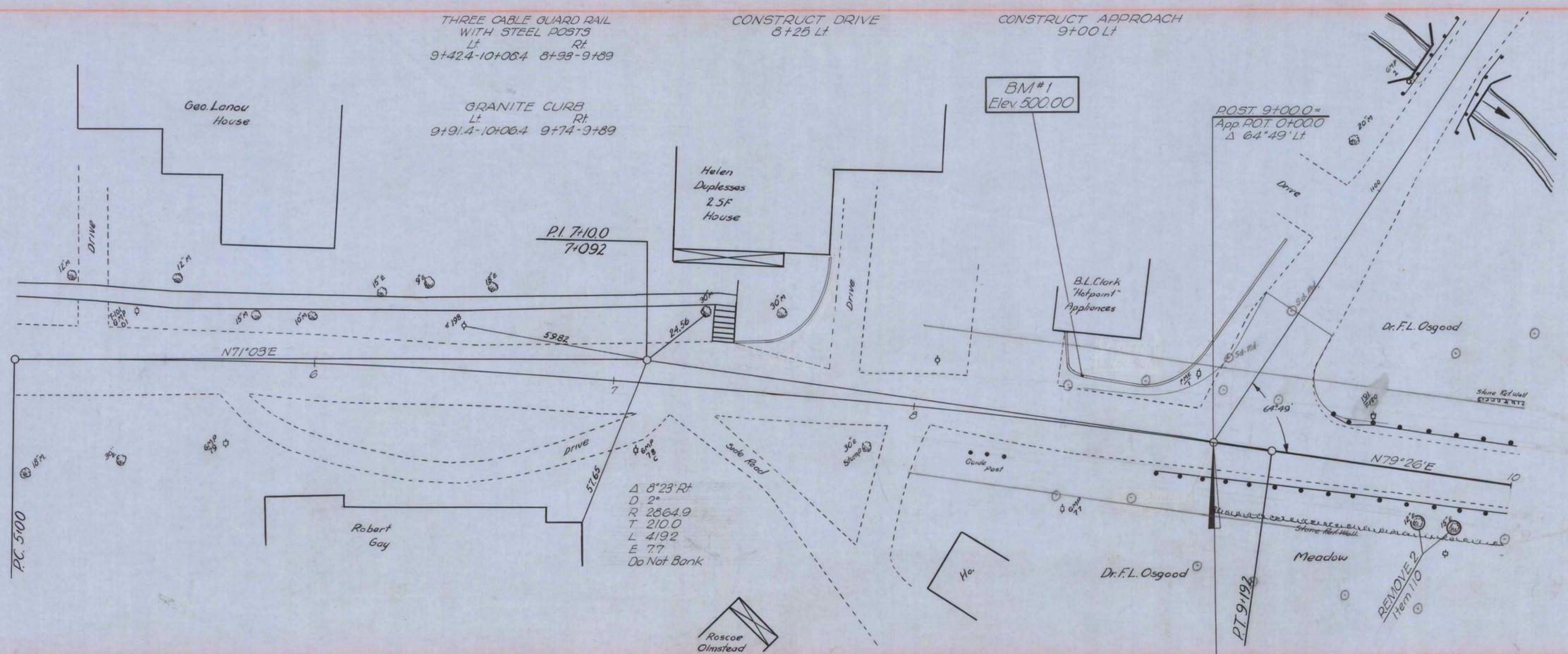
STATE OF VERMONT
 DEPARTMENT OF HIGHWAYS

TOWN OF ROCKINGHAM
 ROAD NO. VT. 121 BRIDGE NO. 11
 EXPANSION PLATE DETAILS

SCALE 1" = 1'-0"
 SURVEYED BY POGAR
 DRAWN BY J.L.H. EPP CHECKED BY R.T.B.
 PROJECT NO. S-156 (3)
 SHEET 15 OF 49

PLAN
 DRAWN BY
 L. Brown
 E. Brown
 CHECKED BY
 DATE
 NO.

PROFILE
 DRAWN BY
 L. Brown
 E. Brown
 CHECKED BY
 DATE
 NO.

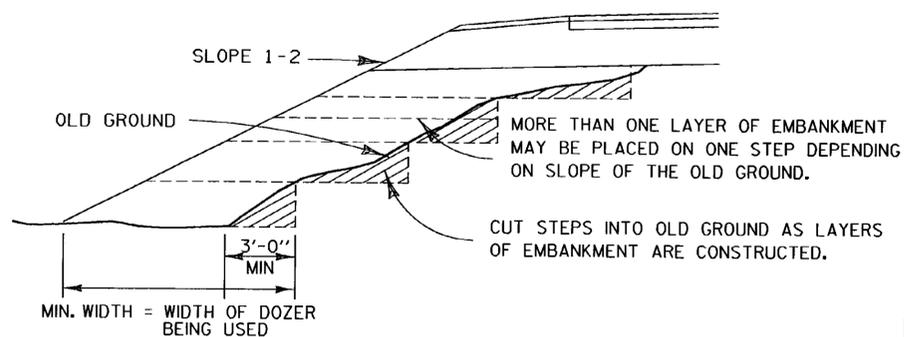


BM#1 - Chiseled square on concrete curb 17 ft. lt. Sta 8+53 Elevation 500.00

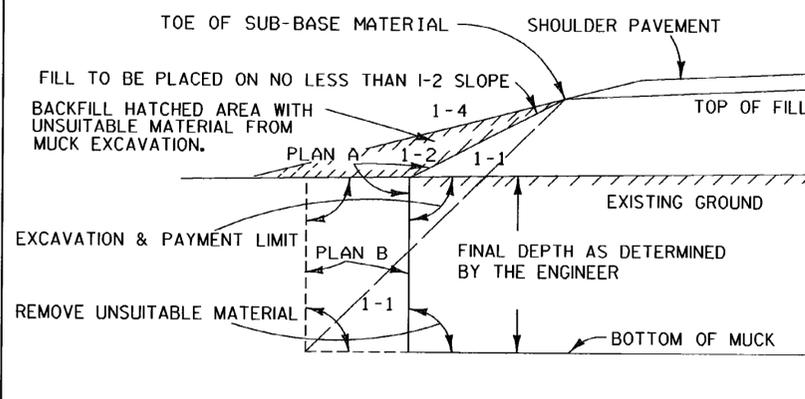
ROCKINGHAM
 Proj. 5 N° 156(3)
 Sheet 32 of 49

FOR REFERENCE ONLY

SHEET 67 OF 69

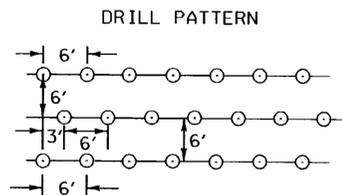
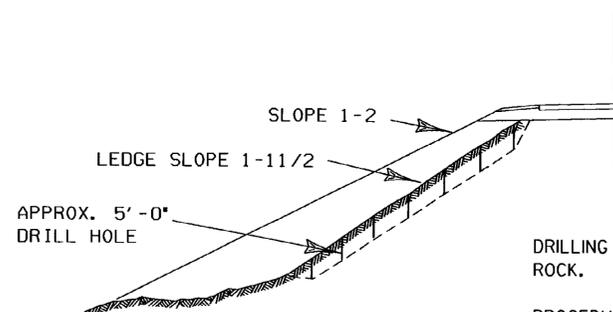


METHOD FOR CONSTRUCTING AN EMBANKMENT ON EARTH SLOPE



GENERAL NOTES:
 THE MUCK OR UNSUITABLE MATERIAL SHALL BE EXCAVATED TO THE NEAT LINES SHOWN ON THE PLANS OR AS DETERMINED BY THE ENGINEER.
 EXCAVATION AND PAYMENT LIMIT WILL BE DETERMINED FROM EITHER PLAN "A" OR PLAN "B", WHICHEVER PRODUCES THE GREATER WIDTH IN A GIVEN MUCK AREA.
 BACKFILL MATERIAL MUST MEET THE REQUIREMENTS SET FORTH UNDER MUCK EXCAVATION, SECTION 203

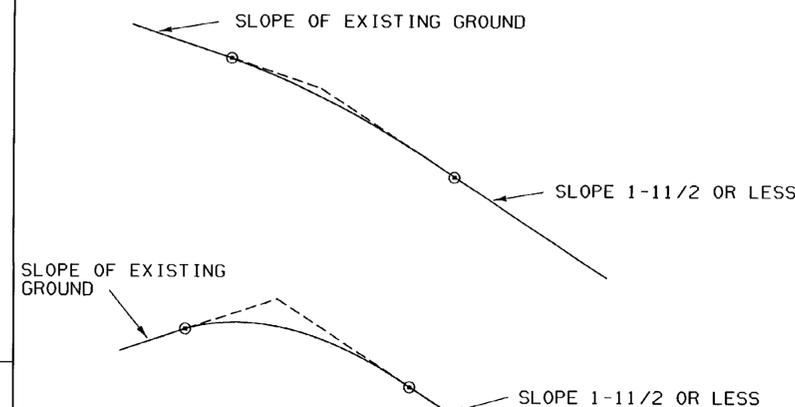
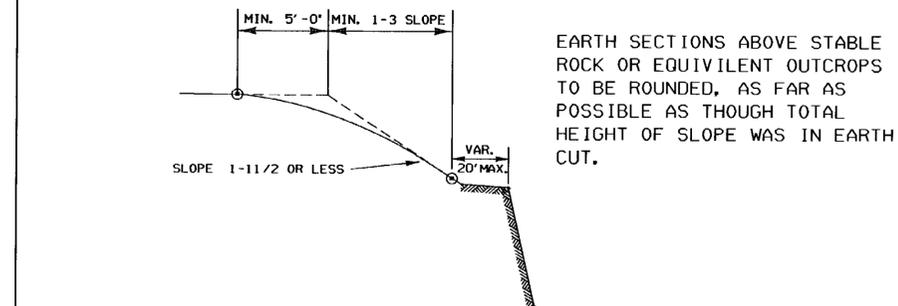
TYPICAL NEAT PAY LINES FOR MUCK EXCAVATION



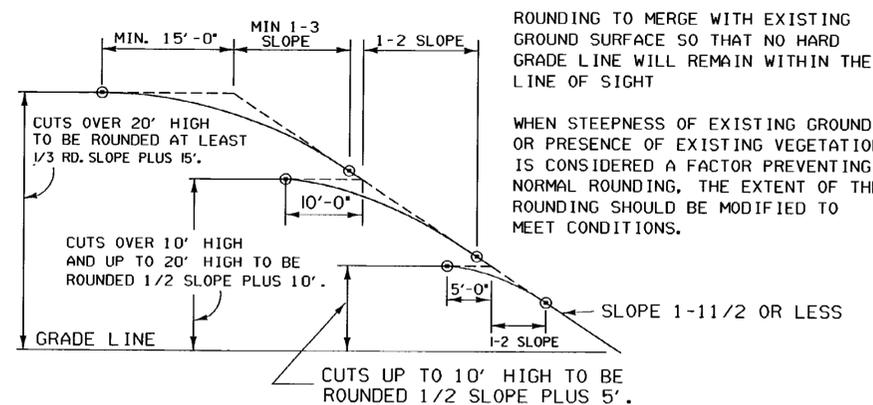
PROCEDURE TO BE FOLLOWED WHEN LEDGE SLOPE ON OLD GROUND IS BETWEEN A 1-1 AND A 1-5 SLOPE.

ALL HOLES TO BE APPROXIMATELY 5'-0" DEEP. HOLES TO BE IN ROWS, SPACED AND STAGGERED AS SHOWN IN DRILL PATTERN, OR AS DIRECTED BY THE ENGINEER, SEE SECTION 205

A METHOD FOR PREPARING LEDGE SLOPE BEFORE CONSTRUCTING AN EMBANKMENT



SLOPES TO BE ROUNDED AS SHOWN IN ORDER TO ALLOW FOR PERSPECTIVE FORESHORTENING AS SEEN FROM THE ROAD AND SO THAT FINISHED SLOPES WILL BETTER SUPPORT VEGETATIVE COVER.



TYPICAL SLOPE ROUNDDING

REVISIONS AND CORRECTIONS

DEC. 6, 1971 - ORIGINAL APPROVAL DATE
 JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.

APPROVED

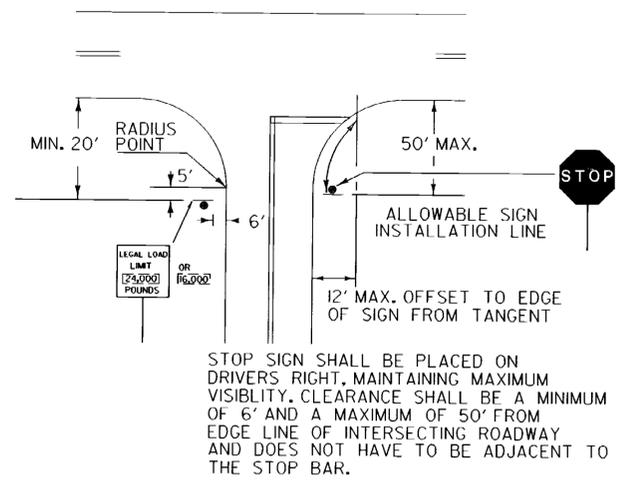
APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION. FHWA FINAL APPROVAL PENDING.

Stephen D. MacArthur, P.E.
 DIRECTOR OF ENGINEERING
Robert M. Murphy, P.E.
 DESIGN ENGINEER

EMBANKMENT ON EARTH SLOPE
 EMBANKMENT ON ROCK SLOPE
 MUCK EXCAVATION
 TYPICAL SLOPE ROUNDDING

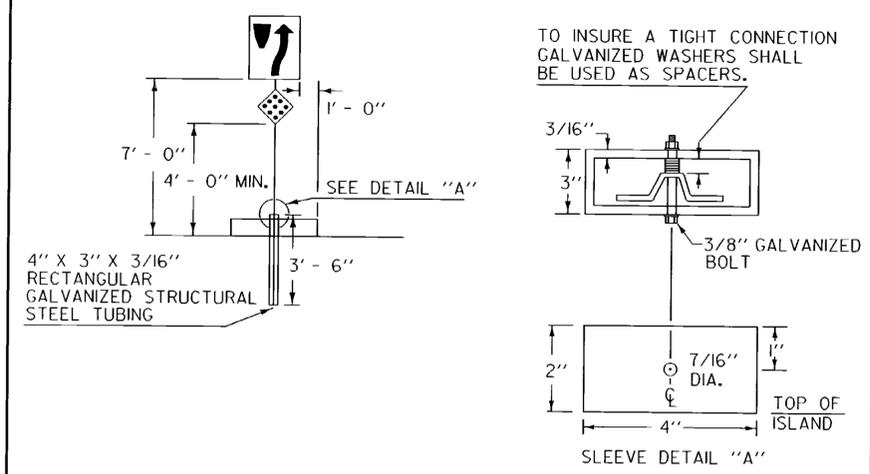


STANDARD
 B-5



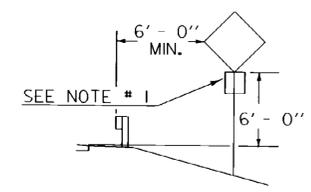
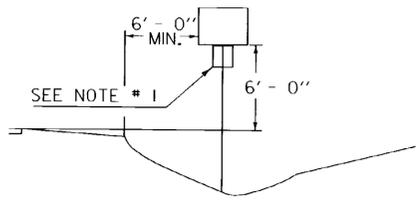
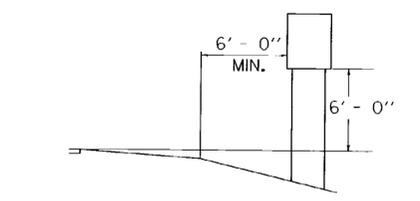
LEGAL LOAD LIMIT AND STOP SIGNS AT INTERSECTIONS WITH TOWN HIGHWAYS

STOP SIGN SHALL BE PLACED ON DRIVERS RIGHT, MAINTAINING MAXIMUM VISIBILITY. CLEARANCE SHALL BE A MINIMUM OF 6' AND A MAXIMUM OF 50' FROM EDGE LINE OF INTERSECTING ROADWAY AND DOES NOT HAVE TO BE ADJACENT TO THE STOP BAR.

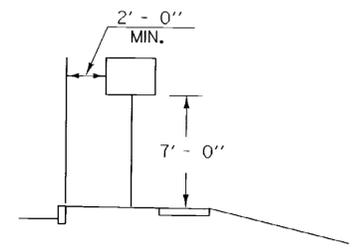
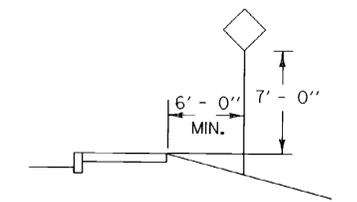


SIGNS ON MEDIAN ISLANDS IN THE LINE OF TRAFFIC

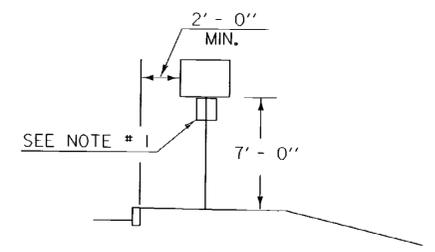
INCREASE VERTICAL CLEARANCE TO 7' IN AREAS OF FREQUENT ROADSIDE PARKING OR PEDESTRIAN ACTIVITY



RURAL



IF SUFFICIENT CLEARANCE IS NOT AVAILABLE BETWEEN CURB AND SIDEWALK MOUNT SIGN BEHIND SIDEWALK AS SHOWN AT TOP. CHECK FOR ADEQUATE R.O.W..



URBAN

NOTES:

1. IN BOTH RURAL AND URBAN LOCATIONS, IF A SECONDARY SIGN IS MOUNTED BELOW ANOTHER SIGN, THE MINIMUM CLEARANCE MAY BE REDUCED BY ONE FOOT.
2. IN RURAL AREAS WITH NO OR MINIMAL SHOULDER, THE LATERAL CLEARANCE TO THE EDGE OF A SIGN SHOULD BE A MINIMUM OF 12' FROM THE EDGE OF THE TRAVELED WAY.
3. ALSO SEE OTHER STANDARD SHEETS FOR MOUNTING CLEARANCE AND SPACING OF DESTINATION AND ROUTE MARKER ASSEMBLIES AND TOWN LINE SIGNS.

POST REFERENCE:
REFER TO THE DETAILS ON THE APPROPRIATE STANDARD DRAWING FOR INFORMATION CONCERNING THE PROPER MOUNTING OF SIGNS ON APPROPRIATE POSTS.

OTHER STDS. REQUIRED: E-160 E-161 E-162 E-163 E-164

REVISIONS AND CORRECTIONS
JAN. 23, 1995 - DATE OF ORIGINAL ISSUE
AUG. 08, 1995 - VARIOUS MINOR NOTE REVISIONS

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

**STANDARD SIGN PLACEMENT
CONVENTIONAL ROAD**



**STANDARD
E-121**

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

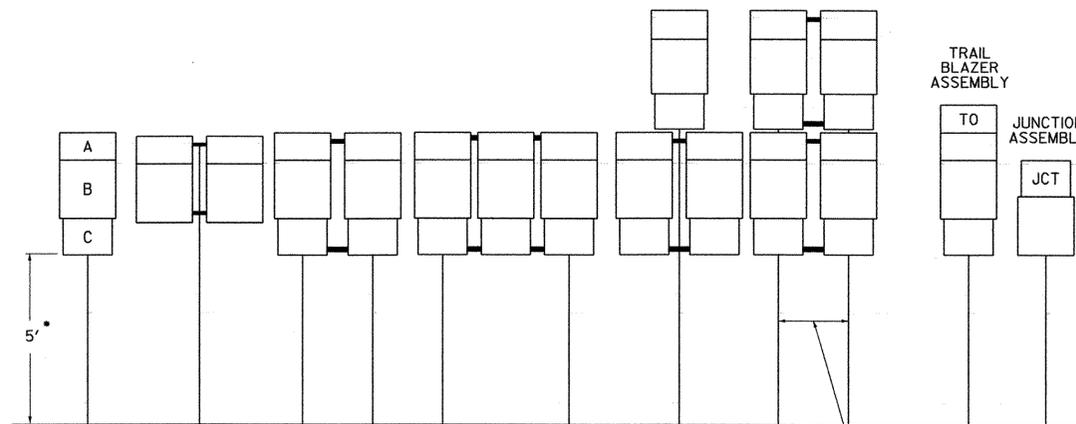
DESIGN
LETTERS, DIGITS, ARROWS, SYMBOLS, SPACING AND TEXT DIMENSIONS SHALL CONFORM WITH THE "STANDARD HIGHWAY SIGNS BOOK" AND DESIGNS PRESCRIBED IN THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) ADOPTED BY THE U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION (FHWA).

MATERIALS
THE SIGN BASE MATERIALS USED FOR THE STREET SIGNS MAY BE EITHER OF THE FOLLOWING: A - EXTRUDED ALUMINUM BLADES WITH RETROREFLECTIVE SHEETING B - FLAT ALUMINUM BLADES WITH RETROREFLECTIVE SHEETING THE MATERIAL FOR THE BLADES SHALL BE EITHER EXTRUDED ALUMINUM WITH A 0.25 INCH FLANGE THICKNESS AND A 0.090 INCH WEBB (MIN) OR FLAT SHEET ALUMINUM WITH A MINIMUM THICKNESS OF 0.125 INCH. THE PREFERRED MOUNTING METHOD FOR STREET SIGNS IS POST TOP MOUNTING BRACKETS, HARDWARE FOR MOUNTING SIGNS TO POST SHALL BE INCIDENTAL TO OTHER ITEMS. MOUNTING METHOD WILL BE AS SHOWN ON THE PLANS. MINIMUM VERTICAL CLEARANCE IS 8 FEET TO THE BOTTOM OF THE SIGN. FOR POST TOP MOUNTINGS SIGNS SHALL HAVE TEXT ON BOTH SIDES.

COLORS
THE STREET SIGNS SHOWN ON THIS SHEET SHALL HAVE WHITE RETROREFLECTIVE ASTM TYPE III TEXT, ON A GREEN RETROREFLECTIVE ASTM TYPE III BACKGROUND. THE COLORS SHALL CONFORM WITH THE COLORS ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS AND APPROVED BY THE FHWA.

SPECIFICATIONS
STREET SIGNS SHALL MEET THE VAOT STANDARD SPECIFICATIONS FOR CONSTRUCTION.
STANDARD SIGNS - USE A 9 INCH HIGH BLADE WITH SERIES "B" LETTERING (MIN) WITH 6 INCH LETTERS FOR THE STREET NAME. 4 INCH LETTERS FOR OTHER TEXT. PVT. SIGNS - USE A 6 INCH HIGH BLADE WITH SERIES B LETTERING (MIN) WITH 4 INCH LETTERS FOR THE STREET NAME, 3 INCH LETTERS FOR OTHER TEXT. OVERHEAD SIGNS USE A 12 INCH HIGH BLADE WITH 8 INCH UPPER CASE AND 6 INCH LOWER CASE LETTERS. FOR ALL 6, 9, 12 INCH BLADES USE LENGTHS OF 24, 30, 36 OR 42 INCH.

STREET NAME SIGNS NOTES



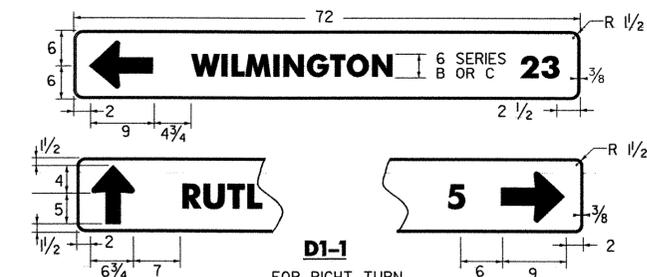
STANDARD MOUNTING OF ROUTE MARKER ASSEMBLIES

- A - CARDINAL DIRECTION MARKER
- B - ROUTE NUMBER
- C - ADVANCE TURN ARROW OR DIRECTIONAL ARROW

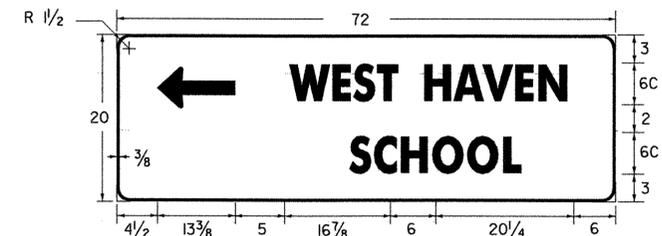
* WHERE PARKING OR PEDESTRIAN TRAFFIC WILL OCCUR IN THE IMMEDIATE VICINITY OF THESE SIGNS MINIMUM VERTICAL CLEARANCE SHALL BE INCREASED TO 7'

INSTALLATION SEQUENCE:

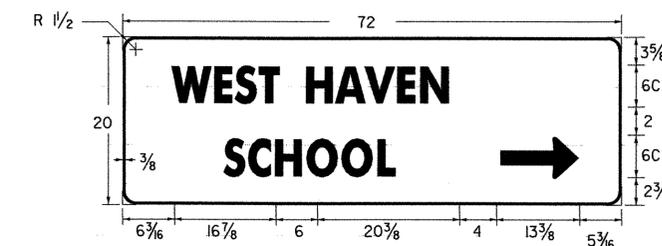
IN MULTIPLE HORIZONTAL MOUNTINGS PLACE A ROUTE MARKER ASSEMBLY INDICATING A LEFT TURN ON THE LEFT SIDE OF THE ASSEMBLY; RIGHT TURN ON THE RIGHT SIDE. FOR VERTICALLY STACKED MOUNTINGS PLACE THE STRAIGHT THROUGH MOVE INDICATION ON TOP, THE LEFT OR RIGHT TURNS AS APPROPRIATE BENEATH.



D1-1
FOR RIGHT TURN SIGN, BEGIN TEXT 2 1/2" FROM LEFT EDGE OF SIGN

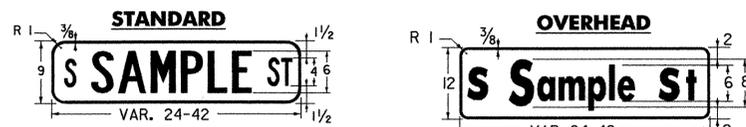


D1-2 (L)

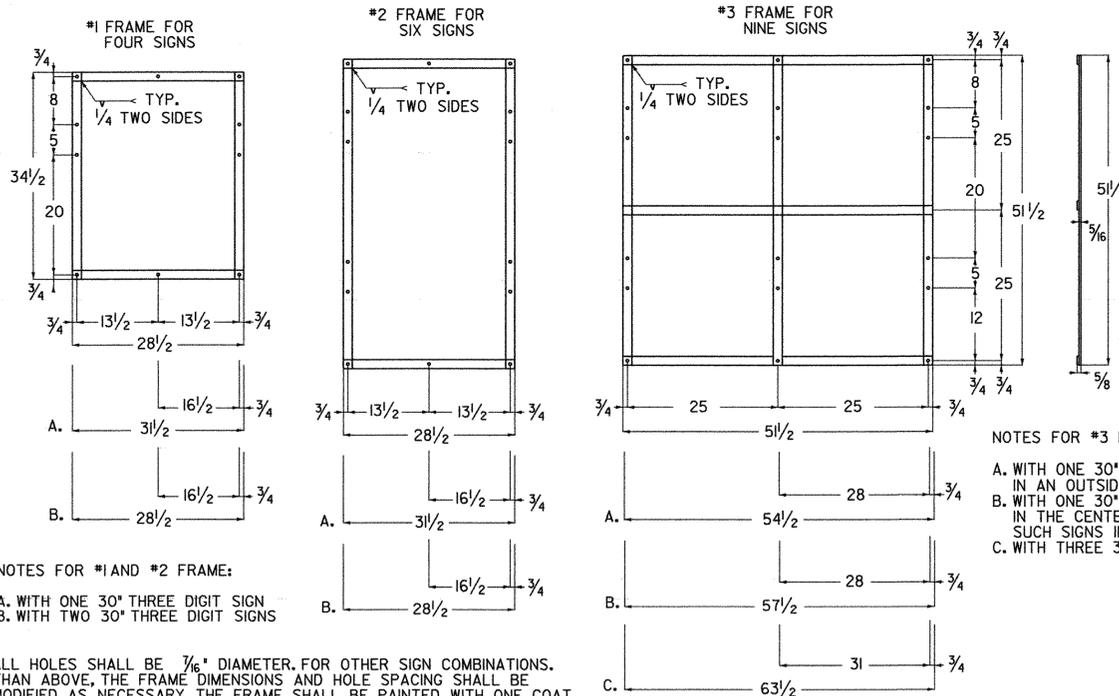


D1-2 (R)

STANDARD DESTINATION SIGNS

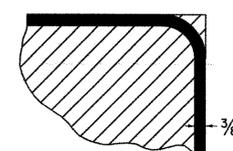


STREET NAME SIGNS

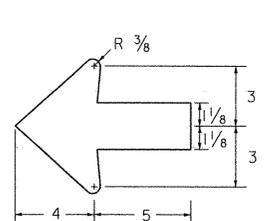


ROUTE MARKER ASSEMBLY FRAMES

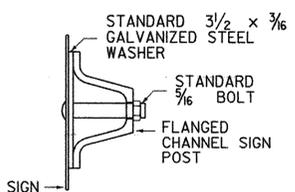
(ALL DIMENSIONS SHOWN IN INCHES EXCEPT WHERE NOTED)



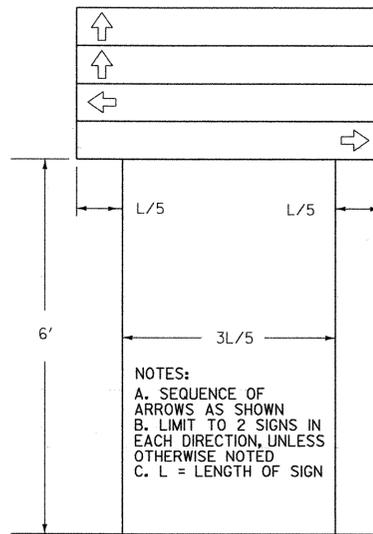
BORDER DETAIL



STANDARD ARROW



INSTALLATION DETAIL



DESTINATION ASSEMBLY

STANDARD DESTINATION SIGN NOTES

DESIGN
LETTERS, DIGITS, ARROWS, SYMBOLS, 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 FOR STANDARD DESTINATION SIGNS SHALL BE HIGH DENSITY OVERLAYERED PLYWOOD 3/8 INCH THICK OR FLAT SHEET ALUMINUM 1/8 INCH THICK.

COLORS
THE DESTINATION SIGNS SHOWN ON THIS SHEET SHALL HAVE WHITE RETROREFLECTIVE ASTM TYPE III TEXT, ARROWS AND BORDERS ON A GREEN RETROREFLECTIVE ASTM TYPE III BACKGROUND. THE COLORS SHALL CONFORM WITH THE COLORS ADOPTED BY AASHTO AND APPROVED BY THE FHWA.

APPLICATION
MULTIPLE ASSEMBLIES SHALL USE THE SAME SIZE THROUGHOUT.

SPECIFICATIONS
DESTINATION SIGNS SHALL MEET THE VAOT STANDARD SPECIFICATIONS FOR CONSTRUCTION "TRAFFIC SIGNS". ALL BORDERS ARE 3/8 INCH

OTHER STDS. E-160, E-164 REQUIRED:

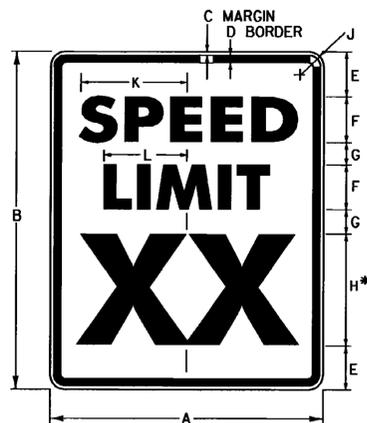
REVISIONS AND CORRECTIONS
APR. 01, 1988 - DATE OF ORIGINAL ISSUE
JAN. 23, 1989 - DELETED TOWN LINE INFO.
AUG. 08, 1995 - REVISED DESTINATION SIGN DETAILS
DETAILED SIGN LOCATION TYPICAL
MARCH 16, 2004 - REVISED ROUTE MARKER ASSEMBLY
FRAMES DETAIL CHANGED SIZE OF D-BOARDS

APPROVED
DIRECTOR OF PROGRAM DEVELOPMENT
TRAFFIC OPERATIONS ENGINEER
FEDERAL HIGHWAY ADMINISTRATION

**GUIDE SIGN PLACEMENT
MISCELLANEOUS DETAILS**



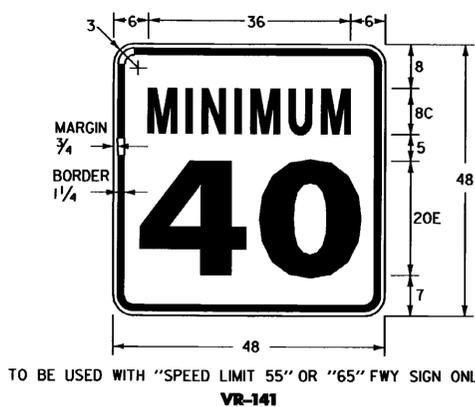
**STANDARD
E-123**



* OPTICALLY SPACE NUMERALS ABOUT VERTICAL CENTERLINE.

