REVIEWER NOTES

1. TRAFFIC MANAGEMENT WILL BE ACCOMPLISHED USING AN OFF-SITE DETOUR ON I-89 AND FOUR WEEK CLOSURE.

2. RIGHT-OF-WAY WILL BE REQUIRED FOR THIS PROJECT.

3. AERIAL UTILITY RELOCATION IS ANTICIPATED. IN ADDITION, AN UNDERGROUND FIBEROPTIC CABLE ATTACHED TO THE BRIDGE WILL BE ABANDONED IN PROJECT AREA, AND POSSIBLY NEARBY DRAINAGE CULVERTS WILL BE RELOCATED.

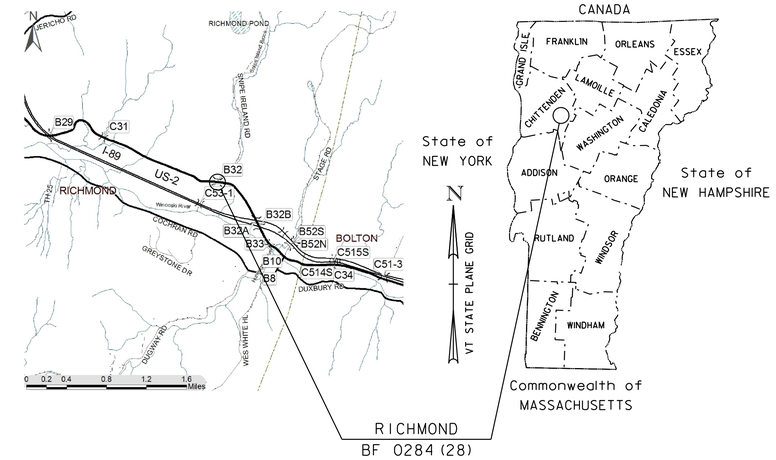
4. WORK TO IMPROVE THE FLOW CHARACTERISTICS OF THE STREAM AT THE BRIDGE IS INCLUDED.

5. A SIMPLIFIED PAVEMENT DESIGN WAS COMPLETED. A FULL DEPTH FLEXIBLE PAVEMENT DESIGN IS RECOMMENDED.

6. A ROADWAY RECLAIM PROJECT (RICHMOND-BOLTON STP 2924(1) 10C254) IS IN EARLY PLANNING AT THE TIME OF CONCEPTUAL DRAWINGS FOR THIS PROJECT. EARLY COORDINATION OF BEGIN AND END PROJECT POINTS AND OTHER DETAILS WITH THE PAVEMENT DESIGN SECTION IS RECOMMENDED. AT THIS TIME, THE RECLAIM PROJECT INTENDS TO USE A 4-11-11-4 TYPICAL ROADWAY SECTION.

7. IT IS RECOMMENDED THAT ANR BE INVITED TO PARTICIPATE EARLY IN THE PLANNING FOR THE REVISED STREAM BANKS.

STATE OF VERMONT
AGENCY OF TRANSPORTATION



PROPOSED IMPROVEMENT
BRIDGE PROJECT

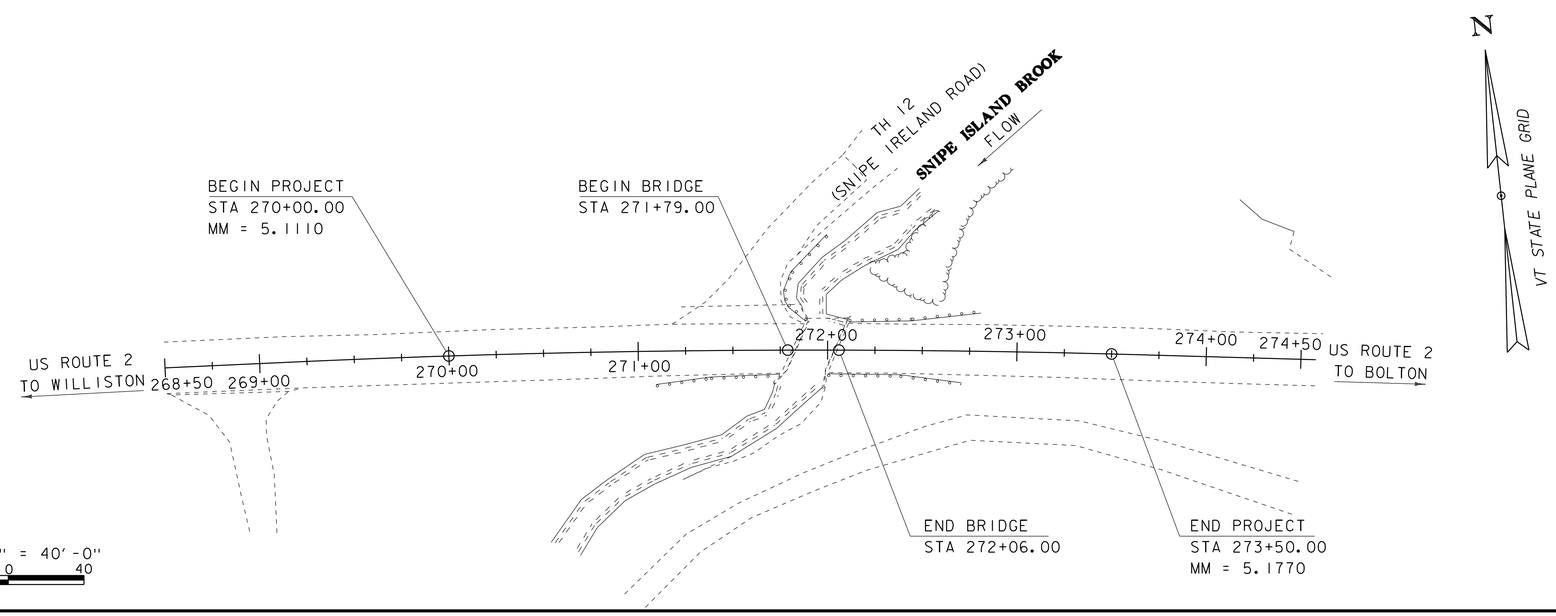
TOWN OF RICHMOND
COUNTY OF CHITTENDEN

ROUTE NO : US ROUTE 2, RURAL MAJOR COLLECTOR. BRIDGE #32

PROJECT LOCATION: 4.2 MILES EAST OF THE JUNCTION OF US ROUTE 2 AND VT ROUTE 117

PROJECT DESCRIPTION: REPLACEMENT OF THE EXISTING BRIDGE 32 INCLUDING APPROACH WORK

LENGTH OF STRUCTURE: 27.00 FEET
LENGTH OF ROADWAY: 323.00 FEET
LENGTH OF PROJECT: 350.00 FEET



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

QUALITY ASSURANCE PROGRAM : LEVEL 2

SURVEYED BY : L. ORVIS
SURVEYED DATE : 06/12/2013

DATUM
VERTICAL NAVD88
HORIZONTAL NAD 83(2011)

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

PRELIMINARY PLANS
23-JUN-2015

DIRECTOR OF PROJECT DELIVERY
APPROVED _____ DATE _____

PROJECT MANAGER : R. S. YOUNG

PROJECT NAME : RICHMOND
PROJECT NUMBER : BF 0284(28)

SHEET 1 OF 31 SHEETS

STATE OF VERMONT
AGENCY OF TRANSPORTATION

PRELIMINARY INFORMATION SHEET (CULVERT)

Version
LRFD

INDEX OF SHEETS

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STANDARDS LIST

E-143	REGULATORY SIGN DETAILS	06-15-2004
E-151	WARNING SIGN DETAILS	05-01-2004
E-155	WARNING SIGN DETAILS	05-01-2004
G-1	STEEL BEAM GUARDRAIL DETAILS (POST, DELINEATOR, TYPICALS)	02-10-2014
G-1D	STEEL BEAM GUARDRAIL DETAILS (END TERMINAL, ANCHOR, MEDIAN)	02-10-2014
S-360A	BRIDGE RAILING, GALVANIZED 2 RAIL BOX BEAM	04-23-2012
S-360B	GUARDRAIL APPROACH SECTION, GALVANIZED 2 RAIL BOX BEAM	04-23-2012
T-29	CONSTRUCTION SIGN DETAILS	08-06-2012
T-30	CONSTRUCTION SIGN DETAILS	08-06-2012
T-31	CONSTRUCTION SIGN DETAILS	08-06-2012
T-42	DELINEATORS AND MILEPOSTS	01-02-2013
T-45	SQUARE TUBE SIGN POST AND ANCHOR	01-02-2013

STRUCTURES DETAIL SHEETS

FINAL HYDRAULIC REPORT

HYDROLOGIC DATA

Date: May 2015

DRAINAGE AREA : 5.2 sq. mi.
CHARACTER OF TERRAIN : Rural, mostly wooded, small ponds
STREAM CHARACTERISTICS : Sinuous and alluvial
NATURE OF STREAMBED : Gravel and sand

PEAK FLOW DATA

Q 2.33 =	200 cfs	Q 50 =	750 cfs
Q 10 =	450 cfs	Q 100 =	900 cfs
Q 25 =	600 cfs	Q 500 =	1260 cfs

DATE OF FLOOD OF RECORD: Unknown
ESTIMATED DISCHARGE: Unknown
WATER SURFACE ELEV.: Unknown
NATURAL STREAM VELOCITY : @ Q50 = 10.8 fps
ICE CONDITIONS : Light to moderate
DEBRIS: Light
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: 2%
HEADWATERS:
UNIFORM: X
IMMEDIATELY ABOVE SITE:

EXISTING STRUCTURE INFORMATION

STRUCTURE TYPE: Concrete t-beam
YEAR BUILT: 1929
CLEAR SPAN(NORMAL TO STREAM): 22'
VERTICAL CLEARANCE ABOVE STREAMBED: 6'
WATERWAY OF FULL OPENING: 100 sq. ft.
DISPOSITION OF STRUCTURE: Remove and replace
TYPE OF MATERIAL UNDER SUBSTRUCTURE: See borings

WATER SURFACE ELEVATIONS AT:

Q2.33 =	313.8'	VELOCITY =	5.4 fps
Q10 =	316.0'	"	5.7 fps
Q25 =	316.4'	"	7.1 fps
Q50 =	317.0'	"	7.7 fps
Q100 =	318.5'	"	8.5 fps

LONG TERM STREAMBED CHANGES: None noted

IS THE ROADWAY OVERTOPPED BELOW Q100: Yes
FREQUENCY: Q100
RELIEF ELEVATION: 317.6'
DISCHARGE OVER ROAD @Q100: 55 cfs

UPSTREAM STRUCTURE

TOWN:	Richmond	DISTANCE:	4400'
HIGHWAY # :	TH 12	STRUCTURE #:	16
CLEAR SPAN:	12.3'	CLEAR HEIGHT:	7.8'
YEAR BUILT:	1969	FULL WATERWAY:	
STRUCTURE TYPE:	CGMPPA		

DOWNSTREAM STRUCTURE

TOWN:	Richmond	DISTANCE:	1500'
HIGHWAY # :	I-89	STRUCTURE #:	53-1
CLEAR SPAN:	18'	CLEAR HEIGHT:	11'
YEAR BUILT:	1964	FULL WATERWAY:	198 sq. ft.
STRUCTURE TYPE:	Concrete box		

LRFR LOAD RATING FACTORS

LOADING LEVELS	TRUCK						
	H-20	HL-93	3S2	6 AXLE	3A. STR.	4A. STR.	5A. SEMI
TONNAGE	20	36	36	66	30	34.5	38
INVENTORY							
POSTING							
OPERATING							
COMMENTS:	TABLE TO BE COMPLETED BY CONTRACTOR'S DESIGNER						

AS BUILT "REBAR" DETAIL

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

CULVERT DESIGN CRITERIA

1. PROPOSED CULVERT IS A PRESTRESS CONCRETE STRUCTURE (22'-0" X 0'-0" X 0'-0" BOX).
2. CULVERT ENDS ARE NOT SKEWED.
3. CULVERT WILL BE SET AT A SLOPE OF 0.00 IN. ON 0 FT.
4. CULVERT WILL REQUIRE FISH PASSAGE ACCOMODATIONS
5. CULVERT CONSTRUCTION WILL REQUIRE A TEMPORARY PIPE

TRAFFIC DATA

YEAR	ADT	DHV	% D	% T	ADTT
2016	3500	410	63	1.8	310
2036	3700	430	63	2.8	510

20 year ESAL for flexible pavement from 2016 to 2036 : 2286000
40 year ESAL for flexible pavement from 2016 to 2056 : 5501000
Design Speed : 50 mph

PROPOSED STRUCTURE

STRUCTURE TYPE: Rigid Frame

CLEAR SPAN(NORMAL TO STREAM): 23'
VERTICAL CLEARANCE ABOVE STREAMBED: 8'
WATERWAY OF FULL OPENING: 185 sq. ft.

WATER SURFACE ELEVATIONS AT:

Q2.33 =	313.8'	VELOCITY=	5.4 fps
Q10 =	315.4'	"	7.4 fps
Q25 =	316.1'	"	7.8 fps
Q50 =	316.8'	"	8.2 fps
Q100 =	318.0'	"	9.1 fps

IS THE ROADWAY OVERTOPPED BELOW Q100: No
FREQUENCY: N/A
RELIEF ELEVATION: 317.7'
DISCHARGE OVER ROAD @Q100: N/A

AVERAGE LOW ELEVATION OF SUPERSTRUCTURE: 318.4' (on upstream side)
VERTICAL CLEARANCE: @ Q50 = 1.6'

SCOUR: Minimum required depth for foundation design is 6' below streambed

REQUIRED CHANNEL PROTECTION: Stone Fill Type III

PERMIT INFORMATION

AVERAGE DAILY FLOW:
ORDINARY LOW WATER:
ORDINARY HIGH WATER:
DEPTH OR ELEVATION:

TEMPORARY BRIDGE REQUIREMENTS

STRUCTURE TYPE: None required
CLEAR SPAN (NORMAL TO STREAM):
VERTICAL CLEARANCE ABOVE STREAMBED:
WATERWAY AREA OF FULL OPENING:

ADDITIONAL INFORMATION

The hydraulics for this site were calculated without any backwater from the Winooski River.

TRAFFIC MAINTENANCE NOTES

1. MAINTAIN TRAFFIC ON AN OFF SITE DETOUR.
2. TRAFFIC SIGNALS ARE NOT NECESSARY.
3. SIDEWALKS ARE NOT NECESSARY

DESIGN VALUES

1. DESIGN LIVE LOAD		HL-93
2. FUTURE PAVEMENT	d_p:	3.0 INCH
3. CULVERT OPENING	D:	22.70 FT
4. MIN. MID-SPAN POS. CAMBER @ RELEASE (PRESTRESSED UNITS)	Δ:	- - -
5. PRESTRESSING STRAND	f_y:	- - -
6. PRESTRESSED CONCRETE STRENGTH	f'_c:	- - -
7. PRESTRESSED CONCRETE RELEASE STRENGTH	f'_{ci}:	- - -
8. CONCRETE, HIGH PERFORMANCE CLASS AA	f'_c:	4.0 KSI
9. CONCRETE, HIGH PERFORMANCE CLASS A	f'_c:	4.0 KSI
10. CONCRETE, HIGH PERFORMANCE CLASS B	f'_c:	3.5 KSI
11. CONCRETE, CLASS C	f'_c:	3.0 KSI
12. REINFORCING STEEL	f_y:	60 KSI
13. STRUCTURAL STEEL AASHTO M270	f_y:	- - -
14. NOMINAL BEARING RESISTANCE OF SOIL	q_n:	- - -
15. SOIL BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	ϕ:	- - -
16. NOMINAL BEARING RESISTANCE OF ROCK	q_n:	- - -
17. ROCK BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	ϕ:	- - -
18. PILE RESISTANCE FACTOR	ϕ:	- - -
19. LATERAL PILE DEFLECTION	Δ:	- - -
20. BASIC WIND SPEED	V_{3s}:	- - -
21. MINIMUM GROUND SNOW LOAD	p_g:	- - -
22. SEISMIC DATA PGA: 0	S_s:	- - -
	S_1:	- - -
23.		
24.		- - -
25.		- - -
26.		- - -

PROJECT NAME: **RICHMOND**
PROJECT NUMBER: **BF 0284(28)**

FILE NAME:	s13c070PI.dgn	PLOT DATE:	3/17/2015
PROJECT LEADER:	R. S. YOUNG	DRAWN BY:	W. LAMMER
DESIGNED BY:	W. LAMMER	CHECKED BY:	
PRELIMINARY INFORMATION SHEET 1		SHEET 2	OF 30

GENERAL INFORMATION

SYMBOLOGY LEGEND NOTE

THE SYMBOLOGY ON THIS SHEET IS INTENDED TO COVER STANDARD CONVENTIONAL SYMBOLOGY. THE SYMBOLOGY 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. SYMBOLOGY ON PLANS MAY VARY, PLAN ANNOTATIONS AND NOTES SHOULD BE USED TO CLARIFY AS NEEDED.

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

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

COMMON TOPOGRAPHIC POINT SYMBOLS

POINT	CODE	DESCRIPTION
	APL	BOUND APPARENT LOCATION
	BM	BENCHMARK
	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

UTILITY SYMBOLOGY

UNDERGROUND UTILITIES

UGU	UTILITY (GENERIC-UNKNOWN)
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)

AGU	UTILITY (GENERIC-UNKNOWN)
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 SYMBOLOGY

PROJECT DESIGN & LAYOUT SYMBOLOGY

CZ	CLEAR ZONE
	PLAN LAYOUT MATCHLINE

PROJECT CONSTRUCTION FEATURES

	TOP OF CUT SLOPE
	TOE OF FILL SLOPE
	STONE FILL
	BOTTOM OF DITCH ℄
	CULVERT PROPOSED
	STRUCTURE SUBSURFACE
PDF PDF	PROJECT DEMARCATION FENCE
BF BF	BARRIER FENCE
	TREE PROTECTION ZONE (TPZ)
	STRIPING LINE REMOVAL
	SHEET PILES

CONVENTIONAL BOUNDARY SYMBOLOGY

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

EPSC LAYOUT PLAN SYMBOLOGY

EPSC MEASURES

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

SEE EPSC DETAIL SHEETS FOR ADDITIONAL SYMBOLOGY

ENVIRONMENTAL RESOURCES

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

ARCHEOLOGICAL & HISTORIC

ARCH	ARCHEOLOGICAL BOUNDARY
HISTORIC DIST	HISTORIC DISTRICT BOUNDARY
HISTORIC	HISTORIC AREA
H	HISTORIC STRUCTURE

CONVENTIONAL TOPOGRAPHIC SYMBOLOGY

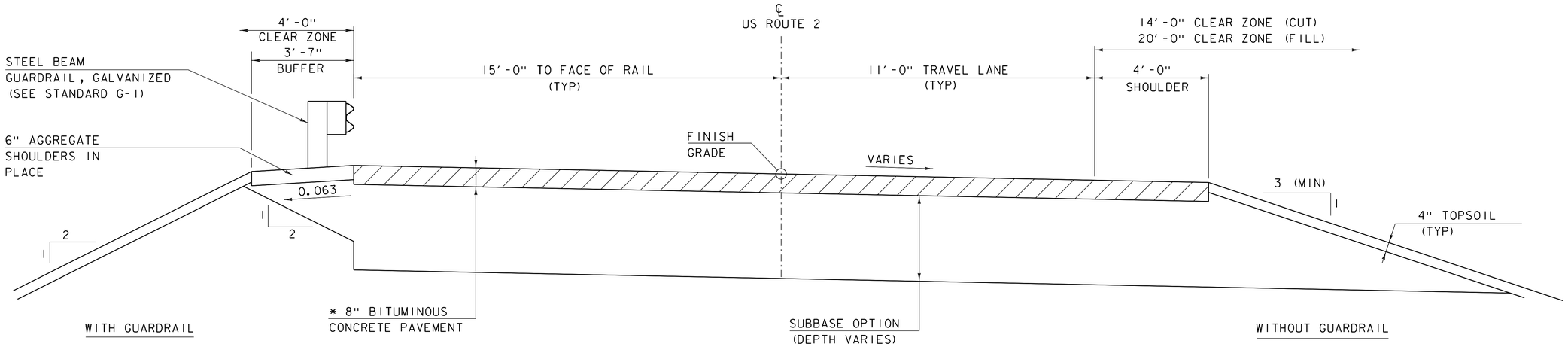
EXISTING FEATURES

	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: RICHMOND
PROJECT NUMBER: BF 0284(28)

FILE NAME: s13c070legend.dgn
PROJECT LEADER: R. S. YOUNG
DESIGNED BY: W. LAMMER
SYMBOLOGY LEGEND

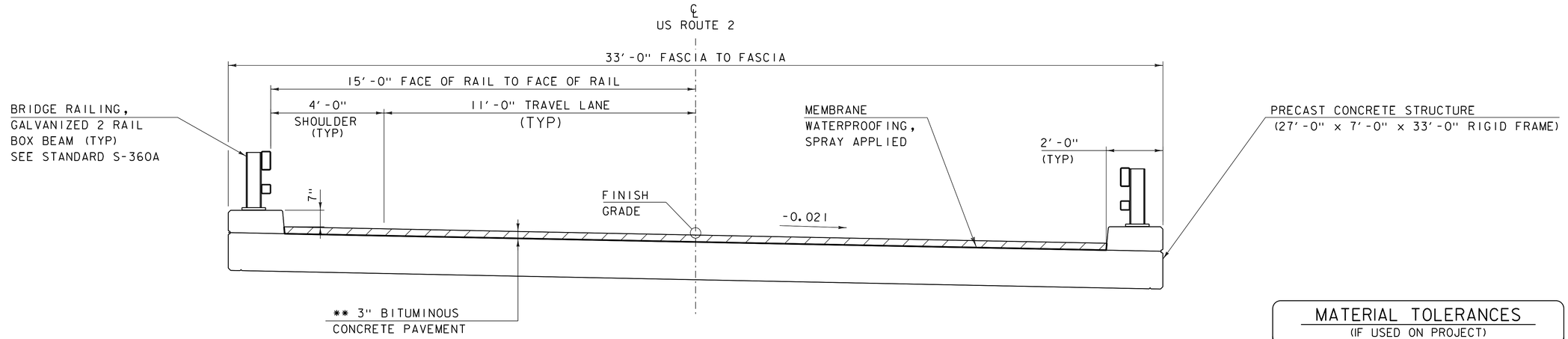
PLOT DATE: 23-JUN-2015
DRAWN BY: M. LONGSTREET
CHECKED BY: W. LAMMER
SHEET 3 OF 31



* 1½" SUPERPAVE BITUMINOUS CONCRETE PAVEMENT TYPE IVS OVER
1½" SUPERPAVE BITUMINOUS CONCRETE PAVEMENT TYPE IVS OVER
2½" SUPERPAVE BITUMINOUS CONCRETE PAVEMENT TYPE IIS OVER
2½" SUPERPAVE BITUMINOUS CONCRETE PAVEMENT TYPE IIS

ROADWAY TYPICAL SECTION

SCALE ½" = 1'-0"



** 1½" SUPERPAVE BITUMINOUS CONCRETE PAVEMENT TYPE IVS OVER
1½" SUPERPAVE BITUMINOUS CONCRETE PAVEMENT TYPE IVS OVER

FRAME TYPICAL SECTION

SCALE ½" = 1'-0"

FLOW

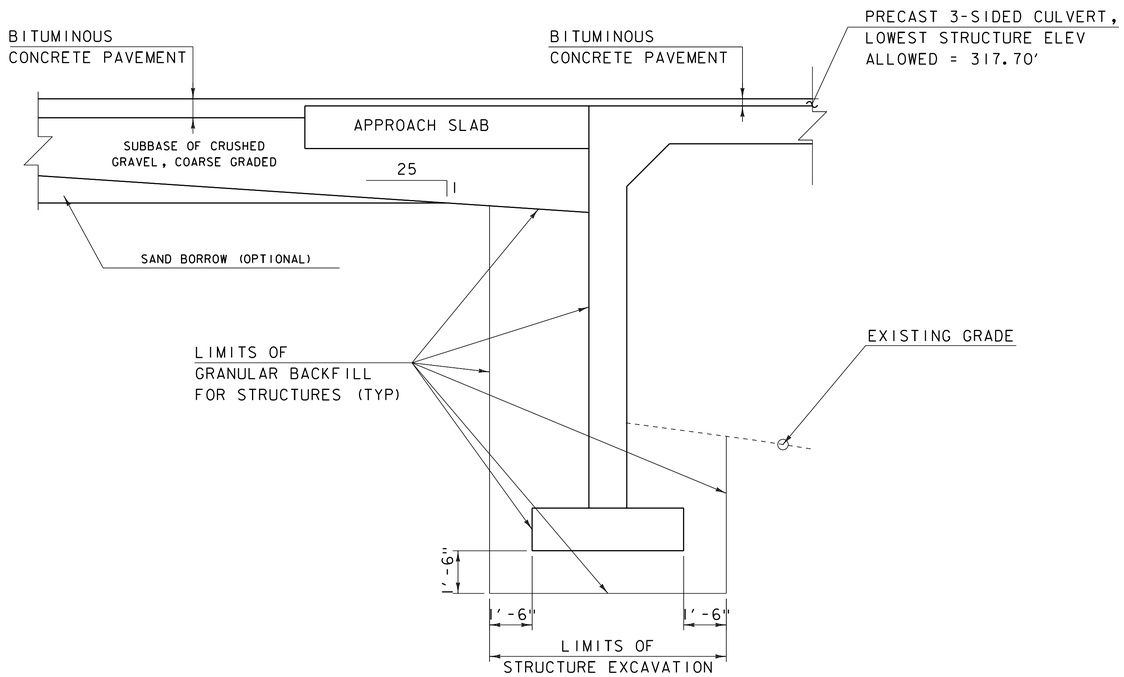
MATERIAL TOLERANCES
(IF USED ON PROJECT)

SURFACE	
- PAVEMENT (TOTAL THICKNESS)	+/- ¼"
- AGGREGATE SURFACE COURSE	+/- ½"
SUBBASE	+/- 1"
SAND BORROW	+/- 1"

PROJECT NAME: RICHMOND
PROJECT NUMBER: BF 0284(28)

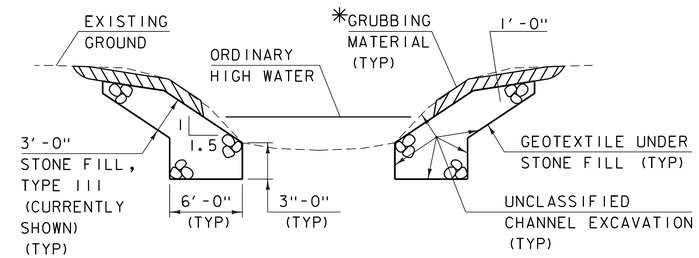
FILE NAME: sl3c070typical.dgn
PROJECT LEADER: R. S. YOUNG
DESIGNED BY: W. LAMMER
TYPICAL SECTIONS 1

PLOT DATE: 23-JUN-2015
DRAWN BY: S. COLEY
CHECKED BY:
SHEET 4 OF 31



PRECAST 3-SIDED FRAME PROFILE

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.

