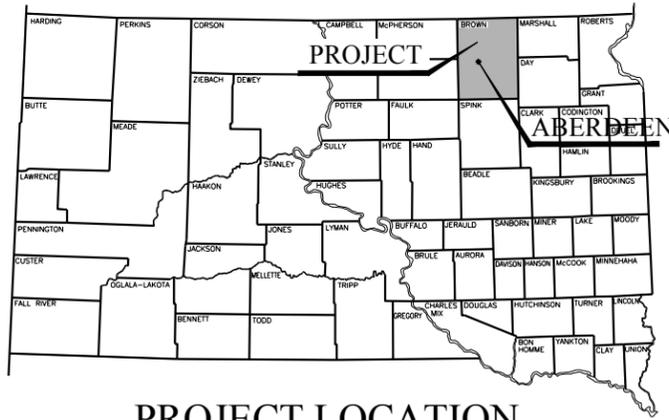


FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	PH 6525(03)	1	30

REVISED 1-6-16



PROJECT LOCATION

# STATE OF SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED  
PROJECT P 6525(03)  
GUARDRAIL RETROFIT  
BROWN COUNTY, SOUTH DAKOTA  
PCN 04Q0

## INDEX OF SECTIONS

- 1 Title Sheet
- 2-6 Estimate of Quantities & Notes
- 7-9 Traffic Control Plans
- 10 Control & Alignment Data
- 11-12 Topography Symbols & Legend
- 13 Project Site A Typical Section
- 14-20 Project Site A Plans & Details
- 21-23 Project Site B Plans & Details
- 24-30 Details & Standard Plates

### DESIGN DESIGNATION

ADT (2013)	700
ADT (2033)	----
DHV	----
D	50%
T DHV	----
T*ADT	----
V	40 MPH

### STORM WATER PERMIT

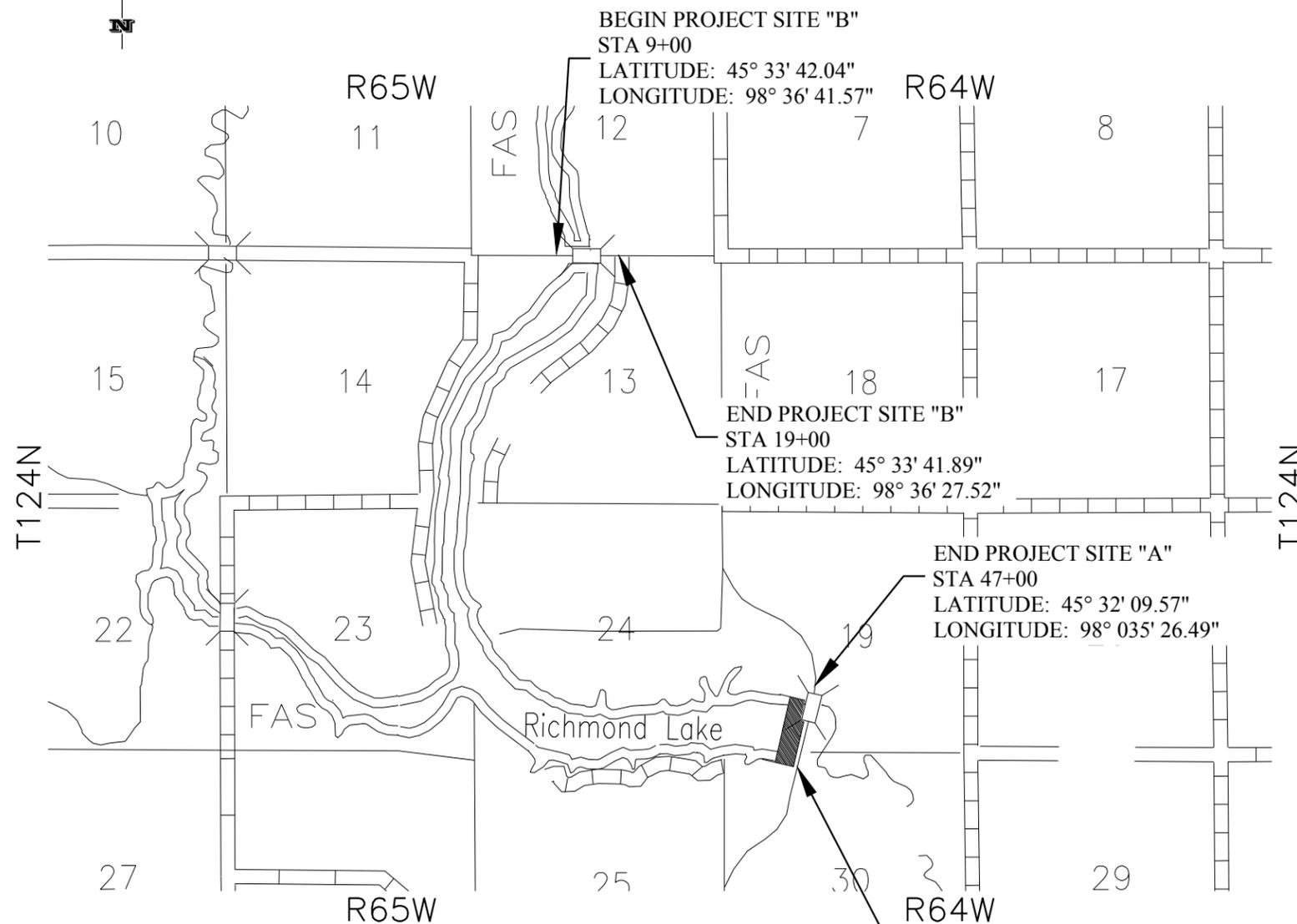
NONE REQUIRED

PROJECT SITE "A"  
LENGTH 1800 FEET 0.341 MILES

PROJECT SITE "B"  
LENGTH 1000 FEET 0.189 MILES

### SCALES

PLAN 1"=40'



LOCATION MAP



# 14



Clark Engineering Corporation  
2301 8th Avenue NE, Suite 125  
Aberdeen, SD 57401  
Phone: (605) 225-3494  
Fax: (605) 225-5433  
Aberdeen@clark-eng.com EOE

Z:\2013 PROJECTS\13105 BROWN CO. - RICHMOND LAKE GUARDRAIL RETROFIT\DESIGN\MISC SHEETS\TITLE SHEET.DWG 1/6/2016 9:44 AM

# ESTIMATE OF QUANTITIES AND ENVIRONMENTAL COMMITMENTS

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	P 6525(03)	2	30

REVISED 12-15-15 kmh

## ESTIMATE OF QUANTITIES

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
250E0010	Incidental Work	Lump Sum	LS
260E1010	Base Course	422	Ton
320E1200	Asphalt Concrete Composite	14.8	Ton
380E1000	6" Miscellaneous PCC Pavement	65.5	SqYd
628E1500	Concrete Barrier End Protection	1	Each
629E0110	NCHRP 350 Test Level 3 High Tension Cable Guardrail	3678	Ft
629E0290	NCHRP 350 Test Level 3 High Tension Cable Guardrail Anchor Assembly	8	Each
629E0500	W Beam to High Tension Cable Guardrail Transition	4	Each
629E1109*	Furnish High Tension Cable Guardrail Post and Sleeve	20	Each
630E1010	Straight Class A W Beam Guardrail with Wood Posts	137.5	Ft
630E1050	Straight Class B W Beam Guardrail with Wood Posts	87.5	Ft
630E1150	Straight Double Class B W Beam Guardrail with Wood Posts	87.5	Ft
630E2015	W Beam Guardrail Flared End Terminal	3	Each
634E0010	Flagging	320	Hour
634E0110	Traffic Control Signs	116	SqFt
634E0120	Traffic Control Miscellaneous	Lump Sum	LS
650E0060	Type B66 Concrete Curb and Gutter	70	Ft
650E3060	Type B6 Concrete Curb	71	Ft

\* = Non-Participating

## SPECIFICATIONS

Standard Specifications for Roads and Bridges, 2015 Edition and Required Provisions, Supplemental Specifications, and Special Provisions as included in the Proposal.

## ENVIRONMENTAL COMMITMENTS

An Environmental Commitment is a measure that SDDOT commits to implement in order to avoid, minimize, and/or mitigate a real or potential environmental impact. Environmental commitments to various agencies and the public have been made to secure approval of this project. An agency mentioned below with permitting authority can influence a project if perceived environmental impacts have not been adequately addressed. Unless otherwise designated, the Contractor's primary contact regarding matters associated with these commitments will be the Project Engineer. These environmental commitments are not subjected to change without prior approval from the SDDOT Environmental Office. The environmental commitments associated with this project are as follows:

## COMMITMENT B: FEDERALLY THREATENED, ENDANGERED, AND PROTECTED SPECIES

### COMMITMENT B2: WHOOPING CRANE

The Whooping Crane is a spring and fall migratory bird in South Dakota that is about five feet tall and typically stops on wetlands, rivers, and agricultural lands along their migration route. An adult Whooping Crane is white with a red crown and a long, dark, pointed bill. Immature Whooping Cranes are cinnamon brown. While in flight, their long necks are kept straight and their long dark legs trail behind. Adult Whooping Cranes' black wing tips are visible during flight.

#### Action Taken/Required:

Harassment or other measures to cause the Whooping Crane to leave the site is a violation of the Endangered Species Act. If a Whooping Crane is sighted roosting in the vicinity of the project, borrow pit, or staging site associated with the project, cease construction activities in the affected area until the Whooping Crane departs and contact the Project Engineer. The Project Engineer will contact the Environmental Office so that the sighting can be reported to USFWS.

### COMMITMENT B4: BALD EAGLE

Bald eagles are known to occur in this area.

#### Action Taken/Required:

If a nest is observed within one mile of the project site, notify the Project Engineer immediately so that he/she can consult with the Environmental Office for an appropriate course of action.

## COMMITMENT C: WATER SOURCE

The Contractor shall not withdraw water with equipment previously used outside the State of South Dakota without prior approval from the SDDOT Environmental Office. Thoroughly wash all construction equipment before entering South Dakota to reduce the risk of invasive species introduction into the project vicinity.

#### Action Taken/Required:

The Contractor shall obtain the necessary permits from the regulatory agencies such as the Department of Environment and Natural Resources (DENR) and the United States Army Corps of Engineers (COE) prior to executing water extraction activities.

## COMMITMENT E: STORM WATER

Construction activities constitute less than one acre of disturbance.

#### Action Taken/Required:

At a minimum and regardless of project size, appropriate erosion and sediment control measures must be installed to control the discharge of pollutants from the construction site.

## COMMITMENT H: WASTE DISPOSAL SITE

The Contractor shall furnish a site(s) for the disposal of construction and/or demolition debris generated by this project.

#### Action Taken/Required:

Construction and/or demolition debris may not be disposed of within the State ROW.

The waste disposal site(s) shall be managed and reclaimed in accordance with the following from the General Permit for Highway, Road, and Railway Construction/Demolition Debris Disposal Under the South Dakota Waste Management Program issued by the Department of Environment and Natural Resources.