R2-1

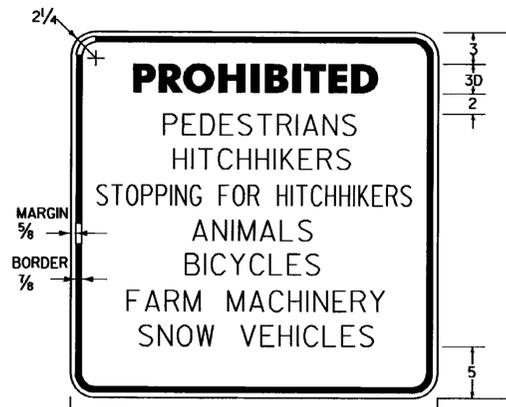
SIGN	DIMENSIONS (INCHES)										
	A	B	C	D	E	F	G	H	J	K	L
MIN	18	24	3/8	5/8	3	3E	2	8E	1/2	7 3/8	5 1/2
STD	24	30	3/8	5/8	4	4E	2	10E	1/2	9 3/8	7 3/8
EXPWY	36	48	5/8	7/8	6	6E	5	14E	2 1/4	14 3/8	11
FWY	48	60	3/4	1 1/4	8	8E	4	20E	3	19 1/8	14 3/8



TO BE USED WITH "SPEED LIMIT 55" OR "65" FWY SIGN ONLY
VR-141



TEXT 4" C; SPACING 2"
VR-002



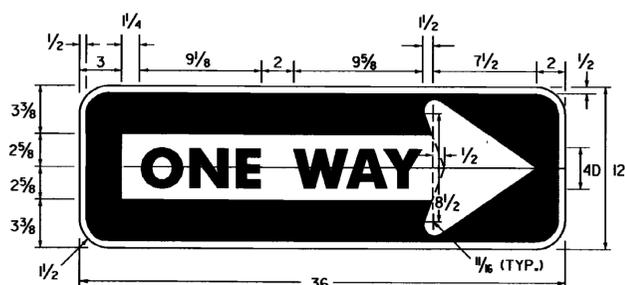
TEXT 2" C, SPACING 1/2", EXCEPT WHERE NOTED.
VR-046



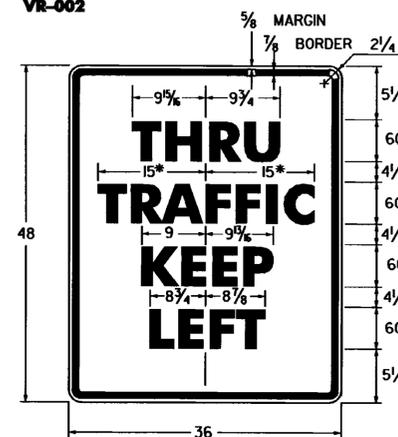
* OPTICALLY SPACE NUMERALS ABOUT VERTICAL CENTERLINE.

R2-4

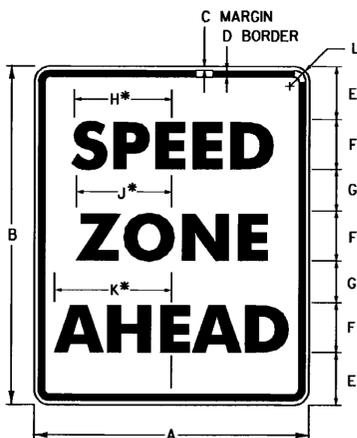
SIGN	DIMENSIONS (INCHES)										
	A	B	C	D	E	F	G	H	J	K	L
STD	24	30	3/8	5/8	4	4E	2	10E	1/2	9 3/8	6 3/8
EXPWY	36	48	5/8	7/8	6	6E	5	14E	2 1/4	13 3/8	10 3/8
FWY	48	60	3/4	1 1/4	8	8E	4	20E	3	18 3/8	13 3/8



R6-1R



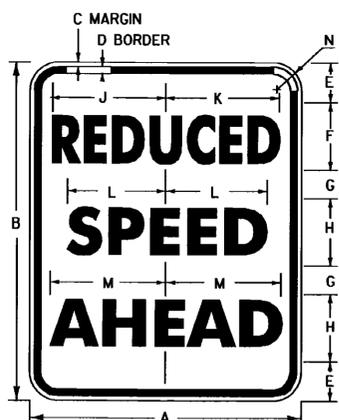
* REDUCE SPACING 25 %
VR-118L



* FOR STD SIZE, REDUCE SPACING 40 %

R2-5C

SIGN	DIMENSIONS (INCHES)										
	A	B	C	D	E	F	G	H	J	K	L
MIN.	18	24	3/8	5/8	3 1/2	4C	2 1/2	6 5/8	5 1/2	7	1 1/2
STD.	24	30	3/8	5/8	3 1/2	6C	2 1/2	9 3/8	7 3/8	9 3/4	1 1/2
EXPWY.	36	48	5/8	7/8	7	8C	5	13 3/8	11 1/8	14	2 1/4
FWY.	48	60	3/4	1 1/4	9	10C	6	17	13 3/8	17 1/2	3



R2-5A

SIGN	DIMENSIONS (INCHES)												
	A	B	C	D	E	F	G	H	J	K	L	M	N
MIN.	18	24	3/8	5/8	3 1/2	4B	2 1/2	4C	6 3/8	7	6 3/8	7	1 1/2
STD.	24	30	3/8	5/8	3 1/2	6B	2 1/2	6C	10	10 3/4	9 3/8	9 3/4	1 1/2
EXPWY.	36	48	5/8	7/8	7	8B	5	8C	14 1/4	14 3/4	13 3/8	14	2 1/4
FWY.	48	60	3/4	1 1/4	9	10B	6	10C	17 3/4	18 3/8	17	17 1/2	3



* FOR FWY SIZE, REDUCE SPACING 50 %
R8-7

SIGN	DIMENSIONS (INCHES)													
	A	B	C	D	E	F	G	H	J	K	L	M	N	P
EXPWY.	30	24	3/8	5/8	3 1/2	4C	2 1/2	4D	12 1/2	13	12 3/4	6 3/8	7	1 1/2
FWY.	48	36	5/8	7/8	5	6D	4	6D	20 1/8	21 1/8	19 1/8	10 3/8	10 3/8	2 1/4

GENERAL:

1. ALL DIMENSIONS IN INCHES.

COLORS:

THE REGULATORY SIGNS SHOWN ON THIS SHEET SHALL HAVE BLACK TEXT ON REFLECTORIZED WHITE BACKGROUND, UNLESS OTHERWISE NOTED. THE COLORS SHALL CONFORM WITH THE COLORS ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS AND APPROVED BY THE DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION.

MATERIALS:

THE SIGN BASE MATERIALS USED FOR REGULATORY SIGNS SHOWN ON THIS SHEET MAY BE ANY OF THE FOLLOWING OF THE MINIMUM THICKNESS NOTED.

Material	18' x 24'	24' x 30'	30' x 24'	36' x 12'	36' x 36'	36' x 48'	48' x 36'	48' x 48'	48' x 60'
FLAT SHEET ALUMINUM	0.060"	0.080"	0.100"						
HIGH DENSITY OVERLAID PLYWOOD	1/2"	1/2"	5/8"						
GALVANIZED FLAT SHEET STEEL	18 GAGE	16 GAGE	14 GAGE						

THE REFLECTIVE MATERIAL FOR GROUND MOUNTED SIGNS SHALL BE AASHTO TYPE II OR III WHITE REFLECTIVE SHEETING APPLIED TO THE ENTIRE BACKGROUND OF THE SIGN. THE TEXT OF THE SIGNS MAY BE LETTERING FILM, SILK SCREENED OR HAND PAINTED. HAND PAINTING MUST BE COMPARABLE IN QUALITY TO THE RESULTS OBTAINED BY SILK SCREENING.

SPECIFICATIONS:

REGULATORY SIGNS SHALL MEET THE VERMONT STANDARD SPECIFICATIONS FOR TRAFFIC SIGNS.

TEXT DESIGN:

LETTERS, DIGITS, ARROWS, SPACING AND TEXT DIMENSIONS SHALL CONFORM WITH THE "STANDARD ALPHABET FOR HIGHWAY SIGNS AND PAVEMENT MARKINGS" AND DESIGNS PRESCRIBED IN THE STANDARD HIGHWAY SIGNS AS SPECIFIED IN THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

OTHER STDS. : NONE REQUIRED

REVISIONS AND CORRECTIONS

OCT. 30, 1987 - DATE OF ORIGINAL ISSUE
SEPT. 20, 1995 - ADDED AND DELETED SIGN DETAILS, ADDED SIGN ID NUMBERS, MINOR NOTE REVISIONS.

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

APPROVED

Stephen D. MacArthur
DIRECTOR OF ENGINEERING

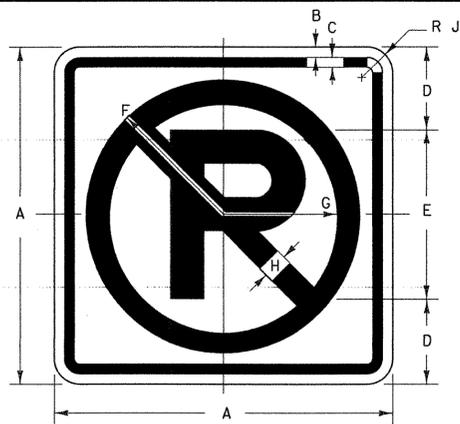
David A. Barr
TRAFFIC AND SAFETY ENGINEER

**REGULATORY SIGN
DETAILS**

/traf/std/stdel42.dgn :stdel42.1



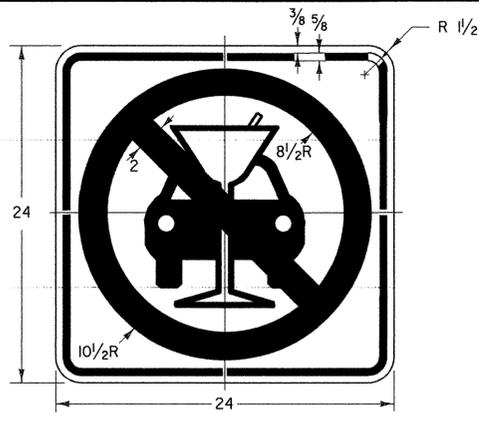
**STANDARD
E-142**



R8-3A

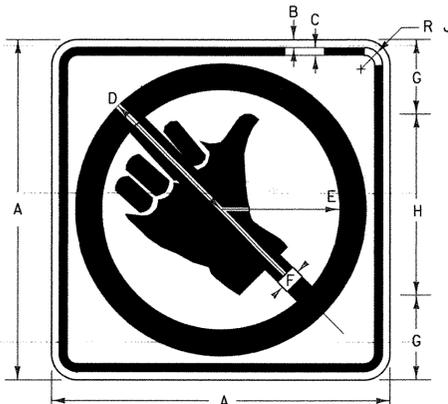
COLORS:
CIRCLE AND DIAGONAL - RED (RETROREFL)
SYMBOL AND BORDER - BLACK (NON - REFL)
BACKGROUND - WHITE (RETROREFL)

SIGN	DIMENSIONS (INCHES)									
	A	B	C	D	E	F	G	H	J	
URBAN MIN. AND STD.	12	3/8	3/8	3	6E(M)	4 7/8	3 3/8	1	1 1/2	
RURAL MIN. AND STD.	24	3/8	5/8	6	12E(M)	10 1/2	8 1/2	2	1 1/2	
EXPWY.	36	5/8	7/8	9	18E(M)	15 3/4	12 3/4	3	2 1/4	
FWY.	48	3/4	1 1/4	12	24E(M)	21	17	4	3	



VR-654

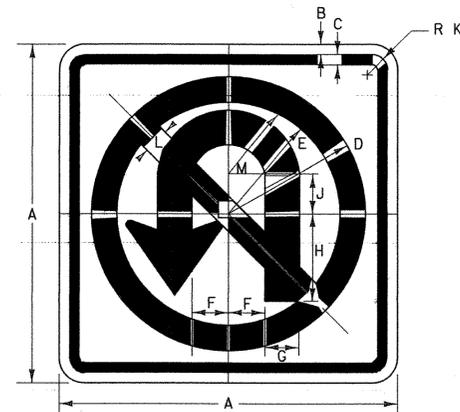
COLORS:
CIRCLE AND DIAGONAL - RED (RETROREFL)
SYMBOL AND BORDER - BLACK (NON - REFL)
BACKGROUND - WHITE (RETROREFL)



R9-4A

COLORS:
CIRCLE AND DIAGONAL - RED (RETROREFL)
SYMBOL AND BORDER - BLACK (NON - REFL)
BACKGROUND - WHITE (RETROREFL)

SIGN	DIMENSIONS (INCHES)									
	A	B	C	D	E	F	G	H	J	
MIN.	18	3/8	5/8	7 7/8	6 3/8	1 1/2	3 3/4	10 1/2	1 1/2	
STD.	24	3/8	5/8	10 1/2	8 1/2	2	5	14	1 1/2	

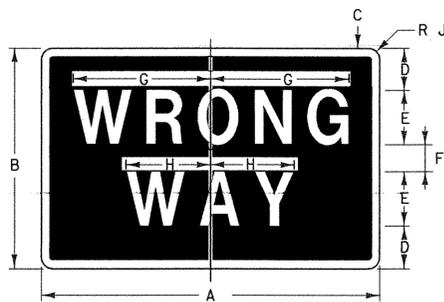
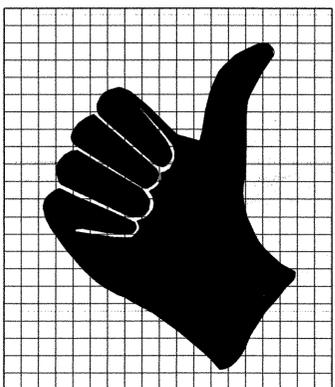
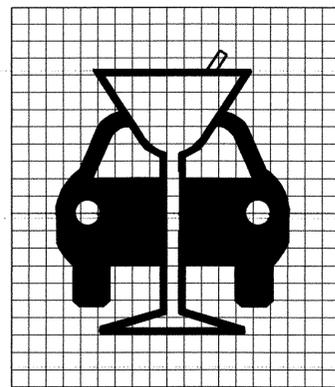


R3-4

SEE STANDARD E-151 FOR ARROW DETAIL

COLORS:
CIRCLE AND DIAGONAL - RED (RETROREFL)
ARROW AND BORDER - BLACK (NON - REFL)
BACKGROUND - WHITE (RETROREFL)

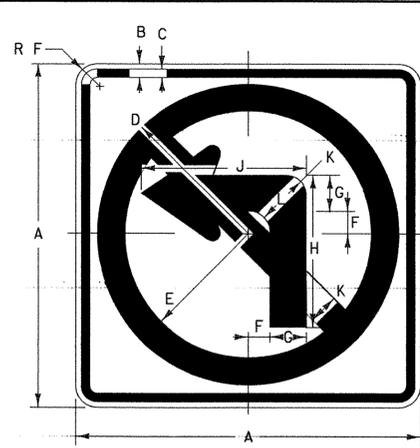
SIGN	DIMENSIONS (INCHES)												
	A	B	C	D	E	F	G	H	J	K	L	M	
MIN. AND STD.	24	3/8	5/8	10 1/2	8 1/2	2 1/2	2 1/2	6	2 1/4	1 1/2	2	5	
SPECIAL	30	1/2	3/4	13 1/8	10 5/8	3 3/8	3 3/8	7 1/2	2 1/8	1 7/8	2 1/2	6 1/4	
EXPWY.	36	5/8	7/8	15 3/4	12 3/4	3 3/4	3 3/4	9	3 3/8	2 1/4	3	7 1/2	
SPECIAL	48	3/4	1 1/4	21	17	5	5	12	4 1/2	3	4	10	



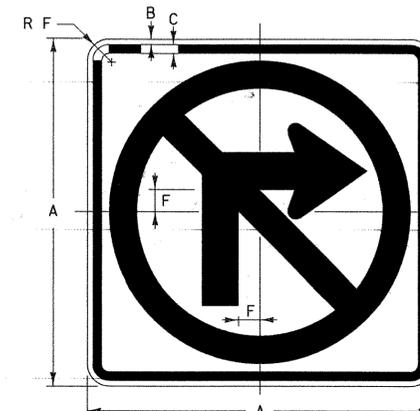
R5-1A

COLORS:
LEGEND - WHITE (RETROREFL)
BACKGROUND - RED (RETROREFL)

SIGN	DIMENSIONS (INCHES)									
	A	B	C	D	E	F	G	H	J	
STD.	36	24	3/4	4 1/2	6D	3	13 5/16	8 1/16	1 1/2	
SPECIAL	42	30	7/8	5	8D	4	17 3/4	10 3/4	1 7/8	



R3-2

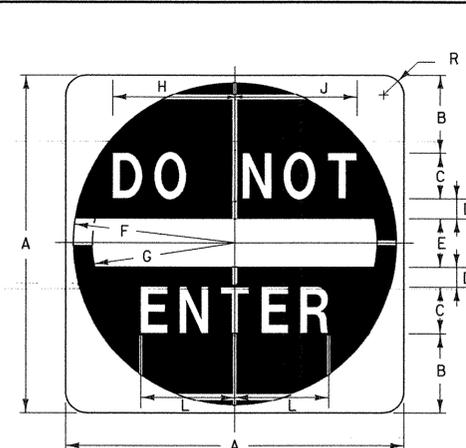


R3-1

NOTE
SEE STANDARD E-151 FOR ARROW DETAIL
USE SAME ARROW DETAIL FOR R3-1 AND R3-2

COLORS:
CIRCLE AND DIAGONAL - RED (RETROREFL)
ARROW AND BORDER - BLACK (NON - REFL)
BACKGROUND - WHITE (RETROREFL)

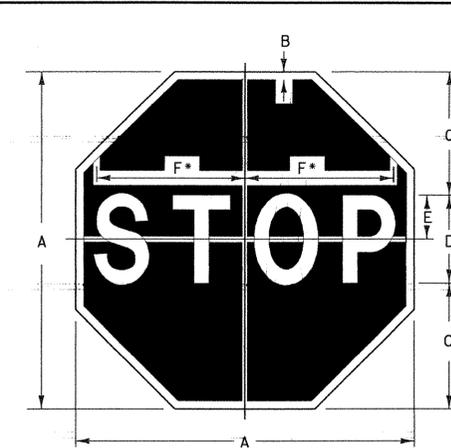
SIGN	DIMENSIONS (INCHES)												
	A	B	C	D	E	F	G	H	J	K	L		
MIN. AND STD.	24	3/8	5/8	10 1/2	8 1/2	1 1/2	2 1/2	10 1/2	11 1/2	2	1 1/2		
SPECIAL	30	1/2	3/4	13 1/8	10 5/8	1 7/8	3 1/8	13 1/8	14 1/2	2 1/2	5/8		
EXPWY.	36	5/8	7/8	15 3/4	12 3/4	2 1/4	3 3/4	15 3/4	17 1/4	3	3/4		
SPECIAL	48	3/4	1 1/4	21	17	3	5	21	23	4	1		



R5-1

COLORS:
SYMBOL - RED (RETROREFL)
LEGEND AND BACKGROUND - WHITE (RETROREFL)

SIGN	DIMENSIONS (INCHES)											
	A	B	C	D	E	F	G	H	J	K	L	
MIN. AND STD.	30	6 1/2	4D	2	5	14 1/2	12 1/2	9 3/4	10	1 7/8	7 7/8	
EXPWY.	36	7 1/2	5D	2 1/2	6	17 1/2	15	12	12 3/8	2 1/4	9 1/16	
SPECIAL	48	11	6D	3	8	23 1/2	20	14 1/2	15	3	11 3/4	



R1-1

* REDUCE SPACING 40 %

COLORS:
LEGEND - WHITE (RETROREFL)
BACKGROUND - RED (RETROREFL)

SIGN	DIMENSIONS (INCHES)					
	A	B	C	D	E	F
PATH	18	3/8	6	6C	3	7 3/4
MIN.	24	5/8	8	8C	4	10
STD.	30	3/4	10	10C	5	12 1/2
EXPWY.	36	7/8	12	12C	6	15
SPECIAL	48	1 1/4	16	16C	8	20

NOTES

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). SEE STANDARD E-144 FOR ARROWHEAD DETAILS.

MATERIALS

THE SIGN BASE MATERIALS USED FOR REGULATORY SIGNS SHOWN ON THIS SHEET MAY BE ANY OF THE FOLLOWING OF THE MINIMUM THICKNESS NOTED.

12" X 12"	24" X 24"	36" X 24"
18" X 18"	30" X 18"	36" X 36"
	30" X 30"	42" X 30"
		48" X 48"
	0.060"	0.080"
		0.100"
		0.125"

REFLECTORIZATION

THE BACKGROUND RETROREFLECTIVE MATERIAL SHALL BE ASTM TYPE III OR TYPE VIII RETROREFLECTIVE SHEETING APPLIED TO THE ENTIRE BACKGROUND OF THE SIGN. THE BLACK PORTIONS OF SIGNS MAY BE LETTERING FILM OR SILK SCREENED.

COLORS

THE REGULATORY SIGNS SHOWN ON THIS SHEET SHALL BE AS DETAILED FOR EACH SIGN. THE COLORS SHALL CONFORM WITH THE COLORS ADOPTED BY AASHTO AND APPROVED BY THE FHWA.

SPECIFICATIONS

REGULATORY SIGNS SHALL MEET THE VERMONT STANDARD SPECIFICATIONS FOR CONSTRUCTION "TRAFFIC SIGNS".

OTHER STDS. E-144, E-151 REQUIRED:

REVISIONS AND CORRECTIONS

- OCT. 30, 1987 - DATE OF ORIGINAL ISSUE
- SEPT. 20, 1995 - ADDED AND DELETED SIGN DETAILS, ADDED SIGN ID NUMBERS, MINOR NOTE REVISIONS.
- JUNE 15, 2004 - CHANGED REFLECTIVE SHEETING TO TYPE III OR TYPE VIII

APPROVED

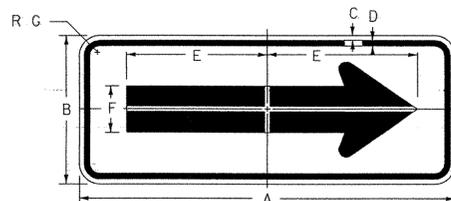
[Signature]
DIRECTOR OF PROGRAM DEVELOPMENT
[Signature]
TRAFFIC OPERATIONS ENGINEER
[Signature]
FEDERAL HIGHWAY ADMINISTRATION

**REGULATORY SIGN
DETAILS**

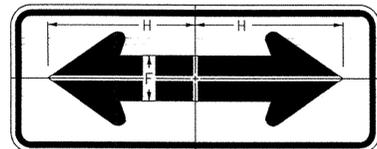


**STANDARD
E-143**

(ALL DIMENSIONS SHOWN IN INCHES EXCEPT WHERE NOTED)

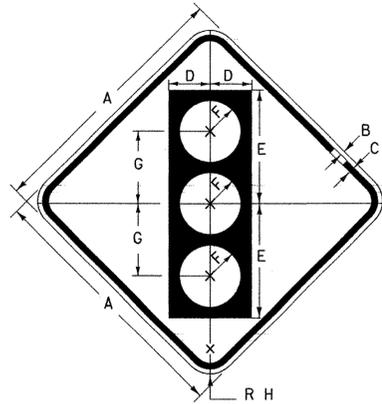


W1-6



W1-7

SIGN	DIMENSIONS (INCHES)							
	A	B	C	D	E	F	G	H
PATH	24	12	3/8	5/8	9/8	3 1/4	1 1/2	10 3/8
MIN.	36	18	3/8	5/8	1 1/8	5	1 1/2	15 5/8
STD.	48	24	1/2	3/4	1 1/2	6 1/2	1 7/8	20 1/2
SPECIAL	60	30	5/8	7/8	2 1/8	8	2 1/4	25 3/8

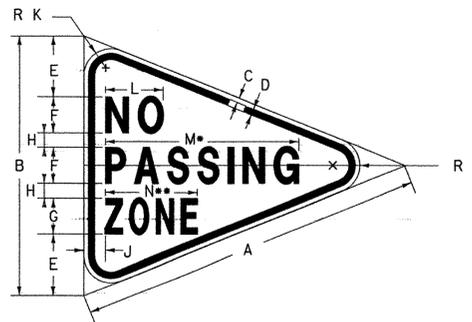


W3-3

COLORS:

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

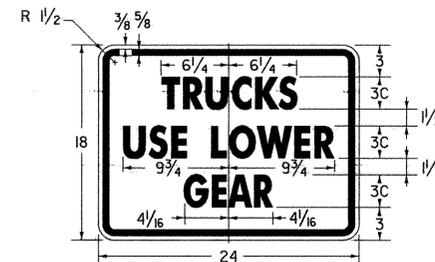
SIGN	DIMENSIONS (INCHES)							
	A	B	C	D	E	F	G	H
PATH	18	3/8	5/8	3	8	2 1/4	5	1 1/2
MIN.	30	1/2	3/4	5	13 3/4	3 3/4	8 3/4	1 7/8
STD.	36	5/8	7/8	5 3/4	15 3/4	4 1/4	10	2 1/4
SPECIAL	48	3/4	1 1/4	7 1/2	20	5	12 1/2	3



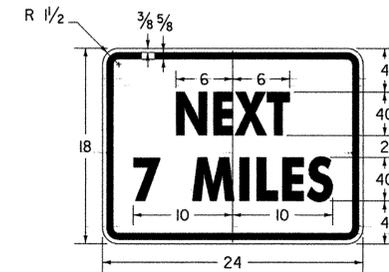
W14-3

- FOR STD. SIZE REDUCE SPACING 20%
- FOR STD. SIZE REDUCE SPACING 35%

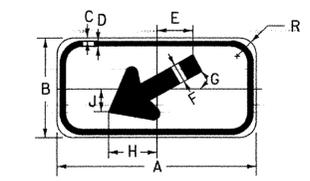
SIGN	DIMENSIONS (INCHES)													
	A	B	C	D	E	F	G	H	J	K	L	M	N	
MIN.	40	30	1/2	3/4	7 1/4	4D	4C	1 3/4	2 1/2	1 7/8	6 1/2	22 3/16	11 1/16	
STD.	48	36	5/8	7/8	8 1/2	5D	5C	2	3	2 1/4	8	26 3/16	12 3/4	
SPECIAL	64	48	3/4	1 1/4	12	6D	6C	3	4	3	10 3/4	33 1/16	16 3/16	



W7-2b



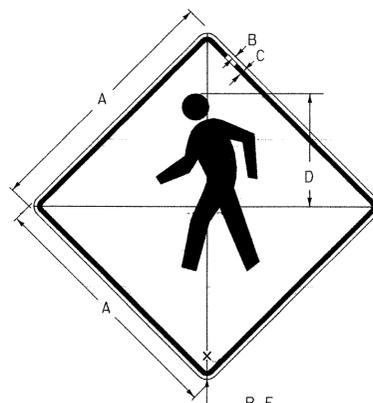
W7-3a



W16-7p

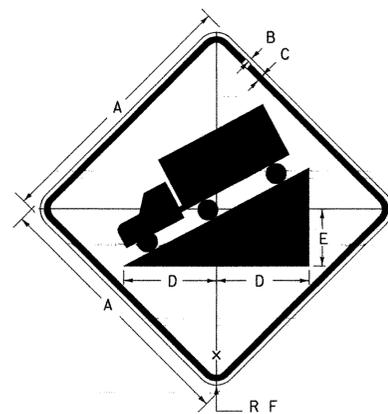
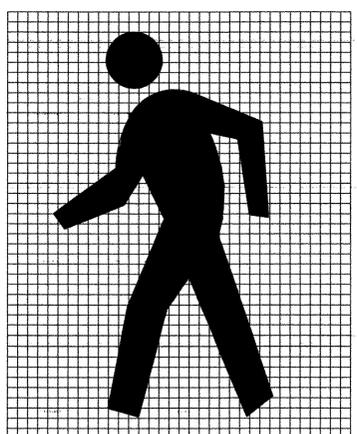
SIGN	DIMENSIONS (INCHES)										
	A	B	C	D	E	F	G	H	J	K	
MIN. OR STD.	24	12	3/8	5/8	4/4	3	30°	5 3/4	3 3/8	2	
EXPWY. OR SPECIAL	30	18	1/2	3/4	6 2/5	4 1/2	30°	8 3/5	4 1/5	2	

• MAY BE FLUORESCENT YELLOW GREEN WHEN USED WITH SI-1 SCHOOL SIGN



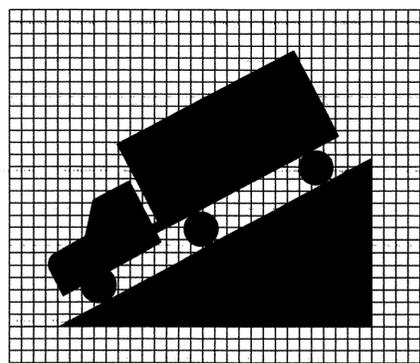
W11-2

SIGN	DIMENSIONS (INCHES)				
	A	B	C	D	E
PATH	18	3/8	5/8	8 3/8	1 1/2
MIN.	24	3/8	5/8	11	1 1/2
STD.	30	1/2	3/4	13 1/2	1 7/8
EXPWY.	36	5/8	7/8	16	2 1/4
SPECIAL	48	3/4	1 1/4	22	3



W7-1

SIGN	DIMENSIONS (INCHES)					
	A	B	C	D	E	F
MIN.	24	3/8	5/8	8 3/4	6	1 1/2
STD.	30	1/2	3/4	11	7 1/2	1 7/8
EXPWY.	36	5/8	7/8	13 1/4	9	2 1/4
FWY.	48	3/4	1 1/4	17 1/2	12	3



(ALL DIMENSIONS SHOWN IN INCHES EXCEPT WHERE NOTED)

NOTES

DESIGN

LETTERS, DIGITS, ARROWS, SYMBOLS, SPACINGS, 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). SEE STANDARD SHEET E-151 FOR ARROWHEAD DETAILS.

MATERIALS

THE SIGN BASE MATERIALS USED FOR THE WARNING SIGNS SHOWN ON THIS SHEET MAY BE ANY OF THE FOLLOWING, OF THE MINIMUM THICKNESS NOTED.

	48" x 24"			
	24" x 12"	36" x 18"	48" x 36"	
	24" x 24"	40" x 30"	48" x 48"	
18" x 18"	30" x 30"	36" x 36"	60" x 30"	64" x 48"
FLAT SHEET ALUMINUM	0.060"	0.080"	0.100"	0.125"

REFLECTORIZATION

THE BACKGROUND RETROREFLECTIVE MATERIAL SHALL BE ASTM TYPE III, TYPE VIII OR TYPE IX RETROREFLECTIVE SHEETING APPLIED TO THE ENTIRE SIGN. THE TEXT, BORDER AND SYMBOLS SHALL BE LETTERING FILM OR SILK SCREENED.

COLORS

ALL THE WARNING SIGNS SHOWN ON THIS SHEET SHALL HAVE BLACK TEXT AND SYMBOLS ON RETROREFLECTORIZED YELLOW BACKGROUND. FLUORESCENT YELLOW GREEN BACKGROUND MAY BE USED AS AN OPTION FOR PEDESTRIAN SIGNS AS APPROVED BY THE MUTCD. THE COLORS SHALL CONFORM WITH THE COLORS ADOPTED BY AASHTO AND APPROVED BY THE FHWA.

SPECIFICATIONS

WARNING SIGNS SHALL MEET THE VERMONT STANDARD SPECIFICATIONS FOR CONSTRUCTION "TRAFFIC SIGNS".