MATERIAL TOLERANCES

(IF USED ON PROJECT)

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

PROJECT NAME: RICHMOND
PROJECT NUMBER: BF 0284(28)

FILE NAME: s13c070typical.dgn
PROJECT LEADER: R. S. YOUNG
DESIGNED BY: W. LAMMER
TYPICAL SECTIONS 2

PLOT DATE: 23-JUN-2015
DRAWN BY: D.D.BEARD
CHECKED BY:
SHEET 5 OF 31

GPS CONTROL POINTS

SNIPE AZ MK

NORTH = 689236.655
EAST = 1522476.676
ELEV. = 322.130

THE MARK IS LOCATED ON INTERSTATE 89 IN THE SOUTHEAST SIDE OF THE U-TURN BETWEEN MILE MARKERS 74.40 AND 74.45. THIS IS THE MOST NORTHERN OF TWO U-TURNS JUST NORTH OF THE BRIDGES OVER US ROUTE 2 IN JONESVILLE. THE MARK IS SET 20 CM (8 INCHES) BELOW GROUND SURFACE IN THE TOP OF A FENO STYLE MONUMENT. IT IS 7.9 M (25.9 FT) SOUTHEAST OF AND ABOUT 0.6 M (2.0 FT) LOWER THAN THE CENTERLINE OF THE U-TURN, 11.3 M (37.1 FT) SOUTHWEST OF THE SOUTHWEST EDGE OF PAVEMENT OF THE NORTHBOUND LANE, 3.7 M (12.1 FT) NORTHEAST OF THE NORTHEAST EDGE OF PAVEMENT OF THE SOUTHBOUND LANE, 8.3 M (27.2 FT) SOUTHWEST OF THE MOST SOUTHWESTERLY POST FOR A U-TURN SIGN AND 0.3 M (1.0 FT) SOUTHEAST OF A FIBERGLASS WITNESS POST.

SNIPE

NORTH = 690764.170
EAST = 1522549.836
ELEV. = 316.480

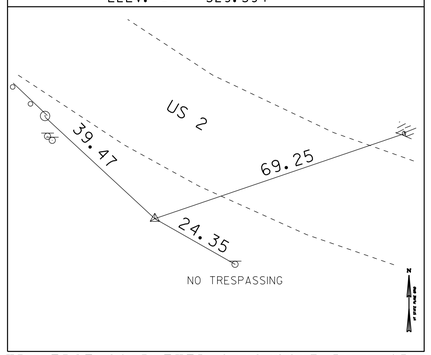
TO REACH FROM THE CENTER OF THE I-89 BRIDGES OVER US ROUTE 2 JUST NORTHWEST OF JONESVILLE, GO NORTHERLY ALONG US ROUTE 2 FOR 0.6 MI (1.0 KM) TO THE SITE OF THE MARK ON THE LEFT ABOUT OPPOSITE OF SNIPE IRELAND ROAD. THE MARK IS SET 20 CM (8 INCHES) BELOW GROUND SURFACE IN THE TOP OF A FENO STYLE MONUMENT. IT IS 6.0 M (19.7 FT) SOUTH OF AND ABOUT 0.3 M (1.0 FT) LOWER THAN THE CENTERLINE OF US ROUTE 2, 8.5 M (27.9 FT) WEST OF POLE NO 94-50, 34.6 M (113.5 FT) EAST OF POLE NO 94, 24.3 M (79.7 FT) WEST-SOUTHWEST OF THE SOUTHWEST CORNER OF BRIDGE NO 32 OVER SNIPE IRELAND BROOK AND 4.0 M (13.1 FT) WEST-SOUTHWEST OF THE WEST-SOUTHWEST END OF A STEEL BEAM GUARD RAIL POST.

GPS POINTS SET BY VTrans GSU 5/20/13

TRAVERSE TIES

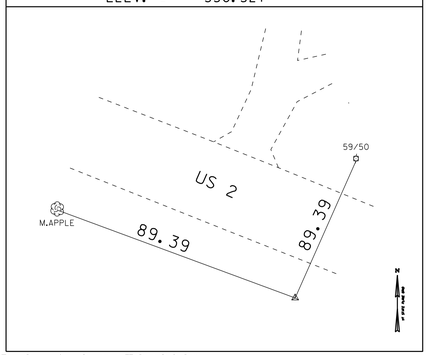
HVCTRL #3

NORTH = 690829.658
EAST = 1521678.345
ELEV. = 329.394



HVCTRL #4

NORTH = 691782.711
EAST = 1519542.675
ELEV. = 350.527



HVCRTL

NORTH =
EAST =
ELEV. =

NORTH =
EAST =
ELEV. =

NORTH =
EAST =
ELEV. =

TRAVERSE COMPLETED 6/12/2013 BY L.ORVIS P.C. & G.HITCHCOCK

ALIGNMENT TIES

NORTH =
EAST =
ELEV. =

NORTH =
EAST =
ELEV. =

NORTH =
EAST =
ELEV. =

NORTH =
EAST =
ELEV. =

NORTH =
EAST =
ELEV. =

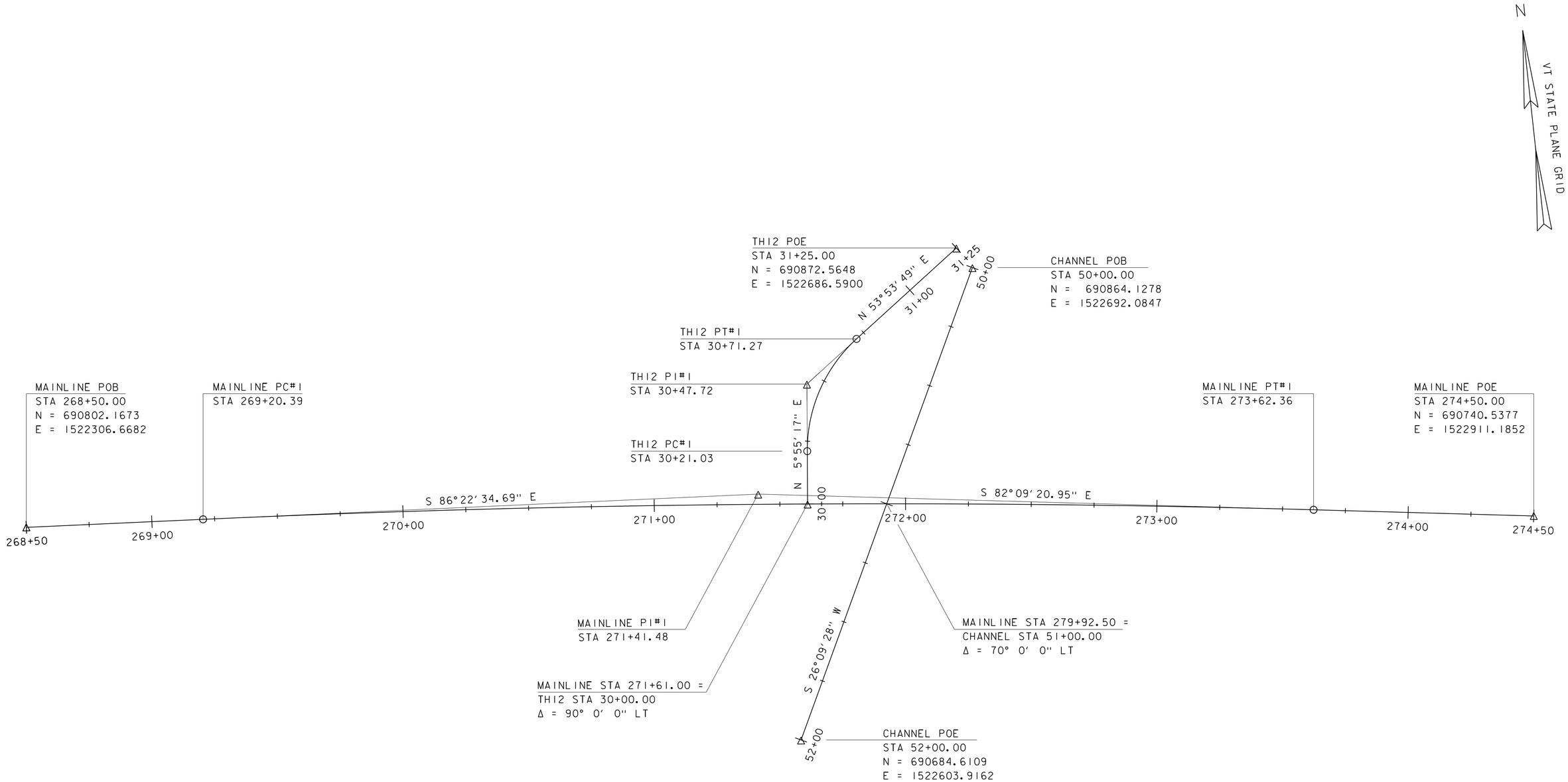
DATUM

VERTICAL NAVD 88
HORIZONTAL NAD 83 (2011)
ADJUSTMENT COMPASS

PROJECT NAME: RICHMOND
PROJECT NUMBER: BF 0284(28)

FILE NAME: survey\x13C070ti.dgn
PROJECT LEADER: C.WILLIAMS
DESIGNED BY:
TIE SHEET

PLOT DATE: 23-JUN-2015
DRAWN BY: G.HITCHCOCK
CHECKED BY:
SHEET 6 OF 31



MAINLINE CURVE (1)
DELTA = 4°13' 14"
D = 0°57' 18"
R = 6000.00'
T = 221.08'
L = 441.97'
E = 4.07'

TH12 CURVE (1)
DELTA = 47°58' 32"
D = 95°29' 35"
R = 60.00'
T = 26.70'
L = 50.24'
E = 5.67'

TH12 POB
STA 30+00.00
N = 690777.7008
E = 1522616.6807

ALIGNMENT SHEET

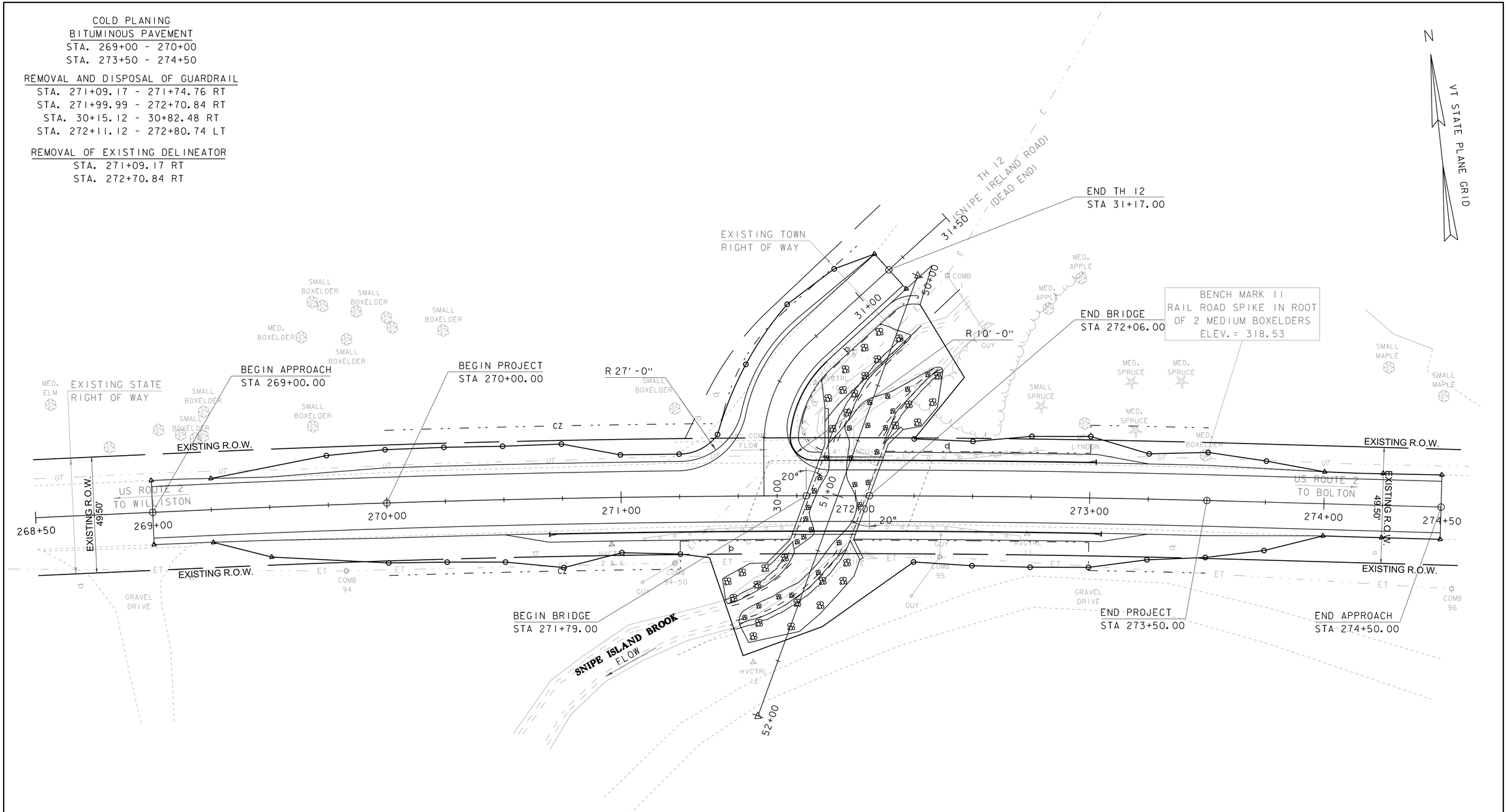
SCALE 1" = 20'-0"
20 0 20

PROJECT NAME: RICHMOND	
PROJECT NUMBER: BF 02 0/128 4(2 0/128 101/100	
FILE NAME: s13c070border.dgn	PLOT DATE: 23-JUN-2015
PROJECT LEADER: R. YOUNG	DRAWN BY: S. COLEY
DESIGNED BY: S. COLEY	CHECKED BY: W. LAMMER
ALIGNMENT SHEET	SHEET 7 OF 31

COLD PLANING
BITUMINOUS PAVEMENT
STA. 269+00 - 270+00
STA. 273+50 - 274+50

REMOVAL AND DISPOSAL OF GUARDRAIL
STA. 271+09.17 - 271+74.76 RT
STA. 271+99.99 - 272+70.84 RT
STA. 30+15.12 - 30+82.48 RT
STA. 272+11.12 - 272+80.74 LT

REMOVAL OF EXISTING DELINEATOR
STA. 271+09.17 RT
STA. 272+70.84 RT



EXISTING BRIDGE DATA
SINGLE SPAN CONCRETE T-BEAM
BUILT 1929
25' LONG, 27'-7" CURB TO CURB

LAYOUT SHEET

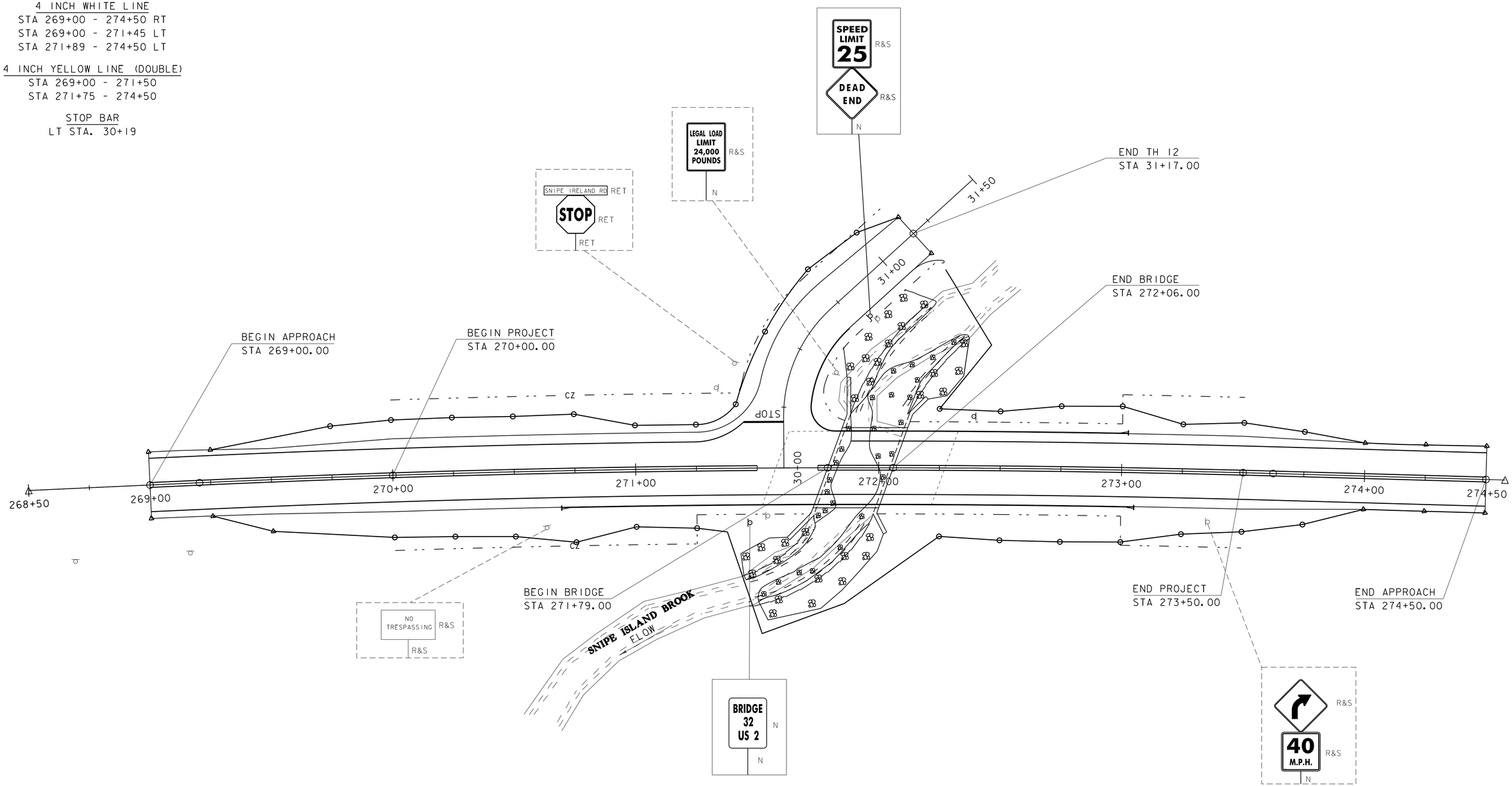
SCALE 1" = 20'-0"
20 0 20

PROJECT NAME: RICHMOND	
PROJECT NUMBER: BF 0284(28)	
FILE NAME: sl3c070border.dgn	PLOT DATE: 23-JUN-2015
PROJECT LEADER: R. YOUNG	DRAWN BY: S. COLEY
DESIGNED BY: S. COLEY	CHECKED BY: W. LAMMER
LAYOUT SHEET	SHEET 8 OF 31

4 INCH WHITE LINE
STA 269+00 - 274+50 RT
STA 269+00 - 271+45 LT
STA 271+89 - 274+50 LT

4 INCH YELLOW LINE (DOUBLE)
STA 269+00 - 271+50
STA 271+75 - 274+50

STOP BAR
LT STA. 30+19



SIGN LEGEND
N = NEW
R = REMOVE
S = SALVAGE
R&S = REMOVE & SALVAGE
RET = RETAIN

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

PROJECT NAME: RICHMOND
PROJECT NUMBER: BF 0284 (28)

FILE NAME: sl3c070sign
PROJECT LEADER: R. YOUNG
DESIGNED BY: S. COLEY
SIGN LAYOUT

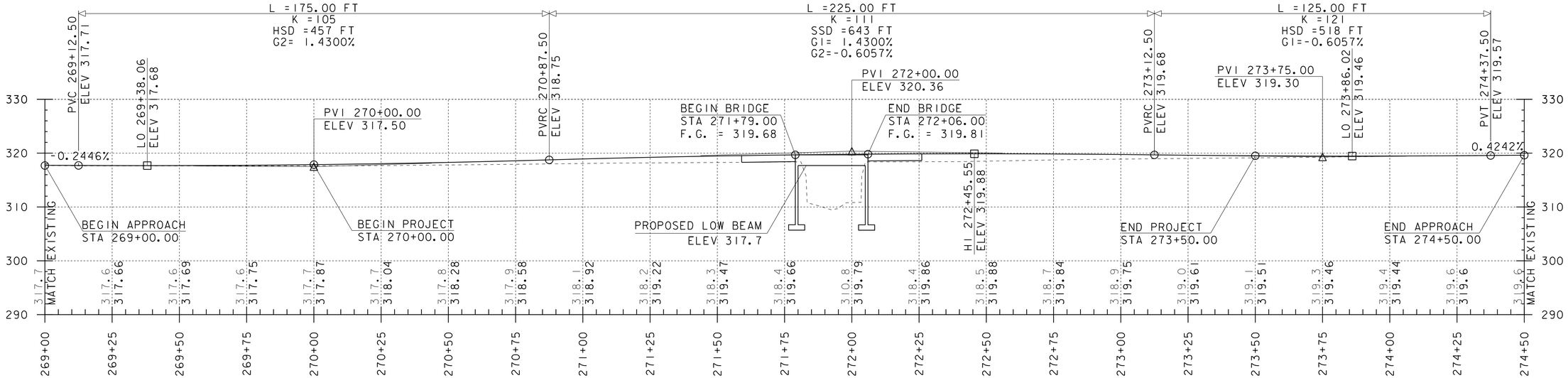
PLOT DATE: 23-JUN-2015
DRAWN BY: S. COLEY
CHECKED BY: ------
SHEET 9 OF 31

MILEMARKER, STATION, OR SIGN NUMBER	SIGN LEGEND	SIGN DIMENSIONS		NEW SIGN	EXIST POST		NEW SIGN POSTS						REMARKS	SIGN DETAIL	
								SQUARE STEEL (in)							
								1.75	2.0	2.5					
								lb/ft							
		WIDTH (in)	HEIGHT (in)	"A"	RETAIN	SALVAGE	NO. OF POSTS	1.88	2.42	3.35	ANCHOR	SLEEVE		DETAIL ON SHEET NUMBER	STD. SHEET NUMBER
RT 271+45	BRIDGE 32	6	8	0.33			1	8			X		VD-701		T-42
LT 272+40	BRIDGE 32	6	8	0.33			1	8			X		VD-701		T-42
RT 30+81	SPEED LIMIT 25	24	30			X			15						
	DEAD END	30	30			X									
RT 30+48	LEGAL LOAD LIMIT 24,000 POUNDS	24	30			X			15						
LT 30+37	STOP	30	30		X								R1-1		E-143
	ON-LYFE IRELAND RD	42	12		X										
RT 273+36		30	30			X			15				W1-2R		E-151
	40 M.P.H.	24	24			X							W13-1		E-155
RT 270+63	NO TRESPASSING					X									
								FT 16	FT 45	FT		EA			
	TOTALS			SF 0.66				FT 61					SHS = STANDARD HIGHWAY SIGNS (MUTCD)		

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."

