

STATE OF VERMONT AGENCY OF TRANSPORTATION



PROPOSED IMPROVEMENT BRIDGE PROJECT

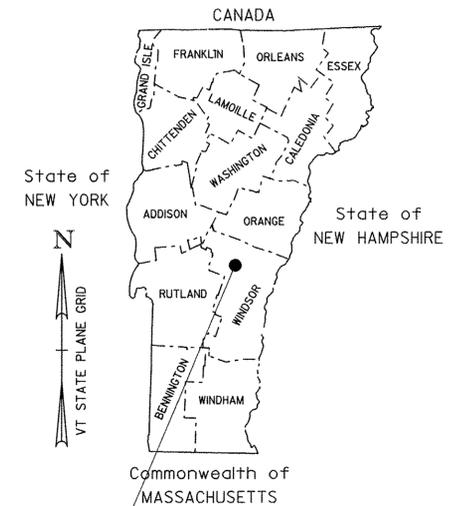
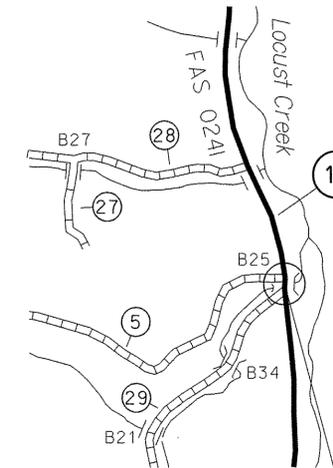
TOWN OF BARNARD
COUNTY OF WINDSOR

VT ROUTE 12, MAJOR COLLECTOR BRIDGE NO : 25

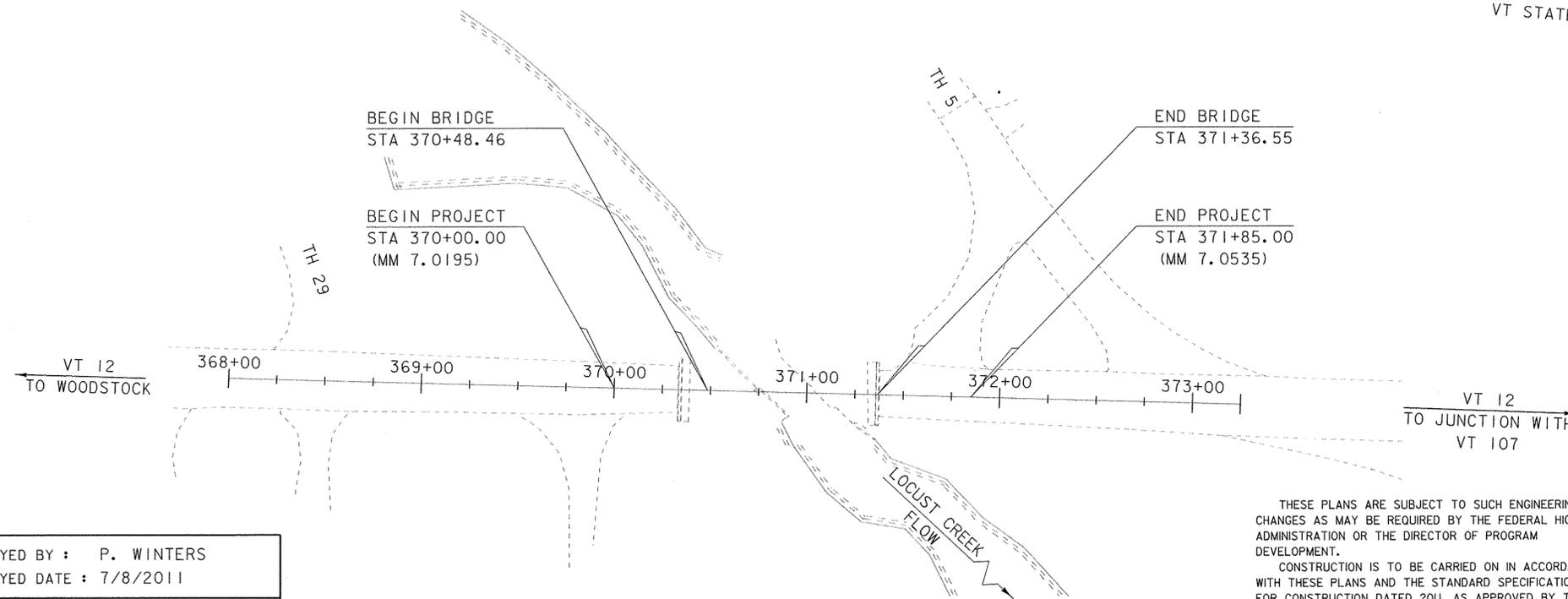
PROJECT LOCATION: BEGINNING AT MILE POST 7.0195 (STA 370+00) ON VT 12 IN BARNARD,
CROSSING LOCUST CREEK AND ENDING AT MILE POST 7.0535 (STA 371+85).

PROJECT DESCRIPTION: REPLACEMENT OF BRIDGE 25 WITH MINOR CHANNEL AND APPROACH WORK.

LENGTH OF STRUCTURE: 88.09 FEET
LENGTH OF ROADWAY: 96.91 FEET
LENGTH OF PROJECT: 185.00 FEET



BARNARD
ER BRF 0241 (39)



QUALITY ASSURANCE PROGRAM: LEVEL 2

CONVENTIONAL SYMBOLS

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

SURVEYED BY : P. WINTERS
SURVEYED DATE : 7/8/2011

DATUM
VERTICAL NAVD88
HORIZONTAL NAD83 (2007)

SCALE 1" = 40' - 0"
40 0 40

THESE PLANS ARE SUBJECT TO SUCH ENGINEERING CHANGES AS MAY BE REQUIRED BY THE FEDERAL HIGHWAY ADMINISTRATION OR THE DIRECTOR OF PROGRAM DEVELOPMENT.
CONSTRUCTION IS TO BE CARRIED ON IN ACCORDANCE WITH THESE PLANS AND THE STANDARD SPECIFICATIONS FOR CONSTRUCTION DATED 2011, AS APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION ON JULY 20, 2011 FOR USE ON THIS PROJECT, INCLUDING ALL SUBSEQUENT REVISIONS AND SUCH REVISED SPECIFICATIONS AND SPECIAL PROVISIONS AS ARE INCORPORATED IN THESE PLANS.
PLOTTED 27-AUG-2013

DIRECTOR OF PROGRAM DEVELOPMENT	
APPROVED	DATE 8-28-13
PROJECT MANAGER : K. M. HIGGINS, P.E.	
PROJECT NAME : BARNARD	
PROJECT NUMBER : ER BRF 0241 (39)	
SHEET 1 OF 39 SHEETS	

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STANDARDS LIST

E-100	CONSTRUCTION APPROACH SIGNS	01-02-2004
E-101	CONSTRUCTION SIGN DETAILS	05-30-2003
E-102	CONSTRUCTION SIGN DETAILS	06-30-2003
E-102A	CONSTRUCTION SIGN DETAILS	05-01-2004
E-108	CONSTRUCTION ZONE LONGITUDINAL DROP OFFS	06-08-2009
E-134	BRIDGE NUMBER PLAQUE	08-08-1995
E-164	SQUARE STEEL SIGN POST	06-08-2009
E-193	PAVEMENT MARKING DETAILS	08-18-1995
G-1B	BOX BEAM GUARD RAIL	06-01-1994
G-4	PLANK RAIL, GUIDE POSTS, MARKER POSTS	06-01-1994
S-364A	BRIDGE RAILING, GALVANIZED 3 RAIL BOX BEAM	04-23-2012
S-364B	GUARDRAIL APPROACH SECTION, GALVANIZED 3 RAIL BOX BEAM	04-23-2012
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

STRUCTURES DETAILS

SD-501.00	CONCRETE DETAILS AND NOTES	4/7/2010
SD-502.00	CONCRETE DETAILS AND NOTES	5/4/2010
SD-516.10	BRIDGE JOINT ASPHALTIC PLUG	4/7/2010

AS BUILT "REBAR" DETAIL		
LEVEL I	LEVEL II	LEVEL III
TYPE:	TYPE:	TYPE:
GRADE:	GRADE:	GRADE:

TRAFFIC DATA

YEAR	ADT	DHV	% D	% T	ADTT	20 year ESAL for flexible pavement from 2014 to 2034 : 416000
2014	1000	140	54	7.3	120	40 year ESAL for flexible pavement from 2014 to 2054 : 978000
2034	1100	150	54	10.8	190	Design Speed : 50 mph

FINAL HYDRAULIC REPORT

HYDROLOGIC DATA

Date: January 2013

DRAINAGE AREA : 11.6 sq. mi.
 CHARACTER OF TERRAIN : Hilly to mountainous, mostly forested
 STREAM CHARACTERISTICS : Semi-alluvial, sinuous, flood damaged
 NATURE OF STREAMBED : Mostly gravel and cobbles with some boulders and ledge

PEAK FLOW DATA

Q 2.33 =	550 cfs	Q 50 =	2000 cfs
Q 10 =	1200 cfs	Q 100 =	2400 cfs
Q 25 =	1600 cfs	Q 500 =	3350 cfs

DATE OF FLOOD OF RECORD : Unknown
 ESTIMATED DISCHARGE : Unknown
 WATER SURFACE ELEV. : Unknown
 NATURAL STREAM VELOCITY : @ Q50 = 12.9 fps
 ICE CONDITIONS : Moderate
 DEBRIS : Moderate
 DOES THE STREAM REACH MAXIMUM HIGHWATER ELEV. RAPIDLY? Yes
 IS ORDINARY RISE RAPID? Yes
 IS STAGE AFFECTED BY UPSTREAM OR DOWNSTREAM CONDITIONS? No
 IF YES, DESCRIBE:

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

EXISTING STRUCTURE INFORMATION

STRUCTURE TYPE : Single span concrete T-beam bridge
 YEAR BUILT : 1930
 CLEAR SPAN(NORMAL TO STREAM) : 24'
 VERTICAL CLEARANCE ABOVE STREAMBED : 11'
 WATERWAY OF FULL OPENING : 280 sq. ft.
 DISPOSITION OF STRUCTURE : This structure has been removed*
 TYPE OF MATERIAL UNDER SUBSTRUCTURE : See boring logs.

WATER SURFACE ELEVATIONS AT:

Q2.33 =	874.3'	VELOCITY =	9.2 fps
Q10 =	876.3'	"	12.7 fps
Q25 =	878.3'	"	15.3 fps
Q50 =	879.6'	"	16.9 fps
Q100 =	880.8'	"	18.3 fps

LONG TERM STREAMBED CHANGES : No information available on long term changes.
 The 2011 flood and post-flood channel work significantly changed the streambed and banks.

IS THE ROADWAY OVERTOPPED BELOW Q100: No
 FREQUENCY: Above Q100
 RELIEF ELEVATION: 884.9'
 DISCHARGE OVER ROAD @Q100: None

UPSTREAM STRUCTURE

TOWN: Barnard DISTANCE: 1900'
 HIGHWAY #: TH 29 STRUCTURE #: 34
 CLEAR SPAN: 30' CLEAR HEIGHT: 9'
 YEAR BUILT: 1974 FULL WATERWAY: Unknown
 STRUCTURE TYPE: Bridge

DOWNSTREAM STRUCTURE

TOWN: Not applicable - confluence DISTANCE:
 HIGHWAY #: STRUCTURE #:
 CLEAR SPAN: CLEAR HEIGHT:
 YEAR BUILT: FULL WATERWAY:
 STRUCTURE TYPE:

LRFR LOAD RATING FACTORS

LOADING LEVELS	TRUCK						
	H-20	HL-93	3S2	6 AXLE	3A. STR.	4A. STR.	5A. SEMI
TONNAGE	20	36	36	66	30	34.5	38
INVENTORY	2.48	1.57					
POSTING							
OPERATING	3.34	2.12	2.52	1.65	2.33	2.08	2.18
COMMENTS:							

PILE DRIVING AND TESTING REQUIREMENTS

- NOMINAL PILE DRIVING CAPACITY Refer: SEE GEN. NOTES
- PILE TEST RESISTANCE FACTOR φ: SEE GEN. NOTES
- MAXIMUM PILE TIP ELEVATION SEE GEN. NOTES
- SEE GENERAL NOTES

PROPOSED STRUCTURE

STRUCTURE TYPE: Single span precast concrete beam bridge

CLEAR SPAN(NORMAL TO STREAM): 56'
 VERTICAL CLEARANCE ABOVE STREAMBED: 11'
 WATERWAY OF FULL OPENING: 430 sq. ft.

WATER SURFACE ELEVATIONS AT:

Q2.33 =	874.2'	VELOCITY=	8.7 fps
Q10 =	876.0'	"	10.7 fps
Q25 =	876.8'	"	13.4 fps
Q50 =	877.6'	"	14.6 fps
Q100 =	878.2'	"	15.5 fps

IS THE ROADWAY OVERTOPPED BELOW Q100: No
 FREQUENCY: Above Q100
 RELIEF ELEVATION: 885.4'
 DISCHARGE OVER ROAD @Q100: None

AVERAGE LOW ELEVATION OF SUPERSTRUCTURE: 881.8'
 VERTICAL CLEARANCE: @ Q50 = 4.2'

SCOUR: Contraction scour = 2' at Q100 and Q500, or to ledge if it is higher.

REQUIRED CHANNEL PROTECTION: Stone fill, Type IV

PERMIT INFORMATION

AVERAGE DAILY FLOW: 25 cfs DEPTH OR ELEVATION:
 ORDINARY LOW WATER: 10 cfs Depth = 0.5'
 ORDINARY HIGH WATER: 240 cfs Depth = 3.0'

TEMPORARY BRIDGE REQUIREMENTS

STRUCTURE TYPE: No temporary bridge required. Road will be closed & traffic detoured.
 CLEAR SPAN (NORMAL TO STREAM):
 VERTICAL CLEARANCE ABOVE STREAMBED:
 WATERWAY AREA OF FULL OPENING:

ADDITIONAL INFORMATION

* The previous existing bridge was damaged in the August 2011 flood and has been removed.
 There is now a temporary bridge in place. Existing bridge information listed in this report is for the bridge that was removed in 2011.

TRAFFIC MAINTENANCE NOTES

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

DESIGN VALUES

1. DESIGN LIVE LOAD	HL-93
2. FUTURE PAVEMENT	d _p : 0.0 INCH
3. DESIGN SPAN	L: 85.00 FT
4. MIN. MID-SPAN POS. CAMBER @ RELEASE (PRESTRESSED UNITS)	Δ: 1.50 INCH
5. PRESTRESSING STRAND (0.60 INCH DIAMETER - LOW RELAX)	f _y : 270 KSI
6. PRESTRESSED CONCRETE STRENGTH	f' _c : 10.0 KSI
7. PRESTRESSED CONCRETE RELEASE STRENGTH	f' _{cr} : 8.0 KSI
8. CONCRETE, HIGH PERFORMANCE CLASS AA	f' _c : ---
9. CONCRETE, HIGH PERFORMANCE CLASS A	f' _c : ---
10. CONCRETE, HIGH PERFORMANCE CLASS B	f' _c : ---
11. CONCRETE, CLASS C	f' _c : ---
12. REINFORCING STEEL	f _y : 60 KSI
13. STRUCTURAL STEEL AASHTO M270	f _y : ---
14. SOIL UNIT WEIGHT	γ: 0.140 KCF
15. NOMINAL BEARING RESISTANCE OF SOIL	q _n : SEE GEN. NOTES
16. SOIL BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	φ: ---
17. NOMINAL BEARING RESISTANCE OF ROCK	q _n : 10.0 KSF
18. ROCK BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	φ: ---
19. NOMINAL AXIAL PILE RESISTANCE	q _p : SEE GEN. NOTES
20. PILE YIELD STRENGTH ASTM A572	f _y : 50 KSI
21. PILE SIZE	SEE GEN. NOTES
22. EST. PILE LENGTH	L _p : SEE BORING LOGS
23. PILE RESISTANCE FACTOR	φ: ---
24. LATERAL PILE DEFLECTION	Δ: ---
25. BASIC WIND SPEED	V _{3s} : ---
26. MINIMUM GROUND SNOW LOAD	p _g : ---
27. SEISMIC DATA	PGA: --- S _s : --- S ₁ : ---

PROJECT NAME: BARNARD

PROJECT NUMBER: ER BRF 0241(39)

FILE NAME: s10c410pi.dgn PLOT DATE: I6-SEP-2013
 PROJECT LEADER: K. M. HIGGINS DRAWN BY: J. SALVATORI
 DESIGNED BY: W. LAMMER CHECKED BY: W. LAMMER
PRELIMINARY INFORMATION SHEET SHEET 2 OF 39

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.

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 VALUE
⊕	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

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
	I&M	INSTALL & MAINTAIN EASEMENT
	LAND	LANDSCAPE EASEMENT
	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	CALCULATED ROW POINT
[DISTANCE]		DISTANCE CARRIED ON NEXT SHEET

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

PROJECT DESIGN & LAYOUT 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	PROJECT DEMARCATION FENCE
BF	BARRIER FENCE
—	TREE PROTECTION ZONE (TPZ)
—	STRIPING LINE REMOVAL
—	SHEET PILES

CONVENTIONAL BOUNDARY SYMBOLGY

BOUNDARY LINES

— TOWN LINE —	TOWN BOUNDARY LINE
— COUNTY LINE —	COUNTY BOUNDARY LINE
— STATE 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 —	PROPERTY LINE (P/L)
— SR —	SLOPE RIGHTS
6f	6F PROPERTY BOUNDARY
4f	4F PROPERTY BOUNDARY
HAZ	HAZARDOUS WASTE

EPSC LAYOUT PLAN SYMBOLGY

EPSC MEASURES

—	FILTER CURTAIN
—	SILT FENCE
—	SILT FENCE WOVEN WIRE
—	CHECK DAM
—	DISTURBED AREAS REQUIRING RE-VEGETATION
—	EROSION MATTING

ENVIRONMENTAL RESOURCES

—	WETLAND BOUNDARY
—	RIPARIAN BUFFER ZONE
—	WETLAND BUFFER ZONE
—	SOIL TYPE BOUNDARY
— T&E —	THREATENED & ENDANGERED SPECIES
— 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
⊕	HISTORIC STRUCTURE

CONVENTIONAL TOPOGRAPHIC SYMBOLGY

EXISTING FEATURES

—	ROAD EDGE PAVEMENT
—	ROAD EDGE GRAVEL
—	DRIVEWAY EDGE
—	DITCH
—	FOUNDATION
—	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: BARNARD
PROJECT NUMBER: ER BRF 0241(39)

FILE NAME: s86e060Legend.dgn PLOT DATE: 29-AUG-2013
PROJECT LEADER: K. HIGGINS DRAWN BY: K. FRIEDLAND
DESIGNED BY: W. LAMMER CHECKED BY: J. SALVATORI
LEGEND SHEET SHEET 3 OF 39

GENERAL

- 1. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO THE VERMONT AGENCY OF TRANSPORTATION 2011 STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE 2012 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, AND THEIR LATEST REVISIONS.
- 2. ON-SITE WORK SHALL NOT OCCUR DURING THE PERIOD FROM DECEMBER 1st to APRIL 15th. THE BRIDGE SHALL NOT BE CLOSED TO TRAFFIC PRIOR TO JUNE 20, AS PER THE PROJECT SPECIAL PROVISIONS.
- 3. ALL PRECAST CONCRETE ELEMENTS TO BE FABRICATED TO THE SPECIFIED DIMENSIONS WITHIN THE TOLERANCES DICTATED IN THE PRECAST/PRESTRESSED CONCRETE INSTITUTE TOLERANCE MANUAL FOR PRECAST AND PRESTRESSED CONCRETE CONSTRUCTION, MNL 135-00, AND ITS LATEST REVISIONS.
- 4. ALL DIMENSIONS ARE HORIZONTAL OR VERTICAL, AND ARE GIVEN AT 68 DEGREES FAHRENHEIT, UNLESS NOTED OTHERWISE.
- 5. NO ADJUSTMENTS 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 SHALL BE SHIMMED TRANSVERSELY AS NECESSARY TO ACCOUNT FOR POTENTIAL DIFFERENTIAL CAMBER OF THE ADJACENT BEAMS.
- 6. NO SUBSTITUTION FOR PRECAST CONCRETE WILL BE PERMITTED.

TRAFFIC CONTROL

- 7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SUPPLYING THE SITE SPECIFIC TRAFFIC CONTROL PACKAGE IDENTIFYING CONSTRUCTION ACTIVITIES BEFORE, DURING, AND AFTER THE BRIDGE CLOSURE PERIOD. THE CONTRACTOR SHALL SUBMIT A DETAILED TRAFFIC CONTROL PLAN TO THE RESIDENT ENGINEER FOR ALL STAGES OF CONSTRUCTION, FOR APPROVAL PER SUBSECTION 106.03. ALL COSTS SHALL BE INCLUDED IN ITEM 900.645 "SPECIAL PROVISION (TRAFFIC CONTROL, ALL-INCLUSIVE)". SEE SPECIAL PROVISIONS.
- 8. ALL SIGNING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MUTCD. WHERE CONFLICTS EXIST, THE MUTCD SHALL GOVERN. FOR ADDITIONAL SIGNING INSTRUCTIONS SEE THE SERIES OF THE STANDARDS.
- 9. ALL ITEMS REQUIRED TO IMPLEMENT THE CONTRACTOR'S TRAFFIC CONTROL PLAN WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED INCLUDED IN THE BID PRICE FOR ITEM 900.645 SPECIAL PROVISION (TRAFFIC CONTROL, ALL-INCLUSIVE).

EARTHWORK

- 10. PORTIONS OF THE ABUTMENTS FROM THE EXISTING, FAILED STRUCTURE SHALL BE REMOVED UNDER ITEM 529.20, "PARTIAL REMOVAL OF STRUCTURE". THIS WORK SHALL INCLUDE REMOVAL OF ANY PORTIONS OF THE EXISTING ABUTMENTS THAT FALL OUTSIDE THE LIMITS OF STRUCTURE EXCAVATION OR UNCLASSIFIED CHANNEL EXCAVATION.
- 11. BEDROCK IS PRESENT AT SHALLOW DEPTHS AT ABUTMENT 2, PARTICULARLY VW 3. ANY BEDROCK ENCOUNTERED WITHIN 1 FT OF THE BOTTOM OF THE ABUTMENT 2 SUBSTRUCTURE UNITS, INCLUDING THE WINGWALLS, SHALL BE REMOVED. THIS SHALL BE PAID FOR UNDER ITEM 203.16, "SOLID ROCK EXCAVATION".
- 12. REMOVAL OF THE CMP AT STATION 370+82.00 - 371+25 LT SHALL BE PAID FOR UNDER ITEM 204.20, "TRENCH EXCAVATION OF EARTH".
- 13. THE "STONE FILL, TYPE IV" UNDER THE BRIDGE AS SHOWN IN THE PLANS SHALL BE PLACED BEFORE THE NEW BEAMS ARE SET.

CONCRETE

- 14. WATER REPELLENT, SILANE SHALL BE FURNISHED IN ACCORDANCE WITH SECTION 514. SILANE SHALL BE SHOP APPLIED TO ALL EXPOSED CONCRETE ON THE BRIDGE SUPERS STRUCTURE AND SUBSTRUCTURE, WITH THE EXCEPTION OF THE BOTTOM OF THE PRECAST NEXT BEAMS BETWEEN THE DRIP NOTCHES. PAYMENT FOR SILANE WILL BE INCLUDED IN THE UNIT PRICE BID FOR THE APPROPRIATE PRECAST ITEM.
- 15. ALL CONCRETE PLACED INTEGRALLY WITH THE SUPERS STRUCTURE SHALL BE ITEM 900.608, "SPECIAL PROVISION (HIGH PERFORMANCE CONCRETE, RAPID SET)". ALL PRECAST SUBSTRUCTURE AND APPROACH SLAB CONCRETE SHALL MEET THE REQUIREMENTS OF SECTION 540 - PRECAST CONCRETE.
- 16. ALL REINFORCING STEEL SHALL BE DETAILED AND FABRICATED USING PROCEDURES AND TOLERANCES IN ACCORDANCE WITH APPLICABLE PUBLICATIONS OF THE "CONCRETE REINFORCING STEEL INSTITUTE".
- 17. ALL REINFORCING STEEL SHALL MEET THE REQUIREMENTS OF ITEM 507.12, "REINFORCING STEEL, LEVEL II".
- 18. MINIMUM CLEAR COVER FOR REINFORCING STEEL SHALL BE AS FOLLOWS:

ALONG BACK FACES OF WALLS AGAINST EARTH	2 INCH
ALONG TOP SURFACE OF DECK SLAB	2 INCH
ALONG BOTTOM SURFACE OF DECK SLAB	1.75 INCH
ELSEWHERE UNLESS OTHERWISE INDICATED:	3 INCH

PRECAST ABUTMENTS AND POST-TENSIONING

- 19. THE UNIT PRICE FOR EACH PRECAST ABUTMENT SHALL INCLUDE THE ASSOCIATED WINGWALLS, AND ALL LABOR AND MATERIALS TO CONNECT WINGWALLS TO THE PILE CAPS. THIS WORK SHALL BE PAID FOR UNDER ITEM 540.10, "PRECAST CONCRETE STRUCTURE (ABUTMENT #1) AND/OR "PRECAST CONCRETE STRUCTURE (ABUTMENT #2)" AS APPROPRIATE.

- 20. IF VERTICAL CONSTRUCTION JOINTS ARE REQUIRED BY THE CONTRACTOR FOR SHIPMENT OF THE ABUTMENTS, THEN THE SECTIONS SHALL BE KEED AND MATCH CAST. A JOINT DETAIL SHALL BE SHOWN ON THE FABRICATION DRAWINGS.
- 21. POST-TENSIONING AND ASSOCIATED ITEMS ARE ONLY REQUIRED IF THE PILE CAP IS CONSTRUCTED OF MORE THAN ONE UNIT. ANY POST-TENSIONING STRANDS AND CONDUIT SHALL ADHERE TO THE REQUIREMENTS OF SECTION 510 - PRESTRESSED CONCRETE. GALVANIZED ANCHOR ASSEMBLIES, CONDUIT, AND POST-TENSIONING STRANDS SHALL BE INCLUDED UNDER ITEM 540.10, "PRECAST CONCRETE STRUCTURE (ABUTMENT #1) AND/OR "PRECAST CONCRETE STRUCTURE (ABUTMENT #2)" AS APPROPRIATE. POST-TENSIONING STRANDS SHALL BE COVERED WITH SEAMLESS POLYPROPYLENE SHEATH (WITH CORROSION INHIBITOR GREASE BETWEEN SHEATH AND STRAND) FOR THE LENGTH OF THE STRAND, EXCEPT AT ANCHORAGE LOCATIONS.
- 22. GALVANIZE ANCHOR ASSEMBLIES AFTER FABRICATION ACCORDING TO AASHTO M232M/M 232.
- 23. DESIGN VALUES
 - a. CONCRETE COMPRESSIVE STRENGTH: $f'c = 5000$ PSI.
 - b. POST-TENSIONING STRANDS: 0.5 INCH DIAMETER, 270 KSI, LOW RELAXATION 7-WIRE STRANDS.
 - c. ASSUMED MODULUS OF ELASTICITY IS 28,500 KSI.
 - d. THERE SHALL BE 2 STRANDS PER CONDUIT.
 - e. THE JACKING FORCE PER STRAND = 32 KIPS

- 24. THE CONCRETE FOR THE ABUTMENT # 1 AND ABUTMENT #2 PILE CAVITIES SHALL MEET THE REQUIREMENTS OF SPECIAL PROVISION (HIGH PERFORMANCE CONCRETE, RAPID SET).
- 25. THE CORRUGATED STEEL PIPE SHALL MEET THE REQUIREMENTS OF SUBSECTION 711.01. ALL COSTS ASSOCIATED WITH PLACING THE CORRUGATED STEEL PIPE SHALL BE INCLUDED IN THE BID PRICE FOR ITEM 540.10, "PRECAST CONCRETE STRUCTURE (ABUTMENT #1)" AND ITEM 540.10, "PRECAST CONCRETE STRUCTURE (ABUTMENT #2)".
- 26. PROPOSED SEQUENCE OF CONSTRUCTION:
 - a. PREPARE AND GRADE FOUNDATION TO REQUIRED ELEVATION.
 - b. DRIVE PILES.
 - c. PLACE PRECAST ABUTMENT AND INSTALL TRANSVERSE STRANDS (IF MORE THAN ONE UNIT).
 - d. APPLY EPOXY TO MATCH CAST FACES OF VERTICAL CONSTRUCTION JOINT.
 - e. USE A CALIBRATED JACK TO TENSION TO 3 KIPS TO REMOVE SAG IN STRANDS.
 - f. CHECK ALIGNMENT OF PILE CAP ELEMENTS.
 - g. STRESS POST-TENSIONING STRANDS USING A CALIBRATED JACK OPERATED BY QUALIFIED PERSONNEL WHO HAVE PREVIOUS EXPERIENCE IN POST-TENSIONING.
 - h. FILL PILE CAVITIES WITH ITEM 900.608, "SPECIAL PROVISION (HIGH PERFORMANCE CONCRETE, RAPID SET)".
 - i. PLACE PRECAST WINGWALLS AND GROUT SPLICE CONNECTORS.
 - j. BACKFILL MAY BE COMPLETED AFTER SPLICE CONNECTOR GROUT HAS REACHED 85% OF 5,000 PSI.
- 27. ALTERNATE SEQUENCE OF CONSTRUCTION MAY BE SUBMITTED TO THE VTRANS PROJECT MANAGER FOR APPROVAL.

NEXT D BEAMS

- 28. NEXT D BEAMS ARE A NON-PROPRIETARY SHAPE DEVELOPED BY PCINORTHEAST (PCINE). STANDARDIZED SECTION PROPERTIES AND DETAILS MAY BE FOUND AT <http://www.pane.org>

- 29. DESIGN VALUES
 - a. CONCRETE COMPRESSIVE STRENGTH: $f'c = 10,000$ PSI.
 - b. CONCRETE COMPRESSIVE STRENGTH AT RELEASE: $f'd = 8,000$ PSI
 - c. PRESTRESSING STRANDS: 0.6 INCH DIAMETER, 270 KSI, LOW-RELAXATION 7-WIRE STRANDS
 - d. ASSUMED MODULUS OF ELASTICITY = 28,500 KSI.
 - e. PRESTRESSING STRANDS SHALL EACH BE PULLED TO A NET TENSION OF 44.0 KIPS AFTER ACCOUNTING FOR CHUCK SLIPPAGE.
 - f. SERVICE LOADS

MEMBER MOMENT	1,470 K-FT
SUPERIMPOSED DEAD LOAD MOMENT	508 K-FT
LIVE LOAD AND IMPACT MOMENT	1,520 K-FT
DEAD LOAD REACTION/END	98 KIPS
LIVE LOAD AND IMPACT REACTION/END	108 KIPS
TOTAL REACTION/END	206 KIPS
CAMBER AT RELEASE	1 11/16 INCHES
FINAL CAMBER	1 7/16 INCHES

- 30. FORMING FOR ENDS OF FLANGES ALONG LONGITUDINAL CLOSURE POURS MAY BE TREATED WITH CONCRETE SURFACE RETARDER, OR SIMILAR, TO PROVIDE A ROUGHENED SURFACE; AND SHALL BE POWER WASHED WITH WATER PRIOR TO ERECTION OF THE BEAMS.
- 31. FILL THE FLANGE TO FLANGE CONNECTION WITH ITEM 900.608, "SPECIAL PROVISION (HIGH PERFORMANCE CONCRETE, RAPID SET)".
- 32. METHOD OF FORMING FLANGE CONNECTION SHALL BE DETERMINED BY THE CONTRACTOR. THE FORMS SHALL BE REMOVABLE AND ABLE TO ACCOMMODATE DIFFERENTIAL CAMBER. FORMSUPPORTS SHALL NOT BE ATTACHED TO ANY PREFABRICATED SUPERS STRUCTURE ELEMENT BY DRILLING OR SIMILAR MEANS.

- 33. THE FABRICATOR MAY ALTER THE DESIGN AS DETAILED IN THESE PLANS TO ACCOMMODATE THEIR SPECIFIC OPERATION. THIS ALTERATION SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER, LICENSED IN THE STATE OF VERMONT, TO MEET THE SPECIFIED CRITERIA, AND SHALL BE SUBMITTED TO THE VTRANS PROJECT MANAGER FOR APPROVAL.
- 34. PROPOSED SEQUENCE OF CONSTRUCTION
 - a. LAYOUT WORKING LINES THE ENTIRE WIDTH OF THE BRIDGE ALONG CENTERLINE OF BEARING, MEASURED FROM A SINGLE WORKING POINT. THE WORKING LINES SHALL BE BASED ON THE NOMINAL BEAM WIDTHS.
 - b. VERIFY THE BEAM SEAT ELEVATIONS AND TAKE CORRECTIVE ACTION IF NECESSARY.
 - c. INSTALL BEARINGS
 - d. ERECT THE BEAMS TO FIT WITHIN THE WORKING LINES.
 - e. ADJUST FASCIA BEAM TO FIT SNUG AGAINST 1/2" CORK ON INTERIOR OF CHEEK WALL.
 - f. CONSTRUCT FORMS FOR THE FLANGE AND CURTAIN WALL CONNECTION POURS.
 - g. GROUT CONNECTIONS BETWEEN BEAM FLANGES AND CURE.
 - h. BACKFILL AND PREPARE GRADE FOR APPROACH SLABS.
 - i. COMPLETE BEAM-END CLOSURE POUR TO BOTTOM OF DECK ALLOWING FOR APPROACH SLAB BRACKET.
 - j. COMPLETE PLACEMENT OF BACKFILL AND PLACE APPROACH SLAB.
 - k. GROUT REBAR DOWELS IN APPROACH SLAB.
 - l. COMPLETE LONGITUDINAL CLOSURE POURS OF APPROACH SLAB.
 - m. COMPLETE BEAM-END CLOSURE POUR TO TOP OF DECK AND APPROACH SLABS.
- 35. ALTERNATE SEQUENCE OF CONSTRUCTION MAY BE SUBMITTED TO THE VTRANS PROJECT MANAGER FOR APPROVAL.

H-PILES

- 36. THE PILES SHALL BE HP 12 X 74 AT ABUTMENT 1 AND HP 10 X 57 AT ABUTMENT 2.
- 37. TO PREVENT DAMAGE TO THE PILES, PILE SHOES ARE REQUIRED FOR DRIVEN PILES AND SHALL CONFORM TO SUBSECTION 505.04 (f).
- 38. THE PILE AT ABUTMENT 1 SHALL BE DRIVEN TO A NOMINAL AXIAL PILE DRIVING RESISTANCE (RNRD) OF 402 KIPS OR REFUSAL, PROVIDED A MINIMUM PENETRATION OF 20 FEET BELOW THE BOTTOM OF PILE CAP HAS BEEN ACHIEVED.
- 39. THE PILE LOCATIONS AT ABUTMENT 2 SHALL BE PRE-EXCAVATED THREE (3) FEET INTO COMPETENT BEDROCK. THE MINIMUM REQUIRED PILE LENGTH IS 10 FEET. IF COMPETENT BEDROCK IS ENCOUNTERED SHALL LOWER THAN 7 FEET BELOW THE PILE CAP, PRE-EXCAVATION TO A MINIMUM DEPTH OF 10 FEET BELOW THE PILE CAP IS REQUIRED. PRE-EXCAVATED HOLES SHALL BE 20 INCHES IN DIAMETER AT ABUTMENT 2.
- 40. A MINIMUM OF TWO DYNAMIC PILE TESTS SHALL BE CONDUCTED ON PILES AT ABUTMENT 1. THIS SHALL BE PAID FOR UNDER ITEM 505.45, "DYNAMIC PILE LOADING TEST". NO LOAD TESTING IS REQUIRED AT ABUTMENT 2.
- 41. THE TOPS OF THE PILE AFTER DRIVING OR PLACEMENT SHALL NOT VARY FROM THE POSITION SHOWN ON THE PLANS 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. THESE MEASURES SHALL BE DEMONSTRATED IN A SUBMITTAL TO BE ACCEPTED BEFORE PILE DRIVING COMMENCES.
- 42. FOR ESTIMATING PURPOSES, THE PILE TIP ELEVATIONS WERE ASSUMED AS SHOWN ON THE BORING LOGS. THE ACTUAL IN PLACE LENGTHS MAY VARY.
- 43. PAYMENT FOR PRE-EXCAVATION SHALL BE MADE UNDER ITEM 900.640, "SPECIAL PROVISION (PRE-EXCAVATION OF INTEGRAL ABUTMENTS PILES, EARTH)" OR ITEM 900.640, "SPECIAL PROVISION (PRE-EXCAVATION OF INTEGRAL ABUTMENTS PILES, ROCK)". THE ENTIRE PRE-EXCAVATED HOLE SHALL BE BACKFILLED WITH SAND AFTER THE PILE IS SET. SAND SHALL CONFORM TO THE REQUIREMENTS OF SUBSECTION 703.03. REFER TO THE SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION.

MISCELLANEOUS

- 44. A TEMPORARY BRIDGE IS IN PLACE. REMOVAL OF THIS TEMPORARY BRIDGE SHALL BE PAID FOR UNDER SPECIAL PROVISION ITEM 900.645 (REMOVAL OF TEMPORARY BRIDGE AND APPROACHES). THE TEMPORARY BRIDGE IS THE PROPERTY OF VTRANS AND SHALL BE RETURNED TO THE VTRANS MAINTENANCE FACILITY IN SPRINGFIELD, VT. CONTACT HOBERT GATES AT (802) 524-5926 TO MAKE NECESSARY ARRANGEMENTS AS PER THE SPECIAL PROVISIONS.
- 45. SIX TO TWELVE (6-12) STONES, MEETING THE REQUIREMENTS OF SUBSECTION 706.04(D), SHALL BE PROVIDED FOR PLACEMENT IN THE RIVER UPSTREAM AND DOWNSTREAM OF THE BRIDGE. THEY SHALL BE EMBEDDED APPROXIMATELY TWO-FEET (2-FT.) INTO THE STREAMBED AS DIRECTED BY THE RESIDENT ENGINEER. THIS WORK SHALL BE PAID FOR UNDER ITEM 613.13, "STONE FILL, TYPE IV".
- 46. AN EXISTING CONDITIONS LAYOUT HAS BEEN ADDED TO THE PLAN SET FOR THE USE OF THE CONTRACTOR IN PREPARING SUBMITTALS.

PROJECT NAME: BARNARD	
PROJECT NUMBER: ER BRF 0241(39)	
FILE NAME: si0c410gen.dgn	PLOT DATE: 11-SEP-2013
PROJECT LEADER: K. HIGGINS	DRAWN BY: W. LAMMER
DESIGNED BY: W. LAMMER	CHECKED BY: J. SALVATORI
GENERAL NOTES	SHEET 4 OF 39

QUANTITY SHEET 1

SUMMARY OF ESTIMATED QUANTITIES										TOTALS		DESCRIPTIONS				DETAILED SUMMARY OF QUANTITIES			
							ROADWAY	EROSION CONTROL	BRIDGE	FULL C.E. ITEMS	GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND	QUANTITIES	UNIT	ITEMS
							1				1		LS	CLEARING AND GRUBBING, INCLUDING INDIVIDUAL TREES AND STUMPS	201.10				
							570				570		CY	COMMON EXCAVATION	203.15		570.0	CY	COMMON EXCAVATION (570*1.0)
									12		12		CY	SOLID ROCK EXCAVATION	203.16		652.5	CY	UNCLASSIFIED CHANNEL EXCAVATION (870*0.75)
									875		875		CY	UNCLASSIFIED CHANNEL EXCAVATION	203.27		232.5	CY	STRUCTURE EXCAVATION (310*0.75)
							40				40		CY	TRENCH EXCAVATION OF EARTH	204.20		1455	CY	SUB TOTAL
							1				1		CY	TRENCH EXCAVATION OF EARTH, EXPLORATORY (N.A.B.I.)	204.22		45	CY	ROUNDING
									220		220		CY	STRUCTURE EXCAVATION	204.25		1500	CY	TOTAL FILL AVAILABLE
									90		90		CY	GRANULAR BACKFILL FOR STRUCTURES	204.30		0	CY	TOTAL FILL REQUIRED
							320				320		SY	COLD PLANING, BITUMINOUS PAVEMENT	210.10		1500	CY	TOTAL WASTE
							560				560		CY	SUBBASE OF DENSE GRADED CRUSHED STONE	301.35				
							30				30		CY	AGGREGATE SHOULDERS, IN PLACE	402.10				
							4				4		CWT	EMULSIFIED ASPHALT	404.65				
							1				1		LU	PRICE ADJUSTMENT, ASPHALT CEMENT (N.A.B.I.)	406.50				
									1		1		LS	FURNISHING EQUIPMENT FOR DRIVING PILING	504.10				
									60		60		LF	STEEL PILING, HP 10 X 57	505.12				
									120		120		LF	STEEL PILING, HP 12 X 74	505.16				
									2		2		EACH	DYNAMIC PILE LOADING TEST	505.45				
									3900		3900		LB	REINFORCING STEEL, LEVEL II	507.12				
									70		70		LF	BRIDGE EXPANSION JOINT, ASPHALTIC PLUG	516.10				
									310		310		SY	MEMBRANE WATERPROOFING, SPRAY APPLIED	520.10				
									70		70		LF	JOINT SEALER, HOT POURED	524.11				
									185		185		LF	BRIDGE RAILING, GALVANIZED 3 RAIL BOX BEAM	525.335				
									1		1		EACH	PARTIAL REMOVAL OF STRUCTURE	529.20				
									16		16		EACH	BEARING DEVICE ASSEMBLY, STEEL REINFORCED ELASTOMERIC PAD	531.17				
									1		1		LS	PRECAST CONCRETE STRUCTURE (ABUTMENT #1)	540.10				
									1		1		LS	PRECAST CONCRETE STRUCTURE (ABUTMENT #2)	540.10				
									1		1		LS	PRECAST CONCRETE STRUCTURE (APPROACH SLAB #1)	540.10				
									1		1		LS	PRECAST CONCRETE STRUCTURE (APPROACH SLAB #2)	540.10				
								1			1		MGAL	DUST CONTROL WITH WATER	609.10				
									660		660		CY	STONE FILL, TYPE IV	613.13				
							2				2		EACH	YIELDING MARKER POSTS	619.17				
							165.16				165.16		LF	BOX BEAM GUARDRAIL	621.30				
							2				2		EACH	MANUFACTURED TERMINAL SECTION, TANGENT	621.51				
							4				4		EACH	GUARDRAIL APPROACH SECTION, GALVANIZED 3 RAIL BOX BEAM	621.725				
							40				40		HR	UNIFORMED TRAFFIC OFFICERS	630.10				
							400				400		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				

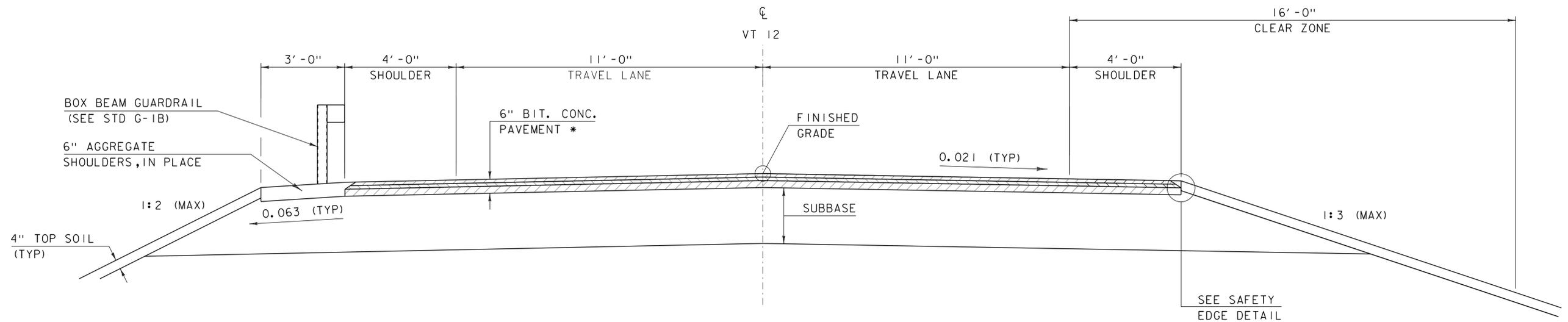
PROJECT NAME: BARNARD
PROJECT NUMBER: ER BRF 0241(39)
FILE NAME: s10c410qs.dgn PLOT DATE: 29-AUG-2013
PROJECT LEADER: K. HIGGINS DRAWN BY: W. LAMMER
DESIGNED BY: W. LAMMER CHECKED BY: J. SALVATORI
QUANTITY SHEET 1 SHEET 5 OF 39

QUANTITY SHEET 2

SUMMARY OF ESTIMATED QUANTITIES										TOTALS		DESCRIPTIONS				DETAILED SUMMARY OF QUANTITIES			
							ROADWAY	EROSION CONTROL	BRIDGE	FULL C.E. ITEMS	GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND	QUANTITIES	UNIT	ITEMS
							1				1		LS	MOBILIZATION/DEMOBILIZATION	635.11				
							580				580		LF	4 INCH WHITE LINE	646.20				
							73040				73040		LF	4 INCH YELLOW LINE	646.21				
									720		720		SY	GEOTEXTILE UNDER STONE FILL	649.31				
								170			170		SY	GEOTEXTILE FOR SILT FENCE	649.51				
								130			130		SY	GEOTEXTILE FOR FILTER CURTAIN	649.61				
								5			5		LB	SEED	651.15				
								5			5		LB	SEED, WINTER RYE	651.17				
								40			40		LB	FERTILIZER	651.18				
								1			1		TON	AGRICULTURAL LIMESTONE	651.20				
								1			1		TON	HAY MULCH	651.25				
								30			30		CY	TOPSOIL	651.35				
									20		20		SY	GRUBBING MATERIAL	651.40				
								1			1		LS	EPSC PLAN	652.10				
								40			40		HR	MONITORING EPSC PLAN	652.20				
								1			1		LU	MAINTENANCE OF EPSC PLAN (N.A.B.I.)	652.30				
								110			110		SY	TEMPORARY EROSION MATTING	653.20				
								2			2		CY	TEMPORARY STONE CHECK DAM, TYPE I	653.25				
								60			60		CY	VEHICLE TRACKING PAD	653.35				
								600			600		LF	PROJECT DEMARCATION FENCE	653.55				
							174.91				174.91		SF	TRAFFIC SIGNS, TYPE A	675.20				
							451				451		LF	SQUARE TUBE SIGN POST AND ANCHOR	675.341				
							26				26		EACH	REMOVING SIGNS	675.50				
							2				2		EACH	SETTING SALVAGED POSTS	675.61				
									38		38		CY	SPECIAL PROVISION (HIGH PERFORMANCE CONCRETE, RAPID SET)(FPQ)	900.608				
									30		30		LF	SPECIAL PROVISION (PRE-EXCAVATION OF INTEGRAL ABUTMENT PILES, EARTH)	900.640				
									25		25		LF	SPECIAL PROVISION (PRE-EXCAVATION OF INTEGRAL ABUTMENT PILES, ROCK)	900.640				
									344		344		LF	SPECIAL PROVISION (PRESTRESSED CONCRETE, NEXT D BEAMS)(NEXT 36D)	900.640				
							1				1		LS	SPECIAL PROVISION (CPM SCHEDULE)	900.645				
									1		1		LS	SPECIAL PROVISION (REMOVAL OF TEMPORARY BRIDGE AND APPROACHES)	900.645				
							1				1		LS	SPECIAL PROVISION (TRAFFIC CONTROL, ALL-INCLUSIVE)	900.645				
							1				1		LU	SPECIAL PROVISION (INCENTIVE/DISINCENTIVE)(N.A.B.I.)	900.650				
							1				1		LU	SPECIAL PROVISION (MAT DENSITY PAY ADJUSTMENT, SMALL QUANTITY)(N.A.B.I.)	900.650				
							1				1		LU	SPECIAL PROVISION (MIXTURE PAY ADJUSTMENT)(N.A.B.I.)	900.650				
							195				195		TON	SPECIAL PROVISION (BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY)	900.680				

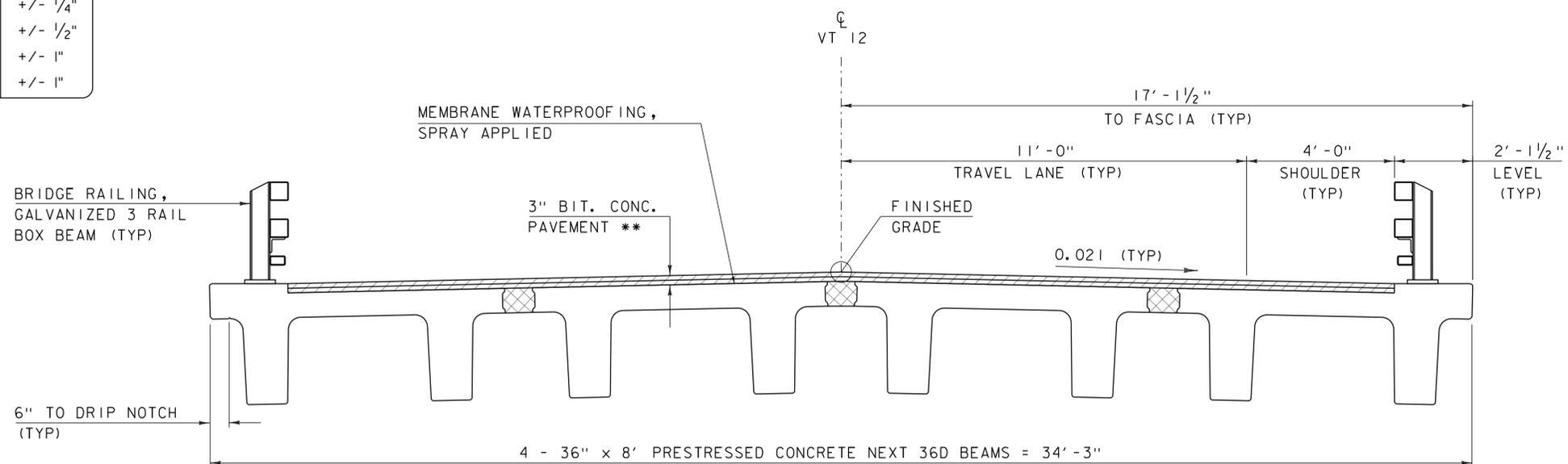
PROJECT NAME:	BARNARD
PROJECT NUMBER:	ER BRF 0241(39)
FILE NAME:	sl0c4l0qs.dgn
PROJECT LEADER:	K. HIGGINS
DESIGNED BY:	W. LAMMER
QUANTITY SHEET	2
PLOT DATE:	17-SEP-2013
DRAWN BY:	W. LAMMER
CHECKED BY:	J. SALVATORI
SHEET	6 OF 39

* 1 1/2" SUPERPAVE BITUMINOUS CONCRETE PAVEMENT, TYPE IVS
 1 1/2" SUPERPAVE BITUMINOUS CONCRETE PAVEMENT, TYPE IVS
 3" SUPERPAVE BITUMINOUS CONCRETE PAVEMENT, TYPE IIS
 VARIES SUBBASE OF DENSE GRADED CRUSHED STONE
 SEE MATERIAL TRANSITION ON MAINLINE PROFILE SHEET



ROADWAY TYPICAL SECTION
 SCALE 1/2" = 1'-0"

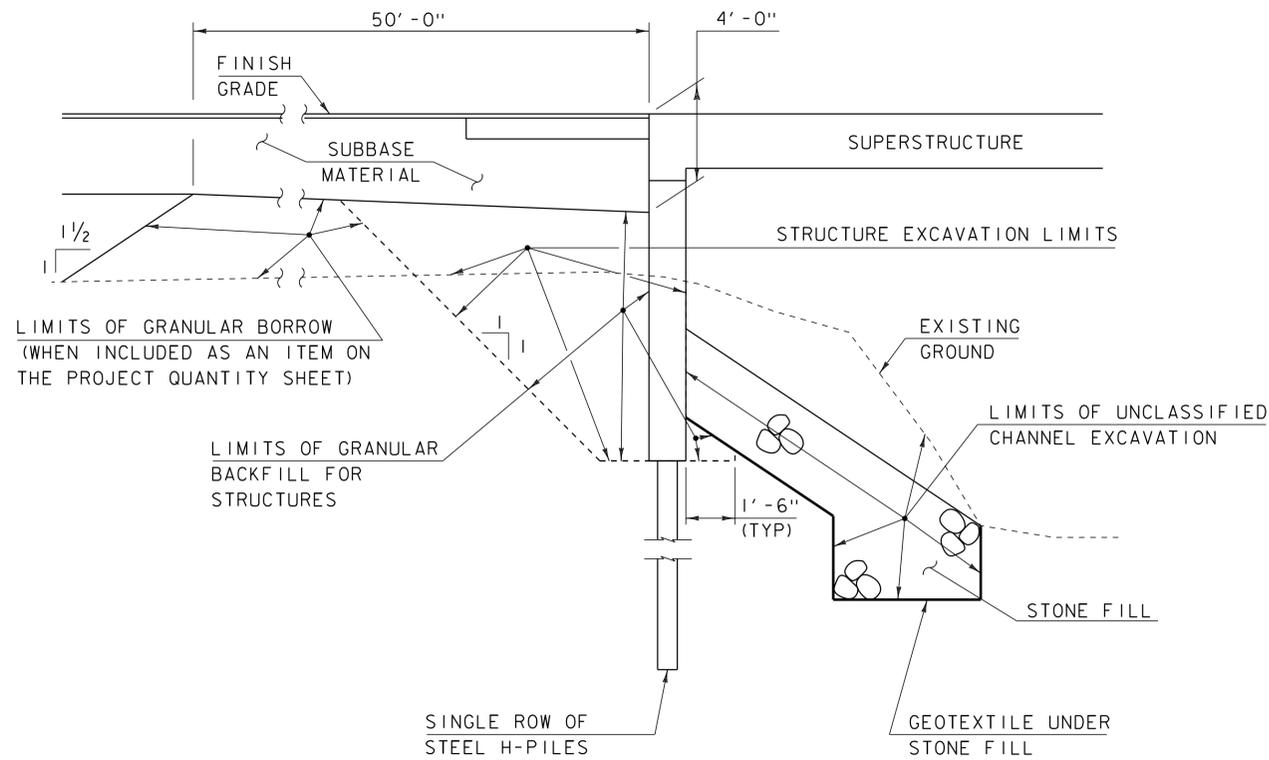
MATERIAL TOLERANCES (IF USED ON PROJECT)	
SURFACE	
- PAVEMENT (TOTAL THICKNESS)	+/- 1/4"
- AGGREGATE SURFACE COURSE	+/- 1/2"
SUBBASE	+/- 1"
SAND BORROW	+/- 1"



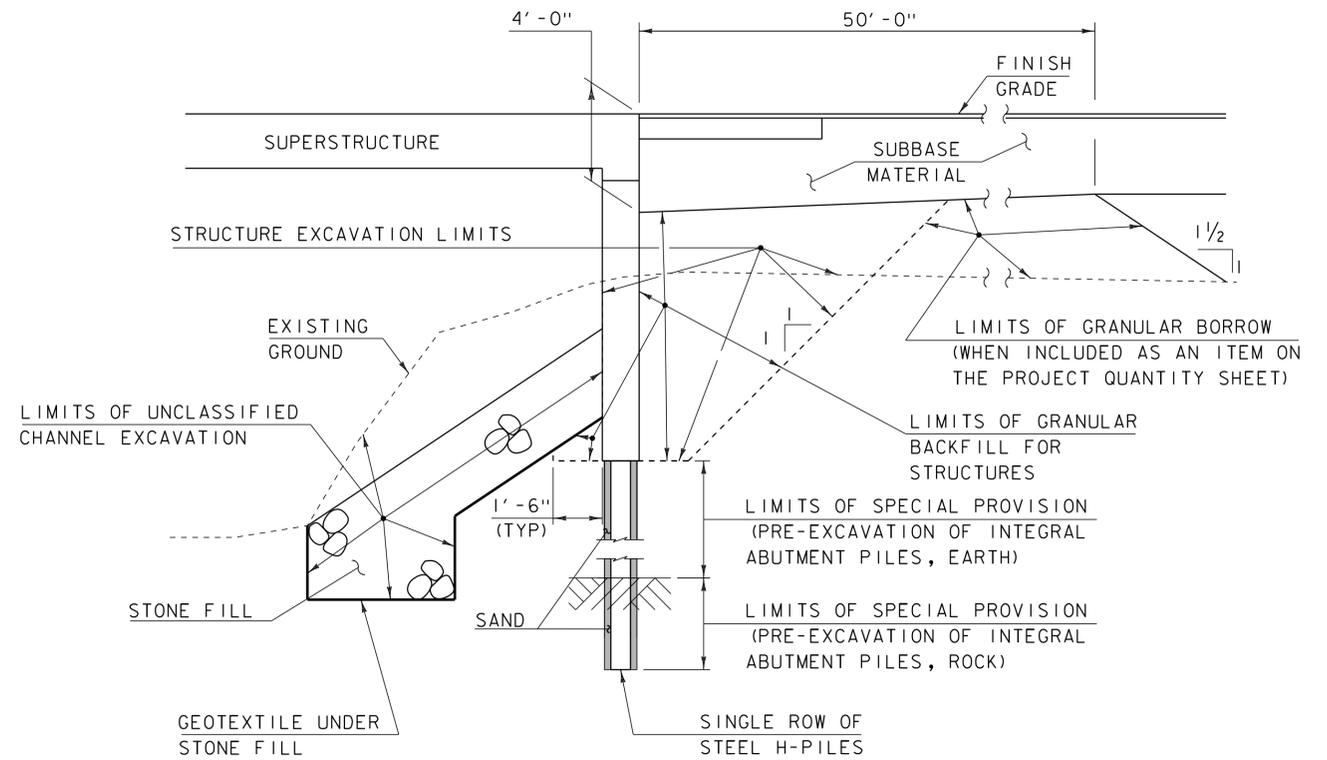
BRIDGE TYPICAL SECTION
 SCALE 1/2" = 1'-0"

** 1 1/2" SUPERPAVE BITUMINOUS CONCRETE PAVEMENT, TYPE IVS
 1 1/2" SUPERPAVE BITUMINOUS CONCRETE PAVEMENT, TYPE IVS

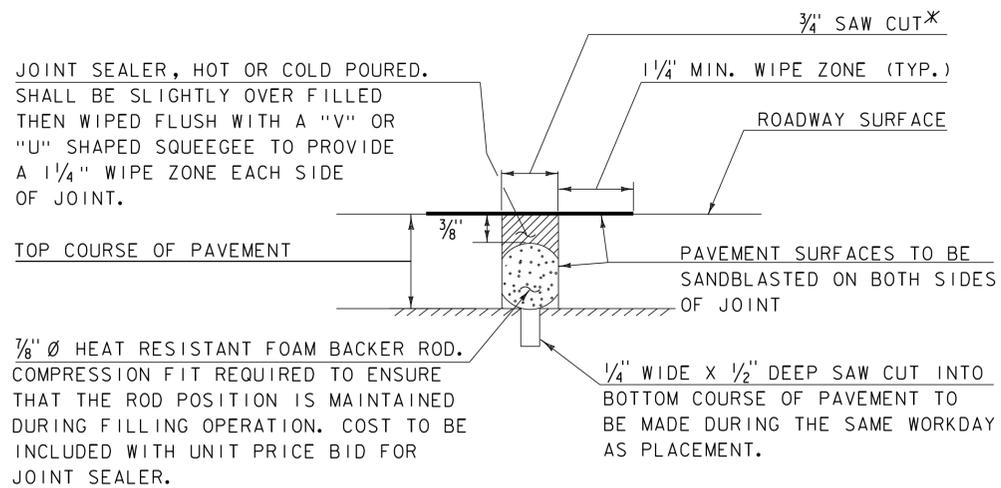
PROJECT NAME: BARNARD	PLOT DATE: 29-AUG-2013
PROJECT NUMBER: ER BRF 0241(39)	DRAWN BY: K. FRIEDLAND
FILE NAME: I0c410+yp.dgn	CHECKED BY: W. LAMMER
PROJECT LEADER: K.HIGGINS	SHEET 7 OF 39
DESIGNED BY: J. SALVATORI	TYPICAL SECTIONS I



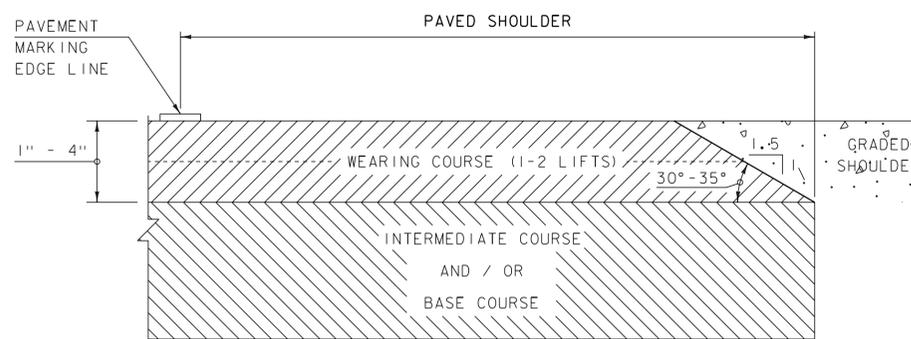
EARTHWORK SECTION (ABUTMENT #1)
NOT TO SCALE



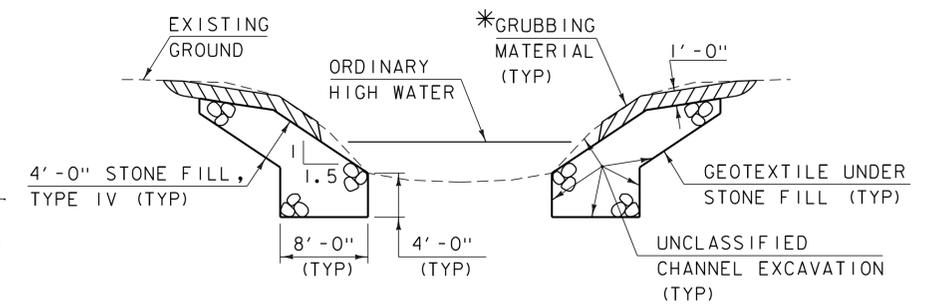
EARTHWORK SECTION (ABUTMENT #2)
NOT TO SCALE



SAWED PAVEMENT JOINT DETAIL
(NOT TO SCALE)



SAFETY EDGE DETAIL
NOT TO SCALE



TYPICAL CHANNEL SECTION
(NOT TO SCALE)

*GRUBBING MATERIAL SHALL NOT BE PLACED ON THE STONE FILL IN THE AREA UNDER THE BRIDGE. WHENEVER CHANNEL SLOPE INTERSECTS ROADWAY SUBBASE, GRUBBING MATERIAL SHALL BEGIN AT THE BOTTOM OF SUBBASE.