The waste disposal site(s) shall not be located in a wetland, within 200 feet of surface water, or in an area that adversely affects wildlife, recreation, aesthetic value of an area, or any threatened or endangered species, as approved by the Project Engineer.

If the waste disposal site(s) is located such that it is within view of any ROW, the following additional requirements shall apply:

- Construction and/or demolition debris consisting of concrete, asphalt concrete, or other similar materials shall be buried in a trench completely separate from wood debris. The final cover over the construction and/or demolition debris shall consist of a minimum of 1 foot of soil capable of supporting vegetation. Waste disposal sites provided outside of the State ROW shall be seeded in accordance with Natural Resources Conservation Service recommendations. The seeding recommendations may be obtained through the appropriate County NRCS Office. The Contractor shall control the access to waste disposal sites not within the State ROW through the use of fences, gates, and placement of a sign or signs at the entrance to the site stating "No Dumping Allowed".

- Concrete and asphalt concrete debris may be stockpiled within view of the ROW for a period of time not to exceed the duration of the project. Prior to project completion, the waste shall be removed from view of the ROW or buried and the waste disposal site reclaimed as noted above.

The above requirements will not apply to waste disposal sites that are covered by an individual solid waste permit as specified in SDCL 34A-6-58, SDCL 34A-6-1.13, and ARSD 74:27:10:06.

Failure to comply with the requirements stated above may result in civil penalties in accordance with South Dakota Solid Waste Law, SDCL 34A-6-1.31.

All costs associated with furnishing waste disposal site(s), disposing of waste, maintaining control of access (fence, gates, and signs), and reclamation of the waste disposal site(s) shall be incidental to the various contract items.



# ESTIMATE OF QUANTITIES AND ENVIRONMENTAL COMMITMENTS

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	P 6525(03)	3	30

REVISED 12-15-15 kmh

## COMMITMENT I: HISTORICAL PRESERVATION OFFICE CLEARANCES

The SDDOT has obtained concurrence with the State Historical Preservation Office (SHPO or THPO) for all work included within the project limits and all department designated sources and designated option material sources, stockpile sites, storage areas, and waste sites provided within the plans.

### Action Taken/Required:

All earth disturbing activities not designated within the plans require review of cultural resources impacts. This work includes, but is not limited to: staging areas, borrow sites, waste disposal sites, and all material processing sites.

The Contractor shall arrange and pay for a cultural resource survey and/or records search. The Contractor has the option to contact the state Archaeological Research Center (ARC) at 605-394-1936 or another qualified archaeologist, to obtain either a records search or a cultural resources survey. A record search might be sufficient for review; however, a cultural resources survey may need to be conducted by a qualified archaeologist.

The Contractor shall provide ARC with the following: a topographical map or aerial view on which the site is clearly outlined, site dimensions, project number, and PCN. If applicable, provide evidence that the site has been previously disturbed by farming, mining, or construction activities with a landowner statement that artifacts have not been found on the site.

The Contractor shall submit the records search or cultural resources survey report and if the location of the site is within the current geographical or historic boundaries of any South Dakota reservation to SDDOT Environmental Engineer, 700 East Broadway Avenue, Pierre, SD 57501-2586 (605-773-3180). SDDOT will submit the information to the appropriate SHPO/THPO. Allow **30 Days** from the date this information is submitted to the Environmental Engineer for SHPO/THPO review.

If evidence for cultural resources is uncovered during project construction activities, then such activities shall cease and the Project Engineer shall be immediately notified. The Project Engineer will contact the SDDOT Environmental Engineer in order to determine an appropriate course of action.

SHPO/THPO review does not relieve the Contractor of the responsibility for obtaining any additional permits and clearances for staging areas, borrow sites, waste disposal sites, or material processing sites that affect wetlands, threatened and endangered species, or waterways. The Contractor shall provide the required permits and clearances to the Project Engineer at the preconstruction meeting.

## UTILITIES

The Contractor shall be aware that the existing utilities shown in the plans were surveyed prior to the design of this project and might have been relocated or replaced by a new utility facility prior to construction of this project, might be relocated or replaced by a new utility facility during the construction of this project, or might not require adjustment and may remain in its current location. The Contractor shall contact each utility owner and confirm the status of all existing and new utility facilities. Utility contact information is provided but contractors shall also confirm all utilities through SD One Call process.

Midcontinent Cable	800-888-1300
Northwestern Energy	800-245-6977
Century Link	605-334-0044
Richmond Lake Sanitary District	605-229-4477
Northern Electric	605-225-0310
WEB Water Development	605-229-4749



**PROJECT SITE "A" SCOPE OF WORK**

Work on project site "A" will consist of removing the in-place posts and single guard cable, removing in-place curb and gutter and 6" concrete, remove the in-place rail taper and install end caps. The Contractor will install three W-Beam guardrails with W-Beam guardrail flared end terminals and one crash cushion at the corners of the bridge. Associated with this work is replacement of concrete pavement, curb and gutter, asphalt surfacing, and restoration. Project "A" will also include incidental work for grading along the road edge at the face of the dam and construct new 3-Cable High Tension Guardrail.

**TABLE OF BASE COURSE**

Station	to	Station	L/R	Quantity (Ton)
32+25		42+02	R	145
45+80.3		47+29	R	52
45+82.5		46+02	L	9
30+00		44+58	L	216
Total:				422

**TABLE OF 6" MISCELLANEOUS PCC PAVEMENT**

6" Miscellaneous PCC Pavement shall be continuously reinforced with # 4 rebar 18" on center in both directions.

Station	to	Station	L/R	Quantity (SqYd)
45+82.5		46+02.3	L	19.4
45+80.3		47+28.5	R	46.1
Total:				65.5

**TABLE OF TYPE B CONCRETE CURB & GUTTER**

Station	to	Station	L/R	Quantity (Lf)
46+58.4		47+28.5	R	70'
Total:				70

**TABLE OF GUARDRAIL PROJECT SITE "A"**

Location	Concrete Barrier End Protection (Each)	High Tension Cable Guardrail Post and sleeve * (Each)	NCHRP 350 High Tension 3 Cable Guardrail (Ft)	NCHRP 350 High Tension 3 Cable Guardrail Anchor Assembly (Each)	Straight Class A W Beam Guardrail with Wood Posts (Ft)	Straight Class B Beam Guardrail with Wood Posts (Ft)	W Beam Guardrail Flared End Terminal (Each)	Straight Double Class B W Beam Guardrail with Wood Posts
Sta 30+00 to 44+58 Lt.			1425	2	12.5'	12.5	1	12.5
Sta 32+25 to 42+00 Rt.			1015	2				
Sta 43+83 to 44+61 Rt.					12.5'	12.5	1	12.5
Sta 45+80 to 46+59 Rt.					12.5'	12.5	1	12.5
Sta 45+80 to 46+00 Lt.	1							
MISC.		10						
Totals:		10	2440	4	37.5	37.5	3	37.5

**TABLE OF TYPE B CONCRETE CURB**

Station	to	Station	L/R	Quantity (SF)
45+88.6		46+58.4	R	71
Total:				71

**ASPHALT CONCRETE COMPOSITE**

The Contractor shall furnish and install asphalt concrete composite, where repairs to asphalt surfacing are necessitated by the guardrail work. The surfacing section for roadway repair and behind guardrail shall consist of 8" of gravel base course and 4" of asphalt concrete composite.

**TABLE OF ASPHALT COMPOSITE FOR RESTORATION**

Station	to	Station	L/R	Quantity (Ton)
45+82.5		47+28.5	R	13.8
45+82.5		46+02	L	1
Total:				14.8

**INCIDENTAL WORK PROJECT SITE "A"**

Station	to	Station	L/R	Remarks
30+00.0		44+58.6	L	Remove 1458.6' single cable and post guardrail.
32+24.0		41+41.0	R	Remove 925' single cable and post guardrail.
45+82.5		46+03.0	L	Remove 243 SF of concrete, grouted riprap and asphalt.
45+80		47+28.5	R	Remove 696 SF of concrete/asphalt
32+50		42+00	R	Grading 70 CY
45+82.5		47+28.5	R	Grading 46 CY
45+82.5		46+03	L	Grading 6 CY
30+00		44+58	L	Grading 108 CY
44+50		44+58.6	L	Remove T115 Rail Taper
44+50		44+58.6	R	Remove T115 Rail Taper
45+82.5		45+91.5	L	Remove T115 Rail Taper
45+82.5		45+91.5	R	Remove T115 Rail Taper



12-2-15

FOR BIDDING PURPOSES ONLY

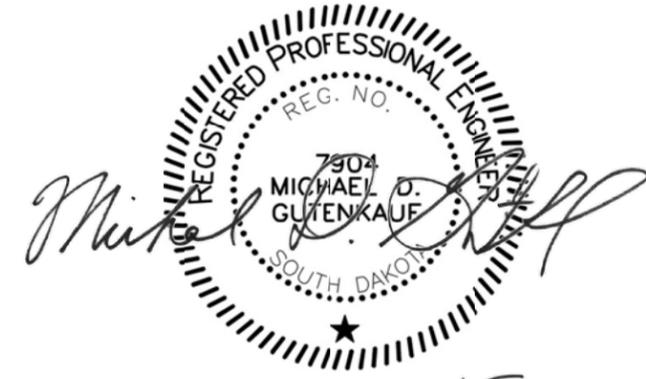
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	P 6525(03)	5	30

**PROJECT SITE "B" SCOPE OF WORK**

Work on project site "B" will consist of removing the in-place posts and single guard cable, removing the T101 rail taper at bridge ends, adding rail caps, installing new class "A" and "B" W-Beam guardrail with W-Beam Breakaway Cable Terminals. Project site "B" also requires constructing new High Tension Cable Guardrail including transitioning into the new W-Beam approach guardrail.

**INCIDENTAL WORK PROJECT SITE "B"**

Station	to Station	L/R	Remarks
10+00.0	13+14	L	Remove 314' single cable and post guardrail
10+10.0	13+14	R	Remove 304' single cable and post guardrail
13+79	16+39	L	Remove 260' single cable and post guardrail
13+79	17+54	R	Remove 375' single cable and post guardrail
13+13	13+21.6	L	Remove T101 Rail Taper
13+13	13+21.6	R	Remove T101 Rail Taper
13+71.6	13+79.8	R	Remove T101 Rail Taper
13+71.6	13+79.8	L	Remove T101 Rail Taper



12-2-15

**TABLE OF GUARDRAIL PROJECT SITE "B"**

Location	High Tension Cable Guardrail Post and sleeve (Each)	NCHRP 350 High Tension 3 Cable Guardrail (Ft)	NCHRP 350 High Tension 3 Cable Guardrail Anchor Assembly (Each)	W Beam High Tension Cable Guardrail Transition (Each)	Straight Class A W Beam Guardrail with Wood Posts (Ft)	Straight Class B Beam Guardrail with Wood Posts (Ft)	Straight Double Class B W Beam Guardrail with Wood Posts
Sta 9+49 to 13+21.6 Lt.		334	1	1	25	12.5	12.5
Sta 10+00 to 13+21.6 Rt.		284	1	1	25	12.5	12.5
Sta 13+71.6 to 16+33.3 Lt.		224	1	1	25	12.5	12.5
Sta 13+71.6 to 18+05.3 Rt.		396	1	1	25	12.5	12.5
MISC.	10						
Totals:	10	1238	4	4	100	50	50

**REMOVE & SALVAGE CABLE GUARDRAIL**

On both Project Site "A" and "B" there is a single cable and post guardrail that will be removed. The posts to be removed are 8" diameter spaced approximately 12'. The post hole will be restored to existing ground elevation as shown in the "Abandon Post Hole Detail." The cable, posts, and hardware items shall become the property of Brown County and shall be removed, hauled, and neatly stacked at the County Highway Department 3133 8<sup>th</sup> Avenue NE in Aberdeen, South Dakota or as approved by the Engineer.