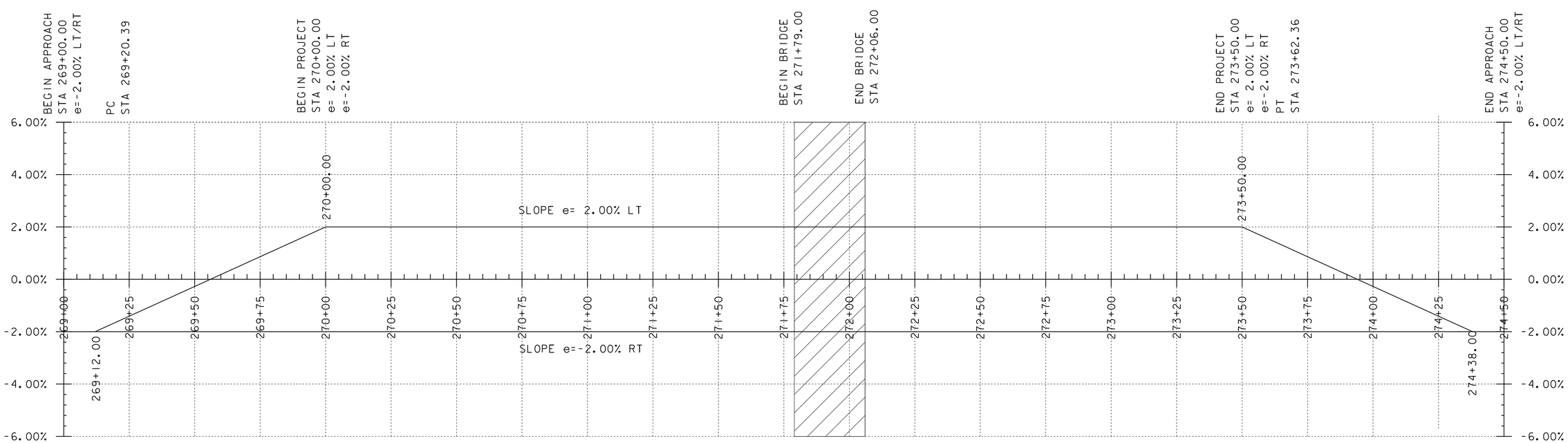
SIGN CHART

PROJECT NAME: RICHMOND	
PROJECT NUMBER: BF 0284 (28)	
FILE NAME: sl3c070sign	PLOT DATE: 23-JUN-2015
PROJECT LEADER: R. YOUNG	DRAWN BY: S. COLEY
DESIGNED BY: S. COLEY	CHECKED BY: ------
SIGN CHART	SHEET 10 OF 31



US ROUTE 2 PROFILE

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



US ROUTE 2 BANKING DIAGRAM

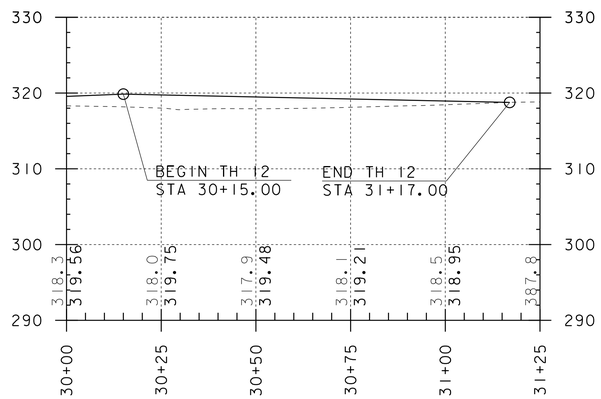
SCALE: HORIZONTAL 1" = 20'-0"
VERTICAL 1" = 10'-0"

NOTE:

GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

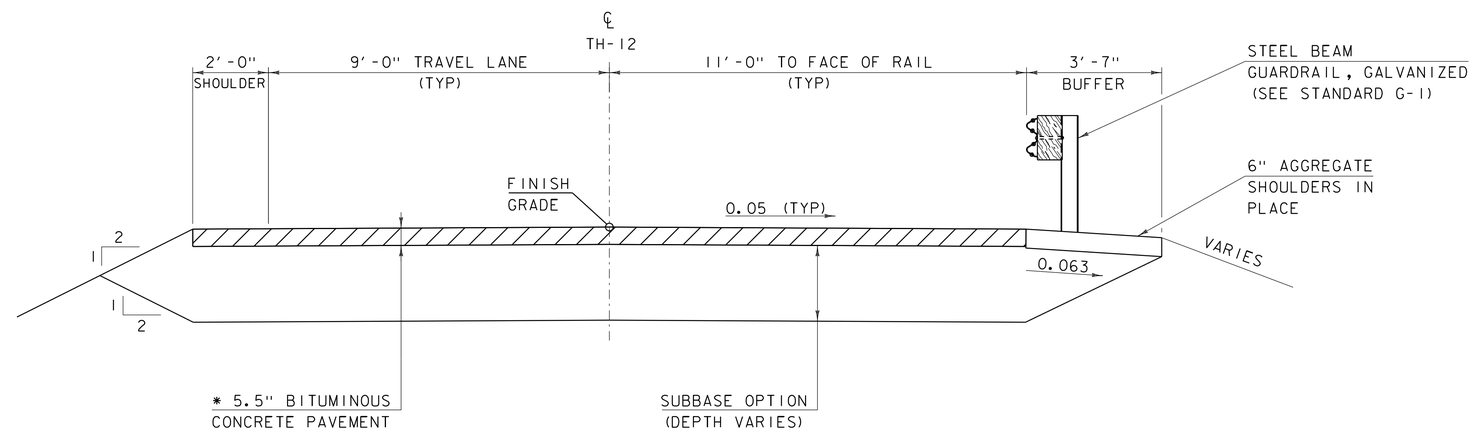
GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: RICHMOND	
PROJECT NUMBER: BF 0284(28)	
FILE NAME: 13c070profile.dgn	PLOT DATE: 23-JUN-2015
PROJECT LEADER: R. YOUNG	DRAWN BY: S. COLEY
DESIGNED BY: G.SWEENY	CHECKED BY:
PROFILE & BANKING DIAGRAM	SHEET 11 OF 31



TH-12 PROFILE

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

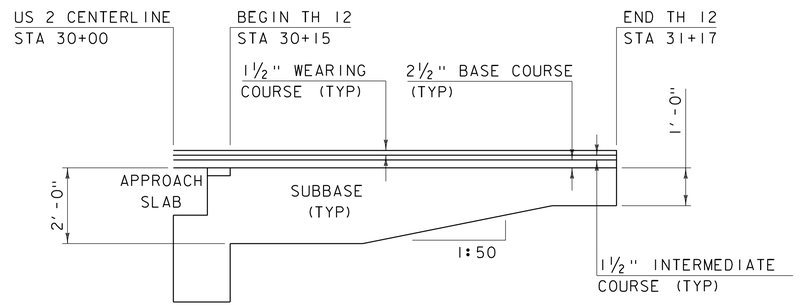


TH-12 TYPICAL SECTION

SCALE ½" = 1'-0"

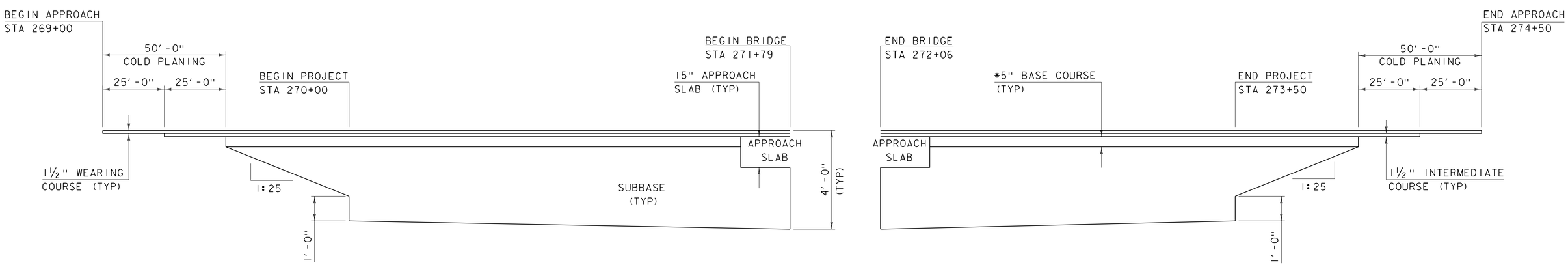
* 1½" SUPERPAVE BITUMINOUS CONCRETE PAVEMENT TYPE IVS OVER
1½" SUPERPAVE BITUMINOUS CONCRETE PAVEMENT TYPE IVS OVER
2½" SUPERPAVE BITUMINOUS CONCRETE PAVEMENT TYPE IIS

PROJECT NAME: RICHMOND	
PROJECT NUMBER: BF 0284(28)	
FILE NAME: 13c070profile.dgn	PLOT DATE: 23-JUN-2015
PROJECT LEADER: R. YOUNG	DRAWN BY: S. COLEY
DESIGNED BY: S. COLEY	CHECKED BY:
TH 12 PROFILE	SHEET 12 OF 31



TH 12 MATERIAL TRANSITION DETAIL

HORIZONTAL SCALE: 1" = 20'-0"
VERTICAL SCALE: 1" = 2'-0"



US 2 MATERIAL TRANSITION DETAIL

HORIZONTAL SCALE: 1" = 20'-0"
VERTICAL SCALE: 1" = 2'-0"

NOTE:
* TWO 2.5 INCH LIFTS OF TYPE IIS BASE

PROJECT NAME: RICHMOND	
PROJECT NUMBER: BF 0284 (28)	
FILE NAME: s13c070transition	PLOT DATE: 23-JUN-2015
PROJECT LEADER: R. YOUNG	DRAWN BY: S. COLEY
DESIGNED BY: S. COLEY	CHECKED BY: ------
MATERIAL TRANSITION DETAIL	SHEET 13 OF 31

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

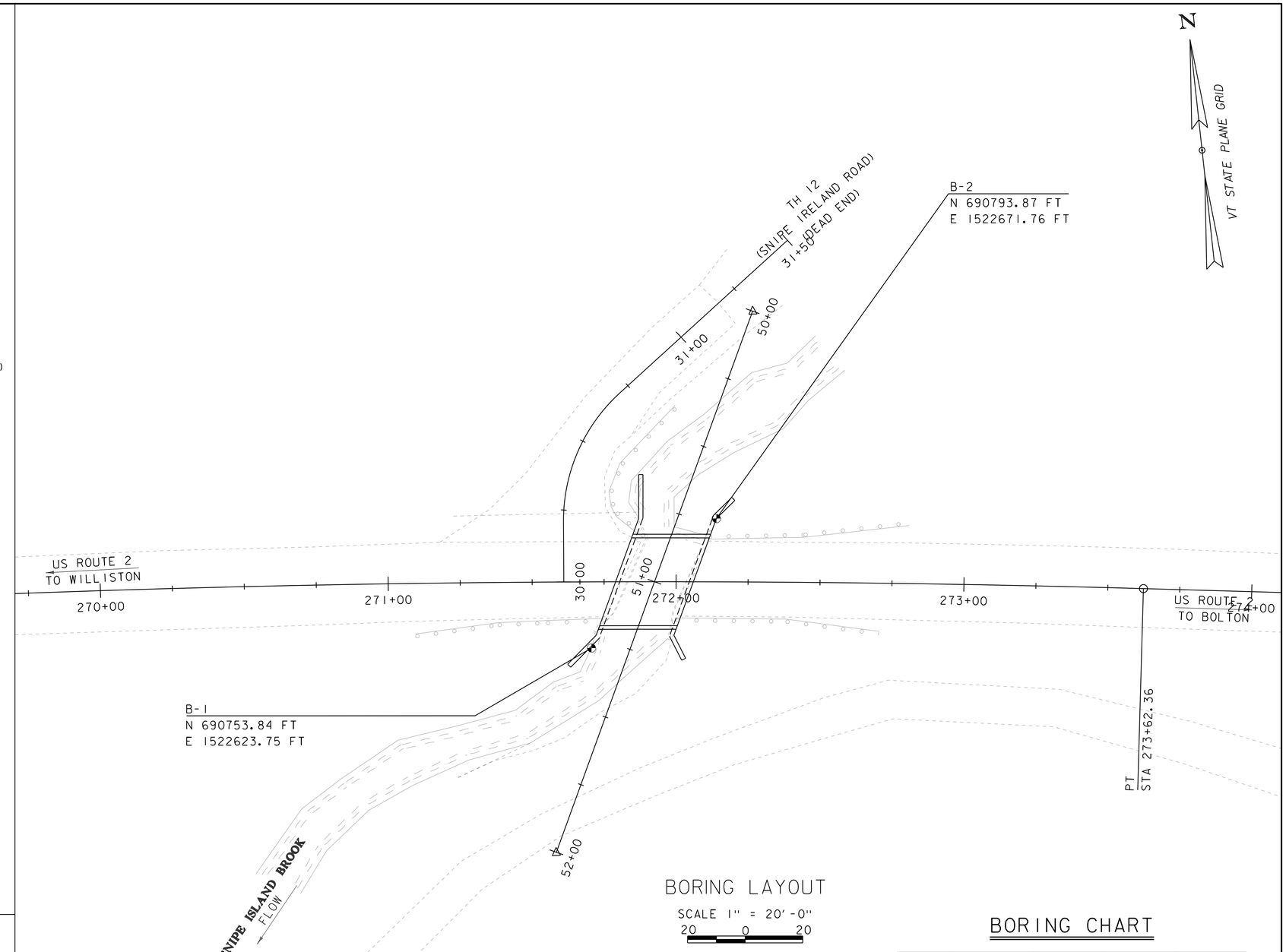
DENSITY (GRANULAR SOILS) N	DENSITY DESCRIPTIVE TERM	CONSISTENCY (COHESIVE SOILS) N	CONSISTENCY DESCRIPTIVE TERM
<5	Very Loose	<2	Very Soft
5-10	Loose	2-4	Soft
11-24	Med. Dense	5-8	Med. Stiff
25-50	Dense	9-15	Stiff
>50	Very Dense	16-30	Very Stiff
		31-60	Hard
		>60	Very Hard

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
AX	Core Size 1 1/8"
BX	Core Size 1 5/8"
NX	Core Size 2 1/8"
M	Double Tube Core Barrel Used
LL	Liquid Limit
PL	Plastic Limit
PI	Plasticity Index
NP	Non Plastic
w	Moisture Content (Dry Wgt. Basis)
D	Dry
M	Moist
MTW	Moist To Wet
W	Wet
Sat	Saturated
Bo	Boulder
Gr	Gravel
Sa	Sand
Si	Silt
Cl	Clay
HP	Hardpan
Le	Ledge
NLTD	No Ledge To Depth
CNPF	Can Not Penetrate Further
TLOB	Top of Ledge Or Boulder
NR	No Recovery
Rec.	Recovery
%Rec.	Percent Recovery
RQD	Rock Quality Designation
CBR	California Bearing Ratio
<	Less Than
>	Greater Than
R	Refusal (N > 100)
VTSPG	NAD83 - See Note 7

COLOR

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



BORING LAYOUT

SCALE 1" = 20'-0"

20 0 20

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.

GENERAL NOTES

1. The subsurface explorations shown herein were made between _____ and _____ by the Agency.

2. 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.

3. 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.

4. 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.

5. 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.

6. 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.

7. Northing and Easting coordinates are shown in Vermont State Plane Grid North American Datum 1983 in meters and survey feet.

BORING CHART

HOLE NO.	SURV. STATION	OFFSET	GROUND ELEV.	ELEV. TLOB
B-1	13+20	23.0 RT		
B-2	13+64	22.0 LT		

PROJECT NAME: RICHMOND

PROJECT NUMBER: BF 0284(28)

FILE NAME: 13c070/sl3c070boring.dgn

PROJECT LEADER: R. S. YOUNG

DESIGNED BY: W. LAMMER

BORING INFORMATION SHEET

PLOT DATE: 23-JUN-2015

DRAWN BY: D.D.BEARD

CHECKED BY: W. LAMMER

STD. S-360A BRIDGE RAILING
2 RAIL BOX BEAM

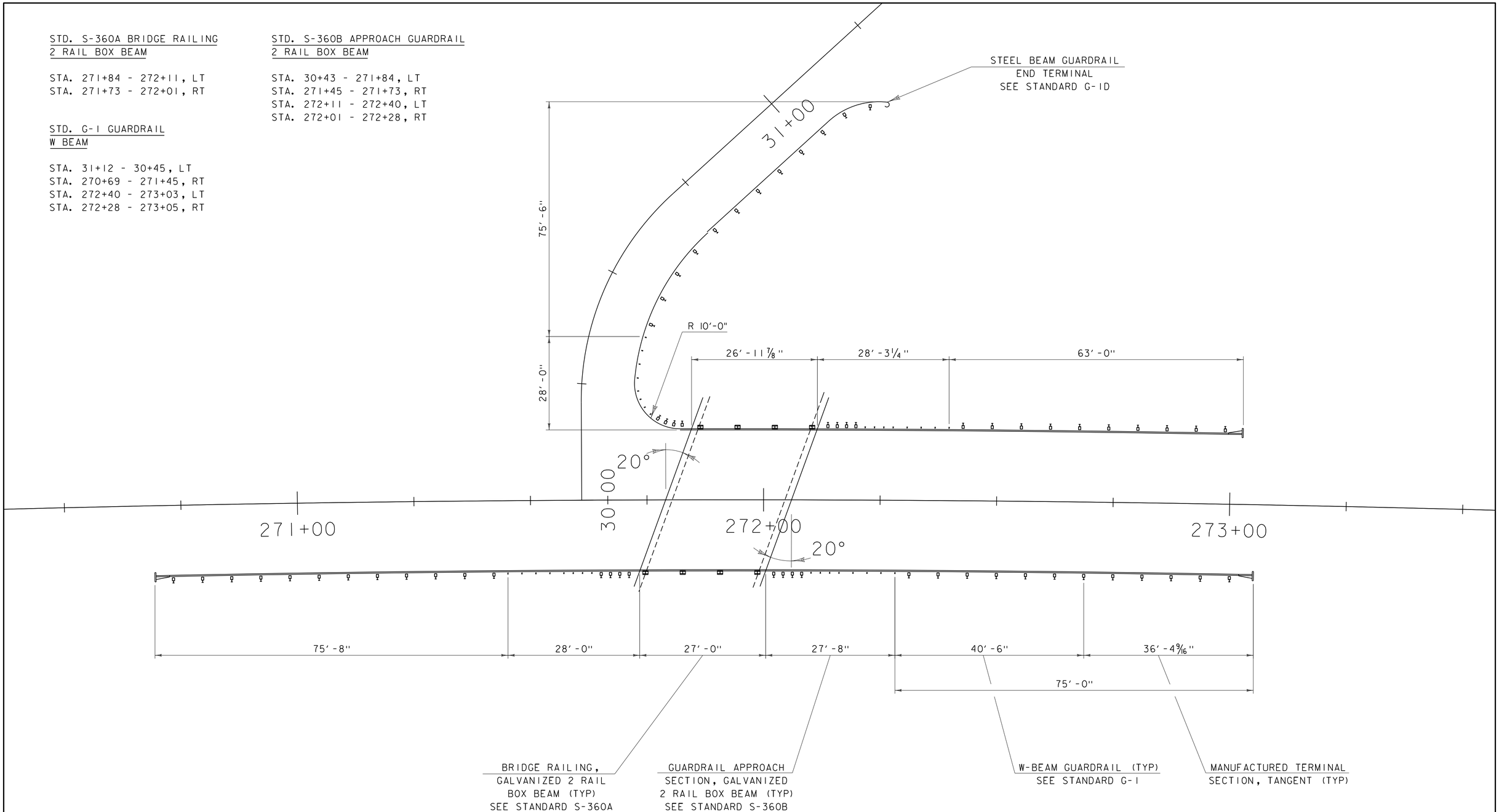
STA. 271+84 - 272+11, LT
STA. 271+73 - 272+01, RT

STD. G-1 GUARDRAIL
W BEAM

STA. 31+12 - 30+45, LT
STA. 270+69 - 271+45, RT
STA. 272+40 - 273+03, LT
STA. 272+28 - 273+05, RT

STD. S-360B APPROACH GUARDRAIL
2 RAIL BOX BEAM

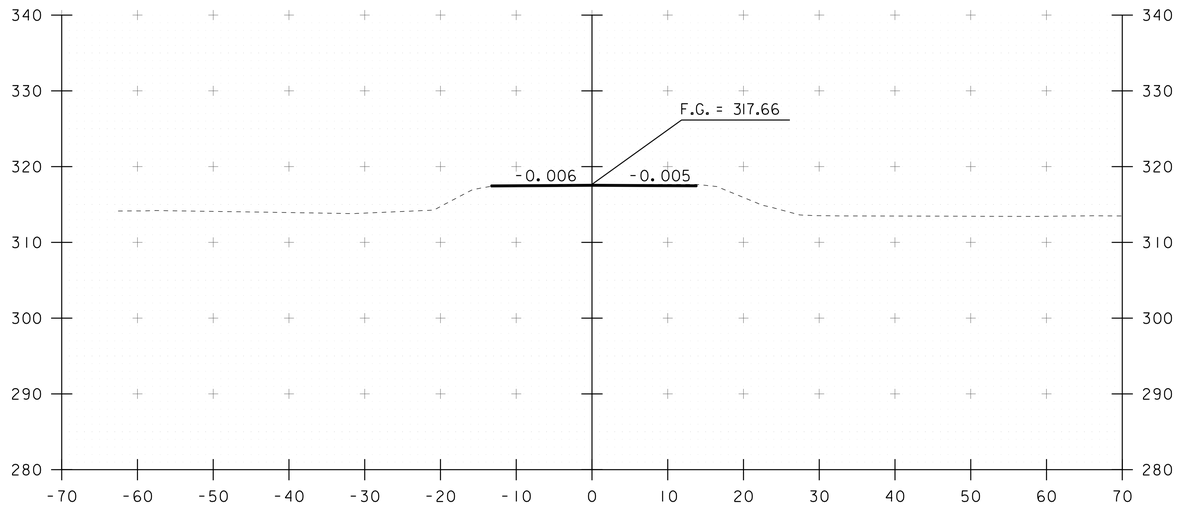
STA. 30+43 - 271+84, LT
STA. 271+45 - 271+73, RT
STA. 272+11 - 272+40, LT
STA. 272+01 - 272+28, RT