*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.

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

PROJECT NAME:	BARNARD
PROJECT NUMBER:	ER BRF 0241(39)
FILE NAME:	I0c410+yp.dgn
PROJECT LEADER:	K.HIGGINS
DESIGNED BY:	J. SALVATORI
TYPICAL SECTIONS 2	
PLOT DATE:	17-SEP-2013
DRAWN BY:	J. SALVATORI
CHECKED BY:	W. LAMMER
SHEET	8 OF 39

GPS CONTROL POINTS

HVCTRL #1

BARNARD AZ MK
 NORTH = 464622.900
 EAST = 1604346.803
 ELEV. = 825.803

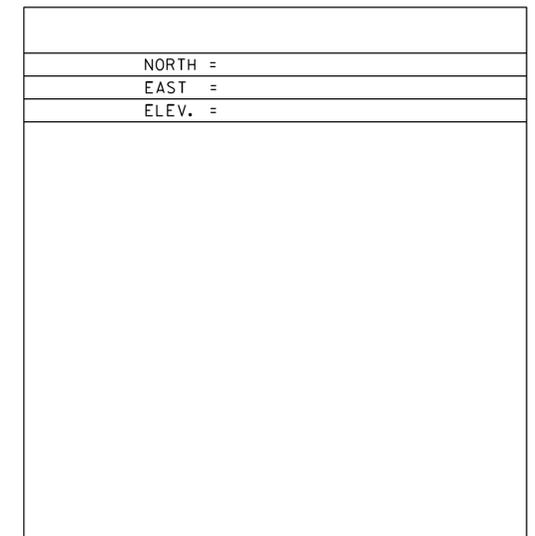
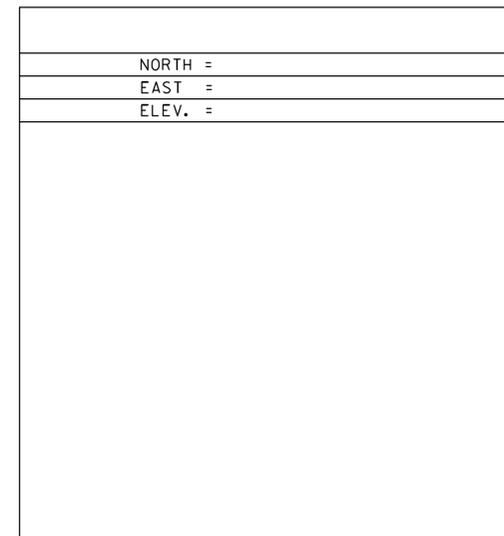
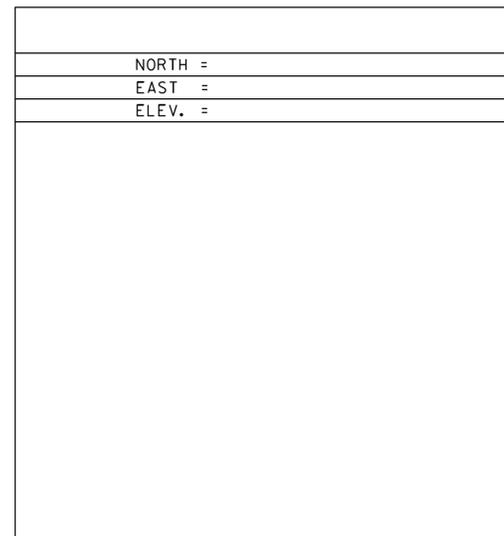
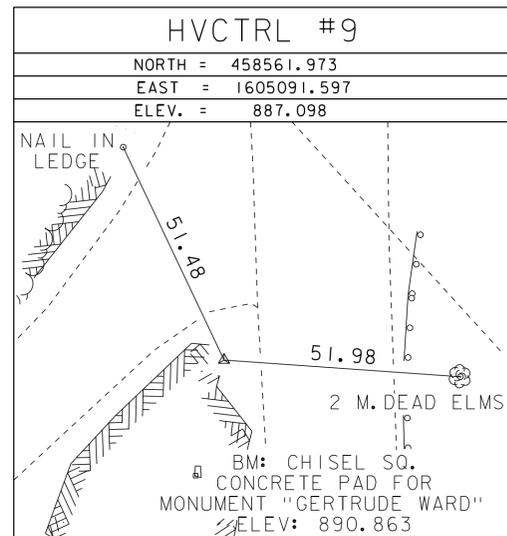
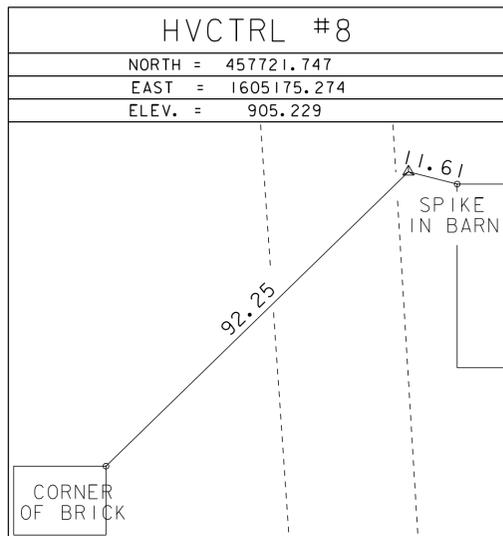
HVCTRL #2

BARNARD
 NORTH = 462804.611
 EAST = 1604264.953
 ELEV. = 848.138

GENERAL LOCATION, BARNARD, VT.
 TO REACH FROM THE INTERSECTION OF US ROUTE 4 AND VT ROUTE 12 NORTH IN THE VILLAGE OF WOODSTOCK, GO NORTH ALONG VT ROUTE 12 FOR 10.2 MI (16.4 KM) TO THE INTERSECTION OF STAGE ROAD RIGHT, NORTH ROAD STRAIGHT AND VT ROUTE 12 LEFT IN THE VILLAGE OF BARNARD. TURN LEFT AND CONTINUE NORTH ALONG VT ROUTE 12 FOR 3.5 MI (5.6 KM) TO THE SITE OF THE MARK ON THE LEFT. TO REACH FROM THE INTERSECTION OF VT ROUTE 107 AND VT ROUTE 12 SOUTH JUST WEST OF BETHEL VILLAGE, GO SOUTH ALONG VT ROUTE 12 FOR 2.7 MI (4.3 KM) TO THE SITE OF THE MARK. IT IS ABOUT 70 M (229.7 FT) SOUTH OF THE CENTERLINE OF THE DRIVEWAY LEADING TO HOUSE NO 9671. THE MARK IS SET 10 CM (4 INCHES) BELOW GROUND SURFACE IN THE TOP OF A 30 CM (12 INCH) DIAMETER CONCRETE MONUMENT POURED 1.5 M (4.9 FT) DEEP. IT IS 7.3 M (24.0 FT) WEST OF AND ABOUT 0.2 M (0.7 FT) LOWER THAN THE CENTERLINE OF VT ROUTE 12, 34.4 M (112.9 FT) NORTH-NORTHEAST OF POLE NO 58/317, 67.2 M (220.5 FT) NORTH OF MILE MARKER 0120/1403/0820, 47.8 M (156.8 FT) SOUTH-SOUTHWEST OF POLE NO 57/318, 42.1 M (138.1 FT) SOUTH OF THE MOST SOUTHERLY GATE POST IN A WOODEN RAIL FENCE, 25.2 M (82.7 FT) NORTHEAST OF THE NORTHEAST CORNER OF A TIMOTHY NEWTON GRANITE HISTORICAL MARKER, 1.3 M (4.3 FT) EAST OF A WOODEN RAIL FENCE AND A FIBERGLASS WITNESS POST.

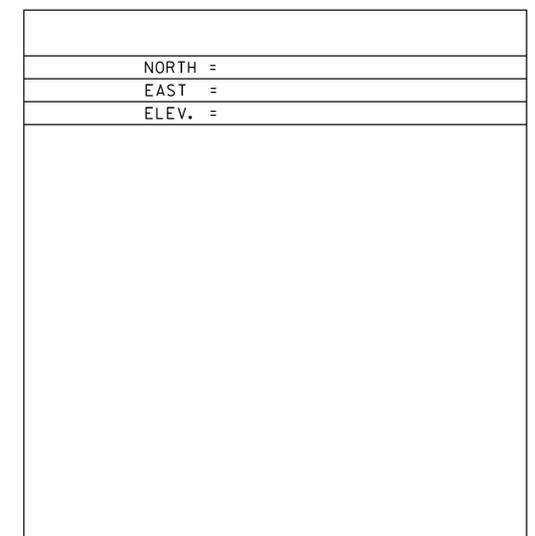
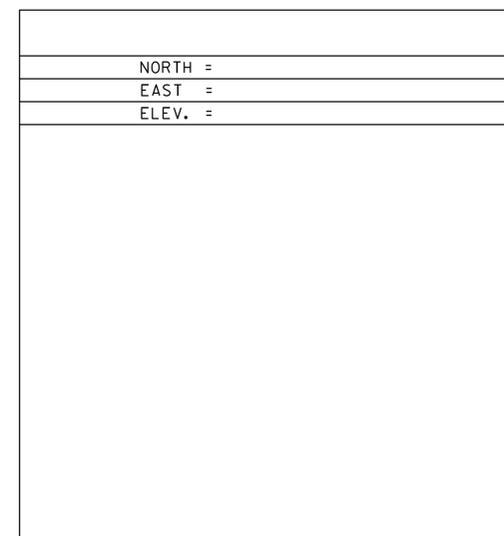
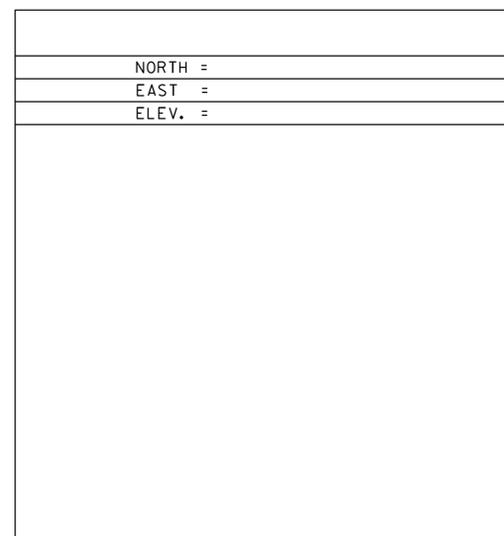
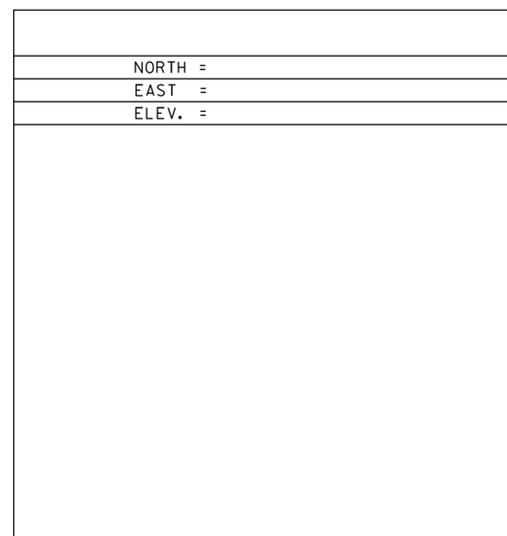
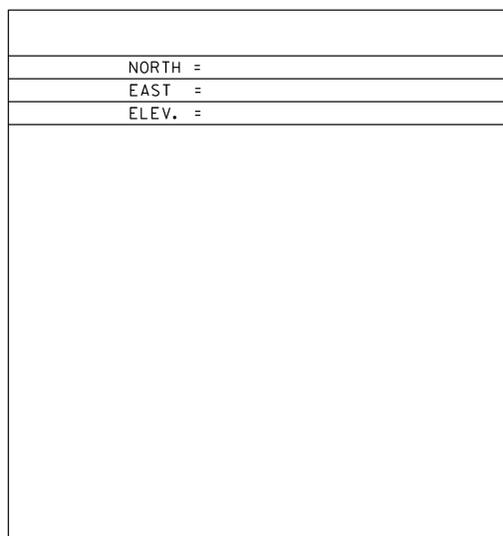
GENERAL LOCATION, BARNARD, VT. OWNERSHIP, LILLIAN GILMAN, 9273 ROUTE 12, BARNARD, VT 05032. TO REACH FROM THE INTERSECTION OF VT ROUTE 107 AND VT ROUTE 12 SOUTH IN BETHEL, GO SOUTH ALONG VT ROUTE 12 FOR 3.0 MI (4.8 KM) TO THE SITE OF THE MARK ON THE RIGHT MARK ON THE LEFT, IN A SMALL FIELD ACROSS THE ROAD FROM HOUSE NO 9273. TO REACH FROM THE INTERSECTION OF US ROUTE 4 AND VT ROUTE 12 NORTH IN WOODSTOCK, GO NORTH ALONG VT ROUTE 12 FOR 10.2 MI (16.4 KM) TO THE INTERSECTION OF STAGE ROAD RIGHT, NORTH ROAD STRAIGHT AND VT ROUTE 12 LEFT. TURN LEFT AND GO NORTH ALONG VT ROUTE 12 FOR 3.2 MI (5.1 KM) TO THE SITE OF THE MARK ON THE RIGHT. THE MARK IS SET 10 CM (4 INCHES) BELOW GROUND SURFACE IN THE TOP OF A CAST ALUMINUM MONUMENT. THE MARK IS 9.1 M (29.9 FT) EAST OF AND ABOUT 0.5 M (1.6 FT) HIGHER THAN THE CENTERLINE OF VT ROUTE 12, 40.6 M (133.2 FT) NORTHEAST OF THE SOUTHEAST CORNER OF A ONE STORY WOOD AND BRICK HOUSE, 54.3 M (178.1 FT) SOUTHEAST OF THE SOUTHEAST CORNER OF A MILK HOUSE ATTACHED TO A BARN AND 57.6 M (189.0 FT) NORTHEAST OF THE CENTER OF THE SOUTHEAST (OUTLET) END OF A 2.0 M (6.6 FT) DIAMETER CONCRETE CULVERT.

TRAVERSE TIES



* MAIN TRAVERSE COMPLETED 7/8/2011 BY P. WINTERS P.C. & C. CYR

ALIGNMENT TIES

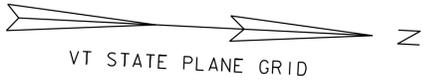


DATUM	
VERTICAL	NAVD 88
HORIZONTAL	NAD 83 (07)
ADJUSTMENT	COMPASS

PROJECT NAME: BARNARD	
PROJECT NUMBER: ER BRF 0241(39)	
FILE NAME: survey\10c410ti.dgn	PLOT DATE: 29-AUG-2013
PROJECT LEADER: K. HIGGINS	DRAWN BY: R. BULLOCK
DESIGNED BY: W. LAMMER	CHECKED BY: W. LAMMER
TIE SHEET	SHEET 9 OF 39

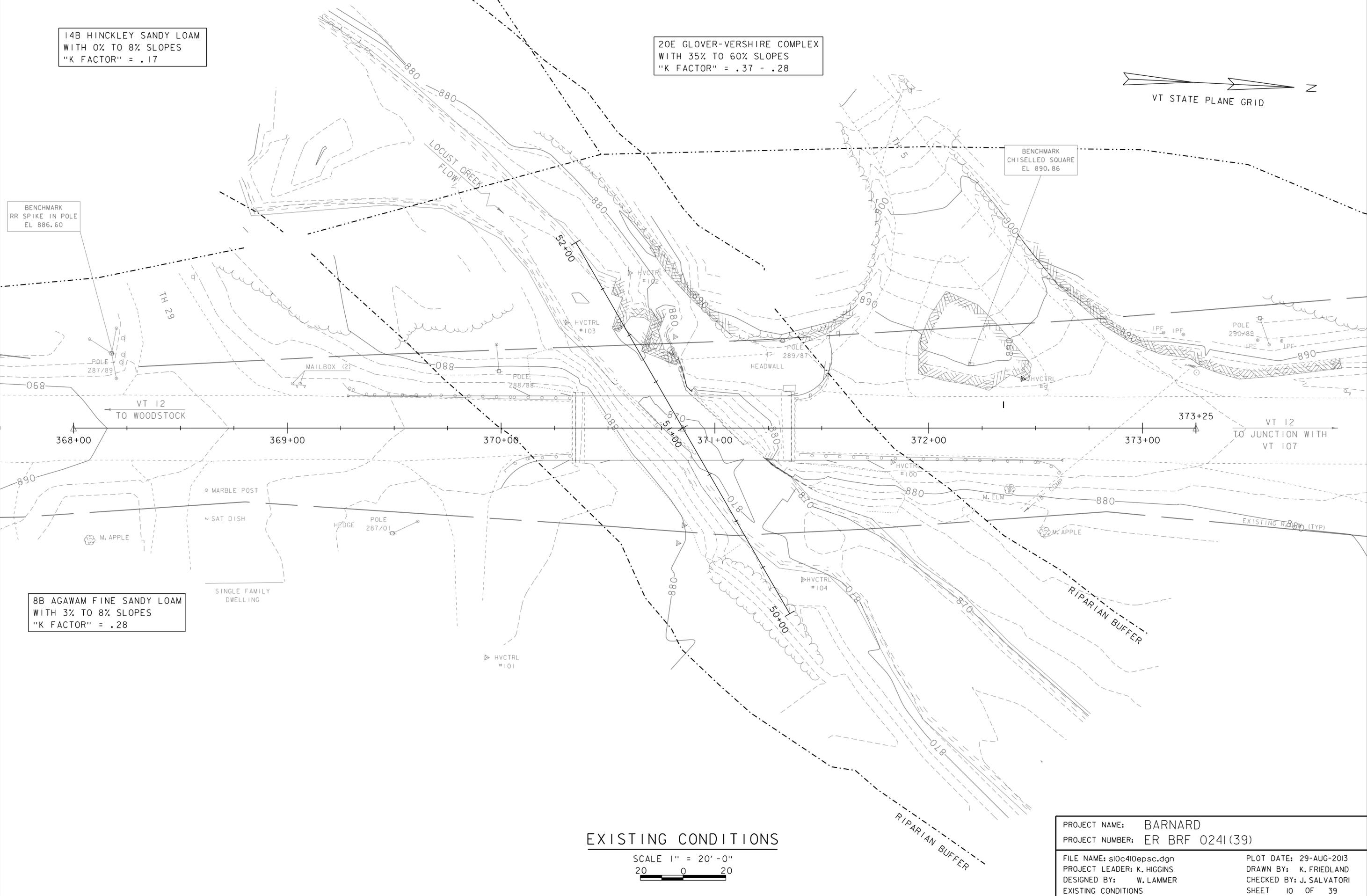
14B HINCKLEY SANDY LOAM
WITH 0% TO 8% SLOPES
"K FACTOR" = .17

20E GLOVER-VERSHIRE COMPLEX
WITH 35% TO 60% SLOPES
"K FACTOR" = .37 - .28



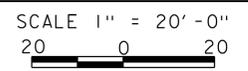
BENCHMARK
RR SPIKE IN POLE
EL 886.60

BENCHMARK
CHISELLED SQUARE
EL 890.86



8B AGAWAM FINE SANDY LOAM
WITH 3% TO 8% SLOPES
"K FACTOR" = .28

EXISTING CONDITIONS



PROJECT NAME:	BARNARD	PLOT DATE:	29-AUG-2013
PROJECT NUMBER:	ER BRF 0241(39)	DRAWN BY:	K. FRIEDLAND
FILE NAME:	sl0c410eps.dgn	CHECKED BY:	J. SALVATORI
PROJECT LEADER:	K. HIGGINS	EXISTING CONDITIONS	SHEET 10 OF 39
DESIGNED BY:	W. LAMMER		

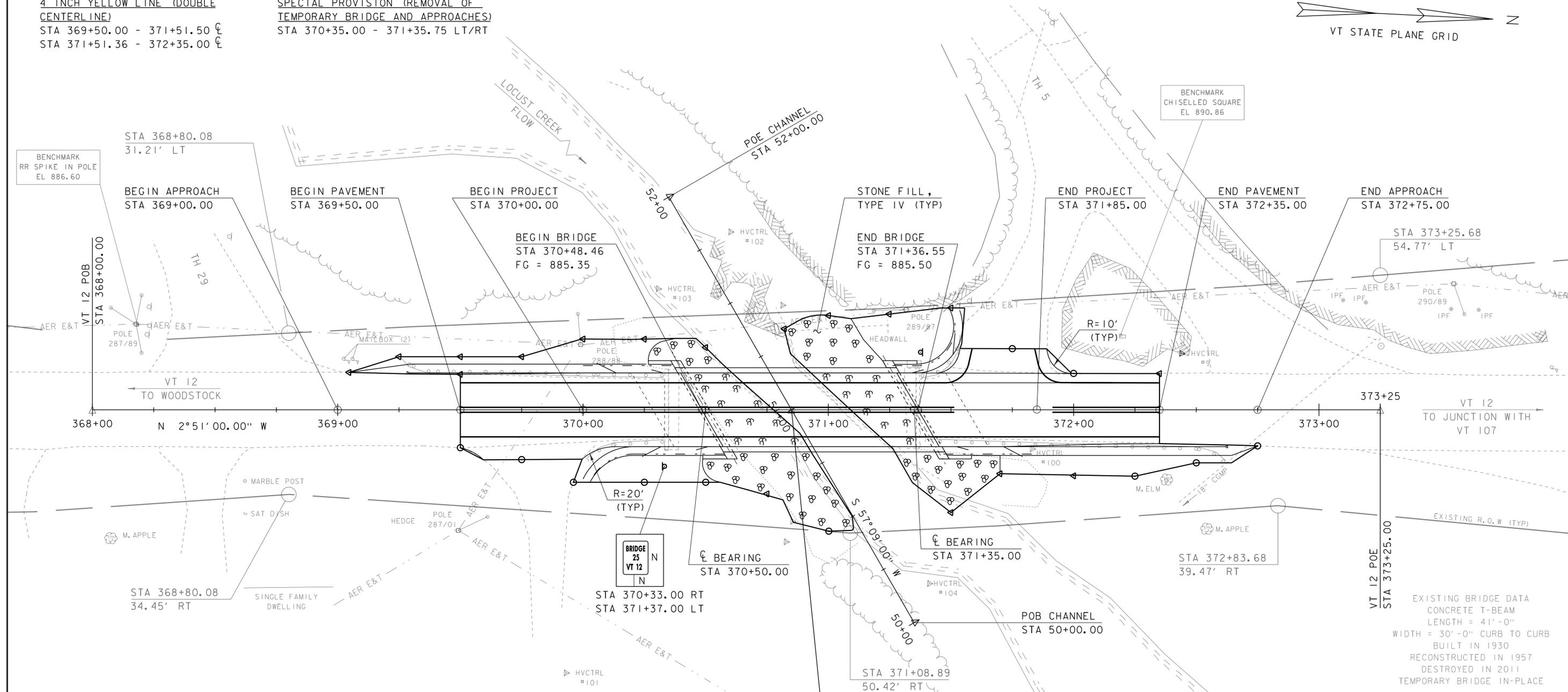
4 INCH WHITE LINE
 STA 369+50.00 - 371+58.50 LT
 STA 371+84.14 - 372+35.00 LT
 STA 369+50.00 - 372+35.00 RT

CONSTRUCT 5'-0" PAVED APRON
 STA 369+54.25 - 370+04.50 RT
 CONSTRUCT 10'-0" PAVED APRON
 STA 371+46.75 - 371+95.25 LT

CONSTRUCT GRADED SWALE
 371+12.00 - 371+25.00 LT

4 INCH YELLOW LINE (DOUBLE CENTERLINE)
 STA 369+50.00 - 371+51.50 CL
 STA 371+51.36 - 372+35.00 CL

SPECIAL PROVISION (REMOVAL OF TEMPORARY BRIDGE AND APPROACHES)
 STA 370+35.00 - 371+35.75 LT/RT

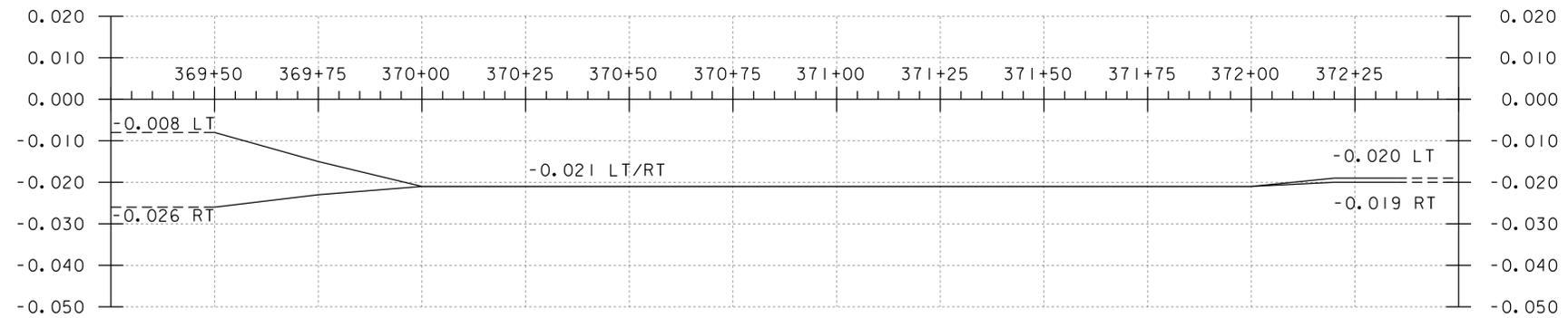


MILEMARKER, STATION, OR SIGN NUMBER	SIGN LEGEND	SIGN DIMENSIONS		NEW SIGN "A"	EXIST POST REL. TO SIGN	NO. OF POSTS	NEW SIGN POSTS SQUARE STEEL (in)			REMARKS	SIGN DETAIL		
		WIDTH (in)	HEIGHT (in)				1.75	2.0	2.5		ANCHOR RODS	S	EA
							lb/ft	1.88	2.42				
370+33.00 RT R&S		6	8	0.33		1	8			X		VD-701	E-134
371+37.00 LT R&S		6	8	0.33		1	8			X		VD-701	E-134
		TOTALS		SF 0.66			16	FT	FT	FT	EA	N = NEW SHS = STANDARD HIGHWAY SIGNS (MUTCD)	

NOTES:
 1. ADJUST NEW CENTERLINE AND EDGE LINES TO MATCH EXISTING LINES AT BEGIN/END APPROACH
 2. EXISTING ROW LINES SHOWN ARE BASED ON BARNARD-BETHEL PROJECT F142 (2) SHEET 36.

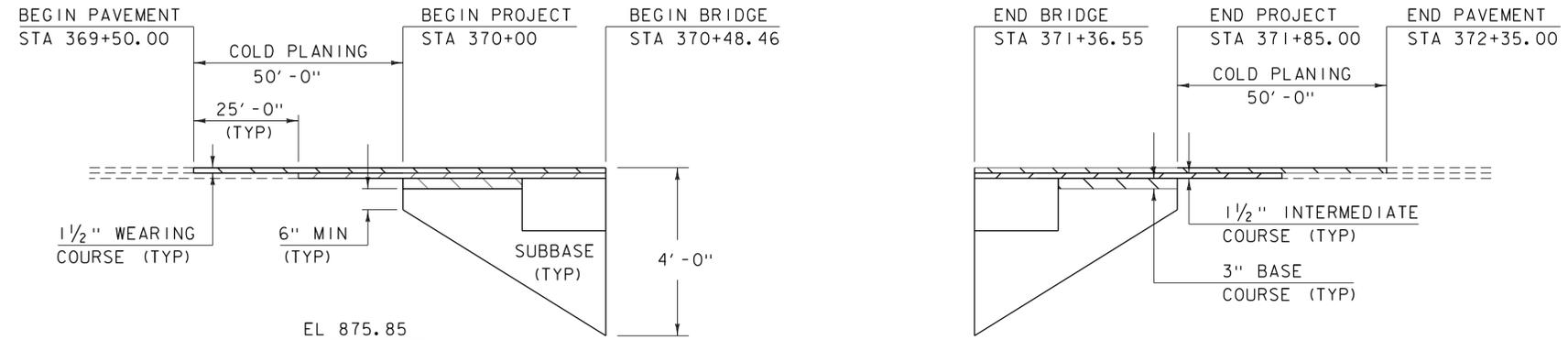
LAYOUT SHEET
 SCALE 1" = 20'-0"
 20 0 20

PROJECT NAME: BARNARD
 PROJECT NUMBER: ER BRF 0241(39)
 FILE NAME: s10c410bdr.dgn
 PROJECT LEADER: K. HIGGINS
 DESIGNED BY: W. LAMMER
 LAYOUT SHEET
 PLOT DATE: 29-AUG-2013
 DRAWN BY: K. FRIEDLAND
 CHECKED BY: J. SALVATORI
 SHEET 11 OF 39



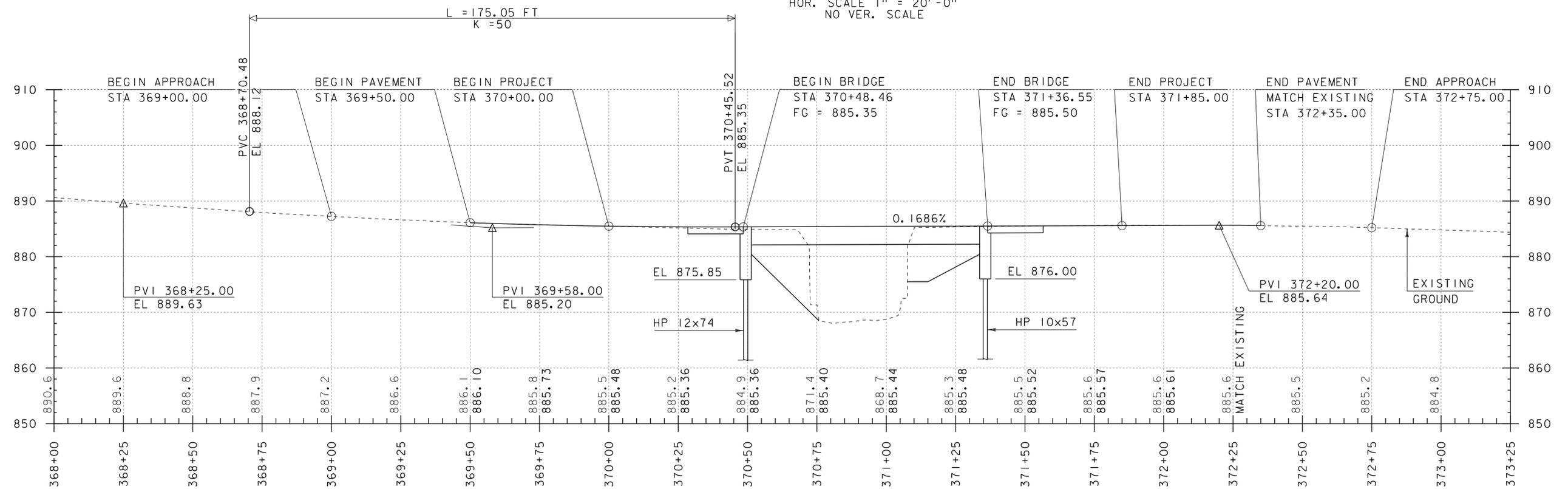
BANKING DIAGRAM

HOR. SCALE 1" = 20'-0"
NO VER. SCALE



MATERIAL TRANSITION

HOR. SCALE 1" = 20'-0"
NO VER. SCALE



MAINLINE PROFILE

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

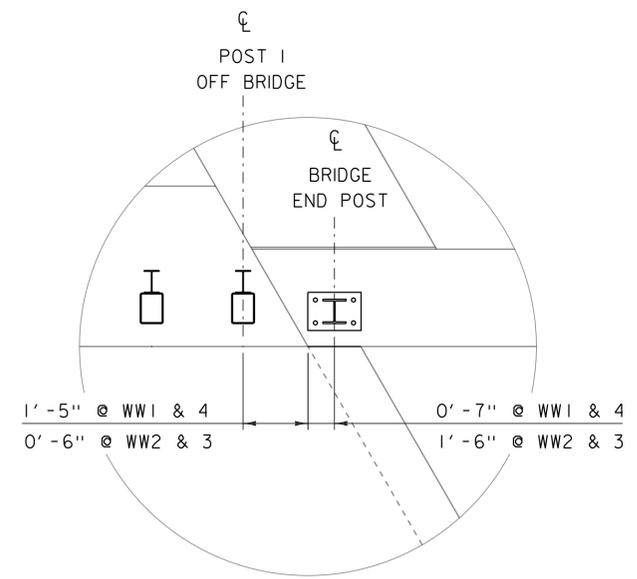
THE GRADES SHOWN TO THE NEAREST TENTH ARE THE ORIGINAL GROUND ELEVATIONS ALONG THE PROPOSED ALIGNMENT.

THE GRADES SHOWN TO THE NEAREST HUNDREDTH ARE THE FINISH GRADES ALONG THE PROPOSED ALIGNMENT.

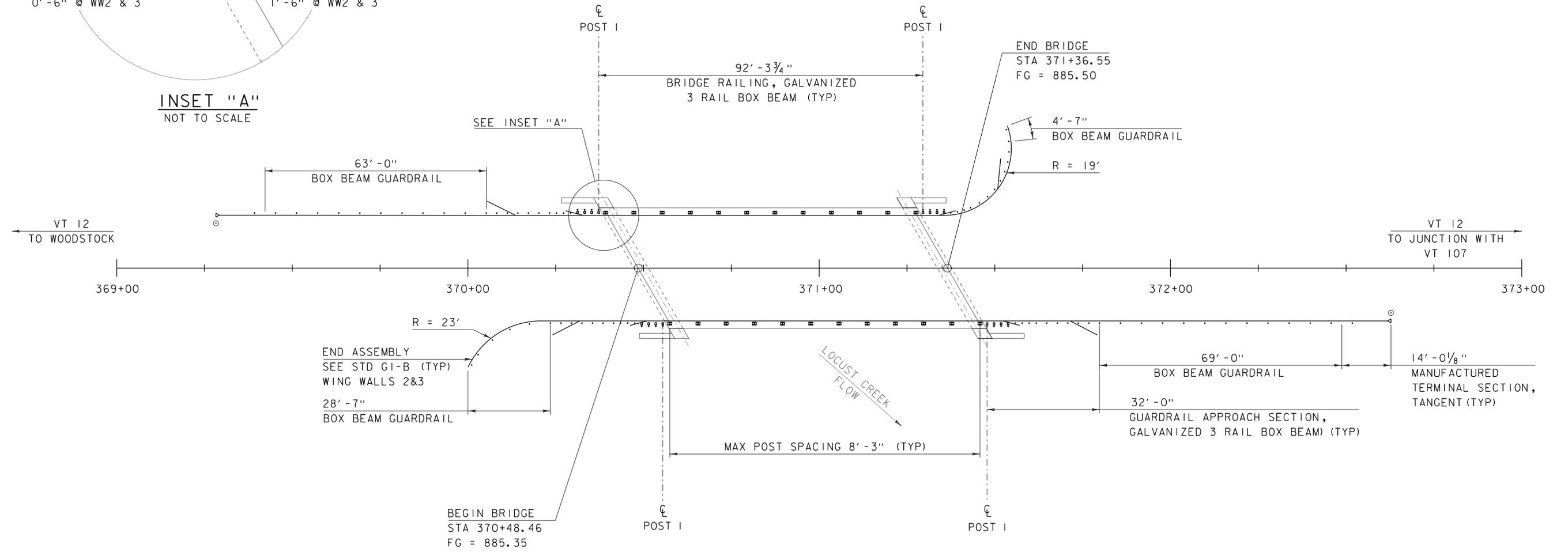
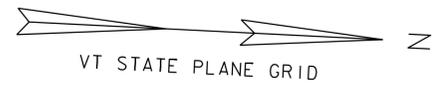
PROJECT NAME: BARNARD
PROJECT NUMBER: ER BRF 0241(39)

FILE NAME: s10c410pro.dgn
PROJECT LEADER: K. HIGGINS
DESIGNED BY: J. SALVATORI
MAINLINE PROFILE

PLOT DATE: 29-AUG-2013
DRAWN BY: K. FRIEDLAND
CHECKED BY: W. LAMMER
SHEET 12 OF 39



INSET "A"
NOT TO SCALE



RAIL LAYOUT SHEET

SCALE 1" = 15'-0"

NOTES:

- SEE STANDARDS G-1B, S-364A, S-364B, S-364C AND S-364D FOR FURTHER DETAILS.

PROJECT NAME: BARNARD	
PROJECT NUMBER: ER BRF 0241(39)	
FILE NAME: s10c410r011.dgn	PLOT DATE: 29-AUG-2013
PROJECT LEADER: K. HIGGINS	DRAWN BY: K. FRIEDLAND
DESIGNED BY: W. LAMMER	CHECKED BY: W. LAMMER
RAIL LAYOUT SHEET	SHEET 13 OF 39

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

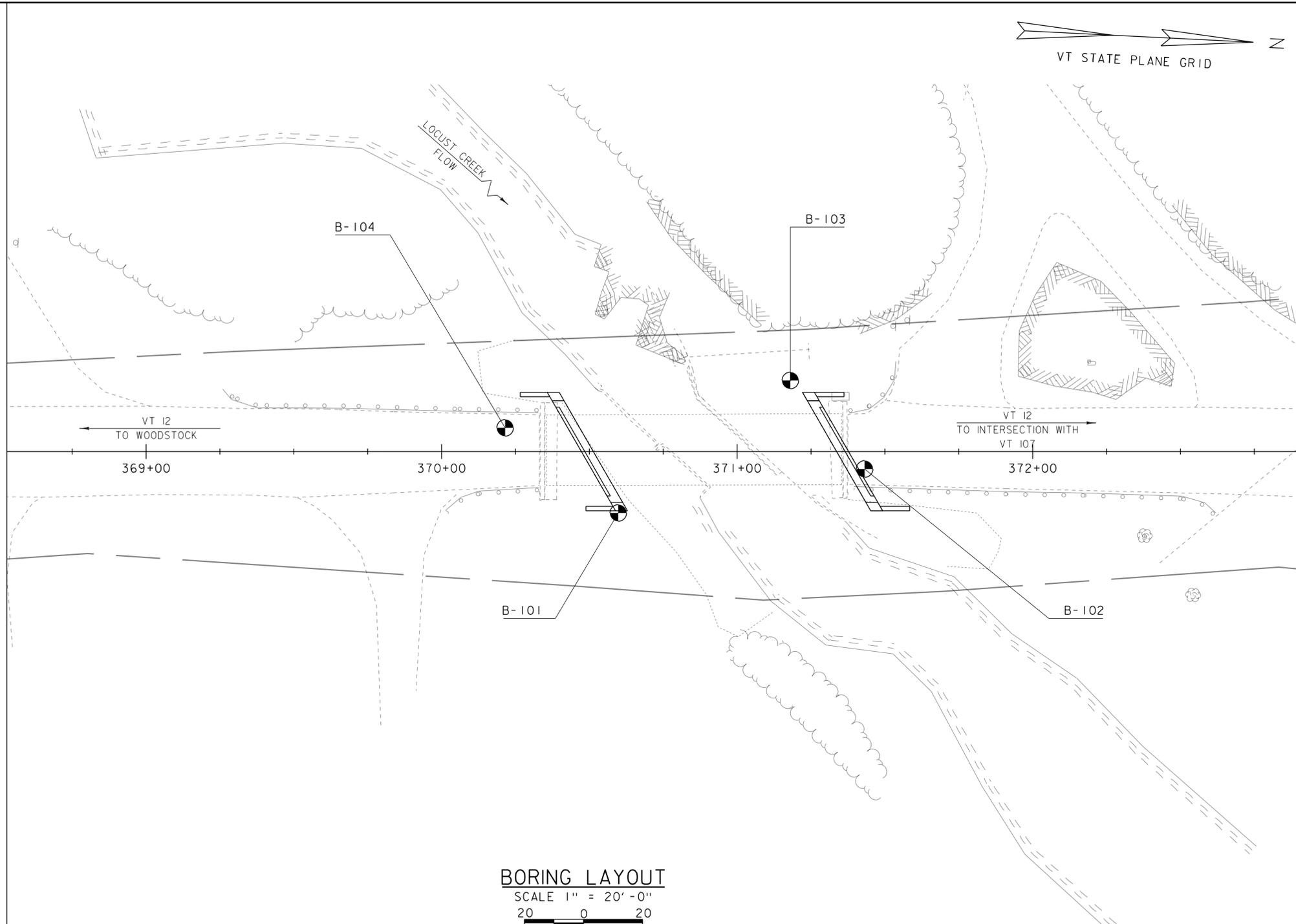
- ▼ Water Elevation
- ⊕ Standard Penetration Boring
- ⊗ Auger Boring
- ⊙ Rod Sounding
- S Sample
- N Standard Penetration Test Blow Count Per Foot For: 2" O.D. Sampler 1 3/8" I.D. Sampler Hammer Weight Of 140 Lbs. Hammer Fall Of 30"
- VS Field Vane Shear Test
- US Undisturbed Soil Sample
- B Blast
- DC Diamond Core
- MD Mud Drill
- WA Wash Ahead
- HSA Hollow Stem Auger Core Size 1 1/8"
- AX Core Size 1 1/8"
- BX Core Size 1 3/8"
- NX Core Size 2 1/8"
- M Double Tube Core Barrel Used
- LL Liquid Limit
- PL Plastic Limit
- PI Plasticity Index
- NP Non Plastic
- w Moisture Content (Dry Wgt. Basis)
- D Dry
- M Moist
- MTW Moist To Wet
- W Wet
- Sat Saturated
- Bo Boulder
- Gr Gravel
- Sa Sand
- Si Silt
- Cl Clay
- HP Hardpan
- Le Ledge
- NLTD No Ledge To Depth
- CNPF Can Not Penetrate Further
- TLOB Top of Ledge Or Boulder
- NR No Recovery
- Rec. Recovery
- 1/2 Rec. Percent Recovery
- ROD Rock Quality Designation
- CBR California Bearing Ratio
- < Less Than
- > Greater Than
- R Refusal (N > 100)
- VTSPG NAD83 - See Note 7

COLOR

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

DEFINITIONS (AASHTO)

- BEDROCK (LEDGE) - Rock in its native location of indefinite thickness.
- BOULDER - A rock fragment with an average dimension > 12 inches.
- COBBLE - Rock fragments with an average dimension between 3 and 12 inches.
- GRAVEL - Rounded particles of rock < 3" and > 0.0787" (#10 sieve).
- SAND - Particles of rock < 0.0787" (#10 sieve) and > 0.0029" (#200 sieve).
- SILT - Soil < 0.0029" (#200 sieve), non or slightly plastic and exhibits no strength when air-dried.
- CLAY - Fine grained soil, exhibits plasticity when moist and considerable strength when air-dried.
- VARVED - Alternate layers of silt and clay.
- HARDPAN - Extremely dense soil, cemented layer, not softened when wet.
- MUCK - Soft organic soil (containing > 10% organic material).
- MOISTURE CONTENT - Weight of water divided by dry weight of soil.
- FLOWING SAND - Granular soil so saturated (loose) that it flows into drill casing during extraction of wash rod.
- STRIKE - Angle from magnetic north to line of intersection of bed with a horizontal plane.
- DIP - Inclination of bed with a horizontal plane.



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

BORING CHART

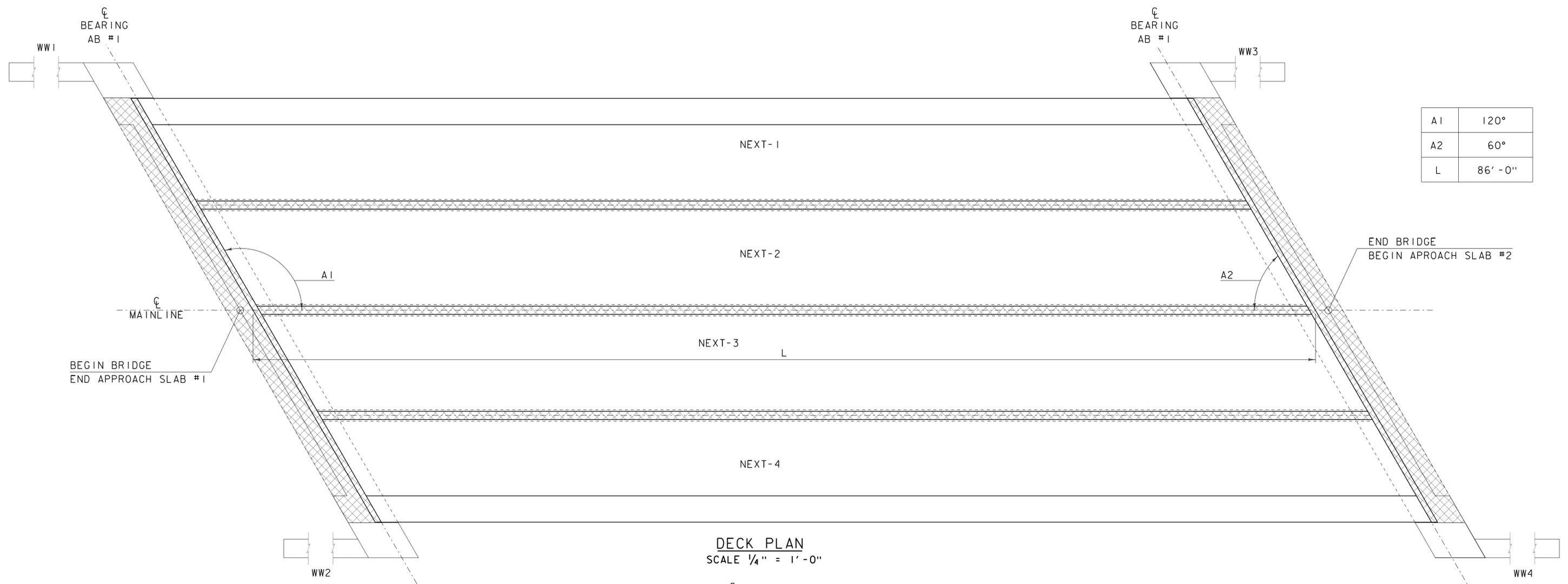
HOLE NO.	SURV. STATION	OFFSET	GROUND ELEV.
B-101	370+59	20.7' RT	881.12'
B-102	371+43	5.9' RT	885.82'
B-103	371+18	24.0' LT	884.37'
B-104	370+21.5	8.0' LT	882.35'

GENERAL NOTES

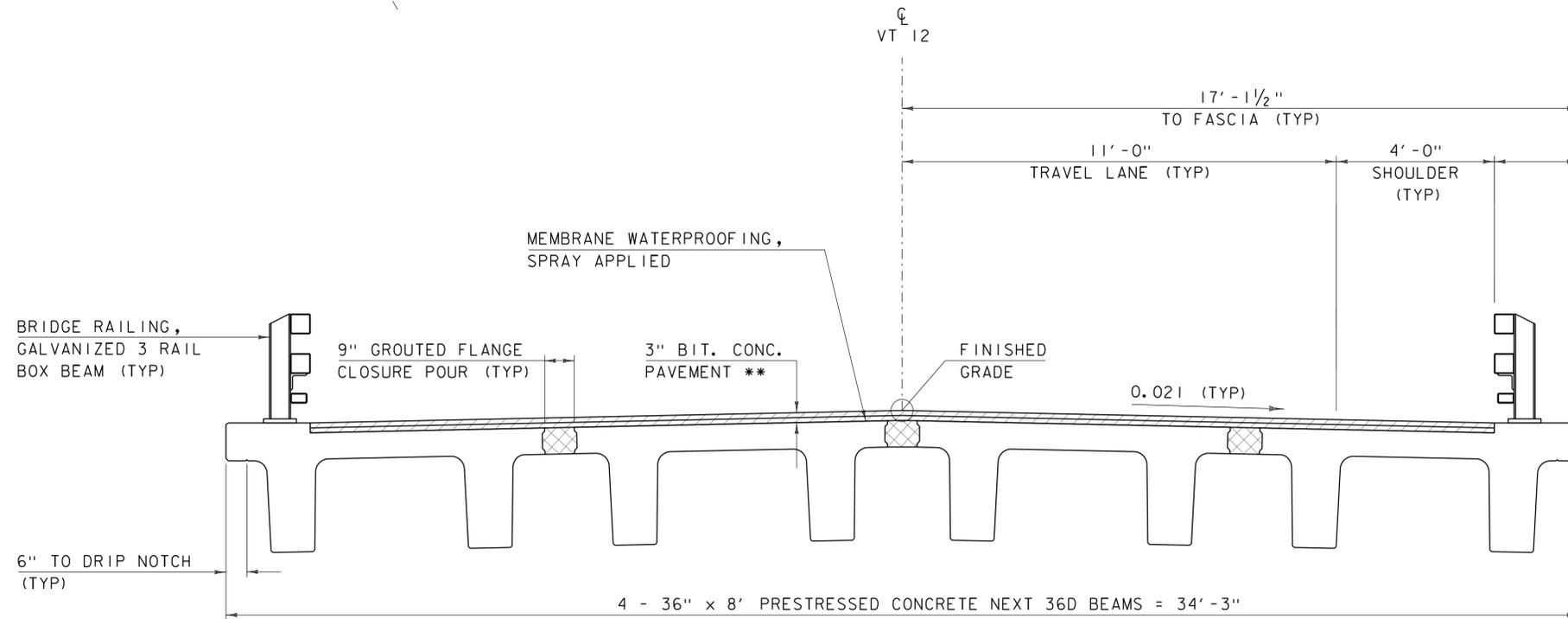
- The subsurface explorations shown herein were made between 5/3/12 and 5/16/12 by the Agency.
- Soil and rock classifications, properties and descriptions are based on engineering interpretation from available subsurface information by the Agency and may not necessarily reflect actual variations in subsurface conditions that may be encountered between individual boring or sample locations.
- Observed water levels and/or conditions indicated are as recorded at the time of exploration and may vary according to the prevailing rainfall, methods of exploration and other factors.
- Engineering judgment was exercised in preparing the subsurface information presented herein. Analysis and interpretation of subsurface data was performed and interpreted for Agency design and estimating purposes. Presentation of the information in the Contract is intended to provide the Contractor access to the same data available to the Agency. The subsurface information is presented in good faith and is not intended as a substitute for personal investigation, independent interpretation, independent analysis or judgment by the Contractor.
- Pictorial structure details shown on the boring plan layout or soils profile are for illustrative purposes only and may not accurately portray final contract details.
- Terminology used on boring logs to describe the hardness, degree of weathering, and spacing of fractures, joints and other discontinuities in the bedrock is defined in the AASHTO Manual on Subsurface Investigations, 1988.
- Northing and Easting coordinates are shown in Vermont State Plane Grid North American Datum 1983 in meters and survey feet.