OTHER STDS. E-151 REQUIRED:

REVISIONS AND CORRECTIONS

- OCT. 30, 1987 - DATE OF ORIGINAL ISSUE
- JANUARY 1991 - 4 X 2 ARROW ENCAPSULATED LENS & 40 X 30 ADDED
- OCT. 21, 1992 - PENNANT SIZE ADDED
- AUG. 08, 1995 - DELETED & ADDED SIGN DETAILS AND ADDED I.D. NUMBER TO EACH DETAIL
- MAY 01, 2004 - ADDED OPTIONAL COLOR FOR PEDESTRIAN SIGNS, CHANGED REFLECTIVE SHEETING TO TYPE III OR TYPE IX, AND ADDED W16-7 ADDED PATH DIMENSIONS

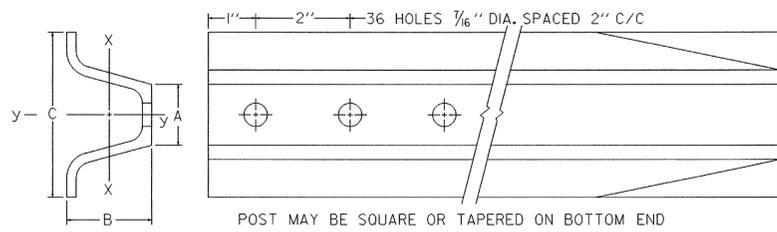
APPROVED

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

WARNING SIGN
 DETAILS

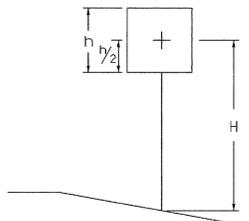


STANDARD
 E-152



POST SIZE (LB./FT.)	DIMENSIONS			SECTION MODULUS, X-X
	A	B	C	
2	1 3/32"	1 3/64"	3 1/16"	0.225 IN. ³
3	1 1/16"	1 7/8"	3 1/2"	0.403 IN. ³

SIMILAR DIMENSIONS ARE ACCEPTABLE, HOWEVER SECTION MODULUS VALUES SHALL NOT BE EXCEEDED.

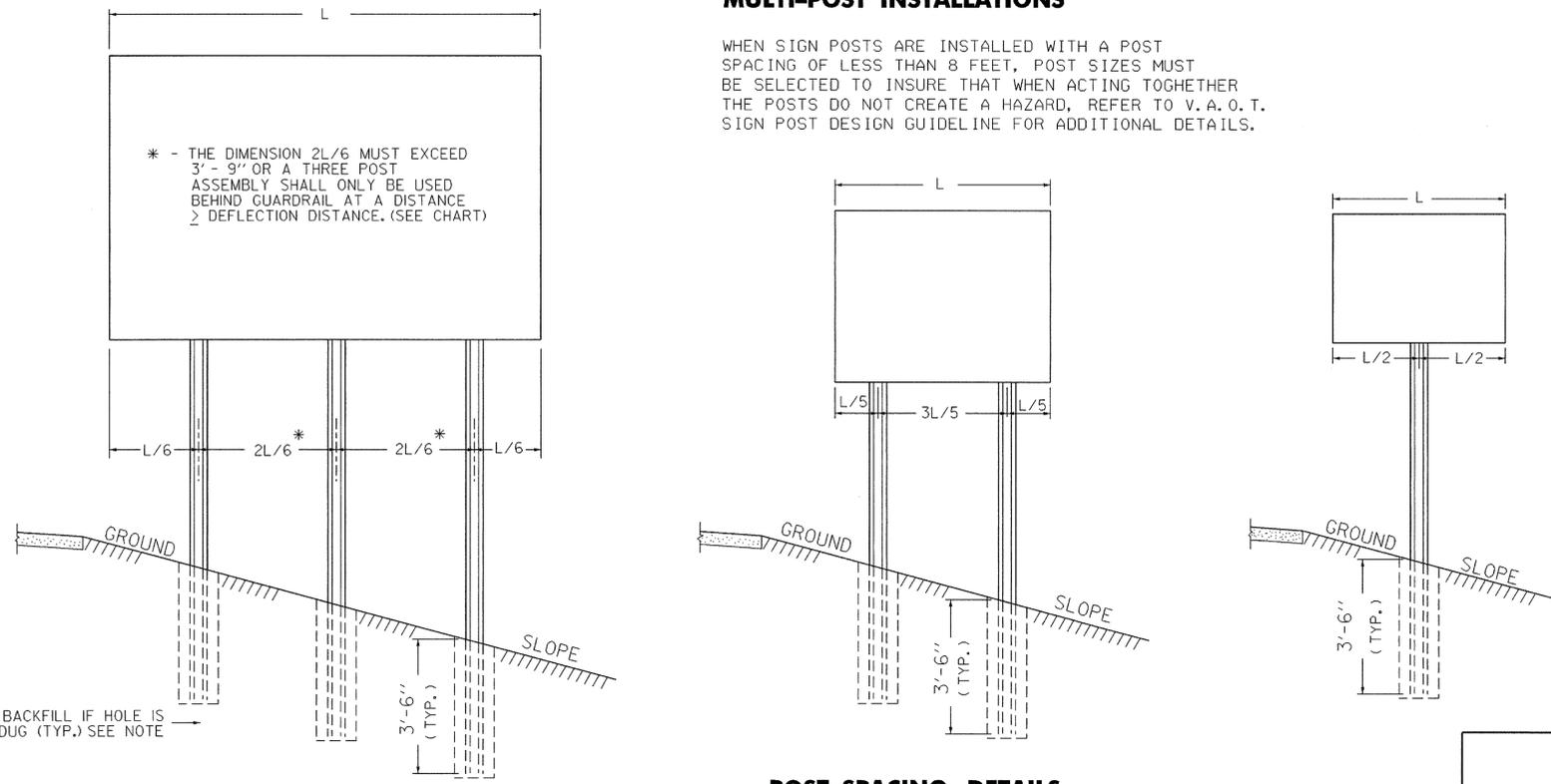


POST SELECTION CHART		
SIGN AREA (FT ²) x H (FT) ≤ SV (SELECTION VALUE)		
POST SIZE	Sv	DESIGN CRITERIA
2 LB./FT. (ONE POST INSTALLATION)	32	WIND SPEED = 60 MPH (10-YEAR MEAN RECURRENCE INTERVAL)
2 LB./FT. (TWO POST INSTALLATION)	56	WIND PRESSURE = 14 PSF
3 LB./FT.	101	STEEL MIN YIELD F _y = 50,000 PSI ALLOWABLE STRESS = (1.4) 0.60 F _y

SINGULAR 2 LB./FT. POSTS SHALL ONLY TO BE USED IN URBAN AREAS.

MULTI-POST INSTALLATIONS

WHEN SIGN POSTS ARE INSTALLED WITH A POST SPACING OF LESS THAN 8 FEET, POST SIZES MUST BE SELECTED TO INSURE THAT WHEN ACTING TOGETHER THE POSTS DO NOT CREATE A HAZARD. REFER TO V.A.O.T. SIGN POST DESIGN GUIDELINE FOR ADDITIONAL DETAILS.



GENERAL NOTES

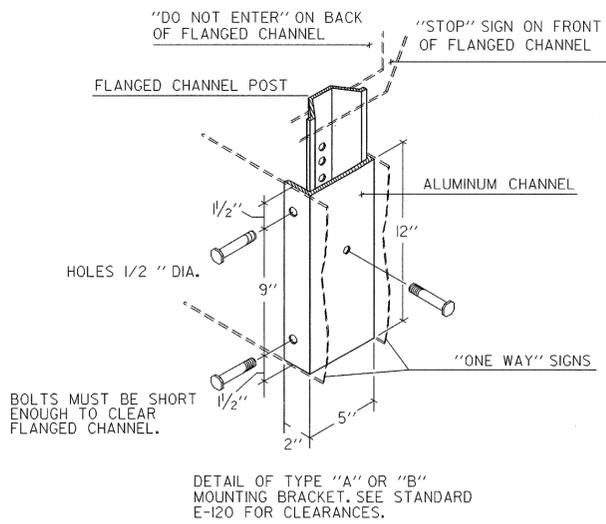
CONSTRUCTION METHODS - POSTS MAY BE DRIVEN OR SET IN A DUG HOLE AND BACKFILLED. IF DRIVEN, A DRIVING CAP SHALL BE USED. THE DUG HOLE INSTALLATION SHALL BE USED IN AREAS OF POOR SOIL CONDITIONS OR AS DIRECTED BY THE RESIDENT ENGINEER. BACKFILL SHALL BE COMPACTED AS DIRECTED BY THE RESIDENT ENGINEER.

IN AREAS WHERE LEDGE ROCK IS ENCOUNTERED, POSTS WILL BE SET IN A HOLE WITH 2" CLEARANCE AND GROUTED WITH TYPE 4 MORTAR 24" BELOW THE SURFACE OF THE SOLID ROCK, UNLESS THE POSTS PENETRATE THE GROUND A MINIMUM OF 3'-6". THE PORTION OF THE POST IN CONTACT WITH THE MORTAR SHALL BE COATED WITH AN APPROVED COATING.

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

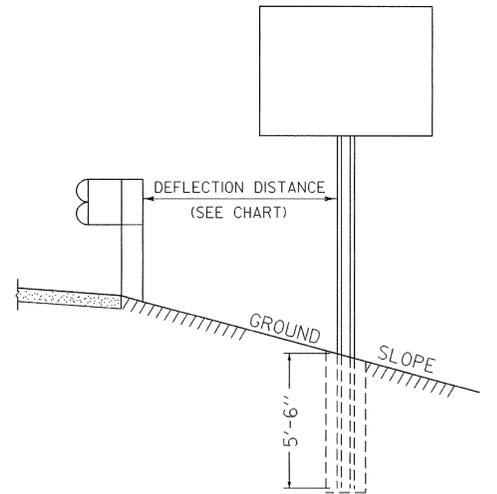
SINGLE POST INSTALLATIONS SHALL BE LIMITED TO A SIGN AREA OF 12-1/2 SQ. FT. OR LESS.

POST SPACING DETAILS



GUARDRAIL DEFLECTION CHART (PER AASHTO - ROADSIDE DESIGN GUIDE - 1988)		
TYPE	GR POST SPACING	DEFLECTION
THREE CABLE W/STEEL POSTS	16' - 0"	12'
W/WOODEN POSTS	12' - 6"	12'
W-BEAM W/WEAK POST	12' - 6"	7'
W/STRONG POST	6' - 3"	3'
BOX BEAM	6' - 0"	5'
THRIE BEAM W/WEAK POST	12' - 6"	4'
W/STRONG POST	6' - 3"	2'

THIS CHART LISTS THE THEORETICAL DEFLECTION DISTANCE UPON IMPACT OF VARIOUS GUARDRAIL WITH DIFFERENT TYPES AND SPACING OF POSTS.



OTHER STDS. REQUIRED:

REVISIONS AND CORRECTIONS

- SEP. 10, 1987 - DATE OF ORIGINAL ISSUE
- MAR. 01, 1988 - FHWA REVIEW COMMENTS
- OCT. 21, 1992 - ADDED DETAILS, REVISED NOTES & REVISED TITLE BLOCK
- AUG. 18, 1995 - DELETION OF 2.5 #/FT. POST AND TWO-RAIL ALUMINUM. ADDED ADDITIONAL NOTE.
- MAR. 11, 1996 - REVISED POST SELECTION CHART
- MAY 20, 1999 - ORIGINAL LOST NEEDED NEW SIGNATURE

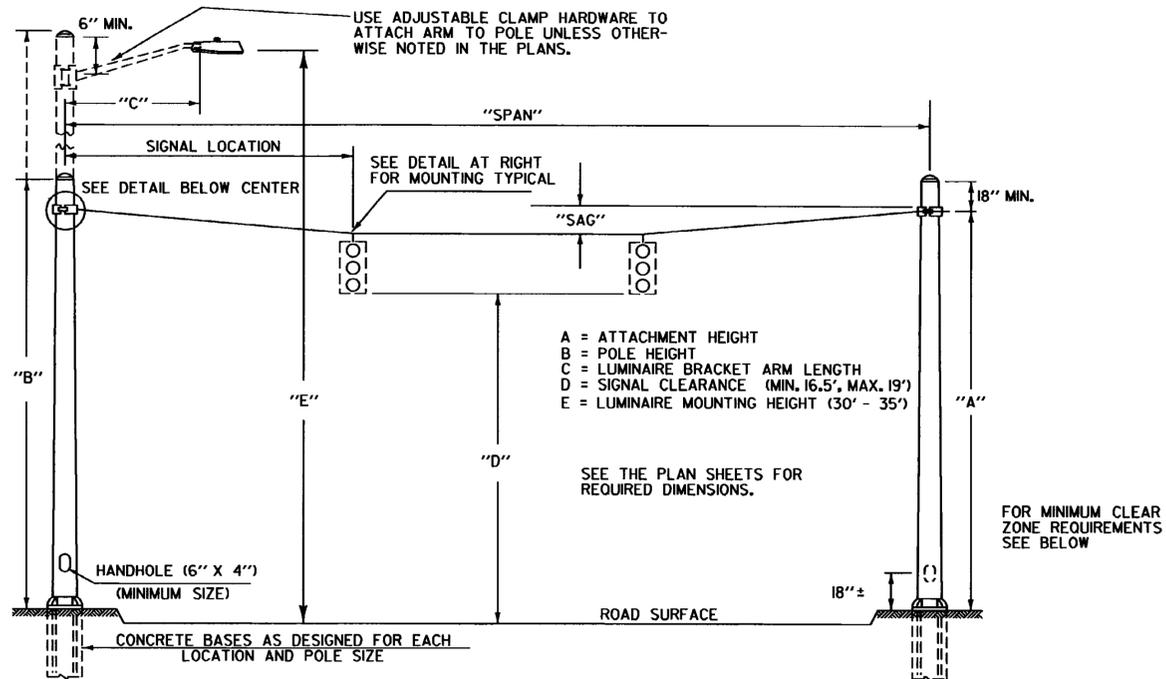
APPROVED

[Signature]
DIRECTOR OF PROJECT DEVELOPMENT

FLANGED CHANNEL STEEL SIGN POST

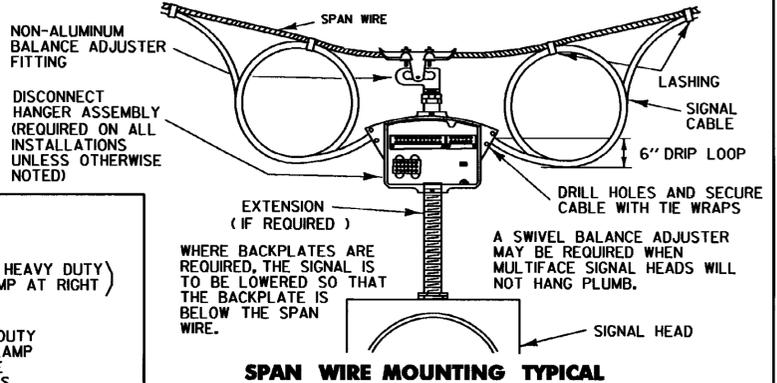


STANDARD E-160

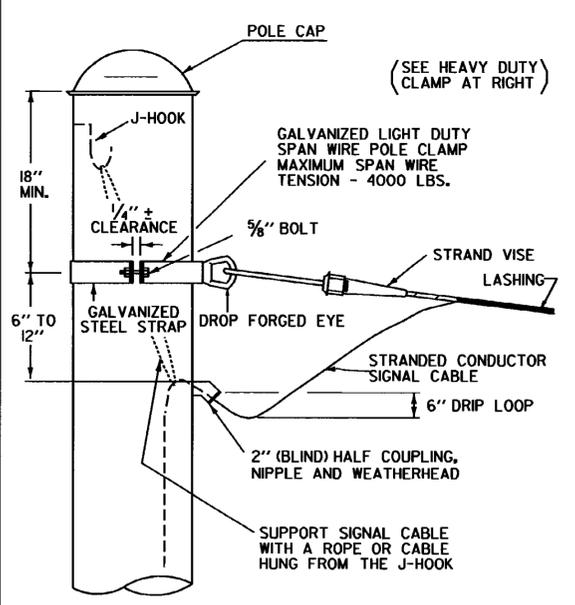


SPAN WIRE MOUNTED TRAFFIC SIGNALS WITH LUMINAIRES

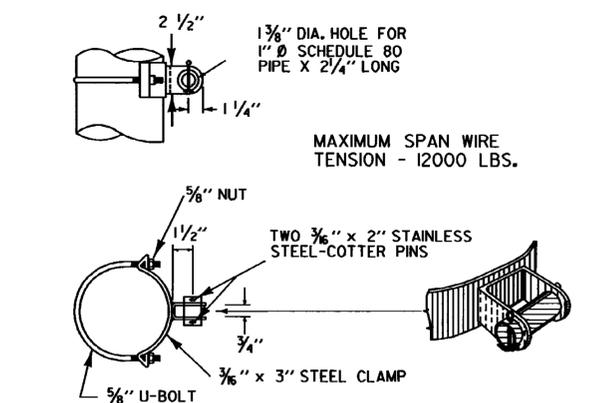
- NOTES**
- 1) ALL TRAFFIC SIGNAL EQUIPMENT SHALL MEET OR EXCEED ALL REQUIREMENTS OF THE LATEST REVISION OF THE NATIONAL ELECTRICAL MANUFACTURERS ASSOC. (NEMA) AND THE INTERNATIONAL MUNICIPAL SIGNAL ASSOC. (IMSA) STANDARDS FOR TRAFFIC CONTROL SYSTEMS.
 - 2) ALL ELECTRICAL WIRE AND CABLE SHALL BE COPPER. ELECTRICAL SIGNAL CABLE FROM TRAFFIC SIGNAL CONTROLLER TO SIGNAL HEADS SHALL BE COMPOSED OF AWG # 12 (MIN) STRANDED CONDUCTORS, AND SHALL MEET IMSA WIRE AND CABLE SPECIFICATIONS.
 - 3) ALL SIGNAL HEAD CABLES SHALL BE CONTINUOUS FROM THE CONTROLLER TO THE NEAREST SIGNAL HEAD TO WHICH THEY APPLY. THE CABLE SHALL ALSO BE CONTINUOUS FROM THE FIRST SIGNAL HEAD TO ANY ADDITIONAL HEADS WITH TERMINATION IN THE DISCONNECT HANGER.
 - 4) THE PEDESTRIAN SIGNAL HEADS SHALL HAVE AUDIO SIGNALS TO INDICATE ALLOWABLE PEDESTRIAN MOVEMENT FOR THE VISUALLY IMPAIRED DURING THE PEDESTRIAN PHASE. THEY SHALL BE OF THE TYPE NORMALLY USED FOR SUCH AN INSTALLATION AND BE WIRED IN SUCH A WAY AS TO BE EASILY DEACTIVATED. AFTER THE AUDIO SIGNAL HAS BEEN INSTALLED AND FIELD TESTED IT SHALL BE DEACTIVATED, UNLESS AN EXCLUSIVE PEDESTRIAN PHASE IS OPERATING AT THE INTERSECTION. PEDESTRIAN PUSH BUTTONS SHALL BE INSTALLED AT EACH END OF EACH CROSSWALK WHERE ACTUATED PEDESTRIAN SIGNALS ARE INSTALLED OR AS SHOWN ON THE PLANS.
 - 5) THE PEDESTRIAN HEADS SHALL HAVE TEXT "WALK", "DONT WALK", UNLESS OTHERWISE NOTED. THEY SHALL MEET THE LATEST REQUIREMENTS OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
 - 6) WHEN STREET LIGHTS ARE INSTALLED ON A TRAFFIC SIGNAL STRAIN POLE, AND THE STREET LIGHTING ITEM IS NOT PART OF THE CONTRACT, THE LUMINAIRES AND BRACKET ARMS ARE INCLUDED UNDER THE TRAFFIC CONTROL SIGNAL ITEM. THEY SHALL MEET ALL OF THE REQUIREMENTS OF SECTION 679 OF THE CURRENT VERMONT STANDARD SPECIFICATIONS FOR CONSTRUCTION.



SPAN WIRE MOUNTING TYPICAL



CABLE INSTALLATION TYPICAL WITH SPAN WIRE POLE CLAMP (LIGHT DUTY GALVANIZED)



SPAN WIRE CLAMP (HEAVY DUTY GALVANIZED)

- 7) SIGNAL TIMING IS APPROXIMATE AND IS NOT TO BE CONSIDERED FINAL. ALL NECESSARY HARDWARE TO CHANGE THE TIMING SHALL BE ON HAND WHEN THE SIGNALS ARE ACTIVATED. THE RESIDENT ENGINEER SHALL PERFORM CHECKS DURING THE AM AND PM PEAK PERIODS TO INSURE OPTIMUM SETTINGS. IF REQUIRED, APPROPRIATE TIMING CHANGES SHALL BE MADE TO "FINE-TUNE" THE CONTROLLER TO ITS BEST EFFICIENCY PRIOR TO COMPLETION OF THE PROJECT. TIMING CHANGES WILL BE APPROVED BY A REPRESENTATIVE OF THE V.A.O.T. TRAFFIC AND SAFETY DIVISION. TIMING ADJUSTMENTS SHALL BE SUBSIDIARY TO THE TRAFFIC CONTROL SIGNAL ITEM. MINOR TIMING CHANGES MADE TO "FINE-TUNE" THE CONTROLLER WILL NOT AFFECT THE RUNNING OF THE 30 DAY TEST PERIOD.
- 8) THE TRAFFIC SIGNAL STRAIN POLES SHALL BE BACK RAKED BEFORE THE WIRES AND SIGNALS ARE INSTALLED SO THAT THE POLES WILL BE PLUMB WHEN DEAD LOAD DEFLECTION DUE TO SPAN WIRE AND SIGNAL HEADS OCCURS. THE AMOUNT OF BACK RAKE SHALL BE AS SHOWN ON THE PLANS.
- 9) THE SIGNAL SYSTEM SHALL NOT OPERATE WITHOUT THE APPROPRIATE PAVEMENT MARKINGS AND RELATED SIGNING IN PLACE.
- 10) THE SIGNAL HEADS SHALL BE COVERED WITH AN OPAQUE COVERING UNTIL SUCH TIME AS THE SIGNAL SYSTEM IS FUNCTIONAL. AT NO TIME SHOULD THE HEADS BE VIEWED WITHOUT HAVING SOME FORM OF SIGNAL INDICATION, I.E. FLASHING OPERATION OR SEQUENCING AS PER PLAN.
- 11) THE CONFLICT MONITOR SHALL BE CAPABLE OF DETECTING A LACK OF RED, GREEN, YELLOW OR WALK SIGNAL AND SHALL BE CAPABLE OF STORING AT LEAST NINE PREVIOUS FAULTS FOR RECALL VIA A DISPLAY SCREEN.
- 12) THE VEHICLE DETECTOR AMPLIFIERS AND PHASE MODULES (WHERE APPROPRIATE) INSIDE THE CONTROLLER CABINET SHALL HAVE LABELS TO INDICATE WHICH PHASE AND MOVEMENT GOES WITH EACH. THE LABELS SHALL BE 1/2" WIDE. THE LOOP DETECTOR LEAD-INS SHALL ALSO BE LABELED AT THE TERMINAL BOARD AS TO WHICH MOVEMENT AND LANE THEY ARE FROM. VEHICLE DETECTOR AMPLIFIERS SHALL BE OF A TYPE THAT FAIL IN THE "ON" POSITION.
- 13) TEST SWITCHES FOR EACH PHASE SHALL BE PLACED EITHER ON THE CABINET DOOR OR IN A CONVENIENT LOCATION ON THE SIDE WALL.
- 14) ALL DOOR MOUNTED SWITCHES AND BUTTONS SHALL BE PROTECTED FROM ACCIDENTAL BUMPING OR FROM COMING INTO CONTACT WITH OTHER EQUIPMENT WHEN THE DOOR IS CLOSED.
- 15) ALL SIGNALS SHALL BE WIRED SUCH THAT NO MORE THAN TWO THROUGH FACES (NORTH-SOUTH AND/OR EAST-WEST) ARE WIRED INTO ONE LOAD SWITCH EVEN THOUGH TWO APPROACHES ARE GREEN DURING THE SAME PHASE.
- 16) THE CONTRACTOR SHALL PROVIDE A MINIMUM OF TWO COPIES OF THE INSTRUCTION MANUALS FOR THE CONTROLLER, LOOP DETECTORS, CONFLICT MONITORS, AND ANY OTHER EQUIPMENT INCLUDED IN THE CABINET. ONE COPY IS TO BE KEPT IN THE CABINET AND THE OTHER GIVEN TO THE PARTY RESPONSIBLE FOR MAINTENANCE OF THE SIGNAL SYSTEM. ADDITIONAL COPIES TO BE PROVIDED AS CALLED FOR ON THE PLANS.
- 17) FOR PROGRAMMABLE SOLID STATE CONTROLLERS AND MASTERS, COPIES OF THE FINAL PROGRAM LISTINGS SHALL BE PROVIDED AND DISTRIBUTED AS DETAILED IN NOTE 16.
- 18) PHASING CHANGES, IF REQUESTED AND FEASIBLE, SHALL BE CONSIDERED AS PART OF THE CONTRACT. EXTRA COMPENSATION FOR THE CHANGES MAY BE AUTHORIZED FOLLOWING APPROVAL OF THE ESTIMATE.
- 19) TRAFFIC SIGNALS INSTALLED AT NEW LOCATIONS SHALL BE ACTIVATED ONLY UPON THE APPROVAL OF THE ENGINEER AND AFTER FLASHING FOR A MINIMUM OF 48 HRS.
- 20) IF THE PROJECT INVOLVES REPLACING OR IMPROVING AN EXISTING TRAFFIC SIGNAL, TRAFFIC SHALL BE CONTROLLED BY A UNIFORMED TRAFFIC OFFICER AT ANY TIME THE SIGNAL IS NOT SEQUENCING PER PLAN OR OPERATING ON FLASH. THE SWITCH FROM THE OLD TO THE NEW SIGNAL SHALL BE DONE DURING OFF-PEAK TRAFFIC AND IN SUCH A WAY AS TO MINIMIZE DOWN TIME.
- 21) TRAFFIC & PEDESTRIAN SIGNALS MOUNTED ON THE SIDE OF THE SIGNAL POLES MAY BE ATTACHED BY METHODS OTHER THAN THOSE SHOWN. SHOP DRAWINGS FOR THE ALTERNATE MOUNTING HARDWARE MUST BE SUBMITTED TO THE TRAFFIC DESIGN SECTION OF THE VAOT VIA THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION.
- 22) ALL RIGIDLY MOUNTED TRAFFIC AND PEDESTRIAN SIGNAL HEADS (POST TOP, SIDE OR ARM MOUNTED) SHALL BE HEAVY DUTY ALUMINUM, UNLESS OTHERWISE NOTED ON THE PLANS.
- 23) WHEN (FREE SWINGING) OPTICALLY PROGRAMMABLE SIGNAL HEADS ARE REQUIRED, THEY SHALL NOT BE INSTALLED ON THE SAME HANGER ASSEMBLY AS LIGHTER WEIGHT HEADS, UNLESS OTHERWISE NOTED ON THE PLANS. WHEN TWO HANGER ASSEMBLIES ARE INSTALLED CLOSE TOGETHER, THE BOTTOM OF THE SIGNALS SHALL BE CONNECTED BY A FLAT ARM ASSEMBLY TO PREVENT THE HEADS FROM HITTING EACH OTHER.
- 24) WHEN MASKING OF OPTICALLY PROGRAMMABLE SIGNAL HEADS IS REQUIRED, THE HEADS SHALL BE RIGIDLY MOUNTED OR TETHERED, AS SHOWN ON STD E-171B.
- 25) WHEN STREET LIGHTING AND SIGNALS ARE INSTALLED AT THE SAME LOCATION, THE POWER FOR EACH SHALL BE SEPARATED AT THE STATION OR SERVICE.
- 26) WHEN MORE THAN ONE SIGNAL IS POWERED FROM THE SAME SERVICE, EACH SHALL HAVE ITS OWN DISCONNECT AT THE STATION.

OTHER STDS. E - 171B, E - 175 REQUIRED

REVISIONS AND CORRECTIONS

- JUNE 21, 1989 - DATE OF ORIGINAL ISSUE
- MAY 14, 1990 - FHWA COMMENTS
- NOV. 17, 1993 - FHWA COMMENTS, NOTE REVISIONS AND POLE MOUNTING DETAIL MOVED TO E-171B
- AUG. 9, 1995 - GENERAL REVISION OF NOTES & DETAILS

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

APPROVED

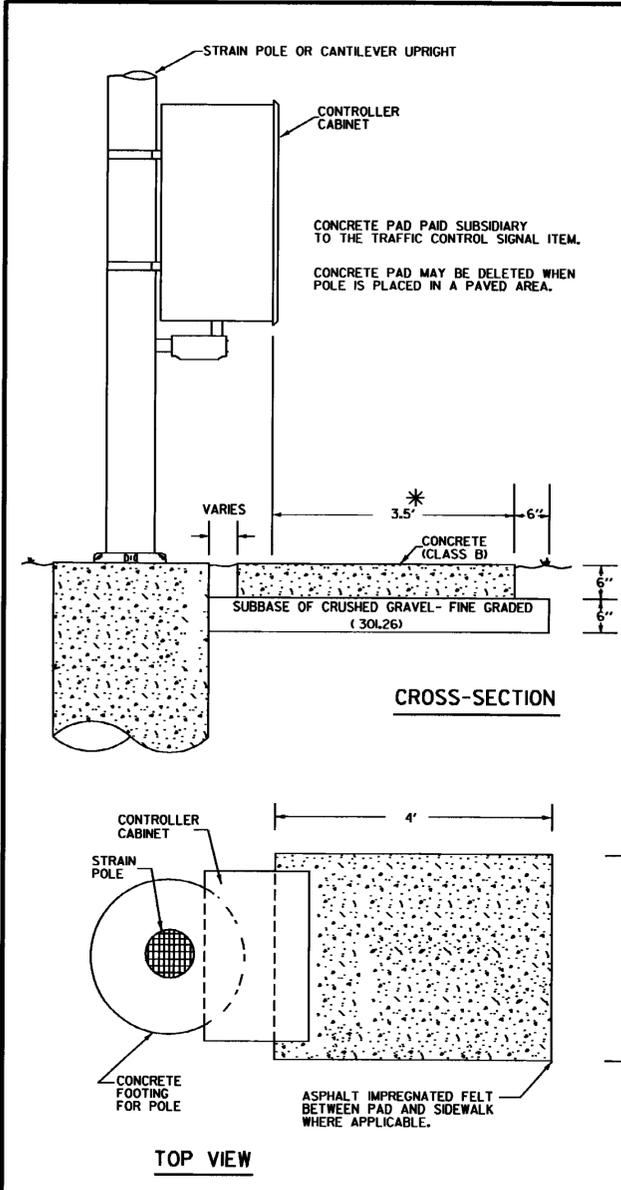
Stephen D. MacArthur
DIRECTOR OF ENGINEERING

David A. Row
TRAFFIC AND SAFETY ENGINEER

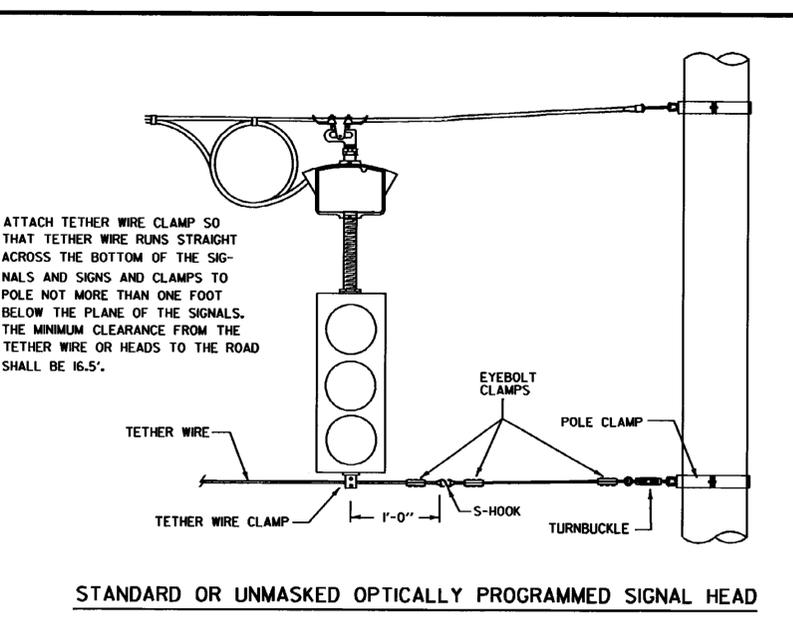
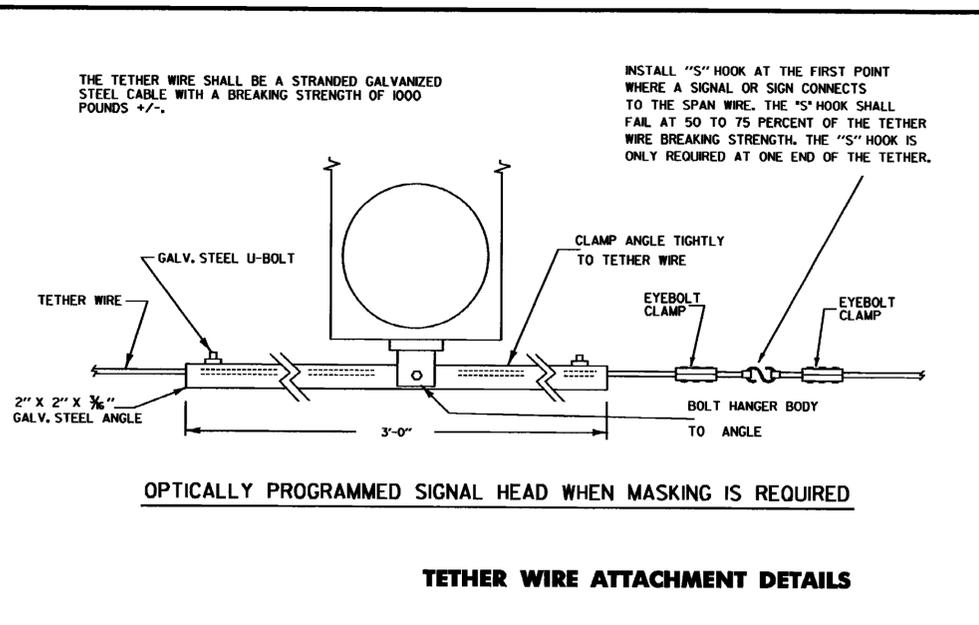
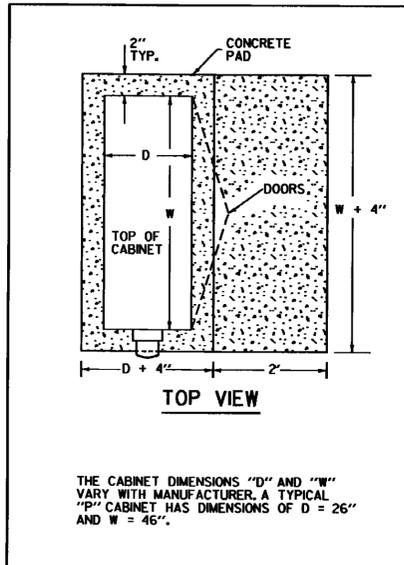
**TRAFFIC CONTROL SIGNALS
GENERAL NOTES & DETAILS**