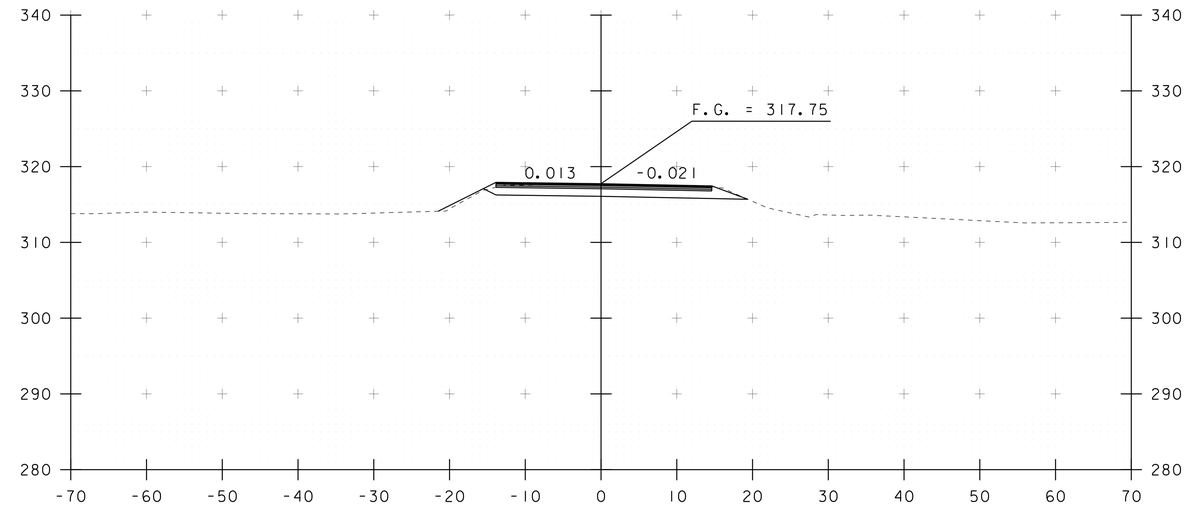
RAIL LAYOUT

SCALE 1" = 10'-0"
10 0 10

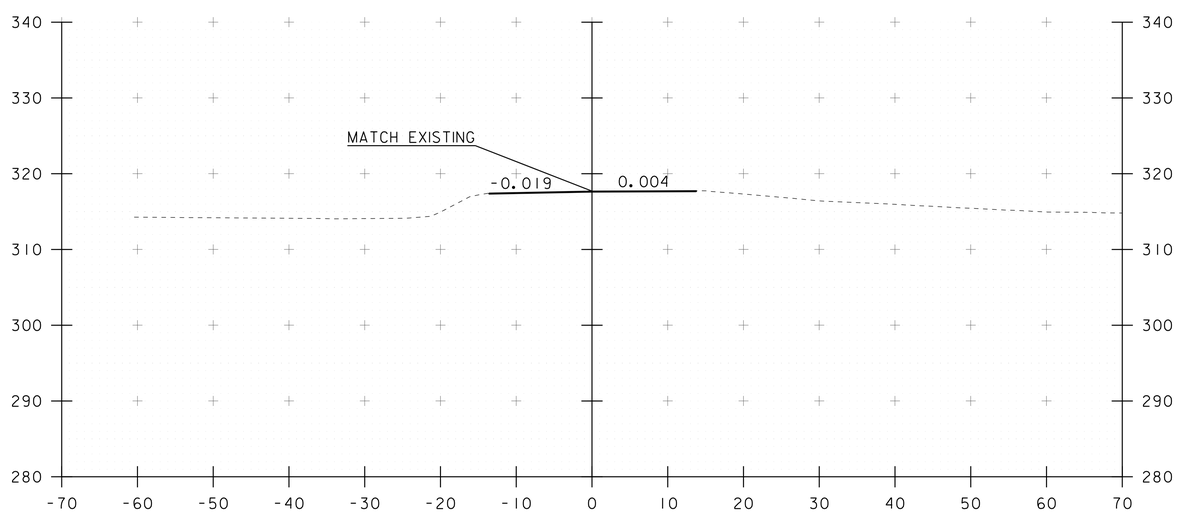
PROJECT NAME: RAIL LAYOUT	
PROJECT NUMBER: BF 0284 (28)	
FILE NAME: sl3c070rail	PLOT DATE: 23-JUN-2015
PROJECT LEADER: R. YOUNG	DRAWN BY: S. COLEY
DESIGNED BY: ------	CHECKED BY: ------
RAIL LAYOUT	SHEET 15 OF 31



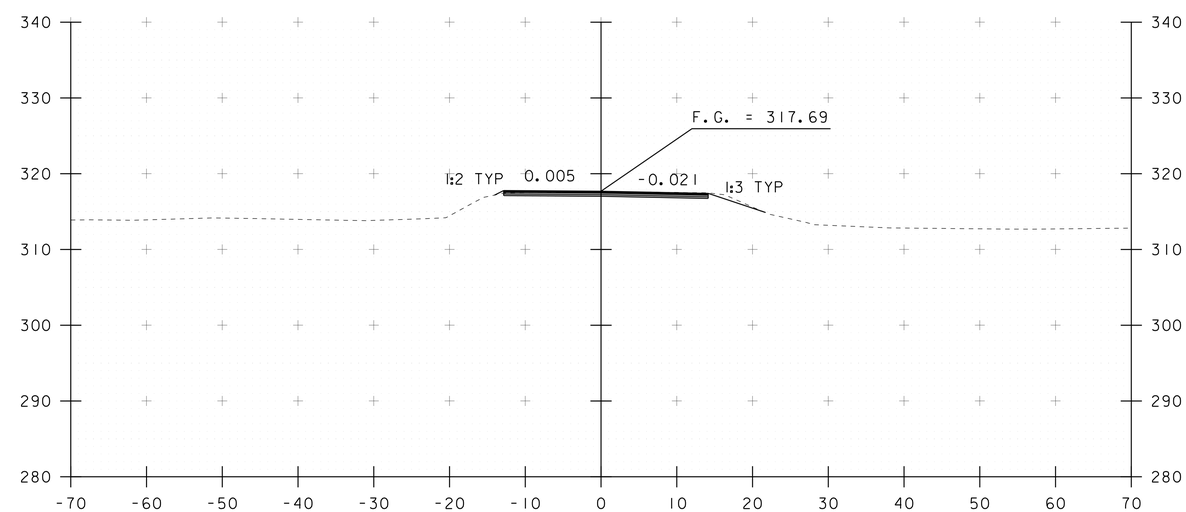
269+25



269+75



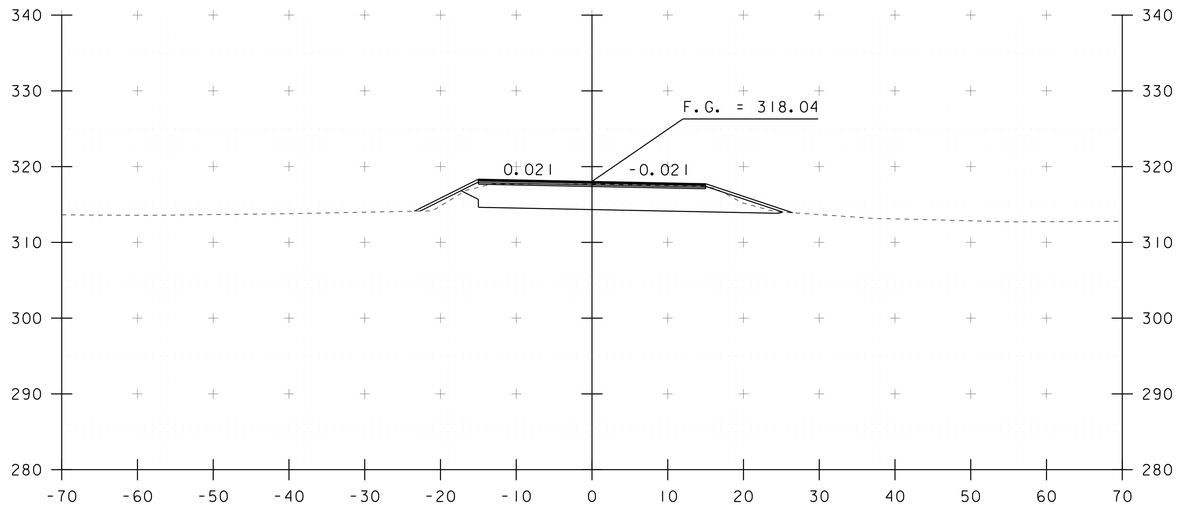
269+00
BEGIN APPROACH



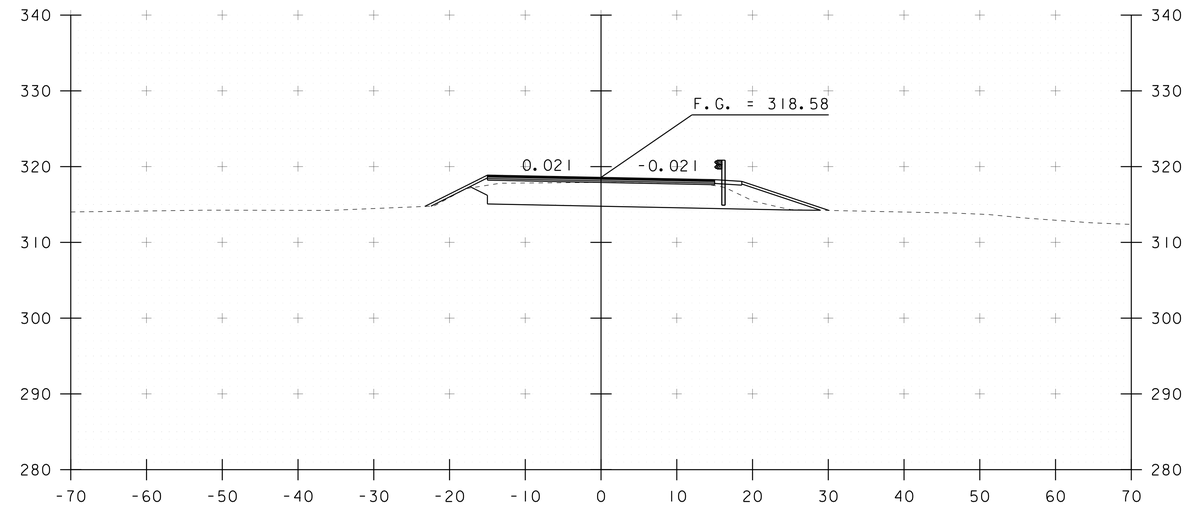
269+50

STA. 10+50 TO STA. 11+25

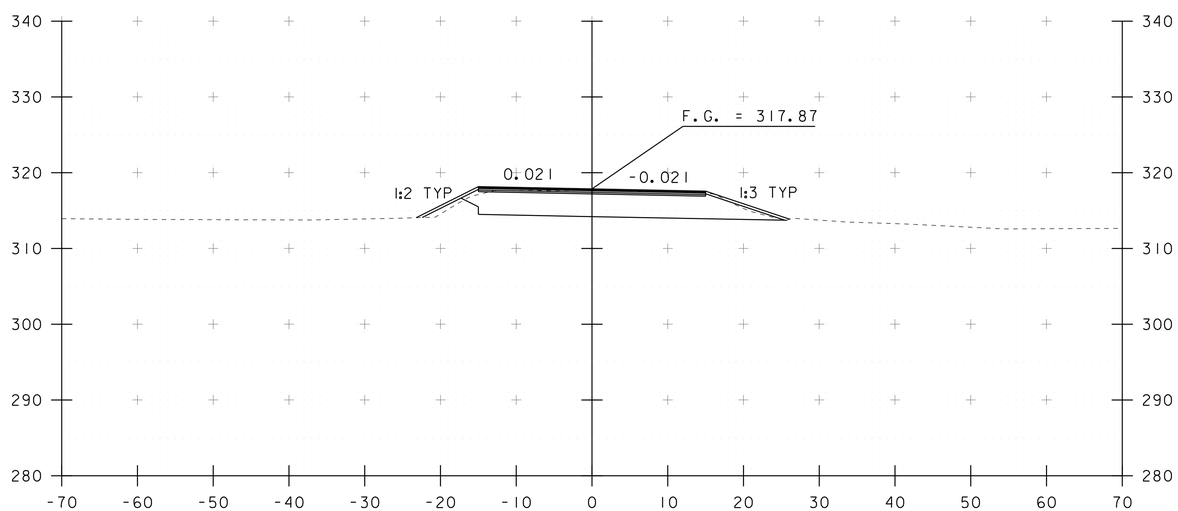
PROJECT NAME: RICHMOND	
PROJECT NUMBER: BF 0284(28)	
FILE NAME: s13c070xs.dgn	PLOT DATE: 23-JUN-2015
PROJECT LEADER: R. YOUNG	DRAWN BY: S. COLEY
DESIGNED BY: S. COLEY	CHECKED BY: W. LAMMER
ROADWAY CROSS SECTIONS 1	SHEET 16 OF 31



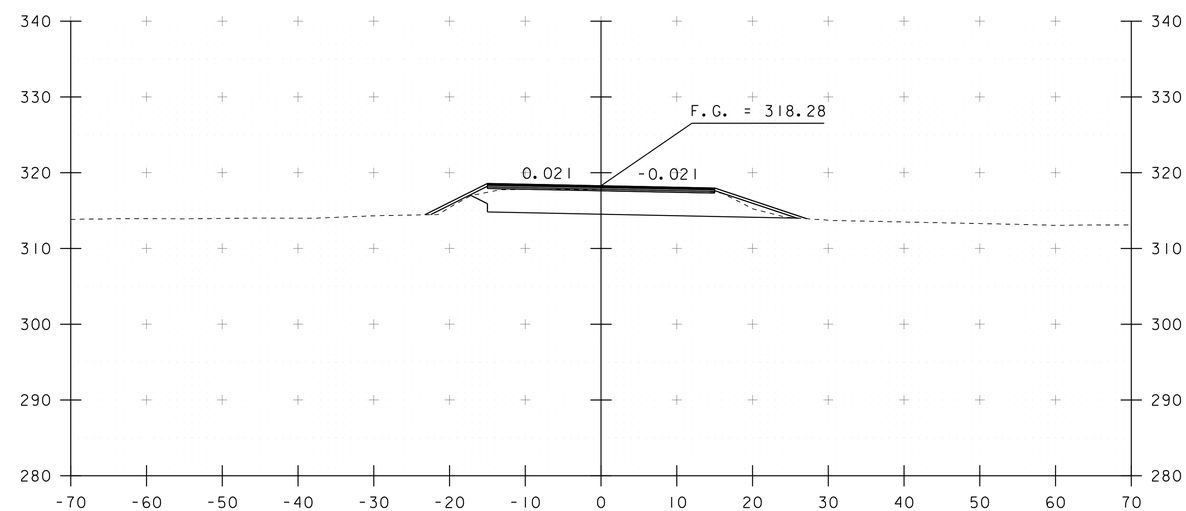
270+25



270+75



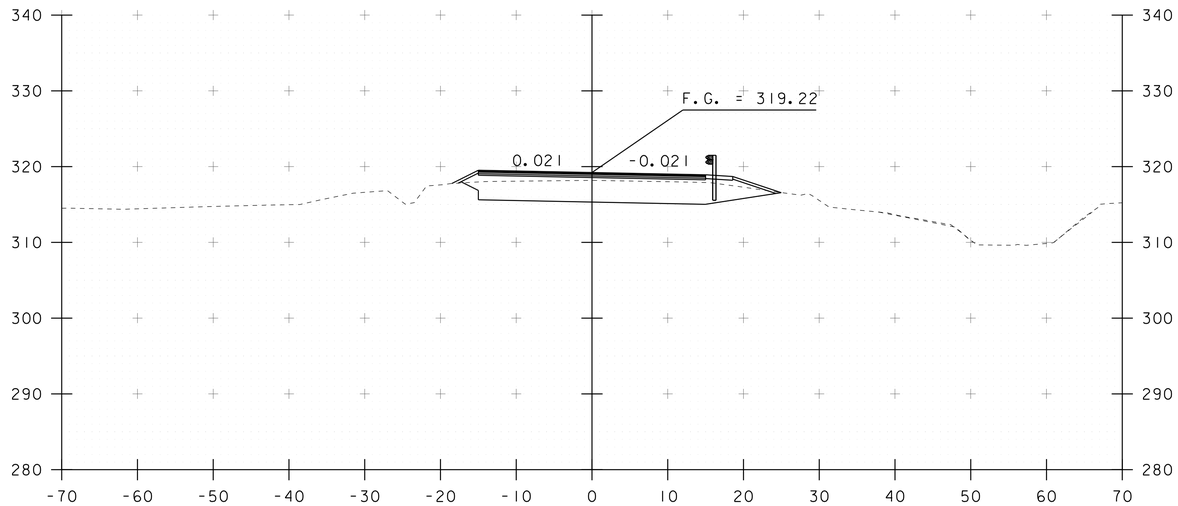
270+00
BEGIN PROJECT



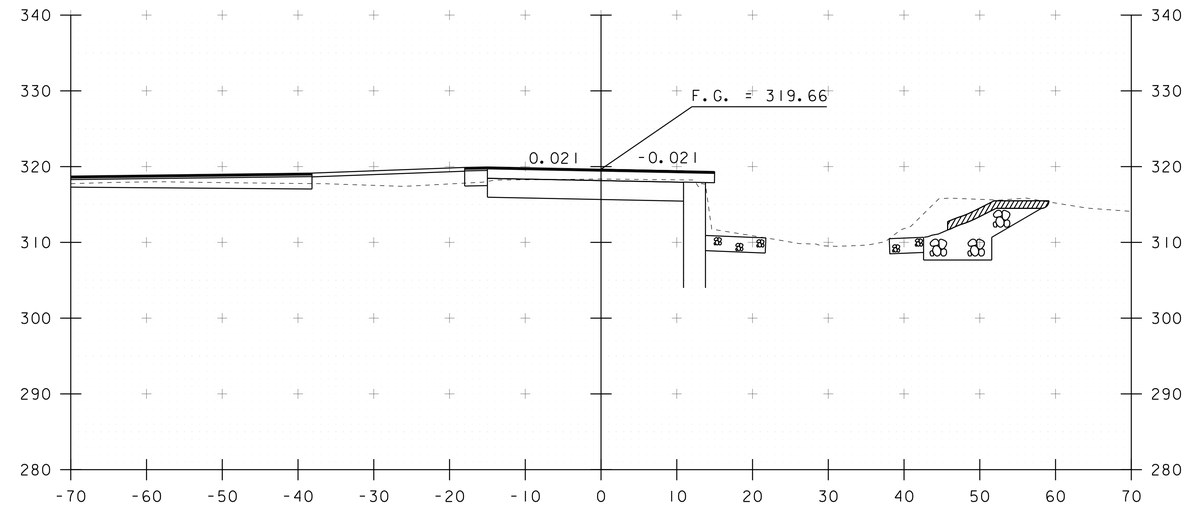
270+50

STA. 11+50 TO STA. 12+25

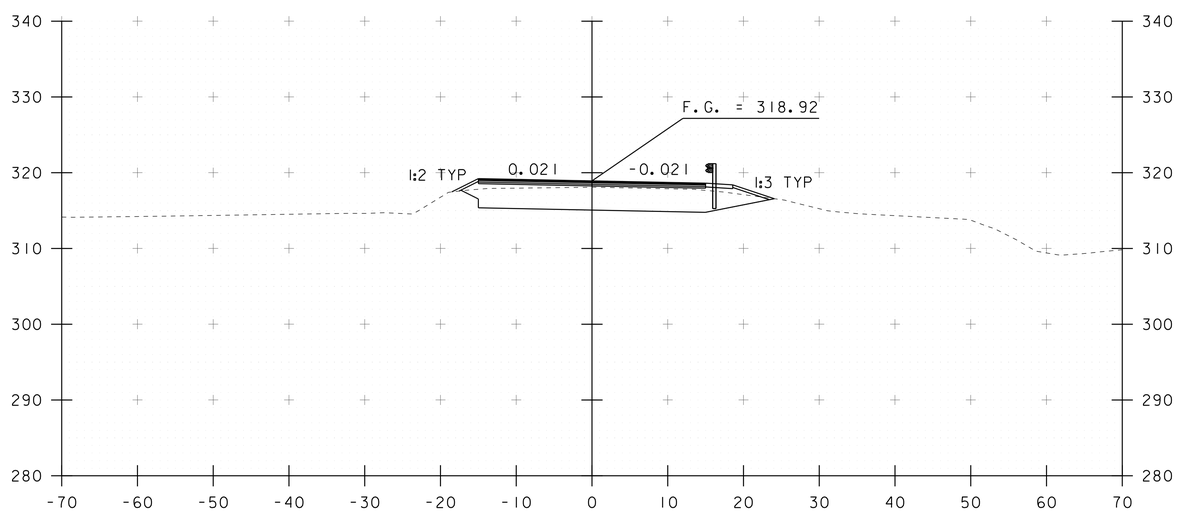
PROJECT NAME: RICHMOND	
PROJECT NUMBER: BF 0284(28)	
FILE NAME: s13c070xs.dgn	PLOT DATE: 23-JUN-2015
PROJECT LEADER: R. YOUNG	DRAWN BY: S. COLEY
DESIGNED BY: S. COLEY	CHECKED BY: W. LAMMER
ROADWAY CROSS SECTIONS 2	SHEET 17 OF 31