PROJECT NAME: BARNARD	PLOT DATE: 29-AUG-2013
PROJECT NUMBER: ER BRF 0241(39)	DRAWN BY: J. SALVATORI
FILE NAME: si0c410bor.dgn	CHECKED BY: W. LAMMER
PROJECT LEADER: K. HIGGINS	SHEET 14 OF 39
DESIGNED BY: J. SALVATORI	
BORING LAYOUT SHEET	

VT Trans		STATE OF VERMONT AGENCY OF TRANSPORTATION MATERIALS & RESEARCH SECTION SUBSURFACE INFORMATION		BORING LOG		Boring No.: B-103				
				BARNARD BHF 0241(39) VT-12 BR-25		Page No.: 1 of 1				
						Pin No.: 10C410				
						Checked By: NSM				
Boring Crew: SALISBURY, GARROW		Casing		Sampler		Groundwater Observations				
Date Started: 5/03/12 Date Finished: 5/03/12		Type: WB SS		Date		Notes				
VTSPG NAD83: N 458436.07 ft E 1605096.79 ft		I.D.: 4 in 1.5 in		Depth (ft)		Drilled same day.				
Station: 371+18 Offset: -24.00		Hammer Wt: N.A. 140 lb.								
Ground Elevation: 884.37 ft		Hammer Fall: N.A. 30 in.								
		Hammer/Rod Type: Auto/AWJ								
		Rig: CME 45C TRACK $C_e = 1.34$								
Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/ft (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
0.0		A-2-4, GrSiSa, brn, Moist, Rec. = 1.5 ft				4-4-7-4 (11)	13.6	23.4	48.7	27.9
2.5		A-2-4, SiSa, brn, Moist, Rec. = 1.2 ft				3-3-2-2 (5)	17.5	18.5	52.1	29.4
5.0		A-2-4, SiGrSa, brn, Moist, Rec. = 0.8 ft				3-2-2-2 (4)	19.3	29.0	46.8	24.2
7.5		A-2-4, SiGrSa, brn, Moist, Rec. = 0.5 ft				2-2-12-R@3.5" (14)	18.4	37.0	41.7	21.3
7.5		Visual Description: Broken Rock with Silty Sand, Rec. = 0.3 ft					3.4			
7.8		7.8 ft - 9.0 ft, NXDC, Weathered Rock. Very poor rock								
10.0		9.0 ft - 14.0 ft, Light gray, To pale-green schist and feldspathic biotite quartzite Hard, Unweathered to slightly weathered, Good rock, NXMDC, RMR = 62	1 (30)	88 (58)	4					
12.5					4					
15.0					4					
17.5					4					
15.0		14.0 ft - 19.0 ft, Light gray, To pale-green schist and feldspathic biotite quartzite Hard, Unweathered to slightly weathered, Good rock, NXMDC, RMR = 62	2 (30)	100 (70)	3					
20.0					3					
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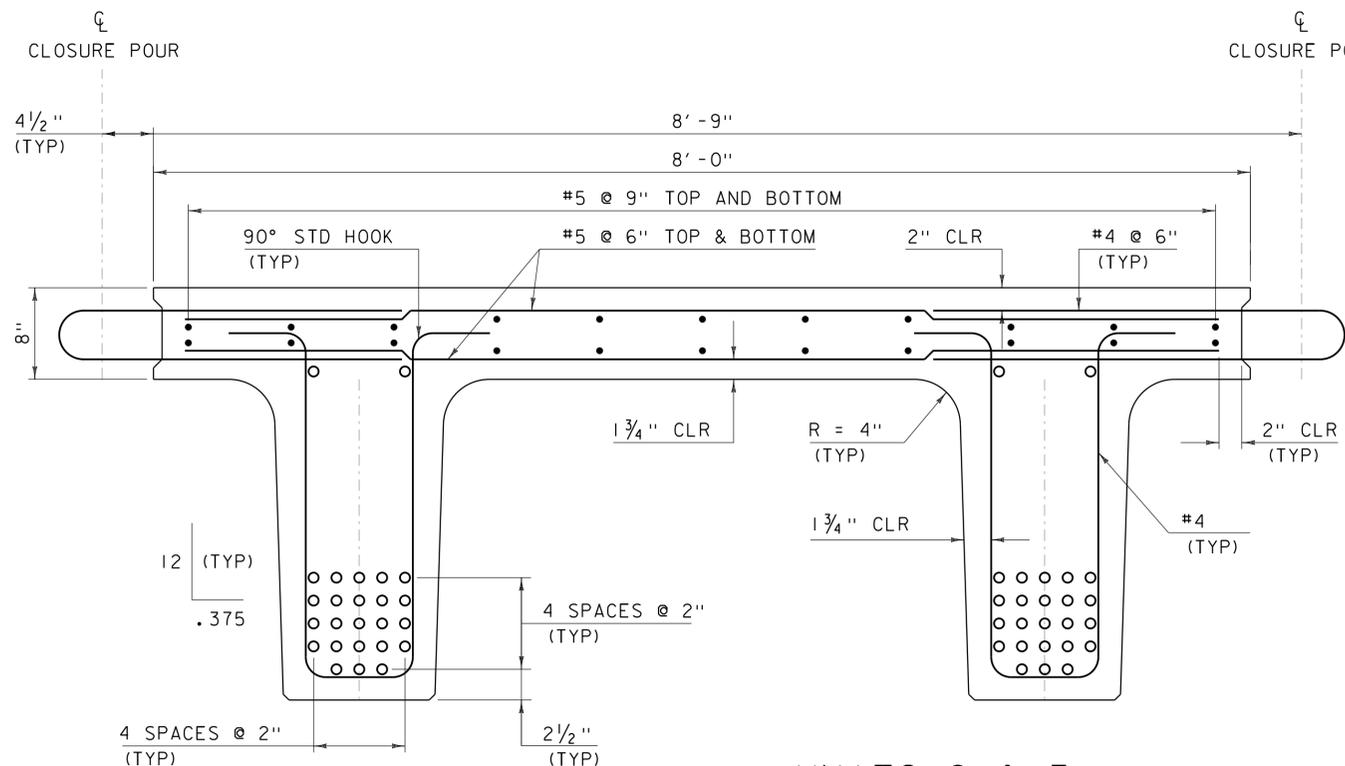
A1	120°
A2	60°
L	86'-0"



LEGEND

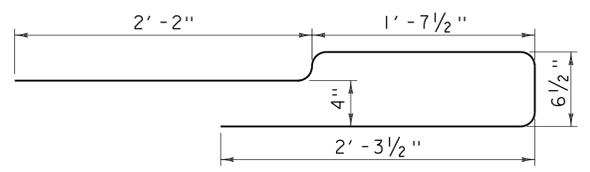
- SPECIAL PROVISION (BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY)
- HPC = SPECIAL PROVISION (HIGH PERFORMANCE CONCRETE, RAPID SET)

PROJECT NAME:	BARNARD	PLOT DATE:	10-SEP-2013
PROJECT NUMBER:	ER BRF 0241(39)	DRAWN BY:	K. FRIEDLAND
FILE NAME:	sl0c410sup.dgn	DESIGNED BY:	W. LAMMER
PROJECT LEADER:	K. HIGGINS	CHECKED BY:	W. LAMMER
FRAMING PLAN		SHEET	17 OF 39



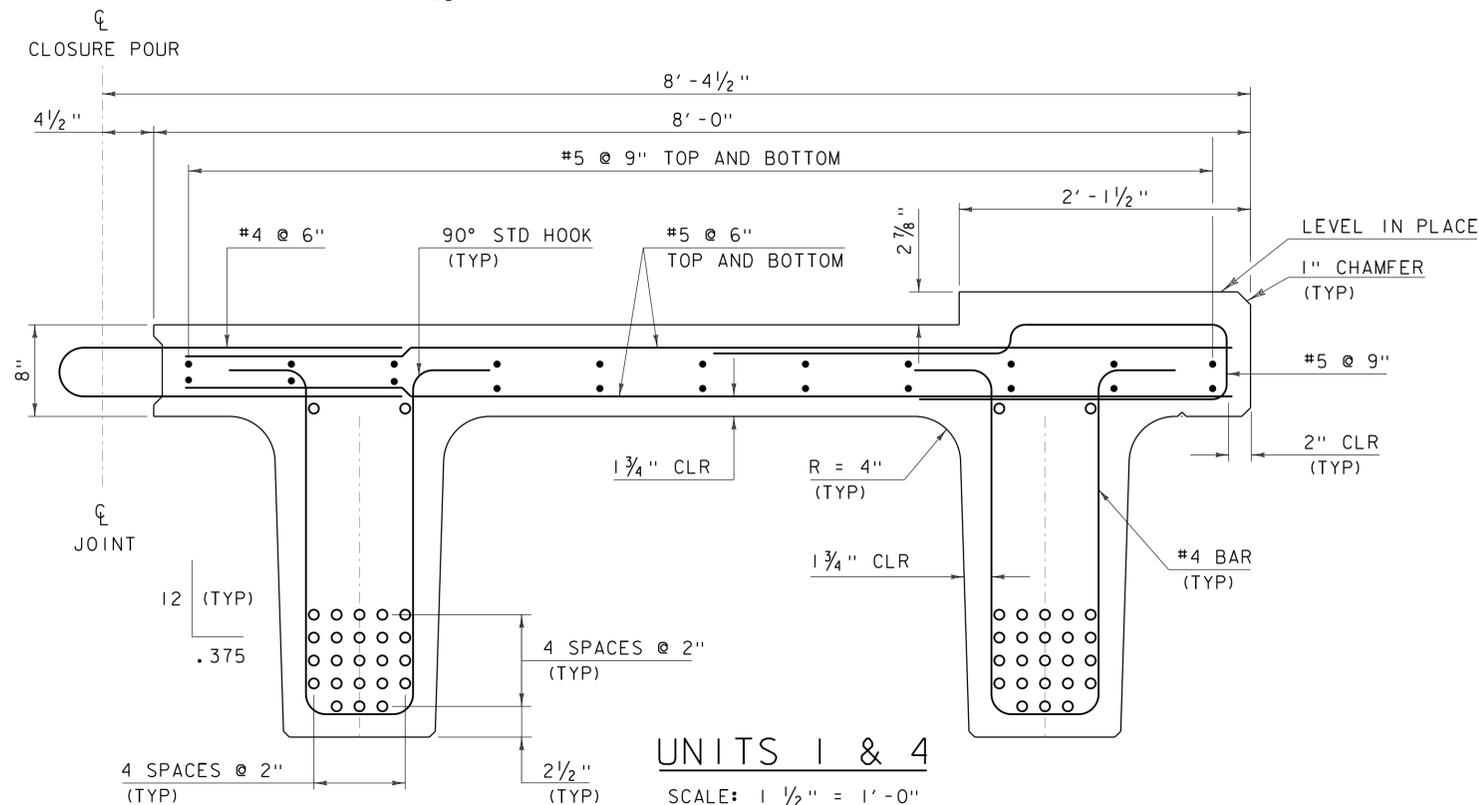
UNITS 2 & 3

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



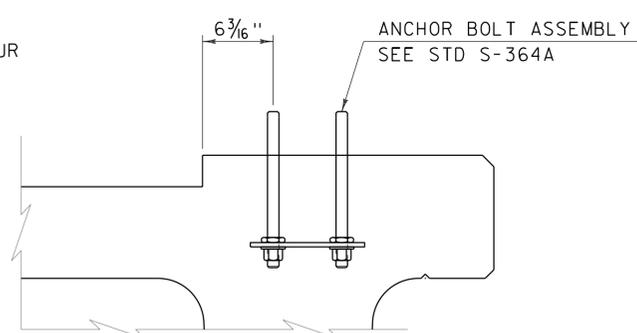
CURB BAR

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



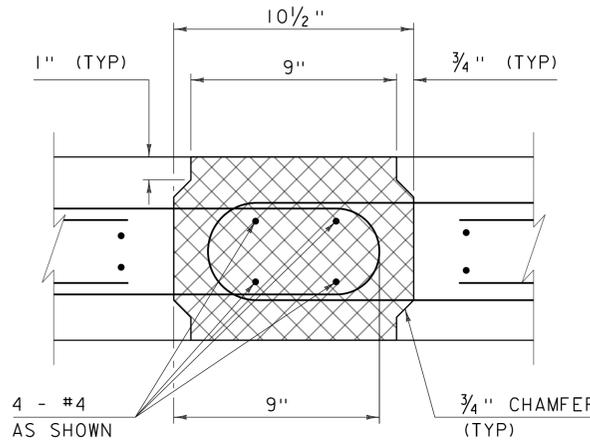
UNITS 1 & 4

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



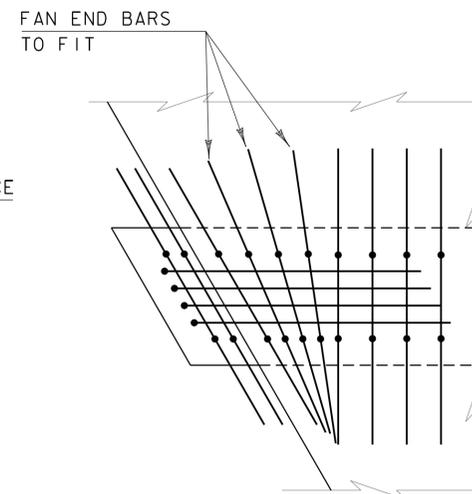
END SECTION

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



CONNECTION DETAIL SECTION

SCALE = 3" = 1'-0"

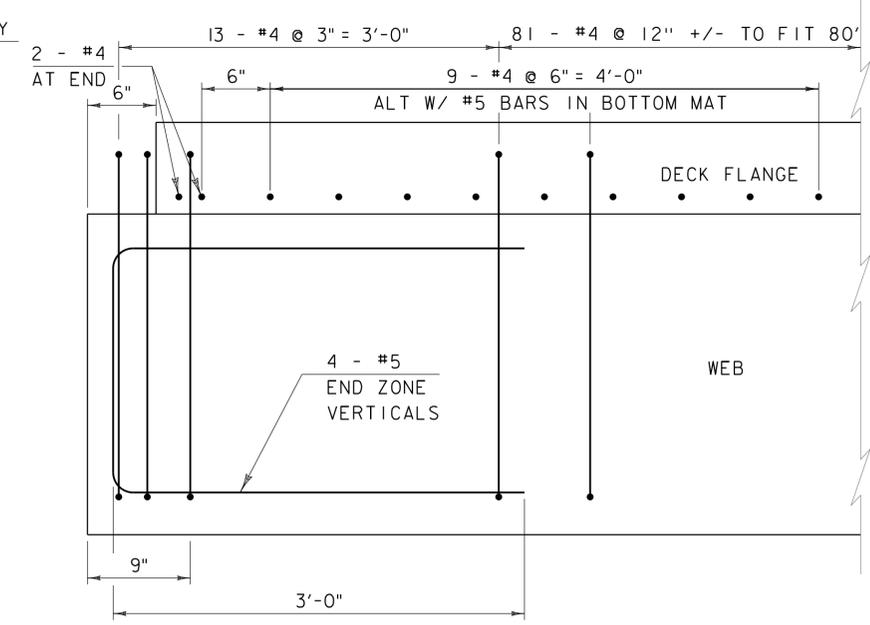


SKewed END DETAIL

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

NOTE:

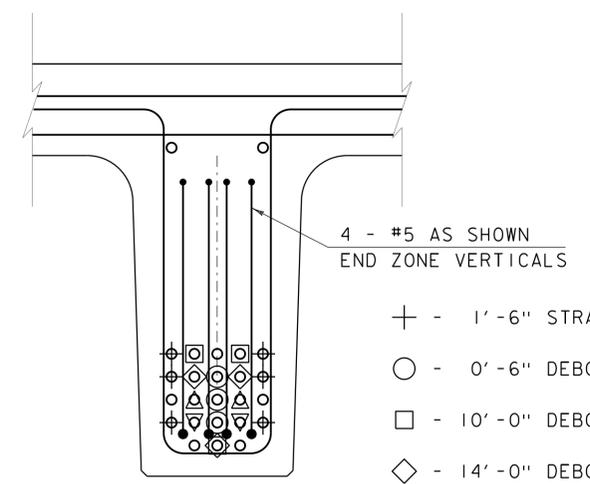
1. BARS IN DECK FLANGE OMITTED FOR CLARITY.
2. TRANSVERSE REINFORCING IN THE DECK SHALL BE PLACED PARALLEL TO THE SKEW.



**ADDITIONAL END BEAM REINFORCING
LONGITUDINAL SECTION**

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

*BARS IN DECK FLANGE OMITTED FOR CLARITY



BEAM SECTION

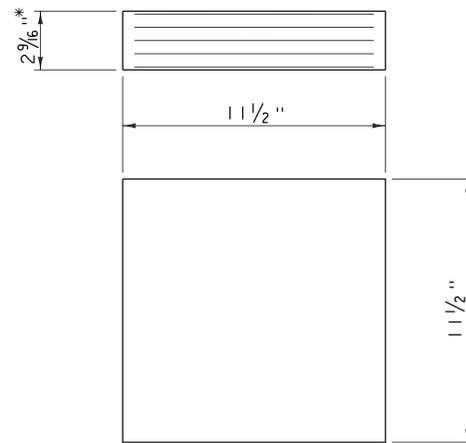
SCALE: 1 1/2" = 1'-0"

- + - 1'-6" STRAND CUT LONG
- - 0'-6" DEBOND EACH END
- - 10'-0" DEBOND EACH END
- ◇ - 14'-0" DEBOND EACH END
- △ - 16'-0" DEBOND EACH END
- ▽ - 18'-0" DEBOND EACH END
- ⊙ - 20'-0" DEBOND EACH END

PROJECT NAME: BARNARD
PROJECT NUMBER: ER BRF 0241(39)

FILE NAME: s10c410next.dgn
PROJECT LEADER: K. HIGGINS
DESIGNED BY: W. LAMMER
NEXT BEAM TYPICAL SECTIONS

PLOT DATE: 29-AUG-2013
DRAWN BY: J. SALVATORI
CHECKED BY: W. LAMMER
SHEET 18 OF 39



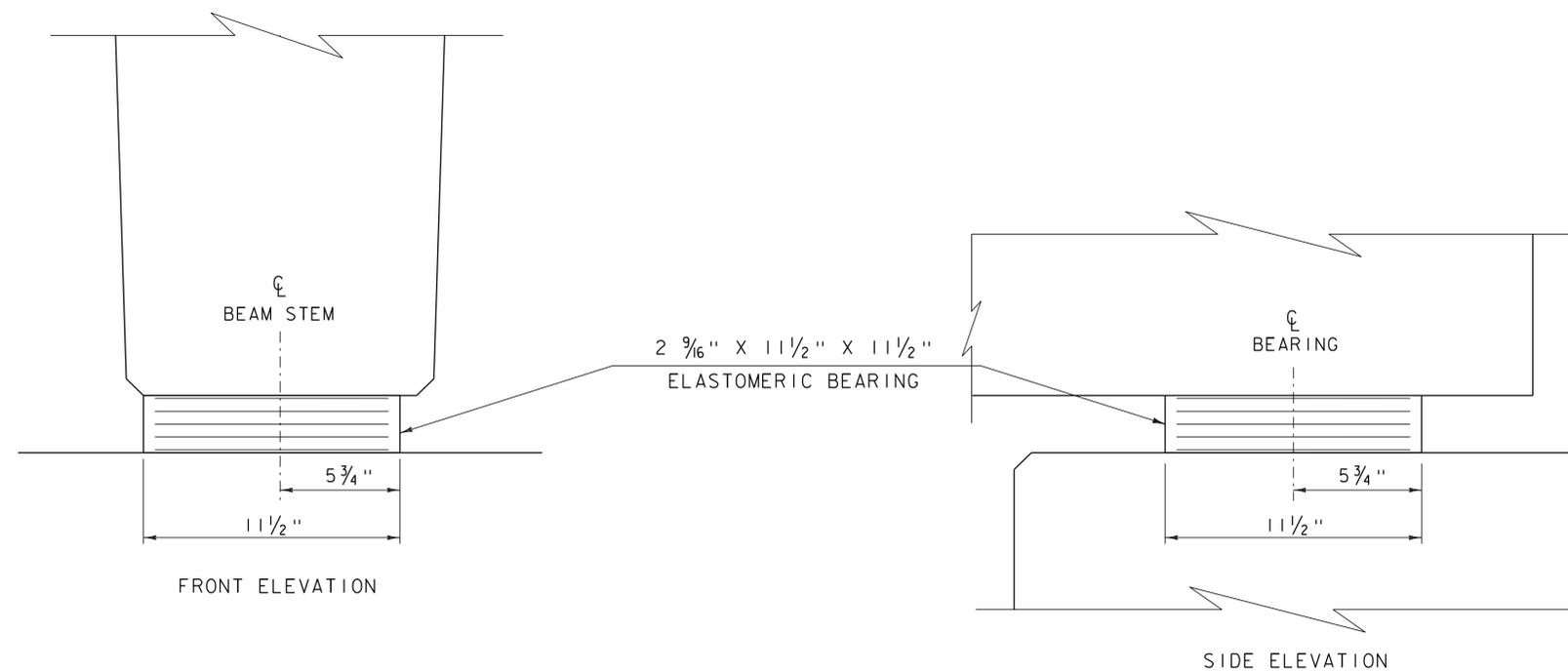
ELASTOMERIC BEARING DETAIL

SCALE 3" = 1'-0"

- * 2 - 1/8" EXTERIOR LAYERS OF ELASTOMER
- 4 - 1/2" INTERIOR LAYERS OF ELASTOMER
- 5- 1/16" STEEL REINFORCING PLATES

BEARING NOTES

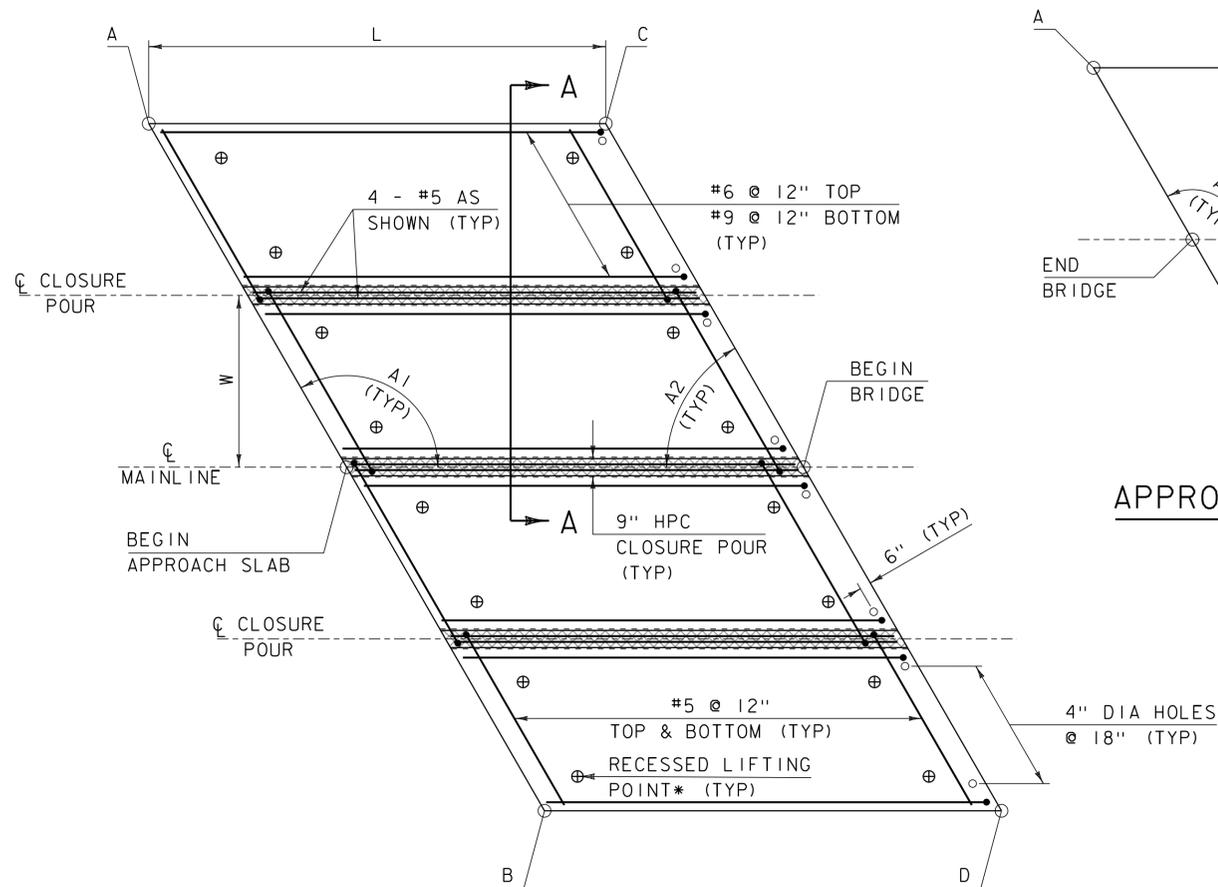
1. BEARINGS SHALL CONFORM TO THE APPLICABLE SUBSECTIONS OF SECTIONS 531 AND 731.
2. ALL REINFORCEMENT BETWEEN LAYERS OF ELASTOMER SHALL BE STEEL MEETING THE REQUIREMENTS OF SUBSECTION 714.02. ALL INTERNAL STEEL PLATES SHALL BE SAND BLASTED AND FREE OF COATINGS, RUST AND MILL SCALE. THE PLATES SHALL BE FREE OF SHARP EDGES AND BURRS.
3. STEEL REINFORCED ELASTOMERIC BEARINGS SHALL HAVE A MINIMUM 1/8" EDGE SEAL OF ELASTOMER INTEGRAL WITH BEARING OVER ALL INTERNAL PLATES.
4. THE ELASTOMER WAS DESIGNED WITH A SHEAR MODULUS OF 100 PSI +/- 15%
5. THE CONCRETE UNDER THE BEARING DEVICE SHALL BE LEVEL.
6. THE CONTRACTOR IS ADVISED TO HAVE A MINIMUM OF 24 - 1/4"x12 1/2"x12 1/2" GALVANIZED STEEL SHIMS AVAILABLE FOR USE FOR ELEVATION ADJUSTMENTS UPON THE SETTING OF THE SUPERSTRUCTURE UNITS. 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".



ELASTOMERIC BEARING DETAILS

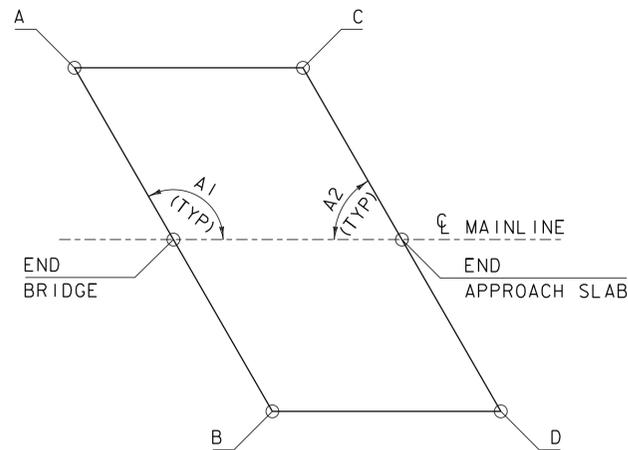
SCALE 3" = 1'-0"

PROJECT NAME: BARNARD	
PROJECT NUMBER: ER BRF 0241(39)	
FILE NAME: s10c410brg.dgn	PLOT DATE: 29-AUG-2013
PROJECT LEADER: K. HIGGINS	DRAWN BY: J. SALVATORI
DESIGNED BY: W. LAMMER	CHECKED BY: W. LAMMER
BEARING DETAILS	SHEET 19 OF 39

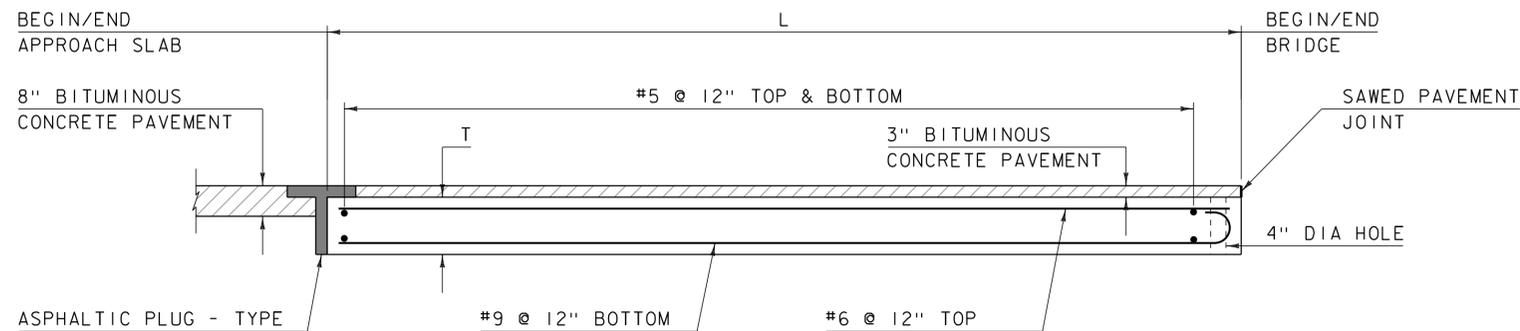


APPROACH SLAB #1 PLAN VIEW
SCALE 1/4" = 1'-0"

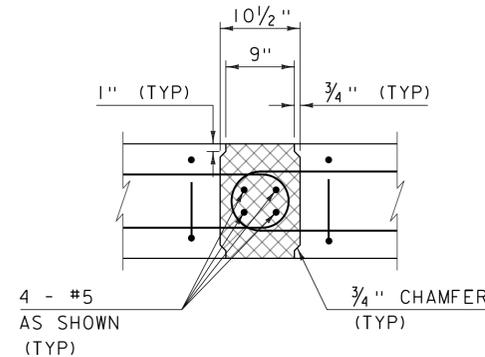
NOTE:
1. FABRICATOR TO DESIGN LIFTING POINTS AND INCLUDE CALCULATIONS WITH SUBMITTAL.



APPROACH SLAB #2 PLAN VIEW
NOT TO SCALE



APPROACH SLAB ELEVATION VIEW
SCALE 1/2" = 1'-0"

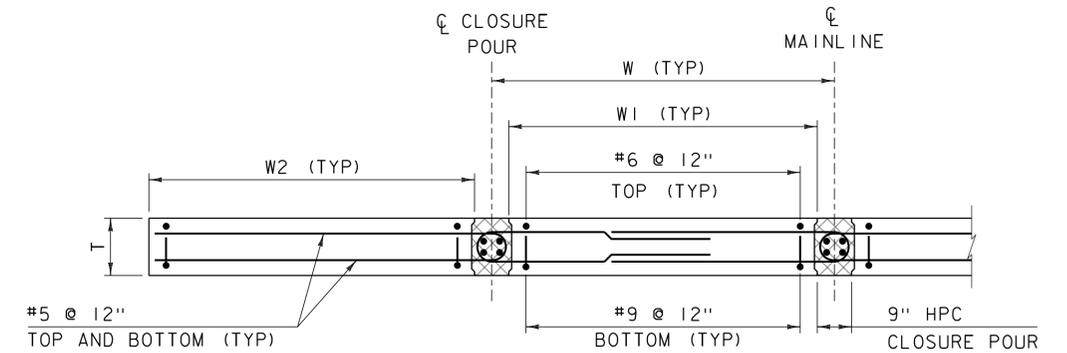


JOINT DETAIL SECTION
SCALE 1" = 1'-0"

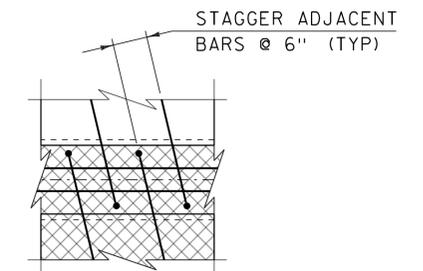
T	1' - 3"			
L	20' - 0"	APPROACH SLAB #1	A1	120°
W	7' - 6"		A2	60°
W1	6' - 9"	APPROACH SLAB #2	A1	120°
W2	7' - 1 1/2"		A2	60°

APPROACH SLAB DIMENSIONS

NOTE:
NF = NEAR FACE
FF = FAR FACE
EF = EACH FACE
3" CLEAR, UNLESS OTHERWISE SPECIFIED ON THE PLANS.
2' - 7" BAR LAP UNLESS OTHERWISE SPECIFIED ON THE PLANS.



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



JOINT DETAIL PLAN
SCALE 1" = 1'-0"

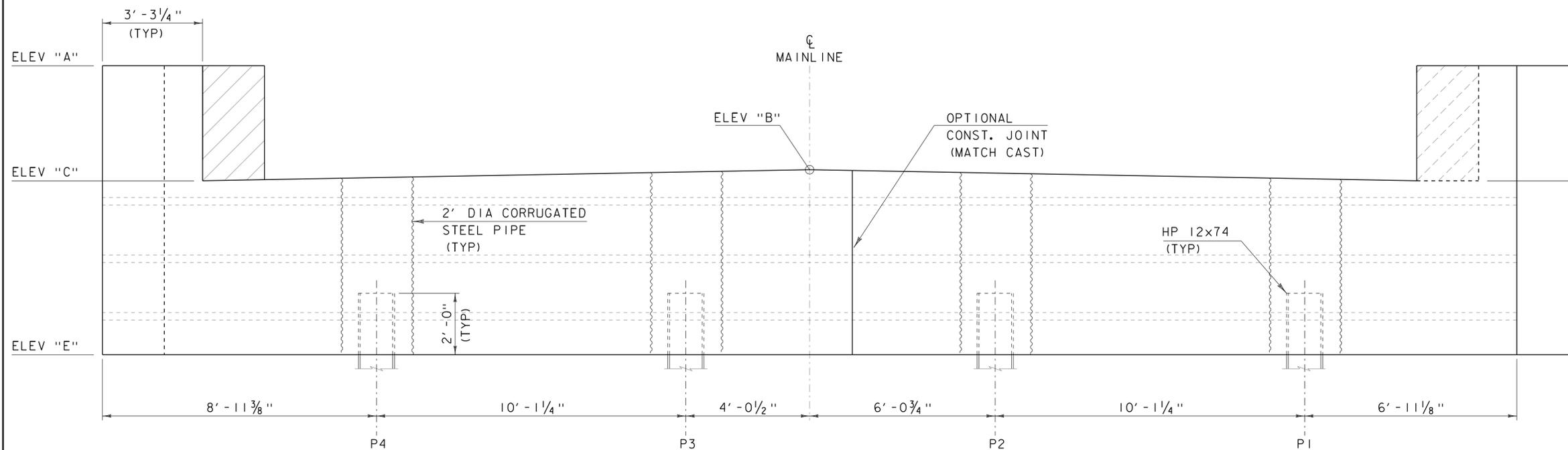
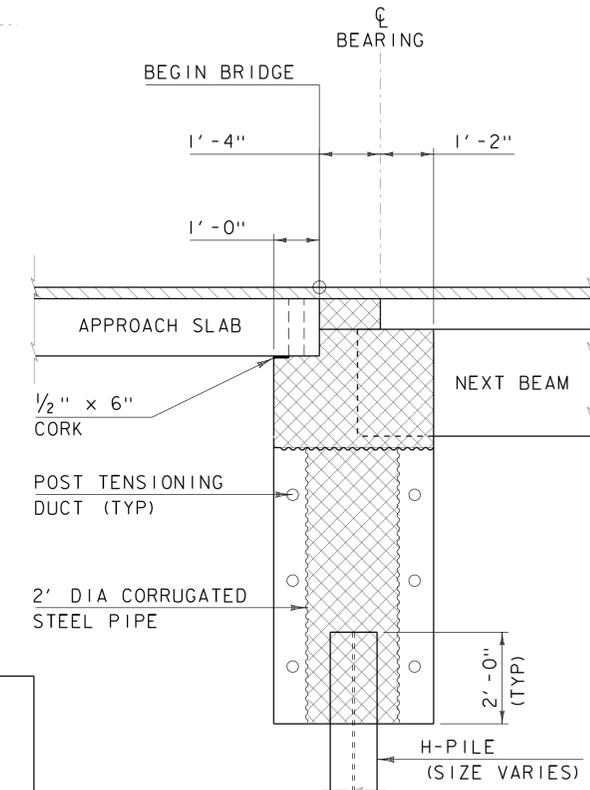
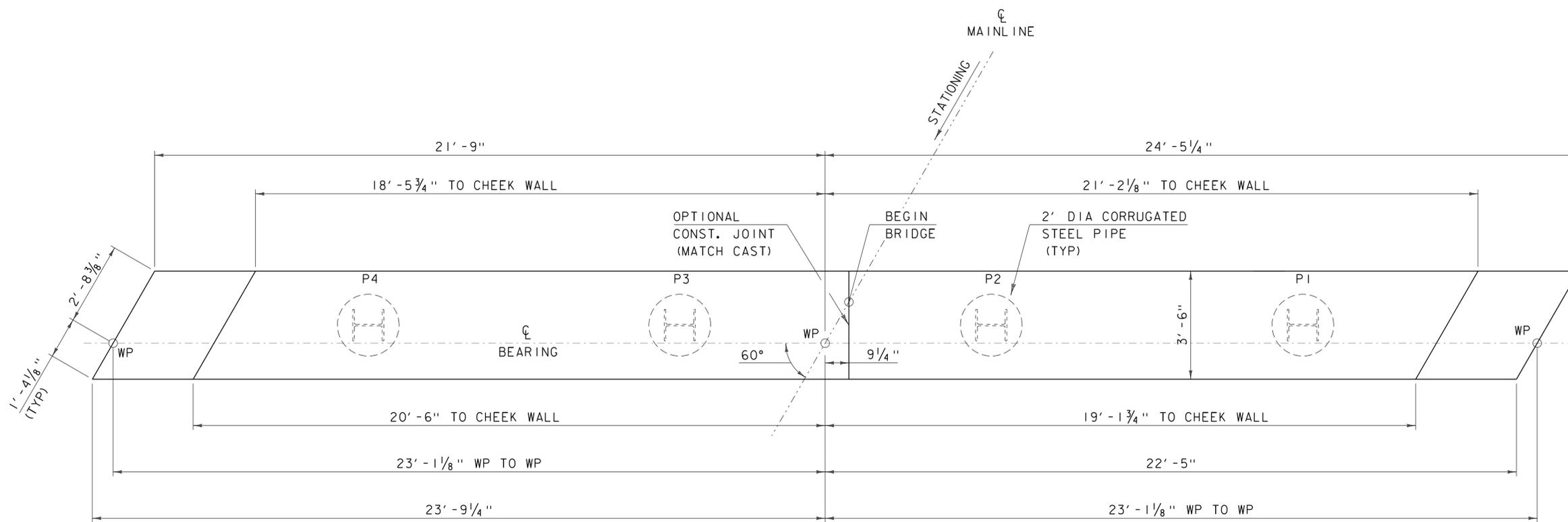
	STATION	OFFSET	ELEVATION
1A	370+19.80	-15.00	884.81
BEGIN AS #1	370+28.46	℄	885.10
1B	370.37.12	15.00	884.78
1C	370+39.80	-15.00	884.78
END AS #1	370+48.46	℄	885.10
1D	370+57.12	15.00	884.81
2A	371+27.89	-15.00	884.93
BEGIN AS #2	371+36.55	℄	885.25
2B	371+45.21	15.00	884.96
2C	371+47.89	-15.00	884.96
END AS #2	371+56.55	℄	885.28
2D	371+65.21	15.00	884.99

APPROACH SLAB ELEVATIONS
ALL ELEVATIONS ARE TOP OF SLAB

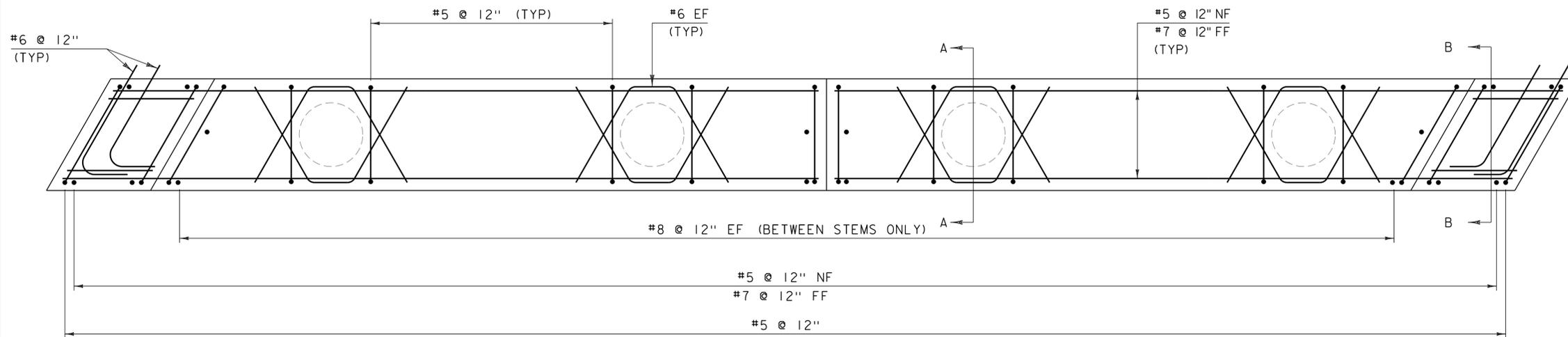
PROJECT NAME:	BARNARD	PLOT DATE:	29-AUG-2013
PROJECT NUMBER:	ER BRF 024(39)	DRAWN BY:	J. SALVATORI
FILE NAME:	sl0c410opslab.dgn	CHECKED BY:	W. LAMMER
PROJECT LEADER:	K. HIGGINS	SHEET	20 OF 39
DESIGNED BY:	J. SALVATORI		
APPROACH SLAB DETAILS			

PCU I ELEVATIONS

	ABI
ELEV "A"	885.35
ELEV "B"	881.89
ELEV "C"	881.51
ELEV "D"	881.51
ELEV "E"	875.85

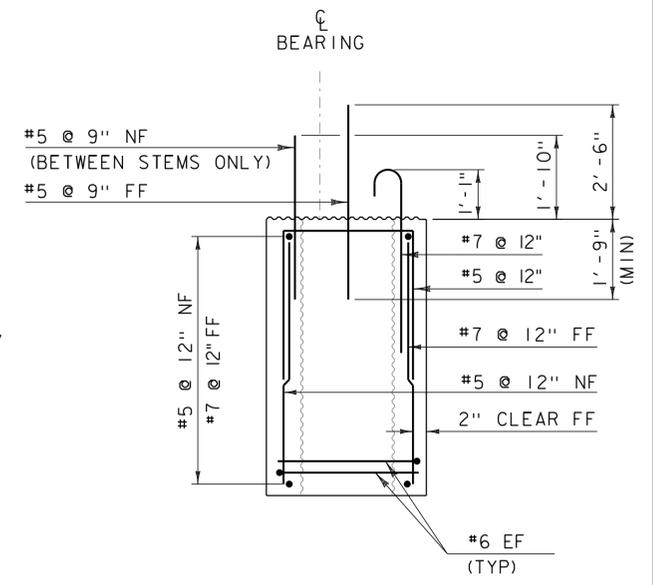


PROJECT NAME:	BARNARD
PROJECT NUMBER:	ER BRF 024(39)
FILE NAME:	s10c410sub.dgn
PROJECT LEADER:	K. HIGGINS
DESIGNED BY:	W. LAMMER
ABUTMENT I PLAN	
PLOT DATE:	16-SEP-2013
DRAWN BY:	J. SALVATORI
CHECKED BY:	W. LAMMER
SHEET	21 OF 39



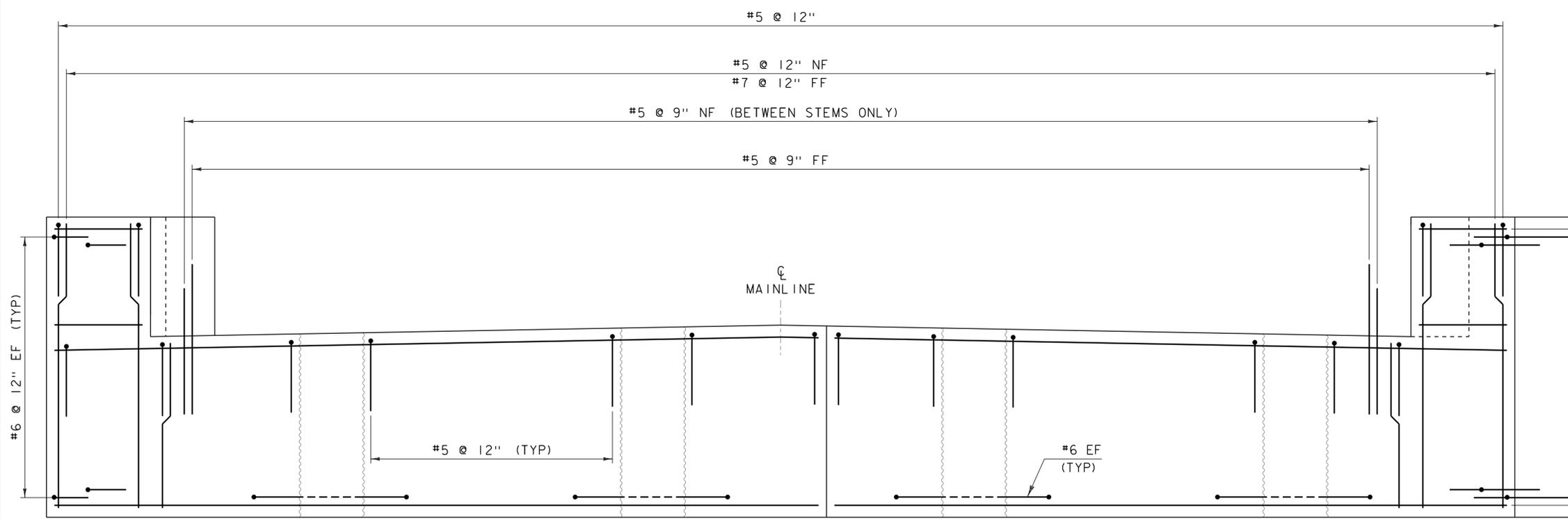
ABUTMENT I REINFORCING PLAN (PCU 1)

SCALE 1/2" = 1'-0"



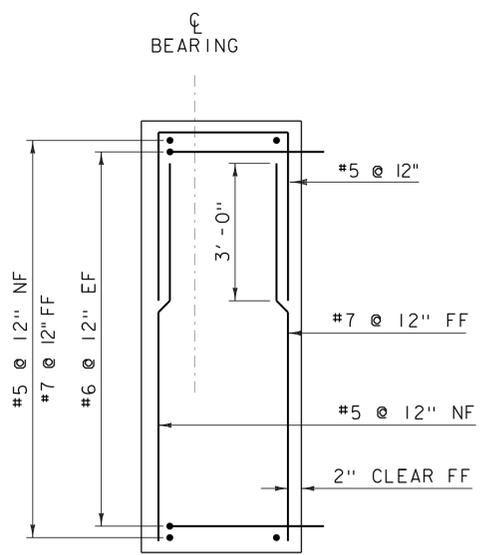
SECTION A-A

SCALE 1/2" = 1'-0"



ABUTMENT I REINFORCING ELEVATION (PCU 1)

SCALE 1/2" = 1'-0"



SECTION B-B

SCALE 1/2" = 1'-0"

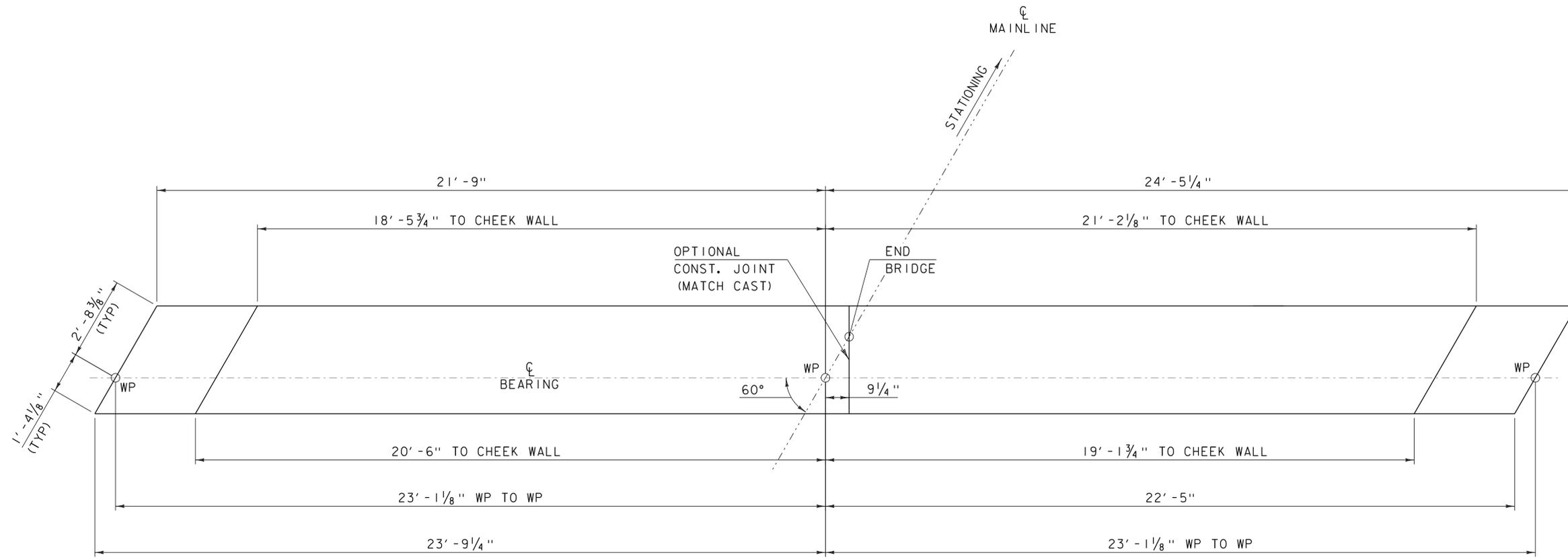
NOTE:

- NF = NEAR FACE
- FF = FAR FACE
- EF = EACH FACE
- 3" CLEAR, UNLESS OTHERWISE SPECIFIED ON THE PLANS.
- 2' - 7" BAR LAP UNLESS OTHERWISE SPECIFIED ON THE PLANS.

NOTE:

1. REINFORCING STEEL FOR PCU 1 SHOWN, PCU 2 SIMILAR.

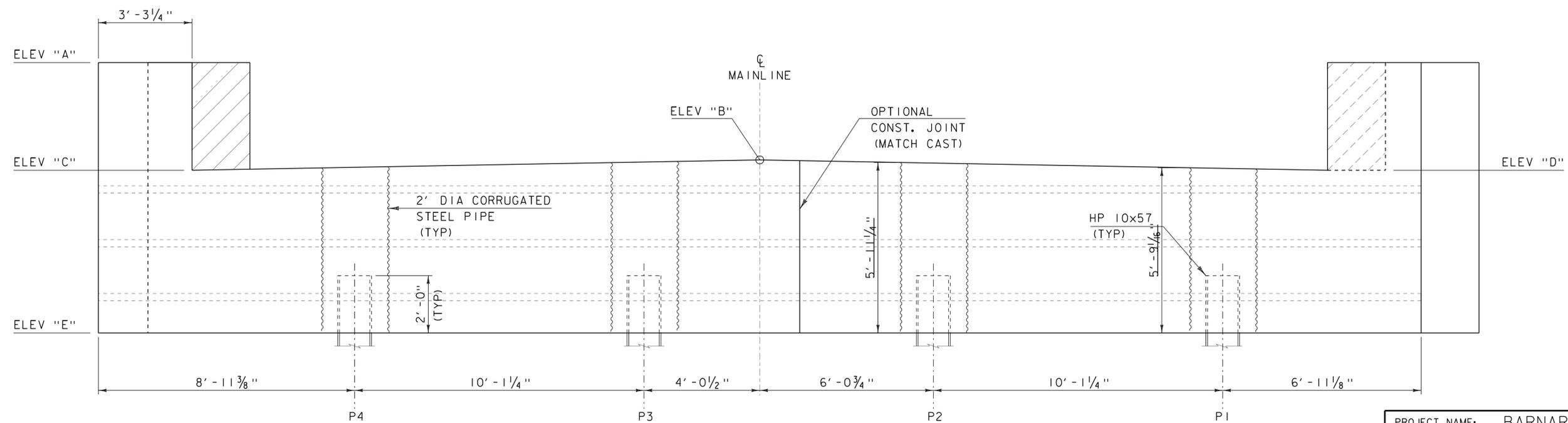
PROJECT NAME: BARNARD	PLOT DATE: 17-SEP-2013
PROJECT NUMBER: ER BRF 024(39)	DRAWN BY: J. SALVATORI
FILE NAME: s10c410sub.dgn	CHECKED BY: W. LAMMER
PROJECT LEADER: K. HIGGINS	SHEET 22 OF 39
DESIGNED BY: W. LAMMER	
ABUTMENT I REINFORCING	



ABUTMENT 2 PLAN (PCU 2)
SCALE 1/2" = 1'-0"

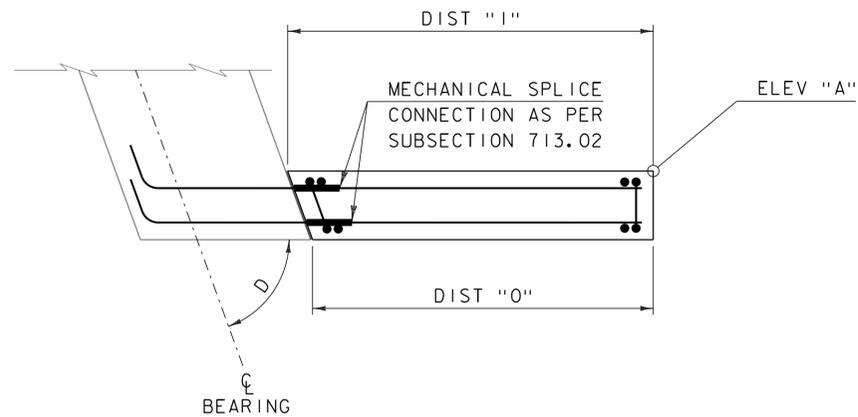
PCU 3 ELEVATIONS

	AB2
ELEV "A"	885.50
ELEV "B"	882.03
ELEV "C"	881.65
ELEV "D"	881.65
ELEV "E"	876.00

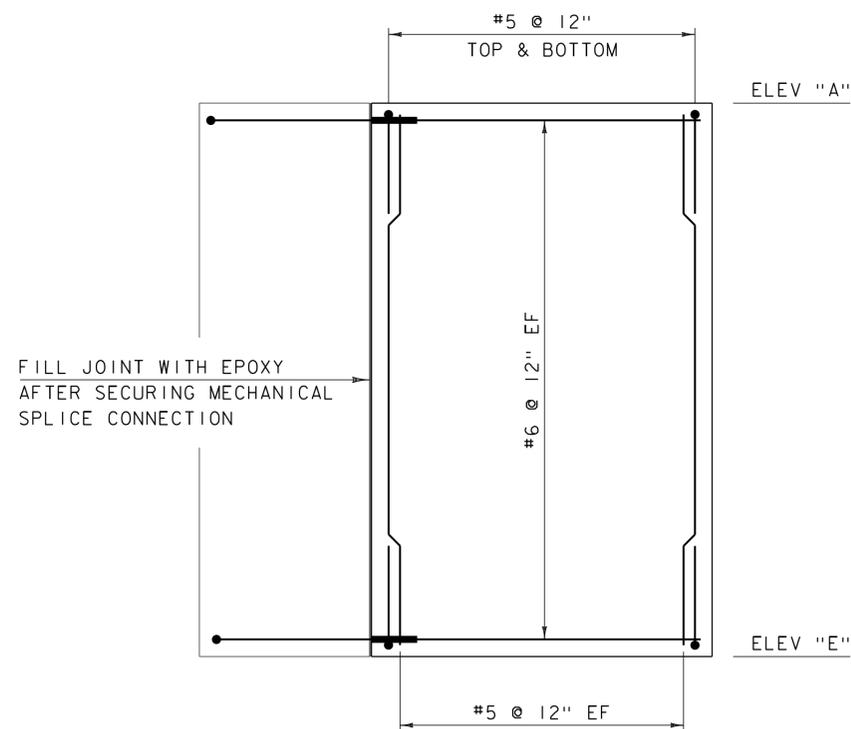


ABUTMENT 2 ELEVATION (PCU 2)
SCALE 1/2" = 1'-0"

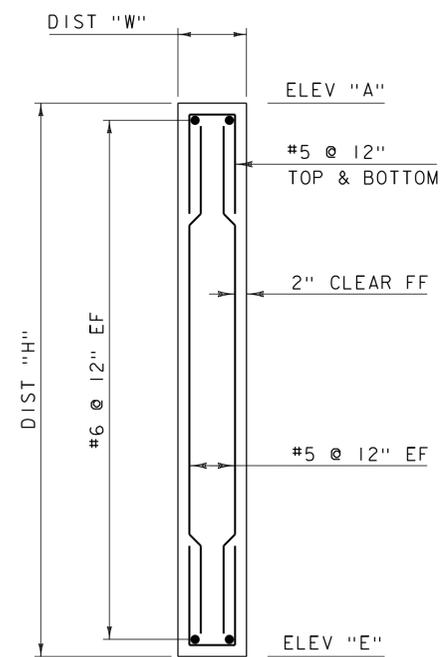
PROJECT NAME:	BARNARD	PLOT DATE:	29-AUG-2013
PROJECT NUMBER:	ER BRF 024(39)	DRAWN BY:	J. SALVATORI
FILE NAME:	sl0c410sub.dgn	CHECKED BY:	W. LAMMER
PROJECT LEADER:	K. HIGGINS	SHEET	23 OF 39
DESIGNED BY:	W. LAMMER		
ABUTMENT 2 PLAN			



WW1 PLAN (PCU 3)
NOT TO SCALE



WW1 ELEVATION (PCU 3)
NOT TO SCALE



WW1 TYPICAL (PCU 3)
NOT TO SCALE

PCU 3-6 ELEVATIONS

	WW1 (PCU 3)	WW2 (PCU 4)	WW3 (PCU 5)	WW4 (PCU 6)
ELEV "A"	885.35	885.35	885.50	885.50
ELEV "E"	875.85	875.85	876.00	876.00
DIST "H"	9' - 6"	9' - 6"	9' - 6"	9' - 6"
DIST "W"	1' - 6"	1' - 6"	1' - 6"	1' - 6"
DIST "I"	10' - 0"	9' - 1 1/2"	9' - 1 1/2"	10' - 0"
DIST "O"	9' - 1 1/2"	10' - 0"	10' - 0"	9' - 1 1/2"
ANGLE "D"	60°	120°	120°	60°

NOTE:

NF = NEAR FACE
FF = FAR FACE
EF = EACH FACE
3" CLEAR, UNLESS OTHERWISE SPECIFIED ON THE PLANS.
2' - 7" BAR LAP UNLESS OTHERWISE SPECIFIED ON THE PLANS.