**STANDARD
E-171A**

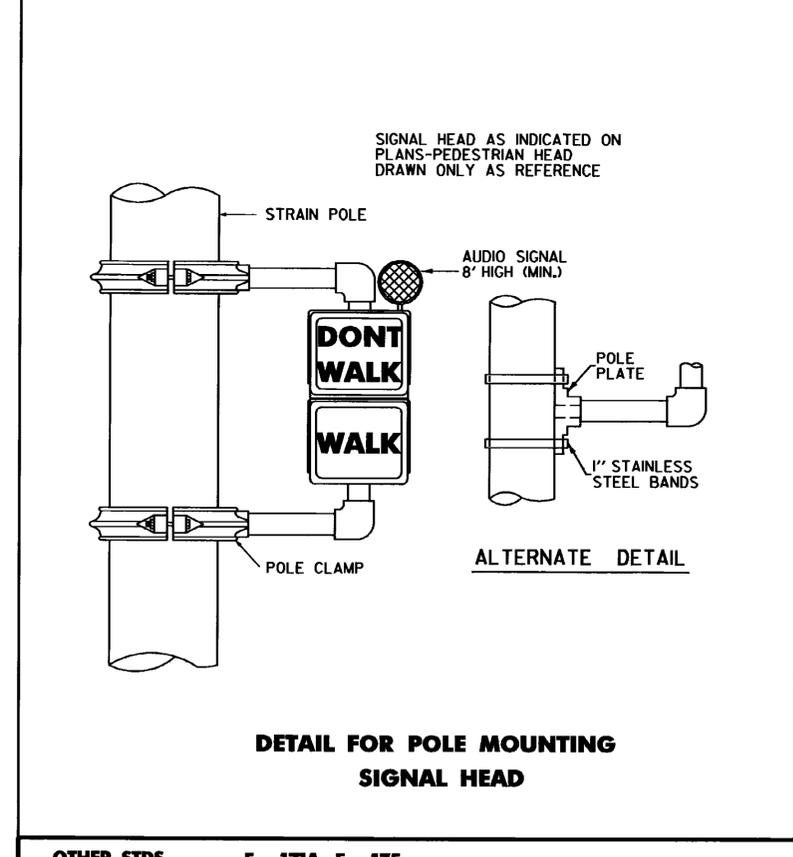
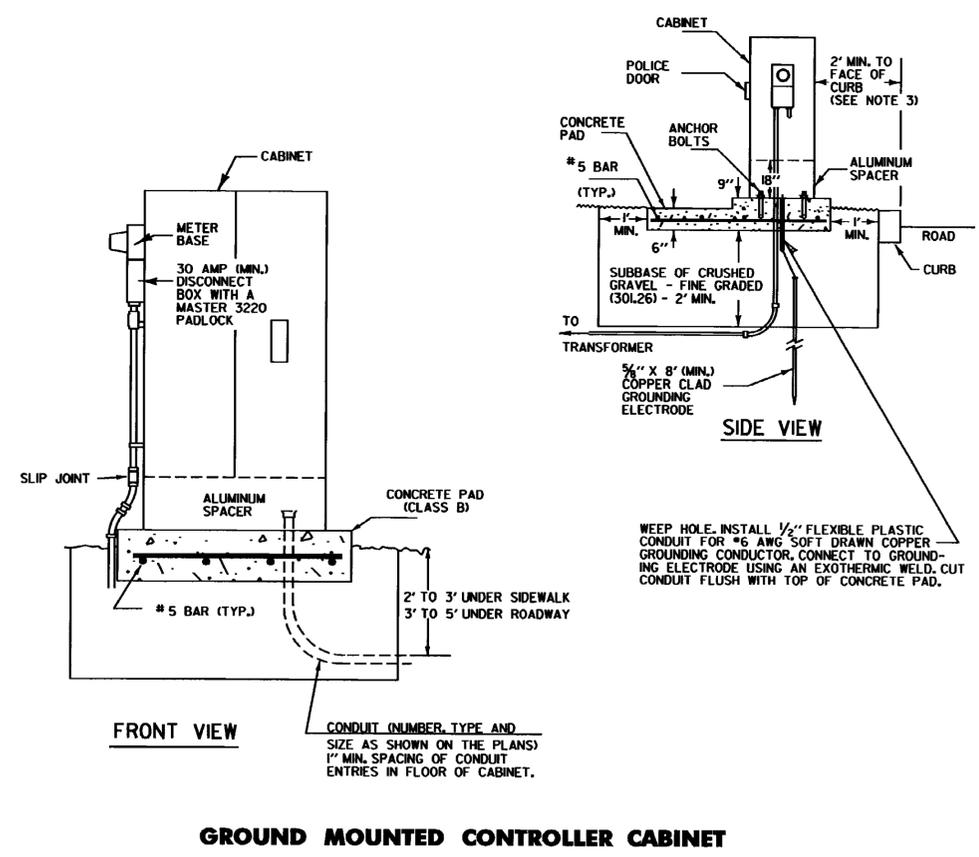


CONCRETE PAD DETAIL FOR POLE MOUNTED CONTROLLER CABINET



- NOTES:**
1. THE CONCRETE PAD SURFACE SHALL HAVE A BRUSHED FINISH.
 2. AN ASPHALT IMPREGNATED FELT PAD SHALL BE USED BETWEEN THE CONTROLLER PAD AND ADJACENT SIDEWALK, WHERE APPLICABLE.
 3. THE MINIMUM CLEAR ZONE IN LOW SPEED URBAN AREAS IS 2' BEYOND THE FACE OF CURB. IN OTHER CASES, THE MINIMUM IS EQUAL TO THE CLEAR ZONE AS DEFINED IN AASHTO'S ROADSIDE DESIGN GUIDE.
 4. THE CONCRETE AND SUBBASE OF CRUSHED GRAVEL SHALL BE SUBSIDIARY TO THE TRAFFIC SIGNAL ITEM.

5. FOR GROUND MOUNTED CABINET INSTALLATIONS:
 - A. THE METER SHOULD BE INSTALLED AS SHOWN ON THE PLANS. THE PREFERRED METER LOCATION IS ON A SEPARATE POLE OR STANCHION. HOWEVER, IF LIMITING CONDITIONS EXIST, THE METER MAY BE INSTALLED ON THE CONTROLLER CABINET ON THE SIDE AWAY FROM APPROACHING TRAFFIC.
 - B. THE NUMBER 5 BARS SHALL BE SPACED 16" CENTER TO CENTER WITH A MINIMUM OF 3" COVER TO THE GROUND. THEY SHALL RUN BOTH NORMAL AND TRANSVERSE IN THE CONCRETE PAD.
 - C. ANCHOR BOLT DIMENSIONS SHALL BE SUPPLIED BY THE CABINET MANUFACTURER. THESE BOLTS SHALL BE GALVANIZED OR STAINLESS STEEL.
 - D. THE ALUMINUM SPACER MAY BE DELETED IN URBAN AREAS, IF SO NOTED ON THE PLANS.



OTHER STDS. REQUIRED E - 171A, E - 175

REVISIONS AND CORRECTIONS

JUNE 21, 1989 - DATE OF ORIGINAL ISSUE

MAY 14, 1990 - FHWA COMMENTS

NOV. 17, 1993 - FHWA COMMENTS, NOTE REVISIONS, MOVED CANTILEVER DETAILS TO NEW E-171C AND ADDED TETHER WIRE DETAIL

AUG. 9, 1995 - SPECIFIED MATERIAL UNDER PAD, REVISED NOTES AND MINOR CORRECTIONS

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

APPROVED

Frederick B. MacArthur
DIRECTOR OF ENGINEERING

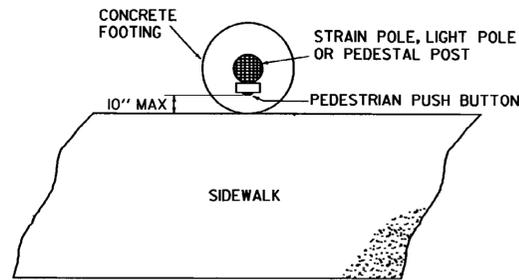
David A. Ross
TRAFFIC AND SAFETY ENGINEER

TRAFFIC CONTROL SIGNALS
MISC. DETAILS

/traf/std/stdel71b.dgn - stdel71b.i

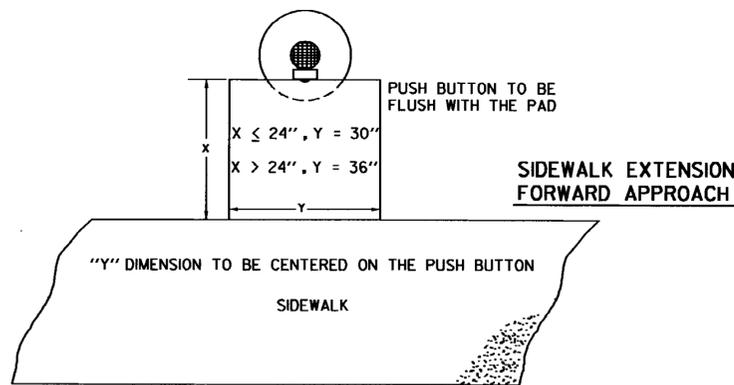
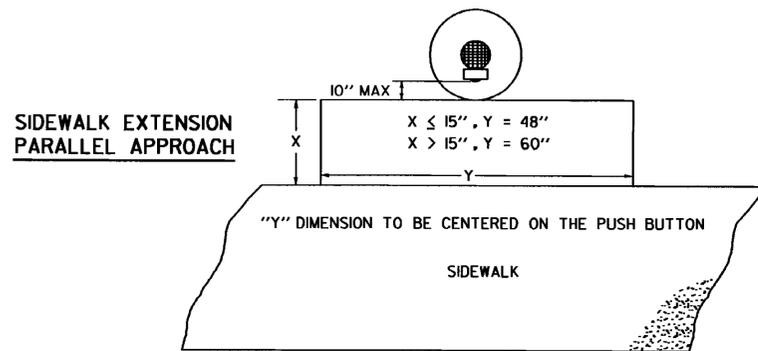
VERMONT AGENCY OF TRANSPORTATION

STANDARD
E-171B

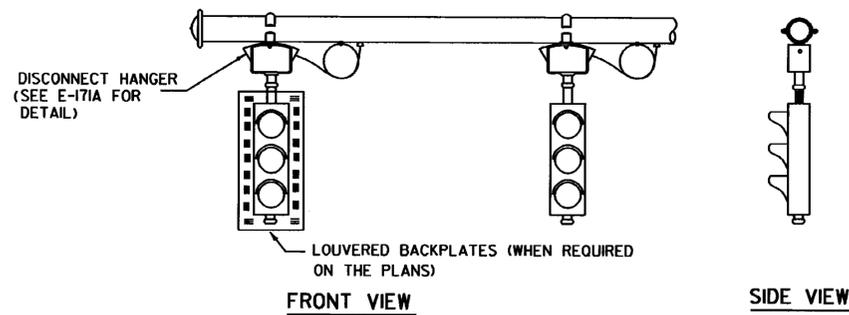


IF THE PEDESTRIAN PUSH BUTTON IS NOT LOCATED WITHIN 10' OF THE SIDEWALK, AN EXTENSION TO THE SIDEWALK MUST BE PROVIDED AS SHOWN BELOW. BUTTONS LOCATED ON THE SIDE OF CONTROLLER CABINETS MAY REQUIRE EXTENSION OF THE CONCRETE PAD, SHOWN ON STD E-171B, TO MEET THIS REQUIREMENT.

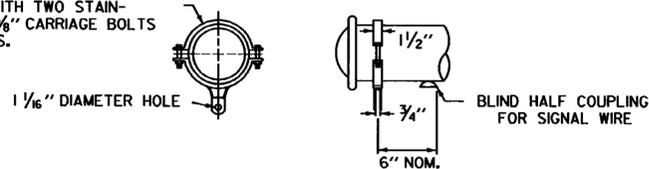
WHEN SIDEWALK EXTENSIONS ARE PROVIDED, A SUBBASE OF FINE GRADED CRUSHED GRAVEL SHALL BE PLACED AND ASPHALT IMPREGNATED FELT SHALL BE USED BETWEEN THE EXTENSION AND THE SIDEWALK AS SHOWN ON STD E-171B.



PEDESTRIAN PUSH BUTTON ACCESSIBILITY DETAIL



CLAMP AND CLEVIS 1/4" STEEL GALVANIZED, WITH TWO STAINLESS STEEL 3/8" CARRIAGE BOLTS AND HEX NUTS.

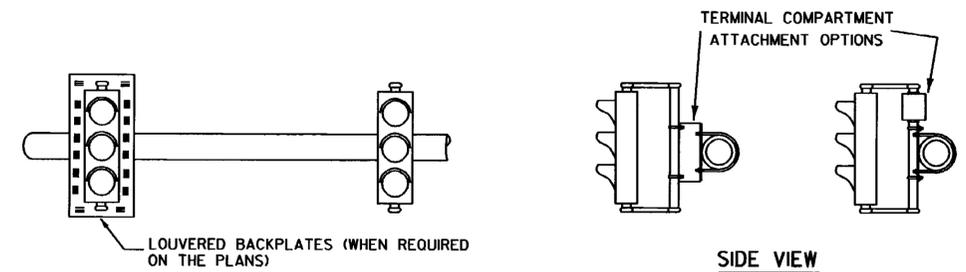


MAST ARM MOUNTING DETAILS FOR FREE SWINGING TRAFFIC SIGNALS

CANTILEVER MOUNTED TRAFFIC SIGNALS (AND LUMINAIRES)

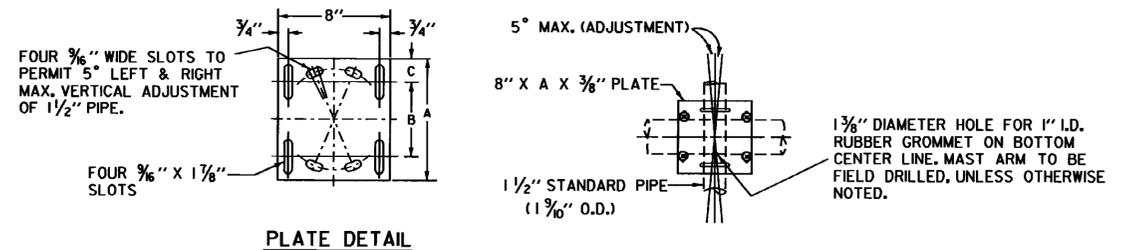
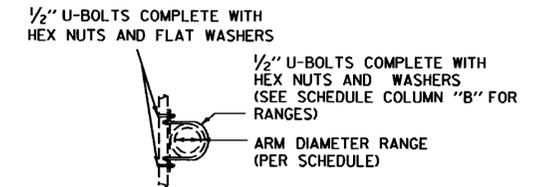
MINIMUM SIGNAL CLEARANCE SHALL BE:
16.5' FOR FREE SWINGING HEADS, OR
17' FOR FIXED MOUNTED HEADS

SEE THE CANTILEVER / FOOTING DETAIL SHEET(S) FOR ADDITIONAL INFORMATION.



SIGNAL MOUNTING PLATE SCHEDULE

ARM DIAMETER	A	B	C
3 1/10" - 5 3/10"	8 3/4"	5 3/8"	1 1/16"
5 3/10" - 7 7/10"	10 3/4"	7 3/8"	1 3/16"
7 7/10" - 11 3/10"	14"	10 7/8"	1 3/8"



1. ALTERNATE METHODS FOR RIGID MOUNTING OF SIGNALS TO MAST ARMS MAY BE USED. SHOP DRAWINGS FOR THE ALTERNATE METHOD HARDWARE SHALL BE SUBMITTED TO THE TRAFFIC DESIGN SECTION VIA THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION.
2. ALL RIGIDLY MOUNTED TRAFFIC AND PEDESTRIAN SIGNALS SHALL BE PROVIDED WITH REINFORCEMENT PLATES AT THE ATTACHMENT POINTS.
3. ALL NUTS, BOLTS AND WASHERS SHALL BE STAINLESS STEEL.
4. ALL OTHER MOUNTING BRACKET MATERIALS SHALL BE GALVANIZED STEEL.

MAST ARM MOUNTING DETAILS FOR FIXED MOUNT TRAFFIC SIGNALS (PREFERRED METHOD)

REVISIONS AND CORRECTIONS

NOV. 17, 1993 - DATE OF ORIGINAL ISSUE

AUG. 9, 1995 - ADDED PED. PUSH BUTTON ACCESSIBILITY DETAIL, REMOVED GENERAL CANTILEVER DETAIL, MINOR CORRECTIONS

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

APPROVED

Stephen D. MacArthur
DIRECTOR OF ENGINEERING

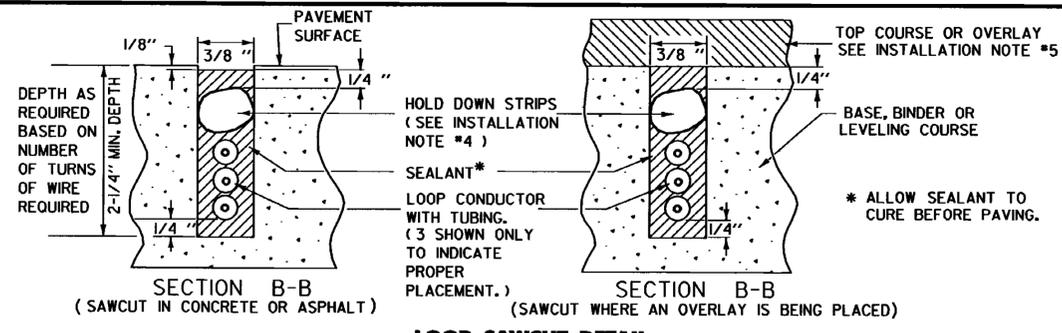
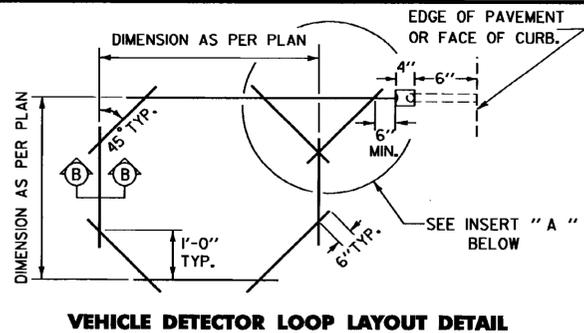
David A. Ross
TRAFFIC AND SAFETY ENGINEER

**TRAFFIC CONTROL SIGNALS
CANTILEVER MOUNTING DETAILS
PED. PUSH BUTTON ACCESSIBILITY DETAIL**

OTHER STDS. E - 170 , E - 171A , E - 171B
REQUIRED



**STANDARD
E-171C**



- GENERAL NOTES**
1. THE TERM "VEHICLE DETECTOR LOOP" SHALL REFER TO THE SENSOR EQUIPMENT EMBEDDED IN THE PAVEMENT WHICH SENSES VEHICLE PASSAGE OR PRESENCE. THE TERM "CABINET AMPLIFIER" SHALL REFER TO THE ELECTRICAL OR ELECTRONIC DEVICE LOCATED IN THE CONTROLLER CABINET WHICH RESPONDS DIRECTLY TO A VEHICLE ACTUATION AND INTERFACES WITH THE CONTROLLER.
 2. WHEN THE DISTANCE FROM THE SAWCUT TO THE CONTROLLER EXCEEDS 25 FEET, SHIELDED CABLE SHALL BE USED TO EXTEND LOOP LEAD-INS FROM A JUNCTION BOX, PULLBOX OR POLE BASE TO THE CABINET. IT SHALL MEET THE REQUIREMENTS OF ISMA SPEC. NO. 50-2.
 3. VEHICLE DETECTOR LOOP SHALL BE INSTALLED IN SUCH A WAY AS TO MAXIMIZE SENSITIVITY AND BE CAPABLE OF DETECTING MOTORCYCLES AND BICYCLES, WHILE ELIMINATING FALSE CALLS FROM VEHICLES IN ADJACENT LANES. LOOPS SHOULD BE DESIGNED SO THAT THE TOTAL INDUCTANCE [LOOP(S) PLUS LEAD-IN(S)] AT THE AMPLIFIER IS BETWEEN 100 AND 450 MICROHENRIES (200-300 PREFERRED). FOR SINGLE LOOPS, THE LOOP INDUCTANCE SHOULD BE AT LEAST TWICE THAT OF THE LEAD-IN. FOR MULTIPLE LOOPS, THE INDUCTANCE ON THE STREET SIDE OF THE SPLICE SHOULD BE AT LEAST TWICE THAT ON THE CONTROLLER SIDE.
 4. THE LOOPS SHALL BE CENTERED IN THEIR RESPECTIVE LANES, UNLESS OTHERWISE NOTED.
 5. ALL LOOPS SHALL OPERATE IN THE PRESENCE MODE WITH THE CONTROLLER SET TO LOCKING MEMORY FOR "LEFT-ONLY" OR "THRU-ONLY" LANES. ALL OTHER LANES SHALL UTILIZE NON-LOCKING MEMORY, UNLESS OTHERWISE NOTED.
 6. ALL LOOPS IN "RIGHT TURN ONLY" LANES OR LOOP PLACED TO DETECT ONLY RIGHT TURNING VEHICLES SHALL HAVE DELAYED CALL LOOP AMPLIFIERS, UNLESS OTHERWISE NOTED.
 7. ALL LOOP DETECTORS SHALL BE OF A TYPE THAT FAIL IN THE "ON" MODE.
 8. ALL LOOP AND LEAD-IN WIRE SHALL BE #12 AWG. THE RESISTANCE OF #12 AWG IS 1.62 OHMS / 1000' AT 77° F.

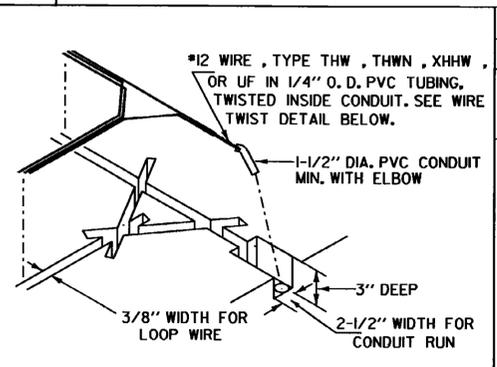
2. ALL LOOP WIRES SHALL BE INSTALLED IN PVC TUBING. THE TUBING ENDS SHALL BE SEALED USING LOOP SEALANT PRIOR TO INSTALLATION IN THE SAWCUT.
3. BEFORE LAYING IN THE LOOP WIRE, A ONE-QUARTER INCH BEAD OF SEALANT SHALL BE PLACED IN THE SAWCUT AND ALLOWED TO SET UP SUFFICIENTLY TO GIVE THE WIRE SOME SUPPORT. EACH WIRE SHALL BE EASED INTO THE SAWCUT WITH A BLUNT WOODEN STICK.
4. THE LOOP WIRES SHALL BE HELD IN PLACE DURING INSTALLATION BY SHORT STRIPS OF POLYETHYLENE FOAM SEALANT BACKERS. THE STRIPS SHALL BE ABOUT 2" LONG AND PLACED EVERY 2 FEET. THEY ARE TO REMAIN IN PLACE WHEN THE SLOT IS SEALED.
5. VEHICLE DETECTOR LOOPS SHALL BE PLACED IN SAWCUTS IN THE PAVEMENT COURSE IMMEDIATELY BELOW THE WEARING SURFACE AND PAVED OVER WHENEVER POSSIBLE. IF THE WEARING SURFACE IS MORE THAN 1-3/4" IN DEPTH, THE SAWCUT SHALL BE MADE AFTER THE WEARING SURFACE IS PLACED. IF PAVING IS NOT PART OF THE PROJECT, THE SAWCUT SHALL BE MADE IN EXISTING PAVEMENT.
6. WHEN LOOP WIRES ARE PLACED BELOW THE WEARING SURFACE, THE SEALANT SHALL BE PROPERLY CURED BEFORE THE FINAL PAVEMENT IS PLACED.
7. LOOP LEAD-INS FROM ADJACENT LOOPS ACTUATING DIFFERENT PHASES SHALL BE IN SEPARATE SAWCUTS AND CONDUITS TO THE PULLBOX OR POLE BASE.
8. LOOP LEAD-INS SHALL BE KEPT AT LEAST ONE FOOT AWAY FROM POWER WIRING, WHENEVER POSSIBLE.
9. ALL ELECTRICAL WORK AND MATERIALS SHALL MEET THE REQUIREMENTS OF THE NATIONAL ELECTRIC CODE.
10. LOOP WIRES FROM EACH LOOP AND/OR APPROACH SHALL BE COLOR CODED OR OTHERWISE IDENTIFIED AT EACH PULLBOX OR JUNCTION BOX, IN THE POLE BASE(S) AND AT THE TERMINAL BOARD IN THE CONTROLLER CABINET. FOLLOWING INSTALLATION, THE CONTRACTOR SHALL SUPPLY 2 COPIES OF A SCHEMATIC SHOWING THE FOLLOWING INFORMATION.
 1. NUMBER OF TURNS.
 2. DIMENSIONS FOR EACH LOOP.
 3. LOOP LEAD-IN ROUTING FROM THE SAWCUT TO THE CONTROLLER.
 4. TYPE OF CONNECTIONS AT EACH SPLICE (SERIES, PARALLEL OR SERIES-PARALLEL).
 ONE COPY SHALL BE LEFT IN THE CONTROLLER CABINET AND THE OTHER GIVEN TO THE TRAFFIC SHOP OR LOCAL OFFICIAL RESPONSIBLE FOR THE SIGNAL MAINTENANCE.

LONG LOOPS

LOOP INDUCTANCE DESIGN TABLE

LOOP INDUCTANCE (MICROHENRIES)

LENGTH OF LOOP (FEET)	WIDTH OF LOOP					
	6 FEET			8 FEET		
	1 TURN	2 TURNS	3 TURNS	1 TURN	2 TURNS	3 TURNS
10	-	98	206	-	104	218
15	-	138	291	-	144	303
20	-	178	376	-	184	388
25	-	218	461	-	224	473
30	-	258	546	-	264	558
35	-	298	-	-	304	-
40	106	338	-	108	344	-
45	118	378	-	120	384	-
50	131	418	-	133	424	-
55	143	458	-	145	464	-
60	156	498	-	158	504	-
65	168	538	-	170	544	-
70	181	578	-	183	584	-



RECTANGULAR LOOPS

LOOP INDUCTANCE DESIGN TABLE

LENGTH OF LOOP (FEET)	WIDTH OF LOOP				LOOP PERIMETER (FT.)	LOOP INDUCTANCE (MICROHENRIES)				
	4 FEET	6 FEET	8 FEET	10 FEET		2 TURNS	3 TURNS	4 TURNS	5 TURNS	
	K=42	K=38	K=36	K=33		K=42	K=38	K=36	K=33	
8	6	-	-	24	40	82	138	198		
10	8	-	-	28	47	96	161	231		
12	10	8	-	32	54	109	184	264		
14	12	10	-	36	60	123	207	297		
16	14	12	10	40	67	137	230	330		
18	16	14	12	44	74	151	254	367		
20	18	16	14	48	81	164	277	396		
22	20	18	16	52	87	178	300	429		
24	22	20	18	56	94	192	323	462		
26	24	22	20	60	101	205	346	495		
28	26	24	22	64	108	219	369	-		
30	28	26	24	68	114	232	392	-		
32	30	28	26	72	121	246	415	-		
34	32	30	28	76	128	260	438	-		
37	35	33	31	82	138	280	472	-		
42	40	38	36	92	155	315	530	-		

NOTE:

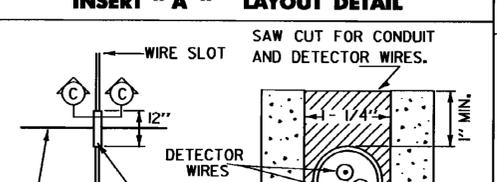
1. THE ABOVE INDUCTANCES ARE ESTIMATED VALUES USING THE FOLLOWING EQUATIONS.

1 TURN = (PERIMETER X 0.5) + (LOOP LENGTH X 1.5)

2 TURN = (PERIMETER X 1.5) + (LOOP LENGTH X 5.0)

3 TURN = (PERIMETER X 3.0) + (LOOP LENGTH X 11.0)

2. SEE NOTES # 1 & 3 UNDER THE RECTANGULAR LOOP TABLE.



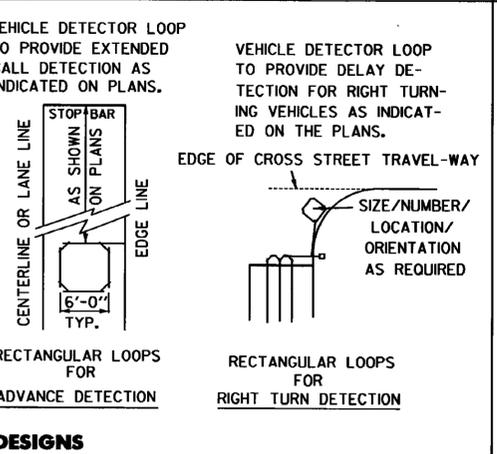
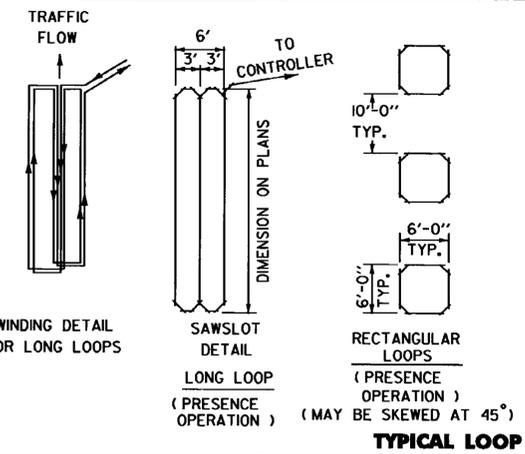
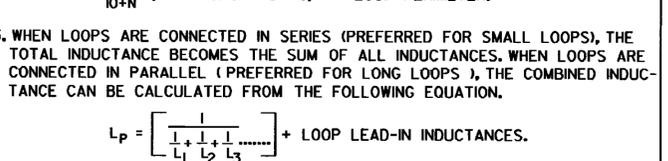
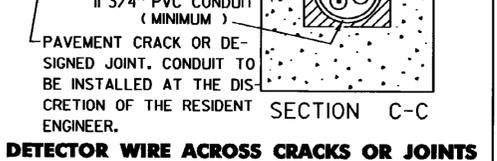
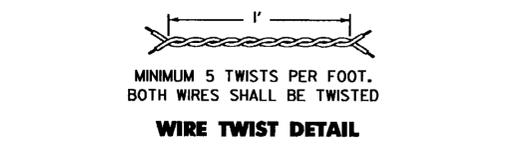
NOTE:

1. TO THE ABOVE LOOP INDUCTANCES, ADD 25 MICROHENRIES FOR EACH 100 FEET OF LEAD-IN CABLE FROM THE PAVEMENT LOOP TO THE CONTROLLER CABINET. LOOP LEAD-IN LENGTH SHALL NOT EXCEED 750 FEET.

2. THE FORMULA USED FOR THE TABLE ABOVE IS INDUCTANCE (L) = KPN² WHERE K = $\frac{5}{10+N}$, N = NO. OF TURNS, P = LOOP PERIMETER.