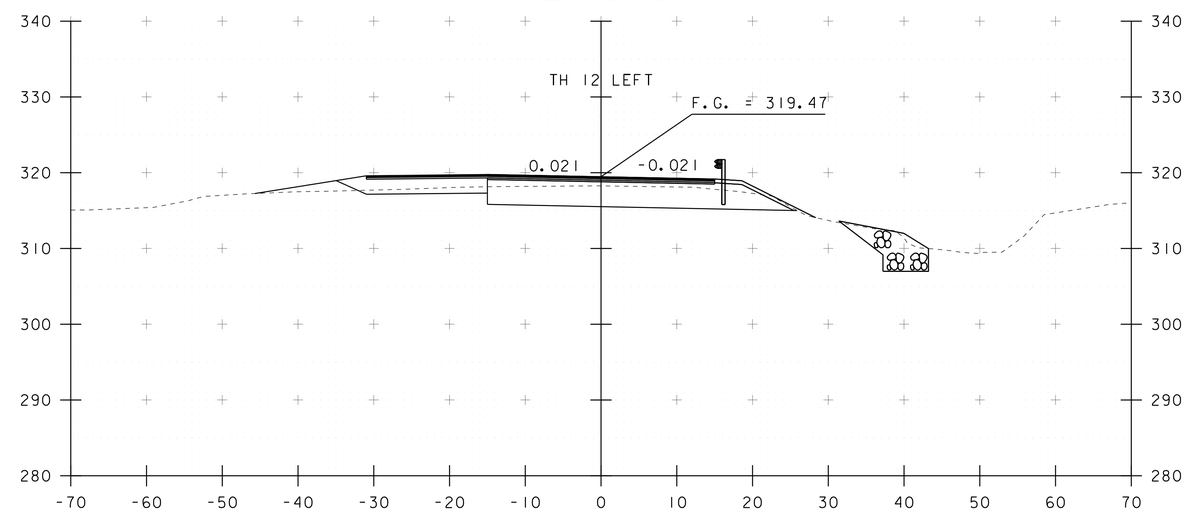
271+25



271+75
STA 271+79.00
BEGIN BRIDGE



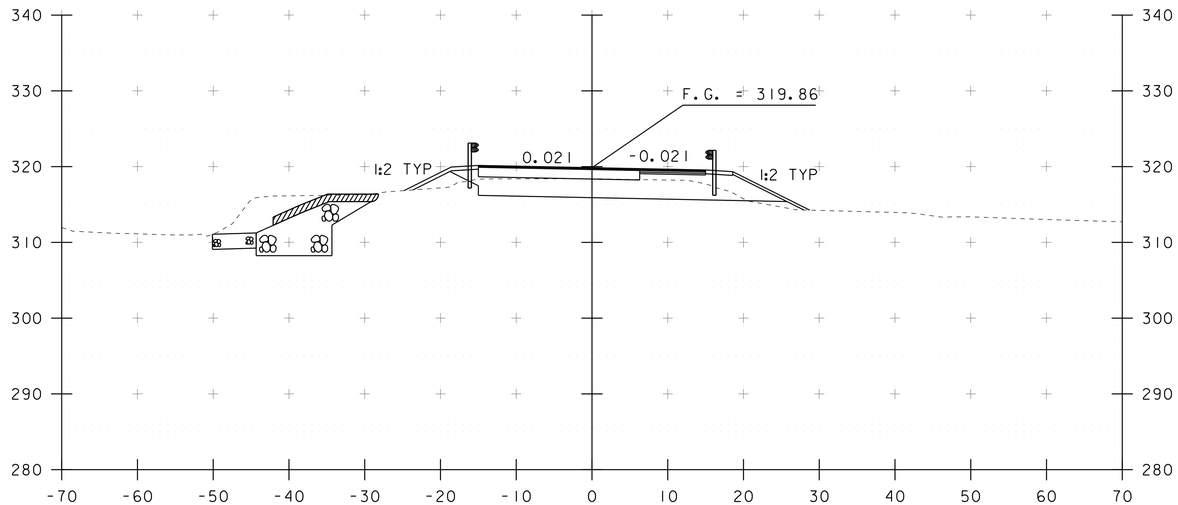
271+00



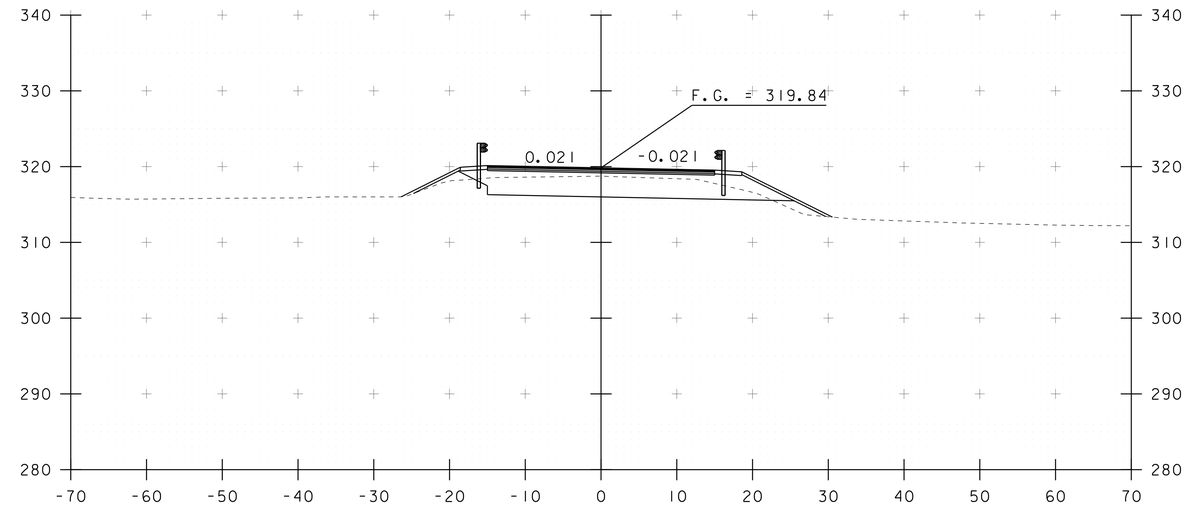
271+50

STA. 12+50 TO STA. 13+25

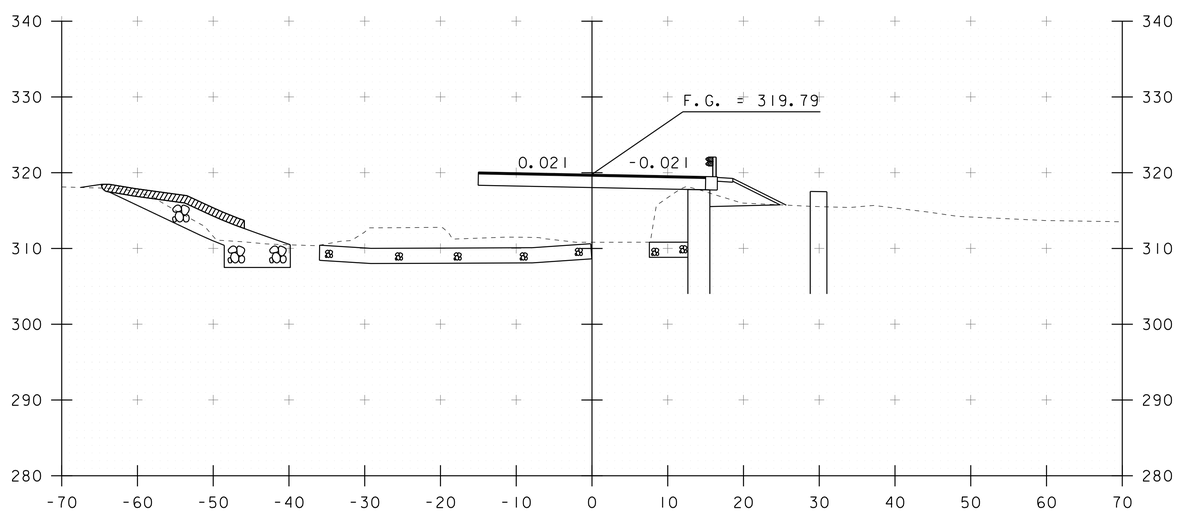
PROJECT NAME: RICHMOND	
PROJECT NUMBER: BF 0284(28)	
FILE NAME: s13c070xs.dgn	PLOT DATE: 23-JUN-2015
PROJECT LEADER: R. YOUNG	DRAWN BY: S. COLEY
DESIGNED BY: S. COLEY	CHECKED BY: W. LAMMER
ROADWAY CROSS SECTIONS 3	SHEET 18 OF 31



272+25

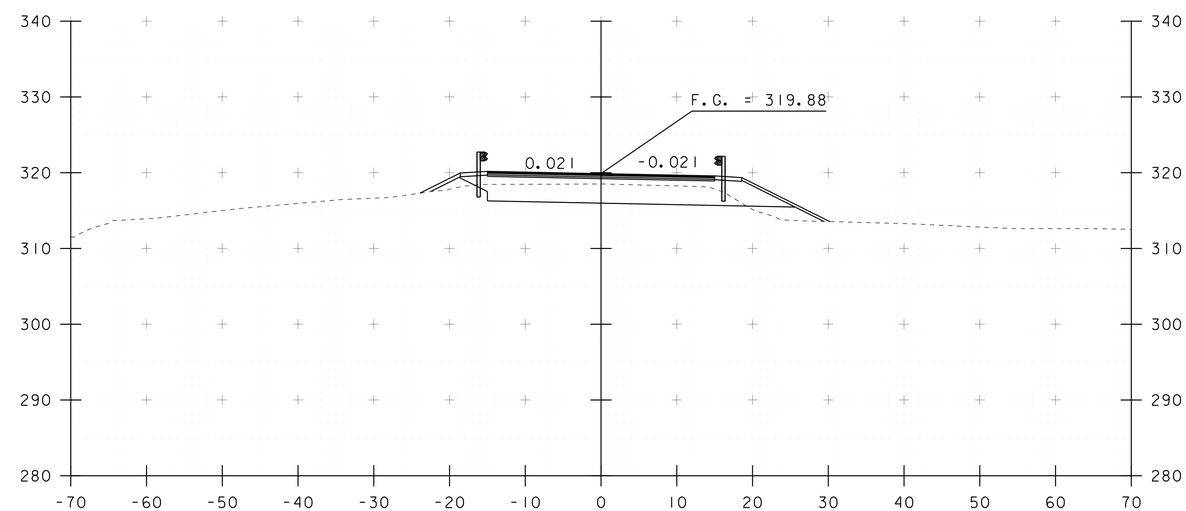


272+75



272+00

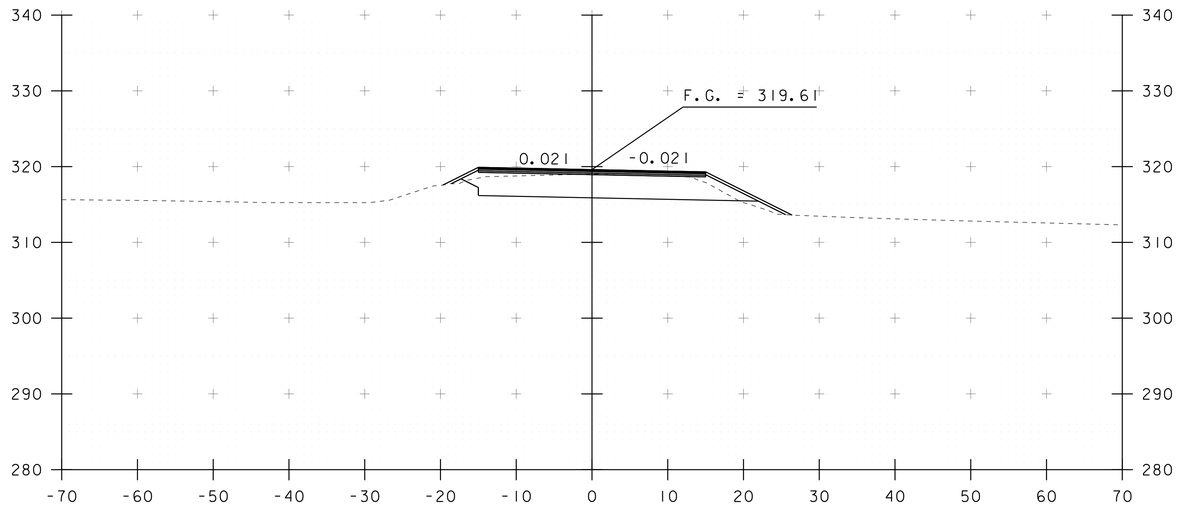
STA 272+06.00
END BRIDGE



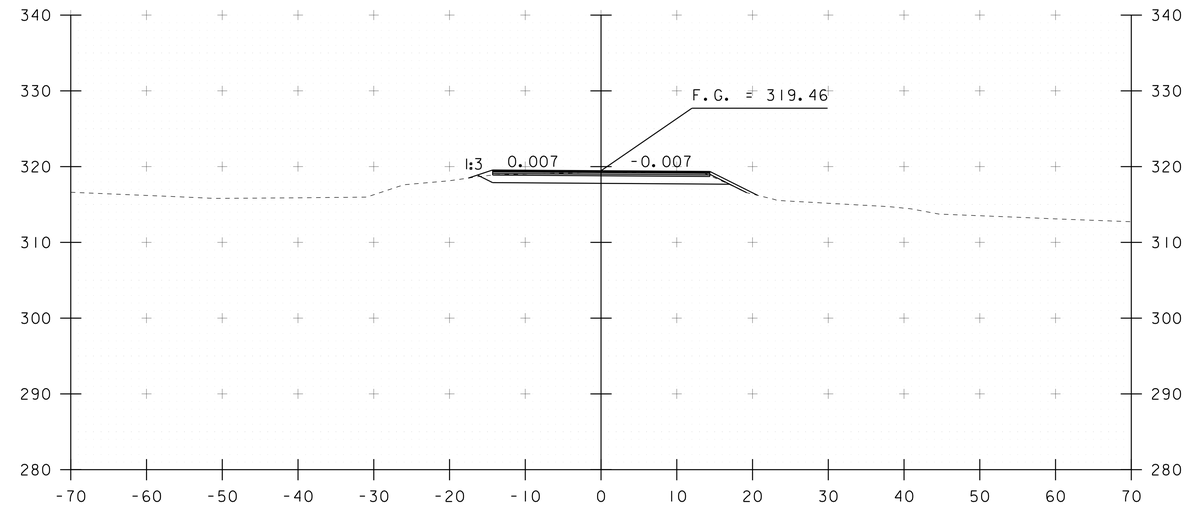
272+50

STA. 13+50 TO STA. 14+25

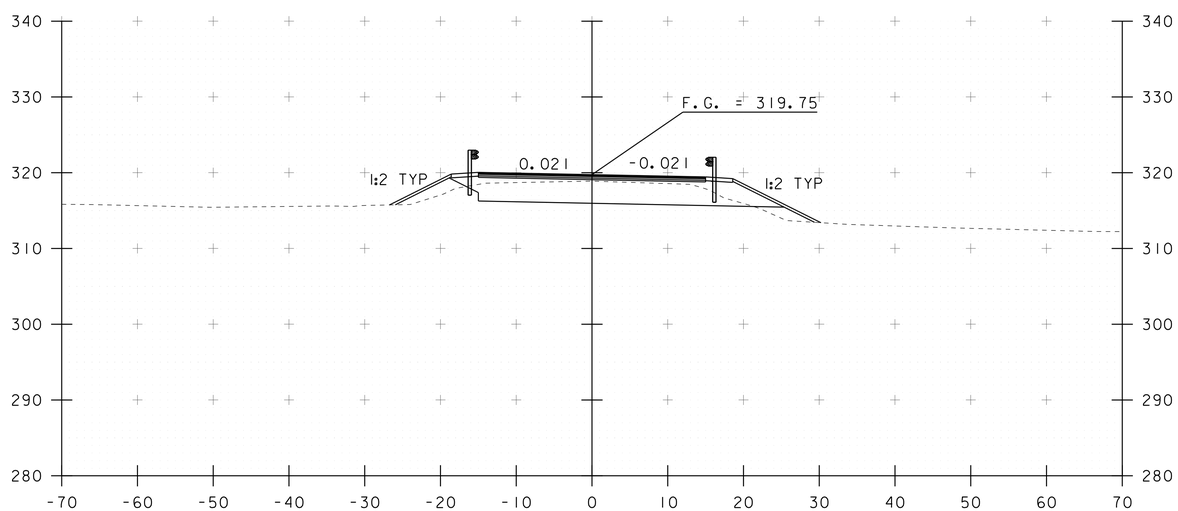
PROJECT NAME: RICHMOND	
PROJECT NUMBER: BF 0284(28)	
FILE NAME: s13c070xs.dgn	PLOT DATE: 23-JUN-2015
PROJECT LEADER: R.YOUNG	DRAWN BY: S. COLEY
DESIGNED BY: S. COLEY	CHECKED BY: W. LAMMER
ROADWAY CROSS SECTIONS 4	SHEET 19 OF 31



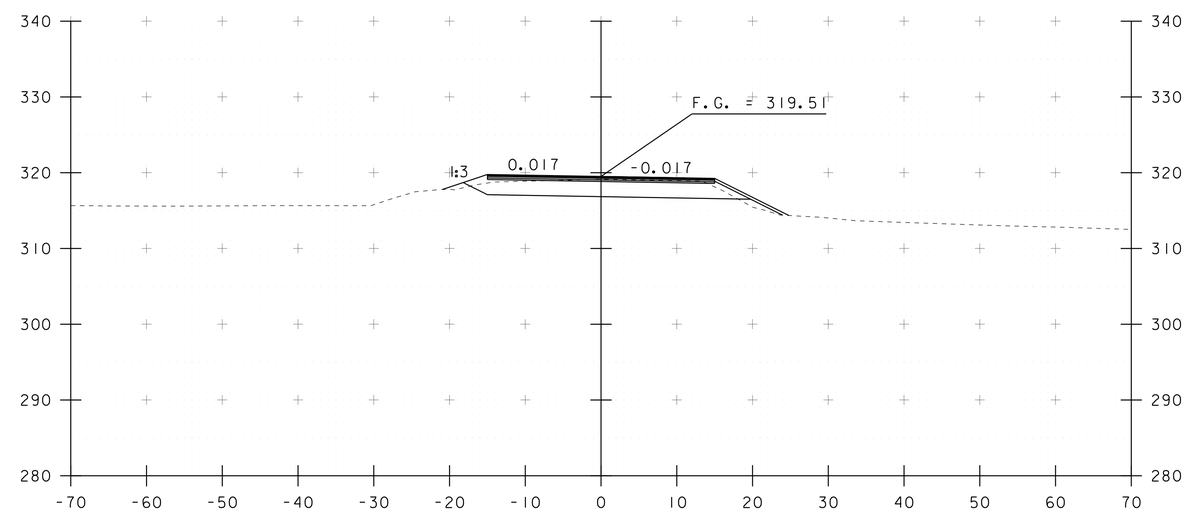
273+25



273+75



273+00

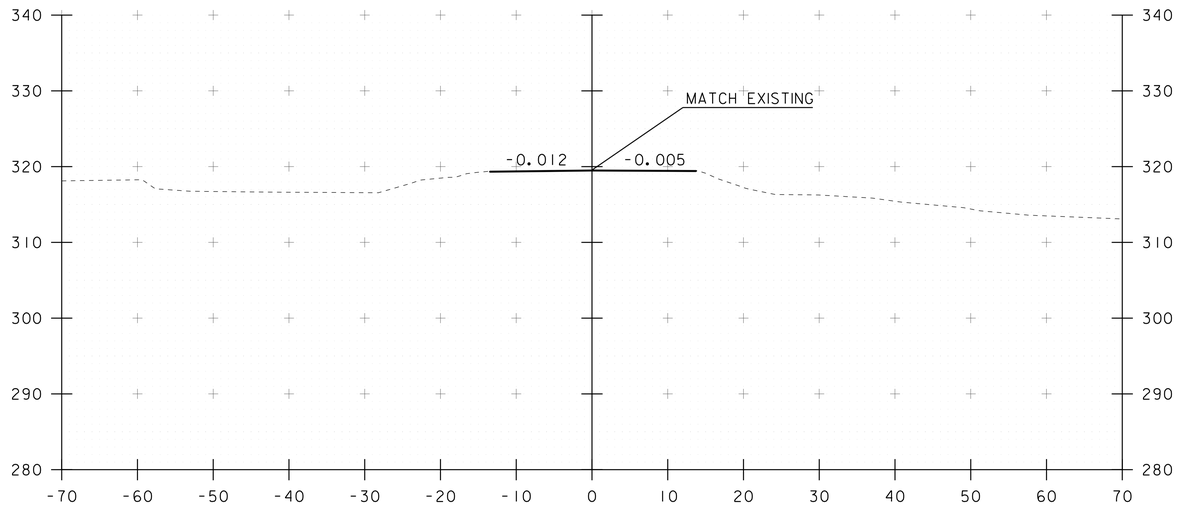


273+50

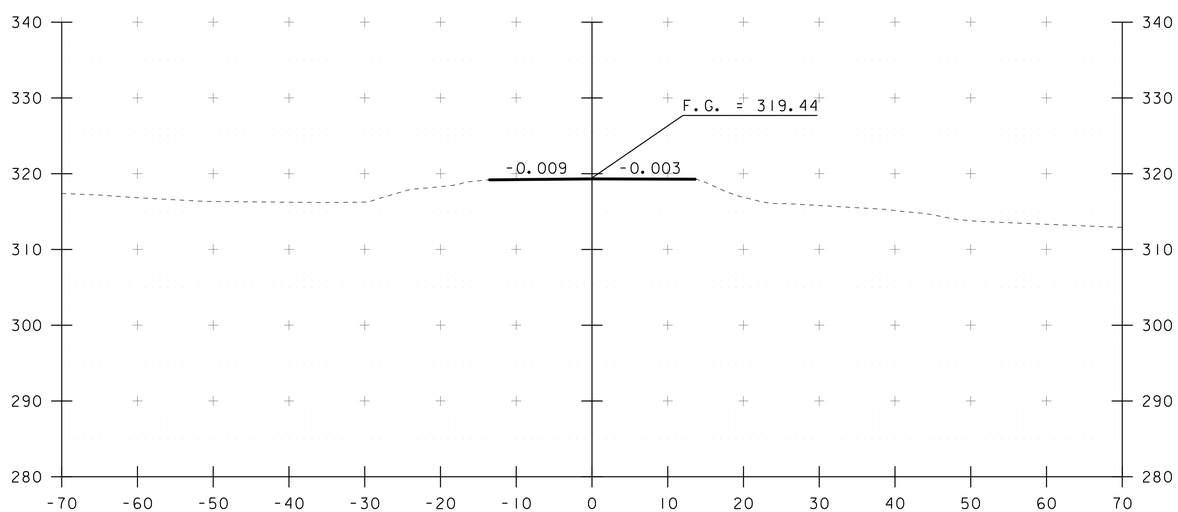
END PROJECT

STA. 14+50 TO STA. 15+25

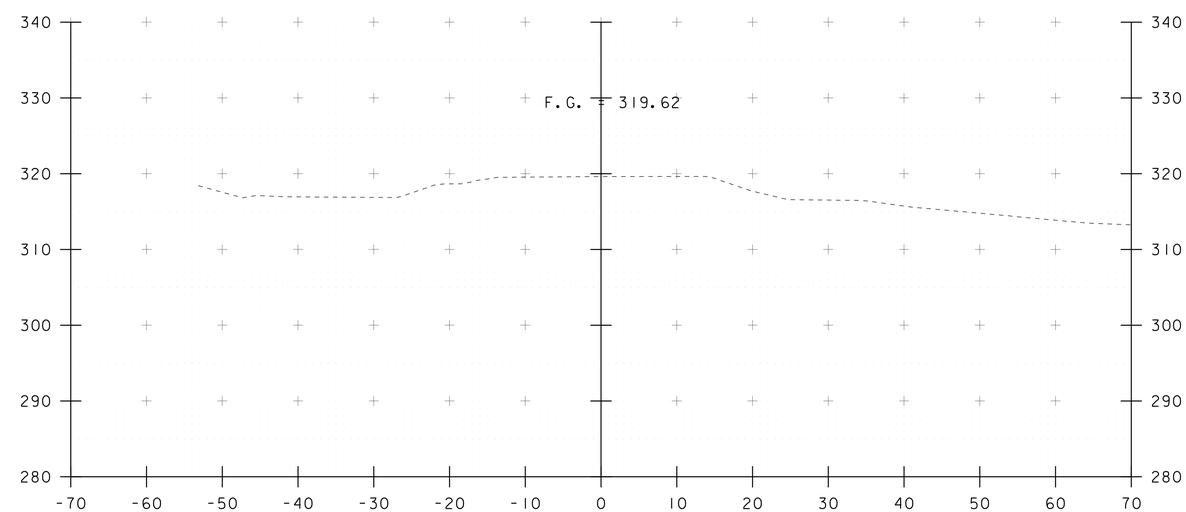
PROJECT NAME: RICHMOND	
PROJECT NUMBER: BF 0284(28)	
FILE NAME: s13c070xs.dgn	PLOT DATE: 23-JUN-2015
PROJECT LEADER: R. YOUNG	DRAWN BY: S. COLEY
DESIGNED BY: S. COLEY	CHECKED BY: W. LAMMER
ROADWAY CROSS SECTIONS 5	SHEET 20 OF 31