Payment for removing, restoring post hole, hauling, and stacking the salvaged guardrail components will be incidental to the contract lump sum price for Incidental Work.

**PERMANENT CONCRETE BARRIER END PROTECTION**

The crash cushion provided shall meet the test level 2 requirements of NCHRP 350 or MASH and be from the following list.

<u>Product</u>	<u>Manufacturer</u>
SCI70GM	Work Area Protection Corp. A Division of Stabler Companies Inc. St. Charles, IL Phone: 1-630-377-9100 <a href="http://www.workareaprotection.com">www.workareaprotection.com</a>
TRACC (24"x14' Shorttracc)	Trinity Highway Products, LLC Dallas, TX Phone: 1-800-644-7976 <a href="http://www.highway-safety.com">www.highway-safety.com</a>
QUADGARD Model: QS2406Y	Energy Absorption Systems, Inc. A Subsidiary of Quixote Corporation Chicago, IL Phone: 1-312-467-6750 <a href="http://www.energyabsorption.com">www.energyabsorption.com</a>

The anchoring pad for the crash cushion shall be an 8 inch thick PCC pavement that meets the requirements of Class M6 concrete.

Documentation on the crash cushion, which includes the drawing details of the crash cushion, details for the transition to the concrete barrier, and the details for the concrete anchoring pad, shall be provided to the Project Engineer at the pre-construction meeting.

The crash cushion shall be attached to the steel bridge rail with a transition that meets test level 2 requirements of NCHRP 350 or MASH at locations shown below in the Table of Permanent Concrete Barrier End Protection. For unidirectional traffic, the transition piece shall be placed on the side of the cushion and barrier that is adjacent to the traffic.

The Contractor shall certify that the crash cushion was installed according to the manufacturer's installation instructions.

All costs for furnishing and installing the crash cushion including the anchoring pad, anchors for connection to the pad, transition to the in-place guiderail, materials, labor, equipment, and incidental items shall be paid for at the contract unit price per each for "Concrete Barrier End Protection."

**TABLE OF PERMANENT CONCRETE BARRIER END PROTECTION**

Station	Location	Unidirectional/ Bidirectional	Quantity (Each)
45+82.6	L	Unidirectional	1
Total:			1

**HIGH TENSION CABLE GUARDRAIL**

The Contractor shall furnish and install a 3 Cable High Tension Guardrail system that meets the Test Level 3 crash testing requirements of National Cooperative Highway Research Program (NCHRP) 350 or Manual for Assessing Safety Hardware (MASH). The maximum dynamic deflection of the system shall be less than 8 feet and the maximum post spacing shall be 16 feet unless specified otherwise in the plans.

The High Tension Cable Guardrail system shall be in compliance with Specifications Section 6.9 Buy America.

The Contractor shall install the system according to the manufacturer's installation recommendations except where stated otherwise in the plans. A copy of the detail drawings and installation instructions for the High Tension Cable Guardrail with Anchor Assemblies and detail drawings for the W-Beam to High Tension Cable Guardrail Transition shall be given to the Engineer a minimum of 4 weeks prior to installation of the High Tension Cable Guardrail system.

All posts shall be galvanized and inserted into driven galvanized steel sleeves with soil plates.

Reflective sheeting shall be placed back-to-back on every other post cap or cable spacer and on the cable release post. The sheeting shall be in conformance with Section 982.2 K.2. of the Specifications. The color of the reflective sheeting shall be the same as the nearest pavement marking.

The cables provided shall be pre-stretched in the factory.

The Contractor shall check and adjust the tension of the cables a minimum of 3 weeks after installation and not longer than 6 weeks after installation. Cost for this work shall be incidental to the contract unit price per foot for "NCHRP 350 Test Level 3 High Tension Cable Guardrail."

The lengths of High Tension Cable Guardrail stated in the plans were based on a non-effective length of 26' at each end of the "run" of guardrail. The length and location of the High Tension Cable Guardrail at each site will need to be adjusted during construction as necessary if a system with a different non-effective length is used and it shall be approved by the Design Engineer before installation.

The Contractor shall provide a signed letter of compliance to the Engineer upon completion of the High Tension Cable Guardrail installation(s) stating that the High Tension Cable Barrier system has been installed in conformance to the installation instructions, specifications, and at a minimum meets the TL-3 crash test requirements of NCHRP 350 or MASH.

The High Tension Cable Guardrail shall be measured along the centerline of the cable guardrail from center of anchor assembly to center of anchor assembly to the nearest foot.

All costs for furnishing and installing the 3 High Tension Cable Guardrail system including all labor, materials, and equipment shall be incidental to the contract unit price per foot for "NCHRP 350 Test Level 3 High Tension Cable Guardrail".

**HIGH TENSION CABLE GUARDRAIL ANCHOR ASSEMBLY**

The beginning and end of each "run" of High Tension Cable Guardrail shall terminate with an anchor assembly that meets the Test Level 3 crash testing requirements of NCHRP 350 or MASH.

The footing for the anchor assembly shall be designed to allow for 1 inch maximum of lateral deflection. The allowable design soil pressure shall be 1000 psf. The top 2 feet of soil pressure shall be neglected in the design of the footing. The footing shall be a minimum of 5' deep. The footing design shall be submitted through proper channels to the Office of Bridge Design for approval a minimum of 4 weeks prior to construction of the anchor footings.

All cost for furnishing and installing the High Tension Cable Guardrail Anchor assembly including all labor, equipment, and materials which include the anchor footing, hardware, and all attachments to the anchor footing, shall be incidental to the contract unit price per each for "NCHRP 350 Test Level 3 High Tension Cable Guardrail Anchor assembly."

**FURNISH HIGH TENSION CABLE GUARDRAIL POST AND SLEEVE**

The Contractor shall furnish an additional 20 galvanized posts and sleeves with soil plates, and 20 caps or cable spacers with back to back reflective sheeting. Materials shall delivered and neatly stockpiled at the Brown County Highway Department 3133 8<sup>th</sup> Avenue NE in Aberdeen, South Dakota or as approved by the Engineer. The posts and sleeves shall be the same type of posts and sleeves provided in the installation of the high tension cable guardrail on the project.

All costs for furnishing the posts, sleeves with soil plates, caps, and delivering them to Brown County Highway Department shall be incidental to the contract unit price per each for "Furnish High Tension Cable Guardrail Post and Sleeve".

**W-BEAM HIGH TENSION CABLE GUARDRAIL TRANSITION**

Where indicated on the plans, the contractor shall furnish and install a W Beam to High Tension Cable Guardrail Transition. The transition shall be designed and constructed to meet test level 3 requirements of NCHRP 350 or MASH as approved by Federal Highway, and in accord with Manufacturer recommendations..

A copy of the detail drawings for the W Beam to High Tension Cable Guardrail Transition shall be given to the Engineer a minimum of 4 weeks prior to installation.

All cost for furnishing and installing the W Beam to High Tension Cable Guardrail Transition including all labor, equipment, and materials which include the breakaway cable terminal, special w beam(slotted), posts, cable, and hardware shall be incidental to the contract unit price per each for "W Beam to High Tensions Cable Guardrail Transition".



# TRAFFIC CONTROL

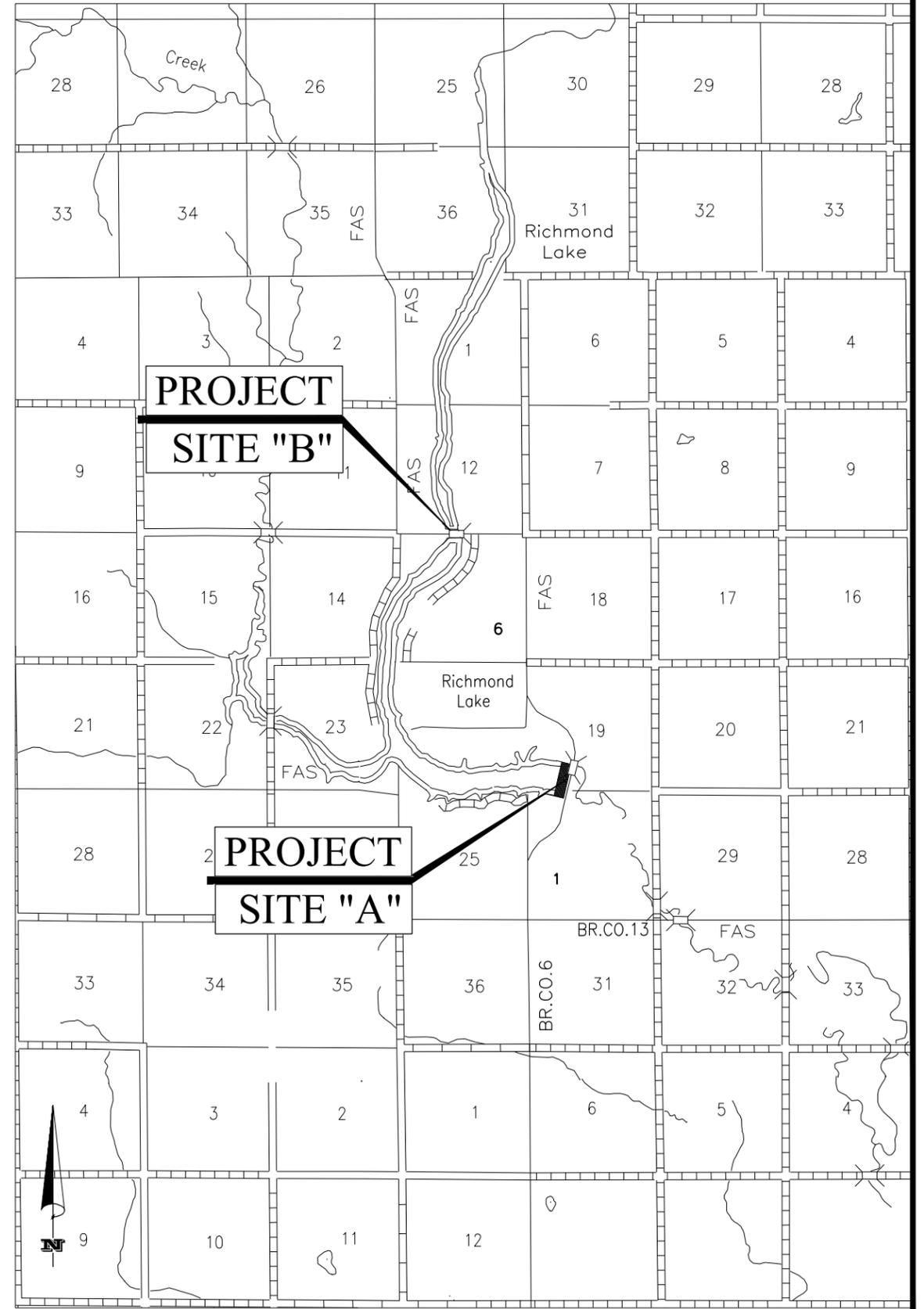
FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT PH 6525(03)	SHEET 7	TOTAL SHEETS 30
-----------------------	------------------------	------------	--------------------

REVISED 12-15-15 kmh

TRAFFIC CONTROL SIGNS					
SIGN CODE	DESCRIPTION	NUMBER REQUIRED	SIGN SIZE	SQFT PER SIGN	SQFT
G20-2	END ROAD WORK	2	36"x18"	5	10
W16-2P	— FEET (SUPPLEMENTAL DISTANCE PLAQUE) (OPTIONAL)	2	30"x24"	5	10
W20-1	ROAD WORK AHEAD	2	48"x48"	16	32
W20-4	ONE LANE ROAD AHEAD	2	48"x48"	16	32
W20-7	FLAGGER (SYMBOL)	2	48"x48"	16	32
				TOTAL:	116

THE QUANTITIES ARE BASED ON ONE LOCATION (SITE).