NOTES:

1. EPOXY GROUT SHALL BE INCIDENTAL TO ITEM 540.10, "PRECAST CONCRETE STRUCTURE".
2. ALL REBAR AND MECHANICAL CONNECTORS IN WINGWALLS SHALL BE LEVEL II EPOXY COATED.
3. THE BRIDGE PLAQUE FURNISHED BY THE AGENCY SHALL BE CAST INTO WINGWALL 2. ALL WORK TO INSTALL THE PLAQUE SHALL BE INCIDENTAL TO THE PRECAST CONCRETE STRUCTURE ITEM. SEE SD-502.00 FOR FURTHER DETAILS.
4. WW1 SHOWN, OTHERS SHALL BE SIMILAR.

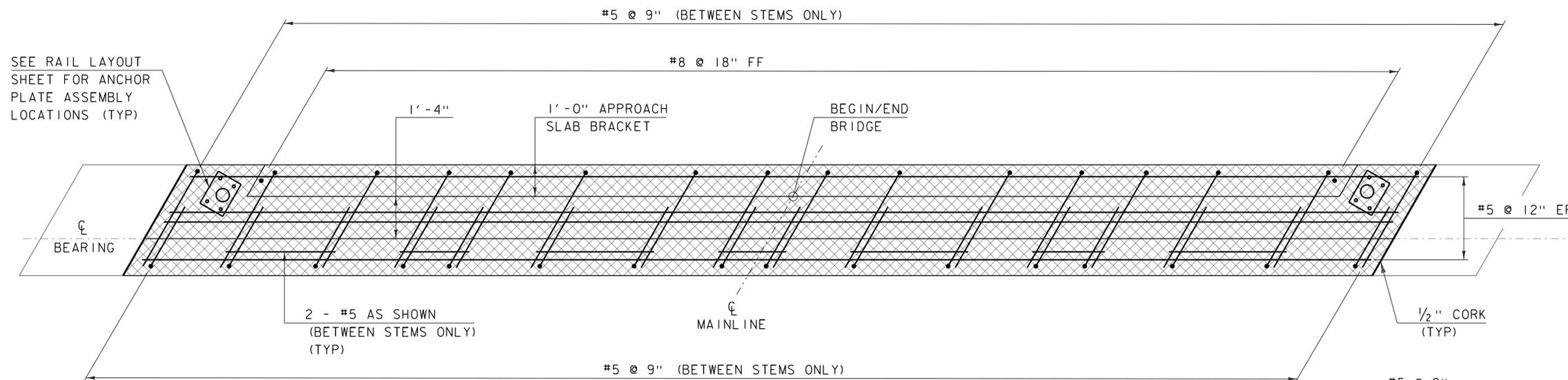
PROJECT NAME: BARNARD
PROJECT NUMBER: ER BRF 024(39)

FILE NAME: s10c410sub.dgn
PROJECT LEADER: K. HIGGINS
DESIGNED BY: W. LAMMER
WINGWALL DETAILS

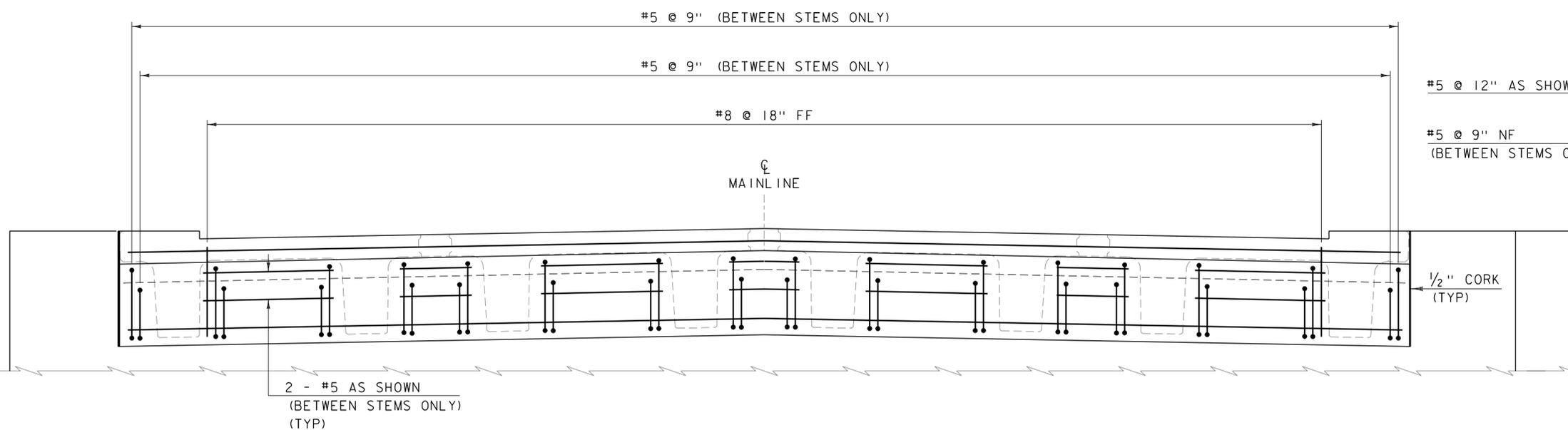
PLOT DATE: 29-AUG-2013
DRAWN BY: J. SALVATORI
CHECKED BY: W. LAMMER
SHEET 24 OF 39

NOTE:

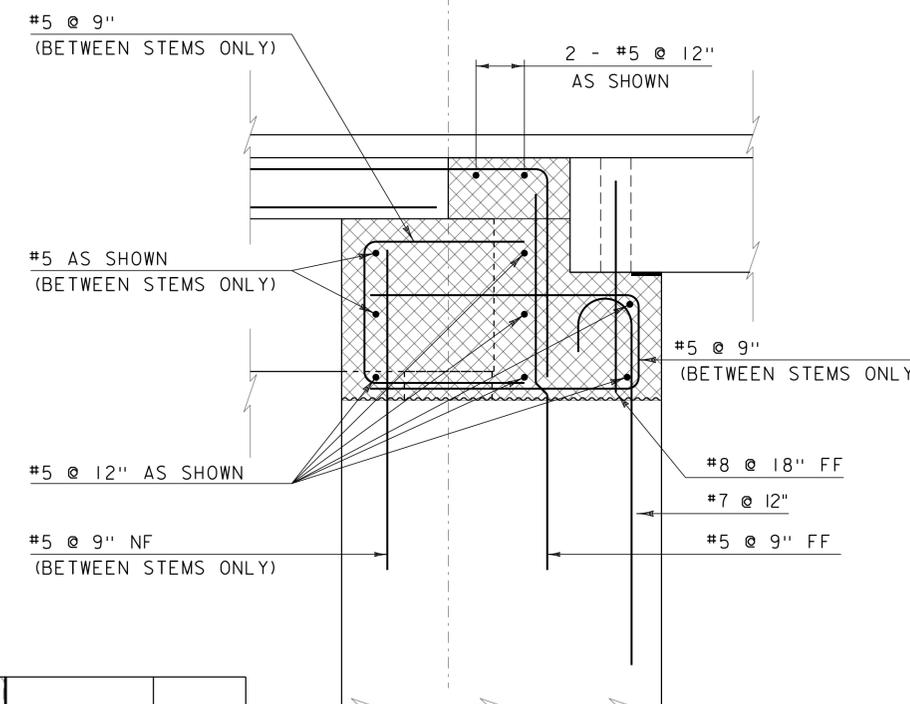
NF = NEAR FACE
 FF = FAR FACE
 EF = EACH FACE
 ▲ = CUT TO FIT IN FIELD
 3" CLEAR, UNLESS OTHERWISE SPECIFIED ON THE PLANS.
 2'-7" BAR LAP UNLESS OTHERWISE SPECIFIED ON THE PLANS.



**DECK CLOSURE POUR
 REINFORCING PLAN**
 SCALE 1/2" = 1'-0"

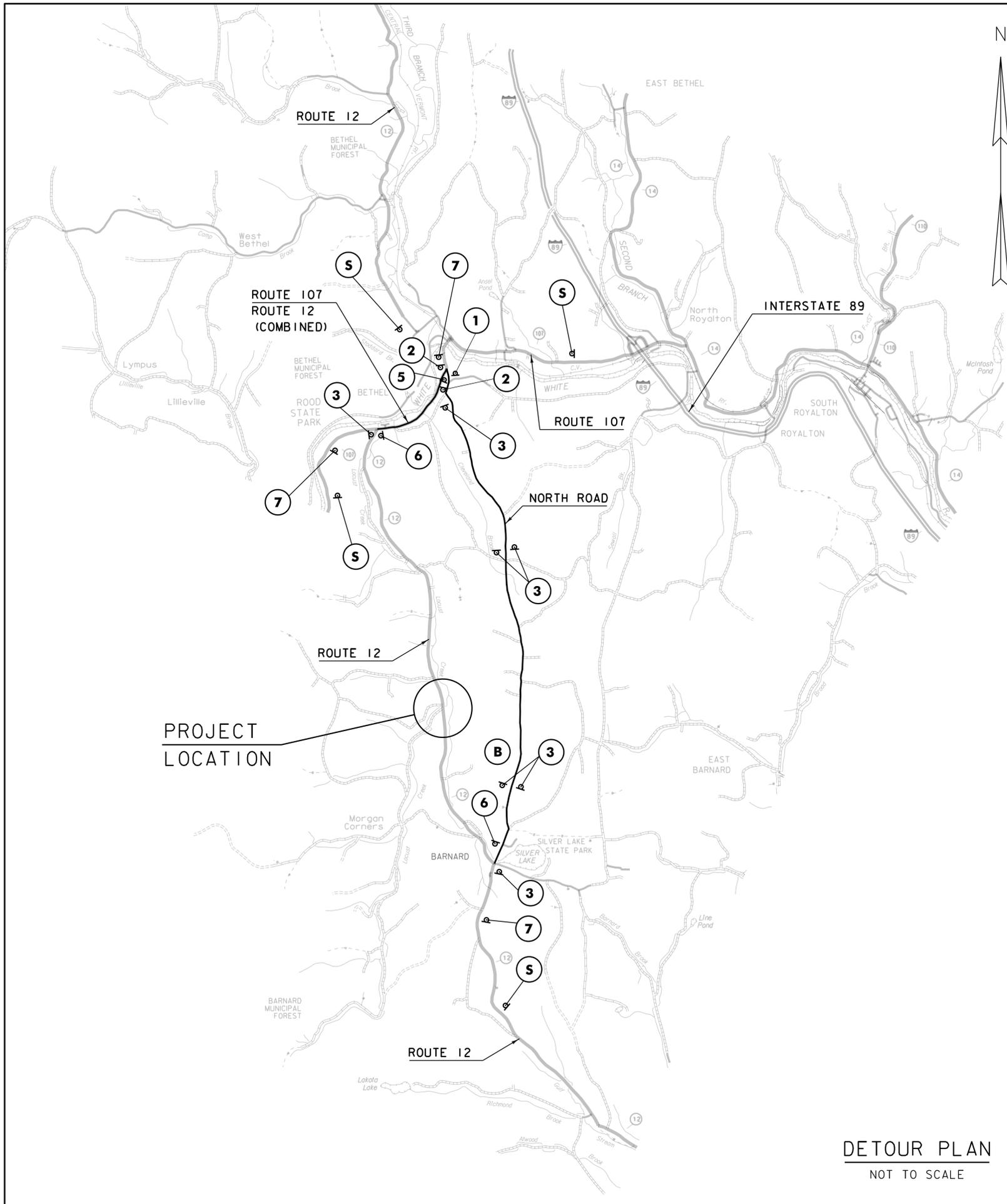


**DECK CLOSURE POUR
 REINFORCING ELEVATION**
 SCALE 1/2" = 1'-0"



REINFORCING TYPICAL
 SCALE 1" = 1'-0"

PROJECT NAME: BARNARD	PLOT DATE: 17-SEP-2013
PROJECT NUMBER: ER BRF 0241(39)	DRAWN BY: J. SALVATORI
FILE NAME: s10c410sub.dgn	CHECKED BY: W. LAMMER
PROJECT LEADER: K. HIGGINS	SHEET 25 OF 39
DESIGNED BY: W. LAMMER	
DECK CLOSURE POUR	



V	T	1	2		
C	L	O	S	E	D

PORTABLE CHANGEABLE SIGN - PHASE 1

N	O	R	T	H	O	F
B	A	R	N	A	R	D

PORTABLE CHANGEABLE SIGN - PHASE 2

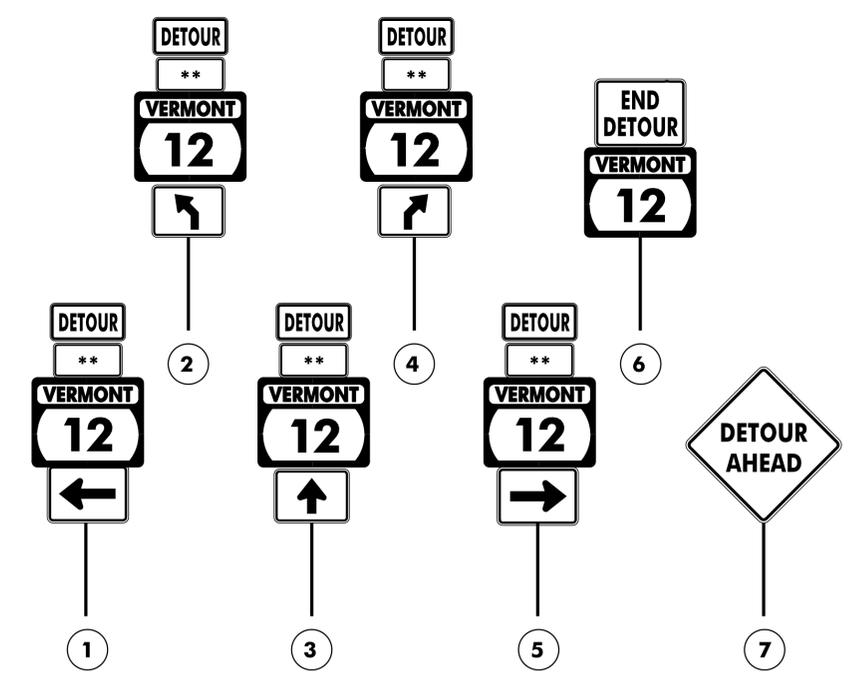
*	M	M	M	D	D	-
*	M	M	M	D	D	

PORTABLE CHANGEABLE SIGN - PHASE 3

**N = NORTH OR SOUTH
 S = SOUTH

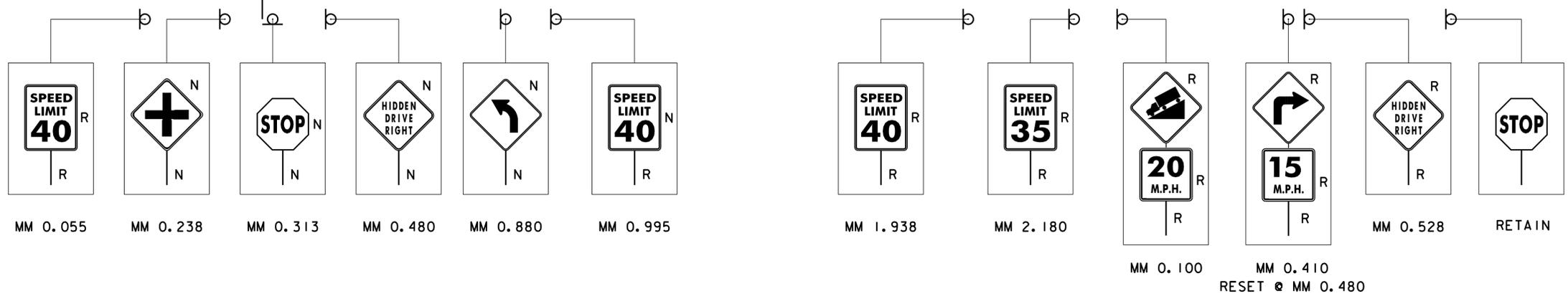
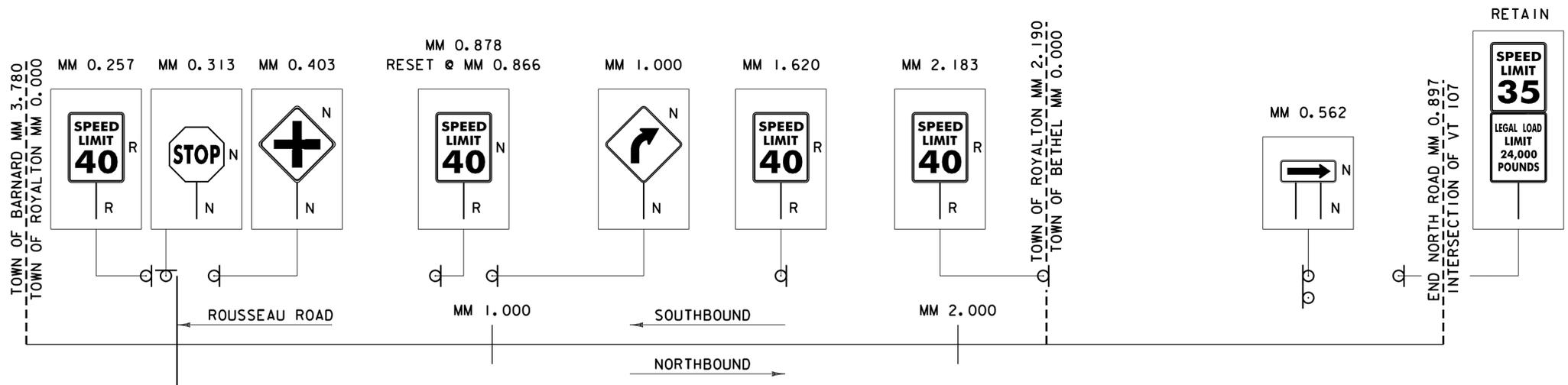
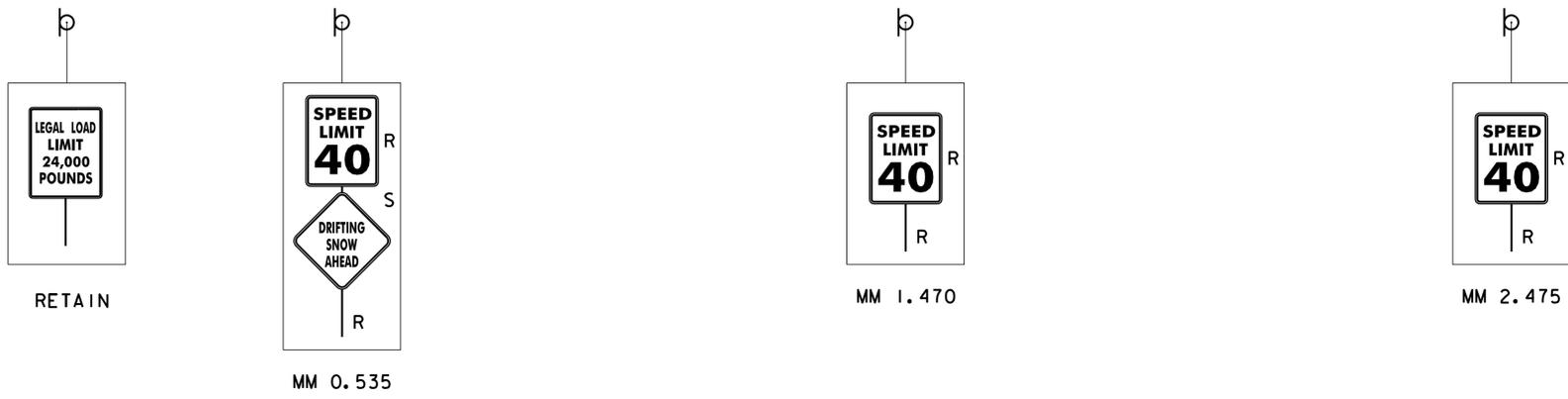
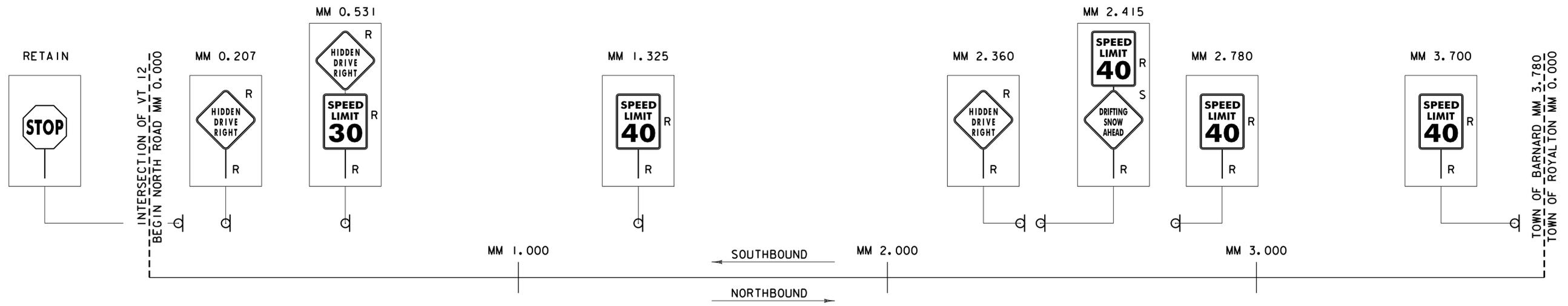
* M = MONTH
 D = DAY
 S = SOUTH

- NOTES:
1. THE PORTABLE CHANGEABLE MESSAGE SIGNS SHALL BE FULLY OPERATIONAL A MINIMUM OF TWO WEEKS PRIOR TO THE CLOSURE OF VT 12.
 2. DURING ACTUAL CLOSURE, ELIMINATE PHASE 3 ONLY.
 3. DETOUR SIGNS SHALL BE LOCATED ADJACENT TO EXISTING INTERSECTION ROUTE MARKER ASSEMBLIES WHERE APPLICABLE.
 4. CONFIRMATION ROUTE MARKERS (SIGN 3) SHALL BE INSTALLED IMMEDIATELY FOLLOWING EACH TURN AND AT ALL LOCATIONS ALONG DETOUR WHERE ROUTE MAKERS EXIST FOR THE PARENT ROUTE.
 5. DETOUR SIGNING IS THE RESPONSIBILITY OF THE CONTRACTOR. PAYMENT FOR ALL TEMPORARY TRAFFIC CONTROL DEVICES FOR IMPLEMENTING THE DETOUR, INCLUDING BUT NOT LIMITED TO SIGNS, BARRICADES AND MESSAGE BOARDS, WILL BE INCLUDED IN THE UNIT PRICE BID FOR CONTRACT ITEM 900.645 SPECIAL PROVISION (TRAFFIC CONTROL, ALL - INCLUSIVE).
 6. THIS DETOUR PLAN IS A CONCEPTUAL OUTLINE ONLY AND THE CONTRACTOR SHALL SUBMIT A DETAILED PLAN OF EACH INTERSECTION SHOWING DETOUR SIGN LOCATIONS IN RELATION TO EXISTING SIGNS.
 7. DURING THE ROAD CLOSURE PERIOD ALL "LEGAL LOAD LIMIT 24,000 POUNDS" SIGNS ALONG THE DETOUR ROUTE SHALL BE COVERED.



DETOUR PLAN
NOT TO SCALE

PROJECT NAME: BARNARD	PLOT DATE: 29-AUG-2013
PROJECT NUMBER: ER BRF 0241 (39)	DRAWN BY: K. FRIEDLAND
FILE NAME: s10c410detour_NorThRoad.dgn	CHECKED BY: J. SALVATORI
PROJECT LEADER: K. HIGGINS	SHEET 26 OF 39
DESIGNED BY: K. FRIEDLAND	
DETOUR PLAN	



LEGEND	
N	= NEW
R	= REMOVE & REPLACE
S	= REMOVE & SALVAGE

PROJECT NAME: BARNARD
 PROJECT NUMBER: ER BRF 0241 (39)
 FILE NAME: s10c410detour_NorthRoad.dgn PLOT DATE: 29-AUG-2013
 PROJECT LEADER: K. HIGGINS DRAWN BY: K. FRIEDLAND
 DESIGNED BY: K. FRIEDLAND CHECKED BY: J. SALVATORI
 NORTH ROAD SIGN LAYOUT SHEET 27 OF 39

MILEMARKER OR STATION	SIGN LEGEND	SIGN DIMENSIONS		NEW SIGN "A"	EXIST POST RELATIVE TO SALVAGE	NO. OF POSTS	NEW SIGN POSTS					REMARKS	SIGN DETAIL	
		WIDTH (in)	HEIGHT (in)				SQUARE STEEL (in)			ANCHOR	SPLICES		DETAIL ON SHEET NUMBER	STD. SHEET NUMBER
							1.75	2.0	2.5					
							1.88	2.42	3.35					
MM 0.207 LT		30	30	6.25		1		15		X	VW-054		E-154	
MM 0.531 LT		30	30	6.25		1		15		X	VW-054		E-154	
		24	30	5.00							R2-I		SHS	
MM 0.535 RT		24	30	5.00		1		15		X	R2-I		SHS	
											REMOVE & SALVAGE			
MM 1.325 LT		24	30	5.00		1		15		X	R2-I		SHS	
MM 1.470 RT		24	30	5.00		1		15		X	R2-I		SHS	
MM 2.360 LT		30	30	6.25		1		15		X	VW-054		E-154	
MM 2.415 LT		24	30	5.00		1		15		X	R2-I		SHS	
											REMOVE & SALVAGE			
MM 2.780 LT		24	30	5.00		1		15		X	R2-I		SHS	
MM 3.700 LT		24	30	5.00		1		15		X	R2-I		SHS	
MM 0.055 RT		24	30	5.00		1		15		X	R2-I		SHS	
MM 0.238 RT		30	30	6.25		1		15		X	W2-I		SHS	
MM 0.257 LT		24	30	5.00		1		15		X	R2-I		SHS	
MM 0.313 LT		30	30	6.25		1		15		X	RI-I		SHS	
MM 0.313 RT		30	30	6.25		1		15		X	RI-I		SHS	
FINAL POST LENGTHS ARE TO BE DETERMINED IN THE FIELD. POST SIZES ARE COMPUTED BASED ON INFORMATION FURNISHED ON THE STANDARD SHEETS AND THE VTRANS "SIGN POST DESIGN GUIDELINE."							FT	FT	FT	EA				
							210							
SUB TOTAL				SF			210.00							
													SHS = STANDARD HIGHWAY SIGNS (MUTCD)	

MILEMARKER OR STATION	SIGN LEGEND	SIGN DIMENSIONS		NEW SIGN "A"	EXIST POST RELATIVE TO SALVAGE	NO. OF POSTS	NEW SIGN POSTS					REMARKS	SIGN DETAIL	
		WIDTH (in)	HEIGHT (in)				SQUARE STEEL (in)			ANCHOR	SPLICES		DETAIL ON SHEET NUMBER	STD. SHEET NUMBER
							1.75	2.0	2.5					
							1.88	2.42	3.35					
MM 0.403 LT		30	30	6.25		1		15		X	W2-I		SHS	
MM 0.480 RT		30	30	6.25		1		15		X	VW-054		E-154	
MM 0.866 LT		24	30	5.00		1		15		X	R2-I		SHS	
MM 0.880 RT		30	30	6.25		1		15		X	WI-2		SHS	
MM 0.995 RT		24	30	5.00		1		15		X	R2-I		SHS	
MM 1.000 LT		30	30	6.25		1		15		X	WI-2		SHS	
MM 1.620 LT		24	30	5.00		1		15		X	R2-I		SHS	
MM 1.938 RT		24	30	5.00		1		15		X	R2-I		SHS	
MM 2.180 RT		24	30	5.00		1		15		X	R2-I		SHS	
MM 2.183 LT		24	30	5.00		1		15		X	R2-I		SHS	
MM 0.100 RT		30	30	6.25		1		15		X	W7-I		SHS	
		24	30	5.00							R2-I		SHS	
MM 0.480 RT		30	30	6.25		1		15		X	WI-2		SHS	
		24	30	5.00							R2-I		SHS	
MM 0.528 RT		30	30	6.25		1		15		X	VW-054		E-154	
MM 0.562 LT		48	24	8.00		2		30		X	WI-6		SHS	
FINAL POST LENGTHS ARE TO BE DETERMINED IN THE FIELD. POST SIZES ARE COMPUTED BASED ON INFORMATION FURNISHED ON THE STANDARD SHEETS AND THE VTRANS "SIGN POST DESIGN GUIDELINE."							FT	FT	FT	EA				
							225							
SUB TOTAL				SF			225.00							
													SHS = STANDARD HIGHWAY SIGNS (MUTCD)	
TOTAL				SF			435.00							

PROJECT NAME: BARNARD
PROJECT NUMBER: ER BRF 0241 (39)
FILE NAME: s10c410de+our_Nor+thRoad.dgn PLOT DATE: 29-AUG-2013
PROJECT LEADER: K. HIGGINS DRAWN BY: K. FRIEDLAND
DESIGNED BY: K. FRIEDLAND CHECKED BY: J. SALVATORI
NORTH ROAD SIGN SUMMARY SHEET 28 OF 39

EPSC PLAN NARRATIVE

1.1 PROJECT DESCRIPTION

THIS PROJECT INVOLVES THE REPLACEMENT OF BRIDGE 25 WITH RELATED APPROACH AND CHANNEL WORK. THE PROJECT LOCATION IS IN THE TOWN OF BARNARD, VT ON VERMONT ROUTE 12, BEGINNING AT MILE POST 7.0195 (STA 370+00) AND ENDING AT MILE POST 7.0535 (STA 371+85).

THE NEW STRUCTURE WILL BE APPROXIMATELY 88 FEET IN LENGTH WITH 97 FEET OF ROADWAY WORK.

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

TOTAL AREA OF DISTURBANCE AS SHOWN ON THE ATTACHED EPSC PLAN IS APPROXIMATELY 0.52 ACRES.

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

1.2 SITE INVENTORY

1.2.1 TOPOGRAPHY

THE TOPOGRAPHY OF THE PROJECT AREA IS RELATIVELY FLAT WITH STEEP BANKS ALONG THE CHANNEL AND ALONGSIDE WING WALLS ONE AND FOUR.

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

LOCUST CREEK IS THE ONLY WATER SOURCE ON THE PROJECT SITE.

THE CREEK IS CLASSIFIED AS SINUOUS, ALLUVIAL, WITH A CONFINED AND ARMORED CHANNEL AT THE SITE. THE STREAM BED CONSISTS OF GRAVEL, COBBLES AND BOULDERS. THE TRIBUTARY AREA AT THE BRIDGE CROSSING IS 4.6 MILES². THERE ARE A NUMBER OF DROP INLETS ON SITE DRAINING FROM THE ROADWAY TO THE BROOK. DUE TO THE NATURE OF THE SURROUNDING TERRAIN THE PROJECT SITE COULD RECEIVE RUNOFF WATER FROM A FEW NEARBY SLOPES.

1.2.3 VEGETATION

THE VEGETATION IN THE PROJECT AREA CONSISTS OF HARDWOOD TREES AND UNDERGROWTH. THE IMPACT TO VEGETATION WILL BE LIMITED TO THAT WHICH IS DIRECTLY AFFECTED BY REPLACEMENT OF THE EXISTING BRIDGE. UPON PROJECT COMPLETION, THE CHANNEL WILL BE ARMORED WITH STONE FILL TYPE IV AS SPECIFIED ON THE PLANS. DISTURBED VEGETATION WILL BE REESTABLISHED WITH STANDARD SEED AND MULCH PRACTICES.

1.2.4 SOILS

ALL SOIL DATA CAME FROM THE U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE FOR THE COUNTY OF WINDSOR, VERMONT.

14B HINCKLEY SANDY LOAM	0% TO 8% SLOPES	"K" FACTOR = 0.17
20E GLOVER-VERSHIRE COMPLEX	35% TO 60% SLOPES	"K" FACTOR = 0.37 - 0.28
8B AGAWAM FINE SANDY LOAM	3% TO 8% SLOPES	"K" FACTOR = 0.28

NOTE: K-VALUES GENERALLY INDICATE THE FOLLOWING:

0.0-0.23 = LOW EROSION POTENTIAL
0.24-0.36 = MODERATE EROSION POTENTIAL
0.37 AND HIGHER = HIGH EROSION POTENTIAL

1.2.5 SENSITIVE RESOURCE AREAS

CRITICAL HABITATS: NO
HISTORICAL OR ARCHEOLOGICAL AREAS: NO
PRIME AGRICULTURAL LAND: NO
THREATENED AND ENDANGERED SPECIES: NO
WATER RESOURCE: LOCUST CREEK
WETLANDS: NO

1.3 RISK EVALUATION

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

1.4 EROSION PREVENTION AND SEDIMENT CONTROL

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

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

1.4.1 MARK SITE BOUNDARIES

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

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

1.4.2 LIMIT DISTURBANCE AREA

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

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

1.4.3 SITE ENTRANCE/EXIT STABILIZATION

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

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

1.4.4 INSTALL SEDIMENT BARRIERS

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

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

FILTER CURTAIN WILL BE INSTALLED AS PROPOSED ON THE EPSC PLAN.

1.4.5 DIVERT UPLAND RUNOFF

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

THE IMMEDIATE PROJECT AREA IS NOT LIKELY TO BE IMPACTED BY RUNOFF FROM UPSLOPE AREAS. THEREFORE IT IS NOT ANTICIPATED THAT DIVERSION MEASURES WILL BE NECESSARY. CONTRACTOR TO INSTALL DIVERSION MEASURES IF IT IS NECESSARY.

1.4.6 SLOW DOWN CHANNELIZED RUNOFF

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

TEMPORARY CHECK DAMS WILL BE INSTALLED AS PROPOSED ON THE EPSC PLAN.

1.4.7 CONSTRUCT PERMANENT CONTROLS

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

THERE ARE NO PERMANENT STORM WATER TREATMENT DEVICES ANTICIPATED ON THIS PROJECT.

1.4.8 STABILIZE EXPOSED SOILS DURING CONSTRUCTION

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

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

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.

IT IS NOT ANTICIPATED THAT DEWATERING WILL BE NECESSARY.

1.4.12 INSPECT YOUR SITE

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

1.5 SEQUENCE AND STAGING

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

1.5.1 CONSTRUCTION SEQUENCE

1.5.2 OFF-SITE ACTIVITIES

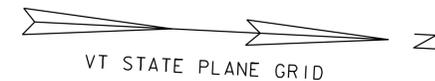
IN ADDITION TO THE CONTRACTOR CHECKLIST ANY ACTIVITIES OUTSIDE THE CONSTRUCTION LIMITS SHALL FOLLOW SUBSECTIONS 105.25- 105.29 OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION.

PROJECT NAME: BARNARD
PROJECT NUMBER: ER BRF 0241(39)

FILE NAME: s10c410epsc_nar.dgn	PLOT DATE: 29-AUG-2013
PROJECT LEADER: K. HIGGINS	DRAWN BY: K. FRIEDLAND
DESIGNED BY: W. LAMMER	CHECKED BY: J. SALVATORI
EPSC NARRATIVE	SHEET 29 OF 39

14B HINCKLEY SANDY LOAM
WITH 0% TO 8% SLOPES
"K FACTOR" = .17

20E GLOVER-VERSHIRE COMPLEX
WITH 35% TO 60% SLOPES
"K FACTOR" = .37 - .28



BENCHMARK
RR SPIKE IN POLE
EL 886.60

BENCHMARK
CHISELLED SQUARE
EL 890.86

BEGIN APPROACH
STA 369+00.00

BEGIN PAVEMENT
STA 369+50.00

BEGIN PROJECT
STA 370+00.00

BEGIN BRIDGE
STA 370+48.46
FG = 885.35

STONE FILL,
TYPE IV (TYP)

END BRIDGE
STA 371+36.55
FG = 885.50

END PROJECT
STA 371+85.00

END PAVEMENT
STA 372+35.00

END APPROACH
STA 372+75.00



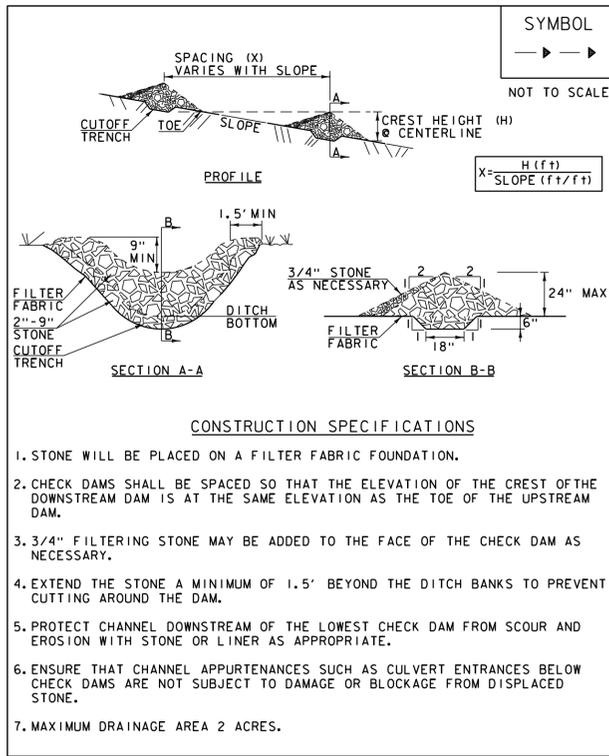
8B AGAWAM FINE SANDY LOAM
WITH 3% TO 8% SLOPES
"K FACTOR" = .28

NOTES:

- FOR CLARITY, AREAS TO BE SEEDED AND MULCHED HAVE NOT BEEN INDICATED; HOWEVER, ALL DISTURBED AREAS SHALL BE SEEDED AND MULCHED AS APPLICABLE.
- EXISTING CONTOURS ARE SHOWN. SEE CROSS SECTIONS FOR FINAL CONTOURS.

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

PROJECT NAME: BARNARD	
PROJECT NUMBER: ER BRF 0241(39)	
FILE NAME: s10c410epsc.dgn	PLOT DATE: 29-AUG-2013
PROJECT LEADER: K. HIGGINS	DRAWN BY: K. FRIEDLAND
DESIGNED BY: W. LAMMER	CHECKED BY: J. SALVATORI
EPSC PLAN	SHEET 30 OF 39



SYMBOL

 NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

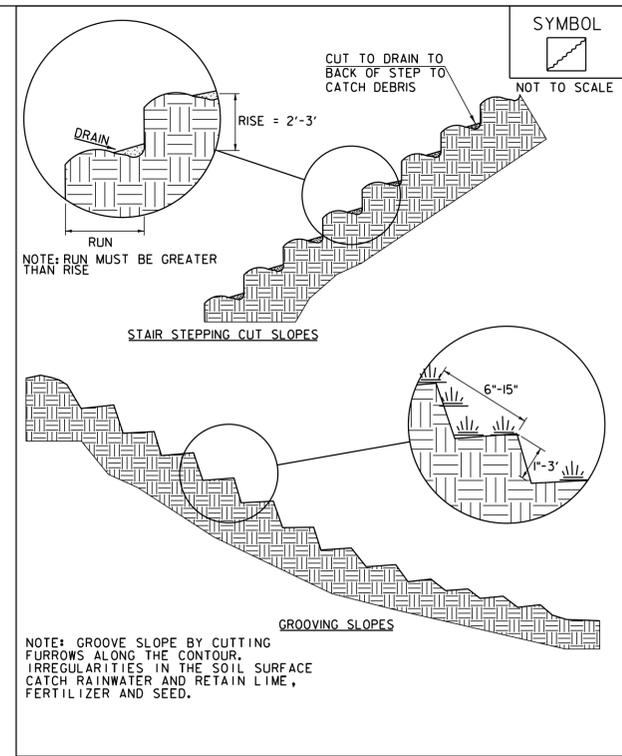
- STONE WILL BE PLACED ON A FILTER FABRIC FOUNDATION.
- CHECK DAMS SHALL BE SPACED SO THAT THE ELEVATION OF THE CREST OF THE DOWNSTREAM DAM IS AT THE SAME ELEVATION AS THE TOE OF THE UPSTREAM DAM.
- 3/4" FILTERING STONE MAY BE ADDED TO THE FACE OF THE CHECK DAM AS NECESSARY.
- EXTEND THE STONE A MINIMUM OF 1.5' BEYOND THE DITCH BANKS TO PREVENT CUTTING AROUND THE DAM.
- PROTECT CHANNEL DOWNSTREAM OF THE LOWEST CHECK DAM FROM SCOUR AND EROSION WITH STONE OR LINER AS APPROPRIATE.
- ENSURE THAT CHANNEL APPURTENANCES SUCH AS CULVERT ENTRANCES BELOW CHECK DAMS ARE NOT SUBJECT TO DAMAGE OR BLOCKAGE FROM DISPLACED STONE.
- MAXIMUM DRAINAGE AREA 2 ACRES.

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

CHECK DAM

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 TEMPORARY STONE CHECK DAM, TYPE 1 (PAY ITEM 653.25)

REVISIONS	
MARCH 21, 2008	WHF
JANUARY 8, 2009	WHF



SYMBOL

 NOT TO SCALE

GROOVING SLOPES

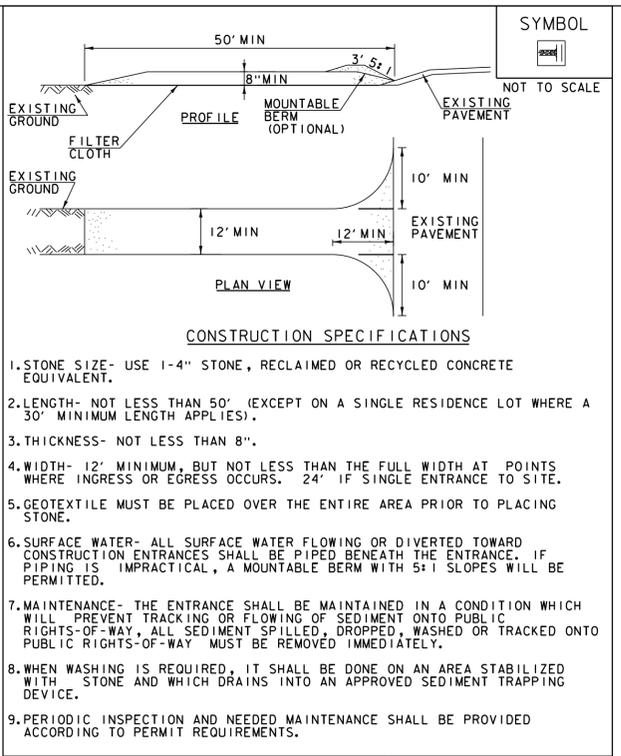
NOTE: GROOVE SLOPE BY CUTTING FURROWS ALONG THE CONTOUR. IRREGULARITIES IN THE SOIL SURFACE CATCH RAINWATER AND RETAIN LIME, FERTILIZER AND SEED.

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

SURFACE ROUGHENING

NOTES:
 REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- "FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.
 THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE CONTRACT

REVISIONS	
APRIL 1, 2008	WHF
JANUARY 13, 2009	WHF



SYMBOL

 NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

- STONE SIZE- USE 1/4-1" STONE, RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
- LENGTH- NOT LESS THAN 50' (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30' MINIMUM LENGTH APPLIES).
- THICKNESS- NOT LESS THAN 8".
- WIDTH- 12' MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. 24' IF SINGLE ENTRANCE TO SITE.
- GEOTEXTILE MUST BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING STONE.
- 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.
- 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.
- WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
- 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

VAOT RURAL AREA MIX				
% 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				
% 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	FOLLOW	PELLETIZED	FOLLOW
500 LBS/AC	MANUFACTURER	2 TONS/AC	MANUFACTURER

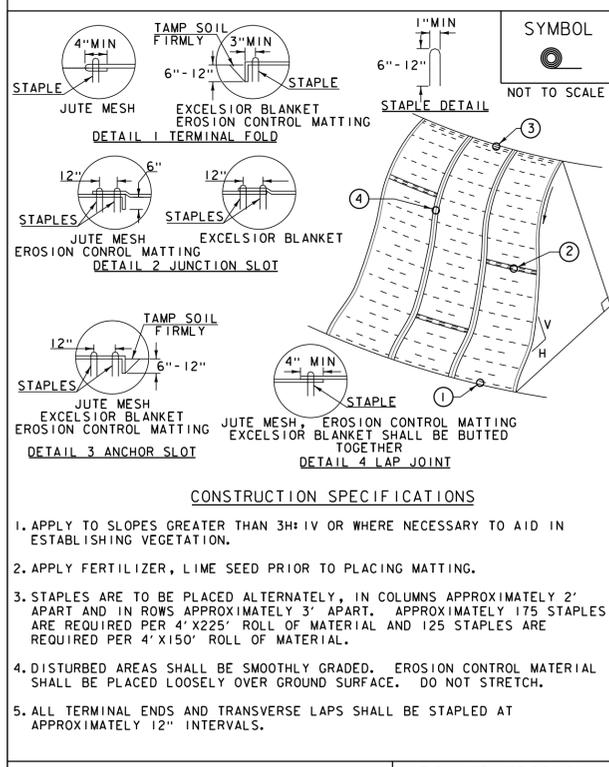
CONSTRUCTION GUIDANCE

- RURAL SEED MIX: USE AS INDICATED IN THE PLANS AND/OR FOR ALL ESTABLISHED UPLAND (NON WETLAND) AREAS DISTURBED BY THE CONTRACTOR.
- URBAN SEED MIX: USE AS INDICATED IN THE PLANS AND/OR FOR ALL ESTABLISHED LAWN AREAS DISTURBED BY THE CONTRACTOR.
- ALL SEED MIXTURES: SHALL NOT HAVE A WEED CONTENT EXCEEDING 0.40% BY WEIGHT AND SHALL BE FREE OF ALL NOXIOUS SEED.
- FERTILIZER AND LIMESTONE: SHALL FOLLOW RATES SHOWN ON PLAN OR AS DIRECTED BY THE ENGINEER
- 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.
- TOPSOIL: TO BE USED WITH SEED AS INDICATED ON THE PLANS, OR AS DIRECTED BY THE ENGINEER.
- 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
- TURF ESTABLISHMENT: PLACING SEED, FERTILIZER, LIME AND MULCH PRIOR TO SEPTEMBER 15 AND AFTER APRIL 15 CAN BETTER ENSURE A VIGOROUS GROWTH OF GRASS.

ADAPTED FROM VTRANS TECHNICAL LANDSCAPE MANUAL FOR ROADWAYS AND TRANSPORTATION FACILITIES

TURF ESTABLISHMENT

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



SYMBOL

 NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

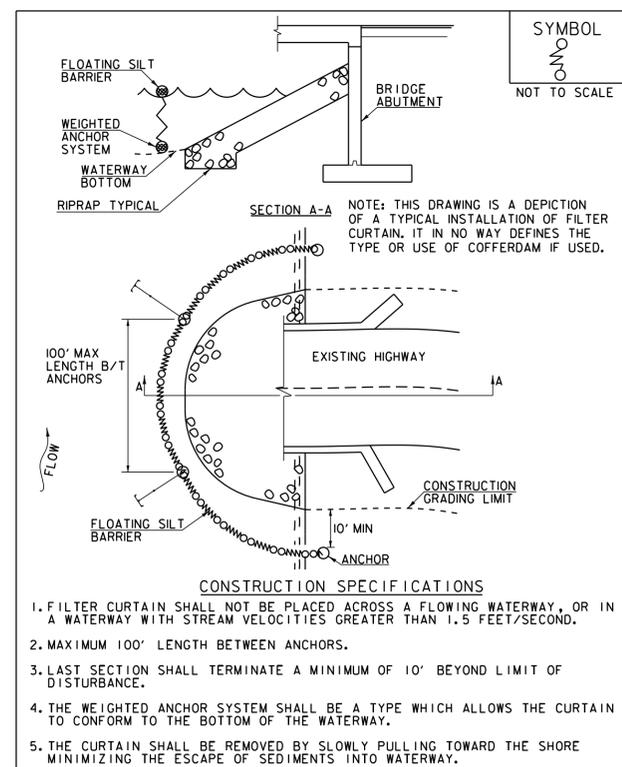
- APPLY TO SLOPES GREATER THAN 3H:1V OR WHERE NECESSARY TO AID IN ESTABLISHING VEGETATION.
- APPLY FERTILIZER, LIME SEED PRIOR TO PLACING MATTING.
- STAPLES ARE TO BE PLACED ALTERNATELY, IN COLUMNS APPROXIMATELY 2' APART AND IN ROWS APPROXIMATELY 3' APART. APPROXIMATELY 175 STAPLES ARE REQUIRED PER 4' X 225' ROLL OF MATERIAL AND 125 STAPLES ARE REQUIRED PER 4' X 150' ROLL OF MATERIAL.
- DISTURBED AREAS SHALL BE SMOOTHLY GRADED. EROSION CONTROL MATERIAL SHALL BE PLACED LOOSELY OVER GROUND SURFACE. DO NOT STRETCH.
- 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 653.25)

REVISIONS	
APRIL 16, 2007	JMF
JANUARY 13, 2009	WHF



SYMBOL

 NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

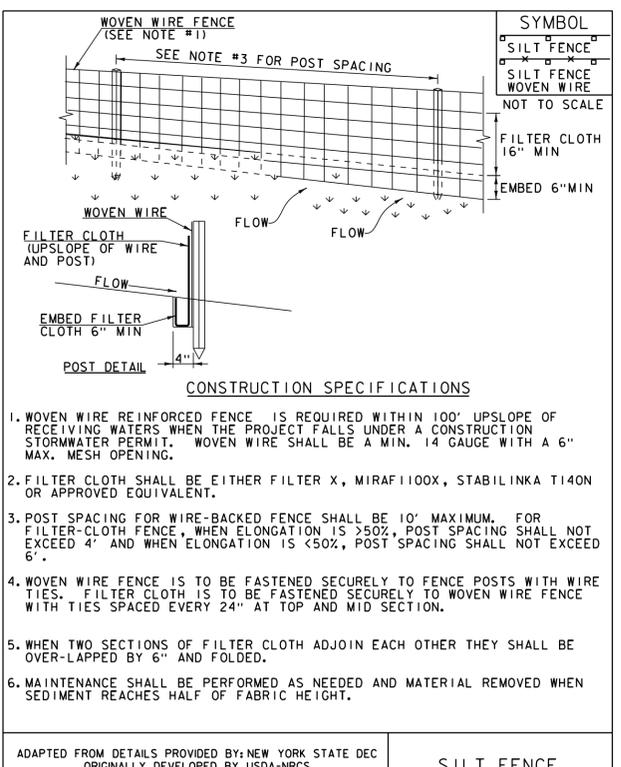
- FILTER CURTAIN SHALL NOT BE PLACED ACROSS A FLOWING WATERWAY, OR IN A WATERWAY WITH STREAM VELOCITIES GREATER THAN 1.5 FEET/SECOND.
- MAXIMUM 100' LENGTH BETWEEN ANCHORS.
- LAST SECTION SHALL TERMINATE A MINIMUM OF 10' BEYOND LIMIT OF DISTURBANCE.
- THE WEIGHTED ANCHOR SYSTEM SHALL BE A TYPE WHICH ALLOWS THE CURTAIN TO CONFORM TO THE BOTTOM OF THE WATERWAY.
- THE CURTAIN SHALL BE REMOVED BY SLOWLY PULLING TOWARD THE SHORE MINIMIZING THE ESCAPE OF SEDIMENTS INTO WATERWAY.

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

FILTER CURTAIN

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 649 FOR GEOTEXTILE FOR FILTER CURTAIN (PAY ITEM 649.60).

REVISIONS	
APRIL 1, 2008	WHF
JANUARY 13, 2009	WHF
SEPTEMBER 4, 2009	WHF



SYMBOL

 NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

- 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.
- FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI100X, STABILINKA T140N OR APPROVED EQUIVALENT.
- 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'.
- 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.
- WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY 6" AND FOLDED.
- 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

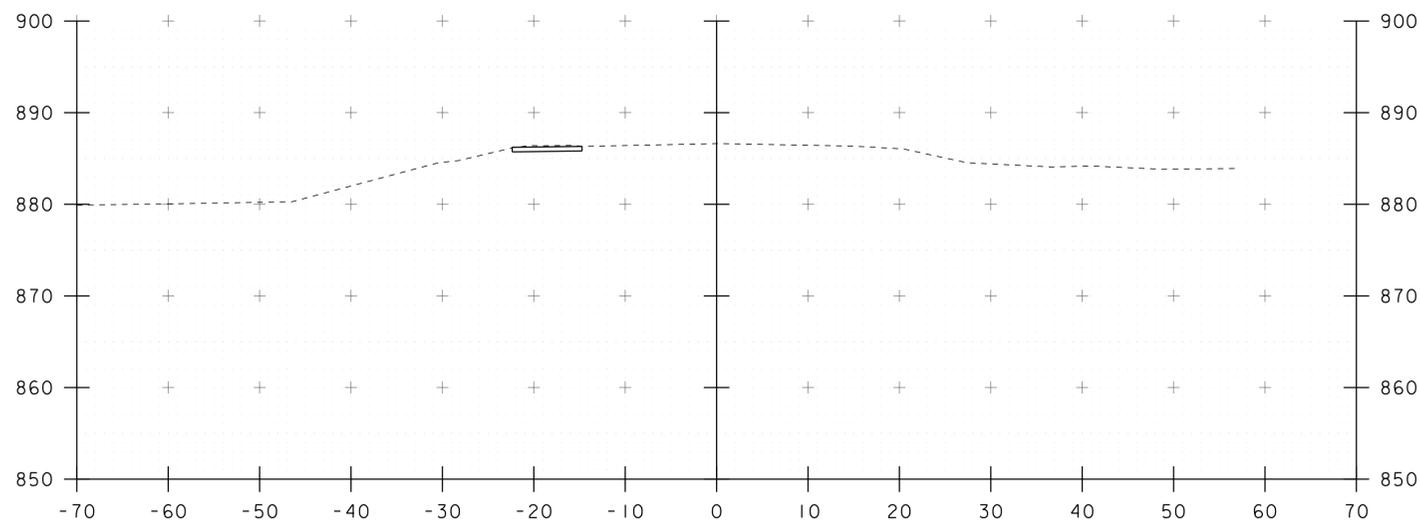
NOTES:
 REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- "FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.
 THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 649 AND AS SHOWN IN THE PLANS FOR GEOTEXTILE FOR SILT FENCE (PAY ITEM 649.50) OR GEOTEXTILE FOR SILT FENCE, WOVEN WIRE REINFORCED (PAY ITEM 649.55).