274+25



274+00



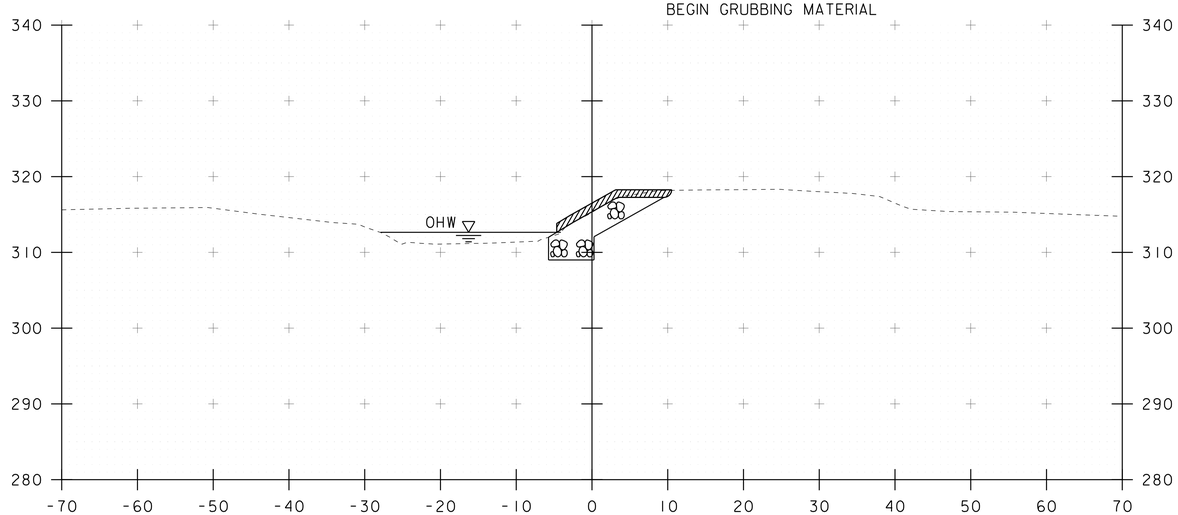
274+50

END APPROACH

STA. 15+50 TO STA. 16+00

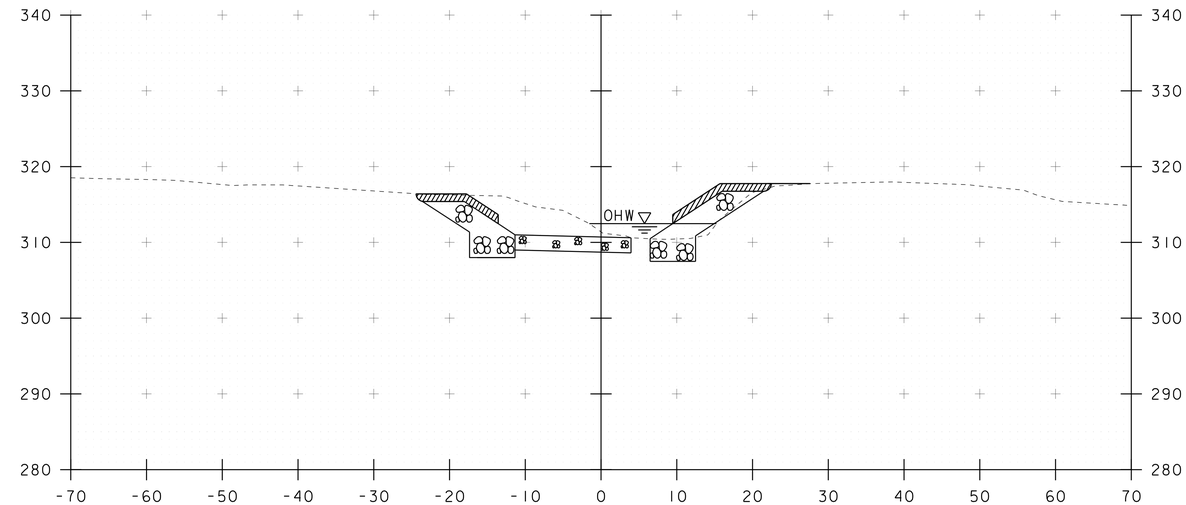
PROJECT NAME: RICHMOND	
PROJECT NUMBER: BF 0284(28)	
FILE NAME: sl3c070xs.dgn	PLOT DATE: 23-JUN-2015
PROJECT LEADER: R. YOUNG	DRAWN BY: S. COLEY
DESIGNED BY: S. COLEY	CHECKED BY: W. LAMMER
ROADWAY CROSS SECTIONS 6	SHEET 21 OF 31

STA 50+25 RT
BEGIN UNCLASSIFIED CHANNEL EXCAVATION
BEGIN STONE FILL, TYPE III
BEGIN GEOTEXTILE UNDER STONE FILL
BEGIN GRUBBING MATERIAL

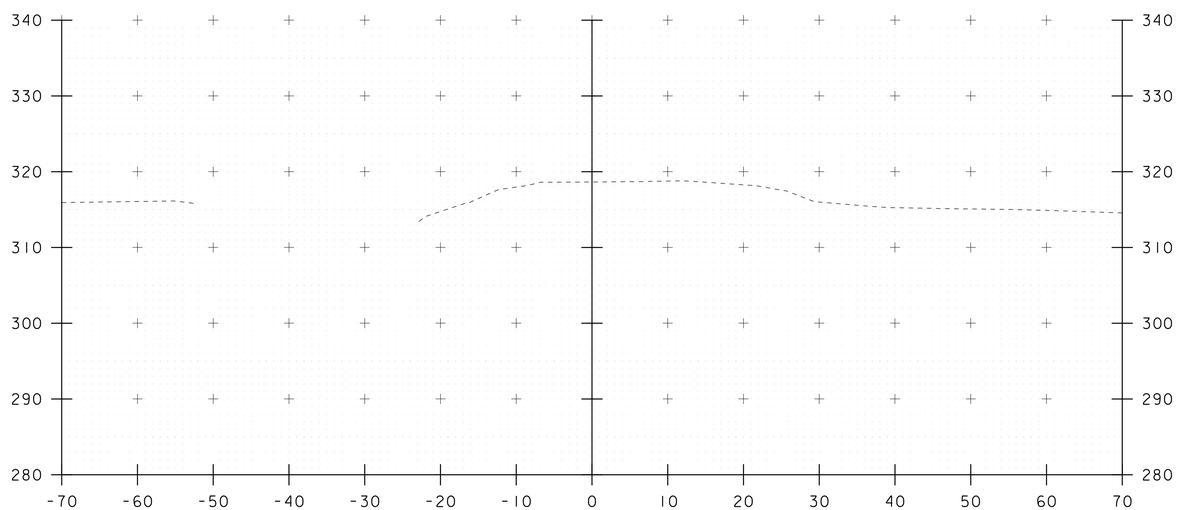


50+25

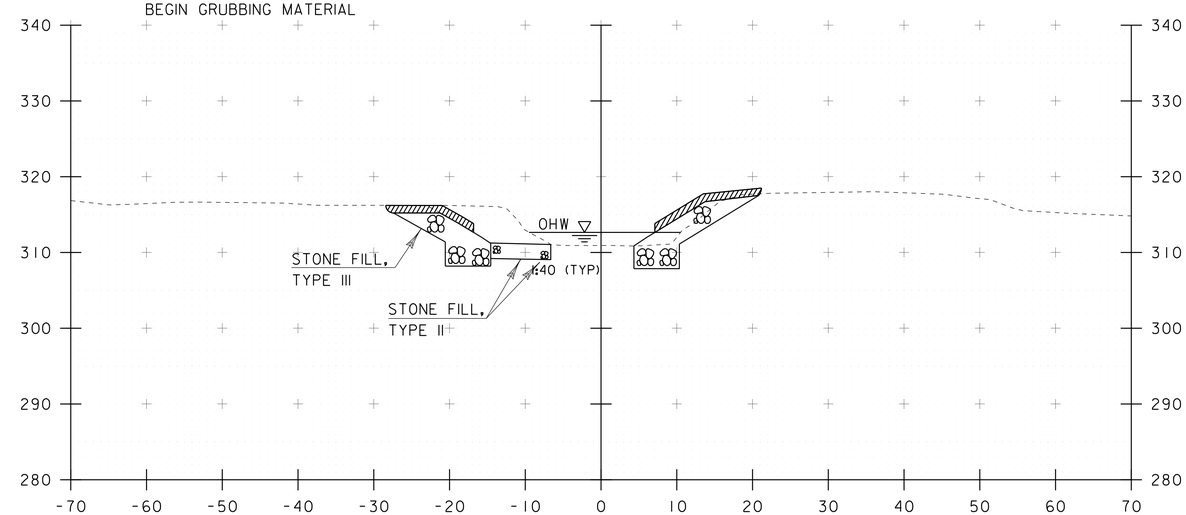
STA 50+34.09 LT
BEGIN UNCLASSIFIED CHANNEL EXCAVATION
BEGIN STONE FILL, TYPE III & II
BEGIN GEOTEXTILE UNDER STONE FILL
BEGIN GRUBBING MATERIAL



50+60



50+00

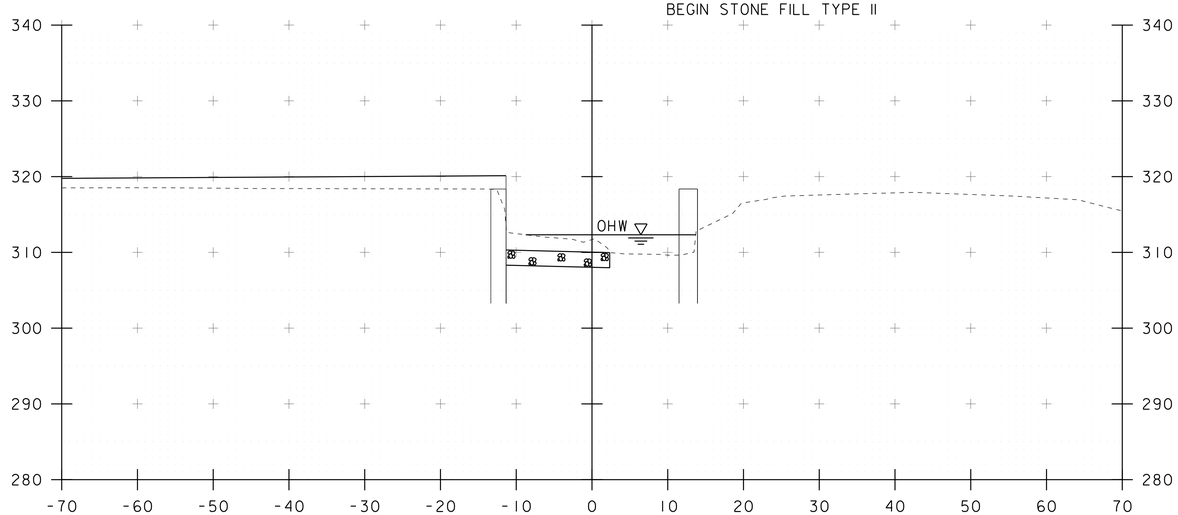


50+50

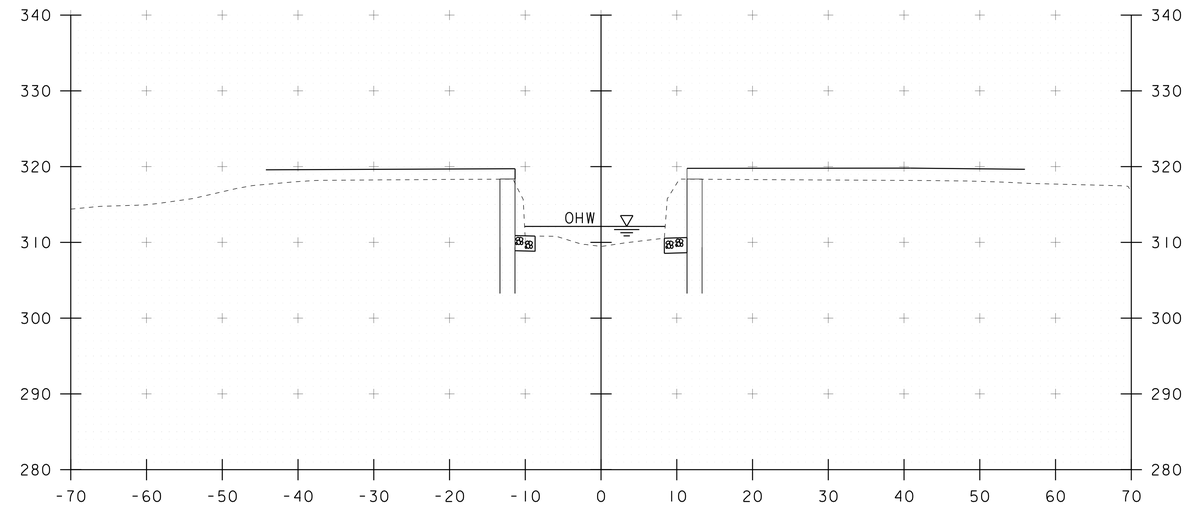
STA. 50+00 TO STA. 50+60

PROJECT NAME: RICHMOND	
PROJECT NUMBER: BF 0284(28)	
FILE NAME: sl3c070xs.dgn	PLOT DATE: 23-JUN-2015
PROJECT LEADER: R. YOUNG	DRAWN BY: S. COLEY
DESIGNED BY: S. COLEY	CHECKED BY: W. LAMMER
CHANNEL CROSS SECTIONS I	SHEET 22 OF 31

STA 50+80 RT
END STONE FILL, TYPE III
END GEOTEXTILE UNDER STONE FILL
END GRUBBING MATERIAL
BEGIN STONE FILL TYPE II

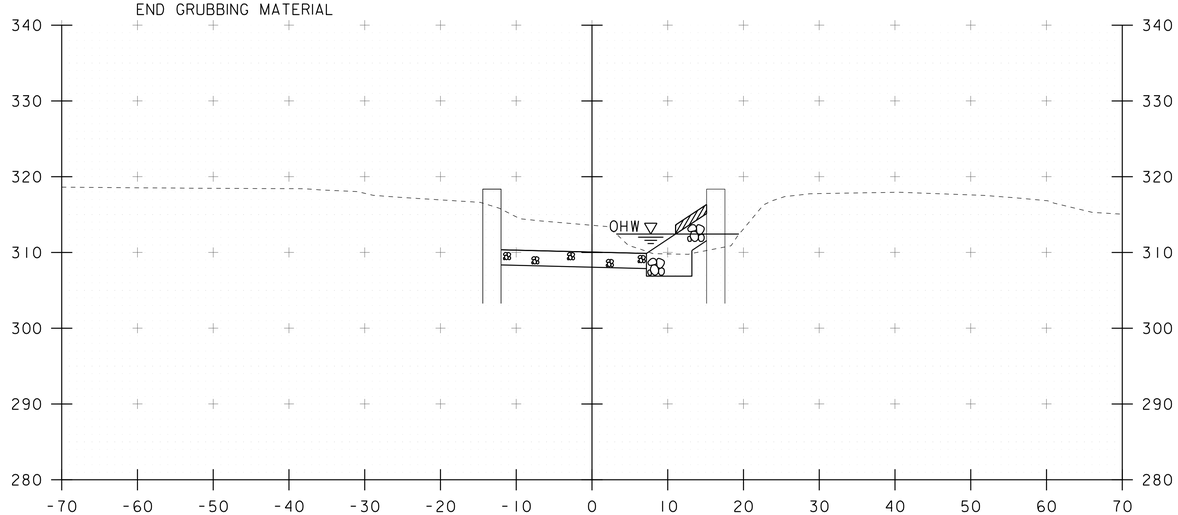


50+80

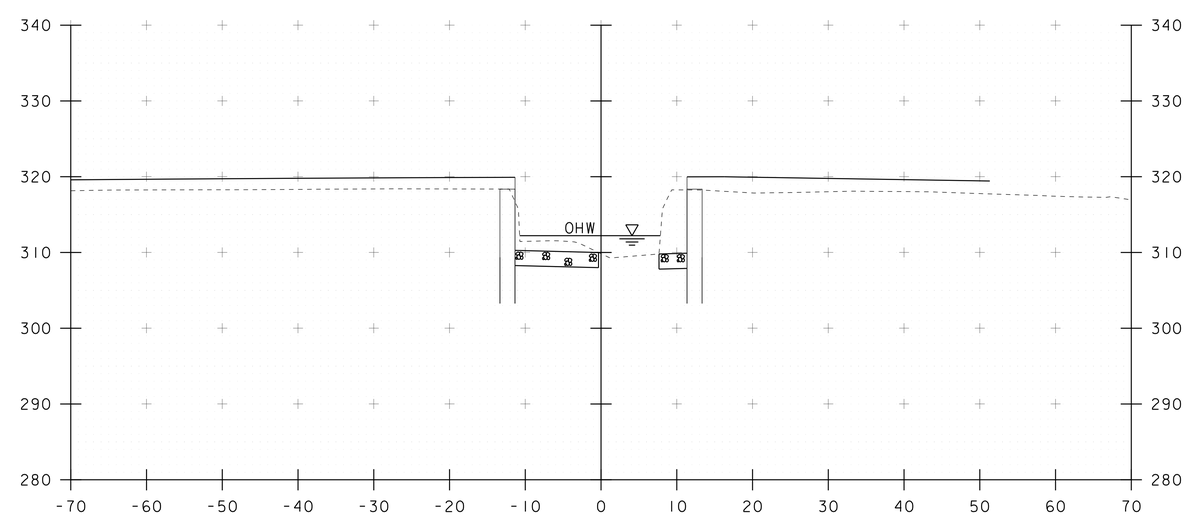


51+00

STA 50+72.77 LT
END STONE FILL, TYPE III
END GEOTEXTILE UNDER STONE FILL
END GRUBBING MATERIAL



50+70



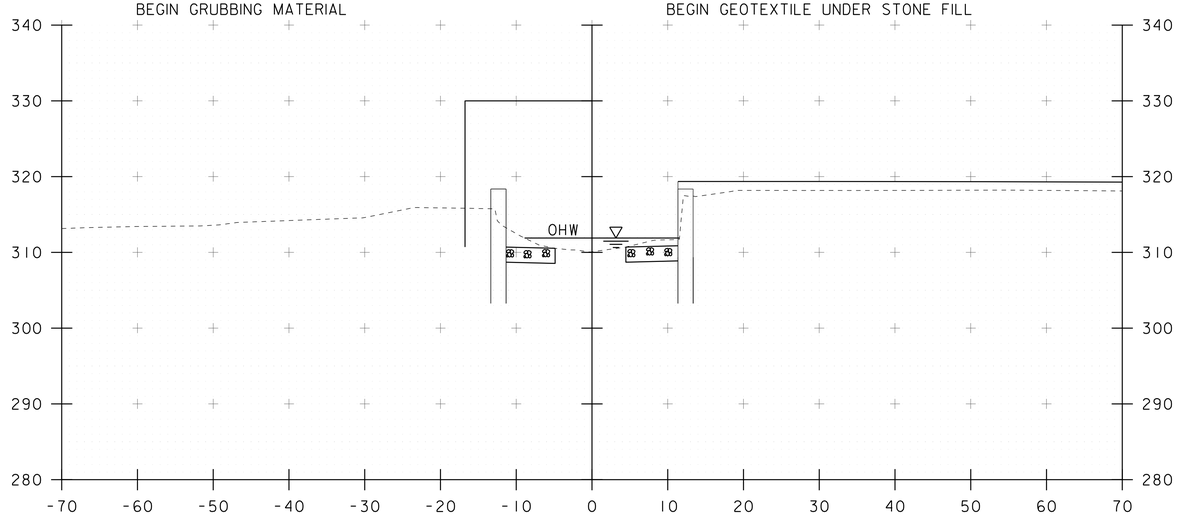
50+90

STA. 50+70 TO STA. 51+00

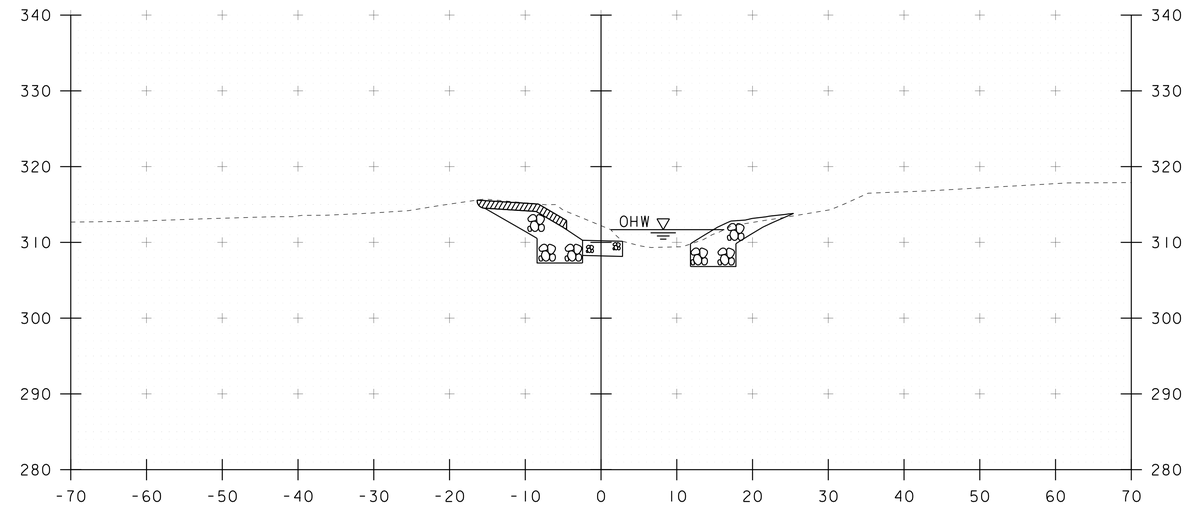
PROJECT NAME: RICHMOND	
PROJECT NUMBER: BF 0284(28)	
FILE NAME: sl3c070xs.dgn	PLOT DATE: 23-JUN-2015
PROJECT LEADER: R. YOUNG	DRAWN BY: S. COLEY
DESIGNED BY: S. COLEY	CHECKED BY: W. LAMMER
CHANNEL CROSS SECTIONS 2	SHEET 23 OF 31

STA 51+20.49 LT
BEGIN STONE FILL, TYPE III
BEGIN GEOTEXTILE UNDER STONE FILL
BEGIN GRUBBING MATERIAL

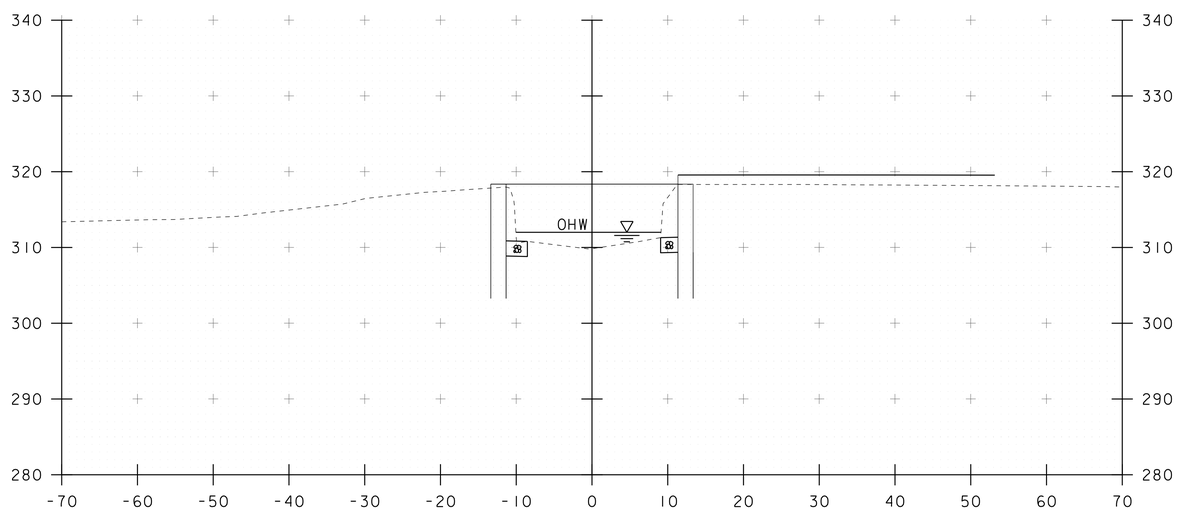
STA 51+28.20 RT
END STONE FILL, TYPE II
BEGIN STONE FILL, TYPE III
BEGIN GEOTEXTILE UNDER STONE FILL