3. WHEN LOOPS ARE CONNECTED IN SERIES (PREFERRED FOR SMALL LOOPS), THE TOTAL INDUCTANCE BECOMES THE SUM OF ALL INDUCTANCES. WHEN LOOPS ARE CONNECTED IN PARALLEL (PREFERRED FOR LONG LOOPS), THE COMBINED INDUCTANCE CAN BE CALCULATED FROM THE FOLLOWING EQUATION.

$$L_p = \left[\frac{1}{\frac{1}{L_1} + \frac{1}{L_2} + \frac{1}{L_3} + \dots} \right] + \text{LOOP LEAD-IN INDUCTANCES.}$$



CONDUIT FILL DESIGN VALUES

AVAILABLE CONDUIT AREA			CONDUCTOR SIZE TABLE					
SIZE	I.D.	SIZE O.D.	26% FILL (IN ²)	CROSS SECTIONAL AREA (IN ²)				
1"	1.315	1.660	0.23	GAUGE				
1-1/4"	1.660	2.093	0.39	#14	#12	#10	#8	#6
1-1/2"	1.900	2.375	0.53	2	3	4	5	6
2"	2.375	2.875	0.87	7	8	9	10	11
2-1/2"	2.875	3.500	1.24	12	14	16	18	20
3"	3.500	4.000	1.92	24	28	32	36	40
3-1/2"	4.000	4.500	2.57	48	56	64	72	80
4"	4.500	-	3.31	96	112	128	144	160

CONDUCTOR SIZE TABLE

CROSS SECTIONAL AREA (IN²)

GAUGE

CALCULATE AS REQUIRED

REVISIONS AND CORRECTIONS

SEPT. 10, 1987 - DATE OF ORIGINAL ISSUE

NOV. 17 1993 - MAJOR NOTE & TABLE REVISIONS

AUG. 9, 1995 - REVISED INSTALLATION NOTES 5 & 6, TYP. LOOP DESIGN & MINOR CHANGES

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

APPROVED

Stephen S. MacArthur
DIRECTOR OF ENGINEERING

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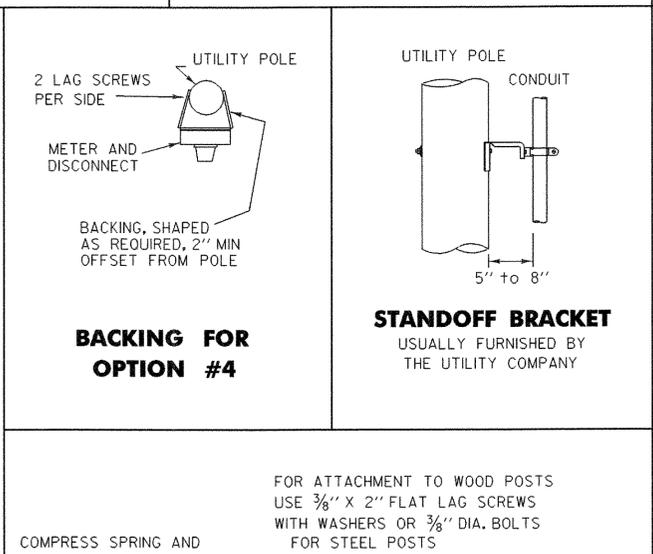
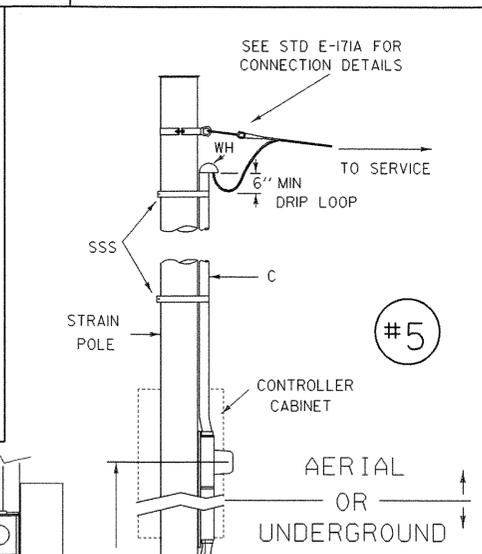
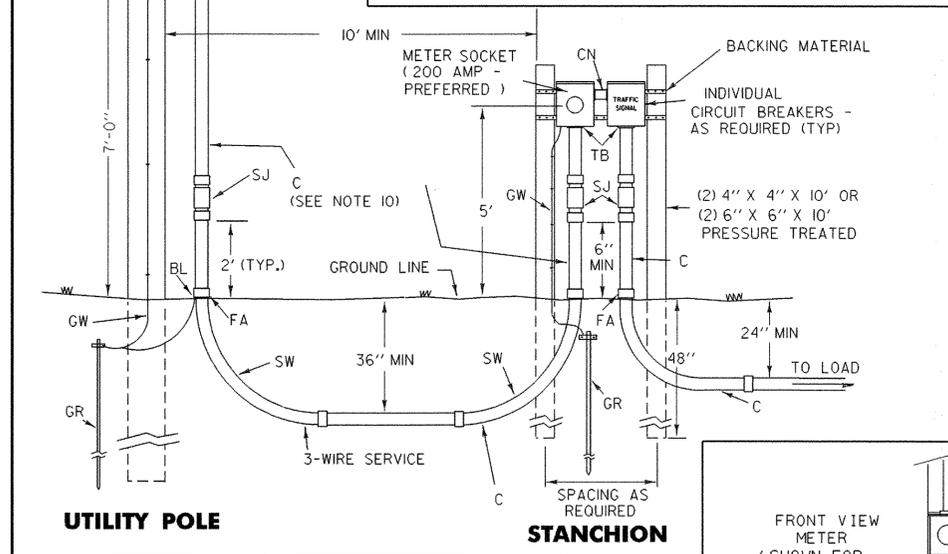
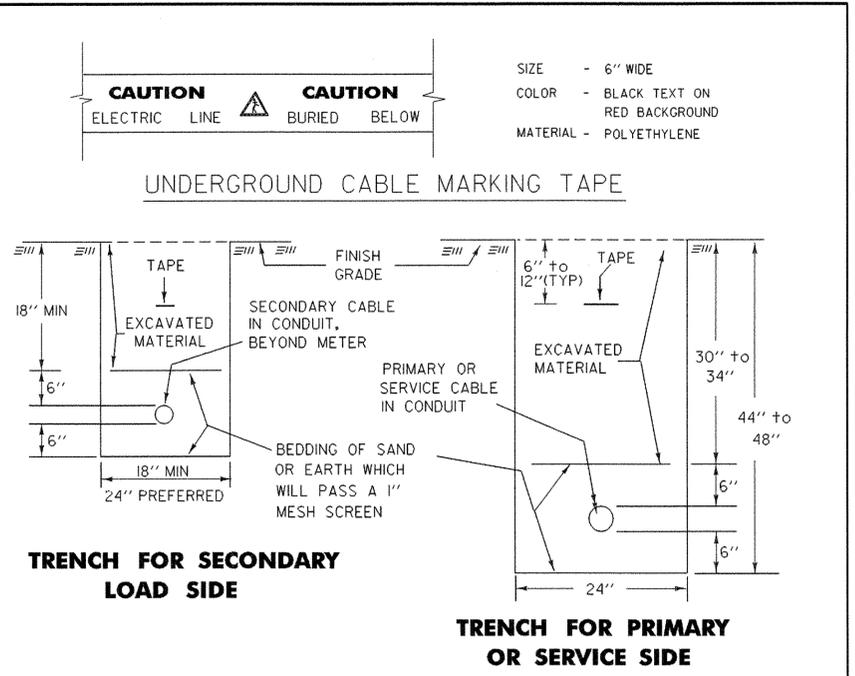
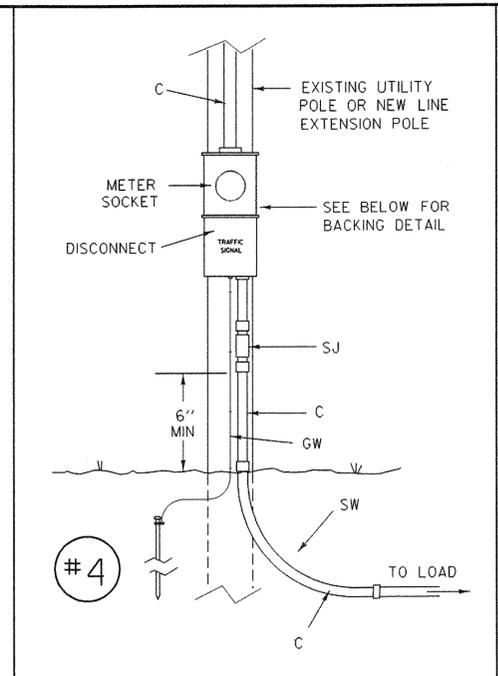
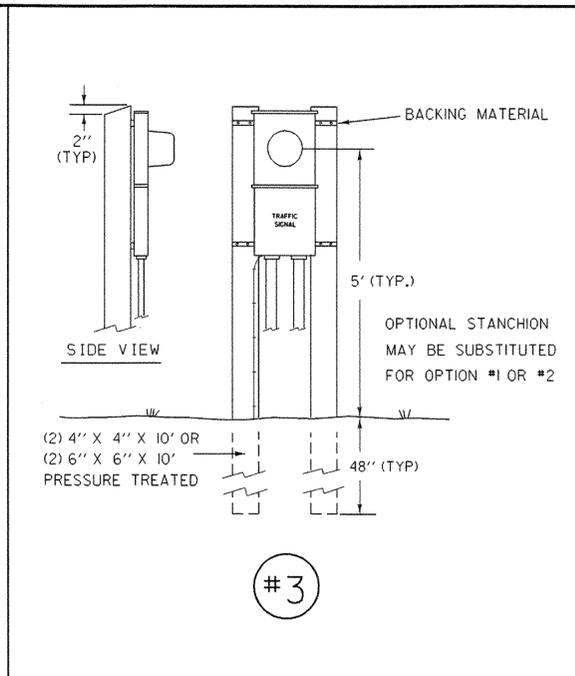
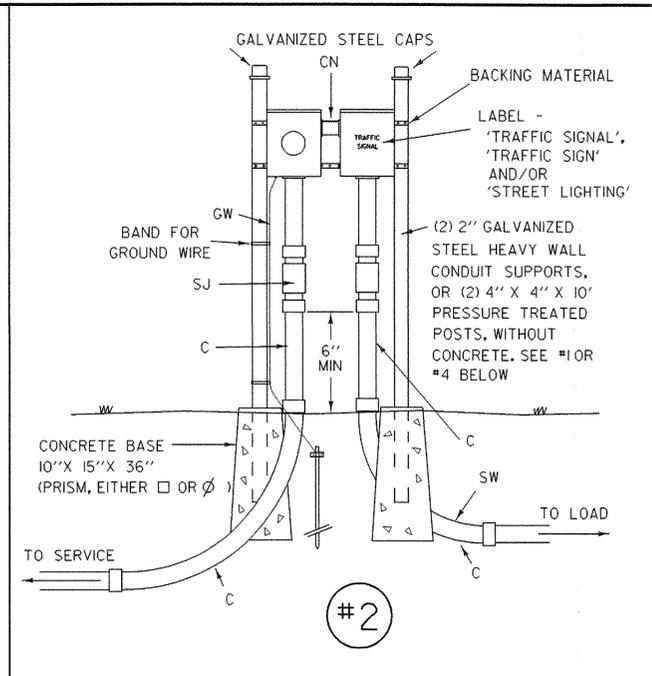
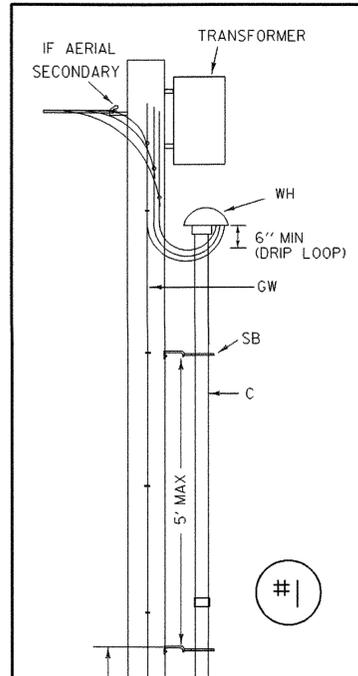
VEHICLE DETECTOR LOOP DETAILS

/traf/std/stdel172.dgn - stdel172j

OTHER STDS. REQUIRED NONE

VERMONT AGENCY OF TRANSPORTATION

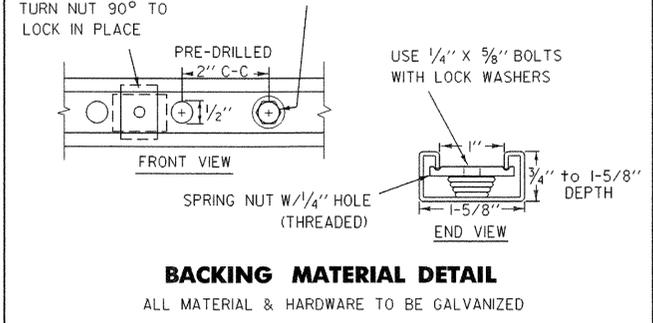
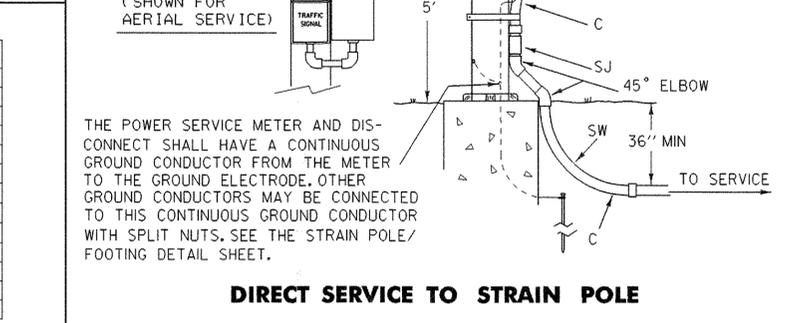
STANDARD E-172



- NOTES**
- ALL CONSTRUCTION MUST COMPLY WITH THE NATIONAL ELECTRICAL CODE AND UTILITY COMPANY REQUIREMENTS.
 - STANCHIONS MUST BE PLACED OUTSIDE THE CLEAR ZONE OR THEY MUST BE PROTECTED BY GUARDRAIL. THE LOCATION OF STANCHIONS MUST BE APPROVED BY THE UTILITY COMPANY PRIOR TO CONSTRUCTION.
 - THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL MATERIALS, EXCEPT FOR STANDOFF BRACKETS WHICH ARE USUALLY FURNISHED AND INSTALLED BY THE UTILITY COMPANY. THE CONTRACTOR IS RESPONSIBLE FOR INSTALLING ALL MATERIALS, EXCEPT THOSE ATTACHED TO THE UTILITY POLE. ALL MATERIAL AND INSTALLATION COSTS FOR THE POWER SERVICE, EXCEPT FOR THE WIRED CONDUIT, SHALL BE CONSIDERED PART OF THE TRAFFIC SIGNAL, STREET LIGHTING OR SIGN ITEM, WHICHEVER IS APPLICABLE.
 - ALL EXPOSED METAL EQUIPMENT MUST BE GROUNDED.
 - ATTACH CONDUIT ON THE SIDE OF THE POLE OR STANCHION AWAY FROM TRAFFIC. CONTACT THE LOCAL UTILITY COMPANY FOR FINAL PLACEMENT.
 - MATERIALS AND DIMENSIONS APPLY TO ALL STANCHIONS.
 - IN RURAL AREAS, WITH THE PERMISSION OF THE UTILITY COMPANY, THE METER AND THE DISCONNECT MAY BE INSTALLED ON AN EXISTING UTILITY POLE. SEE OPTION #4.
 - OPTION #1, #2, #3 OR #5 MAY BE USED IN URBAN AREAS, EITHER RESIDENTIAL OR COMMERCIAL, OR AS DETERMINED BY THE UTILITY AND APPROVED BY THE ENGINEER.
 - THE METER AND DISCONNECT SHALL BE ATTACHED THE STANCHION/POLE WITH TWO LENGTHS OF GALVANIZED BACKING MATERIAL.
 - SERVICE CONDUIT SHALL BE MINIMUM 2 INCH. SMALLER CONDUIT MAY BE ALLOWED WITH PRIOR APPROVAL FROM THE UTILITY AND THE ENGINEER AND AFTER CONSULTATION WITH THE HIGHWAY, SAFETY & DESIGN DIVISION.
 - WHEN MORE THAN ONE GROUND ELECTRODE IS REQUIRED, THEY SHALL BE A MINIMUM OF 6' APART.
 - METERS MAY NOT BE REQUIRED BY ALL UTILITY COMPANIES.

LEGEND

ITEM	MATERIAL
BL	BONDING LUG (IF STEEL CONDUIT)
C	CONDUIT - PVC SCHEDULE 80 (2" MIN.)
CN	CONDUIT NIPPLE
FA	FEMALE ADAPTER OR COUPLINGS AS REQUIRED
GR	GROUND ELECTRODE, 5/8" X 8" (MIN) COPPER CLAD (2 REQ.)
GW	GROUND CONDUCTOR, #6 AWG CU (MIN)
SB	STANDOFF BRACKET (SEE DETAIL)
SJ	SLIP JOINT, INSTALL 2/3 OPEN
SSS	STAINLESS STEEL STRAP (1" MIN)
SW	90° SWEEPS, (PVC) 36" R. - SERVICE, 24" R. - LOAD
TB	THREADED BUSHING
WH	WEATHERHEAD OR CONDULATOR

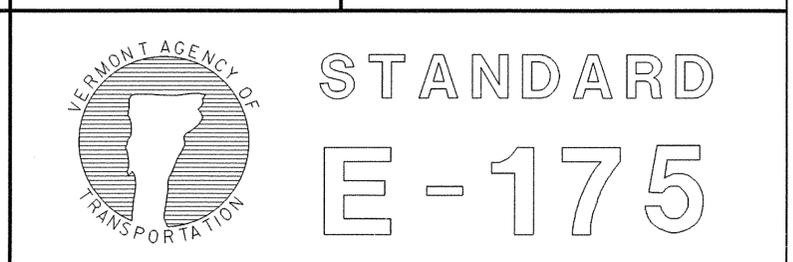


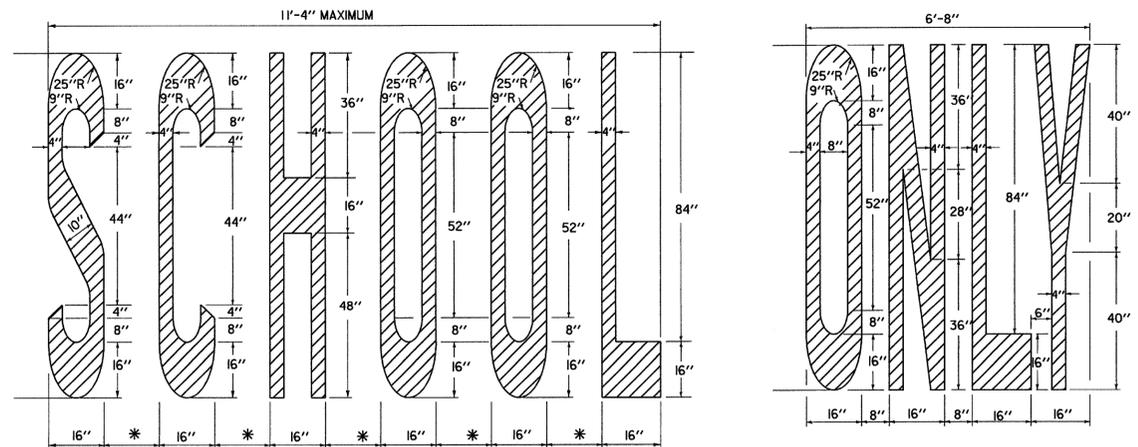
OTHER STDS. E - 171A REQUIRED (WHEN OPTION #5 IS USED) **SEE PLANS FOR OPTION #**

REVISIONS AND CORRECTIONS
 NOV. 17, 1993 - ORIGINAL APPROVAL DATE
 JUN. 08, 2009 - NEC UPDATES FOR PVC CONDUIT

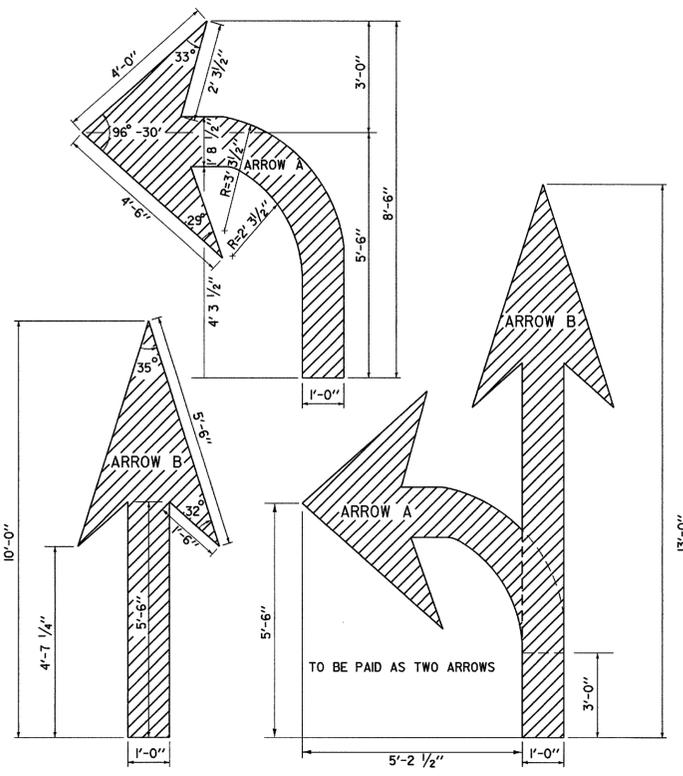
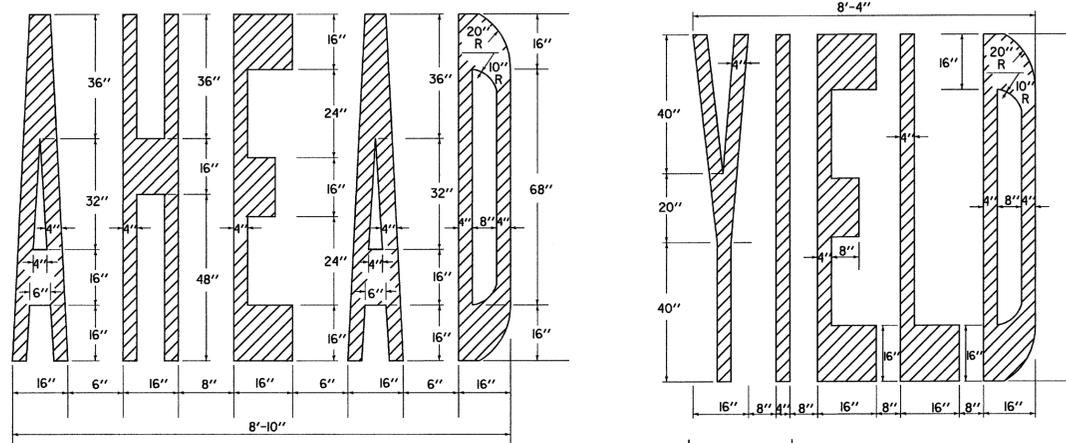
APPROVED
Kevin A. Naushia
 HIGHWAY, SAFETY & DESIGN ENGINEER
Richard F. Stewart
 DIRECTOR OF PROGRAM DEVELOPMENT
Mark D. Richter
 FEDERAL HIGHWAY ADMINISTRATION

POWER DROP STANCHIONS

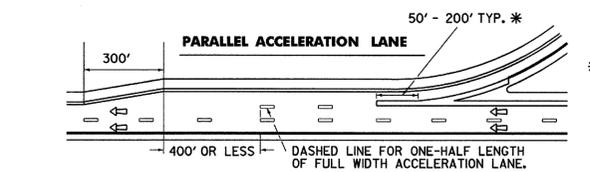




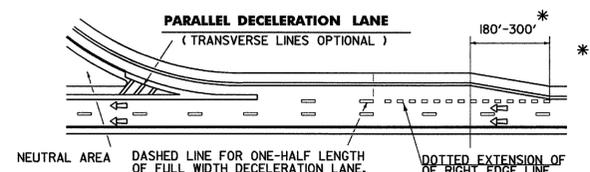
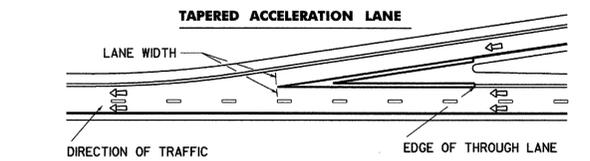
* (4'-8'') - ADJUST TO AVAILABLE PAVEMENT WIDTH



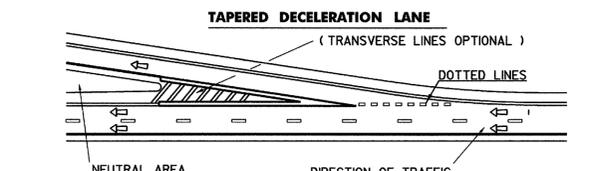
ARROW DETAILS



* USE LONGER LENGTH TO EMPHASIZE SITUATIONS WHERE THE CROSSING REQUIRES UNUSUAL CARE SUCH AS HIGH VOLUME MERGE AREAS.



* SHORTER TAPERS GIVE A BETTER TARGET VALUE, HOWEVER ALIGNMENT MAY DICTATE A LONGER TAPER. RESIDENT ENGINEER SHALL ESTIMATE LENGTH.

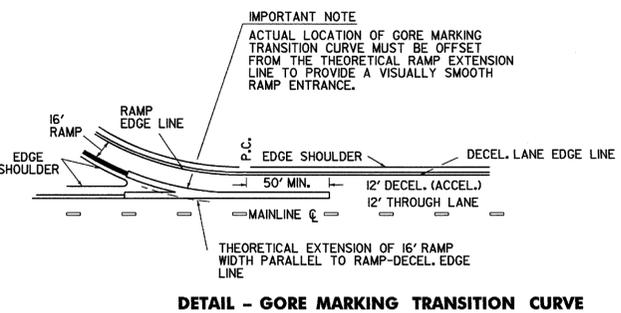


TRANSVERSE LINES SHALL CONSIST OF A WHITE LINE 2 TIMES WIDER THAN THE MAIN LINE MARKING WIDTH SPACED 5'-0\"/>

LEGEND

RAMP MARKINGS

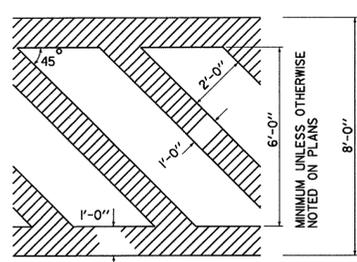
- WHITE LINES
- YELLOW LINES
- CHANNELIZATION WHITE LINES
- WHITE DOTTED LINES (2' SOLID - 4' GAP)
- ← DIRECTION OF TRAFFIC FLOW



DETAIL - GORE MARKING TRANSITION CURVE

LETTER HEIGHT

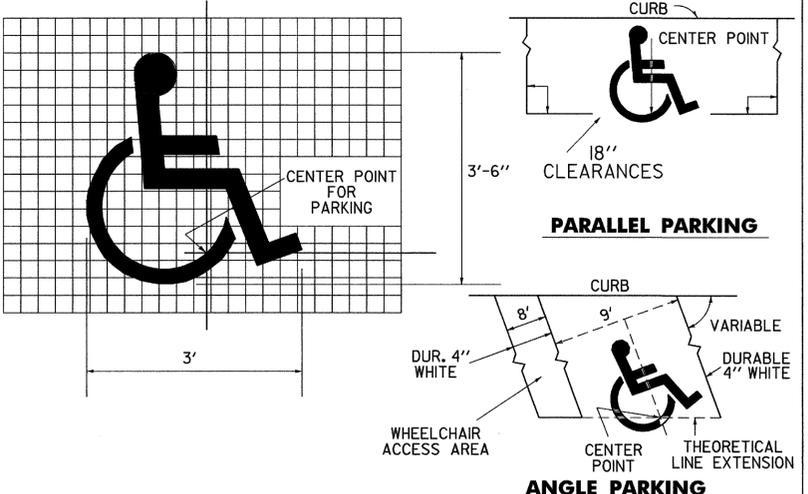
DIMENSIONS ARE FOR 8' - 4\"/>



THE LETTER "G" PERTAINS TO THE WORD "SIGNAL" FOR OTHER LETTERS, SEE ABOVE.

ARROWS AND WORD MARKINGS THAT CONFORM TO THE DIMENSIONS SHOWN ON THIS SHEET OR AS DETAILED IN THE BOOKLET ENTITLED "STANDARD ALPHABETS FOR HIGHWAY SIGNS AND PAVEMENT MARKINGS" AND THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (CURRENT EDITION) PREPARED BY THE FEDERAL HIGHWAY ADMINISTRATION WILL BE ACCEPTABLE.

LETTER IN WORD MARKING AND CROSSWALK DETAILS



HANDICAPPED PAVEMENT MARKING DETAILS

THIS SHEET IS NOT TO SCALE

OTHER STDS. REQUIRED

REVISIONS AND CORRECTIONS

- SEPT. 10, 1987 - DATE OF ORIGINAL ISSUE
- JAN. 23, 1989 - ADDED DOTTED LINES, "SIGNAL" DIMENSIONS, CLARIFIED LETTER HEIGHT.
- AUG. 18, 1995 - MISC. NOTE CHANGES
- FEB. 1, 1999 - CHANGED NOTES FOR ACCELERATION & DECELERATION LANES

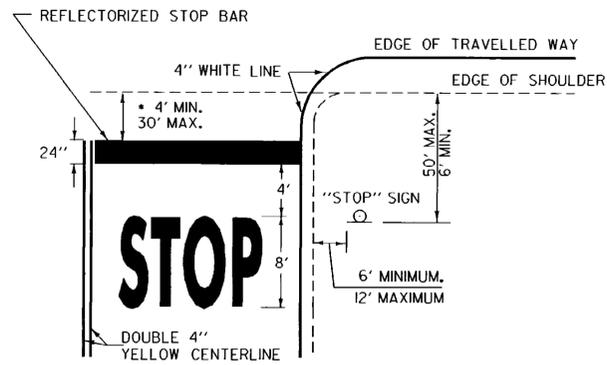
APPROVED

Robert F. Shattuck
DIRECTOR OF PROJECT DEVELOPMENT

PAVEMENT MARKING DETAILS

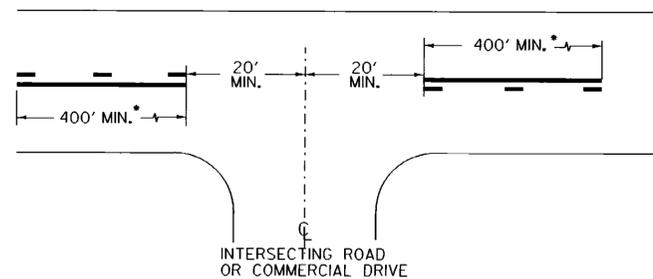


STANDARD E-191



* THE "DESIRED STOPPING POINT" IS THE LOCATION BASED ON SITE CONDITIONS THAT BEST ALLOWS THE STOPPED VEHICLE TO VIEW THE APPROACHING TRAFFIC.

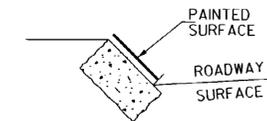
STOP BAR LAYOUT



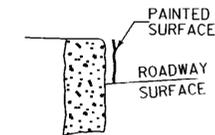
* THE SOLID LINE SHALL BE PAIRED WITH EITHER A SOLID OR DASHED LINE DEPENDING ON SIGHT DISTANCE AVAILABILITY IN THE OPPOSING DIRECTION. ADJUSTMENTS TO THE 40 FOOT CENTERLINE OPENING MAY BE MADE TO ACCOMMODATE SKEWED INTERSECTIONS.

- CENTERLINE BREAKS:
- AT ALL STATE HIGHWAYS AND TOWN HIGHWAYS, INCLUDING CLASS 4 TH'S, THAT HAVE STOP AND LEGAL LOAD LIMIT SIGNS INSTALLED
 - COMMERCIAL DRIVES:
 - WHERE A SEPERATE TURN LANE EXISTS ON THE MAIN LINE (LT. OR RT.)
 - SIGNIFICANT TRAFFIC VOLUMES EXISTS.
 - IF MOTORISTS NEED ASSISTANCE TO DEFINE ENTRANCE POINTS.