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

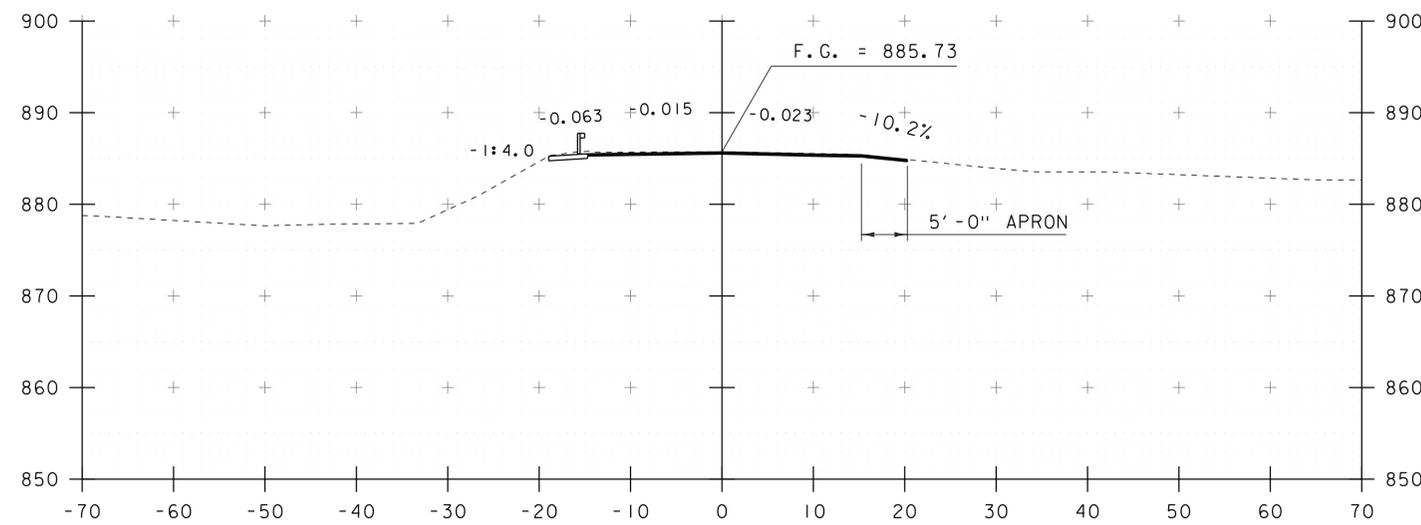
PROJECT NAME: BARNARD
 PROJECT NUMBER: ER BRF 0241(39)

FILE NAME: s10c410epsc_details.dgn
 PROJECT LEADER: K. HIGGINS
 DESIGNED BY: J. SALVATORI
 EPSC DETAILS

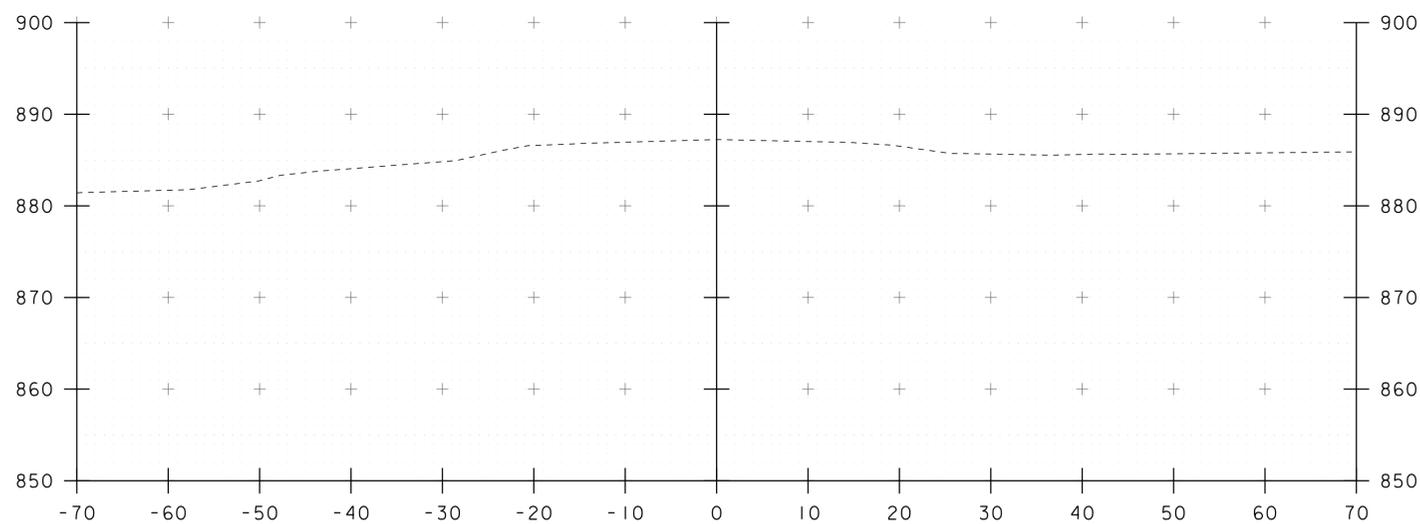
PLOT DATE: 29-AUG-2013
 DRAWN BY: K. FRIEDLAND
 CHECKED BY: J. SALVATORI
 SHEET 31 OF 39



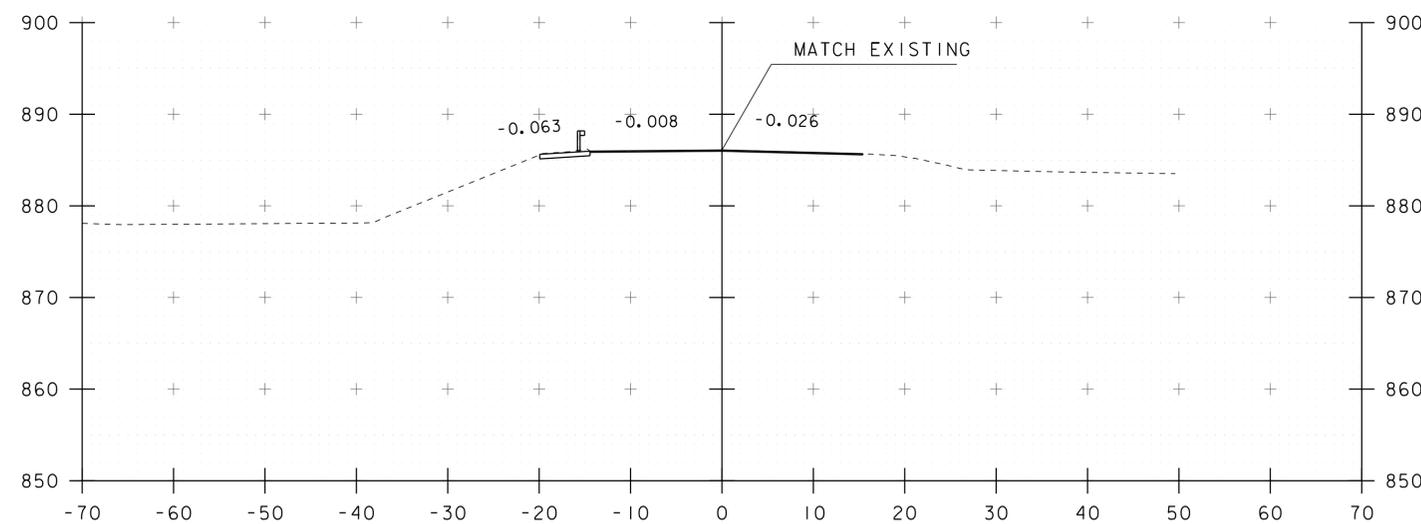
369+25



369+75



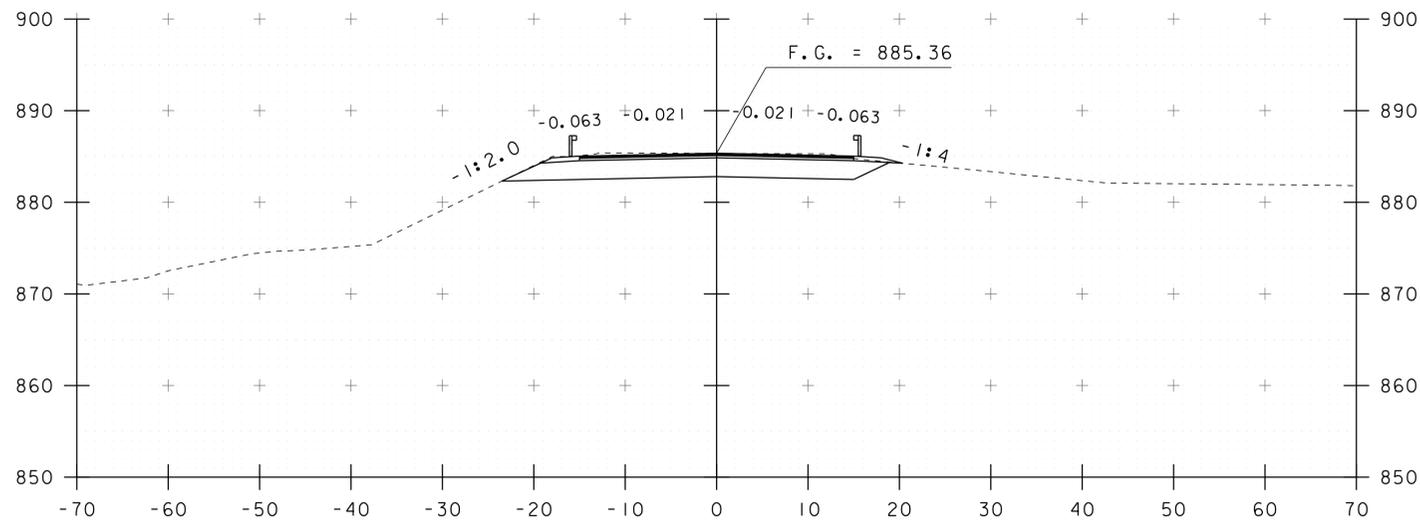
369+00
BEGIN APPROACH



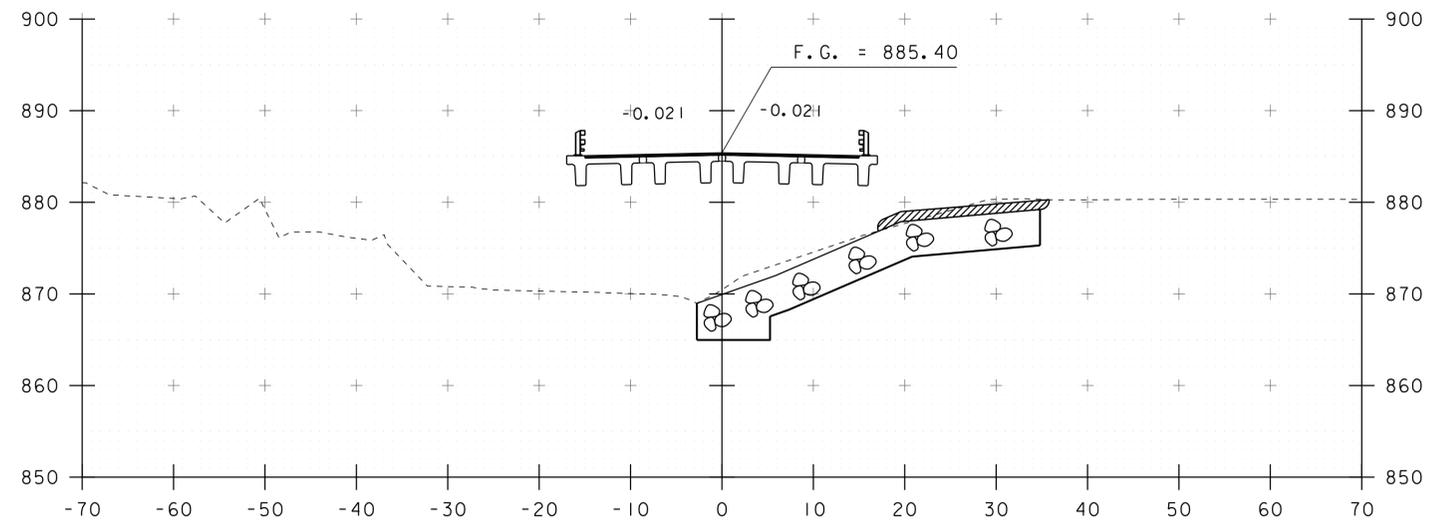
369+50
BEGIN PAVEMENT

STA. 369+00 TO STA. 369+75

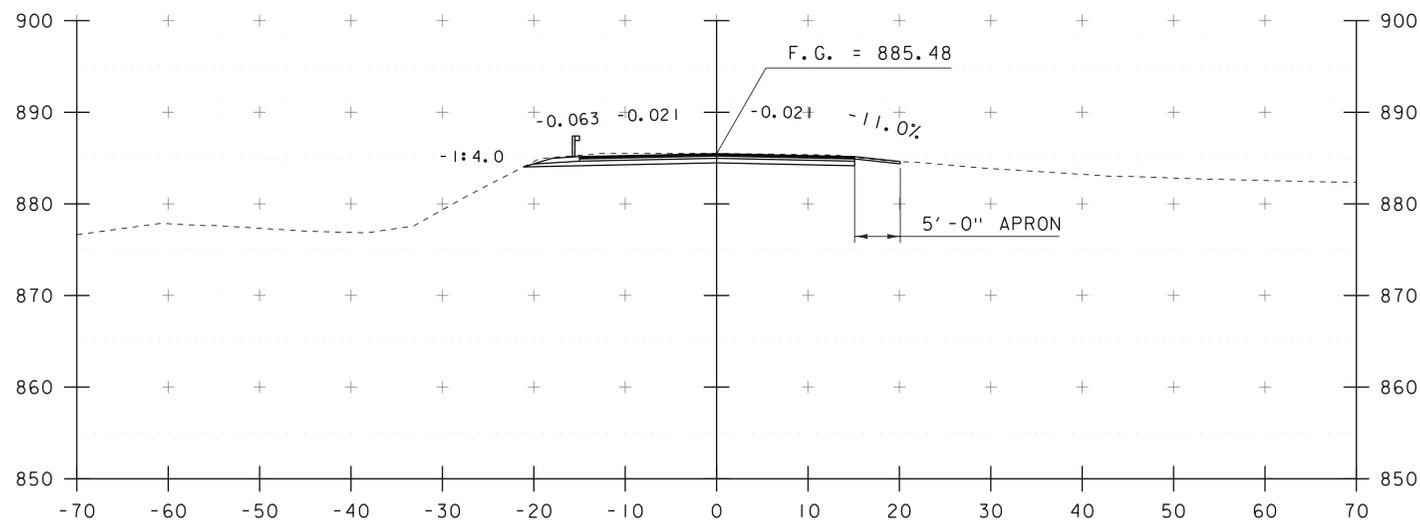
PROJECT NAME: BARNARD	
PROJECT NUMBER: ER BRF 0241(39)	
FILE NAME: s10c410xsl.dgn	PLOT DATE: 29-AUG-2013
PROJECT LEADER: K. HIGGINS	DRAWN BY: J. GRIGAS
DESIGNED BY: W. LAMMER	CHECKED BY: J. SALVATORI
MAINLINE SECTIONS	SHEET 32 OF 39



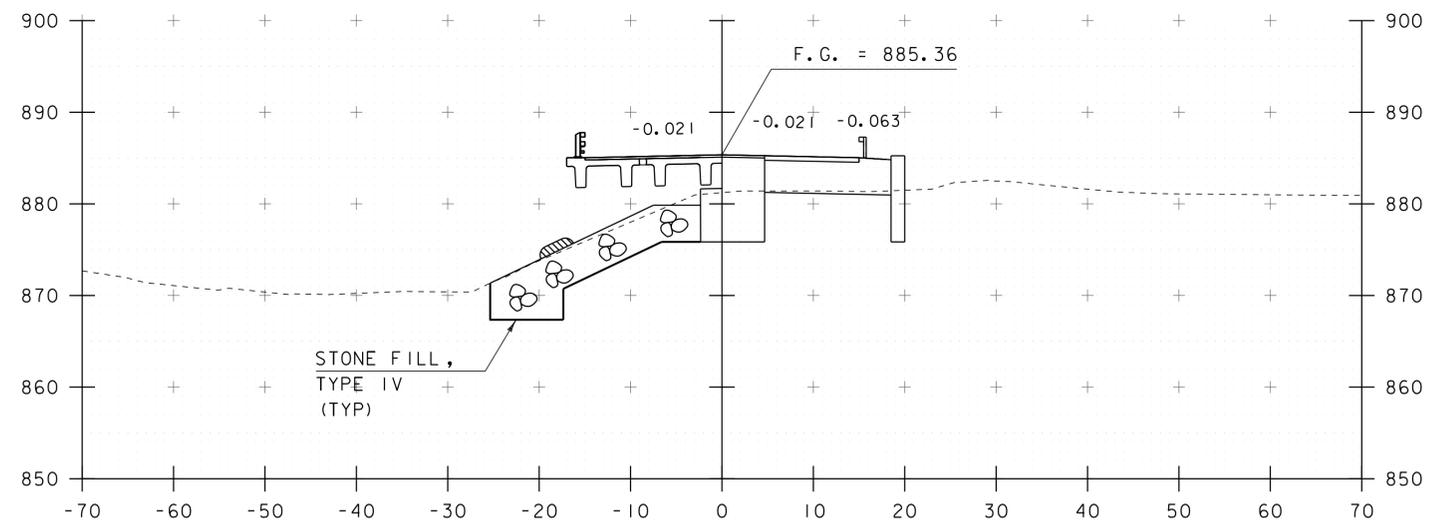
370+25



370+75



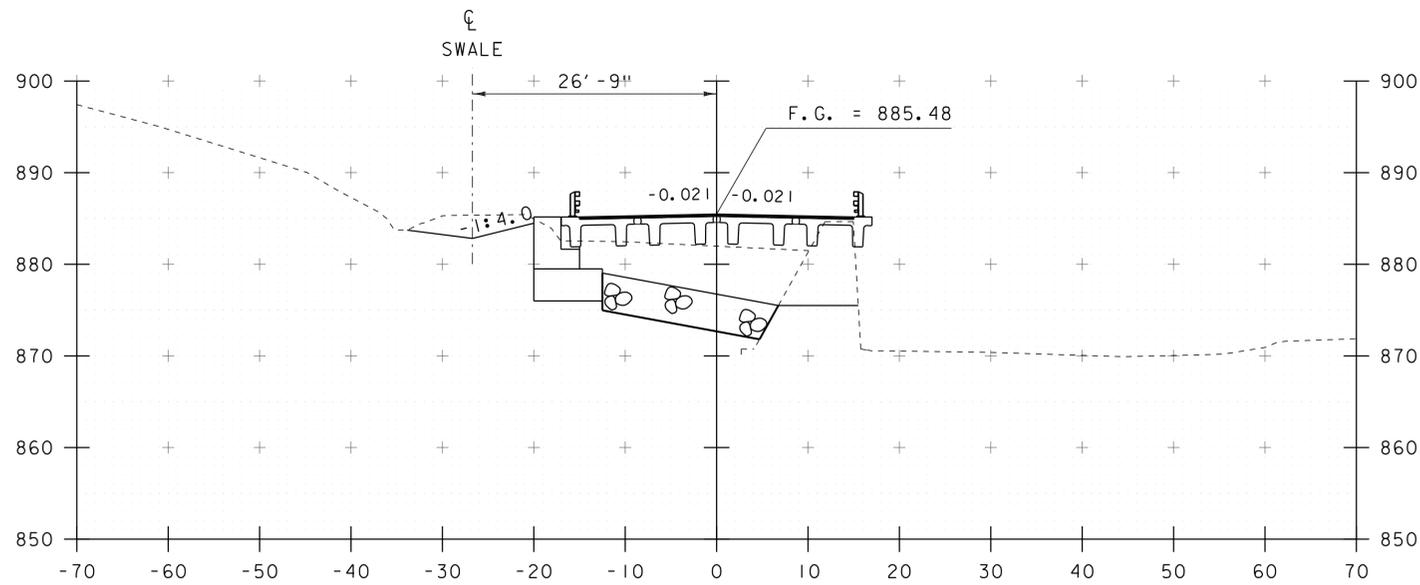
370+00
BEGIN PROJECT



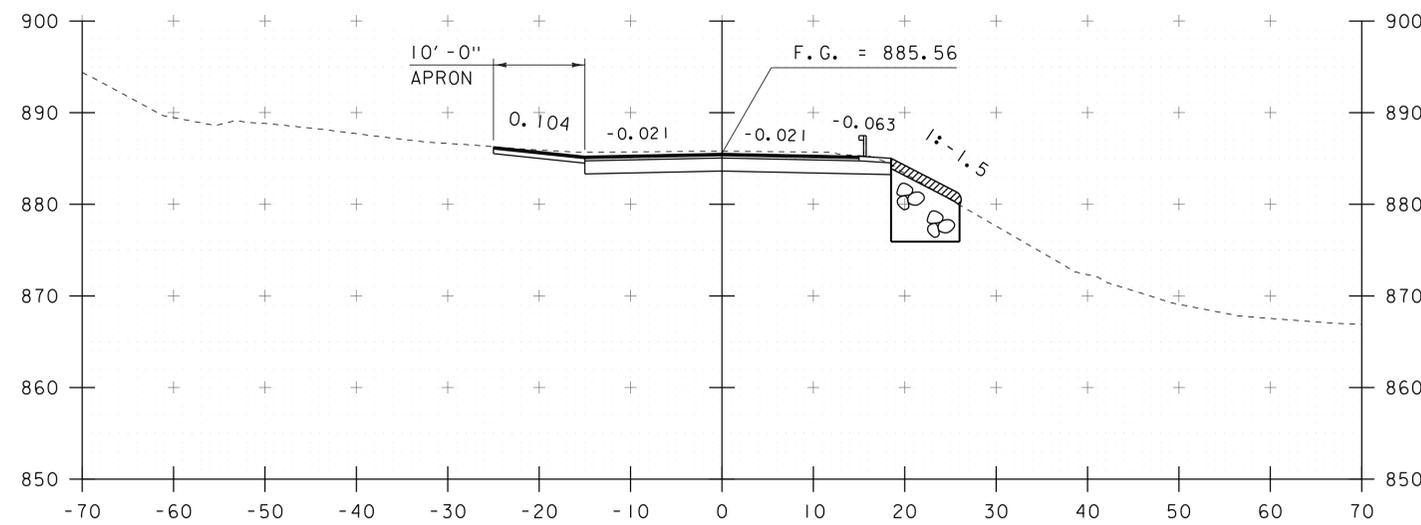
370+50
BEGIN BRIDGE STA 370+48.46

STA. 370+00 TO STA. 370+75

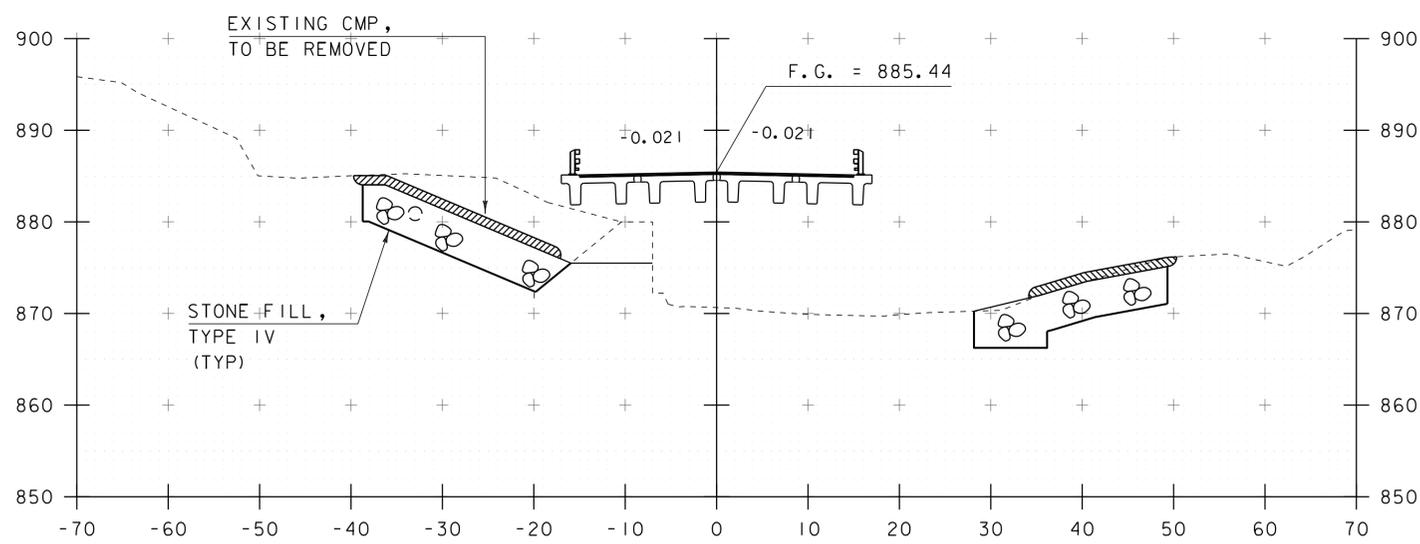
PROJECT NAME: BARNARD	
PROJECT NUMBER: ER BRF 0241(39)	
FILE NAME: sl0c410xsl.dgn	PLOT DATE: 29-AUG-2013
PROJECT LEADER: K. HIGGINS	DRAWN BY: J. GRIGAS
DESIGNED BY: W. LAMMER	CHECKED BY: J. SALVATORI
MAINLINE SECTIONS	SHEET 33 OF 39



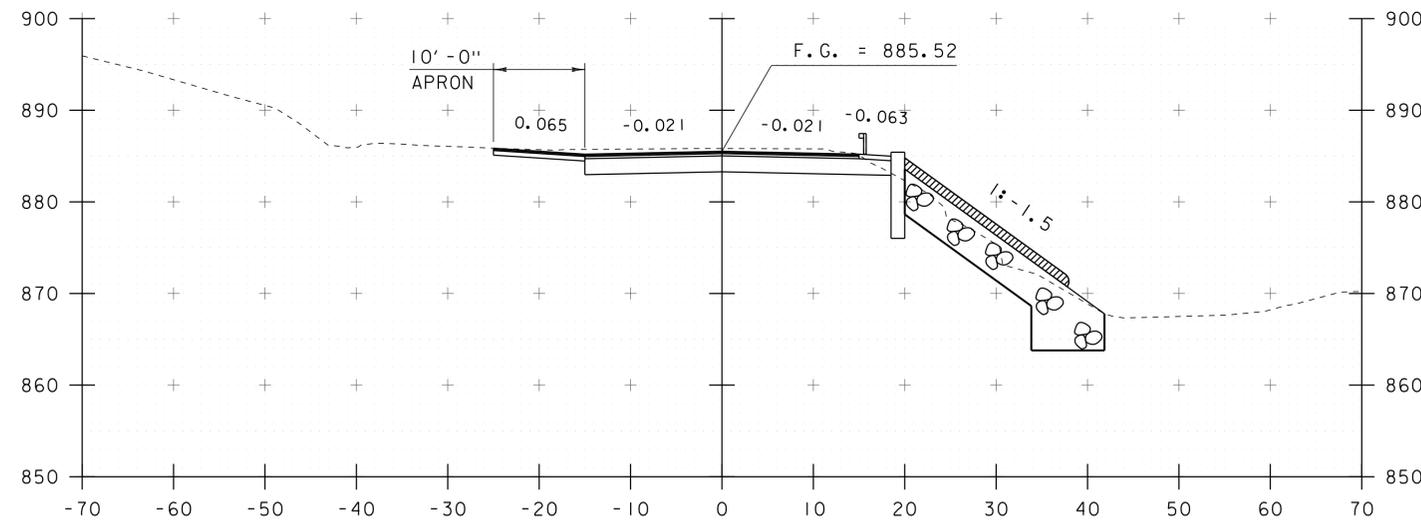
371+25



371+70



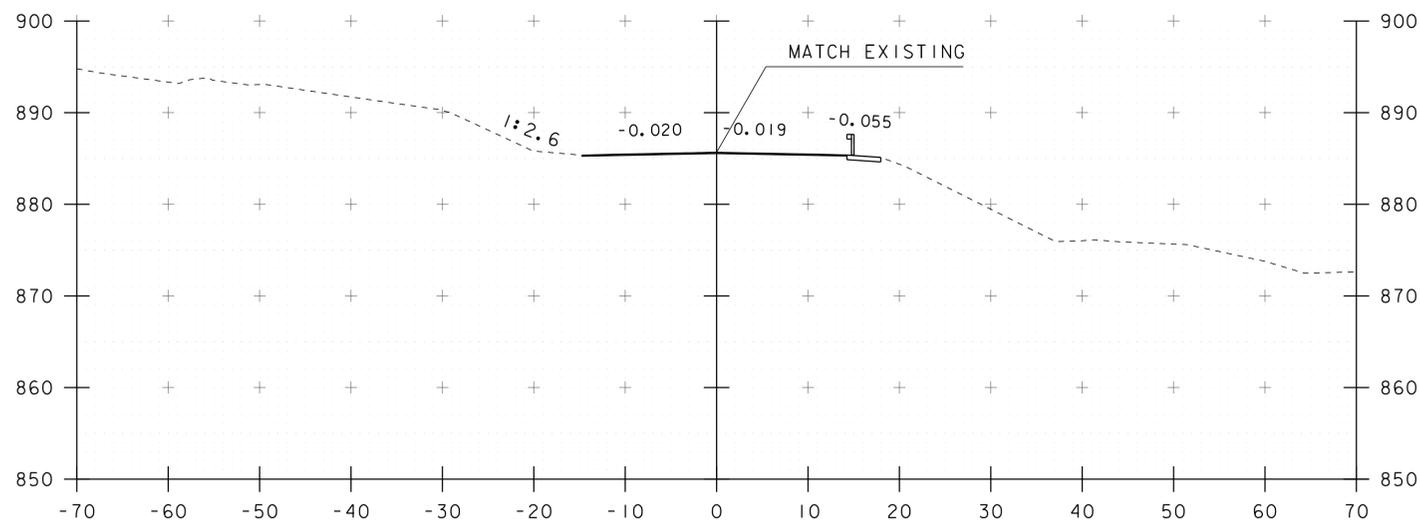
371+00



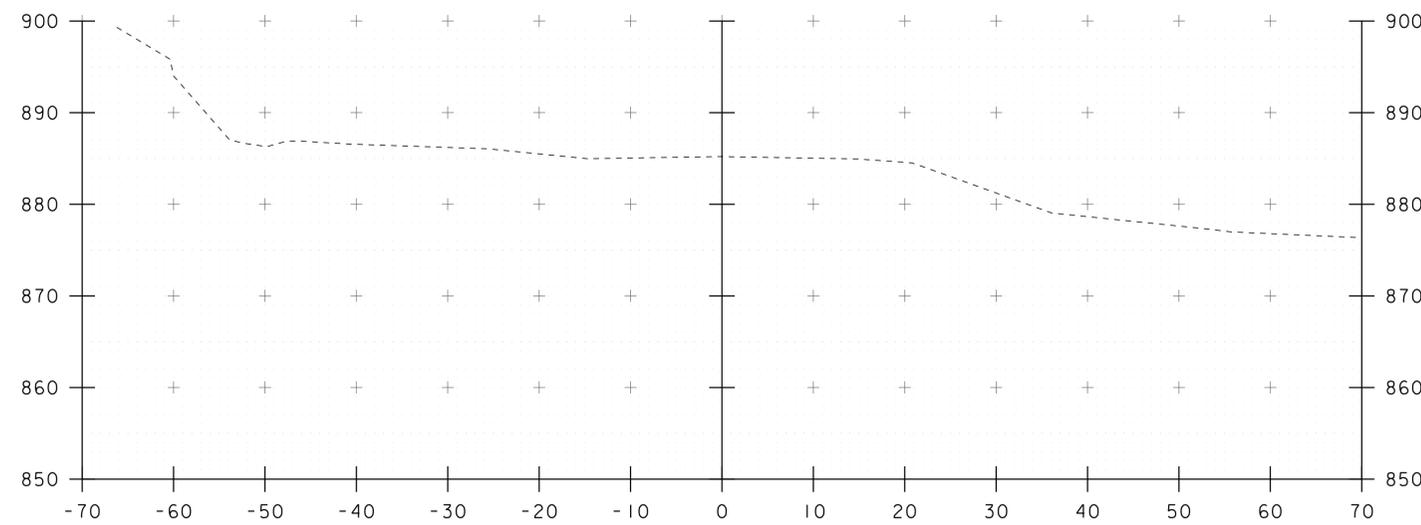
371+50
END BRIDGE STA 371+36.55

STA. 371+00 TO STA. 371+70

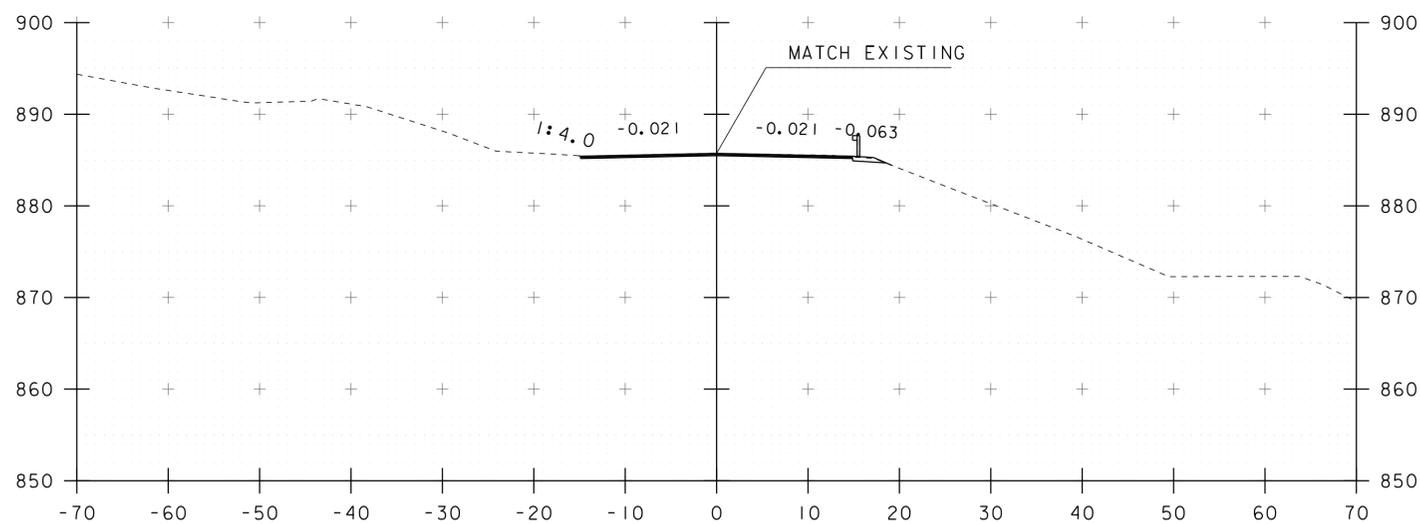
PROJECT NAME: BARNARD	
PROJECT NUMBER: ER BRF 0241(39)	
FILE NAME: s10c410xsl.dgn	PLOT DATE: 29-AUG-2013
PROJECT LEADER: K. HIGGINS	DRAWN BY: J. GRIGAS
DESIGNED BY: W. LAMMER	CHECKED BY: J. SALVATORI
MAINLINE SECTIONS	SHEET 34 OF 39



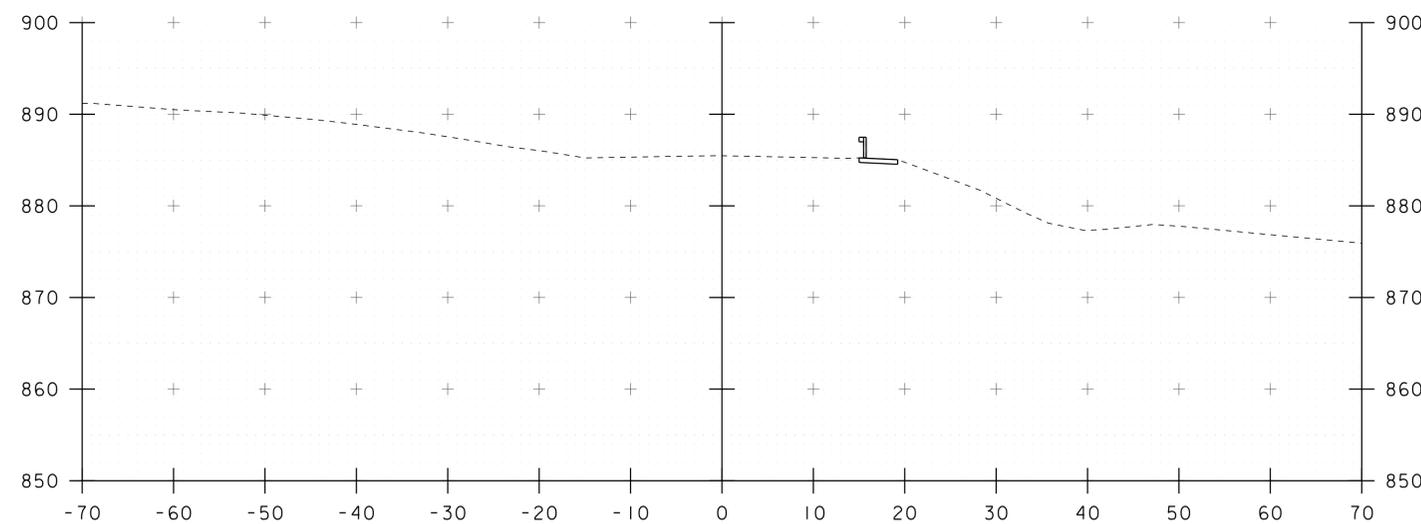
372+20



372+75
END APPROACH



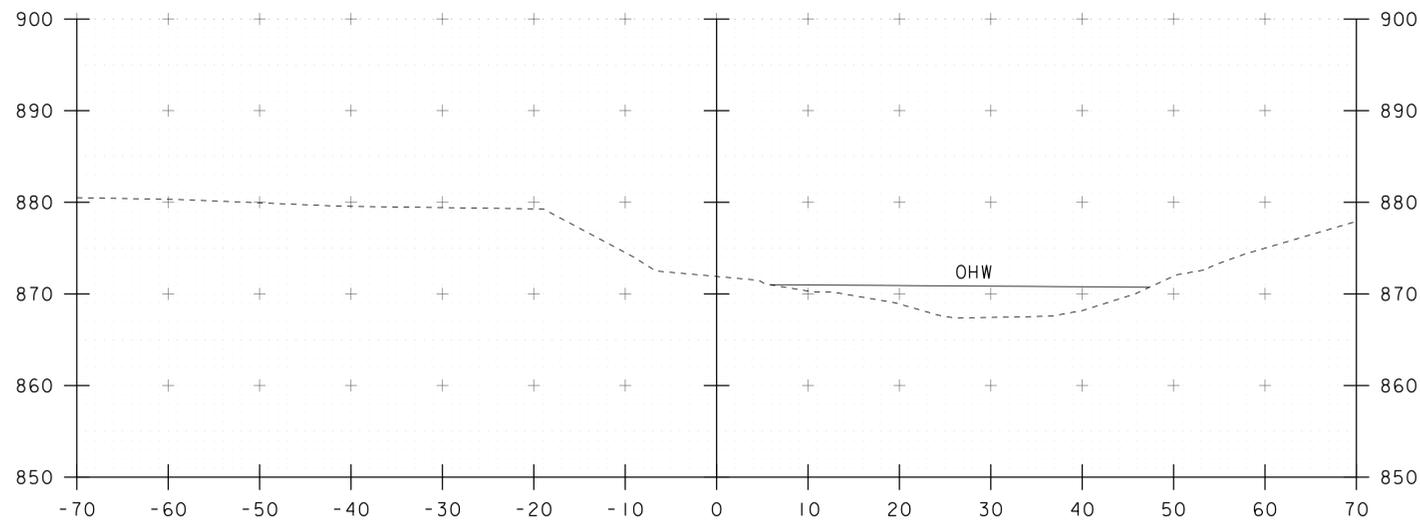
372+00
END PROJECT STA 371+85.00



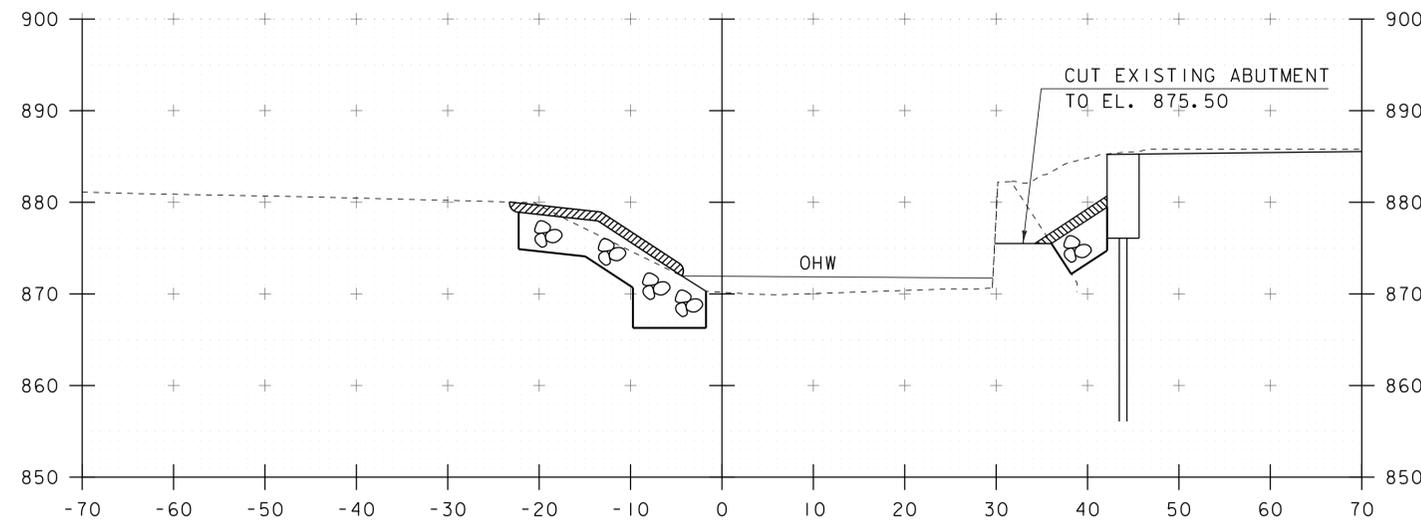
372+50
END PAVEMENT STA 372+35.00

STA. 372+00 TO STA. 372+75

PROJECT NAME:	BARNARD	PLOT DATE:	29-AUG-2013
PROJECT NUMBER:	ER BRF 0241(39)	DRAWN BY:	J.GRIGAS
FILE NAME:	sl0c410xsl.dgn	CHECKED BY:	J. SALVATORI
PROJECT LEADER:	K. HIGGINS	SHEET	35 OF 39
DESIGNED BY:	W. LAMMER	MAINLINE SECTIONS	

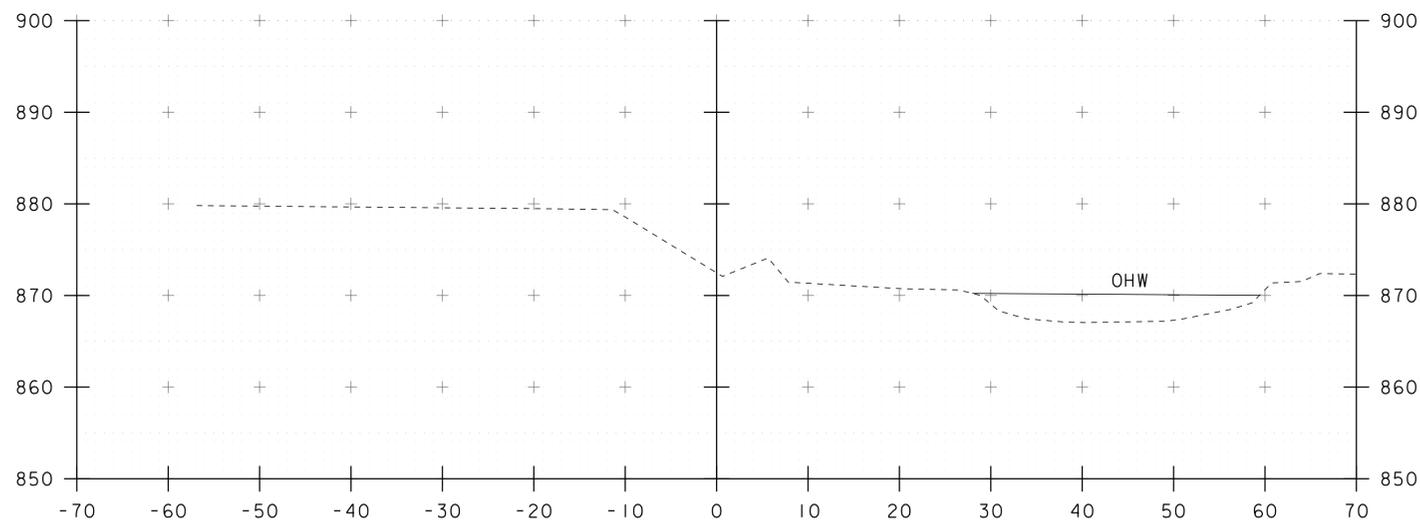


50+25

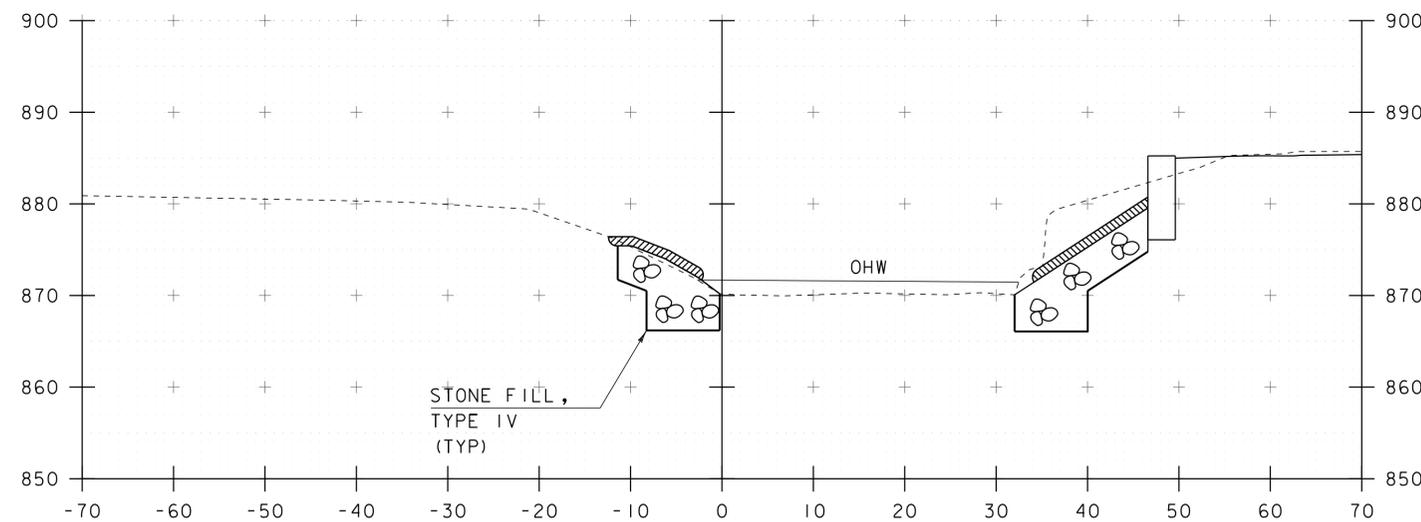


50+60

STA 50+67.50 RT (AB #2)
END GRUBBING MATERIAL



50+00



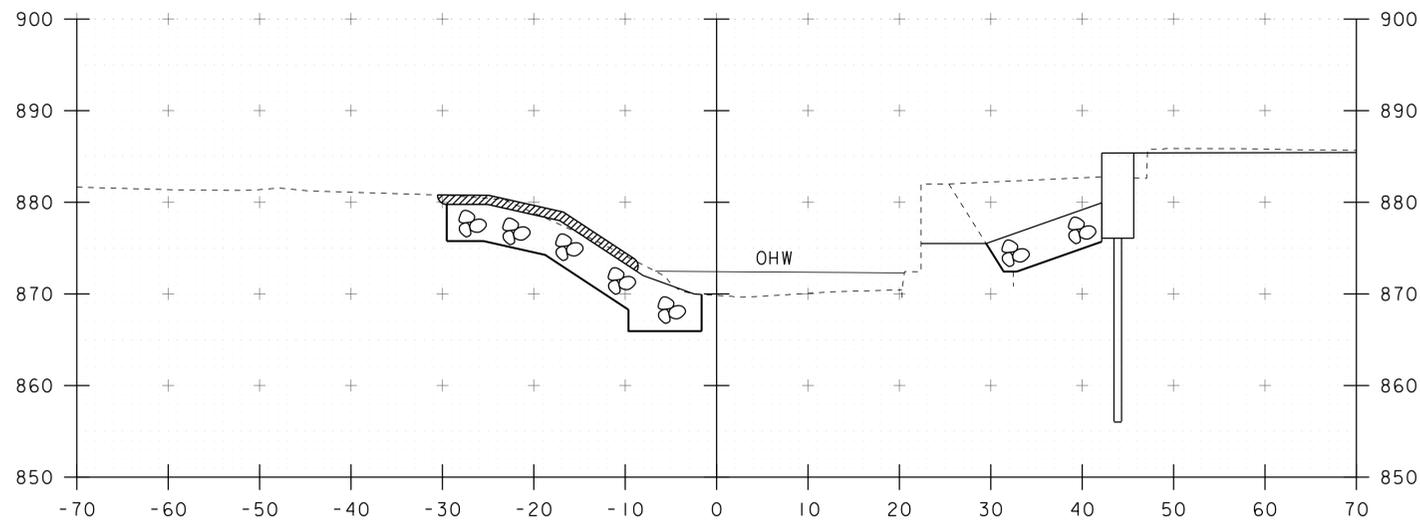
50+50

STA 50+50.00 LT (AB #1)
BEGIN UNCLASSIFIED CHANNEL EXCAVATION
GEOTEXTILE UNDER STONE FILL
STONEFILL, TYPE IV
GRUBBING MATERIAL

STA 50+31.30 RT (AB #2)
BEGIN UNCLASSIFIED CHANNEL EXCAVATION
GEOTEXTILE UNDER STONE FILL
STONEFILL, TYPE IV
GRUBBING MATERIAL

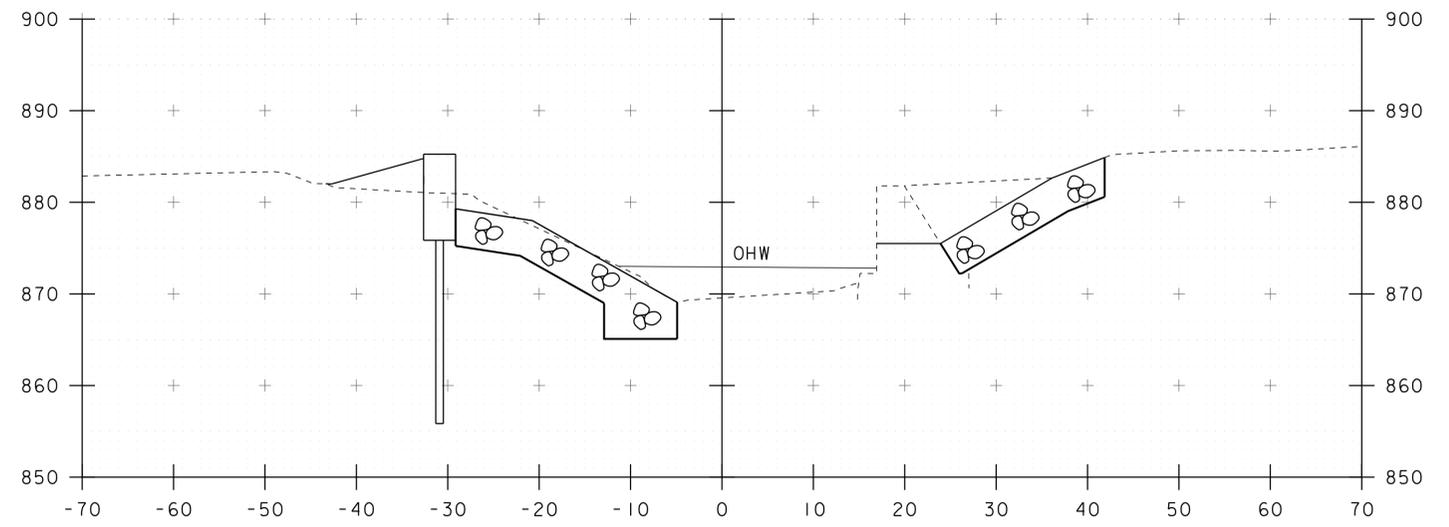
STA. 50+00 TO STA. 50+60

PROJECT NAME: BARNARD	
PROJECT NUMBER: ER BRF 0241(39)	
FILE NAME: sl0c410xsl.dgn	PLOT DATE: 29-AUG-2013
PROJECT LEADER: K. HIGGINS	DRAWN BY: J. GRIGAS
DESIGNED BY: W. LAMMER	CHECKED BY: J. SALVATORI
CHANNEL SECTIONS	SHEET 36 OF 39

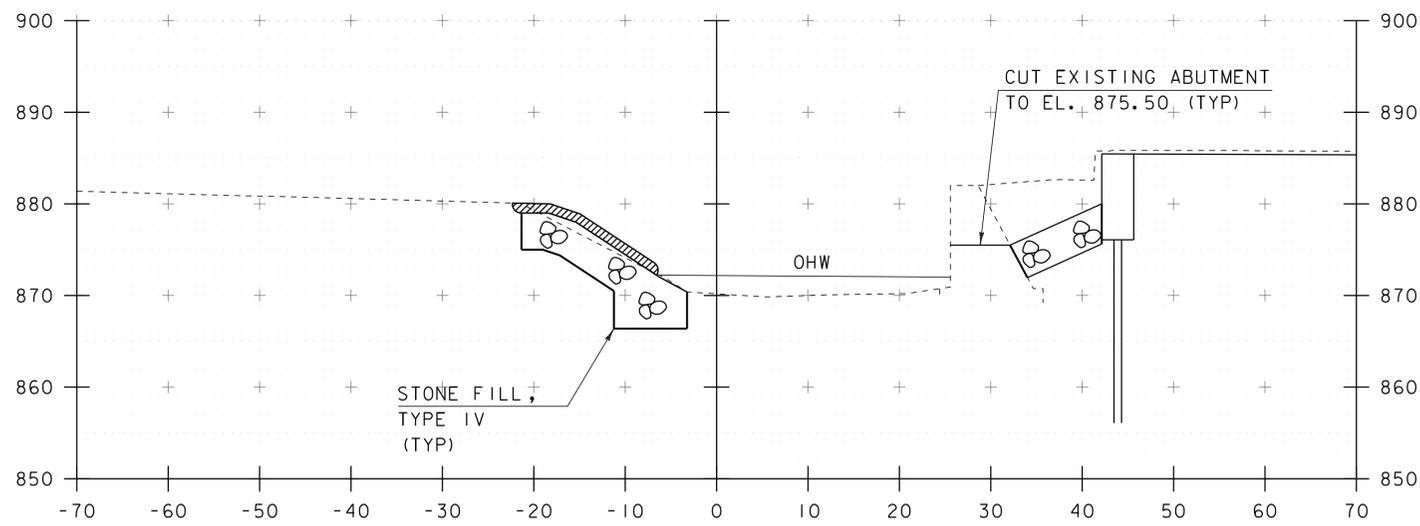


STA 50+80.00 LT (AB #1)
END GRUBBING MATERIAL

50+80

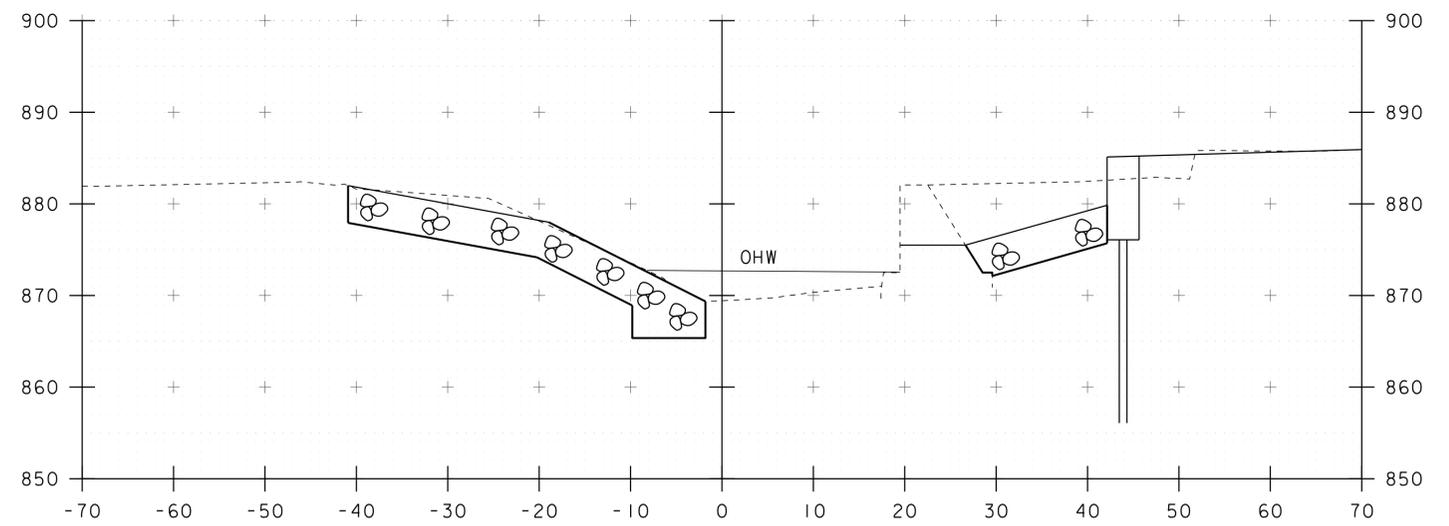


51+00



STONE FILL,
TYPE IV
(TYP)