Z:\2013 PROJECTS\13105 BROWN CO. - RICHMOND LAKE GUARDRAIL RETROFIT\DESIGN\MISC SHEETS\TRAFFIC CONTROL UJD.DWG 12/15/2015 4:27 PM

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)	Spacing of Channelizing Devices (Feet) (G)
0 - 30	200	25
35 - 40	350	25
45 - 50	500	50
55	750	50
60 - 65	1000	50

- Flagger
- Channelizing Device

For low-volume traffic situations with short work zones on straight roadways where the flagger is visible to road users approaching from both directions, a single flagger may be used.

The ROAD WORK AHEAD and the END ROAD WORK signs may be omitted for short duration operations (1 hour or less).

For tack and/or flush seal operations, when flaggers are not being used, the FRESH OIL sign (W21-2) shall be displayed in advance of the liquid asphalt areas.

Flashing warning lights and/or flags may be used to call attention to the advance warning signs.

The channelizing devices shall be drums or 42" cones.

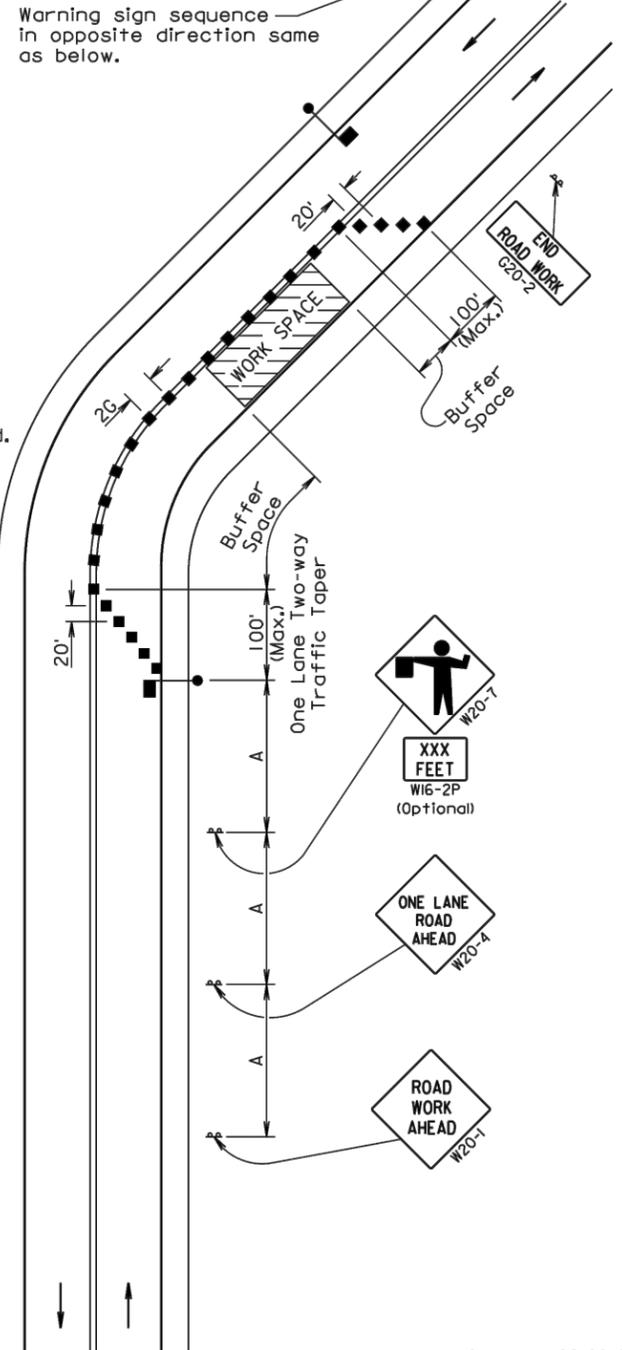
Channelizing devices are not required along the centerline adjacent to work area when pilot cars are utilized for escorting traffic through the work area.

END ROAD WORK G20-2

Channelizing devices and flaggers shall be used at intersecting roads to control intersecting road traffic as required.

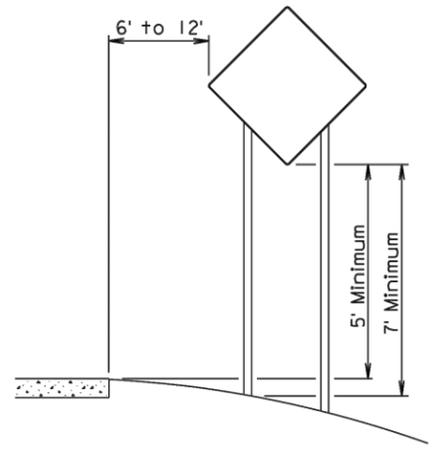
The buffer space should be extended so that the two-way traffic taper is placed before a horizontal or vertical curve to provide adequate sight distance for the flagger and queue of stopped vehicles.

The length of A may be adjusted to fit field conditions.

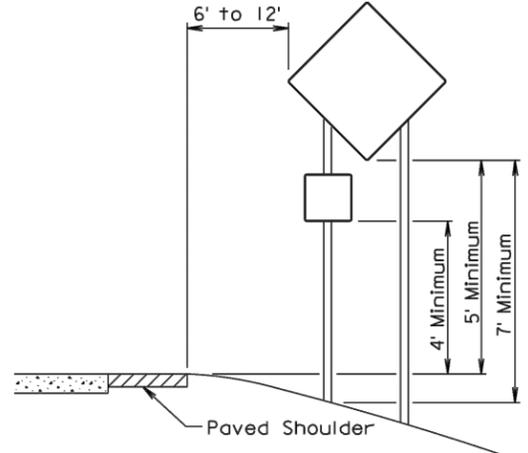


September 22, 2014

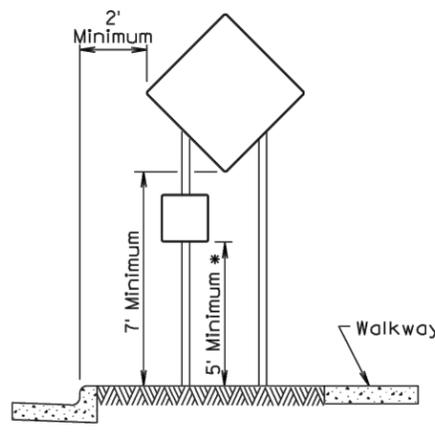
Published Date: 3rd Qtr. 2015	S D D O T	GUIDES FOR TRAFFIC CONTROL DEVICES LANE CLOSURE WITH FLAGGER PROVIDED	PLATE NUMBER 634.23
			Sheet 1 of 1



RURAL DISTRICT

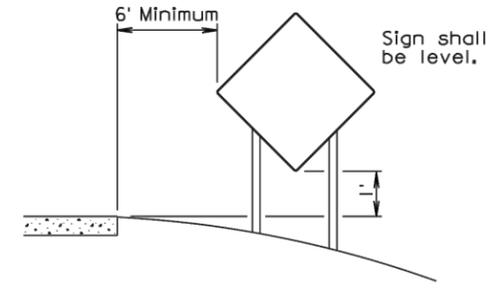


RURAL DISTRICT WITH SUPPLEMENTAL PLATE



URBAN DISTRICT

\* If the bottom of supplemental plate is mounted lower than 7 feet above a pedestrian walkway, the supplemental plate should not project more than 4" into the pedestrian facility.



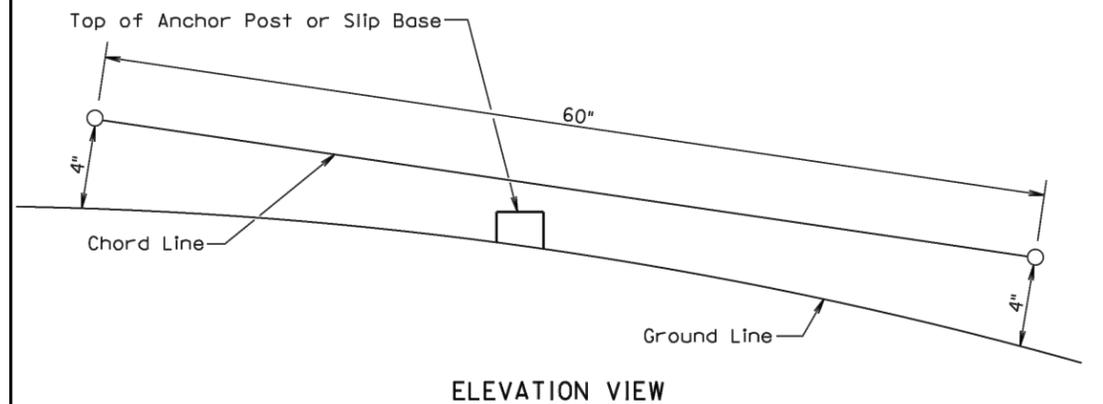
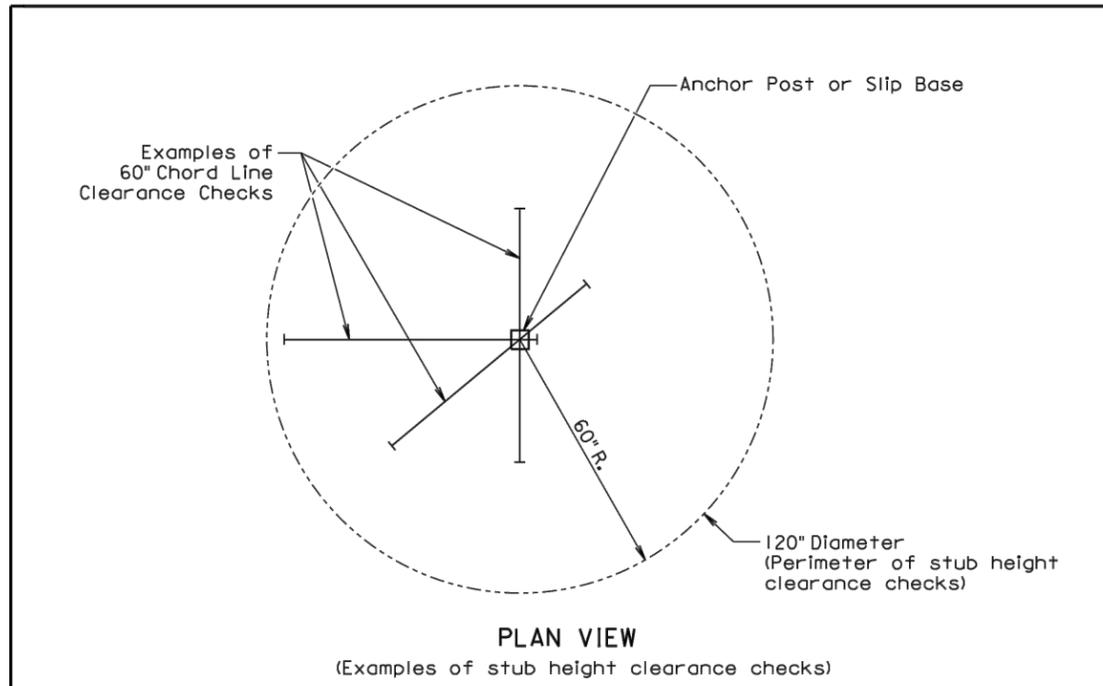
RURAL DISTRICT 3 DAY MAXIMUM