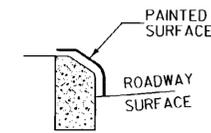
CENTERLINE LAYOUT



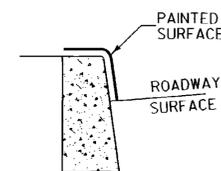
GRANITE SLOPE EDGING



VERTICAL GRANITE CURB

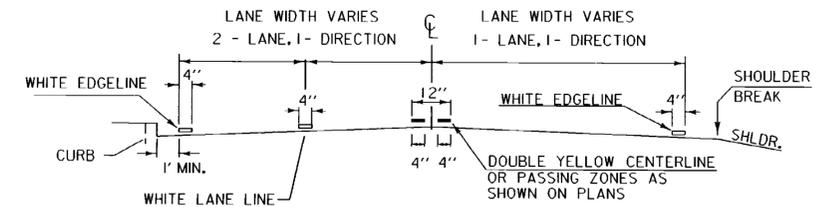


TYPE A (CONCRETE)

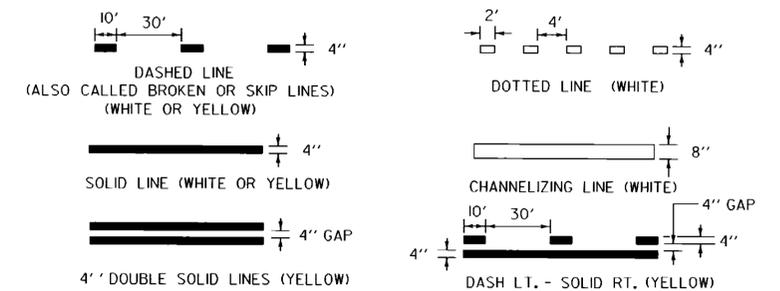


TYPE B (CONCRETE)

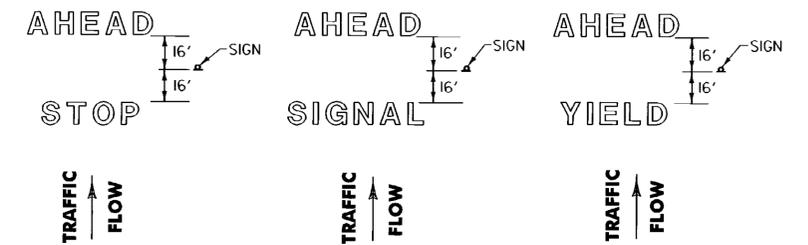
PAINTED CURB



PAVEMENT MARKING PLACEMENT DETAIL

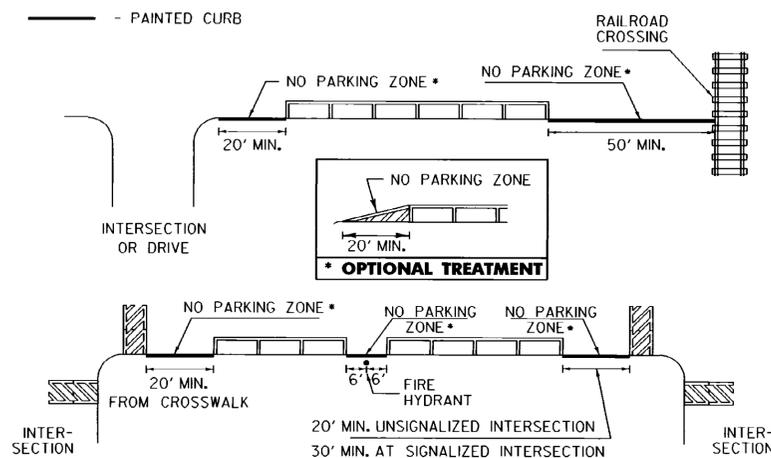


PAVEMENT MARKING LINE DETAILS

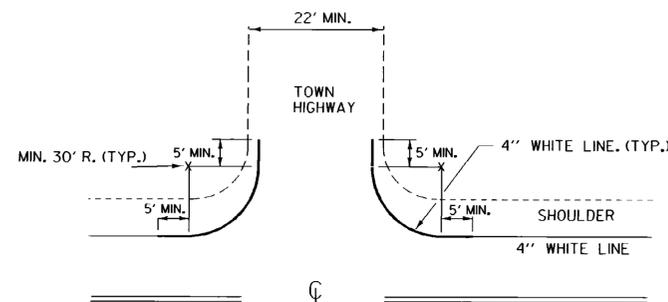


LETTER IN WORD MARKING SPACING DETAIL

NOTE: SINGLE WORDS CENTERED ON SIGN ie: SCHOOL OR YIELD



NO PARKING LAYOUT DETAILS

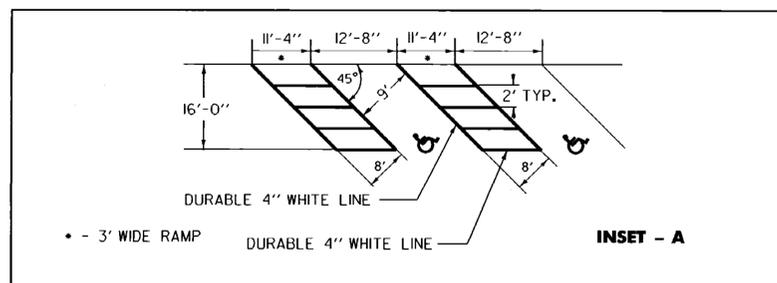


EDGE LINES SHALL BE APPLIED TO ALL STATE HIGHWAYS AND SHOULD BE MAINTAINED AT A CONSTANT DISTANCE FROM THE CENTERLINE UNLESS PAVEMENT WIDTH INCREASES TO ALLOW WIDER LANES.

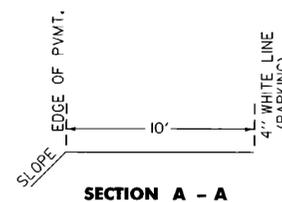
APPLY EDGE LINE AS DETAILED ON ALL PAVED CLASS 1 & CLASS 2 TOWN HIGHWAYS AND ANY CLASS 3 TOWN HIGHWAY 22 FEET OR MORE IN WIDTH.

IF MIN. 30 FOOT RADIUS CANNOT BE OBTAINED, OR THE TOWN HIGHWAY IS NOT PAVED, BREAK THE EDGE LINE USING AN 80 FOOT GAP AT INTERSECTION.

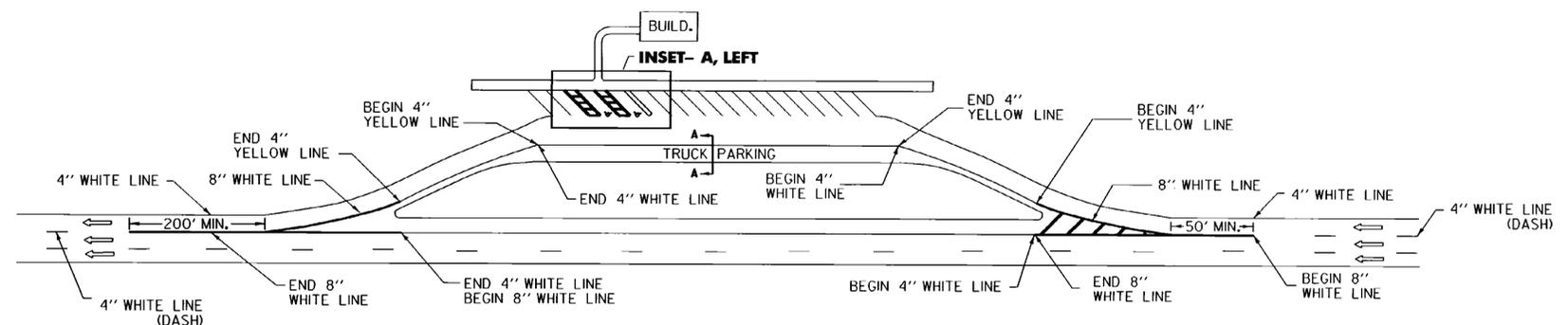
EDGE LINE LAYOUTS



NOTE: SEE STANDARD SHEET E-191 FOR HANDICAP SYMBOL POSITIONING AND DETAIL.



TRUCK PARKING DETAIL



REST AREA PARKING DETAILS

THIS SHEET IS NOT TO SCALE

OTHER STDS. E - 191, E - 192 REQUIRED

REVISIONS AND CORRECTIONS

AUG. 18, 1995 - DATE OF ORIGINAL ISSUE

APPROVED

Sandra S. McCutchen
DIRECTOR OF ENGINEERING

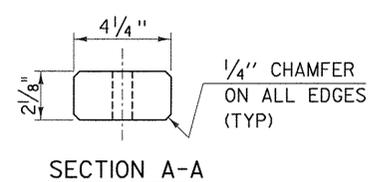
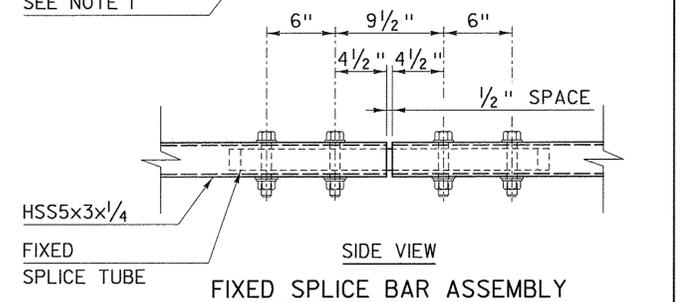
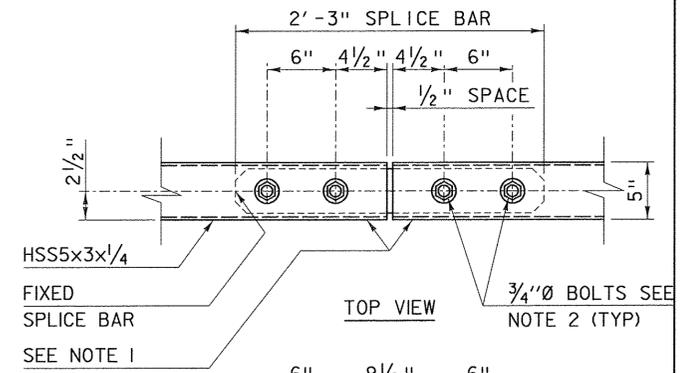
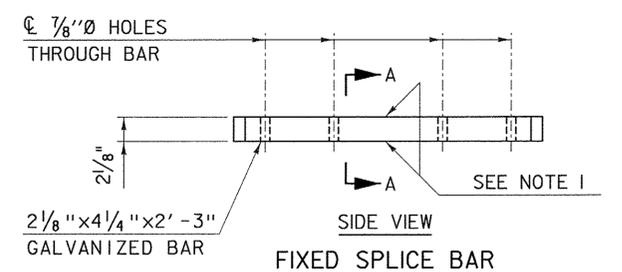
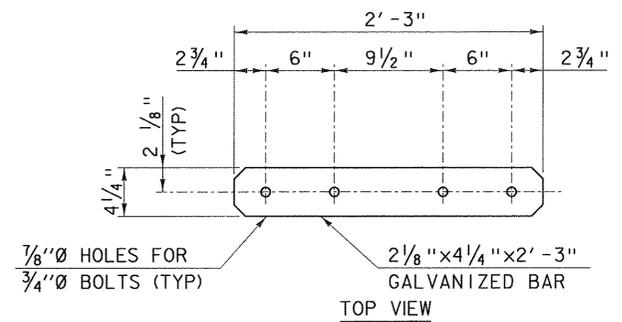
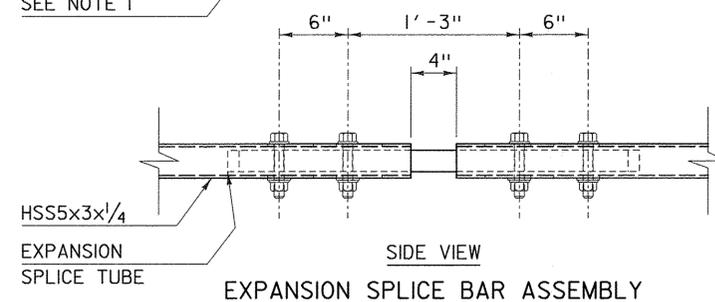
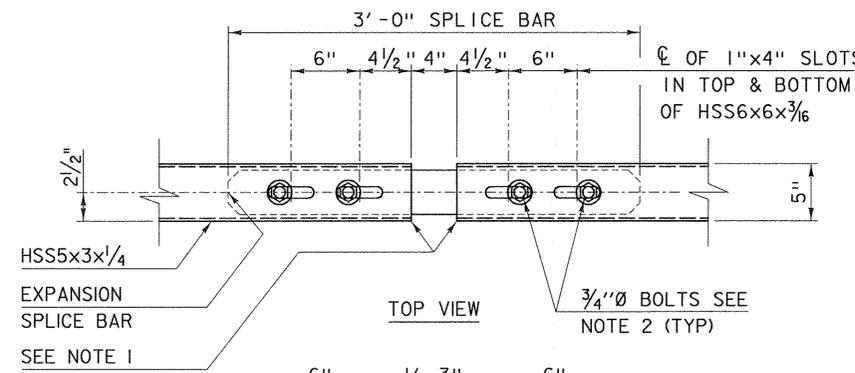
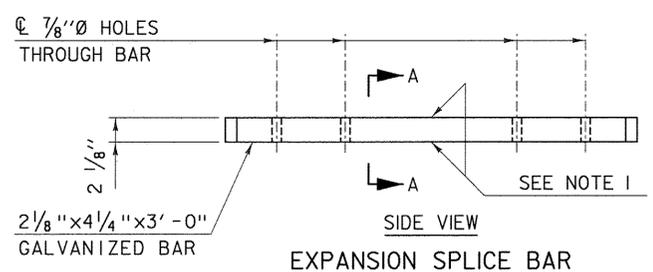
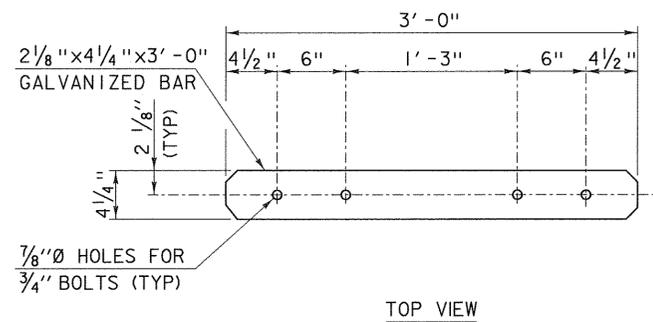
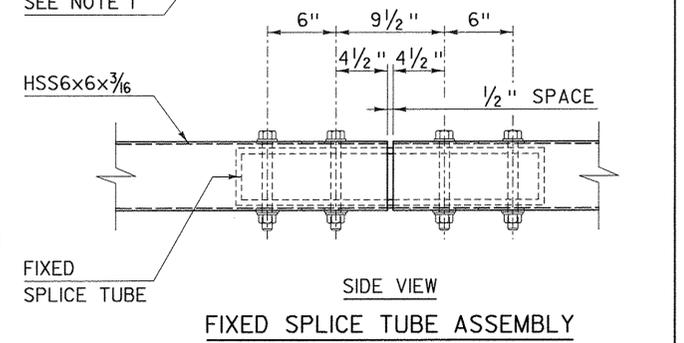
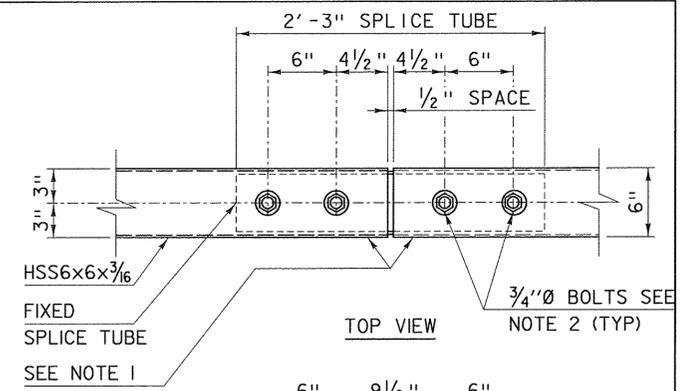
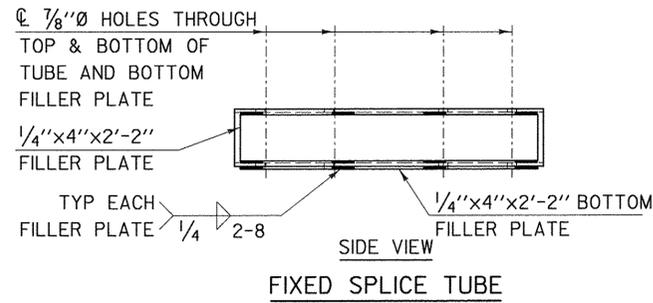
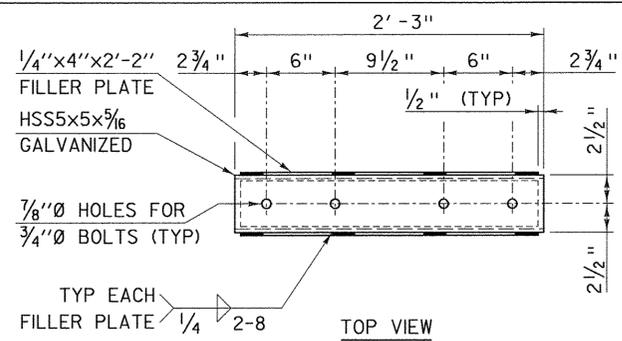
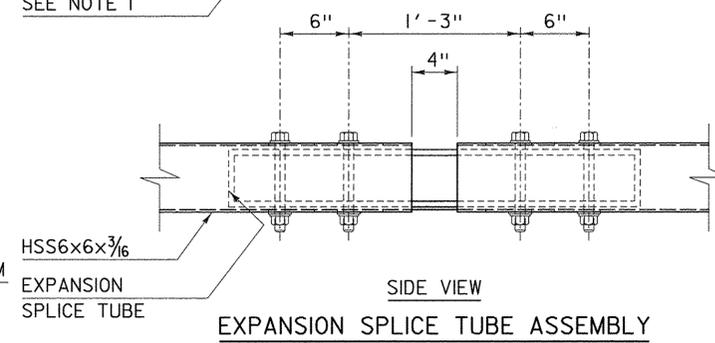
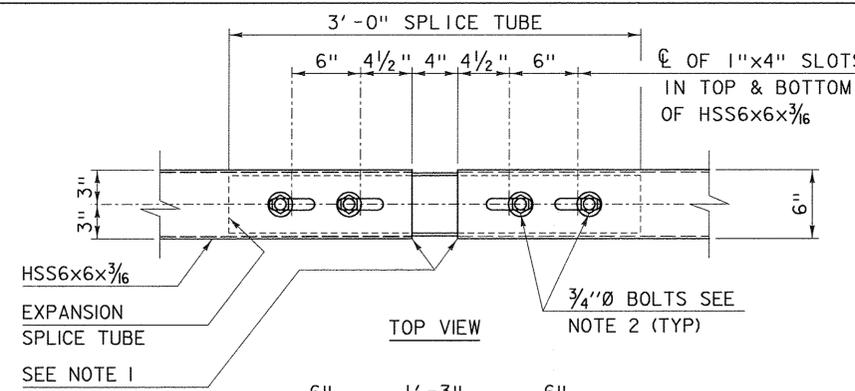
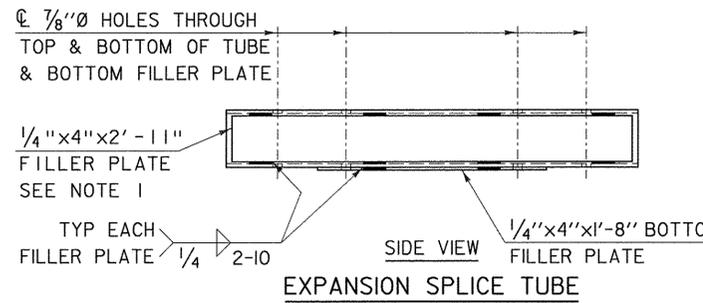
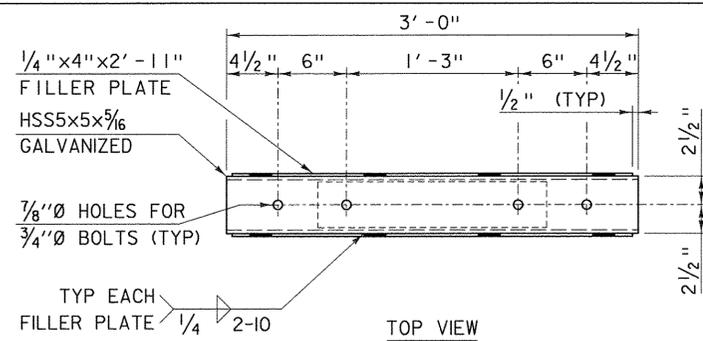
David A. Ross
TRAFFIC AND SAFETY ENGINEER

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

PAVEMENT MARKING DETAILS



STANDARD E-193



NOTES:

1. PROTRUSIONS CAUSED BY WELDING OR GALVANIZING ARE NOT PERMITTED ON THE ADJOINING SURFACES OF THE BOX BEAM RAILS, SPLICE TUBES AND FILL PLATES.
2. FOUR (4) 3/4" DIAMETER FULLY THREADED BOLTS, 7 1/2" LONG WITH TWO (2) WASHERS AND A HEAVY HEX NUT ON EACH BOLT. NUT TO BE FINGER TIGHT AND THE FIRST THREAD BELOW THE NUT TO BE BURRED TO PREVENT DISLODGING. FOUR (4) BOLTS AT EACH SPLICE.

REVISIONS AND CORRECTIONS
AUGUST 9, 2010 - ORIGINAL APPROVAL
APRIL 23, 2012 - GENERAL UPDATE 2012

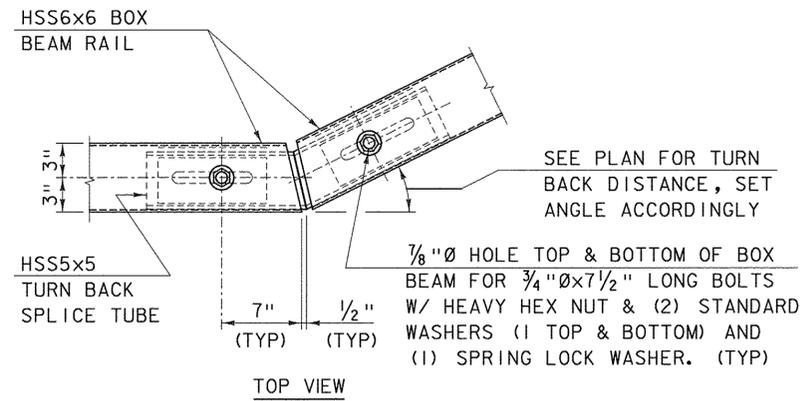
APPROVED
Wm. Michael Hedys
STRUCTURES PROGRAM MANAGER
Richard J. Petrone
DIRECTOR OF PROGRAM DEVELOPMENT
Mark D. Richter
FEDERAL HIGHWAY ADMINISTRATION

GUARDRAIL APPROACH SECTION, GALVANIZED 3 RAIL BOX BEAM

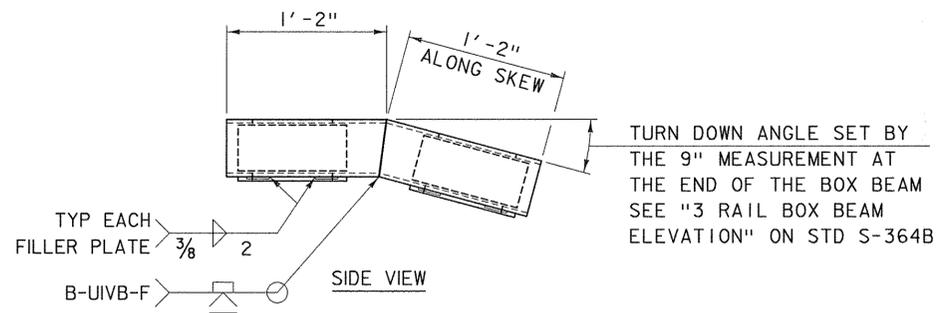
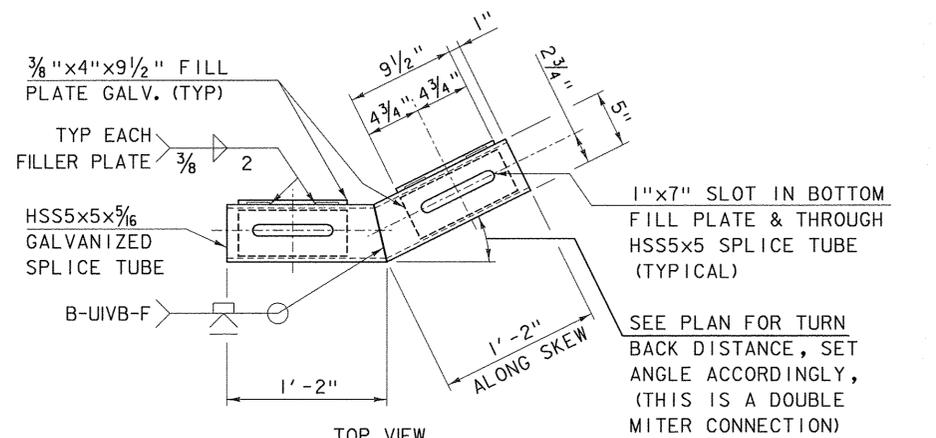
OTHER STDS. REQUIRED:



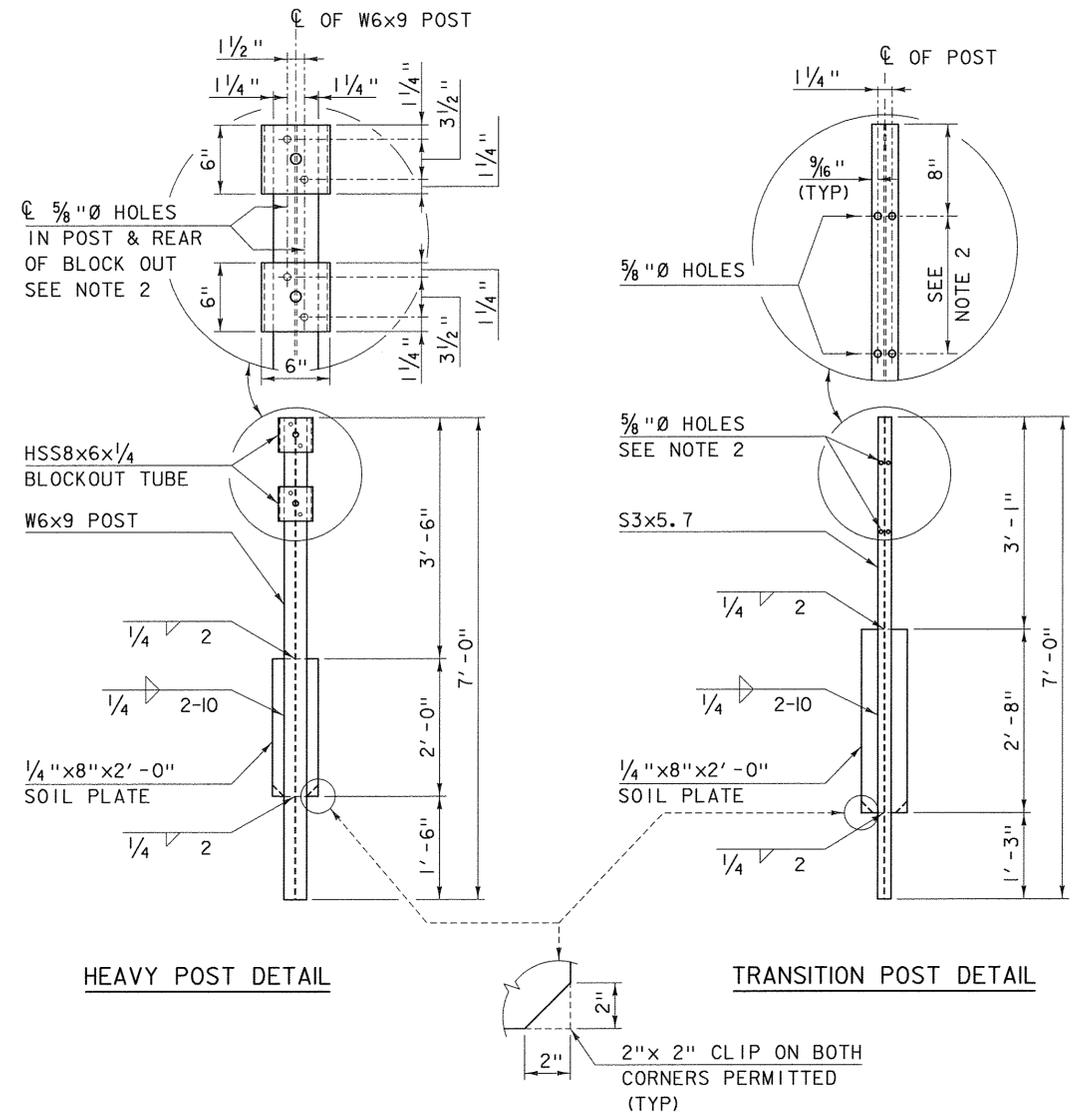
STANDARD S-364C



TURN BACK SPLICE TUBE ASSEMBLY



TURN BACK SPLICE TUBE DETAIL
TURN BACK & TURN DOWN TUBE JOINT



NOTES:

1. PROTRUSIONS CAUSED BY WELDING OR GALVANIZING ARE NOT PERMITTED ON THE ADJOINING SURFACES OF THE BOX BEAM RAILS, SPLICE TUBES AND FILL PLATES.
2. HOLES IN THE POST FOR THE LOWER RAIL MAY BE LOCATED AND DRILLED IN THE FIELD. IF SO, THE GALVANIZING SHALL BE REPAIRED IN ACCORDANCE WITH SPECIFICATION SECTION 525.

OTHER STDS. REQUIRED:

REVISIONS AND CORRECTIONS
AUGUST 9, 2010 - ORIGINAL APPROVAL
APRIL 23, 2012 - GENERAL UPDATE 2012

APPROVED

Wm. Michael Hedge
STRUCTURES PROGRAM MANAGER

Richard Fetsch
DIRECTOR OF PROGRAM DEVELOPMENT

Mark D. Richter
FEDERAL HIGHWAY ADMINISTRATION

GUARDRAIL APPROACH
SECTION, GALVANIZED
3 RAIL BOX BEAM



STANDARD
S - 364D

1. TRAFFIC CONTROL DEVICES NOT DETAILED IN THE VERMONT AGENCY OF TRANSPORTATION (VAOT) "STANDARD DRAWINGS" OR THE PROJECT PLANS SHALL BE IN ACCORDANCE WITH THE "MANUAL ON TRAFFIC CONTROL DEVICES" (MUTCD) AND THE "STANDARD HIGHWAY SIGNS AND MARKINGS" BOOK (SHSM) PUBLISHED BY THE FEDERAL HIGHWAY ADMINISTRATION (FHWA).
2. CONSTRUCTION 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.
3. CONSTRUCTION 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.
4. SIGNS SHALL BE MAINTAINED IN A CLEAN AND LEGIBLE CONDITION SATISFACTORY TO THE ENGINEER. 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.
5. NO CROSS-BRACING OR BACK-BRACING TO KEEP POSTS PLUMB WILL BE ALLOWED. CONCRETE FOUNDATIONS, COLLARS OR SOIL BEARING PLATES ARE NOT PERMITTED. CONSTRUCTION SIGNS SHALL BE PLACED ON TWO POSTS.
6. CONSTRUCTION SIGNS INSTALLED ON POSTS SHALL BE SET SECURELY IN THE GROUND. THE BOTTOM OF A SIGN SHALL BE AT LEAST FIVE FEET ABOVE THE EDGE OF PAVEMENT AND THE NEAREST EDGE OF A SIGN SHALL BE AT LEAST SIX FEET OUTSIDE THE SHOULDER POINT, FOUR FEET OUTSIDE GUARDRAIL, OR TWO 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 SEVEN FEET ABOVE THE SIDEWALK OR EDGE OF PAVEMENT, WHICHEVER IS HIGHER.
7. PORTABLE SIGNS SHALL BE PLACED ON THE EDGE OF ROADWAY AND A MINIMUM OF ONE FOOT ABOVE THE TRAVELED WAY. ALL VEGETATION THAT INTERFERES WITH VISIBILITY OF THE SIGNS SHALL BE REMOVED. WHEN PLACED BEHIND GUARDRAIL, THE BOTTOM OF THE SIGN FACE SHALL BE ABOVE THE TOP OF THE GUARDRAIL.
8. SIGNS SHALL BE REMOVED UPON COMPLETION OF THE WORK AT THE DISCRETION OF THE ENGINEER.
9. ROLL UP CONSTRUCTION SIGNS SHALL HAVE RETROREFLECTIVE SHEETING EQUAL TO OR EXCEEDING THE "AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS" (AASHTO) M 268 ["AMERICAN SOCIETY FOR TESTING AND MATERIALS" (ASTM) D 4956] TYPE VI AND TYPE VII UNLESS OTHERWISE NOTED.
10. SOLID SUBSTRATE CONSTRUCTION SIGNS SHALL HAVE RETROREFLECTIVE SHEETING EQUAL TO OR EXCEEDING THE "AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS" (AASHTO) M 268 ["AMERICAN SOCIETY FOR TESTING AND MATERIALS" (ASTM) D 4956] TYPE VIII OR IX REQUIREMENTS UNLESS OTHERWISE NOTED.
11. WHERE CONSTRUCTION SIGN INSTALLATIONS ARE NOT PROTECTED BY GUARDRAIL OR OTHER APPROVED TRAFFIC BARRIERS, ALL SIGN STANDS AND POST INSTALLATIONS SHALL MEET "NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM" (NCHRP) REPORT 350 OR THE AASHTO "MANUAL FOR ASSESSING SAFETY HARDWARE" (MASH). THE APPROPRIATE RESOURCE SHALL BE DETERMINED AS DESCRIBED IN THE MASH PUBLICATION. NO SIGN POSTS SHALL EXTEND OVER THE TOP OF THE SIGN INSTALLED ON SAID POSTS. WHEN ANCHORS ARE INSTALLED, STUBS SHALL NOT BE GREATER THAN FOUR INCHES ABOVE EXISTING GROUND.
12. ROADWAY AND SHOULDER WIDTHS DEPICTED ON THE STANDARD DRAWINGS MAY VARY.
13. THESE STANDARD DRAWINGS ARE INTENDED TO SERVE AS VTRANS STANDARD OPERATING PROCEDURE. IT IS NOTED THAT COMPONENT PARTS OF A TEMPORARY TRAFFIC CONTROL WORK ZONE MAY BE MODIFIED DUE TO FIELD CONDITIONS, AT THE DISCRETION OF THE ENGINEER.