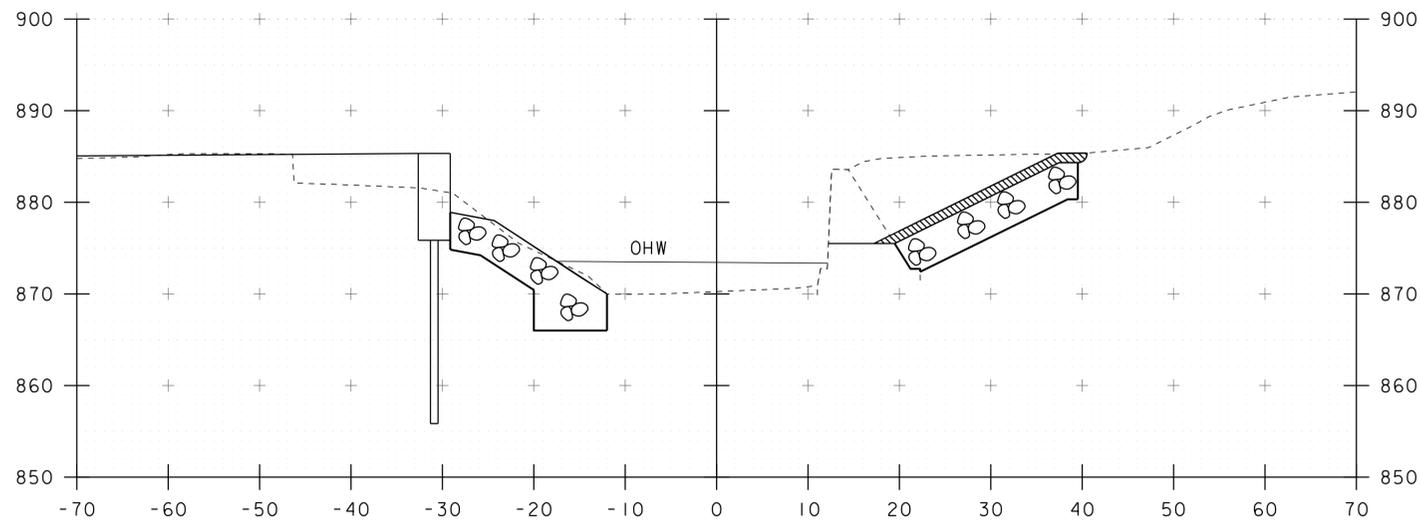
50+70



50+90

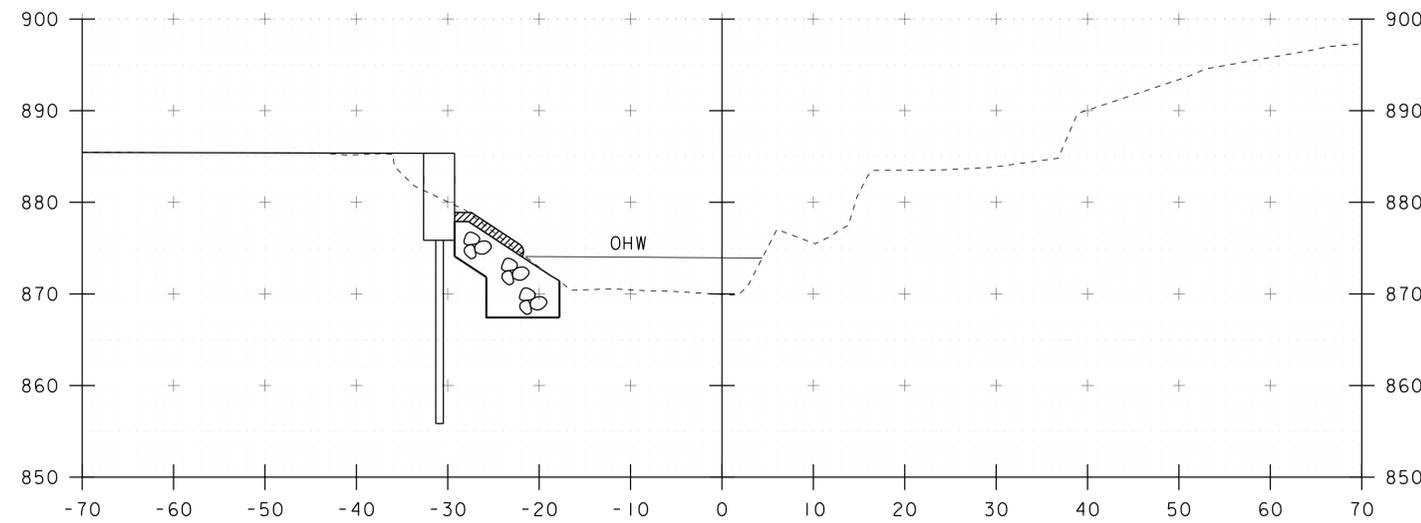
STA. 50+70 TO STA. 51+00

PROJECT NAME: BARNARD	PLOT DATE: 29-AUG-2013
PROJECT NUMBER: ER BRF 0241(39)	DRAWN BY: J. GRIGAS
FILE NAME: s10c410xsl.dgn	CHECKED BY: J. SALVATORI
PROJECT LEADER: K. HIGGINS	SHEET 37 OF 39
DESIGNED BY: W. LAMMER	
CHANNEL SECTIONS	



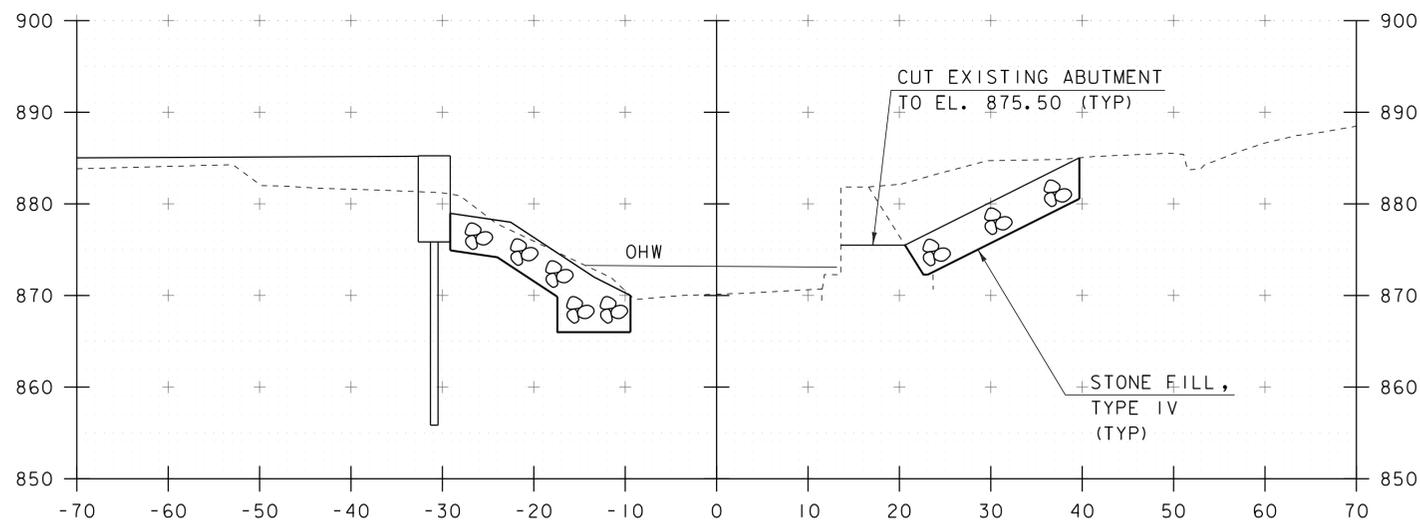
51+20

STA 51+20.00 RT (AB #2)
BEGIN GRUBBING MATERIAL

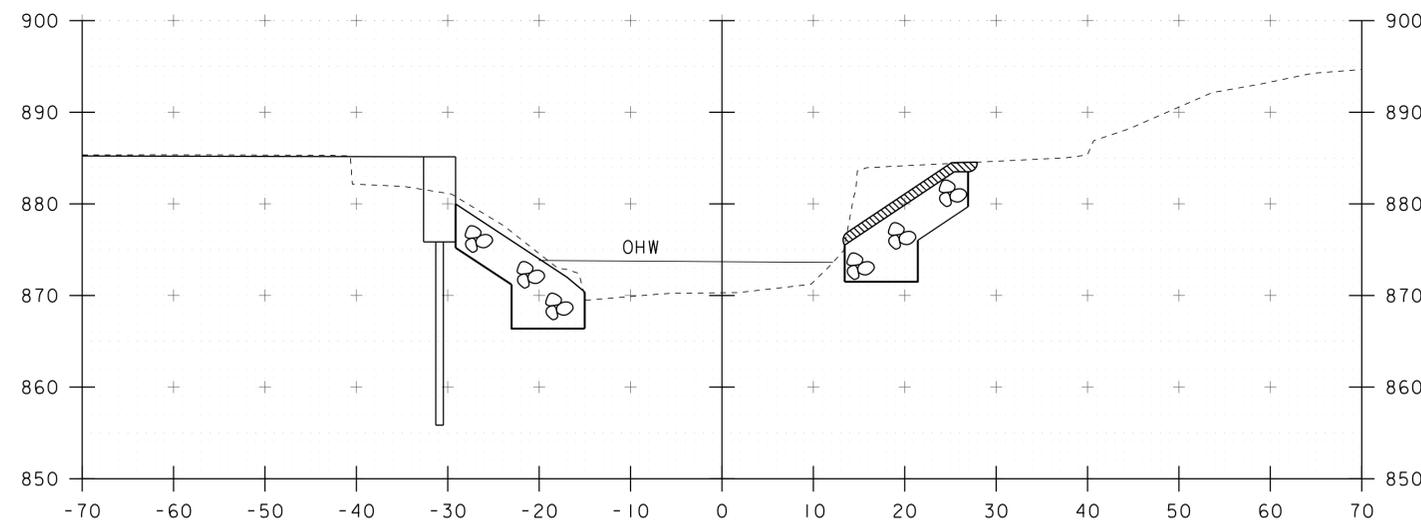


51+40

STA 51+36.00 LT (AB #1)
BEGIN GRUBBING MATERIAL



51+10



51+30

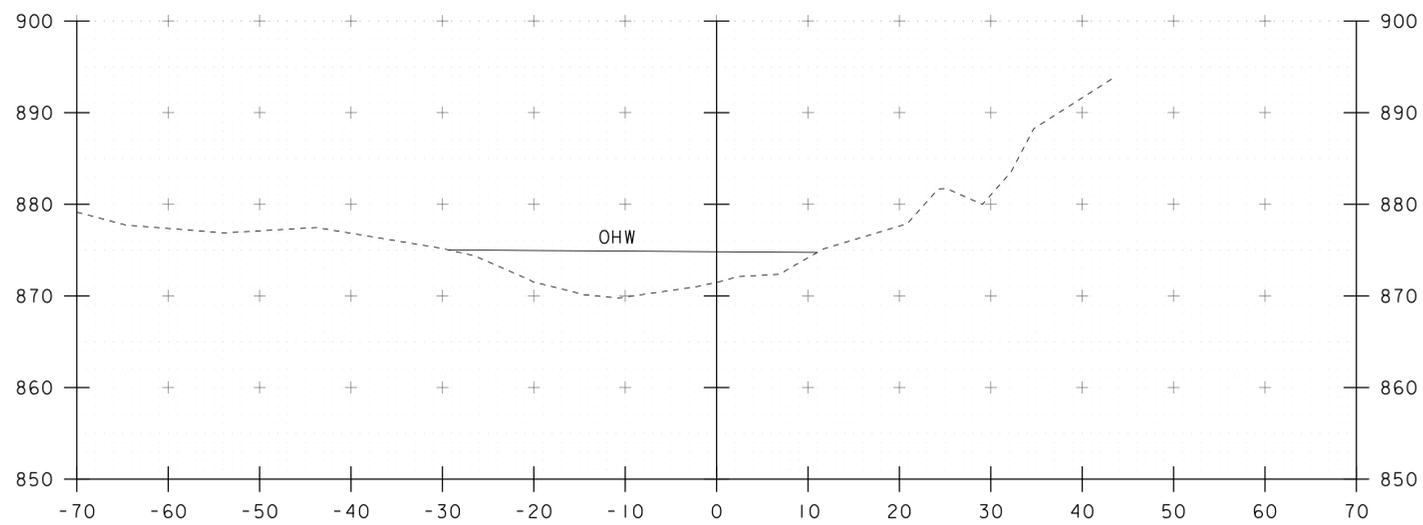
STA 51+30.00 RT (AB #2)
END UNCLASSIFIED CHANNEL EXCAVATION
GEOTEXTILE UNDER STONE FILL
STONE FILL, TYPE IV
GRUBBING MATERIAL

PROJECT NAME: BARNARD
PROJECT NUMBER: ER BRF 0241(39)

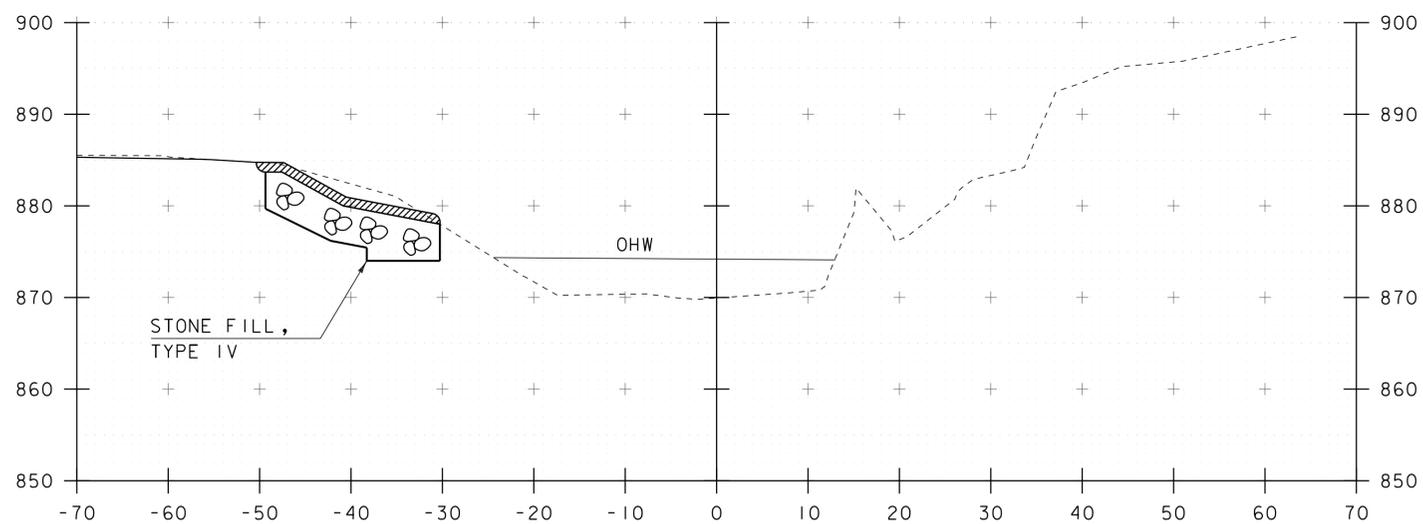
FILE NAME: s10c410xsl.dgn
PROJECT LEADER: K. HIGGINS
DESIGNED BY: W. LAMMER
CHANNEL SECTIONS

PLOT DATE: 29-AUG-2013
DRAWN BY: J. GRIGAS
CHECKED BY: J. SALVATORI
SHEET 38 OF 39

STA. 51+10 TO STA. 51+40

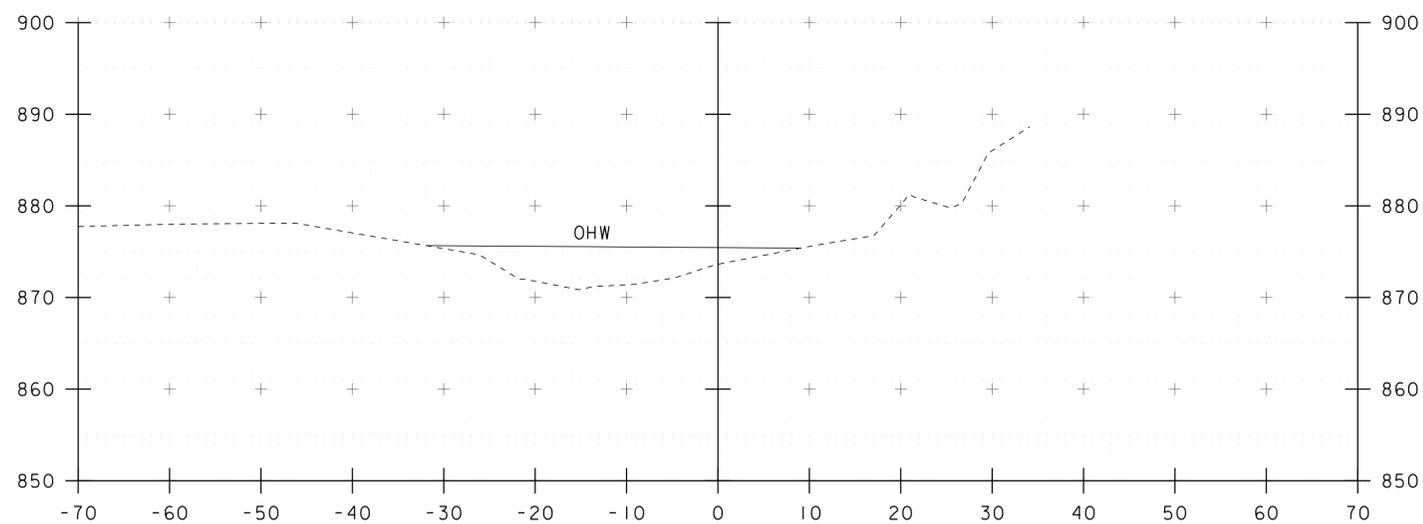


51+75



51+50

STA 51+50.00 LT (AB #1)
 END UNCLASSIFIED CHANNEL EXCAVATION
 GEOTEXTILE UNDER STONE FILL
 STONEFILL, TYPE IV
 GRUBBING MATERIAL



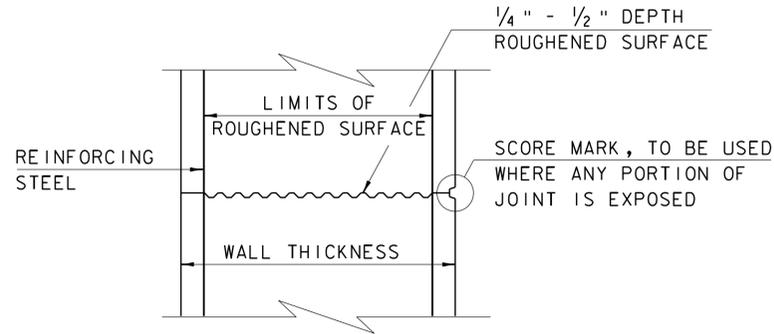
52+00

STA. 51+50 TO STA. 52+00

PROJECT NAME: BARNARD	PLOT DATE: 29-AUG-2013
PROJECT NUMBER: ER BRF 0241(39)	DRAWN BY: J. GRIGAS
FILE NAME: s10c410xsl.dgn	CHECKED BY: J. SALVATORI
PROJECT LEADER: K. HIGGINS	SHEET 39 OF 39
DESIGNED BY: W. LAMMER	
CHANNEL SECTIONS	

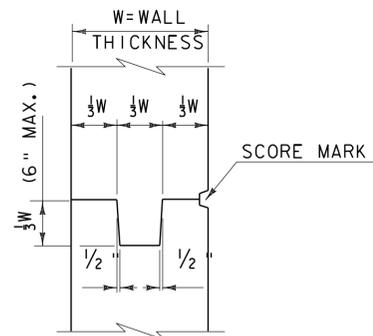
CONCRETE GENERAL NOTES

- ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 1" x 1"

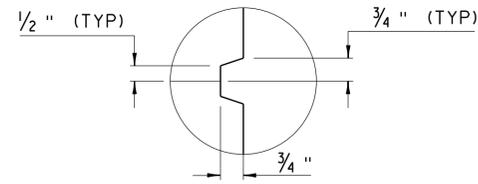


TYPICAL HORIZONTAL CONSTRUCTION JOINT
(NOT TO SCALE)

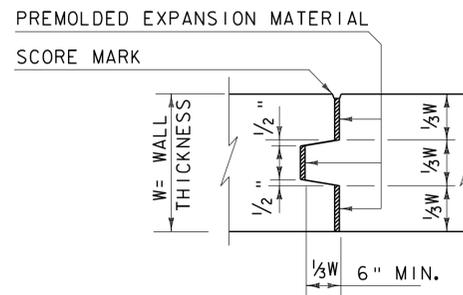
- THE SURFACE OF THE CONCRETE CONSTRUCTION JOINTS SHALL BE CLEANED AND FREE OF LAITANCE.
- IMMEDIATELY BEFORE NEW CONCRETE IS PLACED, ALL CONSTRUCTION JOINTS SHALL BE WETTED AND STANDING WATER REMOVED.



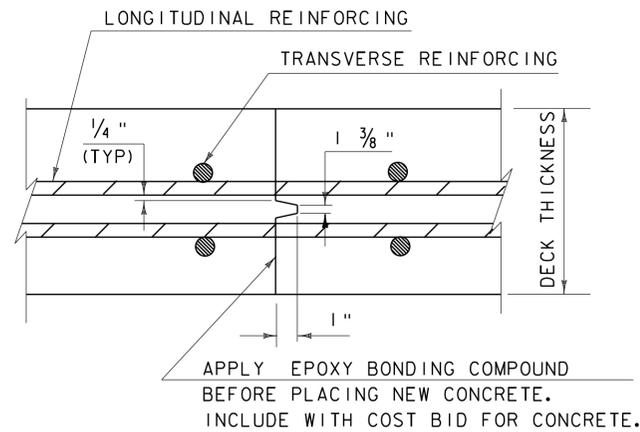
TYPICAL CONCRETE CONSTRUCTION JOINT
(NOT TO SCALE)



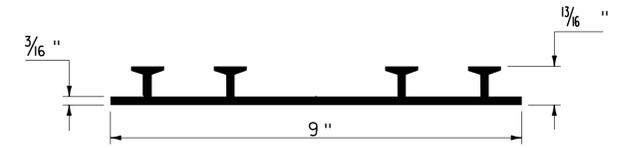
SCORE MARK DETAIL
(NOT TO SCALE)



TYPICAL CONCRETE EXPANSION JOINT
(NOT TO SCALE)



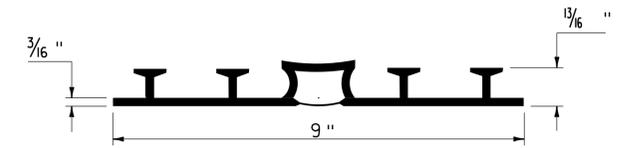
TRANSVERSE BRIDGE SLAB CONSTRUCTION JOINT DETAILS
(NOT TO SCALE)



P.V.C. WATERSTOP FOR CONSTRUCTION JOINTS
(NOT TO SCALE)

PAYMENT FOR THE P.V.C. WATERSTOP SHALL BE INCIDENTAL TO THE UNIT BID PRICE FOR THE ADJACENT CONCRETE.

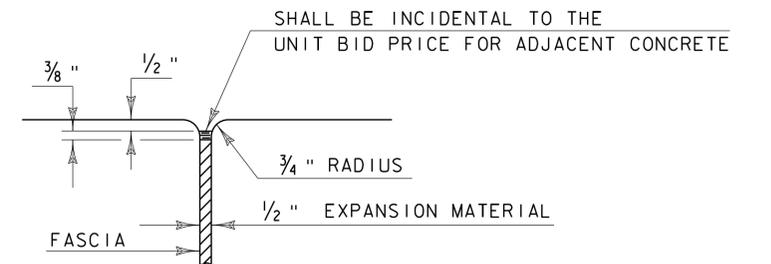
OTHER CONFIGURATIONS OF WATERSTOP MAY BE USED UPON APPROVAL OF THE ENGINEER.



P.V.C. WATERSTOP FOR EXPANSION JOINTS
(NOT TO SCALE)

PAYMENT FOR THE P.V.C. WATERSTOP SHALL BE INCIDENTAL TO THE UNIT BID PRICE FOR THE ADJACENT CONCRETE.

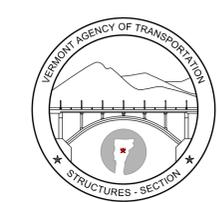
OTHER CONFIGURATIONS OF WATERSTOP MAY BE USED UPON APPROVAL OF THE ENGINEER.



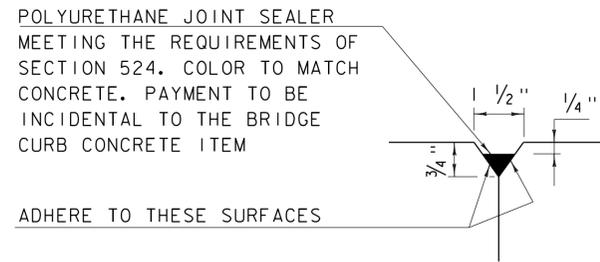
JOINT BETWEEN FASCIA AND WINGWALL
(NOT TO SCALE)

REVISIONS	
MAY 7, 2010	APPROVED FOR USE BY VAOT STRUCTURES SECTION

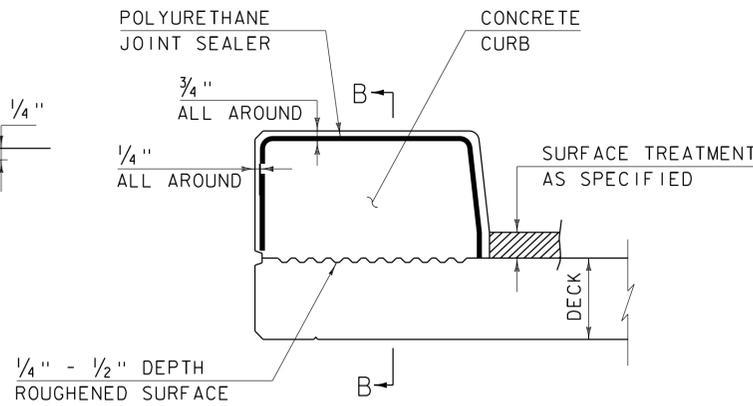
**CONCRETE
DETAILS AND NOTES**



**STRUCTURES
DETAIL
SD-5 01.00**

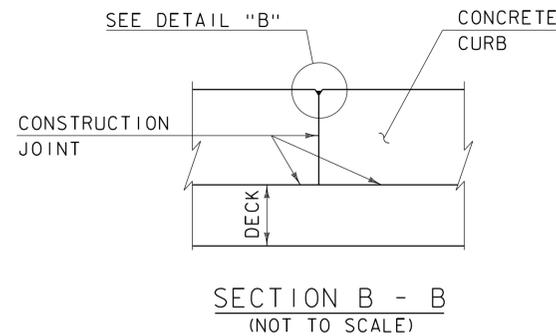


DETAIL "B"
(NOT TO SCALE)

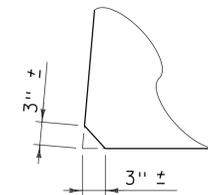


CONCRETE CURB JOINT SECTION
(NOT TO SCALE)

1. SEE TYPICAL HORIZONTAL CONSTRUCTION JOINT DETAIL FOR ADDITIONAL INFORMATION



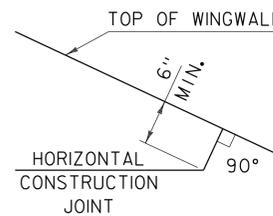
SECTION B - B
(NOT TO SCALE)



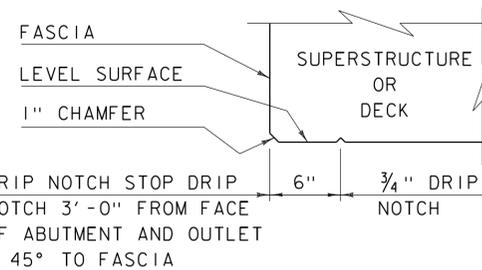
ACUTE ANGLE
CLIP DETAIL
(NOT TO SCALE)

CONCRETE CURB JOINT NOTES

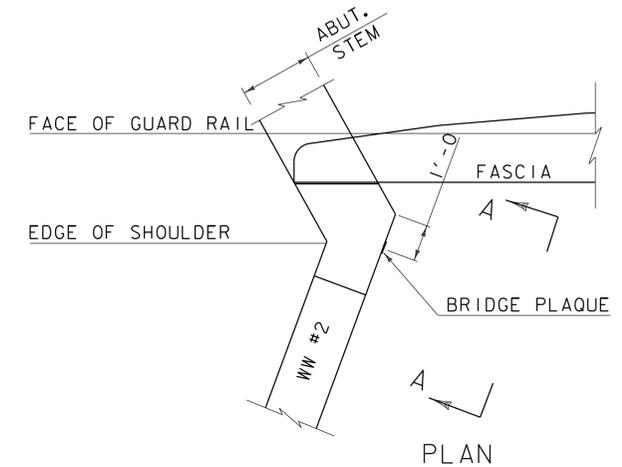
1. CONCRETE CURBS MAY BE PLACED IN ONE CONTINUOUS OPERATION IF AN APPROVED SHRINKAGE REDUCING ADMIXTURE LISTED IN THE SPECIAL PROVISIONS IS USED WITH THE CONCRETE MIX DESIGN. PAYMENT FOR THE SHRINKAGE REDUCING ADMIXTURE WILL BE INCIDENTAL TO THE BRIDGE CURB CONCRETE ITEM.
2. IF THE CONTRACTOR CHOOSES NOT TO USE AN APPROVED SHRINKAGE REDUCING ADMIXTURE, THE CURBS SHALL BE CONSTRUCTED WITH CONSTRUCTION JOINTS SPACED AT A MAXIMUM OF 15'-0" CENTER TO CENTER AND 2'-0" MINIMUM FROM THE CENTER OF NEAREST BRIDGE RAILING POST.
3. ON MULTI-SPAN CONTINUOUS SUPERSTRUCTURES, REGARDLESS OF WHETHER APPROVED SHRINKAGE REDUCING ADMIXTURE IS USED, CURB JOINTS SHALL BE LOCATED OVER THE CENTERLINE OF PIERS AND 7'-0" EACH SIDE OF THE CENTERLINE OF EACH PIER.
4. WHEN CURB JOINTS ARE USED THE CURBS SHALL BE PLACED IN ALTERNATE SECTIONS WITH A MINIMUM OF 48 HOUR DELAY BETWEEN ADJACENT PLACEMENTS.
5. LONGITUDINAL REINFORCING SHALL BE CONTINUOUS THROUGH CURB CONSTRUCTION JOINTS. CURB STIRRUP BARS SHALL BE TURNED AS NECESSARY TO MAINTAIN COVER IN THE FLARED CURB ENDS.
6. THE JOINT SPACING AND DETAILS SHOWN SHALL APPLY TO SIDEWALKS WHEN SHOWN IN THE PLANS.



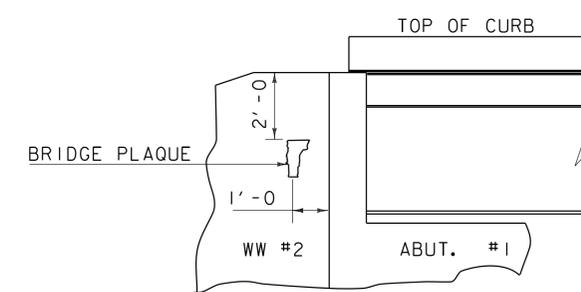
HORIZONTAL WINGWALL
CONSTRUCTION JOINT
(NOT TO SCALE)



DRIP NOTCH DETAIL
(NOT TO SCALE)



PLAN



VIEW "A - A"

BRIDGE PLAQUE
(NOT TO SCALE)

THE BRIDGE PLAQUE WILL BE SUPPLIED BY THE AGENCY OF TRANSPORTATION AND SHALL BE INSTALLED BY THE CONTRACTOR AT ABUTMENT #1 ON THE RIGHT SIDE AS SHOWN OR AS DIRECTED BY THE ENGINEER.

PAYMENT FOR INSTALLATION OF THE BRIDGE PLAQUE SHALL BE INCIDENTAL TO THE ADJACENT CONCRETE.

REVISIONS

MAY 7, 2010	APPROVED FOR USE BY VAOT STRUCTURES SECTION
JUNE 4, 2010	MODIFIED AND ADDED TWO DETAILS
OCTOBER 10, 2012	MODIFIED HORZ. JOINT WINGWALL ADD 6" MIN. DIMENSION

CONCRETE
DETAILS AND NOTES



STRUCTURES
DETAIL
SD-502.00

ASPHALTIC PLUG JOINT NOTES

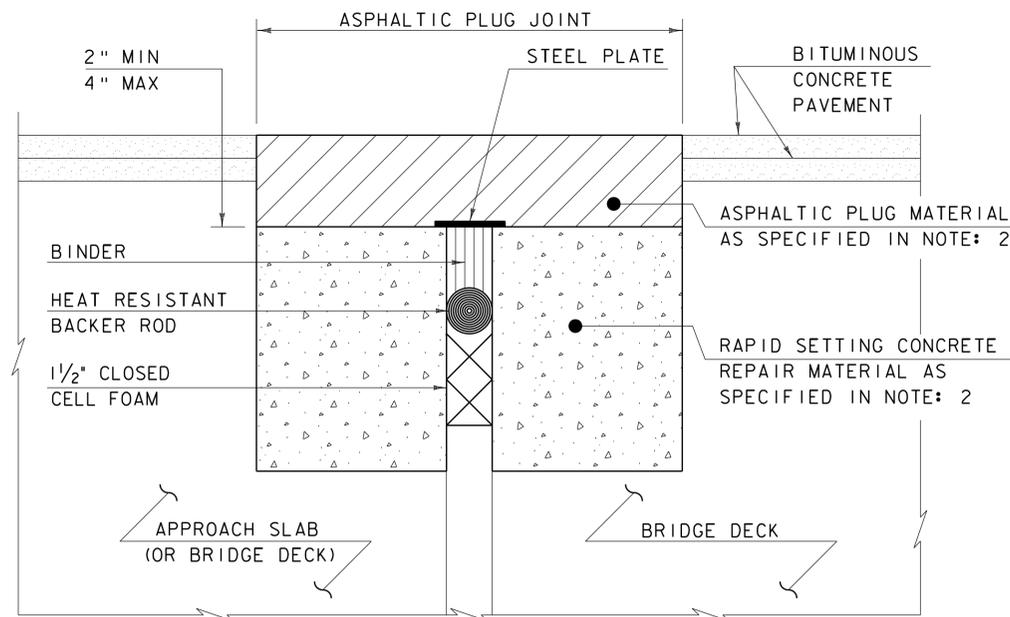
INSTALLATION:

1. LOCATE THE JOINT CENTRALLY OVER THE DECK OVERLAY EXPANSION GAP OR FIXED JOINT, MARKED OUT TO THE MANUFACTURER'S RECOMMENDED WIDTH.
2. REMOVE THE BITUMINOUS CONCRETE PAVEMENT FULL DEPTH AS SHOWN ON THE PLANS. THE PAVEMENT SHALL BE DRY AND SAW CUT TO THE LIMITS REQUIRED TO PLACE THE JOINT. A PNEUMATIC HAMMER AND CHISEL MAY BE USED ADJACENT TO THE CURB ONLY WHEN SAW CUTTING IS NOT POSSIBLE.
3. BLAST CLEAN THE JOINT AREA OF DEBRIS, ASPHALT AND SHEET MEMBRANE. THOROUGHLY DRY THE JOINT AREA WITH COMPRESSED AIR PRIOR TO APPLYING BINDER MATERIAL.
4. REPAIR MATERIAL GREATER THAN 4 INCHES FROM FINISHED GRADE WITH RAPID SETTING CONCRETE REPAIR MATERIAL WITH COARSE AGGREGATE MEETING THE REQUIREMENTS OF SUBSECTION 780.04.
5. PLACE PROPERLY SIZED HEAT RESISTANT BACKER ROD IN THE MOVEMENT GAP ALLOWING FOR 1" +/- OF BINDER ABOVE THE ROD.
6. HEAT AND PLACE THE BINDER MATERIAL AS RECOMMENDED BY THE MANUFACTURER.
7. PLACE 1/4" THICK BY 8" WIDE SECTIONS OF STEEL PLATE OVER THE CENTER OF THE MOVEMENT GAP. SECURE THE PLATES FROM MOVING BY INSERTING LOCATING PINS THROUGH THE PRE-STAMPED HOLES INTO BACKER ROD AND COVER WITH HOT BINDER. THE STEEL PLATES MAY BE OMITTED WHERE THE ENGINEER DETERMINES THAT THE APPROACH SLAB OR BRIDGE DECK WILL PROVIDE INADEQUATE SUPPORT AND WHERE VERTICAL MOVEMENT OF THE PLATES MIGHT OCCUR.
8. HEAT AND MIX THE BINDER MATERIAL AND AGGREGATE AS RECOMMENDED BY THE MANUFACTURER.
9. INSTALLATION OF MATERIAL, COMPACTION, AND TOP COATING SHALL BE AS RECOMMENDED BY THE MANUFACTURER.
10. IMMEDIATELY AFTER TOP COATING, CAST AN ANTI-SKID MATERIAL OVER THE JOINT TO REDUCE THE RISK OF TRACKING.
11. ONCE THE JOINT REACHES 82 DEG C (180 DEG F) +/-, WATER MAY BE USED TO EXPEDITE THE COOLING PROCESS.
12. PROTECT JOINT FROM TRAFFIC UNTIL THE MATERIAL HAS COOLED TO 51 DEG C (125 DEG F) +/-.

WEATHER LIMITATIONS

APPLY BINDER MATERIAL ONLY WHEN THE FOLLOWING CONDITIONS PREVAIL OR AS RECOMMENDED BY THE MANUFACTURER:

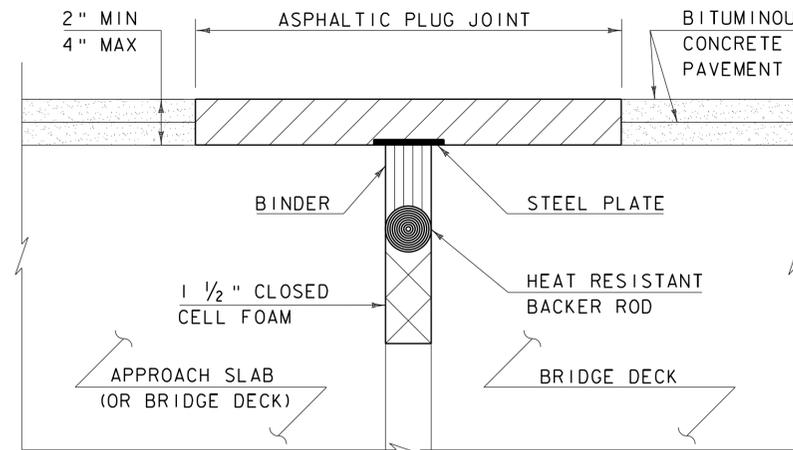
1. THE AMBIENT AIR TEMPERATURE IS AT LEAST 10 DEG C (50 DEG F) AND RISING.
2. THE ROAD SURFACE IS DRY.
3. WEATHER CONDITIONS OR OTHER CONDITIONS ARE FAVORABLE AND ARE EXPECTED TO REMAIN SO FOR THE PERFORMANCE OF SATISFACTORY WORK.



ASPHALTIC PLUG-TYPE JOINT DETAIL - REHAB

NOTES: (NOT TO SCALE)

1. THE CONTRACTOR SHALL REMOVE ALL ASPHALTIC PLUG JOINT MATERIAL AND DETERIORATED CONCRETE AS DIRECTED BY THE ENGINEER. REMOVAL OF THE FIRST 4 INCHES OF MATERIAL SHALL BE INCLUDED IN THE BID PRICE FOR ITEM 516.10 BRIDGE EXPANSION JOINT, ASPHALTIC PLUG. ANY REMOVAL OF MATERIAL GREATER THAN 4 INCHES SHALL BE INCLUDED IN THE BID PRICE OF ITEM 580.20 RAPID SETTING CONCRETE REPAIR MATERIAL WITH COARSE AGGREGATE.
2. THE CONTRACTOR SHALL REPLACE REMOVED MATERIAL THAT IS LESS THAN 4" FROM FINISHED GRADE WITH ASPHALTIC PLUG JOINT MATERIAL MEETING THE REQUIREMENTS OF SUBSECTION 707.15. ALL REMOVED MATERIAL THAT IS GREATER THAN 4 INCHES FROM FINISHED GRADE SHALL BE REPLACED WITH RAPID SETTING CONCRETE REPAIR MATERIAL WITH COARSE AGGREGATE MEETING THE REQUIREMENTS OF SUBSECTION 780.04.
3. REINFORCING STEEL NOT SHOWN FOR CLARITY.

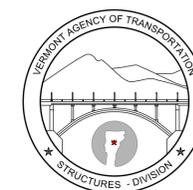


ASPHALTIC PLUG-TYPE JOINT DETAIL - NEW
(NOT TO SCALE)

REVISIONS

MAY 7, 2010	APPROVED FOR USE BY VAOT STRUCTURES SECTION

BRIDGE JOINT
ASPHALTIC PLUG



STRUCTURES
DETAIL
SD-516.10

NOTES CONT.

MAINTENANCE

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

GENERAL

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

SIGN COVERS

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

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

SIGN POSTS

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

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

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

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

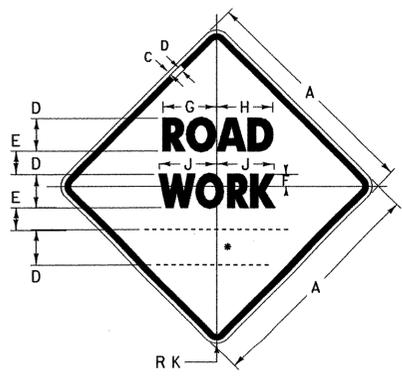
ALL WOODEN POSTS SHALL HAVE AN EMBEDMENT DEPTH OF 4 FEET. NO CROSS-BRACING OR BACK-BRACING TO KEEP THE POSTS PLUMB WILL BE ALLOWED. CONCRETE FOUNDATIONS, COLLARS, OR SOIL BEARING PLATES ARE NOT PERMITTED. CONSTRUCTION SIGNS SHALL BE PLACED ON TWO OR MORE POSTS WHEN ANY OF THE FOLLOWING CONDITIONS GOVERN:

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

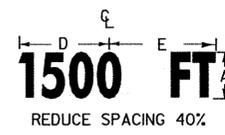
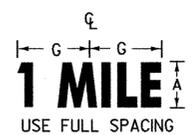
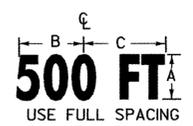
OTHER STDS. REQUIRED: E-100A, E-101, E-102



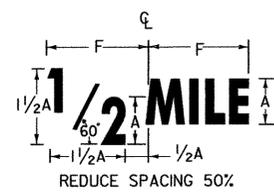
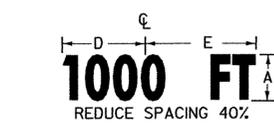
**STANDARD
E-100**



W20-1
• SEE DISTANCE DETAILS



1500 FT
REDUCE SPACING 40%



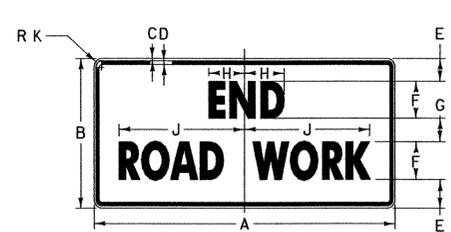
AHEAD
USE FULL SPACING

DISTANCE DETAILS

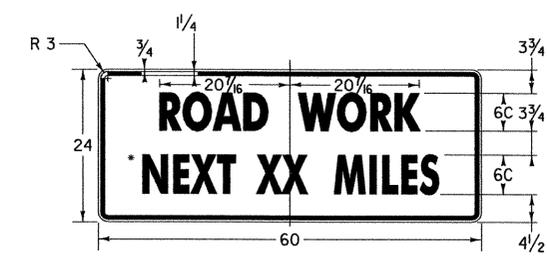
SIGN	DIMENSIONS (INCHES)									
	A	B	C	D	E	F	G	H	J	K
MIN.	36	3/8	7/8	5D	3 1/2	3 1/4	8 3/8	8 7/8	9	2 1/4
STD.	48	3/4	1 1/4	7D	4 3/4	4 1/2	11 1/8	12 1/8	12 5/8	3

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

(ALL DIMENSIONS SHOWN IN INCHES)



G20-2A



G20-1

• OPTICALLY CENTER

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

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

NOTES

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

APPLICATION OF STANDARDS

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

LOCATION

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

DESIGN

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

MATERIALS

THE SIGN BASE MATERIAL USED FOR THE SIGNS ON THIS SHEET MAY BE ANY OF THE FOLLOWING, WITH MINIMUM THICKNESS AS NOTED.
 FLAT SHEET ALUMINUM 0.125 INCHES
 HIGH DENSITY OVERLAYED PLYWOOD 5/8 INCHES

REFLECTORIZATION

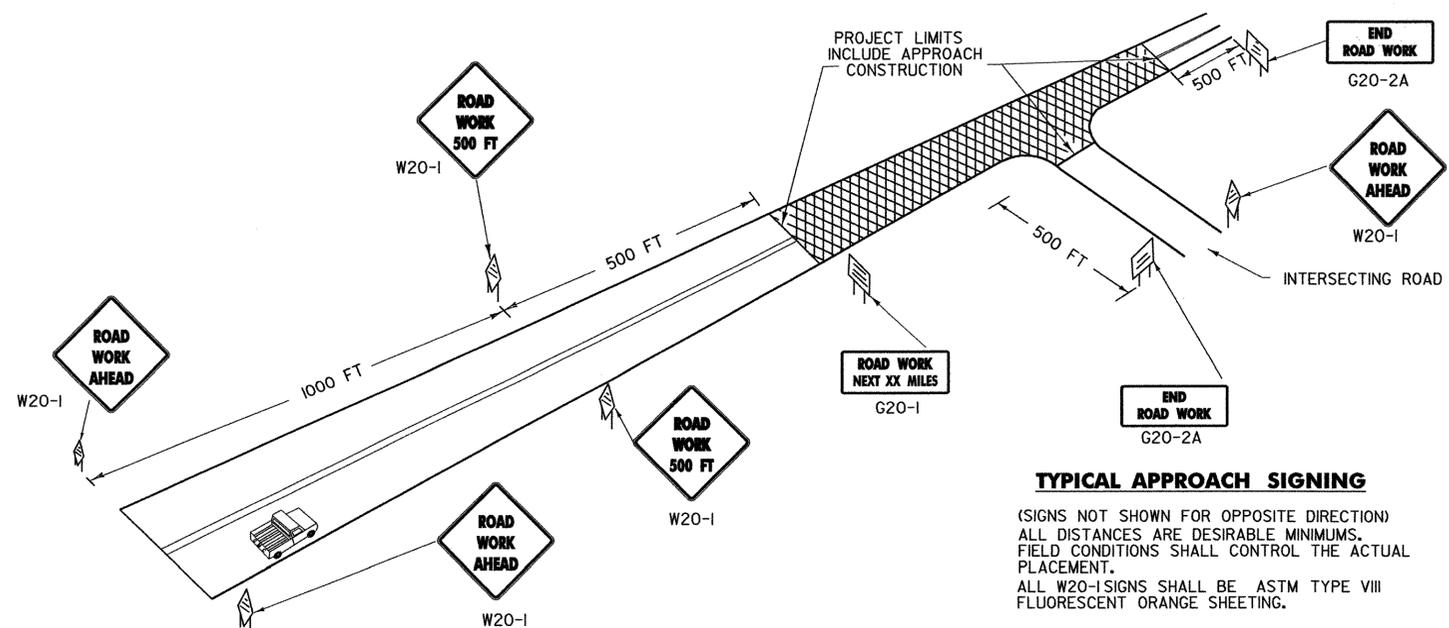
ALL LEAD SIGNS (W20-1) ON THIS SHEET SHALL BE ASTM TYPE VIII FLUORESCENT ORANGE SHEETING. ALL OTHER SIGNS ON THIS SHEET SHALL BE ASTM TYPE III RETROREFLECTORIZED SHEETING.

COLORS

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

INSTALLATION

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



TYPICAL APPROACH SIGNING

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

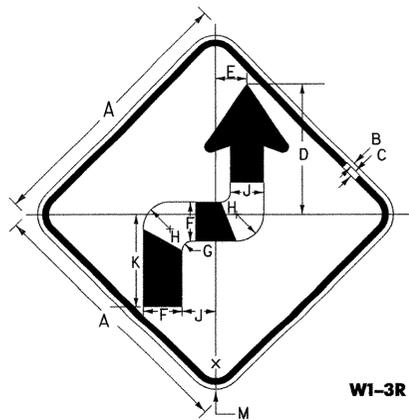
REVISIONS AND CORRECTIONS

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

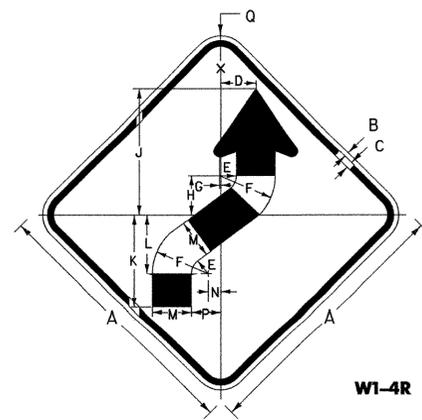
APPROVED

DIRECTOR OF PROGRAM DEVELOPMENT
 TRAFFIC OPERATIONS ENGINEER
 FEDERAL HIGHWAY ADMINISTRATION

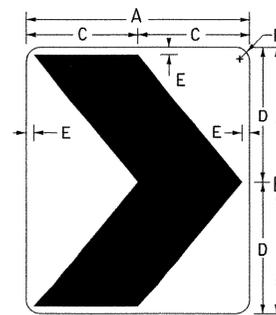
**CONSTRUCTION APPROACH
SIGNS**



W1-3R

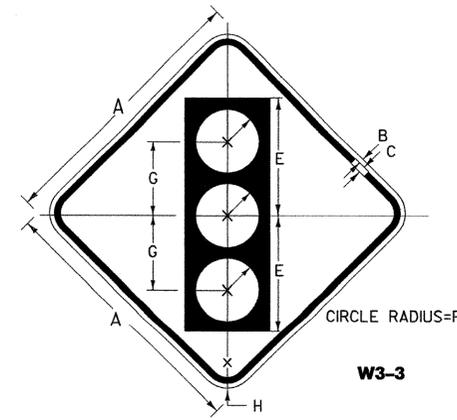


W1-4R



W1-8

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

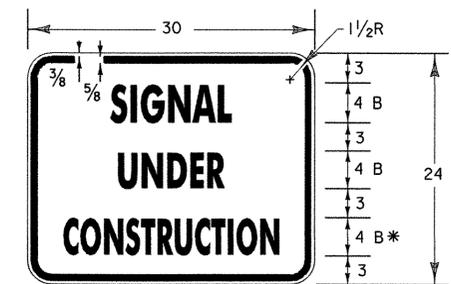


W3-3

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

COLORS

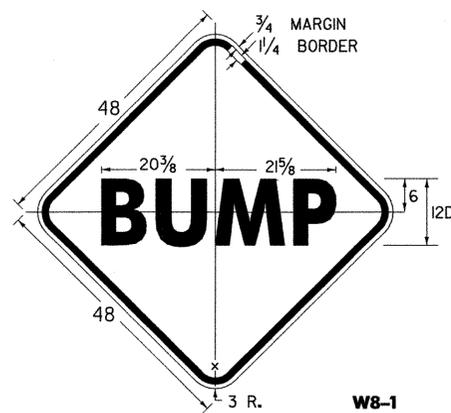
SYMBOL & LEGEND - BLACK (NON-REFL)
BACKGROUND - ORANGE (REFL)
TOP CIRCLE - RED (REFL)
MIDDLE CIRCLE - YELLOW (REFL)
BOTTOM CIRCLE - GREEN (REFL)



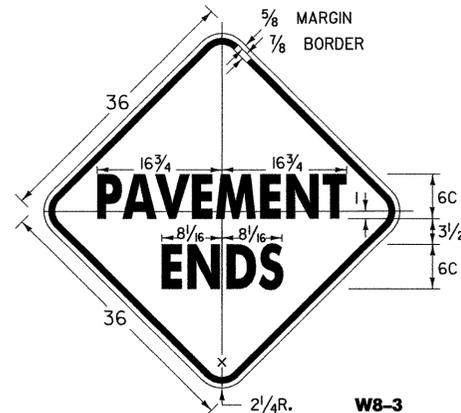
* REDUCE SPACING 50%

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

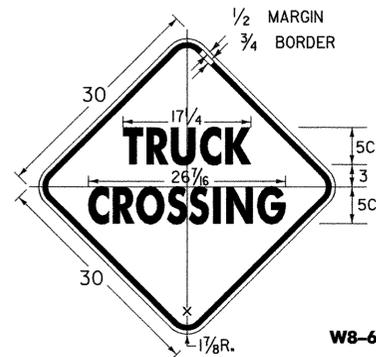
SIGN	DIMENSIONS (INCHES)														
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
STD. & MIN.	36	5/8	7/8	4 2/32	2 1/4	7 1/2	5 3/2	5 1/4	16 7/8	12 3/8	7 7/8	5 1/4	1 1/16	3 15/16	2 1/4
SPECIAL	48	3/4	1 1/4	6 5/16	3	10	3 1/6	7	22 1/2	16 1/2	10 1/2	7	2 1/4	5 1/4	3



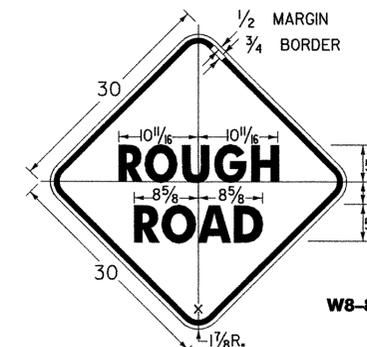
W8-1



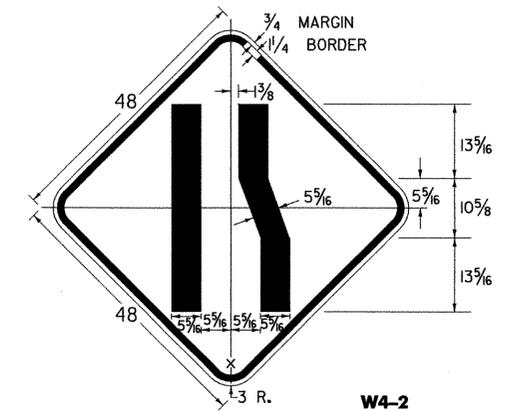
W8-3



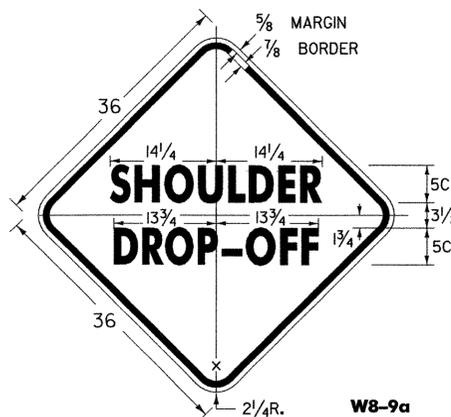
W8-6



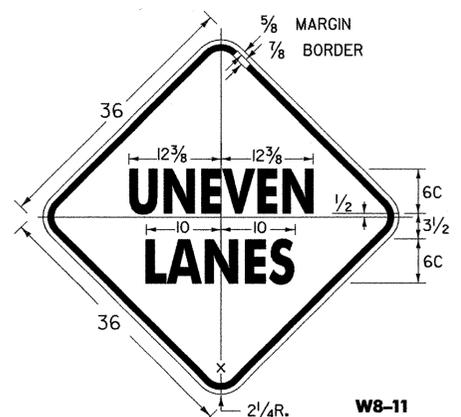
W8-8



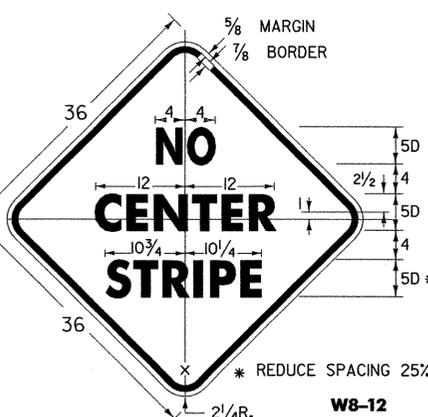
W4-2



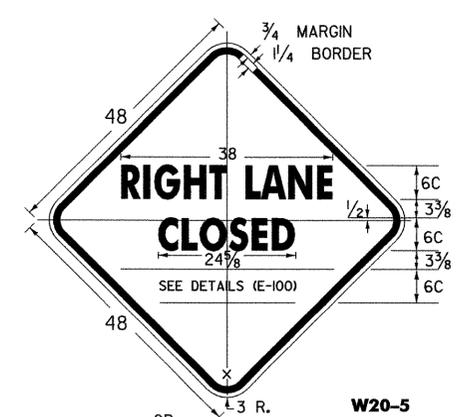
W8-9a



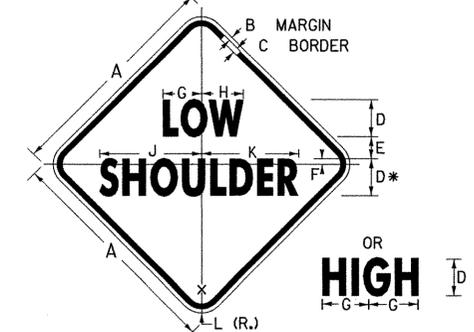
W8-11



W8-12



W20-5



W8-9

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

* REDUCE SPACING 25%

NOTES

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

(ALL DIMENSIONS SHOWN IN INCHES) LEFT LANE

OTHER STDS. E-100 REQUIRED:

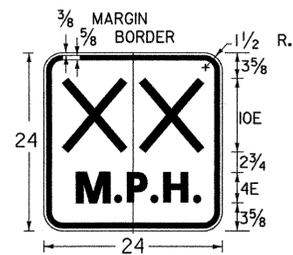
REVISIONS AND CORRECTIONS
OCT. 30, 1987 - DATE OF ORIGINAL ISSUE
OCT. 21, 1992 - ADDED ADDITIONAL SIGN DIMENSIONS,
REVISED CHEVRON BACKGROUND TO ORANGE,
& REVISED TITLE BLOCK
AUG. 08, 1995 - ADDED AND DELETED VARIOUS
SIGN DETAILS
MAR., 10 1997 - REVISED SIGN DETAILS
MAY 30, 2003 - CHANGED REFLECTIVE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