(Not applicable to regulatory signs)

September 22, 2014

Published Date: 3rd Qtr. 2015	S D D O T	CRASHWORTHY SIGN SUPPORTS (Typical Construction Signing)	PLATE NUMBER 634.85
			Sheet 1 of 1

Z:\2013 PROJECTS\13105 BROWN CO. - RICHMOND LAKE GUARDRAIL RETROFIT\DESIGN\MISC SHEETS\TRAFFIC CONTROL UDD.DWG 12/2/2015 2:46 PM



**GENERAL NOTES:**

The top of anchor posts and slip bases SHALL NOT extend above a 60" chord line within a 120" diameter circle around the post with ends 4" above the ground.

At locations where there is curb and gutter adjacent to the breakaway sign support, the stub height shall be a maximum of 4" above the ground line at the localized area adjacent to the breakaway support stub.

The 4" stub height clearance is not necessary for U-channel lap splices where the support is designed to yield (bend) at the base.

July 1, 2005

<i>Published Date: 3rd Qtr. 2015</i>	<b>S D D O T</b>	<b>BREAKAWAY SUPPORT STUB CLEARANCE</b>	<b>PLATE NUMBER</b> 634.99
			Sheet 1 of 1

Z:\2013 PROJECTS\13105 BROWN CO. - RICHMOND LAKE GUARDRAIL RETROFIT\DESIGN\MISC SHEETS\TRAFFIC CONTROL UDI.DWG 12/2/2015 2:46 PM

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	PH 6525(03)	10	30

# ALIGNMENT DATA - HORIZONTAL

PROJECT "A" ALIGNMENT 1 - (EAST BRIDGE)				
TYPE	STATION		NORTHING	EASTING
POB	29+00.00		622140.5141	2329267.0227
		TL=1558.601	N 11°18'47" E	
	44+58.60		623668.8323	2329572.7714
		TL=123.902	N 11°17'37" E	
	45+82.50		623790.3348	2329597.0358
		TL=217.495	N 11°37'19" E	
POE	48+00.00		624003.3703	2329640.8511

PROJECT SITE "B" ALIGNMENT 2 - (NORTH BRIDGE)				
TYPE	STATION		NORTHING	EASTING
POB	9+00.00		633181.8619	2324114.3752
		TL=421.604	S 89°59'39" E	
	13+21.60		633181.8187	2324535.9795
		TL=49.965	N 89°45'47" E	
	13+71.57		633182.0253	2324585.9441
		TL=528.429	S 89°59'22" E	
POE	19+00.00		633181.9271	2325114.3729

# CONTROL DATA

HORIZONTAL AND VERTICAL CONTROL POINTS				
POINT	DESCRIPTION	NORTHING	EASTING	ELEVATION
1	CP /1	622399.024	2329373.133	1368.231
2	CP /2	624027.183	2329700.040	1378.050
3	CP /3	633114.203	2325452.295	1386.845
4	CP /4	633215.854	2323587.232	1390.678

THE COORDINATES SHOWN ON THIS SHEET ARE BASE ON THE SOUTH DAKOTA STATE PLANE COORDINATE SYSTEM, NORTH ZONE (NAD 83/1996) COMBINED SCALE FACTOR=0.9999134  
THE ELEVATIONS SHOWN ON THIS SHEET ARE BASED ON NAVD 88.



Date: 11 Jun thru 12 Jun		TEST HOLE DATA		SUE Crew:	
Client Project No.:		FIELD NOTES		Bob Chris Lea	
Road No.: 382nd				City/County: Brown	
Truck No.: 3				General Location: Richmond Lake	
SUE Project Number:					
Type of Utility	Material	Identification Marker	Distance from ID Marker (English/Metric)		
E - Electric	1-Steel	101 - Sleeve	201 - Edge of Pavement		
NG - Natural Gas	2-PVC(Polyvinyl Chloride)	102 - Hub/Lath	202 - Baseline		
PG - Petroleum Gas	3-DIP(Ductile Iron Pipe)	103 - Nail/Disk	203 - Right of Way		
BT - Buried Telephone	4-VCP(Vitrified Clay Pipe)	104 - "X" Notation	204 - Centerline		
FO - Fiber Optic Cable	5-PE(Polyethylene Pipe)	105 - Swing Ties	205 - Back of Curb		
W - Water	6-AC(Transite)	106 - Other	206 - Survey Hub		
SAN - Sanitary Sewer	7-CIP(Cast Iron Pipe)		207 - "X" Notation		
STM - Storm Sewer	8-DBC(Direct Bury Cable)		208 - Other		
CATV - Cable Television	9-Concrete				
RW - Reclaimed Water	10-CMP(Corrugated Metal)				
Other	11-Duct Bank				
	Other Unknown				

Test Hole Date	Test Hole No.	Station	Offset (L/R)	Utility	Size	Material	ID Marker	Utility Direction	X-Sectional View	Depth	Distance/ID Marker	Comments
11-Jun	TH 8	43+53.68	15.79'L	FO	1.5"	8	103	↑	⊗	2.75	203	
	TH 7	41+64.43	16.34'L	FO	1.5"	8	103	↑	⊗	2.74	203	
	TH 6	39+71.77	15.55'L	FO	1.5"	8	103	↑	⊗	2.6	203	
	TH 5	37+82.05	15.56'L	FO	1.5"	8	103	↑	⊗	2.68	203	
	TH 4	35+88.52	15.49'L	FO	1.5"	8	103	↑	⊗	2.45	203	
	TH 3	33+93.95	15.99'L	FO	1.5"	8	103	↑	⊗	2.7	203	
	TH 2	31+99.50	16.24'L	FO	1.5"	8	103	↑	⊗	2.3	203	
	TH 1	30+10.17	17.04'L	N/A	N/A	N/A	103	N/A	N/A	6	203	DRY
11-Jun	TH 9	14+86.82	17.52'L	N/A	N/A	N/A	103	N/A	N/A	8	203	DRY
12-Jun	TH 13	13+08.23	17.85'R	FO x 2	.5" + 1"	8	103	→	⊗	5	203	X 2
	TH 11	13+83.36	17.54'R	FO x 2	.5" + 1"	8	103	→	⊗	4.2	203	X 2
	TH 10	14+83.72	17.87'R	N/A	N/A	N/A	103	N/A	N/A	8	203	DRY

Prepared By: WEATHERFORD Date: \_\_\_\_\_  
Checked By: \_\_\_\_\_

SUBSURFACE UTILITY EXPLORATIONS WERE DONE AT THE FOLLOWING LOCATIONS. THE INFORMATION BELOW STATES WHAT WAS LOCATED IN THE SPECIFIED AREAS. THIS TABLE IS PROVIDED TO AID THE CONTRACTOR DURING CONSTRUCTION AND DOES NOT SUBSTITUTE OR REPLACE THE REQUIREMENTS OF SD ONE CALL. ALL INFORMATION IS APPROXIMATE AND THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS BEFORE CONSTRUCTION IN THOSE AREAS AS MANDATED IN SDCL 49-7A.



12-2-15

# EXISTING TOPOGRAPHY SYMBOLOLOGY AND LEGEND

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	PH 6525(03)	11	30

FOR BIDDING PURPOSES ONLY



12-2-15

	Antenna		Fiber Optic Pedestal		Lift Station		Photo Control Target		Siren		Trash Barrel
	Azimuth Marker		Fire Hydrant 2		Light Pole		Quarter Corner		Sixteenth Corner		Triple Post Sign
	BBQ Grill		Fire Hydrant 3		Location Of Photo		Rail Road Crossing Sign		Speed Limit Sign		Tree-coniferous
	Beacon		Flag Pole		Magnetic Nail		Rail Road Mile Marker		Spike		Tree-dead
	Bearing Tree		Fuse Box		Mail Box		Rail Road Right Of Way		Sprinkler Head		Tree-deciduous
	Benchmark		Gas Manhole		Meander Corner		Rail Road Spike		Stake		Tree-stump
	Bore Hole		Gas Meter		Merry Go Round		Rail Road Right Of Way Marker		Steel Post		Water Curb Stop
	Brass Disk		Gas Pump		Mile Reference Marker		Rail Road Signal		Street Light		Water Fountain
	Bush		Gas Valve		Monitoring Well		Rebar		Street Sign		Water Hydrant
	Cast Iron Monument		Gas Vent		Nail		Rebar With Aluminum Cap		Stone Monument		Water Manhole
	Chiseled X		Generic Manhole		Parking Block		Rebar With Plastic Cap		Stop Sign		Water Meter
	Concrete Monument		Gps Base Point		Parking Meter		Reference Corner		Stormsewer Manhole		Water Valve
	Control Point		Guard Post/bollard		Pinch Top Pipe		Right Of Way Monument		Taxiway Light		Water Cistern
	Cooling Unit		Guy Pole		PK Nail		Sanitary Manhole		T Bar		Water Well
	Decorative Yard Lamp		Guy Wire		Power Box		Satellite Dish		Telephone Manhole		Water Post Indicator Valve
	Delineator		Hub		Power Manhole		Septic Tank Lid		Telephone Pedestal		Water Stand Pipe
	Ditch Block		Iron Pin		Power Pedestal		Section Corner		Telegraph Pole		Wetland Delineator Flag
	Double Post Sign		Iron Pipe		Power Pole		Sewer Cleanout		Television/cable Pedestal		Witness Corner
	Drill Hole		Judicial Land Corner		Power Pole With Light		Single Post Sign		Temporary Benchmark		Windsock
	Electric Outlet		Lawn Sprinkler		Power/electric Meter				Temporary Control Point		Wood Post
	Fiber Optic Marker				Public Telephone				Traffic Signal		Yield Sign