OTHER STDS. REQUIRED: **NONE**

REVISIONS AND CORRECTIONS
AUG. 6, 2012 - ORIGINAL APPROVAL DATE

APPROVED
W.A.P.
HIGHWAY SAFETY & DESIGN ENGINEER
Rubén J. Huante
DIRECTOR OF PROGRAM DEVELOPMENT
Mark D. Richter
FEDERAL HIGHWAY ADMINISTRATION

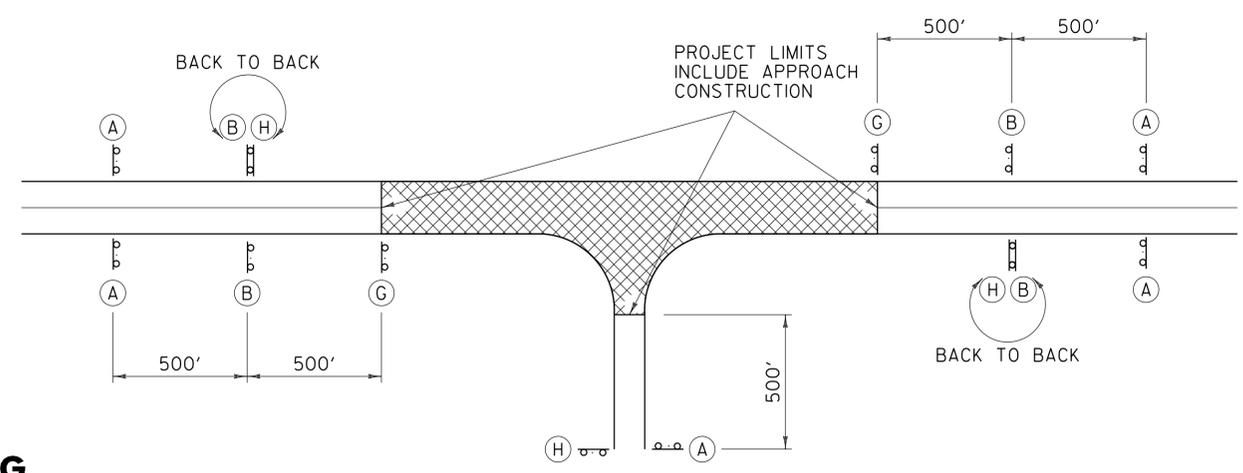
TRAFFIC CONTROL GENERAL NOTES



STANDARD T-1

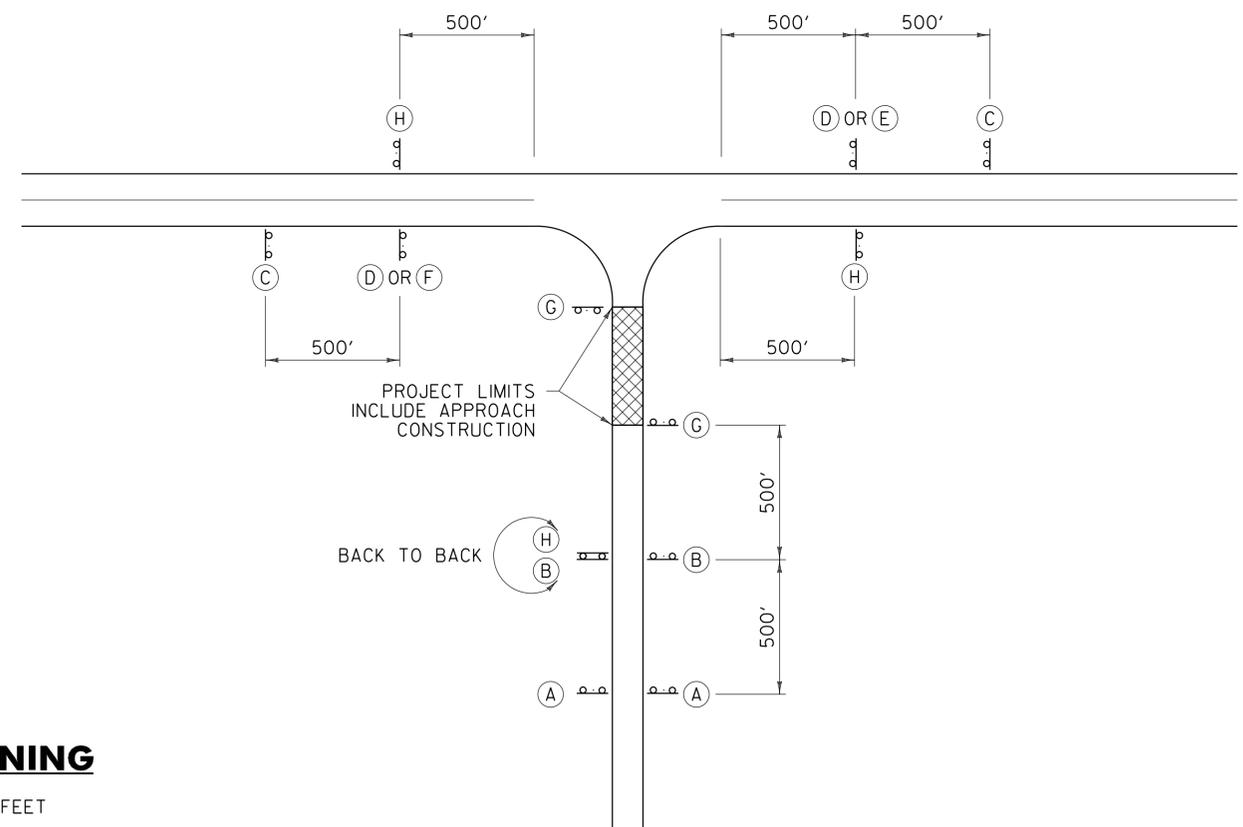
LEGEND

- (A)  ROAD WORK AHEAD
W20-1
- (B)  ROAD WORK 500 FT
W20-1
- (C)  SIDE ROAD WORK AHEAD
VC-869
- (D)  SIDE ROAD WORK 500 FT
VC-869
- (E)  SIDE ROAD WORK LEFT
VC-869
- (F)  SIDE ROAD WORK RIGHT
VC-869
- (G)  ROAD WORK NEXT XX MILES
G20-1
- (H)  END ROAD WORK
G20-2



TYPICAL APPROACH SIGNING

FIELD CONDITIONS MAY DICTATE THE ACTUAL PLACEMENT.



SIDE ROAD APPROACH SIGNING

TO BE USED WHEN CONSTRUCTION IS UP TO 1000 FEET FROM THE INTERSECTION. FIELD CONDITIONS MAY DICTATE THE ACTUAL PLACEMENT.

GENERAL NOTES:

1. 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.
2. THE "ROAD WORK NEXT XX MILES" SIGN (G20-1) SHALL BE INSTALLED IN ADVANCE OF TEMPORARY TRAFFIC CONTROL ZONES THAT ARE MORE THAN TWO MILES IN LENGTH OR AS DIRECTED BY THE ENGINEER. DISTANCES SHALL BE STATED TO THE NEAREST WHOLE MILE.
3. 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.

OTHER STDS. REQUIRED: T-1, T-28

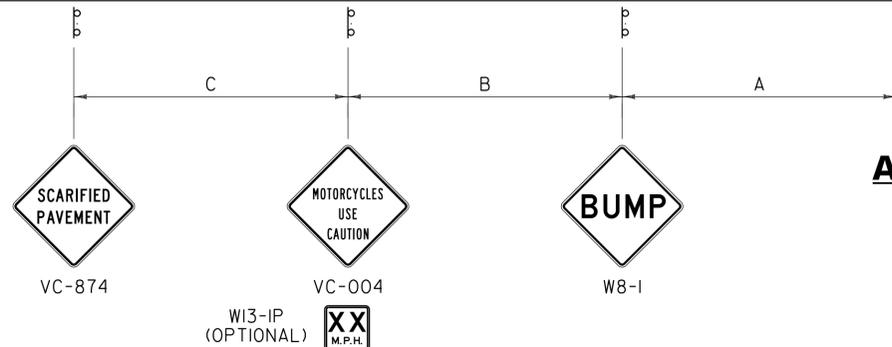
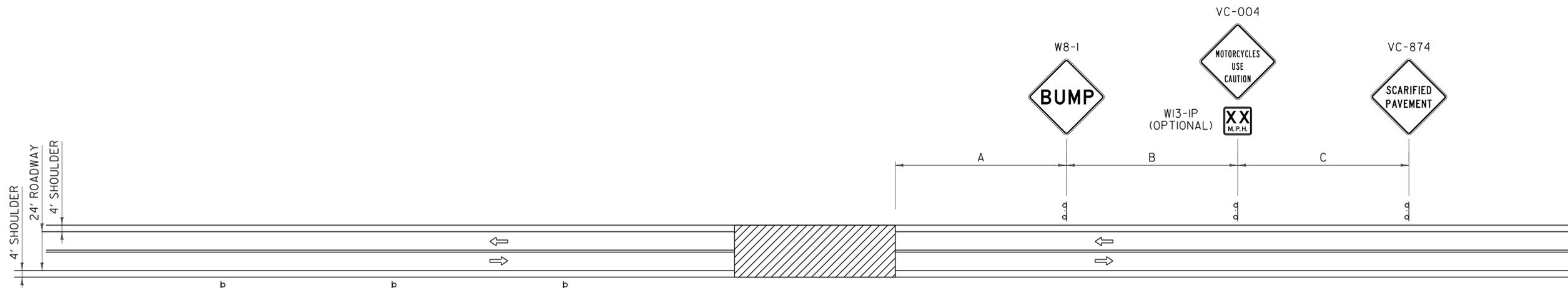
REVISIONS AND CORRECTIONS
AUG. 6, 2012 - ORIGINAL APPROVAL DATE

APPROVED
[Signature]
HIGHWAY SAFETY & DESIGN ENGINEER
[Signature]
DIRECTOR OF PROGRAM DEVELOPMENT
[Signature]
MARK D. RICHTER
FEDERAL HIGHWAY ADMINISTRATION

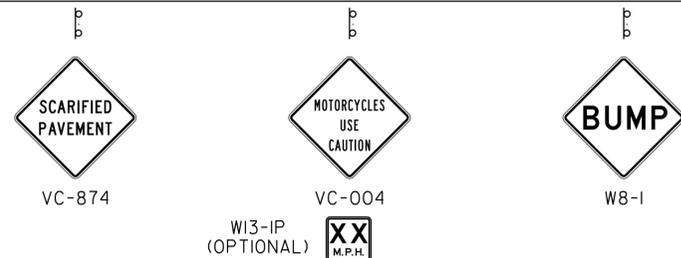
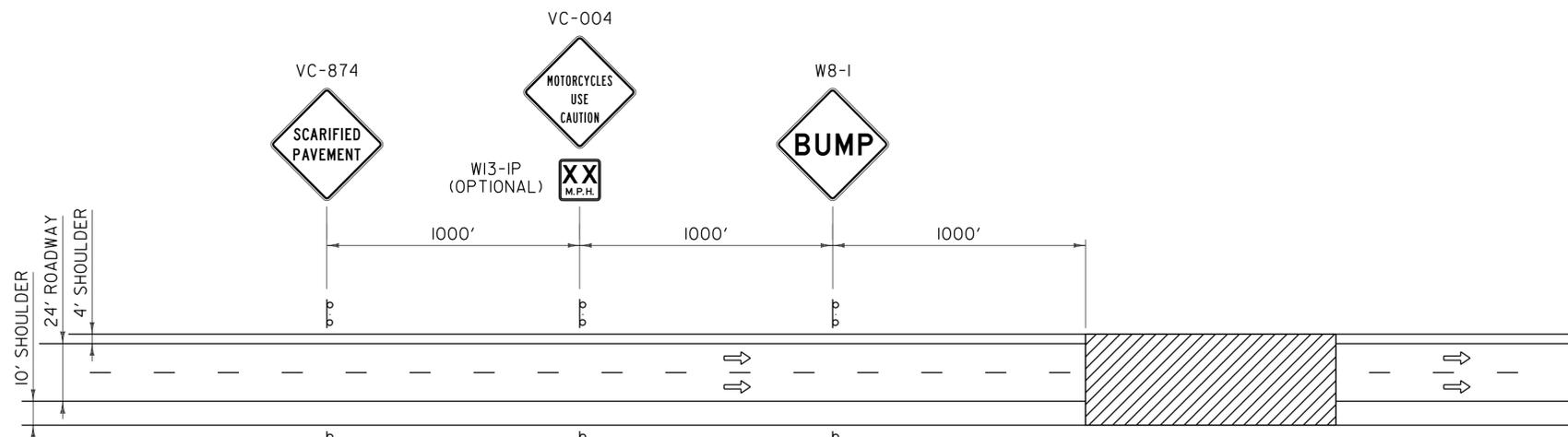
**CONVENTIONAL ROADS
CONSTRUCTION APPROACH
SIGNING**



STANDARD
T-10



**ADVANCE WARNING SIGN PACKAGE FOR
COLD PLANED (SCARIFIED) SURFACES
TWO LANE ROADWAY**



**ADVANCE WARNING SIGN PACKAGE FOR
COLD PLANED (SCARIFIED) SURFACES
DIVIDED HIGHWAY**

LEGEND

- FLOW OF TRAFFIC
- ▨ WORK AREA

GENERAL NOTES:

1. THE BUMP SIGN MAY BE ELIMINATED WHEN THERE IS NO BUMP. WHEN THE CONTRACTOR IS WORKING IN THE CONSTRUCTION AREA, THE APPROPRIATE ADVANCED WARNING SIGN PACKAGE SHALL BE USED. SEE THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) FOR ADDITIONAL INFORMATION.
2. GATE POSTING OF SIGNS IS AN OPTION AS DETERMINED BY THE ENGINEER FOR TWO LANE ROADWAY WHEN PASSING, TURNING OR CLIMBING LANES LIMIT VISIBILITY.
3. FOR DIMENSIONS A, B AND C, REFER TO THE MUTCD, USE TABLE 6C-1 (RECOMMENDED ADVANCE WARNING SIGN MINIMUM SPACING), FOR SIGN SPACING.

OTHER STDS. REQUIRED: T-1, T-28

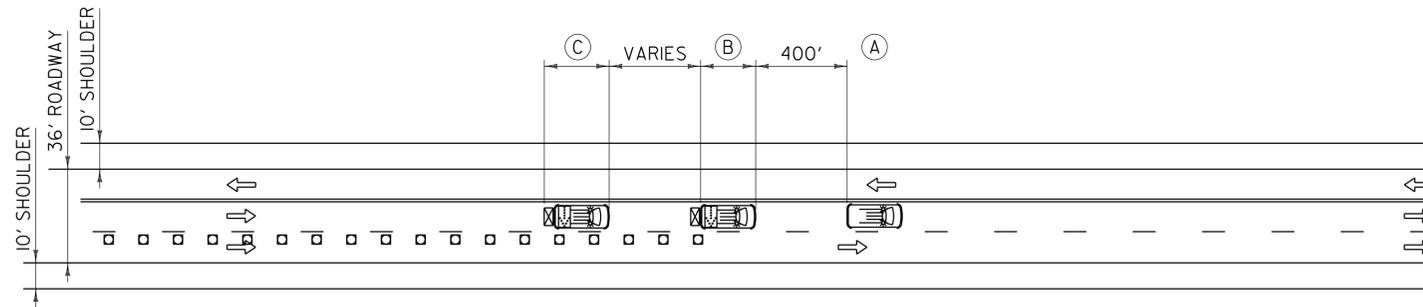
REVISIONS AND CORRECTIONS
AUG. 6, 2012 - ORIGINAL APPROVAL DATE

APPROVED
[Signature]
HIGHWAY SAFETY & DESIGN ENGINEER
[Signature]
DIRECTOR OF PROGRAM DEVELOPMENT
[Signature]
Mark D. Richter
FEDERAL HIGHWAY ADMINISTRATION

TRAFFIC CONTROL
MISCELLANEOUS DETAILS



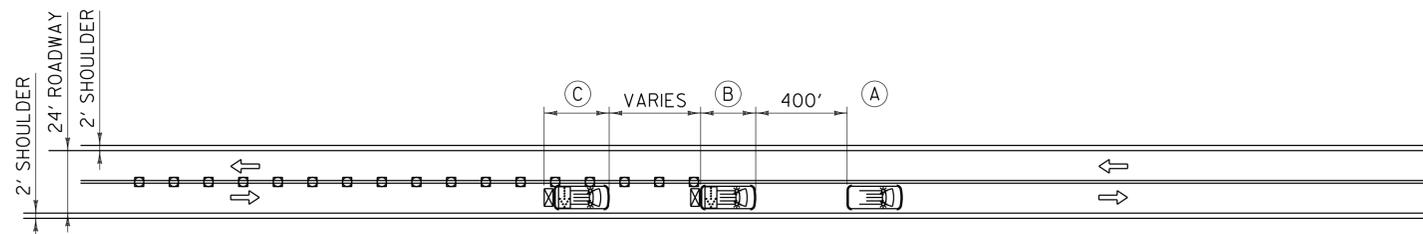
STANDARD
T-17



**PAVEMENT MARKING OPERATION
ON MULTI-LANE ROAD**

NOTES:

1. PAVEMENT MARKING OPERATION VEHICLE (C) SHOULD TRAVEL AT A VARYING DISTANCE FROM THE PAVEMENT MARKING OPERATION SO AS TO PROVIDE ADEQUATE SIGHT DISTANCE FOR TRAFFIC APPROACHING FROM THE REAR.
2. ON HIGH SPEED ROADWAYS, A THIRD PROTECTION VEHICLE SHOULD BE USED - THE FIRST PROTECTION VEHICLE ON THE SHOULDER (IF POSSIBLE), THE SECOND PROTECTION VEHICLE IN THE CLOSED LANE, AND THE THIRD PROTECTION VEHICLE IN THE CLOSED LANE.
3. ARROW PANELS SHALL BE AS A MINIMUM TYPE B, 60 INCHES BY 30 INCHES (MUTCD FIGURE 6F-6, SECTION 6F.6I).
4. WORK SHOULD BE PERFORMED DURING OFF-PEAK TRAFFIC HOURS WHEN PRACTICAL.



**PAVEMENT MARKING OPERATION
ON TWO LANE ROAD**

NOTES:

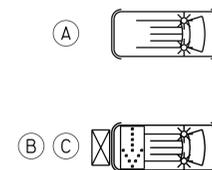
1. ALL PAVEMENT MARKING VEHICLES SHOULD PULL OVER PERIODICALLY TO ALLOW TRAFFIC TO PASS.
2. THE DISTANCE BETWEEN THE WORK AND PROTECTION VEHICLES MAY VARY ACCORDING TO TERRAIN AND OTHER FACTORS. PROTECTION VEHICLES ARE USED TO WARN TRAFFIC OF THE OPERATION AHEAD.
3. UNIFORMED TRAFFIC OFFICERS MAY BE USED TO CONTROL TRAFFIC AT INTERSECTIONS.
4. VEHICLE MOUNTED SIGNS SHALL BE MOUNTED WITH BOTTOM OF THE SIGN AT A MINIMUM HEIGHT OF ONE FOOT ABOVE THE PAVEMENT. SIGNS SHALL BE COVERED OR TURNED FROM VIEW WHEN WORK IS NOT IN PROGRESS.
5. ARROW PANELS ARE OPTIONAL; WHEN USED ARROW PANELS SHALL BE DISPLAYED IN CAUTION MODE.

- FLOW OF TRAFFIC
- ⚡ FLASHING ARROW PANEL
- ☒ TRUCK MOUNTED ATTENUATOR (TMA)
- CONE
- 🚚 PAVEMENT MARKING OPERATION VEHICLE
- Ⓐ PAVEMENT MARKING VEHICLE WITH FLASHING ARROW PANEL, "WET PAINT WITH LEFT ARROW" VC-886L, "WET PAINT WITH RIGHT ARROW" VC-886R SIGNS.
- Ⓑ PROTECTION VEHICLE WITH CONE CAPABILITIES AND TMA.
- Ⓒ PROTECTION VEHICLE WITH FLASHING ARROW PANEL, TMA, "WET PAINT" VC-885, "WET PAINT WITH LEFT ARROW" VC-886L, "WET PAINT WITH RIGHT ARROW" VC-886R SIGNS.

GENERAL NOTES:

1. ALL VEHICLES SHALL DISPLAY HIGH-INTENSITY ROTATING, FLASHING, OSCILLATING, OR STROBE LIGHTS IN ADDITION TO VEHICLE HAZARD LIGHTS.
2. PROTECTION VEHICLE SHOULD SLOW DOWN IN ADVANCE OF VERTICAL OR HORIZONTAL CURVES THAT RESTRICT SIGHT DISTANCE.
3. SIGNS LOCATED ON PAVEMENT MARKING OPERATION VEHICLES SHALL BE PLACED SO AS NOT TO OBSCURE OTHER SIGNS OR FLASHING ARROW PANELS.
4. REPEAT "WET PAINT" (VC-885) SIGN AS NEEDED AT SIDE ROADS
5. ALL DISTANCES ARE DESIRABLE MINIMUMS. FIELD CONDITIONS SHALL CONTROL THE ACTUAL SPACING OF THE VEHICLES.
6. CONE SPACING SHALL BE ADEQUATE SO THAT DRIVERS CAN ALWAYS SEE ONE CONE.

OTHER STDS. REQUIRED: T-1, T-29



**OPERATION VEHICLE
SYMBOLGY**

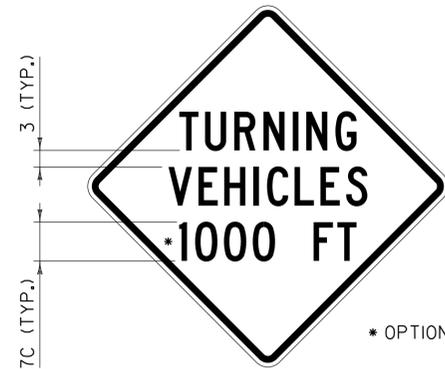
REVISIONS AND CORRECTIONS
AUG. 6, 2012 - ORIGINAL APPROVAL DATE

APPROVED
W.A.C.M.
HIGHWAY SAFETY & DESIGN ENGINEER
Rickard Thwait
DIRECTOR OF PROGRAM DEVELOPMENT
Mark D. Richter
FEDERAL HIGHWAY ADMINISTRATION

TRAFFIC CONTROL FOR
MAINTENANCE PAVEMENT
MARKING OPERATION

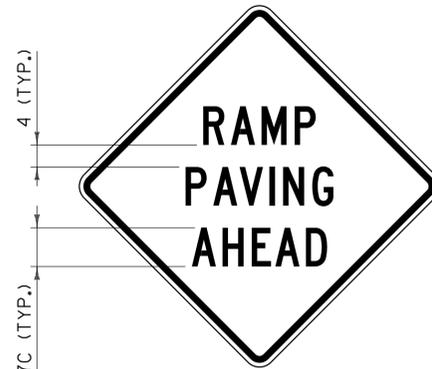


STANDARD
T-24

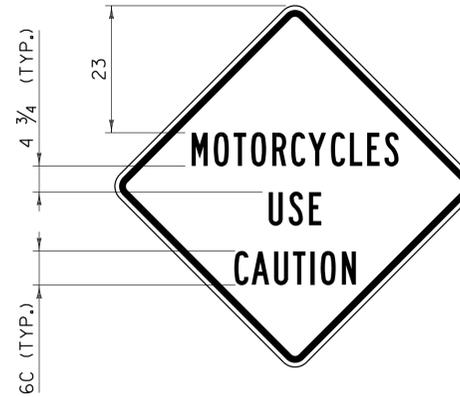


VC-001

* OPTIONS { 500
1500



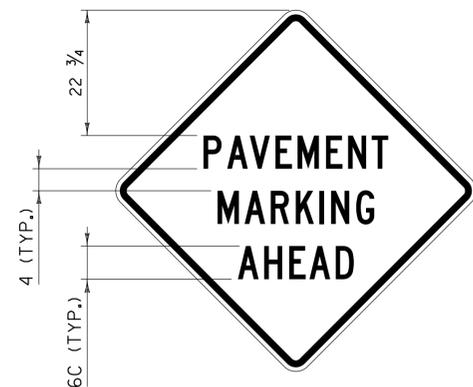
VC-003



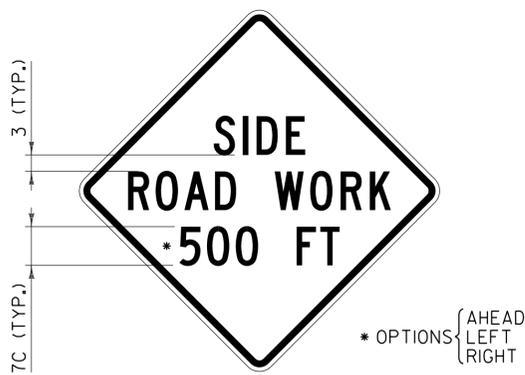
VC-004



VC-008



VC-813



VC-869

* OPTIONS { AHEAD
LEFT
RIGHT



VC-874

GENERAL NOTES:

1. COLORS FOR SIGNS SHALL BE BLACK LEGEND AND BORDER ON FLUORESCENT ORANGE BACKGROUND.
2. CONSTRUCTION SIGNS SHALL BE 48 INCH BY 48 INCH. IF SOLID SUBSTRATE SIGNS ARE USED, SIGNS SHALL HAVE CORNERS ROUNDED TO A THREE INCH RADIUS.
3. SIGNS SHALL HAVE 1 1/4 INCH WIDE BORDERS THAT ARE INDENTED 3/4 INCH FROM THE EDGE OF THE SIGN.
4. SIGNS SHALL HAVE THE LEGEND CENTERED HORIZONTALLY AND VERTICALLY ON THE SIGN UNLESS OTHERWISE INDICATED.
5. ALL DIMENSIONS SHOWN IN INCHES.

OTHER STDS. REQUIRED: T-1

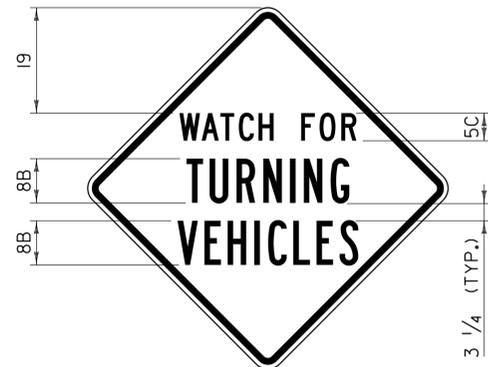
REVISIONS AND CORRECTIONS
AUG. 6, 2012 - ORIGINAL APPROVAL DATE

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CONSTRUCTION SIGN
DETAILS



STANDARD
T-28



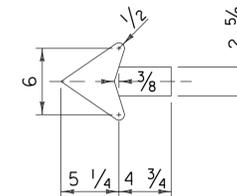
VC-883



VC-885



VC-886L



VC-886R

NOTES:

1. SIGNS SHALL BE 24 INCH BY 24 INCH. IF SOLID SUBSTRATE SIGNS ARE USED, SIGNS SHALL HAVE CORNERS ROUNDED TO A 1 1/2 INCH RADIUS.
2. SIGNS SHALL HAVE 5/8 INCH WIDE BORDERS THAT ARE INDENTED 3/8 INCH FROM THE EDGE OF THE SIGN.



VC-887

GENERAL NOTES:

1. COLORS FOR SIGNS SHALL BE BLACK LEGEND AND BORDER ON FLUORESCENT ORANGE BACKGROUND.
2. CONSTRUCTION SIGNS SHALL BE 48 INCH BY 48 INCH UNLESS OTHERWISE NOTED. IF SOLID SUBSTRATE SIGNS ARE USED, SIGNS SHALL HAVE CORNERS ROUNDED TO A THREE INCH RADIUS UNLESS OTHERWISE NOTED.
3. SIGNS SHALL HAVE 1 1/4 INCH WIDE BORDERS THAT ARE INDENTED 3/4 INCH FROM THE EDGE OF THE SIGN UNLESS OTHERWISE NOTED.
4. SIGNS SHALL HAVE THE LEGEND CENTERED HORIZONTALLY AND VERTICALLY ON THE SIGN UNLESS OTHERWISE INDICATED.
5. ALL DIMENSIONS SHOWN IN INCHES.

OTHER STDS. REQUIRED: T-1

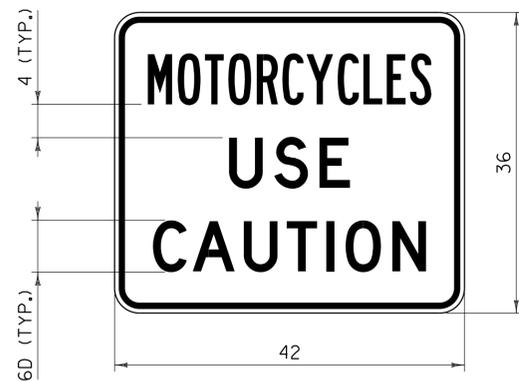
REVISIONS AND CORRECTIONS
AUG. 6, 2012 - ORIGINAL APPROVAL DATE

APPROVED
[Signature]
HIGHWAY SAFETY & DESIGN ENGINEER
[Signature]
DIRECTOR OF PROGRAM DEVELOPMENT
[Signature]
Mark D. Richter
FEDERAL HIGHWAY ADMINISTRATION

CONSTRUCTION SIGN
DETAILS



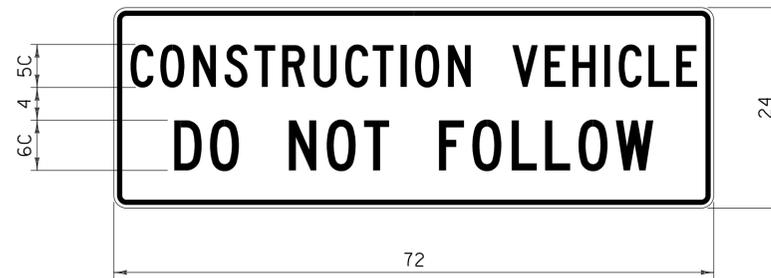
STANDARD
T-29



VC-004P

NOTES:

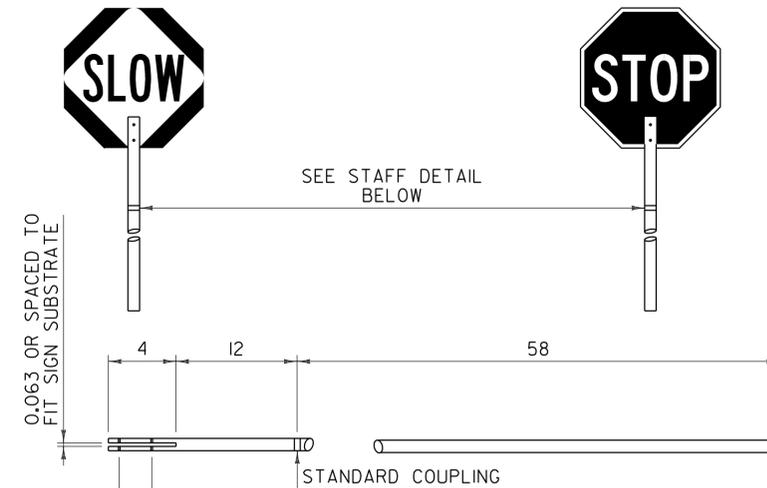
1. CORNERS SHALL BE ROUNDED TO A THREE INCH RADIUS.
2. THE BORDER SHALL BE 3/4 INCH WIDE WITH A 1/2 INCH INDENT FROM THE EDGE OF THE SIGN.
3. "MOTORCYCLES" SHALL HAVE A SPECIFIED WIDTH OF 34 INCHES.
4. "USE" SHALL HAVE A SPECIFIED WIDTH OF 14 1/2 INCHES.
5. "CAUTION" SHALL HAVE A SPECIFIED WIDTH OF 32 3/4 INCHES.
6. SIGN SHALL ONLY BE INSTALLED AS A SUPPLEMENTAL TO A PARENT WARNING SIGN AND SHALL NOT BE INSTALLED BY ITSELF.