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

CONSTRUCTION SIGN
DETAILS

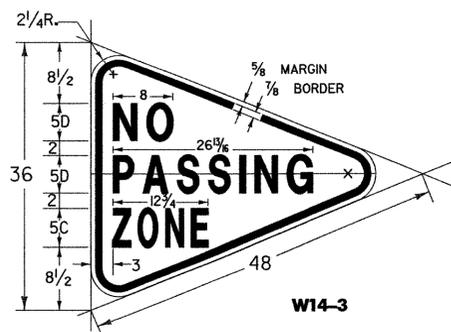


STANDARD
E-101

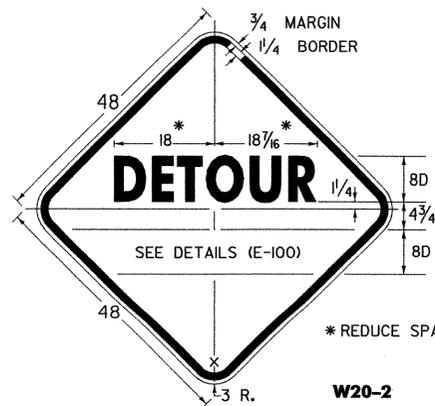


XX DENOTES ADVISORY SPEED AS SHOWN ON THE PLANS

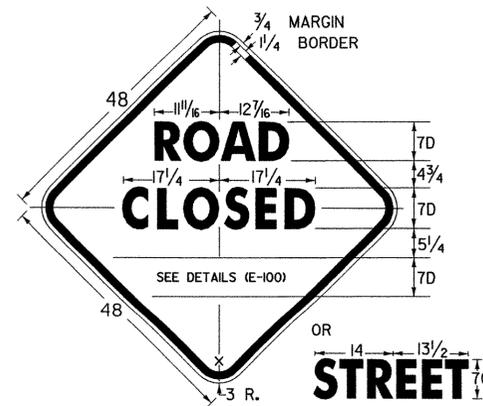
W13-1



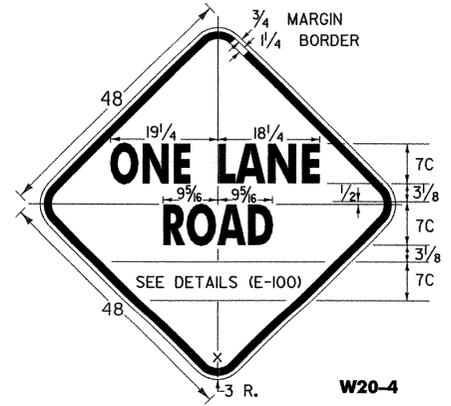
W14-3



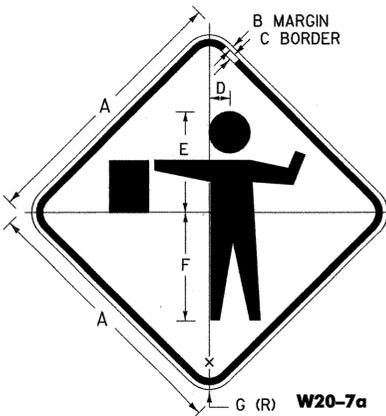
W20-2



W20-3



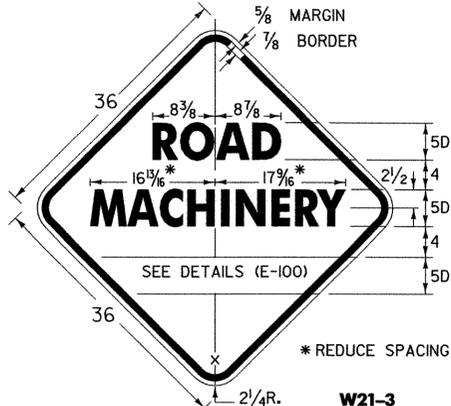
W20-4



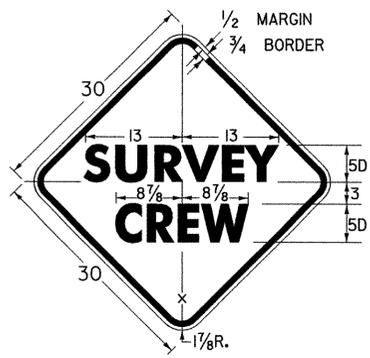
W20-7a



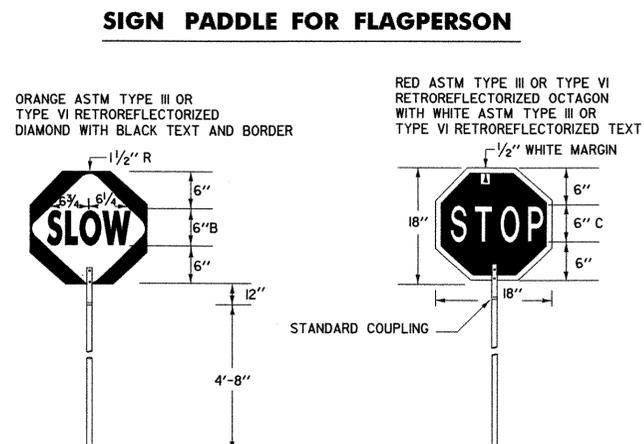
W20-7b



W21-3



W21-6



SIGN PADDLE FOR FLAGPERSON

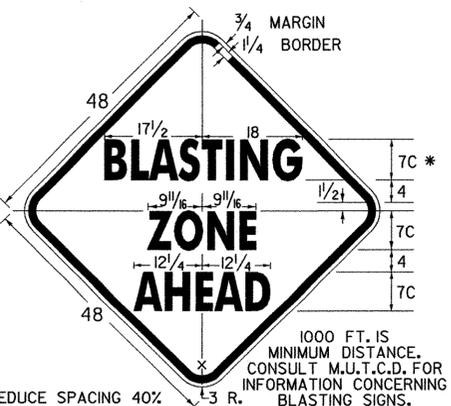
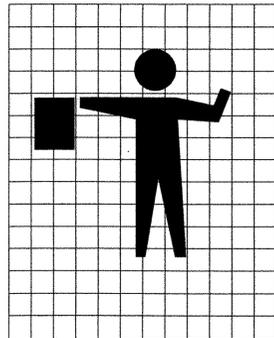
SIGN	DIMENSIONS (INCHES)						
	A	B	C	D	E	F	G
STD.	36	5/8	7/8	2 3/4	13 1/2	14 5/8	2 1/4
FWY.	48	3/4	1 1/4	3 3/4	18	19 1/2	3

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

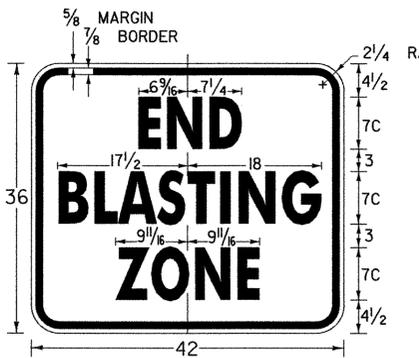
W3-4

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

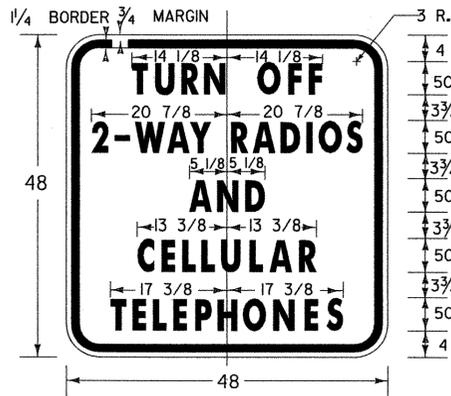
SIGN	DIMENSIONS (INCHES)											
	A	B	C	D	E	F	G	H	J	K	L	
MIN.	36	5/8	7/8	6C	3 3/8	7/8	3 3/4	16 3/8	13	13 3/8	2 1/4	
STD.	48	3/4	1 1/4	8C	4 7/8	1 1/4	5	21 7/8	17 3/8	18 1/2	3	
EXPWY.	60	3/4	1 1/4	9C	5 5/8	1 3/8	5 5/8	24 5/8	19 3/8	20 1/4	3	



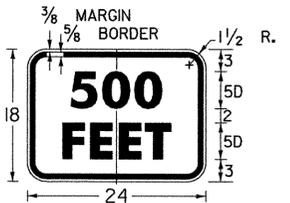
W22-1



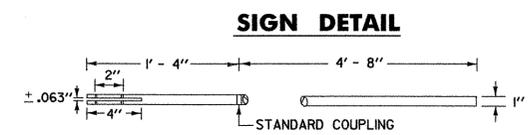
W22-3



VW22-1



W16-2a



SIGN DETAIL

STAFF DETAIL

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

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

NOTES

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

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

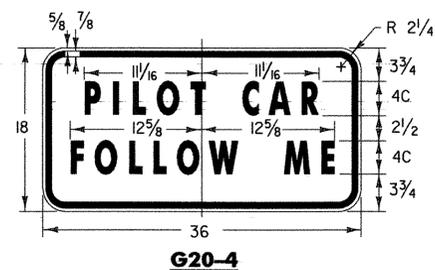
REVISIONS AND CORRECTIONS
OCT. 30, 1987 - DATE OF ORIGINAL ISSUE
JAN. 23, 1989 - DELETE MOTORCYCLE SYMBOL SIGN AND SPEED SIGN, ADDED TWO SIGNS
OCT. 21, 1992 - ADDED A SIGN, REVISED A SIGN DIMENSION & TYPE ERROR & REVISED TITLE BLOCK
AUG. 08, 1995 - ADDED FLAGGER GRID
JUNE 30, 2003 - CHANGED REFLECTIVE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

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

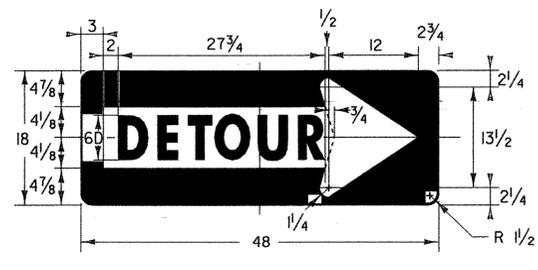
CONSTRUCTION SIGN DETAILS



STANDARD E-102



G20-4

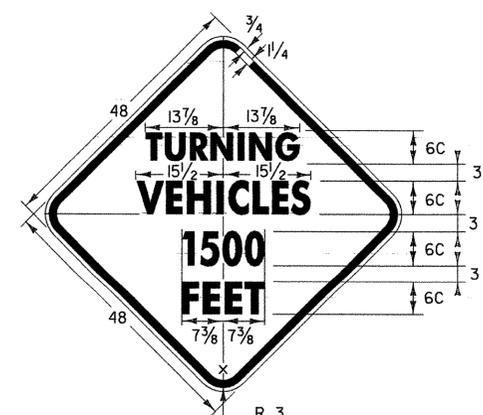


M4-10(R)

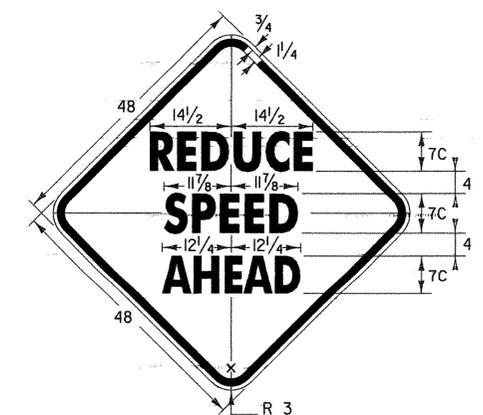


R11-2

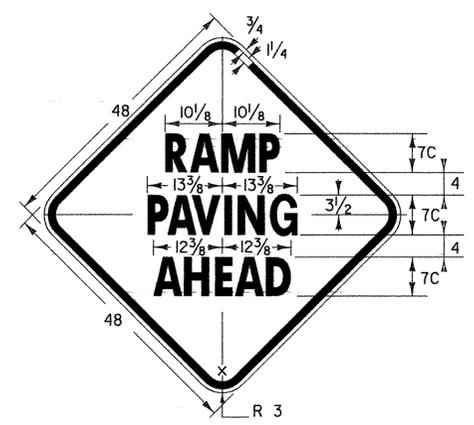
COLORS:
BLACK TEXT AND BORDER
WHITE RETROREFLECTORIZED BACKGROUND



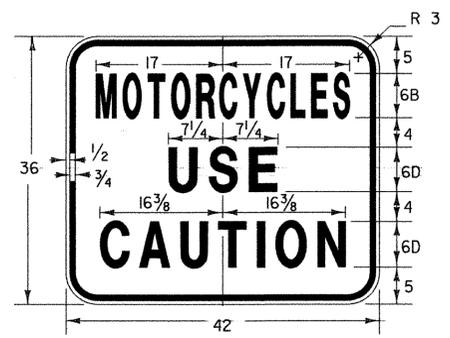
VC-001



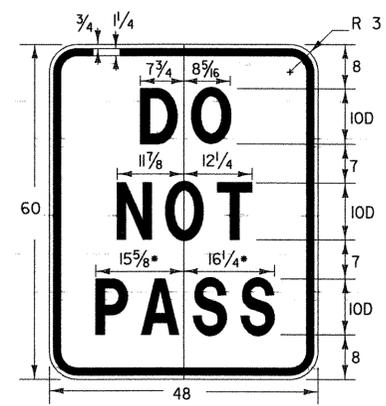
VC-002



VC-003

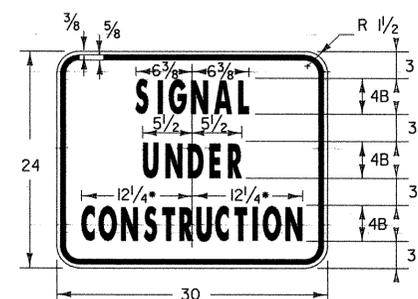


VC-004



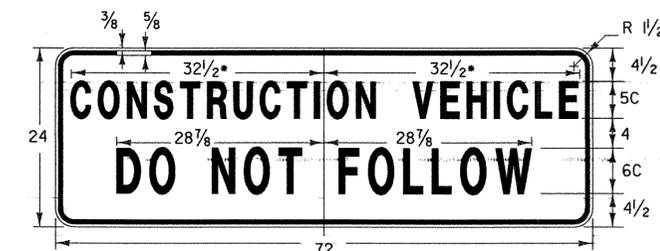
VC-005

* REDUCE SPACING BY 40%



VC-820

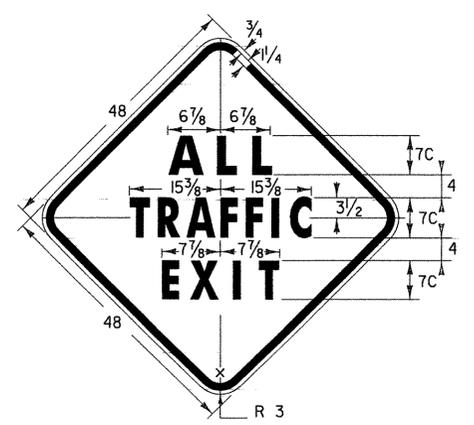
* REDUCE SPACING 25%



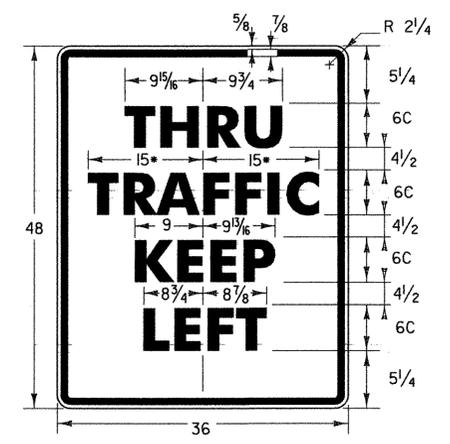
VC-007

* REDUCE SPACING 20%

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



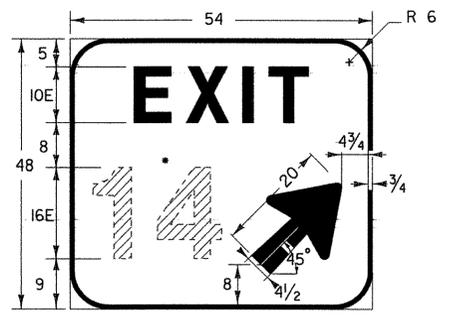
VC-008



VR-118L

* REDUCE SPACING 25 %

COLORS:
BLACK TEXT AND BORDER
WHITE (RETROREFLECTORIZED) BACKGROUND



E5-1a

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

(ALL DIMENSIONS SHOWN IN INCHES EXCEPT WHERE NOTED)

NOTES

SEE STANDARD SHEET E-100 FOR NOTES AND TEXT DETAILS

COLORS FOR SIGNS SHOWN ON THIS SHEET SHALL BE BLACK TEXT, BORDER AND SYMBOLS ON ASTM TYPE III OR TYPE VIII RETROREFLECTIVE ORANGE BACKGROUND, UNLESS OTHERWISE NOTED.

SIGN DETAILS INDICATE THE PROPER COLOR.

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

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

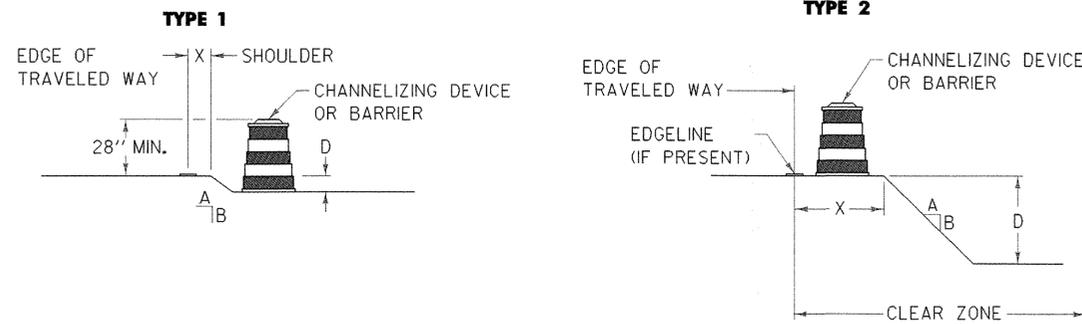
APPROVED
DIRECTOR OF PROGRAM DEVELOPMENT
TRAFFIC OPERATIONS ENGINEER
FEDERAL HIGHWAY ADMINISTRATION

CONSTRUCTION SIGN
DETAILS



STANDARD
E-102A

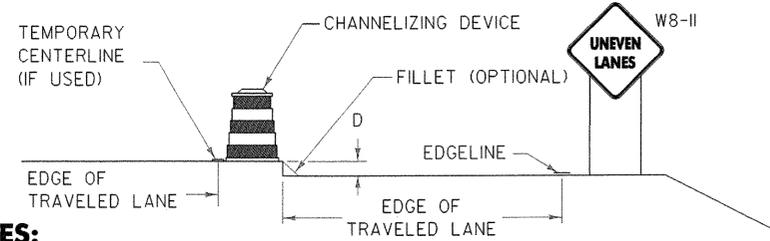
DROP-OFF ADJACENT TO TRAVELED WAY



NOTES:

- CHANNELIZING DEVICES OR BARRIER SHOULD BE PLACED TO MAXIMIZE THE WIDTH OF THE TRAVELED WAY.
- FOR SPECIFIC REQUIREMENTS USE CHART "A".
- IF THE DROP-OFF REQUIRES CHANNELIZING DEVICES TO REMAIN IN PLACE OVERNIGHT THEN "LOW SHOULDER" (W8-9) OR "SHOULDER DROP OFF" (W8-9A) SIGNS SHOULD BE INSTALLED.

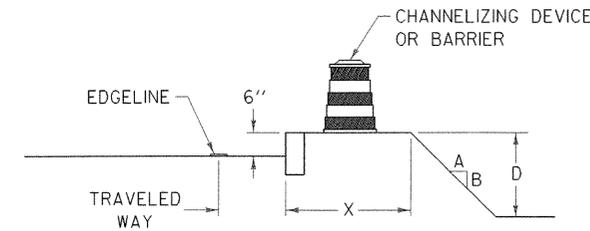
DROP-OFF BETWEEN ADJACENT TRAVELED LANE



NOTES:

- WHENEVER A LONGITUDINAL DROP-OFF BETWEEN ADJACENT TRAVELED LANES IS TO BE LEFT OVERNIGHT THEN "UNEVEN LANES" (W8-II) SIGNS AND CHANNELIZING DEVICES SHOULD BE INSTALLED.
- IF REQUIRED, THE CHANNELIZING DEVICES USED SHALL BE THOSE WHICH MAXIMIZE THE TRAVELED LANE (I.E. CONES, VERTICAL PANELS OR TUBULAR MARKERS).
- A BITUMINOUS CONCRETE FILLET WITH A 1.5:1 SLOPE MAY BE USED IN PLACE OF CHANNELIZING DEVICES, HOWEVER THE "UNEVEN LANES" (W8-II) SIGNS SHOULD BE INSTALLED REGARDLESS.
- FOR SPECIFIC REQUIREMENTS USE CHART "A".

DROP-OFF BEYOND SHOULDER OR CURB



NOTES:

- CHANNELIZING DEVICES OR BARRIER SHOULD BE PLACED TO MAXIMIZE THE WIDTH OF THE TRAVELED WAY.
- FOR SPECIFIC REQUIREMENTS USE CHART "A" OR "B" AS APPLICABLE.

CHART "A"

ALL SPEEDS WITH NO CURB

X (FEET)	DROP (D) (INCHES)	A/B SLOPE	DEVICE REQUIRED
0 TO 4'	LESS THAN 2"	ANY	NONE
	2" TO 6"	1.5:1 OR FLATTER	NONE
		STEEPER THAN 1.5:1	CHANNELIZING DEVICE
GREATER THAN 6"	3:1 OR FLATTER	3:1 OR FLATTER	NONE
		STEEPER THAN 3:1	BARRIER/CHANNELIZING DEVICE
4' TO 10'	LESS THAN 6"	ANY	NONE
	6" TO 12"	3:1 OR FLATTER	NONE
		STEEPER THAN 3:1	BARRIER/CHANNELIZING DEVICE
GREATER THAN 12"	3:1 OR FLATTER	3:1 OR FLATTER	NONE
		STEEPER THAN 3:1	BARRIER/CHANNELIZING DEVICE
10' TO CZ	LESS THAN OR EQUAL TO 12"	ANY	NONE
	GREATER THAN 12"	3:1 OR FLATTER	NONE
		STEEPER THAN 3:1	BARRIER

NOTES:

- THE MINIMUM CLEAR ZONE FOR FREEWAYS IS TO BE DETERMINED PER THE CURRENT "AMERICAN ASSOCIATION OF STATE HIGHWAY TRANSPORTATION OFFICIALS" (AASHTO) ROADSIDE DESIGN GUIDE. ALL OTHER HIGHWAYS WILL BE DETERMINED PER THE CURRENT "VERMONT STATE STANDARDS" BOOK.
- CHANNELIZING DEVICES MAY BE USED INSTEAD OF BARRIER FOR SHORT TERM (ONE-DAY) OPERATIONS.
- ON BORDERLINE CONDITIONS, THE ENGINEER SHOULD DETERMINE WHICH TREATMENT IS ADEQUATE FOR THE EXISTING CONDITIONS.

CHART "B"

40 MPH OR LESS WITH CURB

X (FEET)	DROP (D) (INCHES)	DEVICE REQUIRED
0-10'	LESS THAN OR EQUAL TO 12"	NONE
0-10'	GREATER THAN 12"	CHANNELIZING DEVICE
GREATER THAN 10'	ANY	NONE

NOTES:

- USE THIS CHART FOR DROP-OFF BEYOND SHOULDER OR CURB.
- USE THIS CHART FOR VERTICAL CURBS OF SIX INCHES OR GREATER. FOR LOWER OR MOUNTABLE CURBS USE CHART "A".
- FOR CURBED SECTIONS WITH POSTED SPEED ABOVE 40 MPH, USE CHART "A".

GENERAL NOTES:

- THESE CONDITIONS AND TREATMENTS ARE ONLY PART OF THE TRAFFIC CONTROL SYSTEM AND SHOULD BE USED IN ADDITION TO THE PROPER WORK ZONE SIGNING.
- THE FOLLOWING ARE ACCEPTABLE CHANNELIZING DEVICES:
 - A. VERTICAL PANEL
 - B. TYPE I OR TYPE II BARRICADE
 - C. PLASTIC DRUM
 - * D. CONE - WHERE APPLICABLE
 - E. TUBULAR MARKERS (MUTCD)

* IF CHANNELIZING DEVICES ARE REQUIRED TO REMAIN IN PLACE DURING NIGHTTIME HOURS, CONES SHALL BE A MINIMUM OF 36 INCHES HIGH.
- WHERE BARRIER IS CALLED FOR, EITHER CONCRETE BARRIER (JERSEY SHAPE), STEEL BEAM GUARDRAIL OR OTHER FEDERAL HIGHWAY ADMINISTRATION (FHWA) APPROVED BARRIER MAY BE USED.

BARRIER ENDS FACING ONCOMING TRAFFIC SHALL BE TAPERED BEYOND THE CLEAR ZONE OR PROTECTED WITH AN APPROVED END TREATMENT DESIGNED FOR THE POSTED SPEED LIMIT OF THE ROADWAY.
- CHANNELIZING DEVICE SPACING ALONG A LONGITUDINAL DROP-OFF (TANGENT) SHALL BE AS FOLLOWS:

TANGENT - CHANNELIZING DEVICES SHALL BE SPACED "2S" ("S" IS THE POSTED SPEED LIMIT IN FEET) APART.
- "LOW SHOULDER" (W8-9), "SHOULDER DROP OFF" (W8-9A) OR "UNEVEN LANES" (W8-II) SIGNS, WHEN USED, SHOULD BEGIN PRIOR TO THE DROP-OFF CONDITION AND SHOULD BE REPEATED EVERY 1500 FEET.
- USE CHART "A" FOR DROP OFFS CREATED BY PROJECT ACTIVITIES.

OTHER STDS. REQUIRED: E-101, E-106, E-107, E-107A

REVISIONS AND CORRECTIONS
 SEPT. 20, 1993- ORIGINAL APPROVAL DATE
 AUG. 18, 1995 - ADDED SHOULDER WARNING NOTE
 DEC. 8, 2008 - GENERAL UPDATE
 JUN. 8, 2009 - MINOR REVISIONS

APPROVED
Kevin A. Klaushie
 HIGHWAY, SAFETY & DESIGN ENGINEER
Richard Fehault
 DIRECTOR OF PROGRAM DEVELOPMENT
Mark D. Richtler
 FEDERAL HIGHWAY ADMINISTRATION

**CONSTRUCTION ZONE
 LONGITUDINAL DROP OFFS**

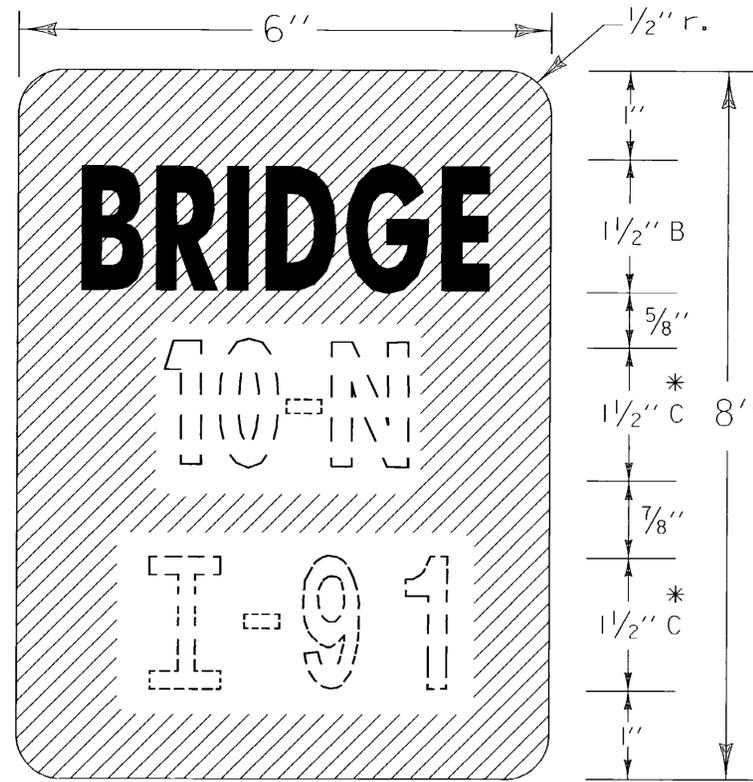
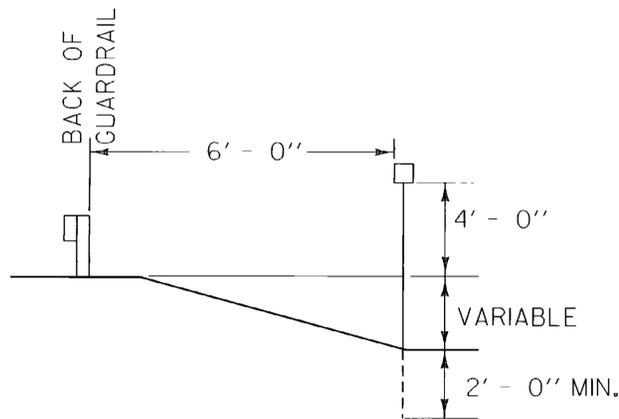
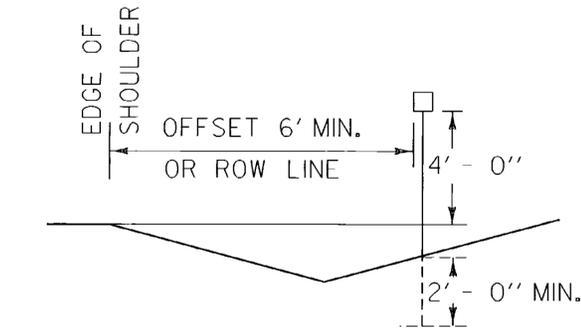


**STANDARD
 E-108**

I-91
 ← 2" →

HYPHENATED WORD DETAIL

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



VD-701

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

NOTES:

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

**OTHER STDS.
 REQUIRED:**

REVISIONS AND CORRECTIONS

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

APPROVED

Gordon J. MacArthur
 DIRECTOR OF ENGINEERING

David A. Ross
 TRAFFIC AND SAFETY ENGINEER

BRIDGE NUMBER PLAQUE

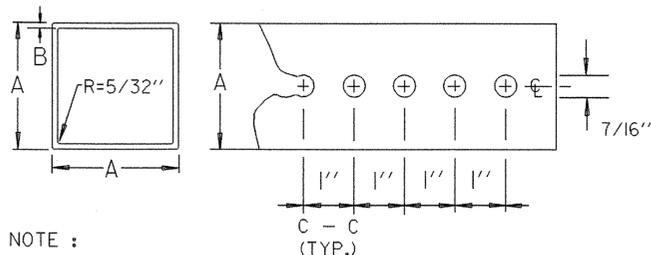


**STANDARD
 E-134**

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

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

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



NOTE :

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

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

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

DIMENSION DETAILS AND POST SELECTION CHART

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

DESIGN CRITERIA:

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

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

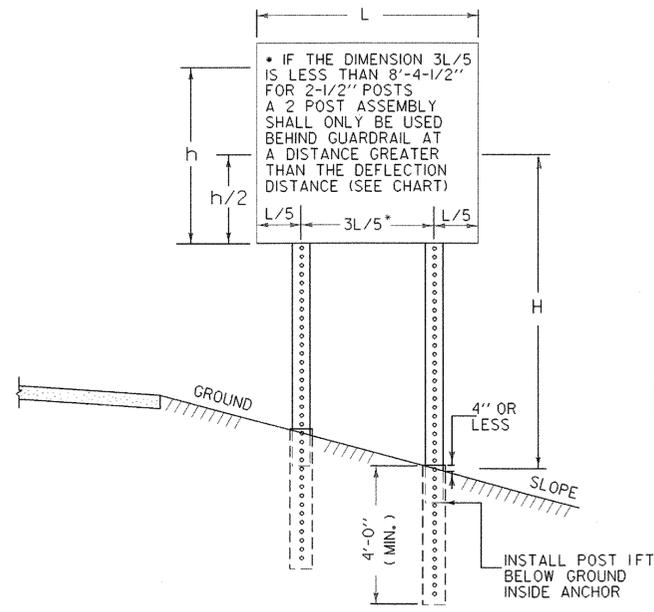
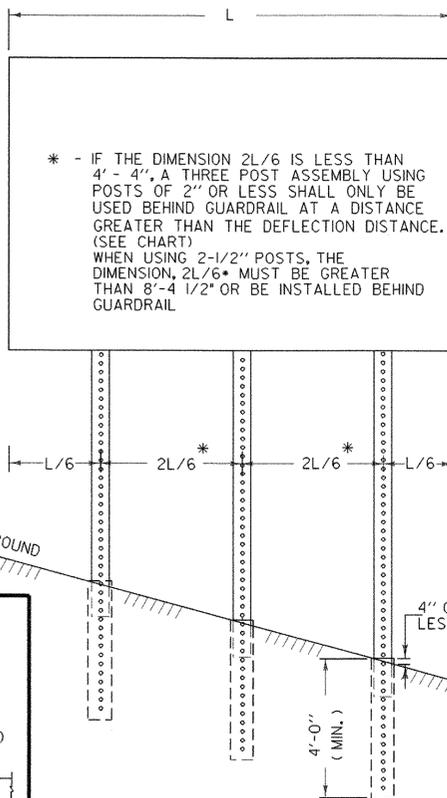
APPROVED

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

SQUARE STEEL SIGN POST

/traf/english/std/e164.dgn

MULTI-POST INSTALLATIONS



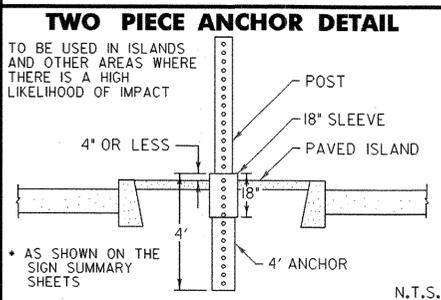
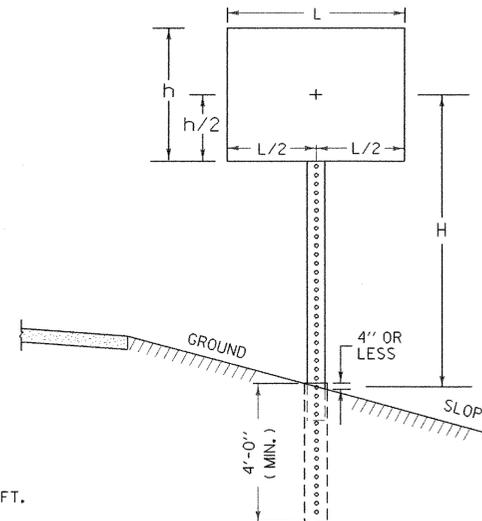
POST SPACING DETAILS

GENERAL NOTES

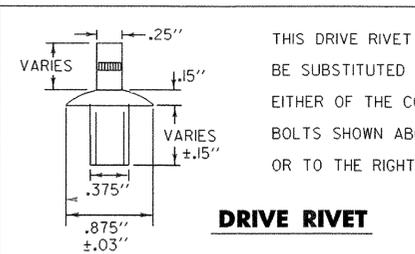
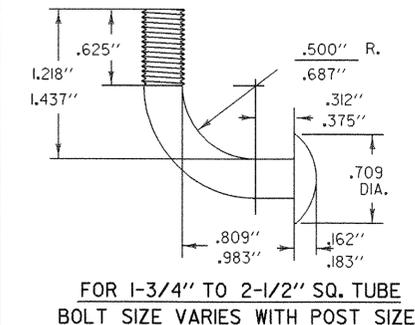
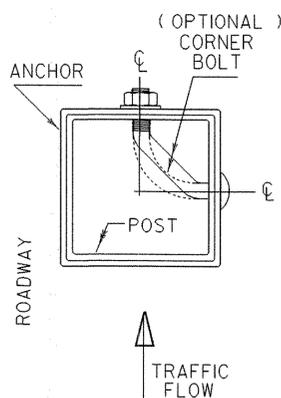
CONSTRUCTION METHODS - POSTS MAY BE DRIVEN OR SET IN A DUG HOLE AND BACKFILLED. IF DRIVEN, A DRIVING CAP SHALL BE USED. THE DUG HOLE INSTALLATION SHALL BE USED IN AREAS OF POOR SOIL CONDITIONS OR AS DIRECTED BY THE RESIDENT ENGINEER. BACKFILL SHALL BE COMPACTED AS DIRECTED BY THE RESIDENT ENGINEER.

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

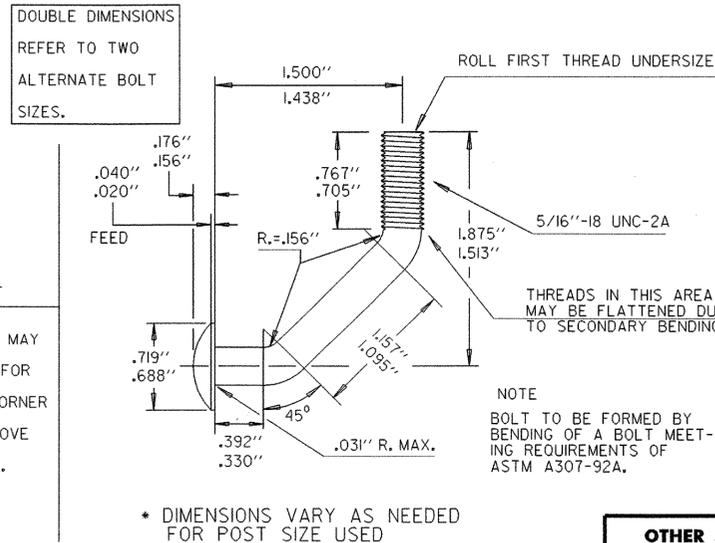
SINGLE POST INSTALLATIONS SHALL BE LIMITED TO A SIGN AREA OF 20 SQ. FT. OR LESS



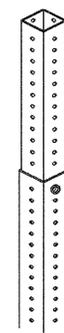
TOP VIEW OF ANCHOR, POST AND BOLT



OPTIONAL CORNER BOLT DETAILS



CONNECTION DETAIL

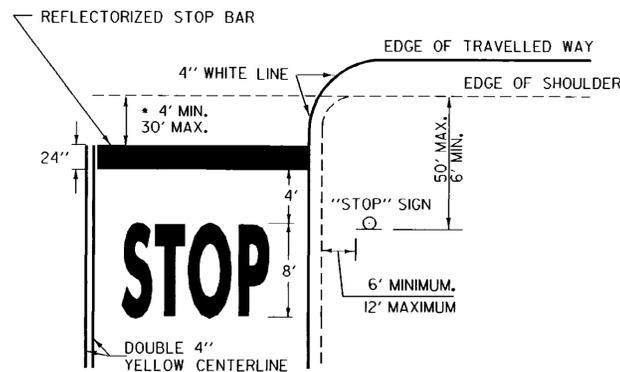


(SEE DETAIL LEFT FOR BOLT PLACEMENT)

OTHER STDS. E-120, E-160
REQUIRED

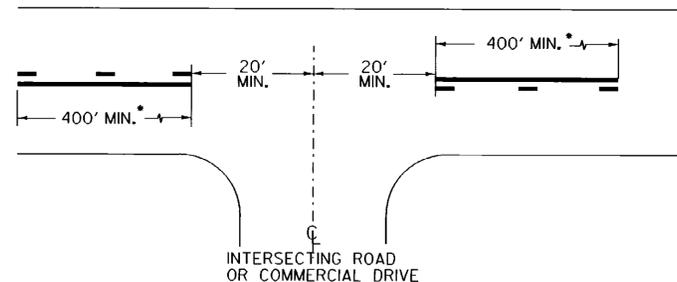


STANDARD E-164



* 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

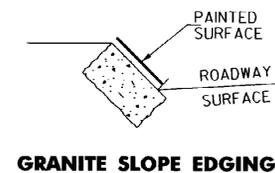


* THE SOLID LINE SHALL BE PAIRED WITH EITHER A SOLID OR DASHED LINE DEPENDING ON SIGHT DISTANCE AVAILABILITY IN THE OPPOSING DIRECTION. ADJUSTMENTS TO THE 40 FOOT CENTERLINE OPENING MAY BE MADE TO ACCOMMODATE SKEWED INTERSECTIONS.

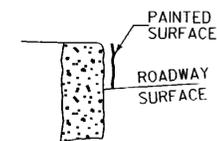
CENTERLINE BREAKS:

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

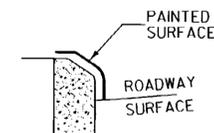
CENTERLINE LAYOUT



GRANITE SLOPE EDGING



VERTICAL GRANITE CURB

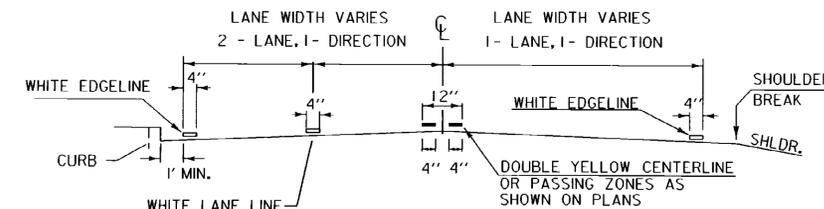


TYPE A (CONCRETE)

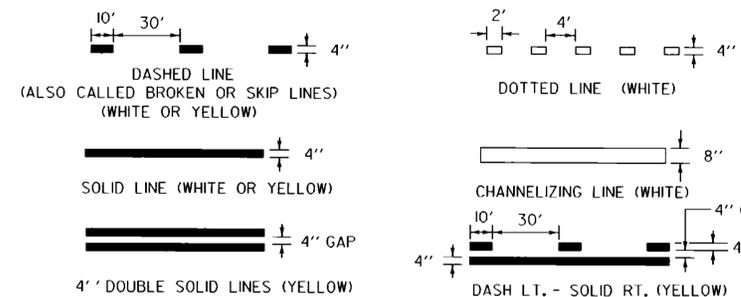


TYPE B (CONCRETE)

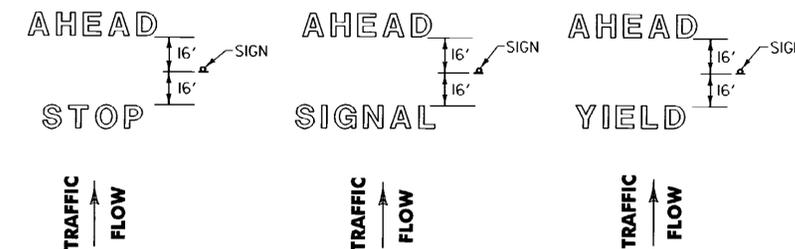
PAINTED CURB



PAVEMENT MARKING PLACEMENT DETAIL

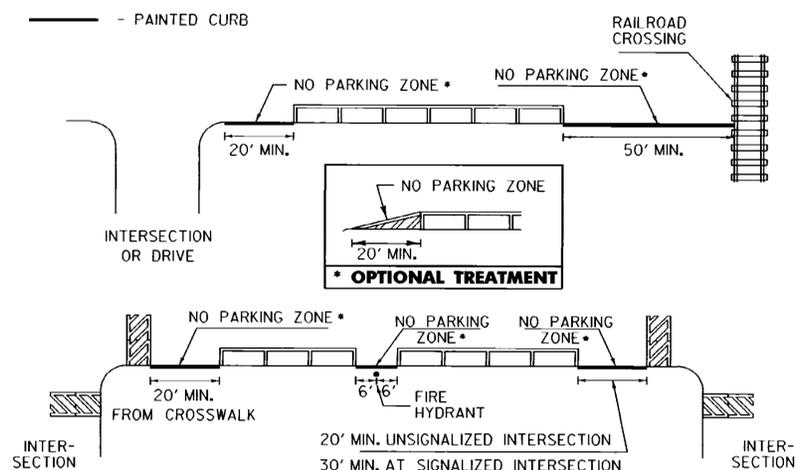


PAVEMENT MARKING LINE DETAILS

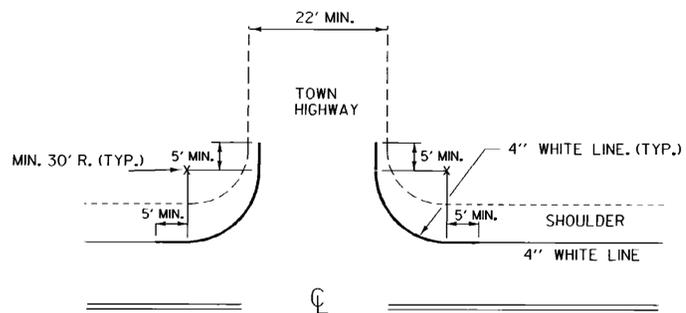


LETTER IN WORD MARKING SPACING DETAIL

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



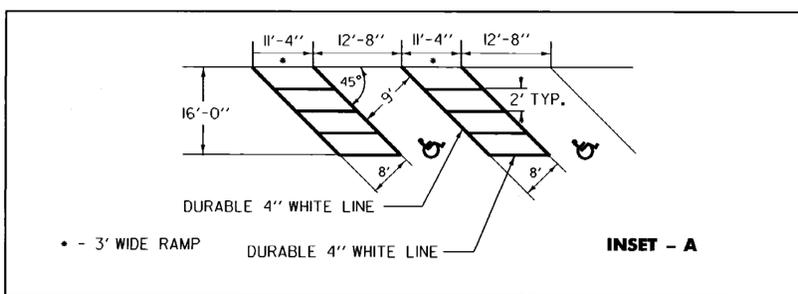
NO PARKING LAYOUT DETAILS



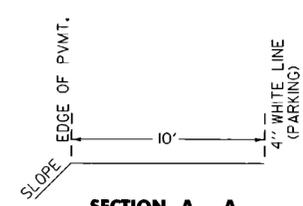
EDGE LINE LAYOUTS

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.

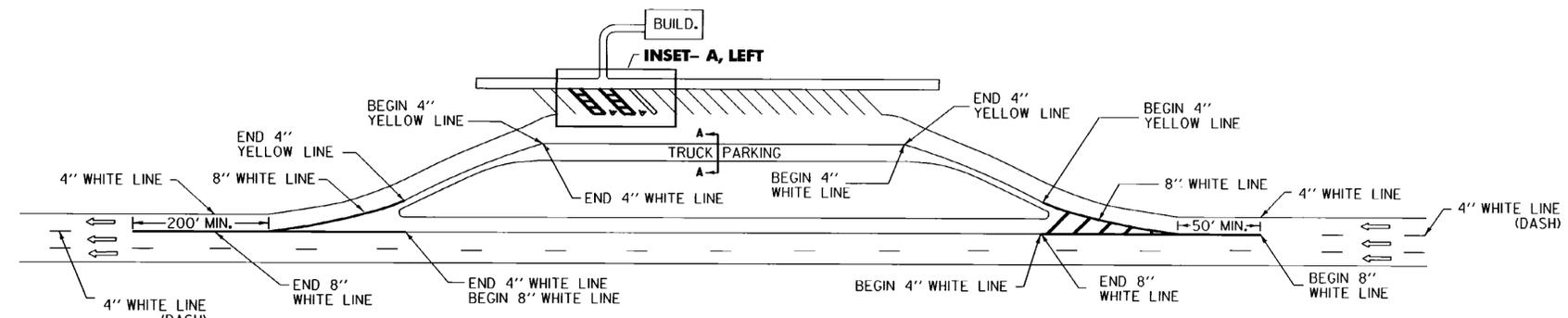
APPLY EDGE LINE AS DETAILED ON ALL PAVED CLASS 1 & CLASS 2 TOWN HIGHWAYS AND ANY CLASS 3 TOWN HIGHWAY 22 FEET OR MORE IN WIDTH. IF MIN. 30 FOOT RADIUS CANNOT BE OBTAINED, OR THE TOWN HIGHWAY IS NOT PAVED, BREAK THE EDGE LINE USING AN 80 FOOT GAP AT INTERSECTION.



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

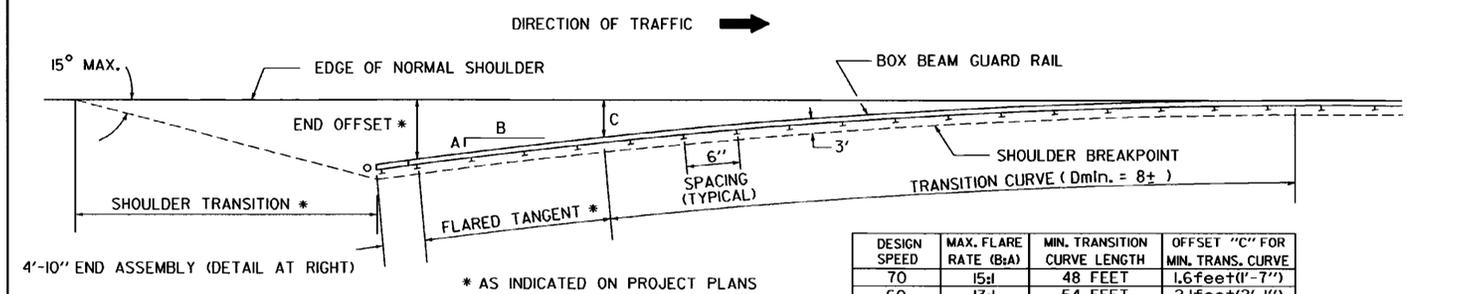
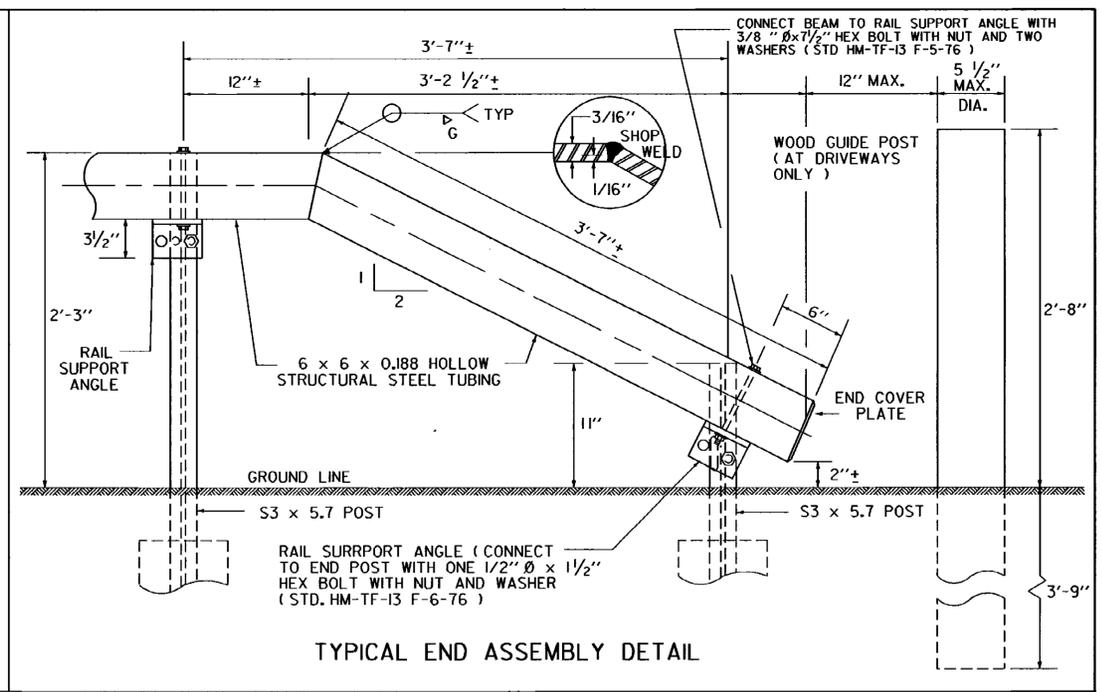
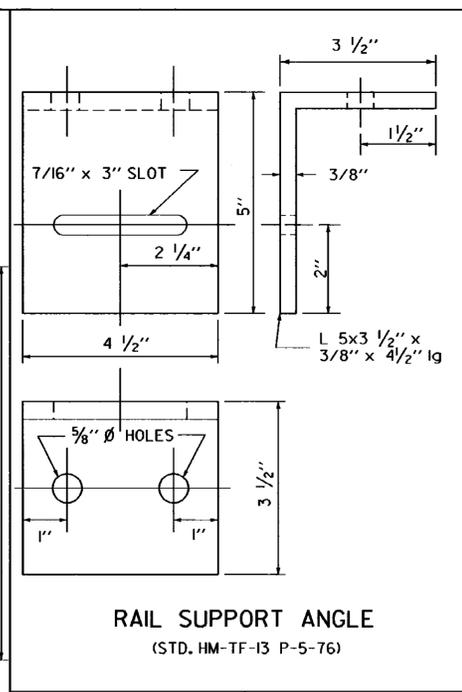
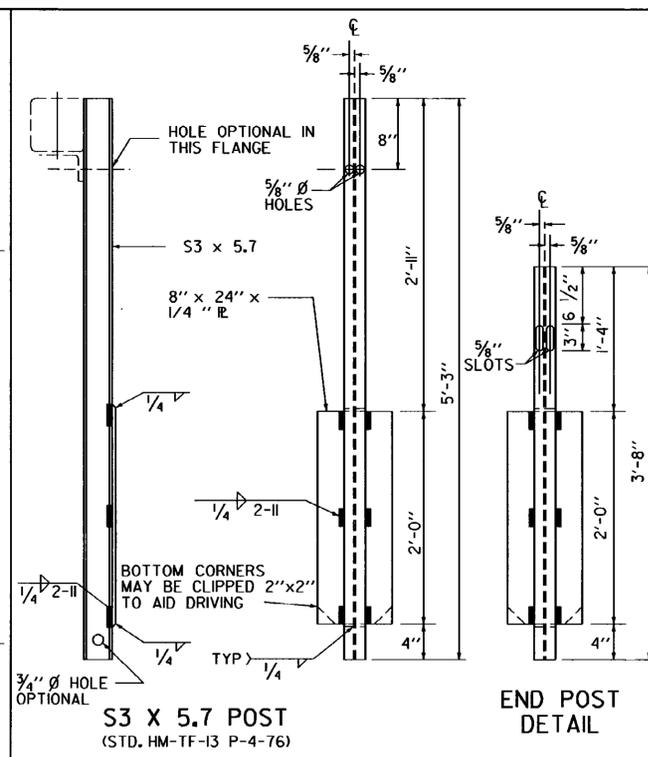
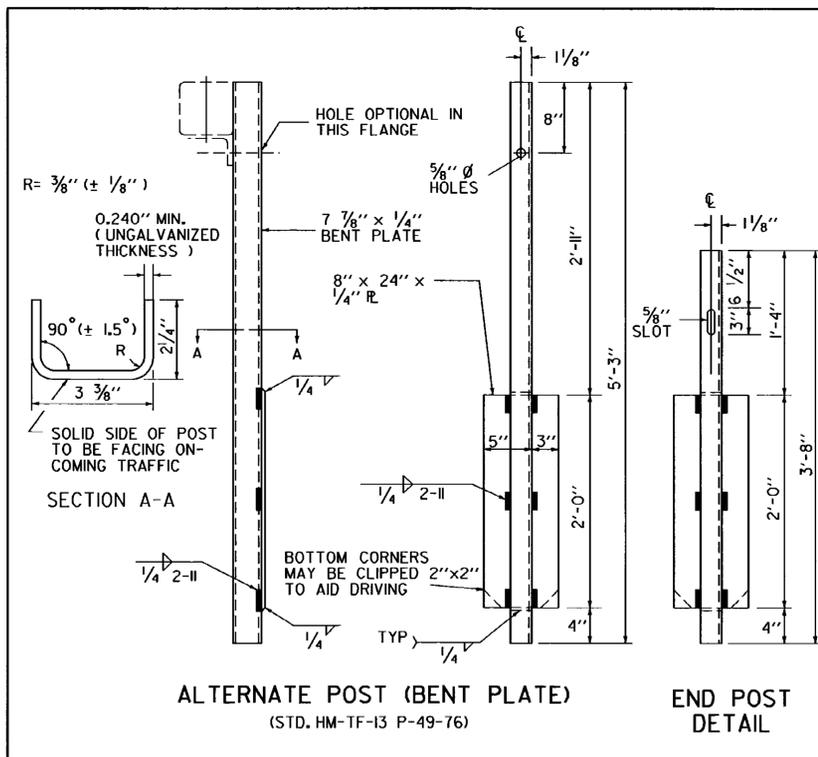
APPROVED
Stephen S. McCall
DIRECTOR OF ENGINEERING
Daniel A. Ross
TRAFFIC AND SAFETY ENGINEER

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

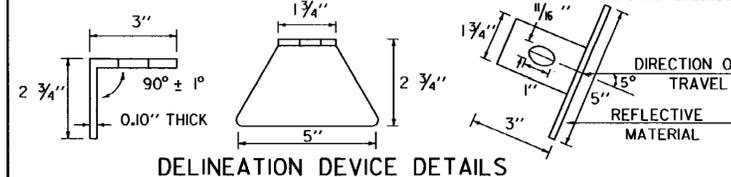
PAVEMENT MARKING DETAILS



STANDARD E-193

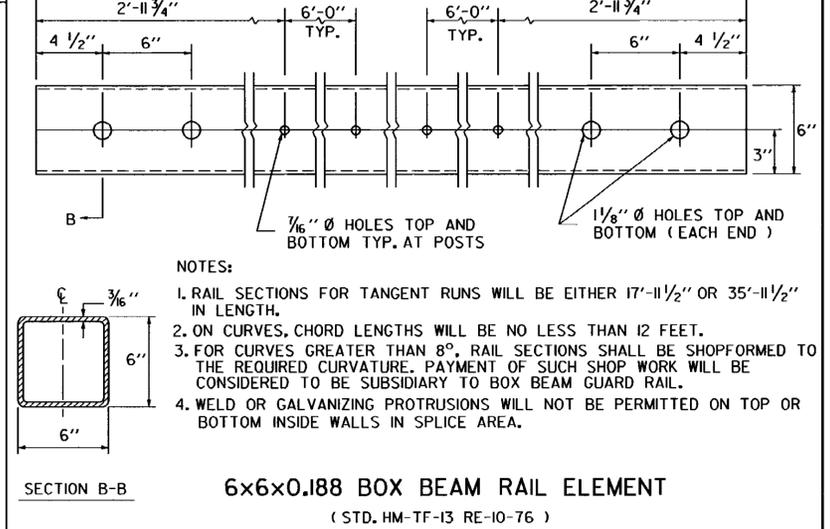
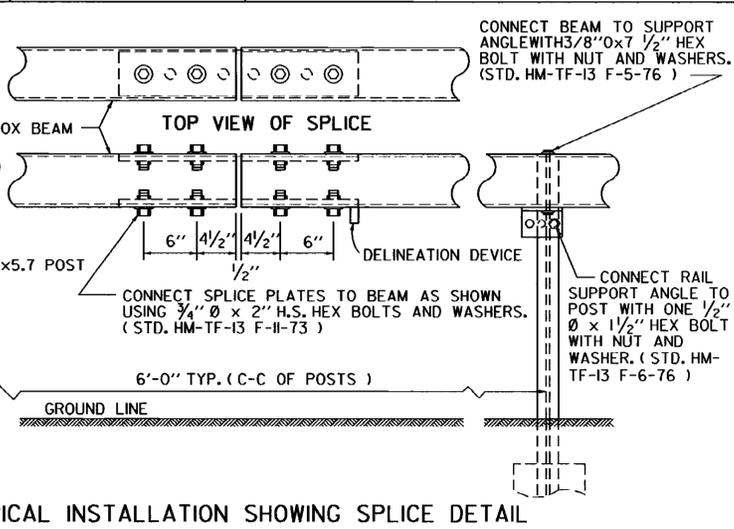
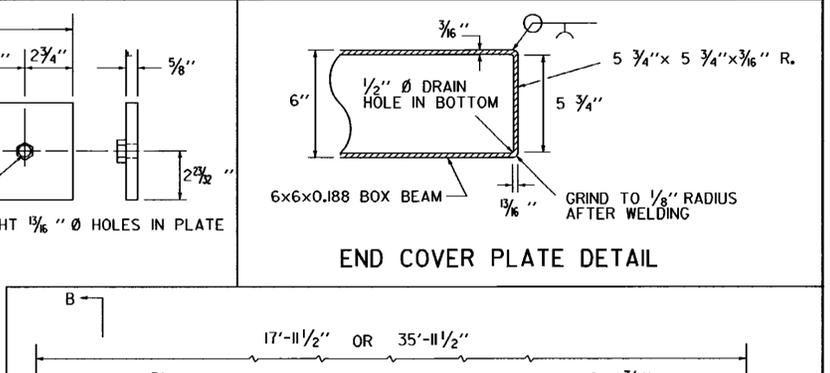
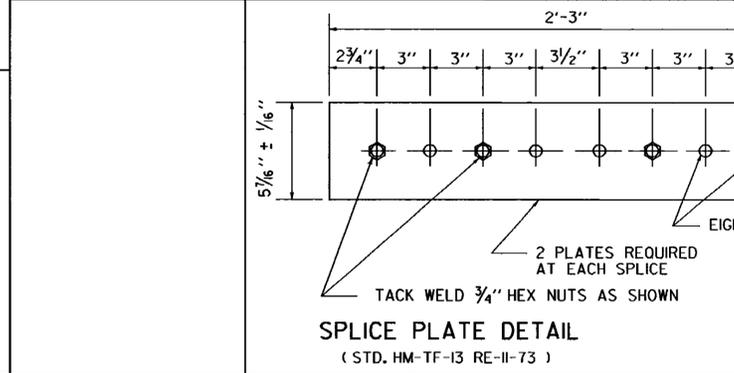


- GENERAL NOTES**
1. THE DESIRED APPROACH END OFFSET SHOULD BE AT LEAST 8' FROM THE EDGE OF NORMAL SHOULDER WHERE SPACE PERMITS; IN SPECIAL CASES, THE END OFFSET MAY BE REDUCED. IN NO CASE, HOWEVER, WILL THE END OFFSET BE LESS THAN 4'.
 2. POST SPACING WILL BE 6'-0" C-C, EXCEPT IN THE VICINITY OF THE JUNCTION OF BOX BEAM GUARD RAIL AND BRIDGE RAILING, AND AT OTHER LOCATIONS INDICATED ON THE PLANS. AT BRIDGE APPROACHES, THE 50' SECTION ADJACENT TO THE BRIDGE RAILING WILL HAVE A POST SPACING OF 4'-0" C-C.
 3. FOR MATERIAL REQUIREMENTS AND CONSTRUCTION DETAILS SEE SPECIFICATIONS FOR BOX BEAM GUARD RAIL.
 4. RAIL ALIGNMENT TO BE STRAIGHT AT SPLICES. NO LATERAL BENDS PERMITTED WITHIN THE SPLICE. THIS DOES NOT PRECLUDE THE SHOP FABRICATION OF BENT SPLICES.
 5. THE LINE OF BOX BEAM GUARD RAIL WHEN COMPLETED SHALL PRESENT A SMOOTH AND PLEASING GRADE LINE IN BOTH HORIZONTAL AND VERTICAL PLANES.
 6. ALL POSTS IN A GIVEN RUN TO BE OF THE SAME TYPE.