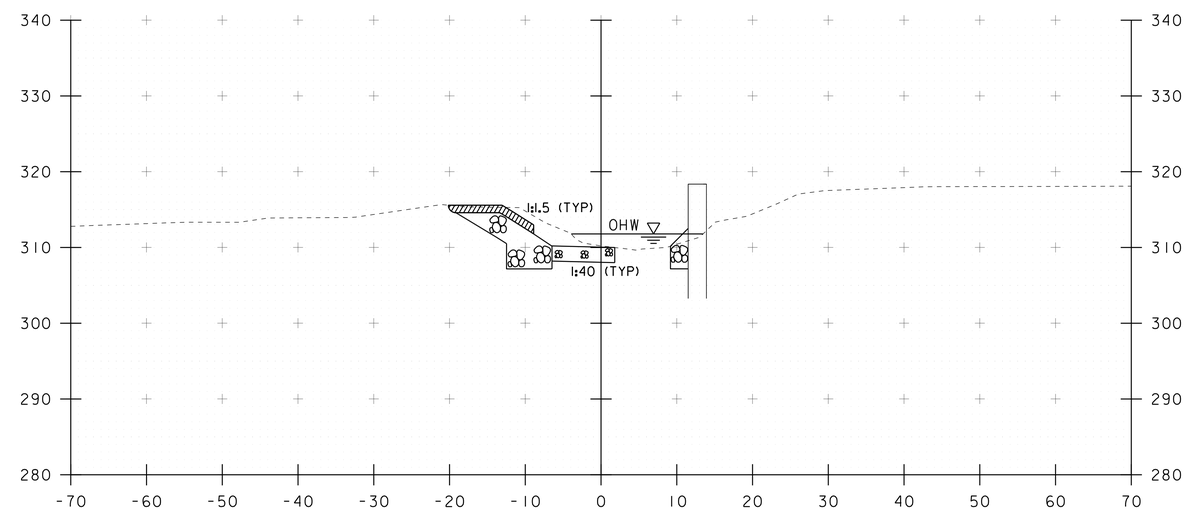
51+20



51+40



51+10

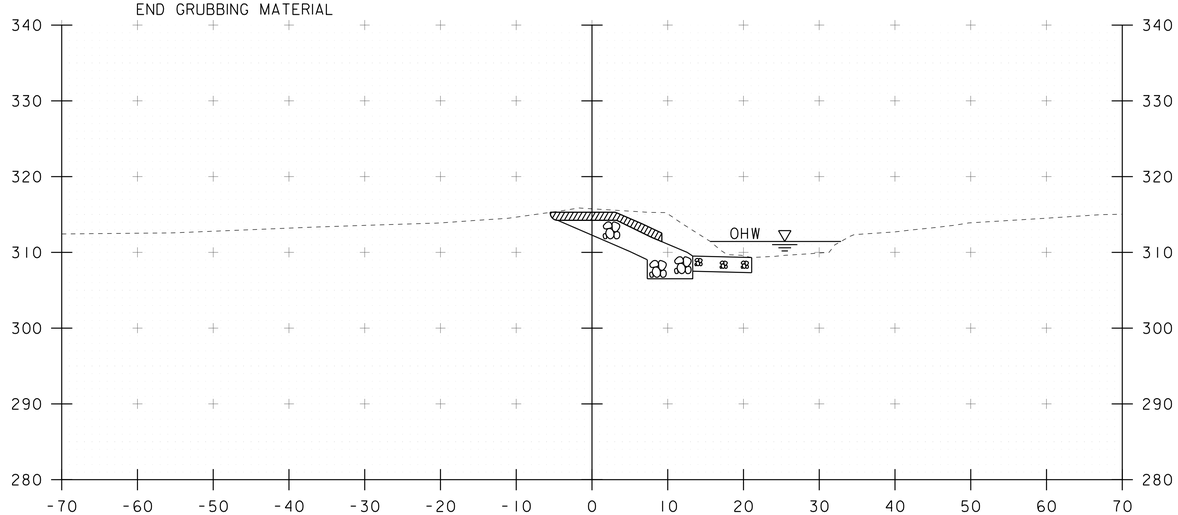


51+30

STA. 51+10 TO STA. 51+40

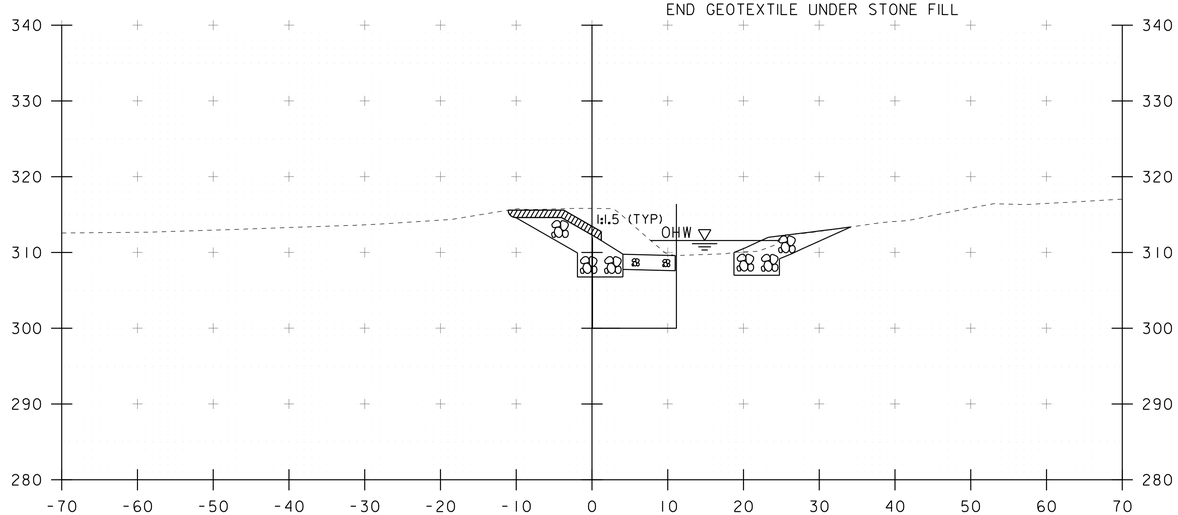
PROJECT NAME: RICHMOND	
PROJECT NUMBER: BF 0284(28)	
FILE NAME: s13c070xs.dgn	PLOT DATE: 23-JUN-2015
PROJECT LEADER: R. YOUNG	DRAWN BY: S. COLEY
DESIGNED BY: S. COLEY	CHECKED BY: W. LAMMER
CHANNEL CROSS SECTIONS 3	SHEET 24 OF 31

STA 51+71.89 LT
END UNCLASSIFIED CHANNEL EXCAVATION
END STONE FILL, TYPE III & II
END GEOTEXTILE UNDER STONE FILL
END GRUBBING MATERIAL

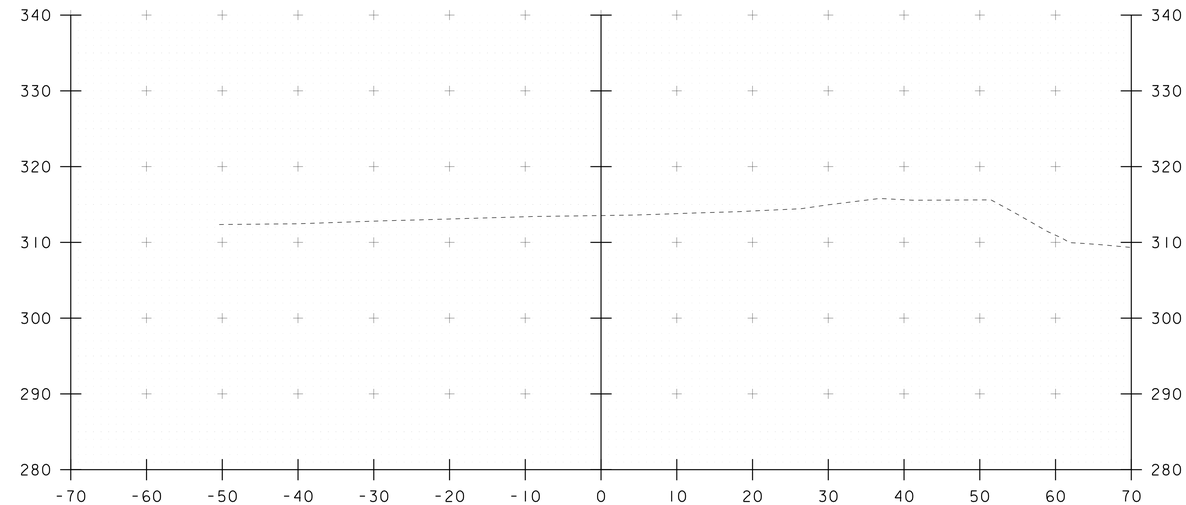


51+60

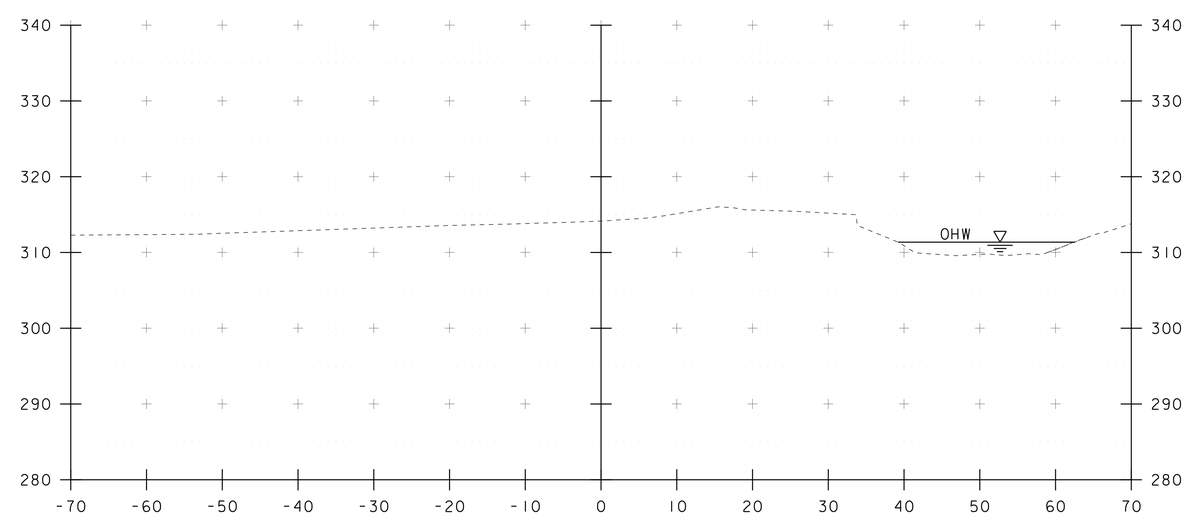
STA 51+59.42 RT
END UNCLASSIFIED CHANNEL EXCAVATION
END STONE FILL, TYPE III
END GEOTEXTILE UNDER STONE FILL



51+50



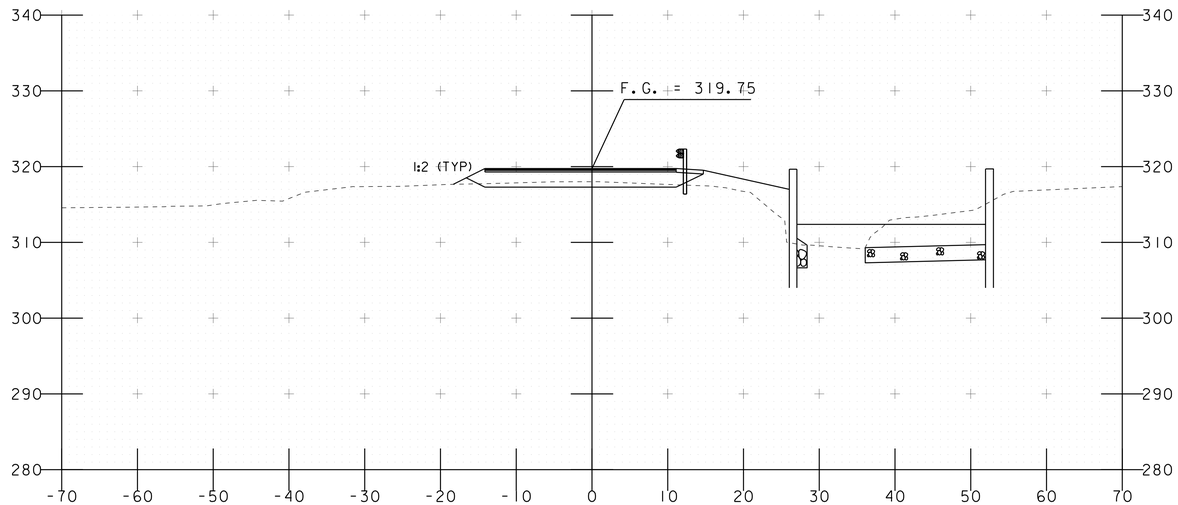
52+00



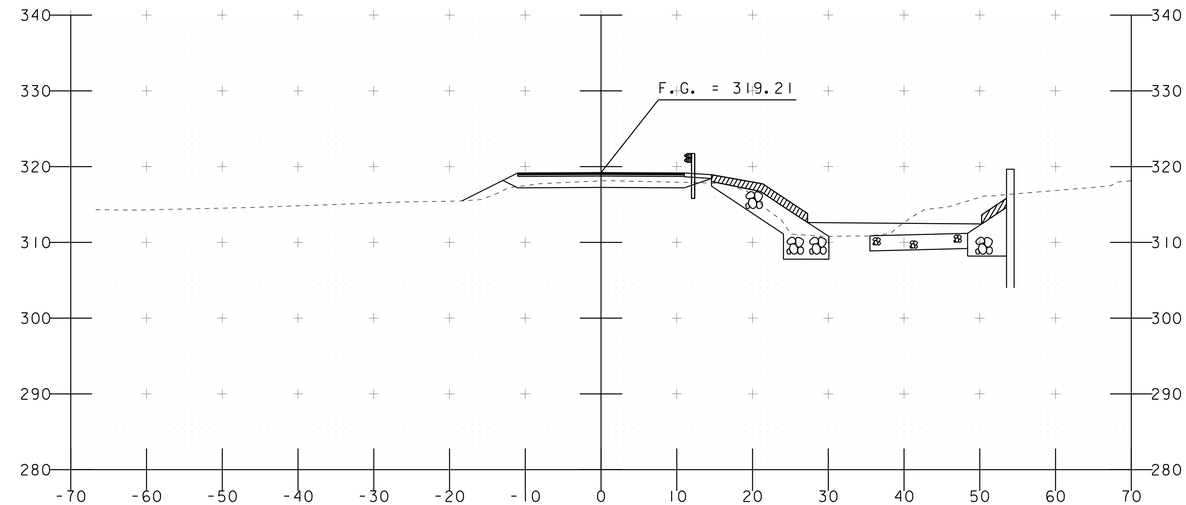
51+80

STA. 51+50 TO STA. 52+00

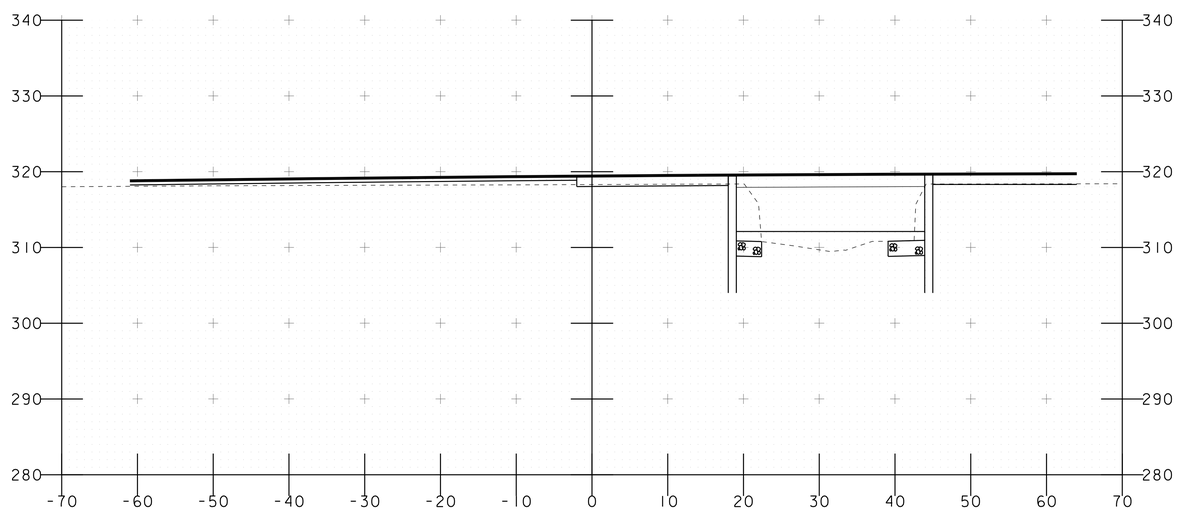
PROJECT NAME: RICHMOND	
PROJECT NUMBER: BF 0284(28)	
FILE NAME: s13c070xs.dgn	PLOT DATE: 23-JUN-2015
PROJECT LEADER: R. YOUNG	DRAWN BY: S. COLEY
DESIGNED BY: S. COLEY	CHECKED BY: W. LAMMER
CHANNEL CROSS SECTIONS 4	SHEET 25 OF 31



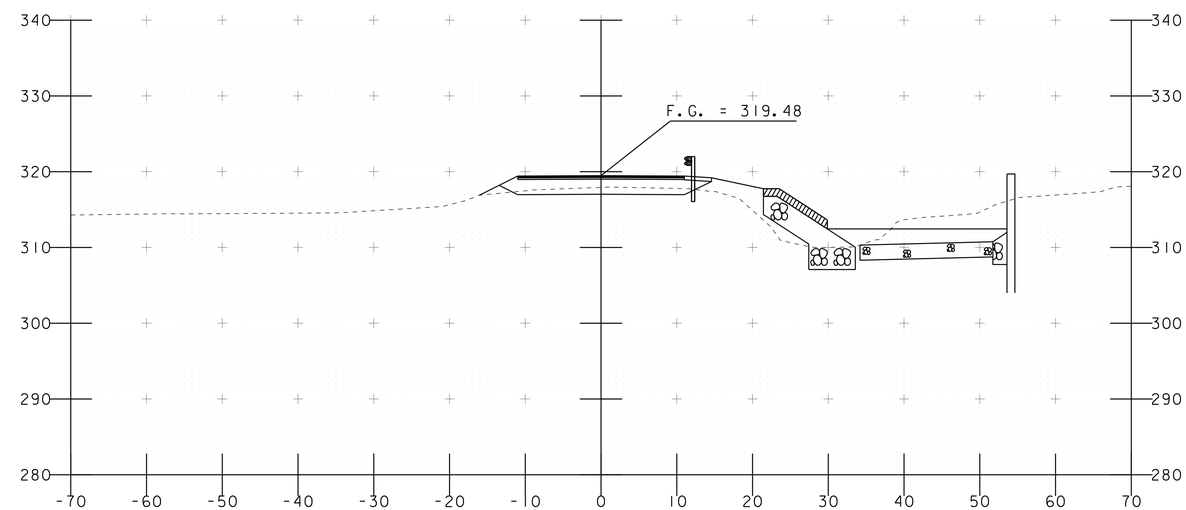
30+25



30+75



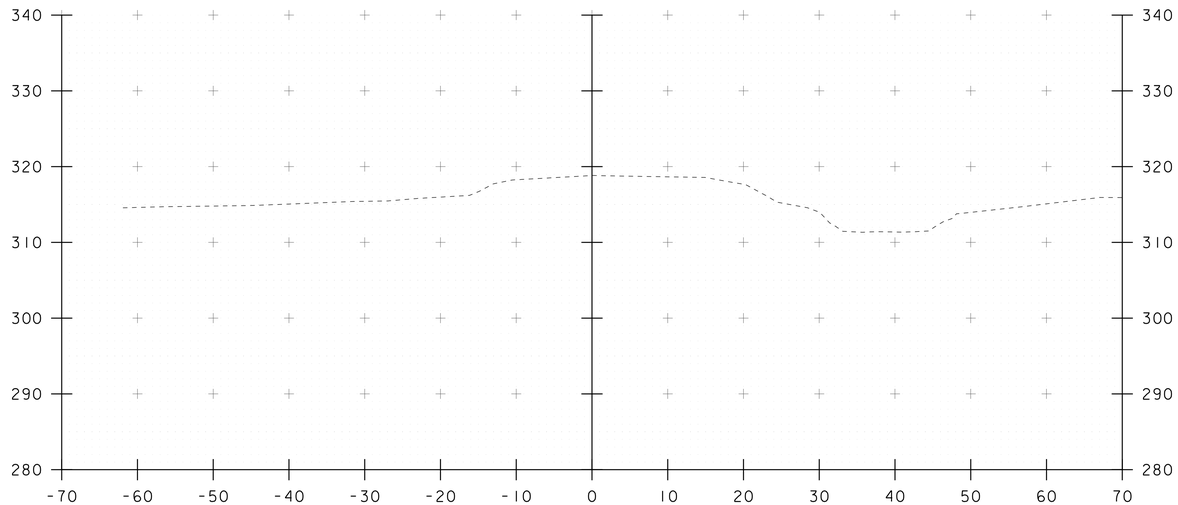
30+00



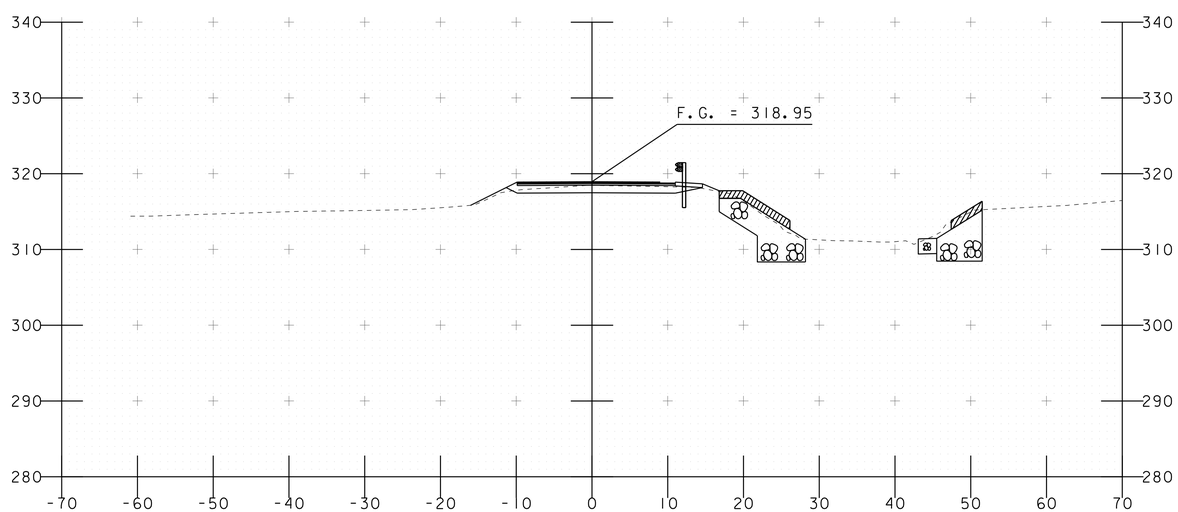
30+50

STA. 30+00 TO STA. 30+75

PROJECT NAME: RICHMOND	
PROJECT NUMBER: BF 0284(28)	
FILE NAME: s13c070xs.dgn	PLOT DATE: 23-JUN-2015
PROJECT LEADER: R. YOUNG	DRAWN BY: S. COLEY
DESIGNED BY: S. COLEY	CHECKED BY: W. LAMMER
TH12 CROSS SECTION 1	SHEET 26 OF 31