VC-007

NOTES:

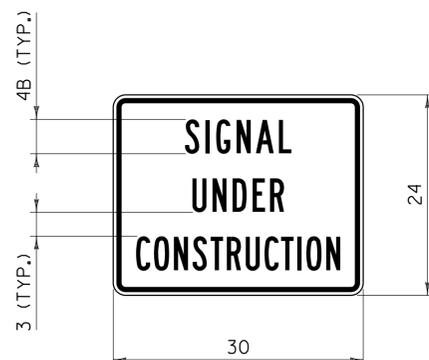
1. CORNERS SHALL BE ROUNDED TO A 1 1/2 INCH RADIUS.
2. THE BORDER SHALL BE 5/8 INCH WIDE WITH A 3/8 INCH INDENT FROM THE EDGE OF THE SIGN.
3. "CONSTRUCTION VEHICLE" SHALL HAVE A SPECIFIED WIDTH OF 68 INCHES.
4. "DO NOT FOLLOW" SHALL HAVE A SPECIFIED WIDTH OF 57 1/2 INCHES.
5. SIGN SHALL BE MOUNTED IN A CONSPICUOUS LOCATION ON THE REAR OF THE CONSTRUCTION VEHICLE.
6. THE SIGN SHALL BE MOUNTED AS NOT TO INTERFERE WITH THE VISIBILITY OF DIRECTIONAL SIGNALS OR TAIL LIGHTS AS REQUIRED BY LAW.
7. SIGN SHALL BE COVERED OR REMOVED WHEN NOT IN USE.



STOP-SLOW PADDLE & STAFF DETAIL

NOTES:

1. REFER TO THE "STANDARD HIGHWAY SIGNS AND MARKINGS" BOOK (SHSM) "TEMPORARY TRAFFIC CONTROL - WARNING SIGNS" FOR THE STOP-SLOW PADDLE DESIGN.
2. COLORS FOR THE SLOW SIDE OF THE PADDLE SHALL BE BLACK LEGEND AND BORDER ON A FLUORESCENT ORANGE DIAMOND WITH RETROREFLECTIVE SHEETING EQUAL TO OR EXCEEDING AASHTO M 268 [ASTM D 4956] TYPE VII, VIII OR IX REQUIREMENTS.
3. COLORS FOR THE STOP SIDE OF THE PADDLE SHALL BE WHITE RETROREFLECTIVE LEGEND AND BORDER ON A RED RETROREFLECTIVE OCTAGON. BOTH COLORS SHALL HAVE RETROREFLECTIVE SHEETING EQUAL TO OR EXCEEDING AASHTO M 268 [ASTM D 4956] TYPE III.
4. SIGN SUBSTRATE MATERIALS SHALL BE ALUMINUM, ACRYLONITRILE BUTADIENE STYRENE (ABS) PLASTIC OR EQUIVALENT.
5. THE STAFF MAY BE RIGID ABS PLASTIC OR WOOD WITH A ONE TO 1 1/2 INCH DIAMETER.
6. 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, DEFACTED OR DIRTY SIGNS SHALL BE REPAIRED, CLEANED OR REPLACED AS ORDERED BY THE ENGINEER.



VC-820

NOTES:

1. CORNERS SHALL BE ROUNDED TO A 1 1/2 INCH RADIUS.
2. THE BORDER SHALL BE 5/8 INCH WIDE WITH A 3/8 INCH INDENT FROM THE EDGE OF THE SIGN.
3. "SIGNAL" SHALL HAVE A SPECIFIED WIDTH OF 12 3/4 INCHES.
4. "UNDER" SHALL HAVE A SPECIFIED WIDTH OF 11 INCHES.
5. "CONSTRUCTION" SHALL HAVE A SPECIFIED WIDTH OF 24 1/2 INCHES.
6. SIGN SHALL ONLY BE INSTALLED AS A SUPPLEMENTAL TO A PARENT WARNING SIGN AND SHALL NOT BE INSTALLED BY ITSELF.

GENERAL NOTES:

1. ALL LEGEND SHALL BE CENTERED VERTICALLY AND HORIZONTALLY UNLESS OTHERWISE NOTED.
2. COLORS FOR SIGNS SHALL BE BLACK LEGEND AND BORDER ON FLUORESCENT ORANGE BACKGROUND UNLESS OTHERWISE NOTED.
3. ALL DIMENSIONS IN INCHES.

OTHER STDS. REQUIRED: T-1

REVISIONS AND CORRECTIONS
AUG. 6, 2012 - ORIGINAL APPROVAL DATE

APPROVED
[Signature]
HIGHWAY SAFETY & DESIGN ENGINEER
[Signature]
DIRECTOR OF PROGRAM DEVELOPMENT
[Signature]
MARK D. RICHTER
FEDERAL HIGHWAY ADMINISTRATION

CONSTRUCTION SIGN
DETAILS



STANDARD
T-30

1 - ADDISON	2 - BENNINGTON	3 - CALEDONIA	4 - CHITTENDEN	5 - ESSEX	6 - FRANKLIN	7 - GRAND ISLE	8 - LAMOILLE
0101 ADDISON 0102 BRIDPORT 0103 BRISTOL 0104 CORNWALL 0105 FERRISBURGH 0106 GOSHEN 0107 GRANVILLE 0108 HANCOCK 0109 LEICESTER 0110 LINCOLN 0111 MIDDLEBURY 0112 MONKTON 0113 NEW HAVEN 0114 ORWELL 0115 PANTON 0116 RIPTON 0117 SALISBURY 0118 SHOREHAM 0119 STARKSBORO 0120 VERGENNES 0121 WALTHAM 0122 WEYBRIDGE 0123 WHITING	0201 ARLINGTON 0202 BENNINGTON 0203 DORSET 0204 GLASTENBURY 0205 LANDGROVE 0206 MANCHESTER 0207 PERU 0208 POWNAL 0209 READSBORO 0210 RUPERT 0211 SANDGATE 0212 SEARSBURG 0213 SHAFTSBURY 0214 STAMFORD 0215 SUNDERLAND 0216 WINHALL 0217 WOODFORD	0301 BARNET 0302 BURKE 0303 DANVILLE 0304 GROTON 0305 HARDWICK 0306 KIRBY 0307 LYNDON 0308 NEWARK 0309 PEACHAM 0310 RYEGATE 0311 ST JOHNSBURY 0312 SHEFFIELD 0313 STANNARD 0314 SUTTON 0315 WALDEN 0316 WATERFORD 0317 WHEELLOCK	0401 BOLTON 0402 BUELS GORE 0403 BURLINGTON 0404 CHARLOTTE 0405 COLCHESTER 0406 ESSEX 0407 HINESBURG 0408 HUNTINGTON 0409 JERICHO 0410 MILTON 0411 RICHMOND 0412 ST GEORGE 0413 SHELburne 0414 SO BURLINGTON 0415 UNDERHILL 0416 WESTFORD 0417 WILLISTON 0418 WINOOSKI	0501 AVERILL 0502 AVERYS GORE 0503 BLOOMFIELD 0504 BRIGHTON 0505 BRUNSWICK 0506 CANAAN 0507 CONCORD 0508 EAST HAVEN 0509 FERDINAND 0510 GRANBY 0511 GUILDHALL 0512 LEMINGTON 0513 LEWIS 0514 LUNENBURG 0515 MAIDSTONE 0516 NORTON 0517 VICTORY 0518 WARNERS GRANT 0519 WARREN GORE	0601 BAKERSFIELD 0602 BERKSHIRE 0603 ENOSBURG 0604 FAIRFAX 0605 FAIRFIELD 0606 FLETCHER 0607 FRANKLIN 0608 GEORGIA 0609 HIGHGATE 0610 MONTGOMERY 0611 RICHFORD 0612 ST ALBANS CITY 0613 ST ALBANS TOWN 0614 SHELDON 0615 SWANTON	0701 ALBURGH 0702 GRAND ISLE 0703 ISLE LA MOTTE 0704 NORTH HERO 0705 SOUTH HERO	0801 BELVIDERE 0802 CAMBRIDGE 0803 EDEN 0804 ELMORE 0805 HYDE PARK 0806 JOHNSON 0807 MORRISTOWN 0808 STOWE 0809 WATERVILLE 0810 WOLCOTT

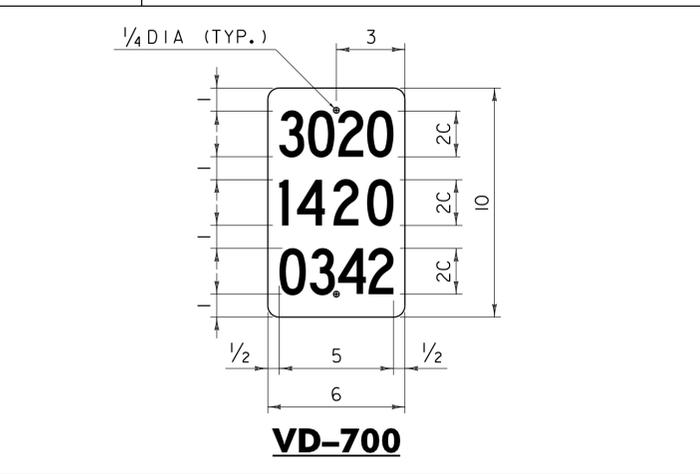
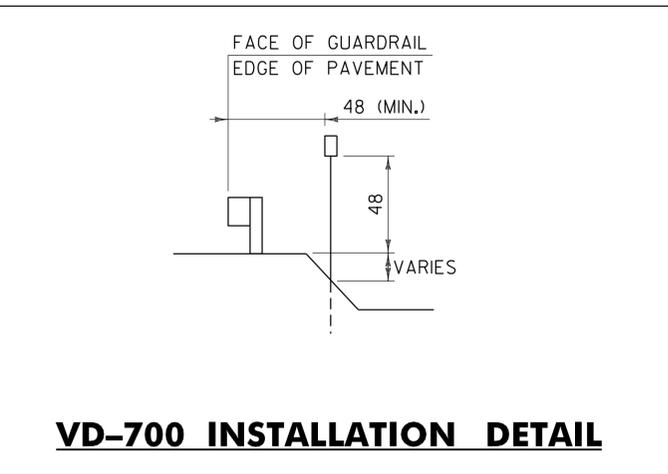
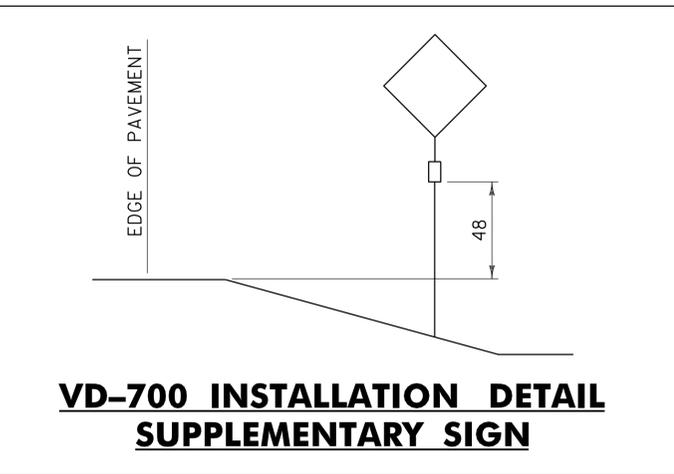
9 - ORANGE	10 - ORLEANS	11 - RUTLAND	12 - WASHINGTON	13 - WINDHAM	14 - WINDSOR
0901 BRADFORD 0902 BRAINTREE 0903 BROOKFIELD 0904 CHELSEA 0905 CORINTH 0906 FAIRLEE 0907 NEWBURY 0908 ORANGE 0909 RANDOLPH 0910 STRAFFORD 0911 THETFORD 0912 TOPSHAM 0913 TUNBRIDGE 0914 VERSHIRE 0915 WASHINGTON 0916 WEST FAIRLEE 0917 WILLIAMSTOWN	1001 ALBANY 1002 BARTON 1003 BROWNINGTON 1004 CHARLESTON 1005 COVENTRY 1006 CRAFTSBURY 1007 DERBY 1008 GLOVER 1009 GREENSBORO 1010 HOLLAND 1011 IRASBURG 1012 JAY 1013 LOWELL 1014 MORGAN 1015 NEWPORT CITY 1016 NEWPORT TOWN 1017 TROY 1018 WESTFIELD 1019 WESTMORE	1101 BENSON 1102 BRANDON 1103 CASTLETON 1104 CHITTENDEN 1105 CLARENDON 1106 DANBY 1107 FAIR HAVEN 1108 HUBBARDTOWN 1109 IRA 1110 MENDON 1111 MIDDLETOWN SPRINGS 1112 MT HOLLY 1113 MT TABOR 1114 PAWLET 1115 PITTSFIELD 1116 PITTSFORD 1117 POULTNEY 1118 PROCTOR 1119 RUTLAND CITY 1120 RUTLAND TOWN 1121 KILLINGTON 1122 SHREWSBURY 1123 SUDBURY 1124 TINMOUTH 1125 WALLINGFORD 1126 WELLS 1127 WEST HAVEN 1128 WEST RUTLAND	1201 BARRE CITY 1202 BARRE TOWN 1203 BERLIN 1204 CABOT 1205 CALAIS 1206 DUXBURY 1207 E MONTPELIER 1208 FAYSTON 1209 MARSHFIELD 1210 MIDDLESEX 1211 MONTPELIER 1212 MORETOWN 1213 NORTHFIELD 1214 PLAINFIELD 1215 ROXBURY 1216 WAITSFIELD 1217 WARREN 1218 WATERBURY 1219 WOODBURY 1220 WORCESTER	1301 ATHENS 1302 BRATTLEBORO 1303 BROOKLINE 1304 DOVER 1305 DUMMERSTON 1306 GRAFTON 1307 GUILFORD 1308 HALIFAX 1309 JAMAICA 1310 LONDONDERRY 1311 MARLBORO 1312 NEWFANE 1313 PUTNEY 1314 ROCKINGHAM 1315 SOMERSET 1316 STRATTON 1317 TOWNSEND 1318 VERNON 1319 WARDSBORO 1320 WESTMINSTER 1321 WHITINGHAM 1322 WILMINGTON 1323 WINDHAM	1401 ANDOVER 1402 BALTIMORE 1403 BARNARD 1404 BETHEL 1405 BRIDGEWATER 1406 CAVENDISH 1407 CHESTER 1408 HARTFORD 1409 HARTLAND 1410 LUDLOW 1411 NORWICH 1412 PLYMOUTH 1413 POMFRET 1414 READING 1415 ROCHESTER 1416 ROYALTON 1417 SHARON 1418 SPRINGFIELD 1419 STOCKBRIDGE 1420 WEATHERSFIELD 1421 WESTON 1422 WEST WINDSOR 1423 WINDSOR 1424 WOODSTOCK

9020 BARNET STATE HIGHWAY
9025 BENNINGTON NORTH STATE HIGHWAY
9030 BERLIN STATE HIGHWAY
9090 BRATTLEBORO STATE HIGHWAY
9150 CASTLETON STATE HIGHWAY
9180 COVENTRY STATE HIGHWAY
9210 FAIR HAVEN STATE HIGHWAY
9240 FAIRLEE STATE HIGHWAY
9270 FERRISBURGH STATE HIGHWAY
9330 MAIDSTONE STATE HIGHWAY
9360 MIDDLESEX STATE HIGHWAY
9390 MONTPELIER STATE HIGHWAY
9420 MONTPELIER JUNCTION STATE HIGHWAY
9430 NEWBURY STATE HIGHWAY
9480 NORTON STATE HIGHWAY
9540 NORWICH STATE HIGHWAY
9600 PUTNEY STATE HIGHWAY
9630 QUECHEE STATE HIGHWAY
9720 ST ALBANS STATE HIGHWAY SOUTH
9730 ST JOHNSBURY STATE HIGHWAY
9750 SOUTH ALBURGH STATE HIGHWAY
9840 WESTMINSTER STATE HIGHWAY
9870 WILDER STATE HIGHWAY
9900 WINHALL STATE HIGHWAY
9990 WEST RUTLAND - RUTLAND (BUSINESS US-4)
9991 BELLOWS FALLS S0117 (ROCK - WEST ST)
9992 BELLOWS FALLS S0117 (BRIDGE ST)
9993 BURLINGTON (ALTERNATE US-7)
9994 DERBY (ALTERNATE US-5)
9995 MONTPELIER (BUSINESS US-2)
9996 NEWPORT (ALTERNATE US-5)
9997 ST JOHNSBURY (ALTERNATE US-5)
9998 SO BURLINGTON - KENNEDY DRIVE

NAMED STATE AND TOWN HIGHWAYS ROUTE NUMBERS

GENERAL NOTES:

- MILEMARKERS ARE TO BE INSTALLED ALONG THE FEDERAL AID HIGHWAY SYSTEM INCLUDING ALL STATE HIGHWAYS AND TOWN HIGHWAYS ON THE FEDERAL AID HIGHWAY SYSTEM.
- MILEMARKERS WILL NORMALLY BE INSTALLED AT EACH 0.20 MILE INTERVAL, ALTERNATING SIDES OF THE ROAD, RESULTING IN A SIGN FACING TRAFFIC EACH 0.40 MILES. A MILEMARKER WILL ALSO BE INSTALLED AT EACH INTERSECTION, ON THE SAME POST AS THE STOP SIGN (MILEMARKER TO BE PLACED PARALLEL TO MAINLINE TRAVELED WAY, VISIBLE TO TRAFFIC). ANY MILEMARKER LOCATION FALLING WITHIN 0.05 MILE OF AN INTERSECTION WILL BE OMITTED. WHEN THE NORMAL LOCATION OF A MILEMARKER IS UNDESIRABLE, SUCH AS ON A LAWN, DRIVEWAY, OR LEDGE, AN ATTEMPT WILL BE MADE TO LOCATE IT ON THE OPPOSITE SIDE OF THE ROAD. IF NO SUITABLE LOCATION CAN BE FOUND WITHIN 20 FEET OF THE NORMAL LOCATION, IT MAY BE OMITTED.
- ON CLASS I TOWN HIGHWAYS OR OTHER CONGESTED LOCATIONS MILEMARKERS WILL ONLY BE INSTALLED ON EXISTING SIGN POSTS AND WILL CARRY THE ACTUAL MILEAGE TO THAT LOCATION. A MILEMARKER LOCATED EVERY 0.10 MILES IS DESIRABLE THROUGH THESE LOCATIONS.
- THE FIRST LINE OF TEXT ON MILEMARKERS INDICATE THE STATE ROUTE NUMBER. THE FOURTH NUMERAL BEING THE CORRESPONDING ROUTE NUMBER LETTER DESIGNATION. FOR EXAMPLE US-2 (WHICH HAS NO LETTER DESIGNATION) WOULD BE IDENTIFIED USING 0020 AND VT-100B WOULD BE IDENTIFIED USING 1002. FOR ANY NAMED FEDERAL AID HIGHWAY SYSTEM HIGHWAYS, THE FOUR DIGIT ROUTE NUMBER (9000 SERIES) LISTED UNDER "NAMED STATE AND TOWN HIGHWAYS ROUTE NUMBERS" SHALL BE UTILIZED.
- THE SECOND LINE OF TEXT ON MILEMARKERS INDICATE THE COUNTY AND TOWN. THE COUNTY IS INDICATED IN THE FIRST AND SECOND NUMERALS AND THE TOWN IN THE THIRD AND FOURTH NUMERALS. THE APPROPRIATE FOUR DIGIT DESIGNATIONS ARE LISTED PER TOWN, UNDER "COUNTY AND TOWN DESIGNATIONS."
- THE THIRD LINE OF TEXT ON MILEMARKERS INDICATE THE MILEAGE, IN HUNDREDTHS, FROM THE TOWN LINE OR BEGINNING OF A ROUTE. MILEAGE IS ALWAYS MEASURED TRAVELING FROM THE SOUTH TO NORTH OR FROM THE WEST TO EAST. THE ROUTE DIRECTION IS ESTABLISHED USING THE VERMONT AGENCY OF TRANSPORTATION (VAOT) ROUTE LOGS.
- THE SIGN BASE MATERIAL SHALL BE 0.063 INCH FLAT SHEET ALUMINUM.
- THE SIGN SHALL BE WHITE RETROREFLECTIVE LEGEND ON A GREEN RETROREFLECTIVE BACKGROUND, BOTH SHALL HAVE RETROREFLECTIVE SHEETING EQUAL TO OR EXCEEDING "AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS" (AASHTO) M 268 ["AMERICAN SOCIETY FOR TESTING AND MATERIALS" (ASTM) D 4956] TYPE III.
- CORNERS SHALL BE ROUNDED TO A 1/2 INCH RADIUS.
- ALL LINES OF TEXT SHALL BE CENTERED HORIZONTALLY AND SHALL BE AS IDENTIFIED IN THE PLANS. THE THREE LINES OF TEXT WILL EACH CONTAIN FOUR NUMERALS.
- WHEN INSTALLED ON ITS OWN POST, A SINGLE 14 GAGE, 1.75 INCH SQUARE STEEL POST AND 12 GAGE, 2 INCH SQUARE ANCHOR SHALL BE USED FOR INSTALLATION. THE ANCHOR SHALL BE A MINIMUM OF 30 INCHES IN LENGTH.
- ALL DIMENSIONS SHOWN IN INCHES.



REVISIONS AND CORRECTIONS
APRIL 9, 2014 - ORIGINAL APPROVAL DATE

APPROVED
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HIGHWAY SAFETY & DESIGN ENGINEER
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DIRECTOR OF PROGRAM DEVELOPMENT
[Signature]
MARK D. RICKTER
FEDERAL HIGHWAY ADMINISTRATION

**MILEMARKER DETAILS
STATE AND TOWN
HIGHWAYS**



**STANDARD
T-44**

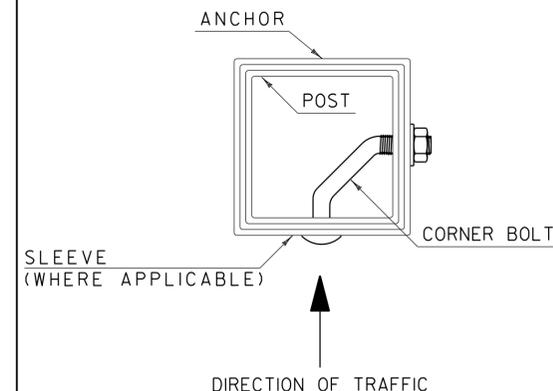
POST AND ANCHOR SELECTION CHART

POST SIZE (IN.)	POST THICKNESS (IN.)	POST WEIGHT (LBS./FT.)	POST GAGE	SECTION MODULUS (IN. ⁴)	ONE POST SV	TWO POST SV	THREE POST SV	POSTS PERMITTED IN 8' PATH	ANCHOR SIZE (IN.)	ANCHOR GAGE	MINIMUM ANCHOR LENGTH
1.75	.083	1.88	14	0.222	45	90	135	TWO	2.00	12	30
2.00	.109	2.42	12	0.393	80	160	240	TWO	2.25	12	48
2.50	.109	3.35	12	0.673	137	274	411	ONE	3.00	7	48

NOTES:

- ALL SIGN POSTS SHALL HAVE $\frac{7}{16}$ INCH HOLES EVERY ONE INCH ON CENTER (ALL FOUR SIDES).
- THE NUMBER OF SIGN POSTS PERMITTED WITHIN AN EIGHT FOOT PATH ASSUMES THAT THE SIGN ASSEMBLY IS NOT PROTECTED BY GUARDRAIL OR IS LOCATED WITHIN A GUARDRAIL'S DEFLECTION DISTANCE DETERMINED PER THE CURRENT "AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS" (AASHTO) ROADSIDE DESIGN GUIDE. ADDITIONAL POSTS MAY BE INSTALLED USING SLIP BASES THAT MEET "NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM" (NCHRP) REPORT 350 OR THE AASHTO "MANUAL FOR ASSESSING SAFETY HARDWARE" (MASH). THE APPROPRIATE RESOURCE SHALL BE DETERMINED AS DESCRIBED IN THE MASH PUBLICATION.
- TO USE THE SELECTION VALUE (SV) COLUMNS IN THE TABLE ABOVE, MULTIPLY A SIGN'S SURFACE AREA IN SQUARE FEET ($H \times L$) BY THE SIGN'S HEIGHT IN FEET MEASURED FROM THE GROUND TO THE CENTROID OF THE SIGN ASSEMBLY (h). THIS RESULT MUST BE LESS THAN OR EQUAL TO THE CORRESPONDING SELECTION VALUE. NOTE THAT FOR SIGNS WITH MULTIPLE POSTS, THE LARGEST HEIGHT DIMENSION SHALL BE USED TO CALCULATE THE POST SELECTION VALUE.
- THE DESIGN CRITERIA UTILIZED IN SIGN POST AND ANCHOR SELECTION IS AS FOLLOWS: WIND SPEED OF 70 MPH (10 YEAR MEAN RECURRENCE INTERVAL), WIND PRESSURE OF 19 PSF, STEEL MINIMUM YIELD OF 55,000 PSI, AND AN ALLOWABLE STRESS OF 1.4 (0.60 FY).

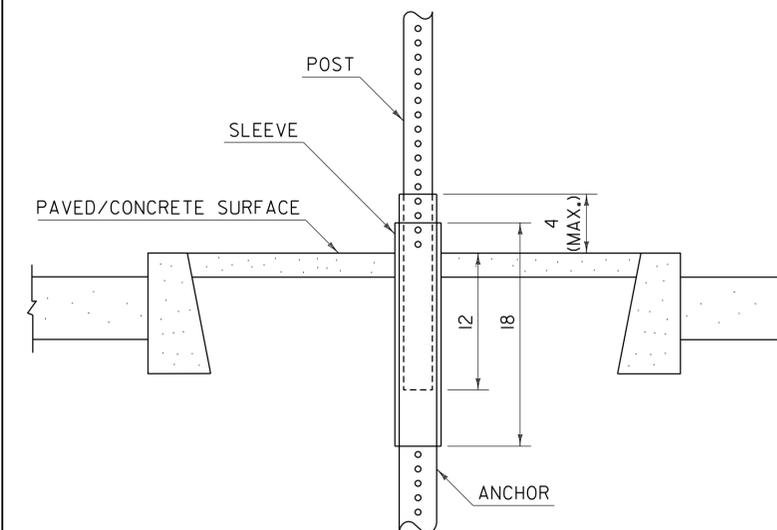
CORNER BOLT INSTALLATION DETAIL



NOTES:

- CORNER BOLTS SHALL BE $\frac{5}{16}$ INCH DIAMETER WITH 18 THREADS PER INCH AND DIMENSIONS SHALL BE DETERMINED BASED ON THE OUTERMOST DIMENSION OF THE SLEEVE, ANCHOR OR POST. THREAD EXPOSURE MUST EXCEED THE CORRESPONDING NUT WIDTH. THE CORNER BOLT AND CORRESPONDING HARDWARE SHALL BE ZINC PLATED, MEETING OR EXCEEDING THE REQUIREMENTS OF THE "AMERICAN SOCIETY FOR TESTING AND MATERIALS" (ASTM) A307.

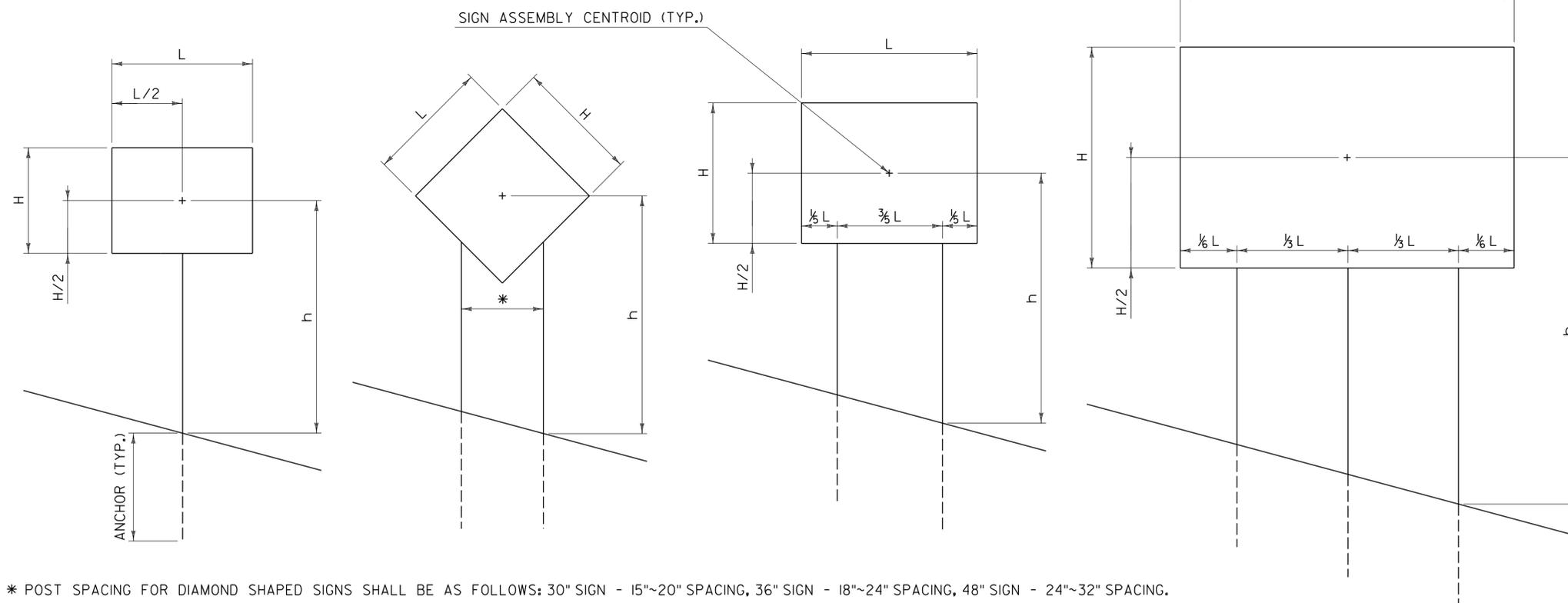
SLEEVE /ANCHOR INSTALLATION DETAIL



NOTES:

- A SLEEVE SHALL BE INSTALLED FOR SIGN INSTALLATIONS IN CONCRETE OR PAVEMENT.
- THE SLEEVE SHALL BE 18 INCHES MINIMUM IN LENGTH.
- THREE INCH SLEEVES THAT DO NOT HAVE HOLES WILL REQUIRE THAT $\frac{7}{16}$ INCH HOLES ARE DRILLED TO FACILITATE CONNECTIONS.
- REFER TO CURRENT EDITION OF THE "VERMONT AGENCY OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION" FOR MATERIAL REQUIREMENTS.

POST SPACING DETAILS



GENERAL NOTES:

- ALL SQUARE TUBE STEEL POSTS AND ANCHORS SHALL BE FORMED INTO A SIZE AND SHAPE IN SUCH A MANNER THAT NEITHER FLASH NOR WELD SHALL INTERFERE WITH THE TELESCOPING PROPERTIES, NOR DAMAGE THE GALVANIZING.
- ANCHORS MAY BE DRIVEN OR SET INTO A DUG HOLE AND BACKFILLED. IF DRIVEN, A DRIVING CAP SHALL BE USED. THE DUG HOLE INSTALLATION METHOD SHALL BE UTILIZED IN AREAS WITH POOR SOIL CONDITIONS OR AS DIRECTED BY THE ENGINEER. BACKFILL SHALL BE COMPACTED AS DIRECTED BY THE ENGINEER.
- THE TOPS OF SIGN POSTS SHALL BE AT OR NEAR THE TOP OF SIGN. THE POST SHALL NOT EXTEND ABOVE THE TOP OF SIGN.
- SIGN POSTS SHALL BE INSTALLED A MINIMUM OF ONE FOOT BELOW GROUND, INSIDE THE ANCHOR. THE LENGTH OF ANCHOR EXPOSED ABOVE GROUND SHALL NOT EXCEED FOUR INCHES.
- ALL DIMENSIONS SHOWN IN INCHES.

OTHER STDS. REQUIRED: NONE

REVISIONS AND CORRECTIONS
JAN. 2, 2013 - ORIGINAL APPROVAL DATE

APPROVED
[Signature]
HIGHWAY SAFETY & DESIGN ENGINEER
[Signature]
DIRECTOR OF PROGRAM DEVELOPMENT
[Signature]
MARK B. RICHTER
FEDERAL HIGHWAY ADMINISTRATION

SQUARE TUBE SIGN POST AND ANCHOR



STANDARD T-45