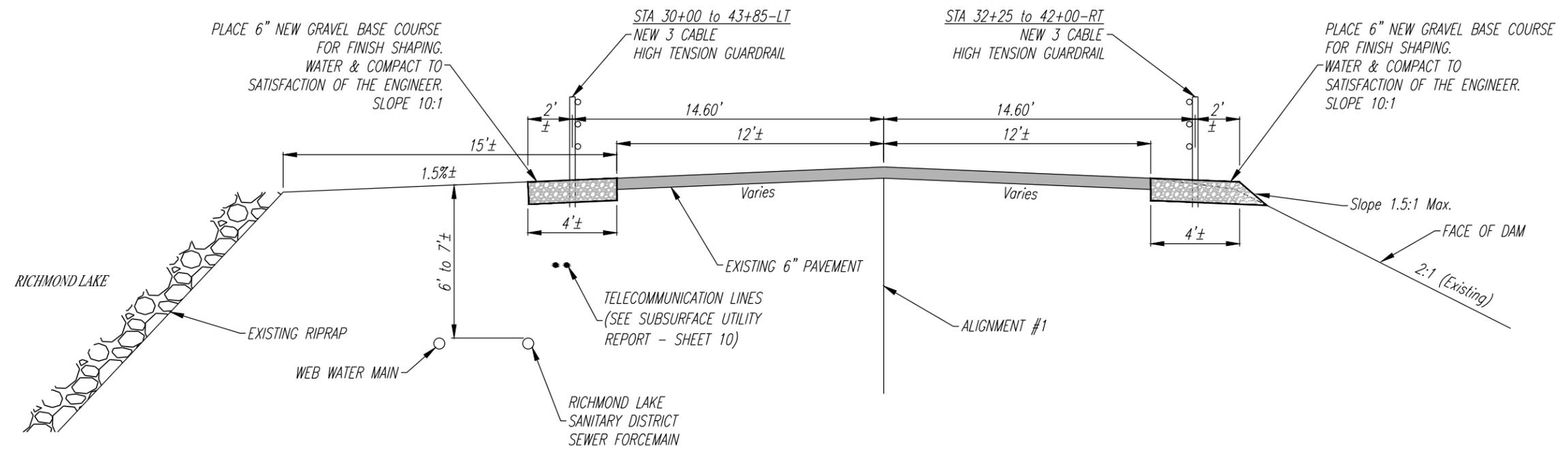
12/2/2015 2:46 PM Z:\2013 PROJECTS\13105 BROWN CO. - RICHMOND LAKE GUARDRAIL RETROFIT\DESIGN\MISC SHEETS\LEGEND.DWG



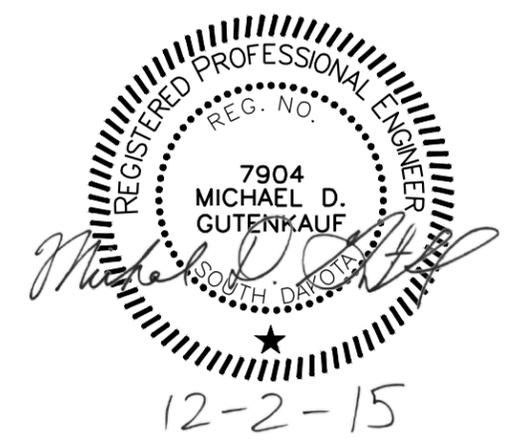
# TYPICAL SECTION

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT PH 6525(03)	SHEET 13	TOTAL SHEETS 30
-----------------------	------------------------	-------------	--------------------



TYPICAL SECTION  
PROJECT SITE "A"  
30+00 TO 42+85



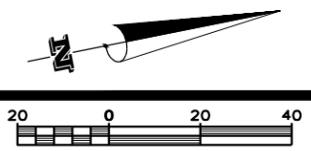
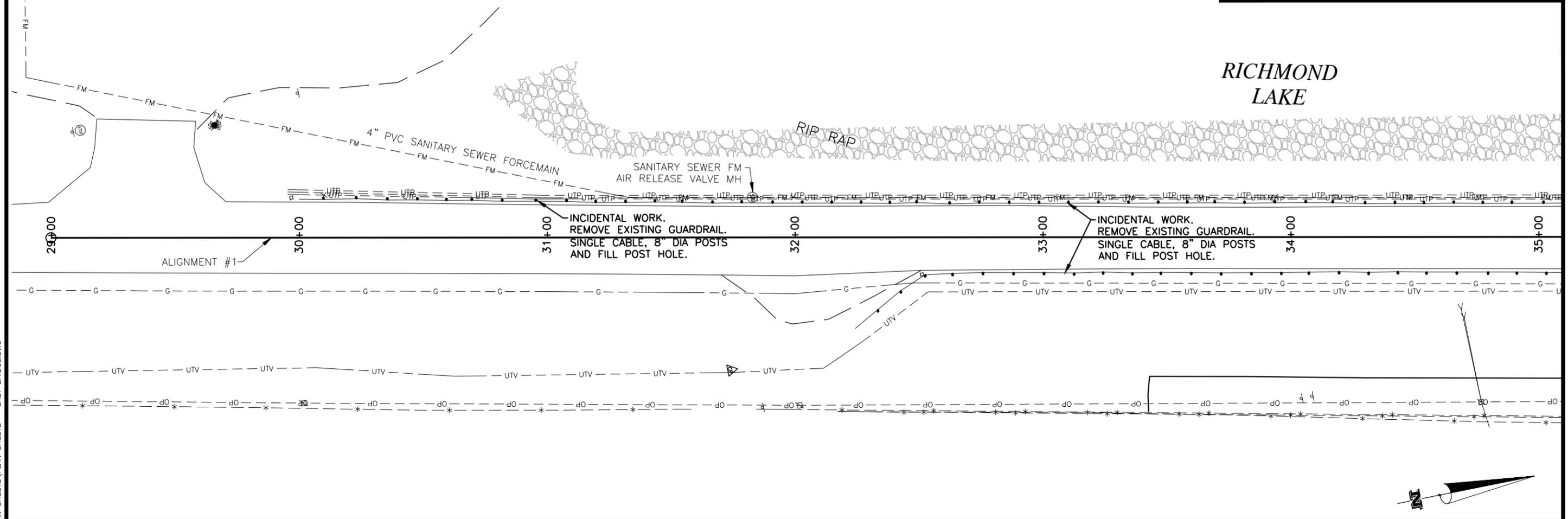
Z:\2013 PROJECTS\13105 BROWN CO. - RICHMOND LAKE GUARDRAIL RETROFIT\DESIGN\PLAN SHEETS\TYP SEC.DWG 12/2/2015 2:46 PM

PROJECT SITE "A"

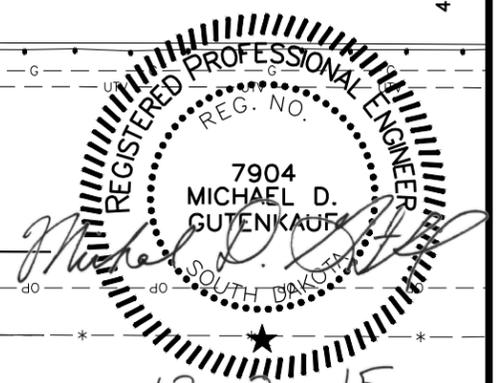
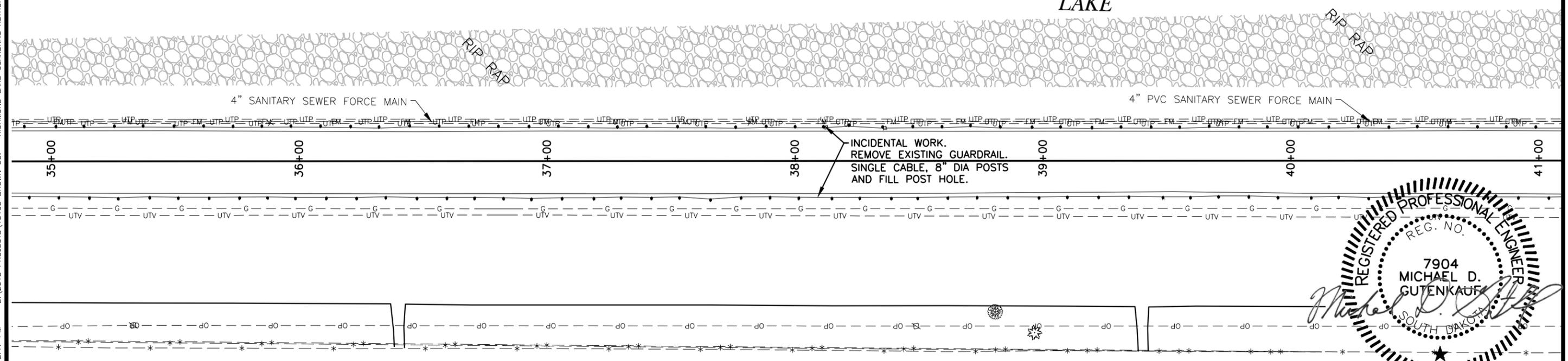
FOR BIDDING PURPOSES

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	PH 6525(03)	14	30

RICHMOND LAKE



RICHMOND LAKE



12-2-15  
PLANS BY: CLARK ENGINEERING, ABERDEEN, SD

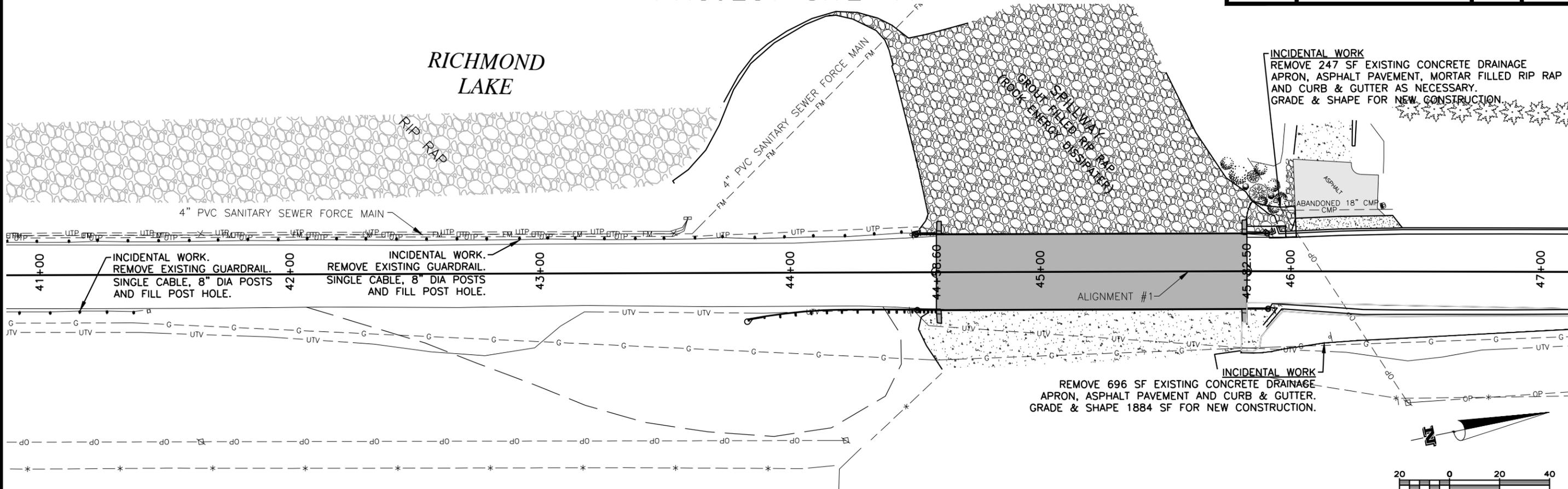
Z:\2013 PROJECTS\13105 BROWN CO. - RICHMOND LAKE GUARDRAIL RETROFIT\DESIGN\PLAN SHEETS\PLAN SHEETS - EAST BRIDGE.DWG 12/2/2015 2:47 PM