THIS REFLECTORIZED ALUMINUM DELINEATION DEVICE IS TO BE ERRECTED EVERY 36 FEET, AT SPLICES. DELINEATOR SHALL MEET SPECIFICATION REQUIREMENTS FOR ASTM B209 ALLOY 5052-H32.

REFLECTIVE MATERIAL SHALL MEET THE REQUIREMENTS OF SUBSECTION 750.09 AND SHALL BE OF ENCAPSULATED LENS SILVER OR AMBER. AMBER IS TO BE INSTALLED ON THE LEFT OR MEDIUM SIDE OF INTERSTATE ROADWAYS OR RAMPS.



- REVISIONS AND CORRECTIONS**
- OCT. 17, 1979- ORIGINAL APPROVAL DATE
 - JULY 23, 1980- CHANGED DIAMETER OF GUIDE POST
 - DEC. 16, 1980- INCREASED SHOULDER WIDENING FOR GUARD RAIL
 - JUNE 17, 1984- DELINEATOR DEVICE ADDED
 - DEC. 21, 1984- HEIGHT OF RAIL LOWERED FROM 2'-6" TO 2'-3"
 - OCT. 31, 1985- REVISED TO CONFORM TO 1986 SPECIFICATIONS
 - JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.

APPROVED

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

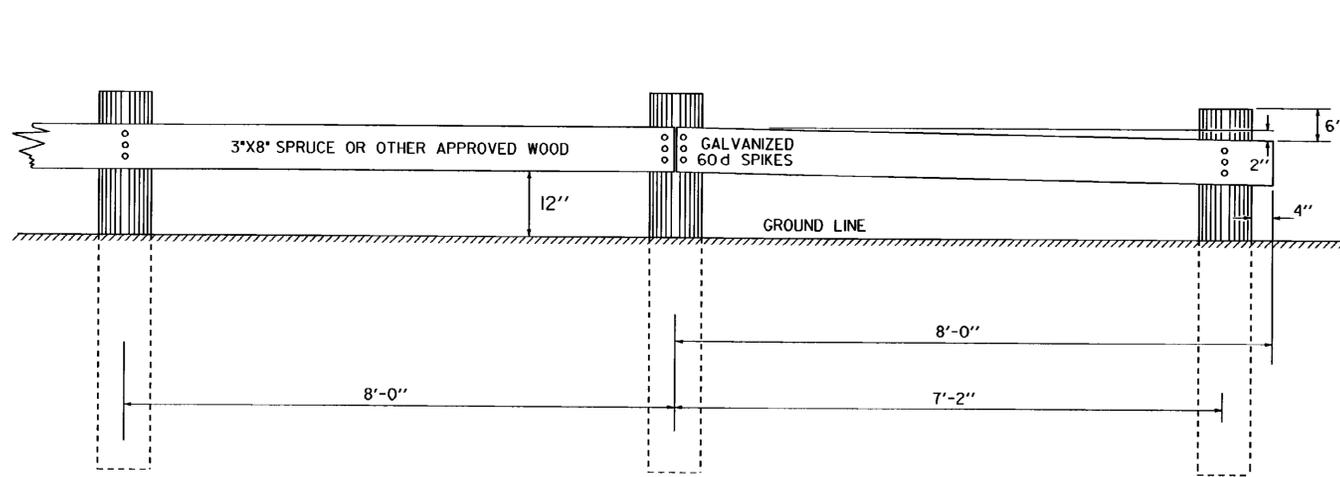
Stephen D. MacArthur, P.E.
DIRECTOR OF ENGINEERING

John M. Murphy, P.E.
DESIGN ENGINEER

BOX BEAM GUARD RAIL

VERMONT AGENCY OF TRANSPORTATION

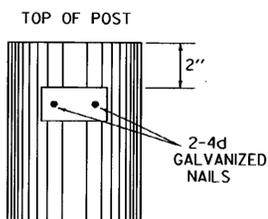
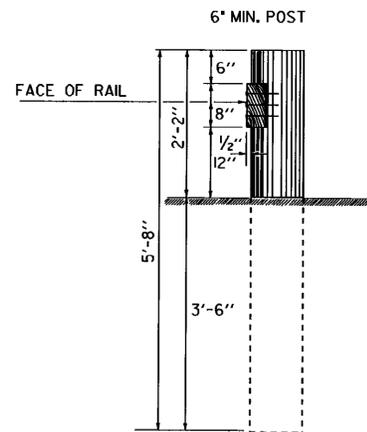
STANDARD G-1b



PLANK SIXTEEN FEET IN LENGTH TO BE USED WHEREVER POSSIBLE. POSTS SIX (6) INCHES SQUARE MAY BE USED IN PLACE OF ROUND POSTS. FIRST AND LAST POSTS OF EACH SECTION TO BE SET BACK TWELVE INCHES FROM THE GENERAL LINE OF POSTS, WHEN FOUR OR MORE POSTS ARE REQUIRED. REFLECTIVE MATERIAL TO BE PLACED AS DIRECTED BY THE ENGINEER. ALL WOOD MEMBERS SHALL BE GIVEN A PRESERVATIVE TREATMENT.

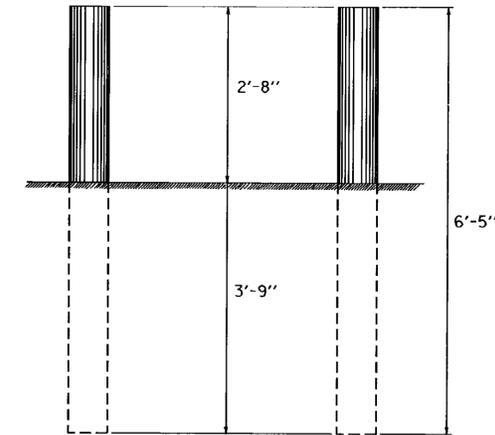
PLANK RAIL
TO BE USED AS A BARRICADE OFF THE HIGHWAY

NOTCH TO BE TREATED WITH PRESERVATIVE BEFORE ERECTING PLANK.



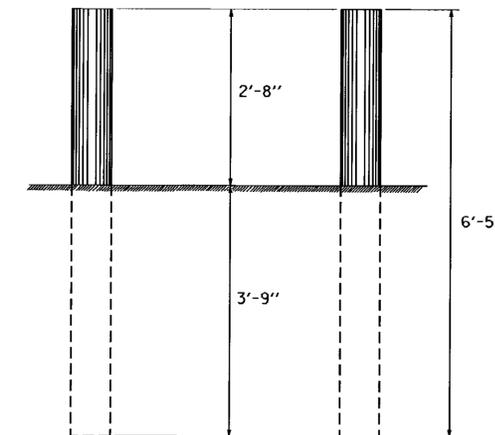
3" x 1 1/2" REFLECTIVE ALUMINUM STRIP TO BE PLACED ON EVERY OTHER WOOD POST IN A LINE OF POSTS AND CLEARLY VISIBLE TO APPROACHING TRAFFIC. STRIPS TO BE ATTACHED TO THE DESIGNATED RAIL POSTS ON BOTH SIDES OF THE ROAD AND VISIBLE TO TRAFFIC IN BOTH DIRECTIONS. REFLECTIVE MATERIAL SHALL MEET THE REQUIREMENTS OF SUBSECTION 750.09 AND SHALL BE OF ENCAPSULATED LENS SILVER OR AMBER.

DELINEATION OF WOOD RAIL AND GUIDE POSTS



MARKER POSTS ARE TO BE 4" TO 5 1/2" IN DIAMETER AND ARE TO BE PLACED AS DIRECTED BY THE ENGINEER. POSTS SHALL BE GIVEN A PRESERVATIVE TREATMENT.

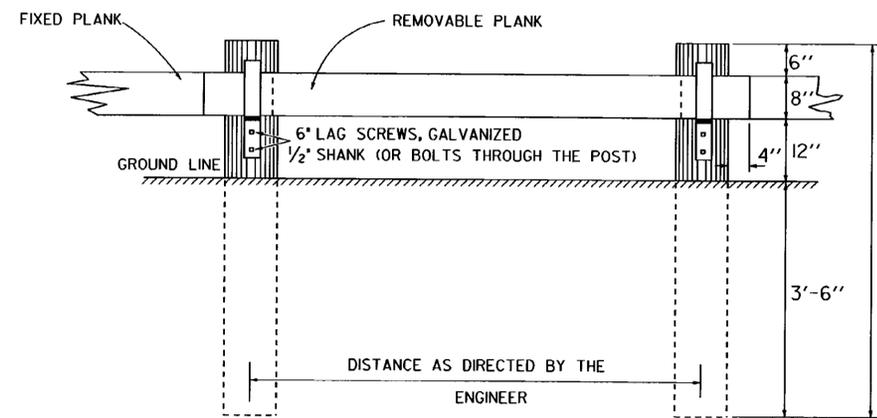
WOOD MARKER POSTS



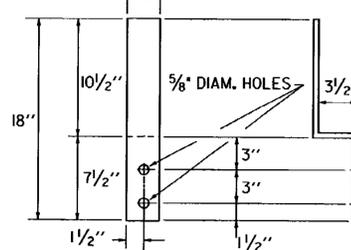
REFLECTIVE MATERIAL TO BE PLACED AS DIRECTED BY THE ENGINEER.

POSTS ARE TO BE 4" TO 5 1/2" IN DIAMETER AND ARE TO BE PLACED AS DIRECTED BY THE ENGINEER. POSTS SHALL BE GIVEN A PRESERVATIVE TREATMENT.

WOOD GUIDE POSTS

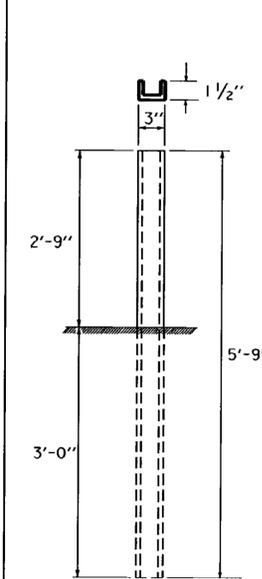
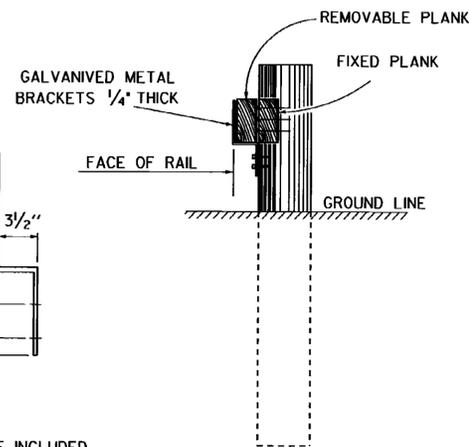


ENTRANCE THROUGH PLANK RAIL



BRACKET DETAIL

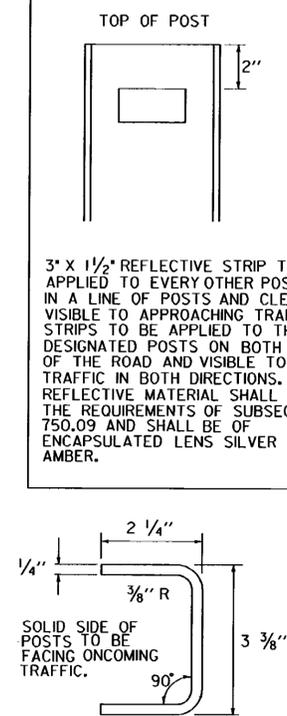
GALVANIZED METAL BRACKETS ARE TO BE INCLUDED IN THE UNIT BID PRICE FOR PLANK RAIL.



ALL STEEL MARKER POSTS TO BE GALVANIZED. STEEL MARKER POSTS TO BE PLACED AS DIRECTED BY THE ENGINEER.

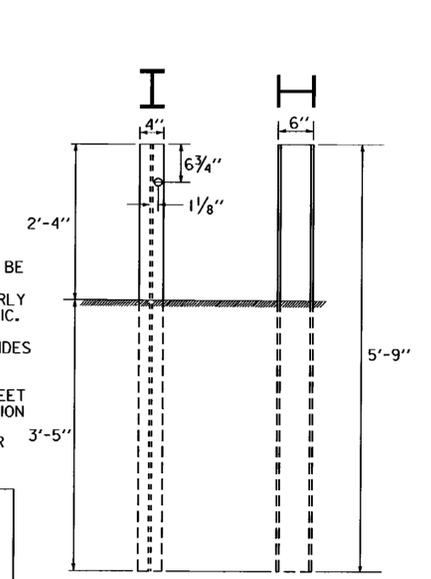
POSTS ARE TO BE AMERICAN STANDARD CHANNEL 5'-9" X 3". (4.1 LBS. PER FT.)

STEEL MARKER POSTS



SOLID SIDE OF POSTS TO BE FACING ONCOMING TRAFFIC.

ALTERNATE POST



ALL STEEL GUIDE POSTS TO BE GALVANIZED. REFLECTIVE MATERIAL TO BE PLACED AS DIRECTED BY THE ENGINEER. POSTS ARE TO BE 5'-9" X 6" X 4" (8.5 LBS. PER FT.).

ALL POSTS IN A GIVEN RUN OF BARRIER TO BE UNIFORM.

STEEL GUIDE POSTS

REVISIONS AND CORRECTIONS
 DEC. 8, 1971 - ORIGINAL APPROVAL DATE
 MAY 23, 1974 - ALTERNATE POST ADDED
 MAY 29, 1979 - NOTE ON REFLECTIVE MATERIAL CHANGED
 JULY 23, 1980 - CHANGED DIAMETER OF WOOD MARKER POST & WOOD GUIDE POST
 MAY 25, 1982 - REMOVED ALTERNATE POST DETAIL
 OCT. 31, 1985 - REVISED TO CONFORM TO 1986 SPECIFICATIONS
 JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.

APPROVED

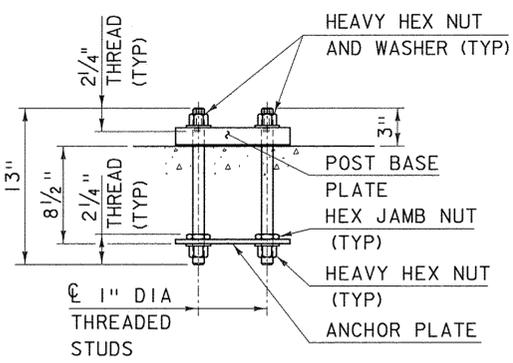
APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION. FHWA FINAL APPROVAL PENDING.

Stephen J. MacArthur, P.E.
 DIRECTOR OF ENGINEERING
Michael J. Murphy, P.E.
 DESIGN ENGINEER

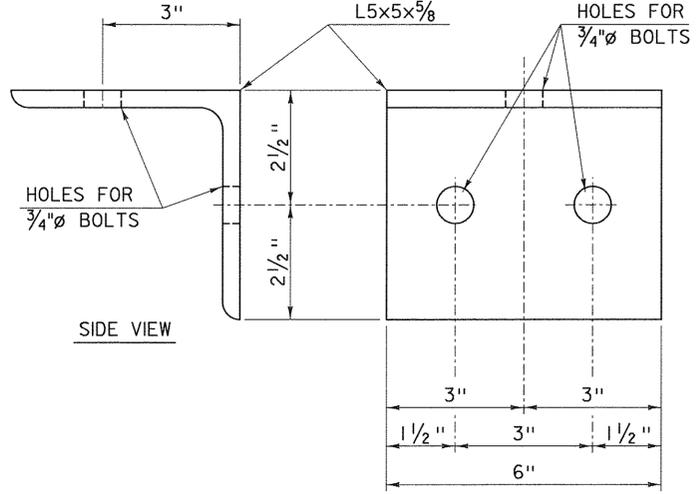
PLANK RAIL
 GUIDE POSTS
 WOOD MARKER POSTS
 STEEL MARKER POSTS



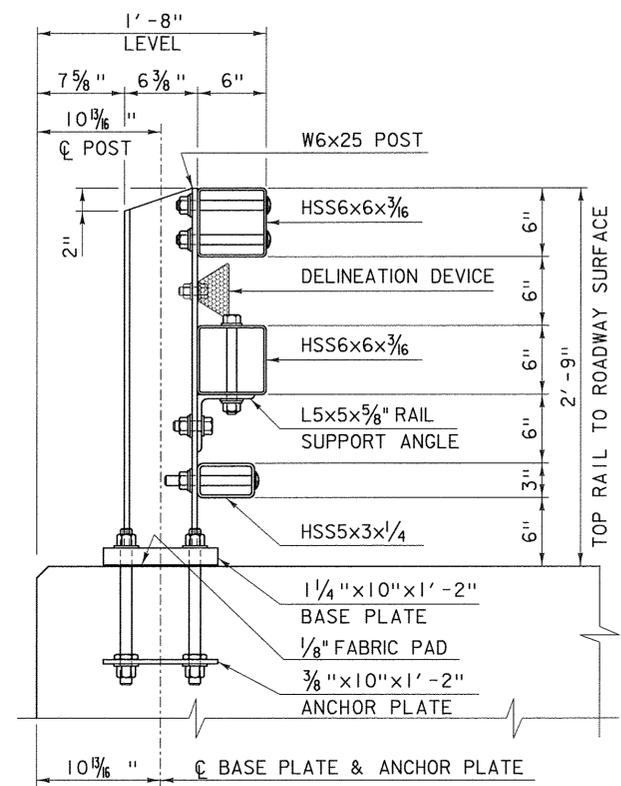
STANDARD
 G-4



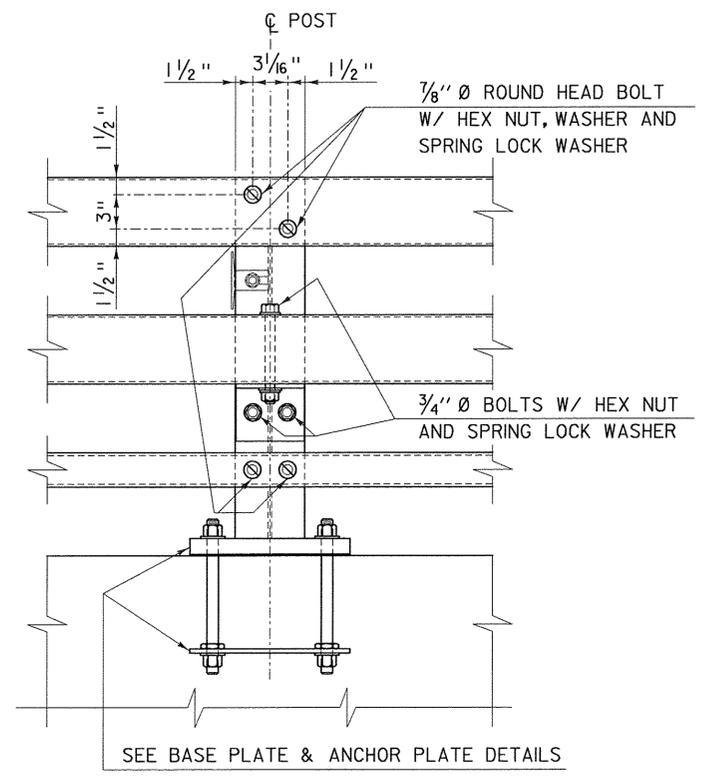
RAILING POST ANCHORAGE



ELEVATION VIEW
RAILING ANGLE DETAILS

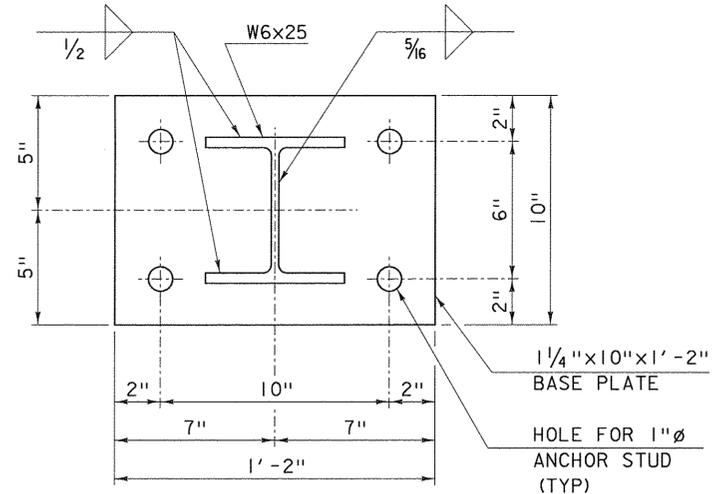


RAILING SECTION

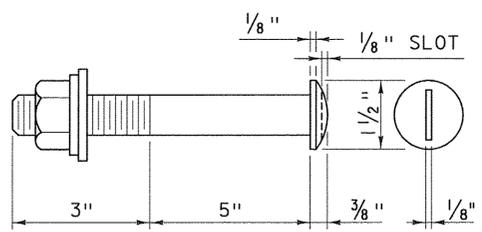


RAILING ELEVATION

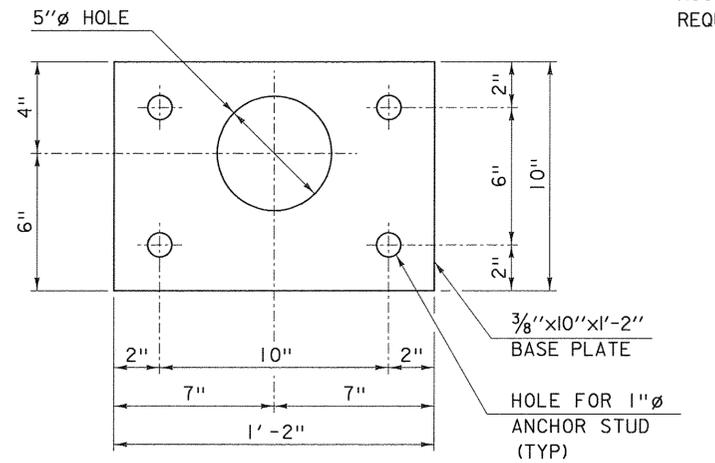
- NOTES:
1. ALL WORK AND MATERIALS SHALL CONFORM TO SECTION 525.
 2. PRIOR TO GALVANIZING THE ASSEMBLED POST, GRIND ALL EDGES TO A MINIMUM RADIUS OF 1/16".
 3. ALL POSTS SHALL BE SET NORMAL TO GRADE. THE MAXIMUM CENTER TO CENTER SPACING OF BRIDGE RAIL POSTS IS 8'-3".
 4. SECTIONS OF RAIL TUBE SHALL BE ATTACHED TO A MINIMUM OF TWO BRIDGE POSTS AND PREFERABLY TO AT LEAST 4 POSTS.
 5. RAIL TUBE EXPANSION JOINTS SHALL BE PROVIDED IN ANY RAIL BAY SPANNING THE END OF AN INTEGRAL ABUTMENT BRIDGE AND AT ALL SUPERSTRUCTURE EXPANSION JOINTS. EXPANSION JOINT WIDTH SHALL BE 4" @ 68°F AND WILL BE ADJUSTED IN THE FIELD BY THE ENGINEER FOR OTHER TEMPERATURES.
 6. HOLES IN RAILS FOR TUBE ATTACHMENT MAY BE FIELD-DRILLED. HOLES SHALL BE COATED WITH AN APPROVED ZINC-RICH PAINT PRIOR TO INSTALLATION.
 7. BOLTS SHALL BE TORQUED SNUG TIGHT (APPROXIMATELY 100 FT-LB).
 8. SEE STANDARD DRAWING G-1B 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. FOR ONE WAY BRIDGES, YELLOW IS TO BE INSTALLED ON THE DRIVER'S LEFT. PAYMENT SHALL BE INCIDENTAL TO OTHER ITEMS.
 9. ANY BENDING OF RAIL SHALL BE DONE AT THE FABRICATION PLANT ACCORDING TO A PROCEDURE PROVIDED BY THE FABRICATOR.
 10. THE MINIMUM DISTANCE FROM THE POST TO AN EXPANSION JOINT SHALL BE DETERMINED BY THE MINIMUM EDGE DISTANCE OF 5" FROM ANY ANCHOR STUD TO THE END OF THE SLAB, OR TO THE EXPANSION JOINT RECESS POUR, IF ONE IS USED.
 11. THIS RAILING MEETS THE REQUIREMENTS FOR A TL-4 SERVICE LEVEL.



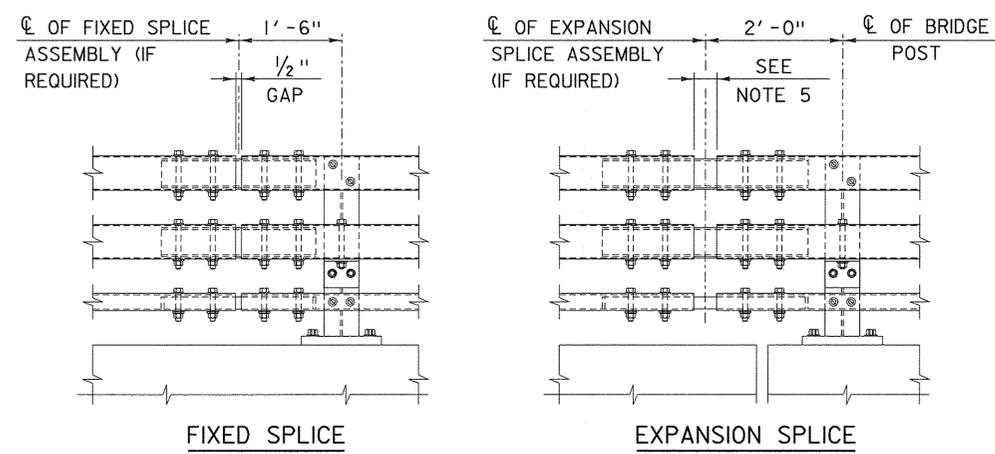
BASE PLATE DETAIL



ROUND HEAD BOLT DETAIL
A449 (TYPE 1)



ANCHOR PLATE DETAIL



RAILING SPLICE DETAIL ELEVATION

A RAILING EXPANSION SPLICE IS REQUIRED IN ANY POST SPACING THAT CONTAINS A SUPERSTRUCTURE EXPANSION JOINT

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

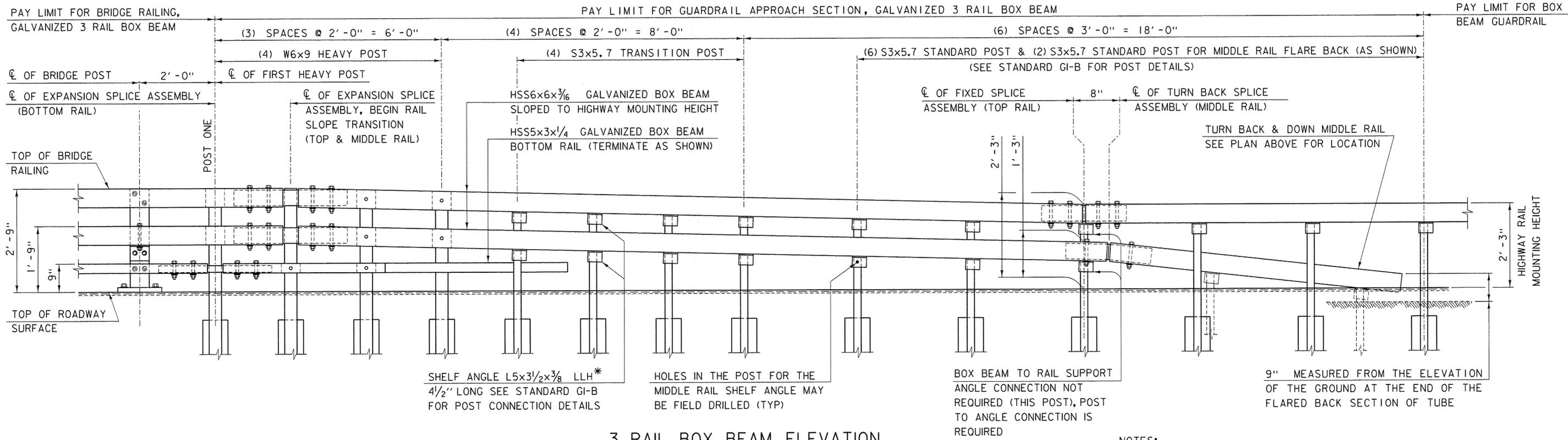
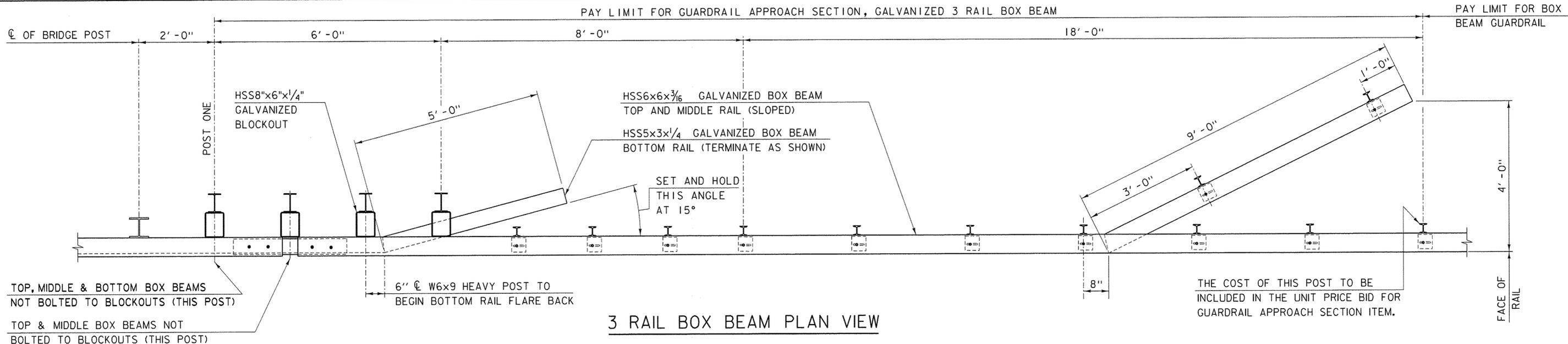
APPROVED
Wm. Michael Hedger
STRUCTURES PROGRAM MANAGER
Richard F. Schaub
DIRECTOR OF PROGRAM DEVELOPMENT
Mark D. Richter
FEDERAL HIGHWAY ADMINISTRATION

BRIDGE RAILING, GALVANIZED 3 RAIL BOX BEAM

OTHER STDS. REQUIRED: **G-1B, S-364C**



STANDARD S-364A



* LONG LEG HORIZONTAL

NOTES:

1. BOX BEAM TUBE AND STEEL POST MATERIALS, DIMENSION SIZES AND NOTES SHALL BE THE SAME AS THOSE OF THE BRIDGE RAIL, UNLESS OTHERWISE NOTED.

OTHER STDS. REQUIRED: **G-1B, S-364A**

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

APPROVED

Don. Michel Hodges
 STRUCTURES PROGRAM MANAGER

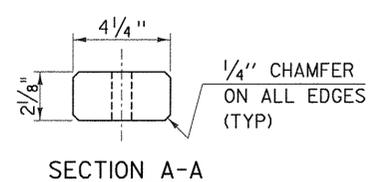
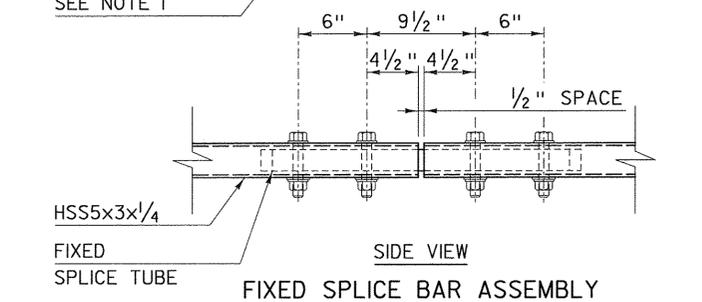
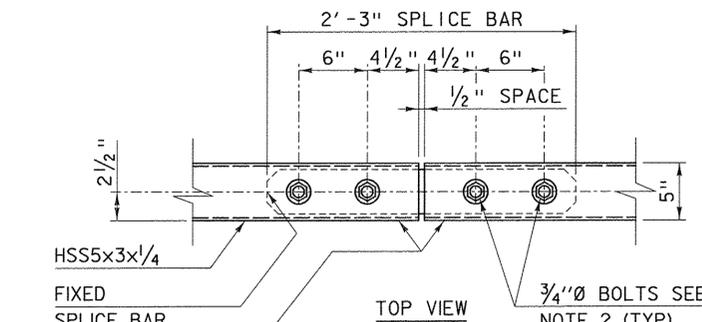
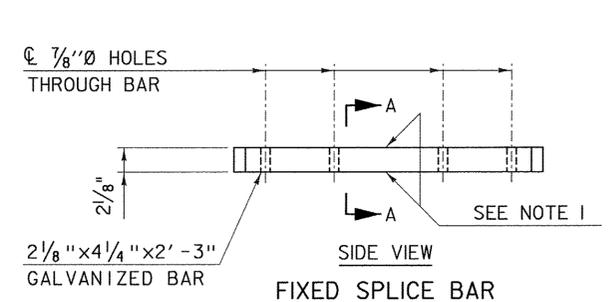
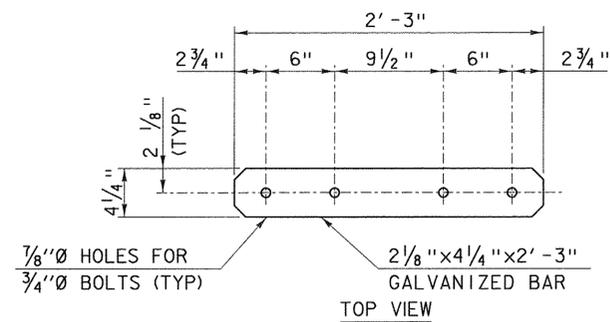
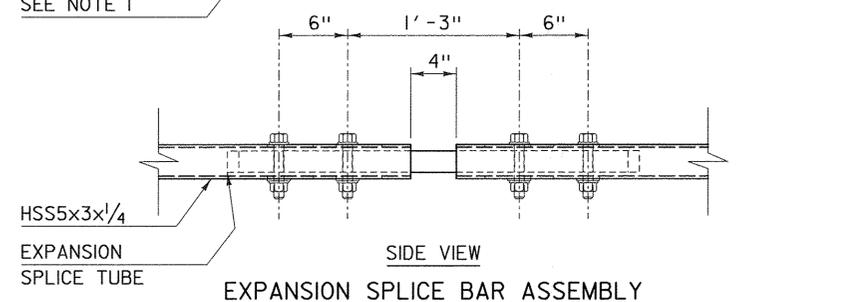
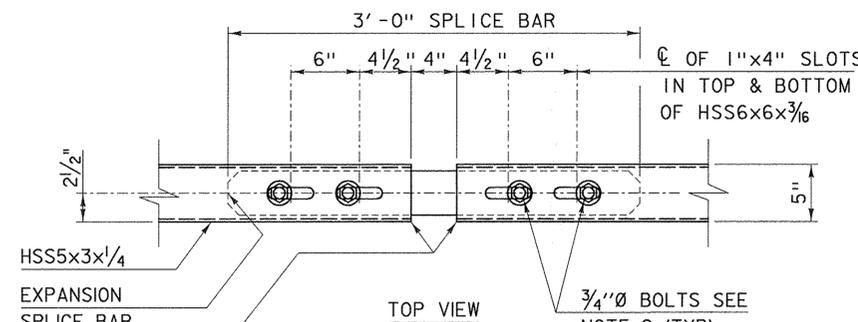
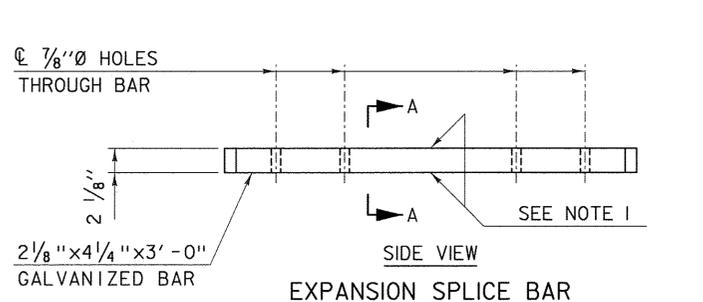
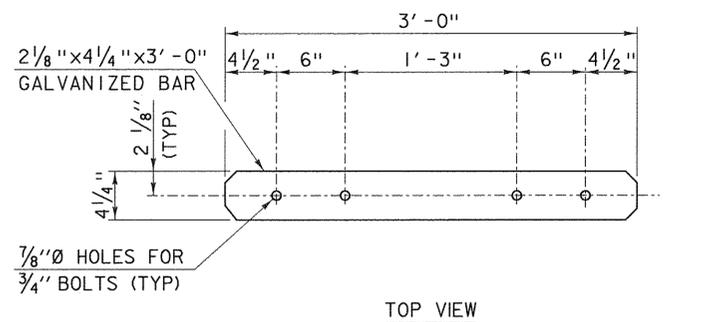
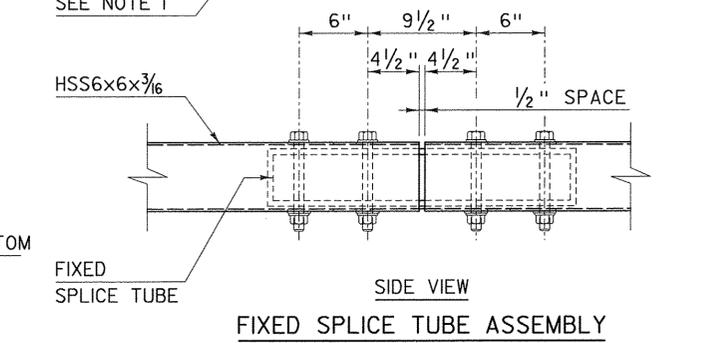
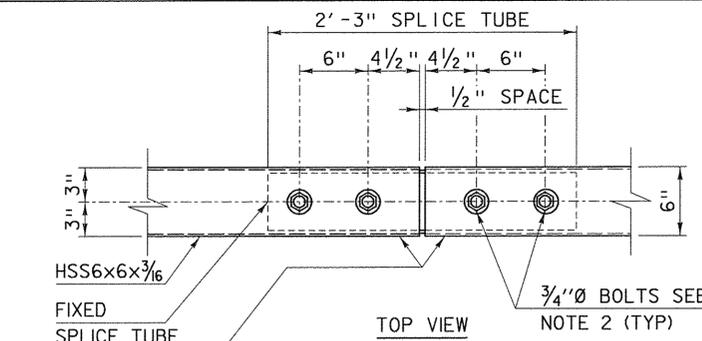
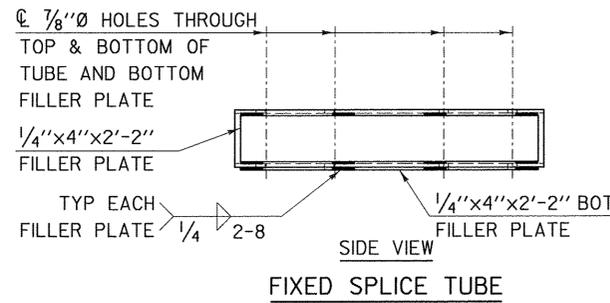
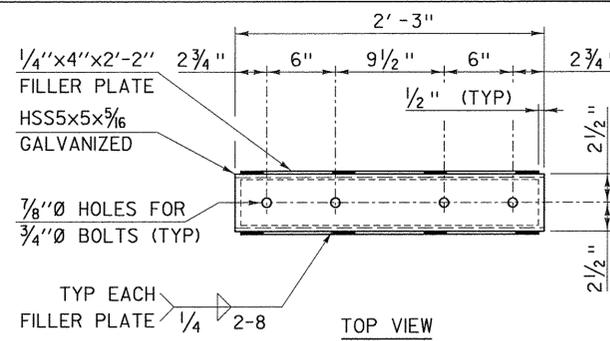
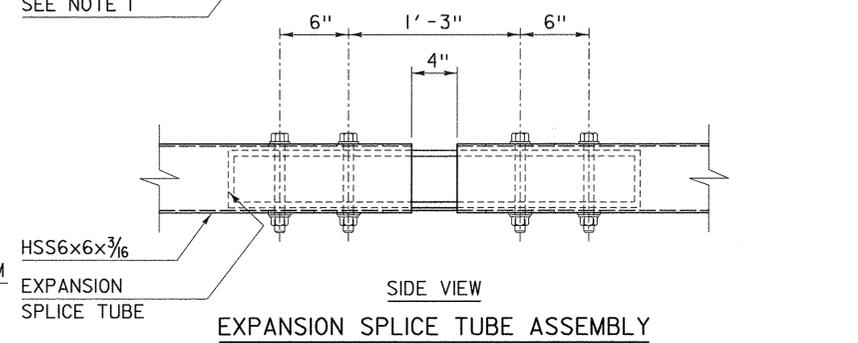
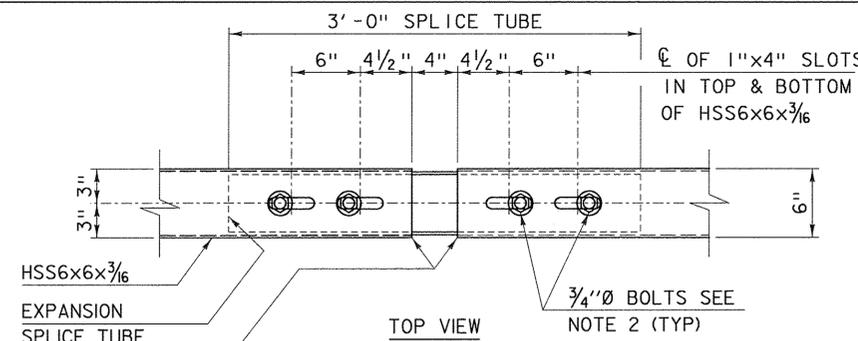
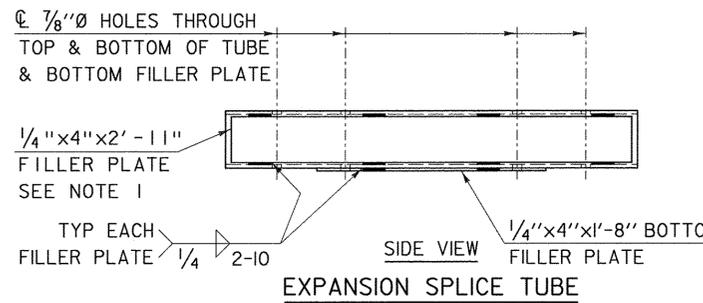
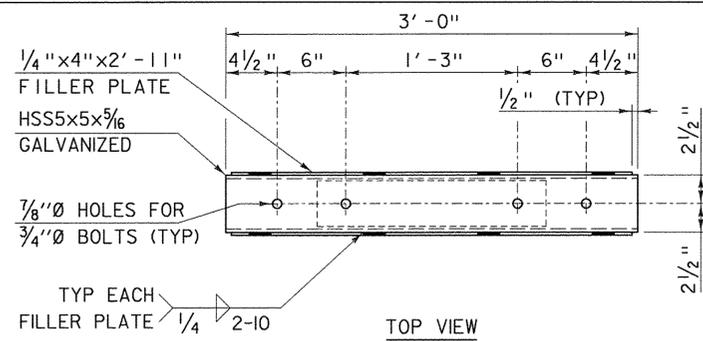
Ruthan Tibbatts
 DIRECTOR OF PROGRAM DEVELOPMENT

Mark D. Kistler
 FEDERAL HIGHWAY ADMINISTRATION

GUARDRAIL APPROACH SECTION, GALVANIZED 3 RAIL BOX BEAM



STANDARD S-364B



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

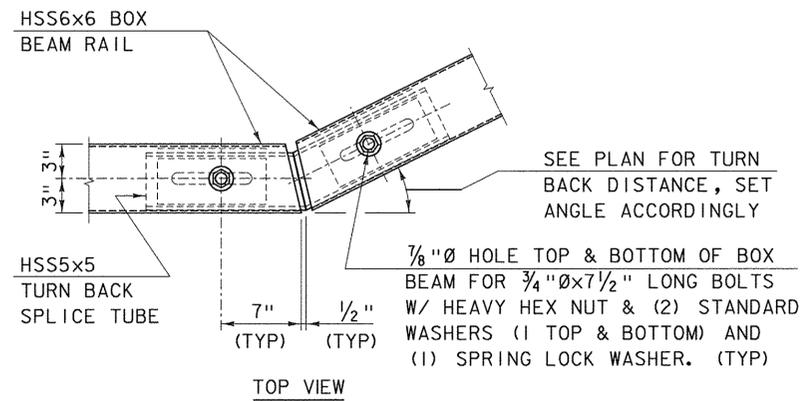
APPROVED
Jim Michael Hedger
 STRUCTURES PROGRAM MANAGER
Richard Johnson
 DIRECTOR OF PROGRAM DEVELOPMENT
Mark D. Richter
 FEDERAL HIGHWAY ADMINISTRATION

GUARDRAIL APPROACH SECTION, GALVANIZED 3 RAIL BOX BEAM

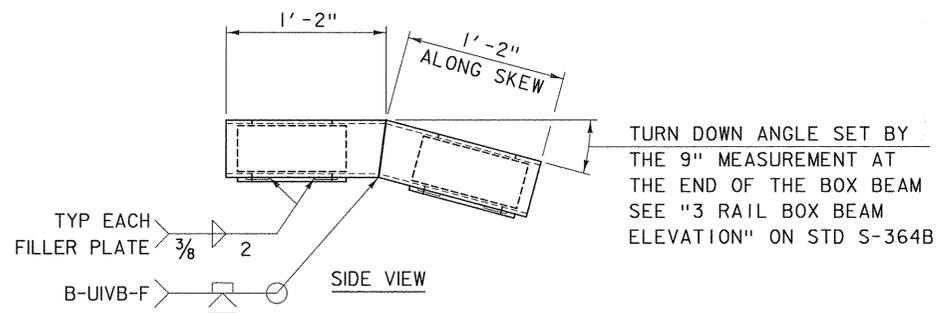
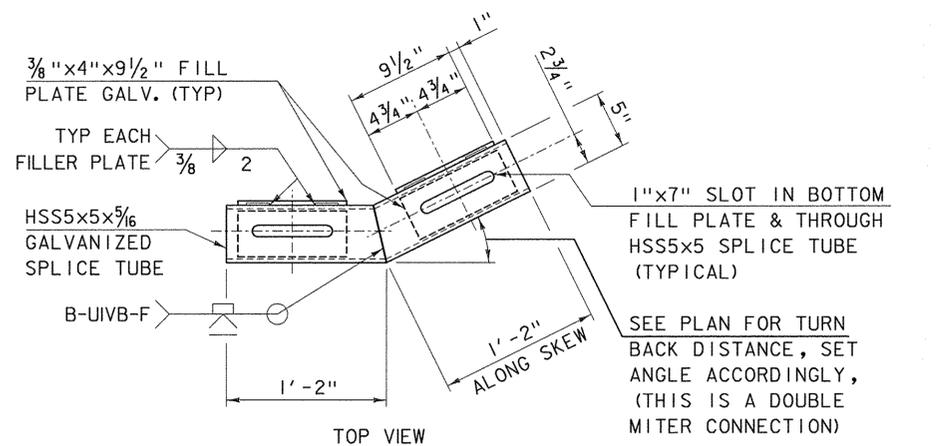
OTHER STDS.
 REQUIRED:



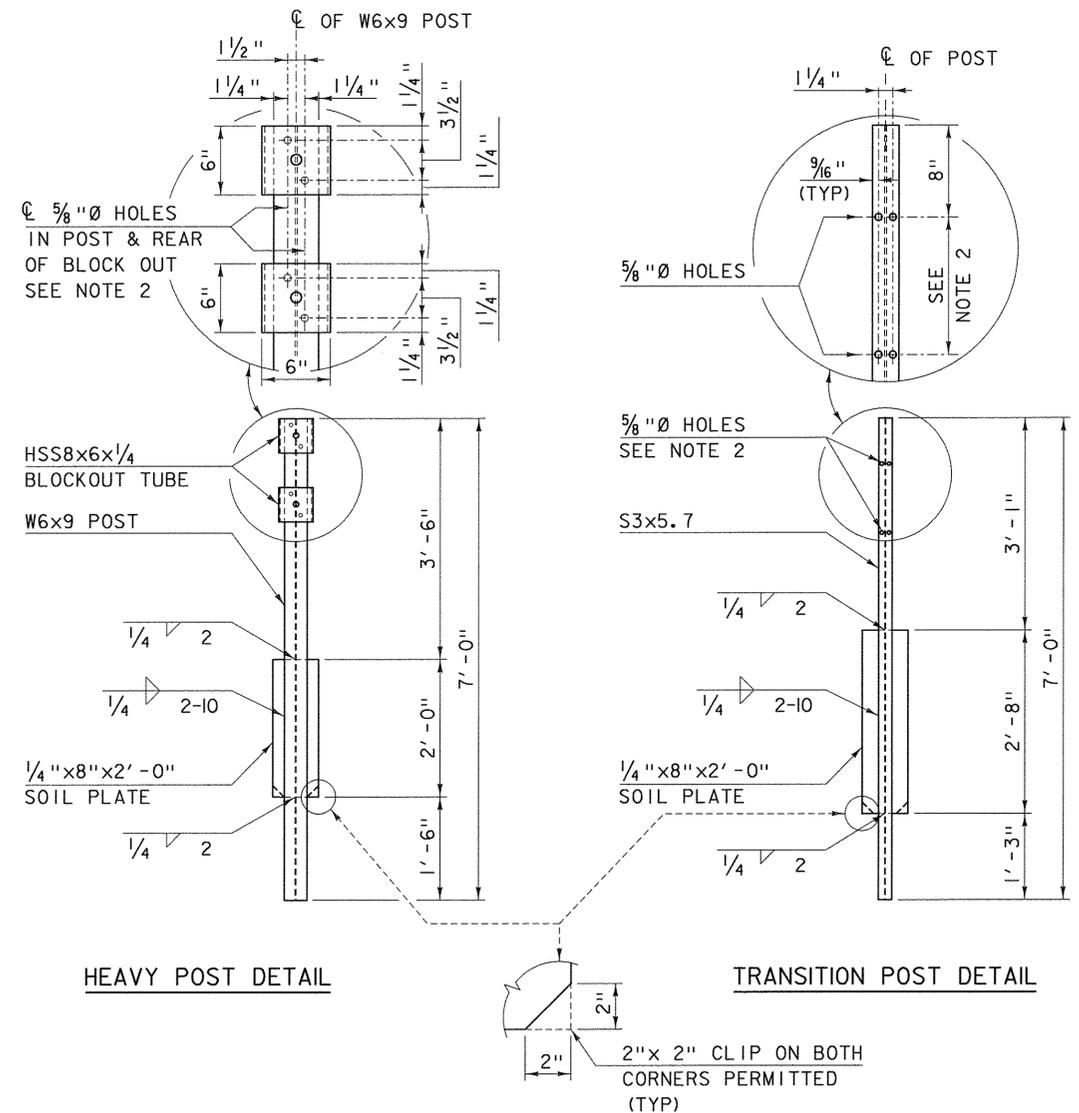
STANDARD S-364C



TURN BACK SPLICE TUBE ASSEMBLY



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



NOTES:

- PROTRUSIONS CAUSED BY WELDING OR GALVANIZING ARE NOT PERMITTED ON THE ADJOINING SURFACES OF THE BOX BEAM RAILS, SPLICE TUBES AND FILL PLATES.
- 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

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STRUCTURES PROGRAM MANAGER

Richard Fetsch
DIRECTOR OF PROGRAM DEVELOPMENT

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FEDERAL HIGHWAY ADMINISTRATION

GUARDRAIL APPROACH
SECTION, GALVANIZED
3 RAIL BOX BEAM



STANDARD
S - 364D