31+25



31+00

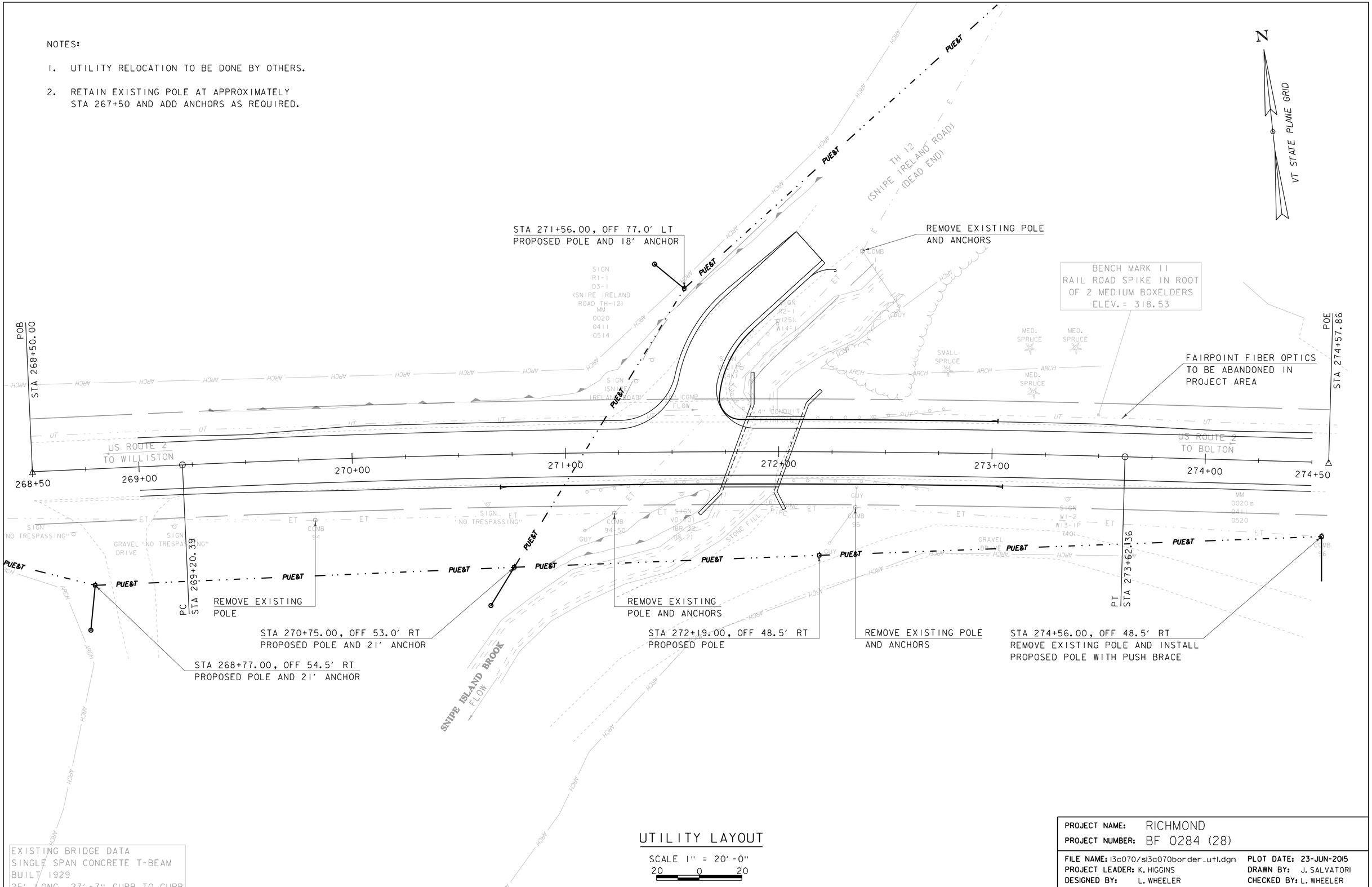
STA. 31+00 TO STA. 31+25

PROJECT NAME: RICHMOND	
PROJECT NUMBER: BF 0284(28)	
FILE NAME: s13c070xs.dgn	PLOT DATE: 23-JUN-2015
PROJECT LEADER: R. YOUNG	DRAWN BY: S. COLEY
DESIGNED BY: S. COLEY	CHECKED BY: W. LAMMER
TH12 CROSS SECTION 2	SHEET 27 OF 31

NOTES:

1. UTILITY RELOCATION TO BE DONE BY OTHERS.

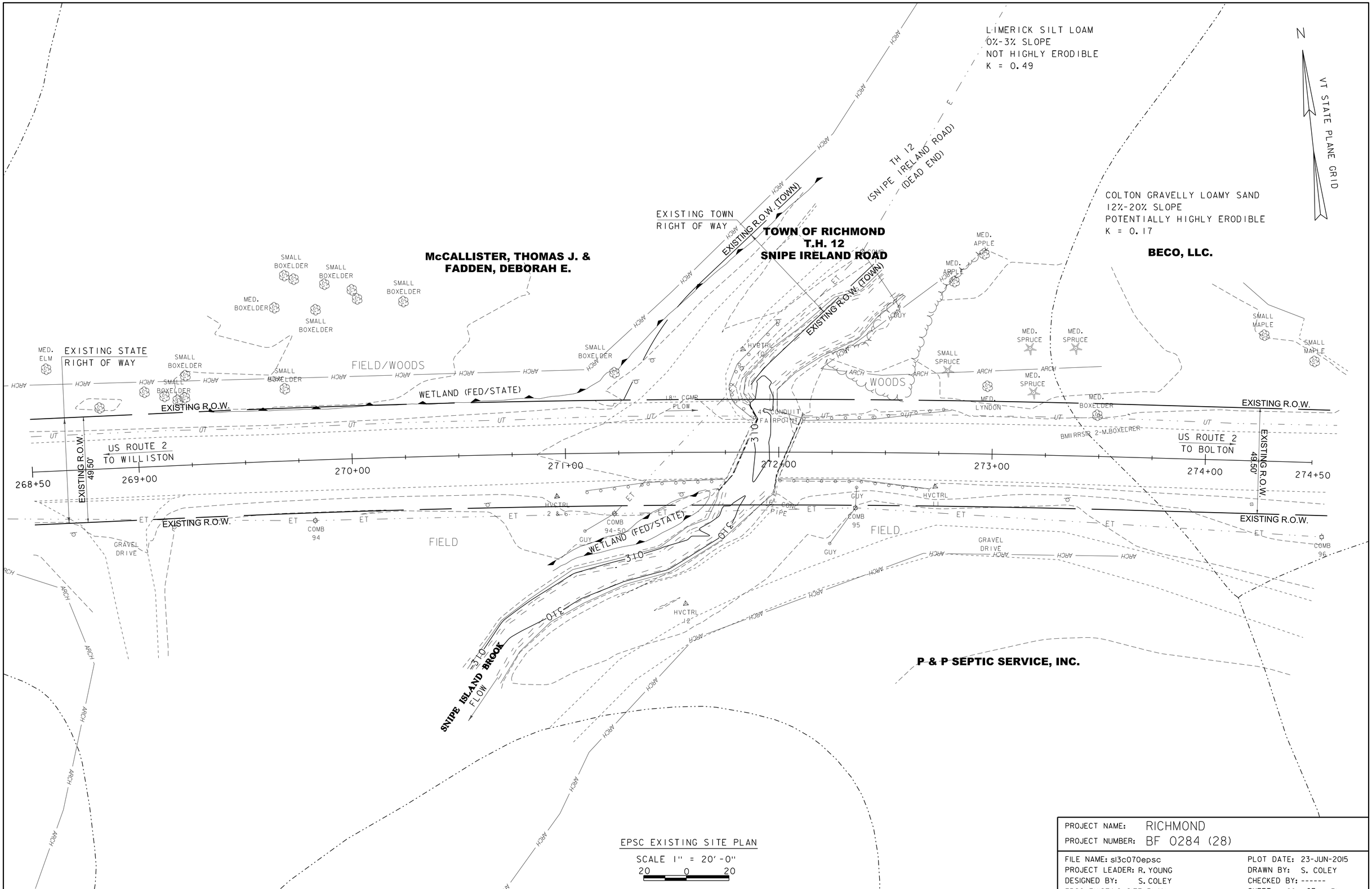
2. RETAIN EXISTING POLE AT APPROXIMATELY STA 267+50 AND ADD ANCHORS AS REQUIRED.



UTILITY LAYOUT

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

PROJECT NAME: RICHMOND	
PROJECT NUMBER: BF 0284 (28)	
FILE NAME: 13c070/sl3c070border_util.dgn	PLOT DATE: 23-JUN-2015
PROJECT LEADER: K. HIGGINS	DRAWN BY: J. SALVATORI
DESIGNED BY: L. WHEELER	CHECKED BY: L. WHEELER
UTILITY LAYOUT	SHEET 28 OF 31

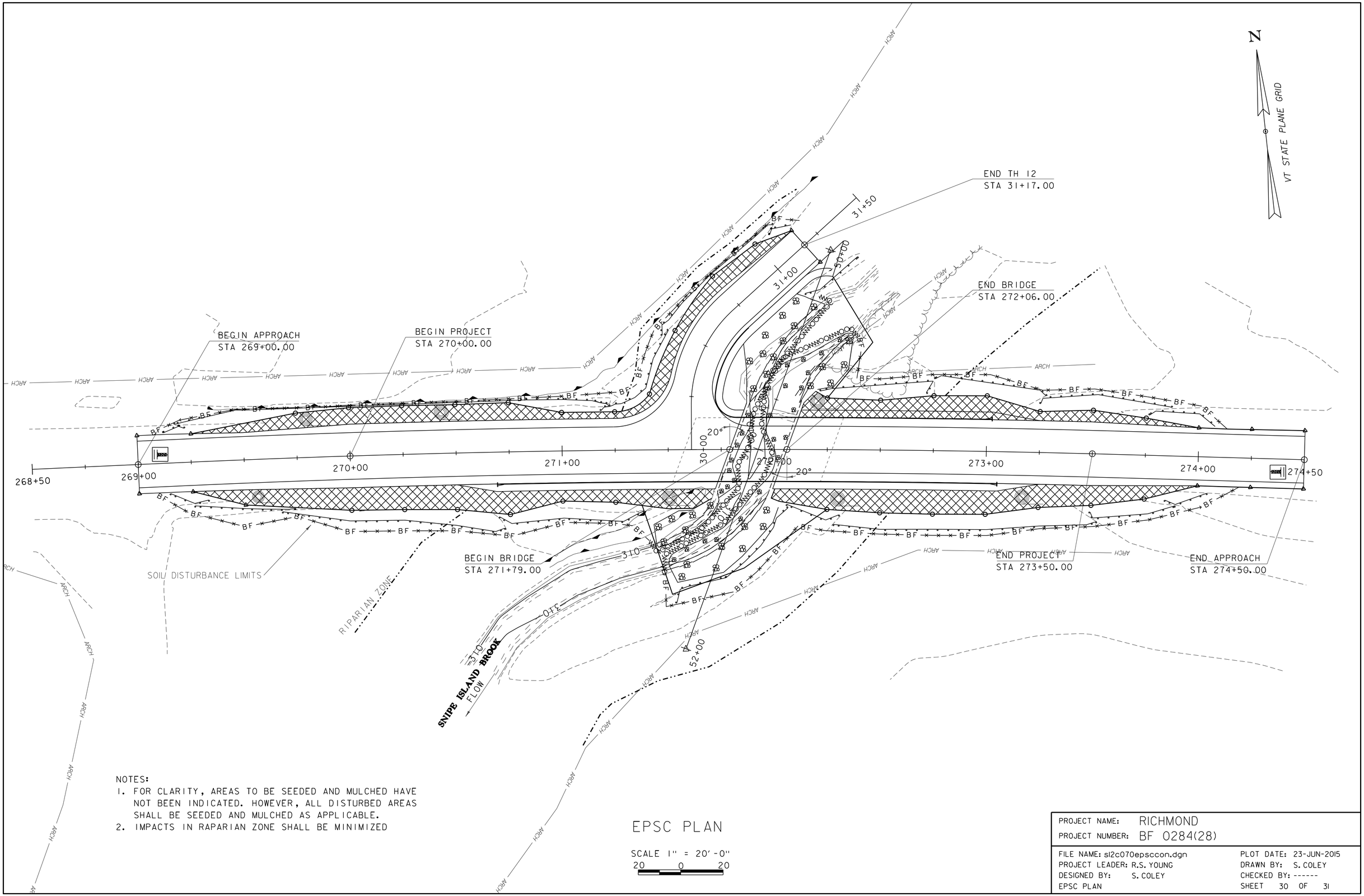


EPSC EXISTING SITE PLAN

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME: RICHMOND	
PROJECT NUMBER: BF 0284 (28)	
FILE NAME: sl3c070epsc	PLOT DATE: 23-JUN-2015
PROJECT LEADER: R. YOUNG	DRAWN BY: S. COLEY
DESIGNED BY: S. COLEY	CHECKED BY: ------
EPSC EXISTING SITE PLAN	SHEET 29 OF 31



NOTES:

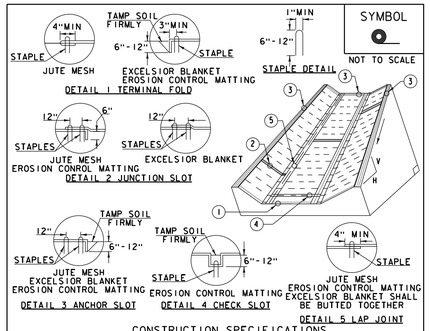
1. FOR CLARITY, AREAS TO BE SEEDED AND MULCHED HAVE NOT BEEN INDICATED. HOWEVER, ALL DISTURBED AREAS SHALL BE SEEDED AND MULCHED AS APPLICABLE.
2. IMPACTS IN RAPARIAN ZONE SHALL BE MINIMIZED

EPSC PLAN

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME: RICHMOND	
PROJECT NUMBER: BF 0284(28)	
FILE NAME: s12c070epsccon.dgn	PLOT DATE: 23-JUN-2015
PROJECT LEADER: R.S. YOUNG	DRAWN BY: S. COLEY
DESIGNED BY: S. COLEY	CHECKED BY: ------
EPSC PLAN	SHEET 30 OF 31



CONSTRUCTION SPECIFICATIONS

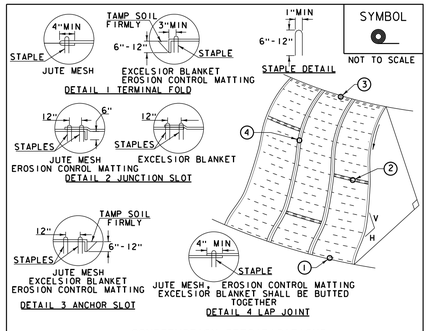
1. EROSION MATTING, CHECK SLOTS, SHALL BE SPACED IN DITCH CHANNEL SO THAT ONE OCCURS WITHIN EACH 50' ON SLOPES OF MORE THAN 4% AND LESS THAN 6%. ON SLOPES OF 6% OR MORE, THEY SHALL BE SPACED SO THAT ONE OCCURS WITHIN EACH 25'.
2. APPLY FERTILIZER, LIME SEED PRIOR TO PLACING MATTING.
3. STAPLES ARE TO BE PLACED ALTERNATELY, IN COLUMNS APPROXIMATELY 2' APART AND IN ROWS APPROXIMATELY 3' APART. APPROXIMATELY 175 STAPLES ARE REQUIRED PER 4'X225' ROLL OF MATERIAL AND 125 STAPLES ARE REQUIRED PER 4'X150' ROLL OF MATERIAL.
4. DISTURBED AREAS SHALL BE SMOOTHLY GRADED. EROSION CONTROL MATERIAL SHALL BE PLACED LOOSELY OVER GROUND SURFACE. DO NOT STRETCH.
5. ALL TERMINAL ENDS AND TRANSVERSE LAPS SHALL BE STAPLED AT APPROXIMATELY 12" INTERVALS.

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

ROLLED EROSION CONTROL PRODUCT (RECP) DITCH

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

REVISIONS	
MARCH 8, 2007	JMF
APRIL 16, 2007	WHF
JANUARY 13, 2009	WHF



CONSTRUCTION SPECIFICATIONS

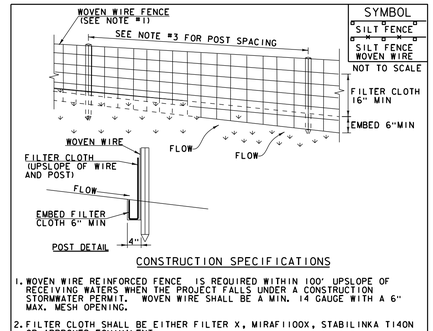
1. APPLY TO SLOPES GREATER THAN 3H: 1V OR WHERE NECESSARY TO AID IN ESTABLISHING VEGETATION.
2. APPLY FERTILIZER, LIME SEED PRIOR TO PLACING MATTING.
3. STAPLES ARE TO BE PLACED ALTERNATELY, IN COLUMNS APPROXIMATELY 2' APART AND IN ROWS APPROXIMATELY 3' APART. APPROXIMATELY 175 STAPLES ARE REQUIRED PER 4'X225' ROLL OF MATERIAL AND 125 STAPLES ARE REQUIRED PER 4'X150' ROLL OF MATERIAL.
4. DISTURBED AREAS SHALL BE SMOOTHLY GRADED. EROSION CONTROL MATERIAL SHALL BE PLACED LOOSELY OVER GROUND SURFACE. DO NOT STRETCH.
5. ALL TERMINAL ENDS AND TRANSVERSE LAPS SHALL BE STAPLED AT APPROXIMATELY 12" INTERVALS.

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

ROLLED EROSION CONTROL PRODUCT (RECP) SIDE SLOPE

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

REVISIONS	
APRIL 16, 2007	JMF
JANUARY 13, 2009	WHF



CONSTRUCTION SPECIFICATIONS

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

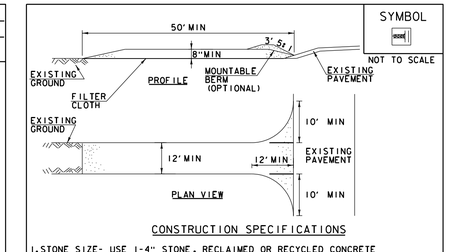
ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC
ORIGINALLY DEVELOPED BY USDA-NRCS
VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SILT FENCE

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

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 649 AND AS SHOWN IN THE PLANS FOR GEOTEXTILE FOR SILT FENCE (PAY ITEM 649.5) OR GEOTEXTILE FOR SILT FENCE, WOVEN WIRE REINFORCED (PAY ITEM 649.5(5).

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



CONSTRUCTION SPECIFICATIONS

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

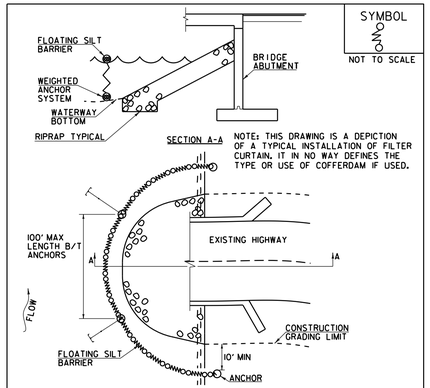
ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC
ORIGINALLY DEVELOPED BY USDA-NRCS
VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

STABILIZED CONSTRUCTION ENTRANCE

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

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

REVISIONS	
MARCH 24, 2008	WHF
JANUARY 13, 2009	WHF



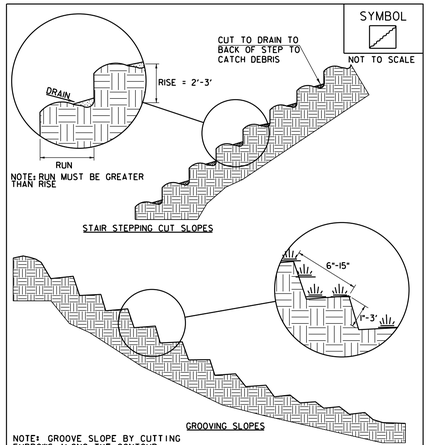
CONSTRUCTION SPECIFICATIONS

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

FILTER CURTAIN

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 649 FOR GEOTEXTILE FOR FILTER CURTAIN (PAY ITEM 649.61).

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



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

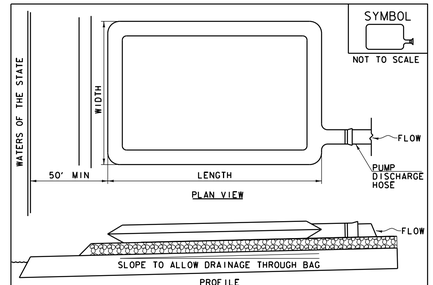
ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC
ORIGINALLY DEVELOPED BY USDA-NRCS
VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

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



CONSTRUCTION SPECIFICATIONS

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

FILTER BAG

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 FILTER BAG (PAY ITEM 653.45) AND AS SPECIFIED IN THE CONTRACT.

REVISIONS	
MARCH 24, 2008	WHF
JANUARY 13, 2009	WHF

VAOT LOW GROW/FINE FESCUE MIX

	LBS/AC					
WEIGHT	BROADCAST	HYDROSEED	NAME	LATIN NAME	GERM	PURITY
38%	57	95	CREEPING RED FESCUE	FESTUCA RUBRA VAR. RUBRA	90%	98%
29%	43.5	72.5	HARD FESCUE	FESTUCA LONGIFOLIA	85%	95%
15%	22.5	37.5	CHEWINGS FESCUE	FESTUCA RUBRA VAR. COMMUTATA	87%	95%
15%	22.5	37.5	ANNUAL RYEGRASS	LOLIUM MULTIFLORUM	90%	95%
3%	4.5	7.5	INERTS			
100%	150	250				

VAOT RURAL AREA MIX

	LBS/AC					
WEIGHT	BROADCAST	HYDROSEED	NAME	LATIN NAME	GERM	PURITY
37.5%	22.5	45	CREEPING RED FESCUE	FESTUCA RUBRA VAR. RUBRA	85%	98%
37.5%	22.5	45	TALL FESCUE	FESTUCA ARUNDINACEA	90%	95%
5.0%	3	6	RED TOP	AGROSTIS GIGANTEA	90%	95%
15.0%	9	18	WHITE FIELD CLOVER	TRIFOLIUM REPENS	85%	98%
5.0%	3	6	ANNUAL RYE GRASS	LOLIUM MULTIFLORUM	85%	95%
100%	60	120				

GENERAL AMENDMENT GUIDANCE

FERTILIZER	LIME	
10/20/10	AG LIME	PELLITIZED
500 LBS/AC	2 TONS/AC	1 TONS/AC

CONSTRUCTION GUIDANCE

1. SEED MIX: THE CONTRACTOR SHALL COORDINATE WITH THE RESIDENT ENGINEER ON WHICH SEED MIX TO USE.
2. SEED MIX: USE AS INDICATED IN THE PLANS AND/OR FOR ALL ESTABLISHED UPLAND (NON WETLAND) AREAS DISTURBED BY THE CONTRACTOR.
3. ALL SEED MIXTURES: SHALL NOT HAVE A WEED CONTENT EXCEEDING 0.40% BY WEIGHT AND SHALL BE FREE OF ALL NOXIOUS SEED.
4. FERTILIZER AND LIMESTONE: SHALL FOLLOW RATES SHOWN ON PLAN OR AS DIRECTED BY THE ENGINEER.
5. HAY MULCH: TO BE PLACED ON EARTH SLOPES AT THE RATE OF 2 TONS/ACRE, ACHIEVE 90% GROUND COVER OR AS DIRECTED BY THE ENGINEER.
6. HYDROSEEDING: ALTHOUGH GUIDANCE IS GIVEN ABOVE THE SITE CONDITIONS AND THE TYPE OF HYDROSEED PROPOSED FOR USE WILL ULTIMATELY DICTATE THE AMOUNTS AND TYPES OF SOIL AMENDMENTS TO BE APPLIED.
7. 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

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 651 FOR SEED (PAY ITEM 651.51)

REVISIONS	
JANUARY 12, 2015	WHF

PROJECT NAME: RICHMOND
PROJECT NUMBER: BF 0284 (28)

FILE NAME: sl3c070epscdetail.dgn
PROJECT LEADER: R. YOUNG
DESIGNED BY: S. COLEY
EPSC DETAIL

PLOT DATE: 23-JUN-2015
DRAWN BY: S. COLEY
CHECKED BY:
SHEET 31 OF 31