PROJECT SITE "A"

FOR BIDDING PURPOSES

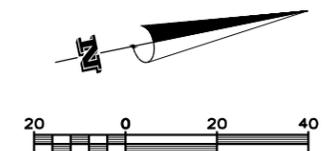
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	PH 6525(03)	15	30

RICHMOND  
LAKE



**INCIDENTAL WORK**  
REMOVE 247 SF EXISTING CONCRETE DRAINAGE APRON, ASPHALT PAVEMENT, MORTAR FILLED RIP RAP AND CURB & GUTTER AS NECESSARY. GRADE & SHAPE FOR NEW CONSTRUCTION.

**INCIDENTAL WORK**  
REMOVE 696 SF EXISTING CONCRETE DRAINAGE APRON, ASPHALT PAVEMENT AND CURB & GUTTER. GRADE & SHAPE 1884 SF FOR NEW CONSTRUCTION.



Z:\2013 PROJECTS\13105 BROWN CO. - RICHMOND LAKE GUARDRAIL RETROFIT\DESIGN\PLAN SHEETS\PLAN SHEETS - EAST BRIDGE.DWG



12-2-15

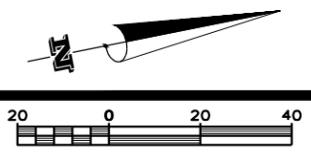
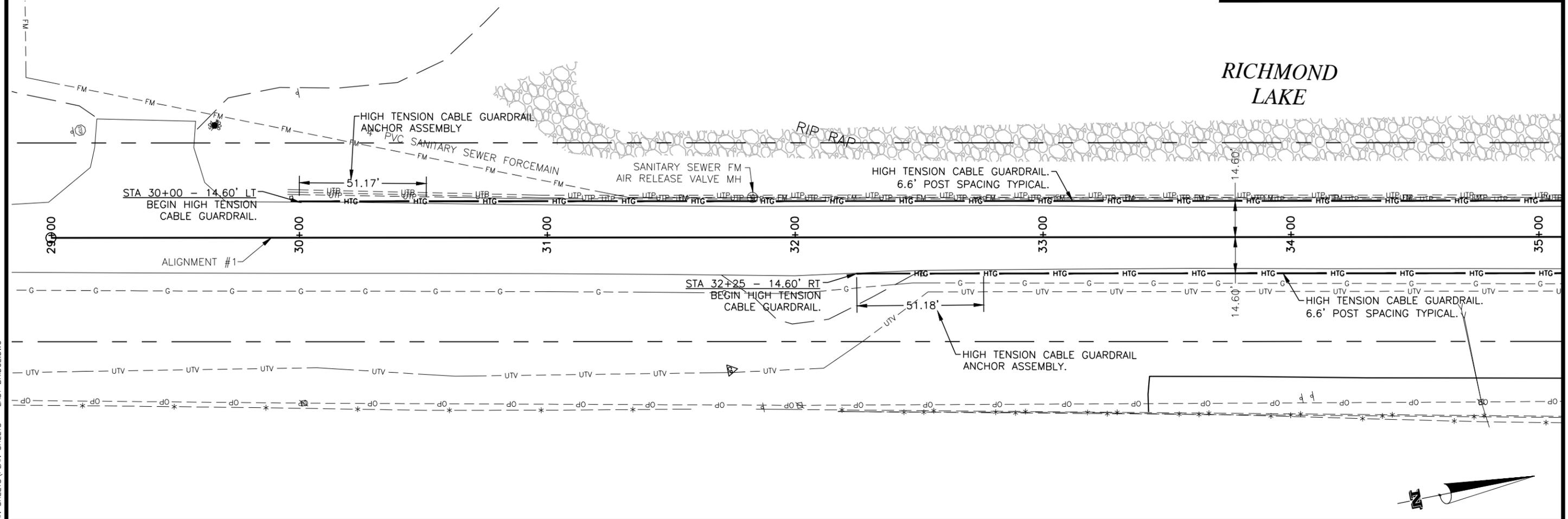
PLANS BY: CLARK ENGINEERING, ABERDEEN, SD

PROJECT SITE "A"

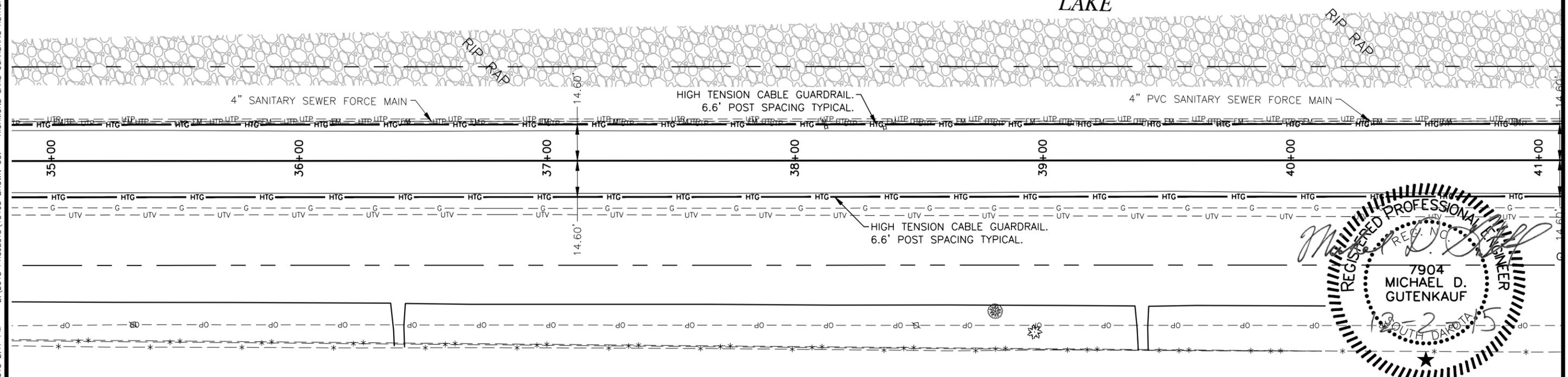
FOR BIDDING PURPOSES

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	PH 6525(03)	16	30

RICHMOND LAKE



RICHMOND LAKE



REGISTERED PROFESSIONAL ENGINEER  
 7904  
 MICHAEL D. GUTENKAUF  
 SOUTH DAKOTA

Z:\2013 PROJECTS\13105 BROWN CO. - RICHMOND LAKE GUARDRAIL RETROFIT\DESIGN\PLAN SHEETS\PLAN SHEETS - EAST BRIDGE.DWG 12/2/2015 2:47 PM

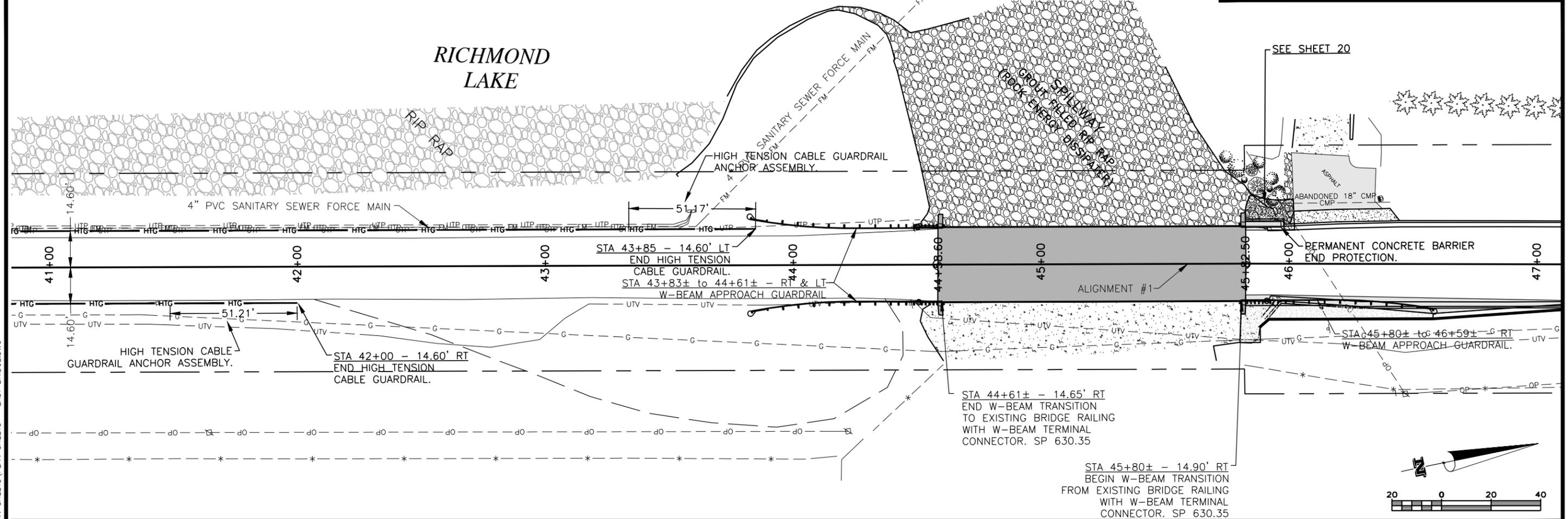
Z:\2013 PROJECTS\13105 BROWN CO. - RICHMOND LAKE GUARDRAIL RETROFIT\DESIGN\PLAN SHEETS\PLAN SHEETS - EAST BRIDGE.DWG

# PROJECT SITE "A"

FOR BIDDING PURPOSES

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	PH 6525(03)	17	30

## RICHMOND LAKE



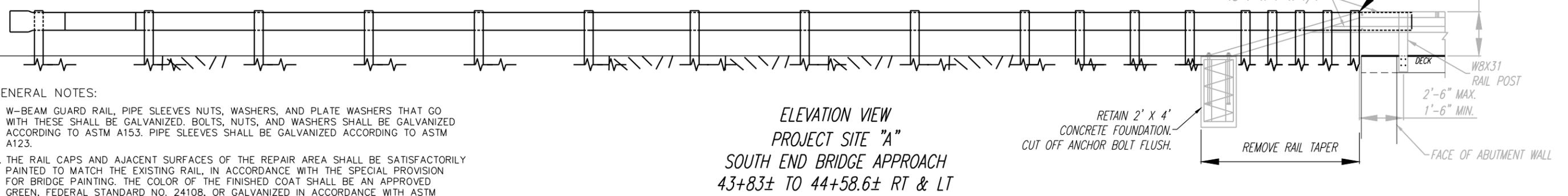
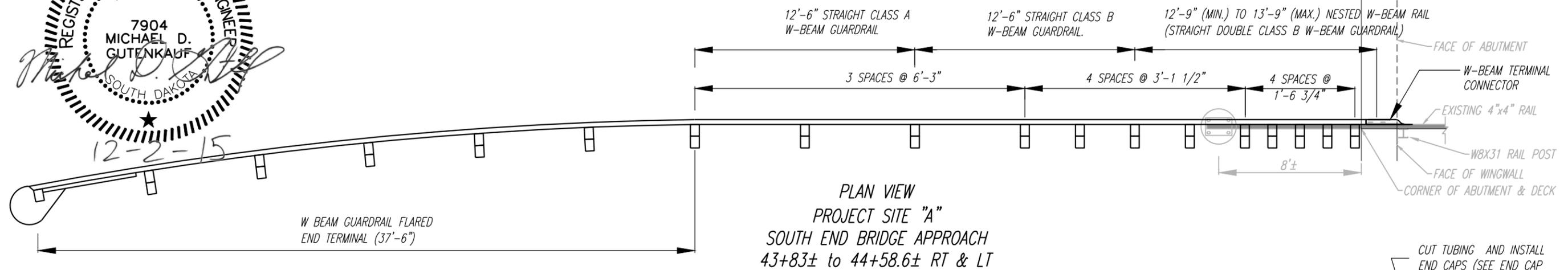
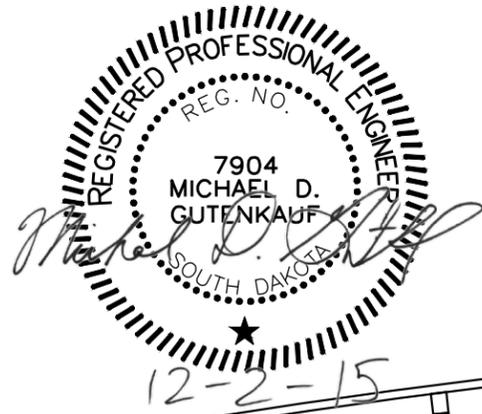
12-2-15

PLANS BY: CLARK ENGINEERING, ABERDEEN, SD

# APPROACH GUARDRAIL

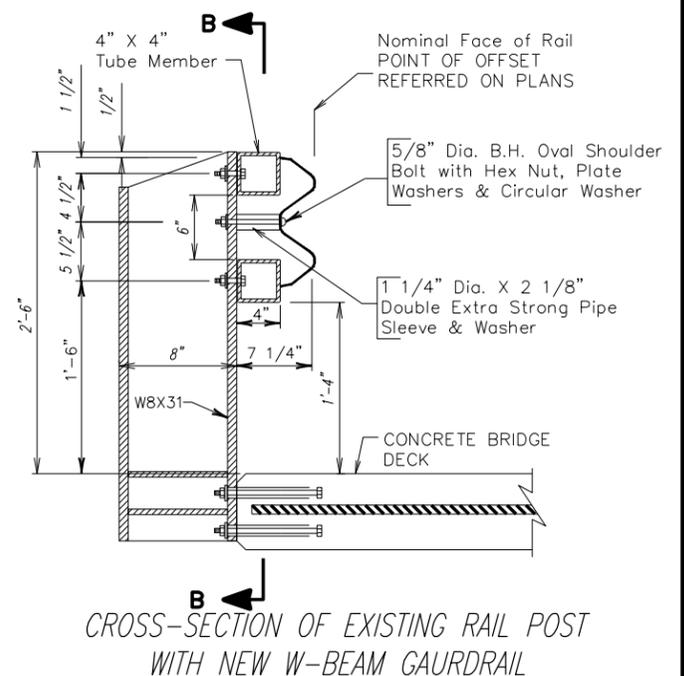
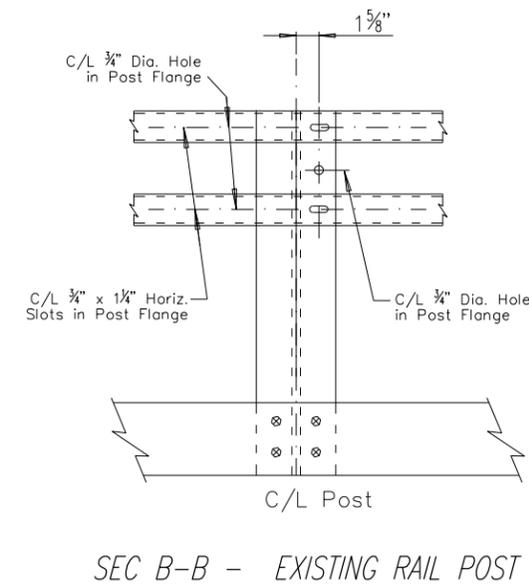
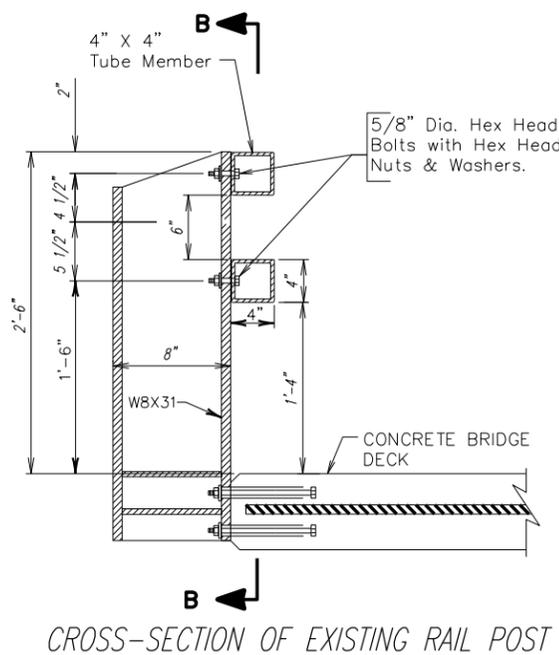
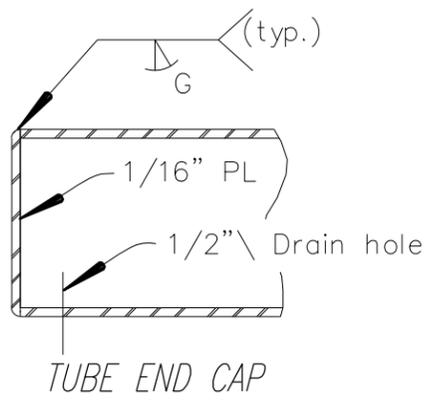
FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT PH 6525(03)	SHEET 18	TOTAL SHEETS 30
-----------------------	------------------------	-------------	--------------------



GENERAL NOTES:

1. W-BEAM GUARD RAIL, PIPE SLEEVES NUTS, WASHERS, AND PLATE WASHERS THAT GO WITH THESE SHALL BE GALVANIZED. BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED ACCORDING TO ASTM A153. PIPE SLEEVES SHALL BE GALVANIZED ACCORDING TO ASTM A123.
2. THE RAIL CAPS AND ADJACENT SURFACES OF THE REPAIR AREA SHALL BE SATISFACTORILY PAINTED TO MATCH THE EXISTING RAIL, IN ACCORDANCE WITH THE SPECIAL PROVISION FOR BRIDGE PAINTING. THE COLOR OF THE FINISHED COAT SHALL BE AN APPROVED GREEN, FEDERAL STANDARD NO. 24108, OR GALVANIZED IN ACCORDANCE WITH ASTM A153, DEPENDING ON EXISTING FINISH ON THE RAIL. THE NUTS, BOLTS, AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153.
3. ALL STRUCTURAL STEEL PARTS FOR THE TYPE T101 STEEL RAILING SHALL CONFORM TO ASTM A709 GR. 36. TUBES SHALL CONFORM TO ASTM A500 GR. B
4. W-BEAM APPROACH RAIL SHALL BE INSTALLED ON 3 CORNERS OF THE BRIDGE AND A CRASH CUSHION WILL BE INSTALLED ON THE NW CORNER OF THE BRIDGE. INSTALLATION OF W-BEAM AND CUSHION SHALL BE ACCORDING TO THE TYPICAL DETAILS ON THIS SHEET. REMOVAL OF THE EXISTING 8'-6"± BRIDGE RAIL TAPERS, INCLUDING CUTTING, REMOVAL OF THE TUBING, CAPPING THE TUBING, AND PAINTING, WILL BE PAID UNDER INCIDENTAL WORK.

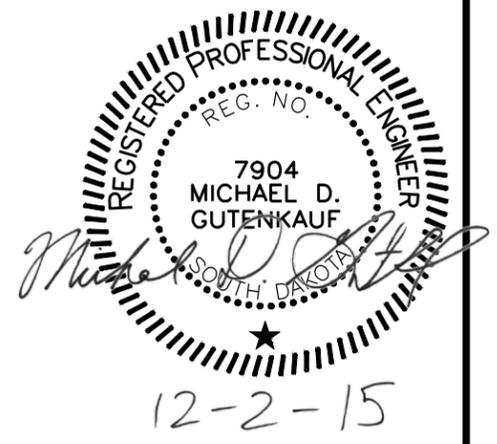
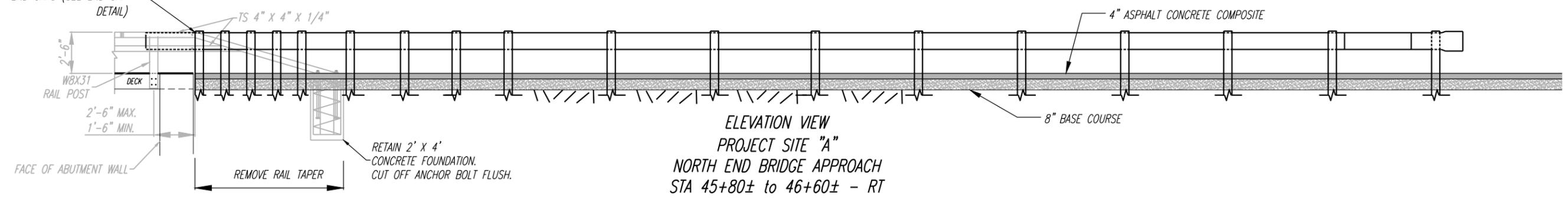
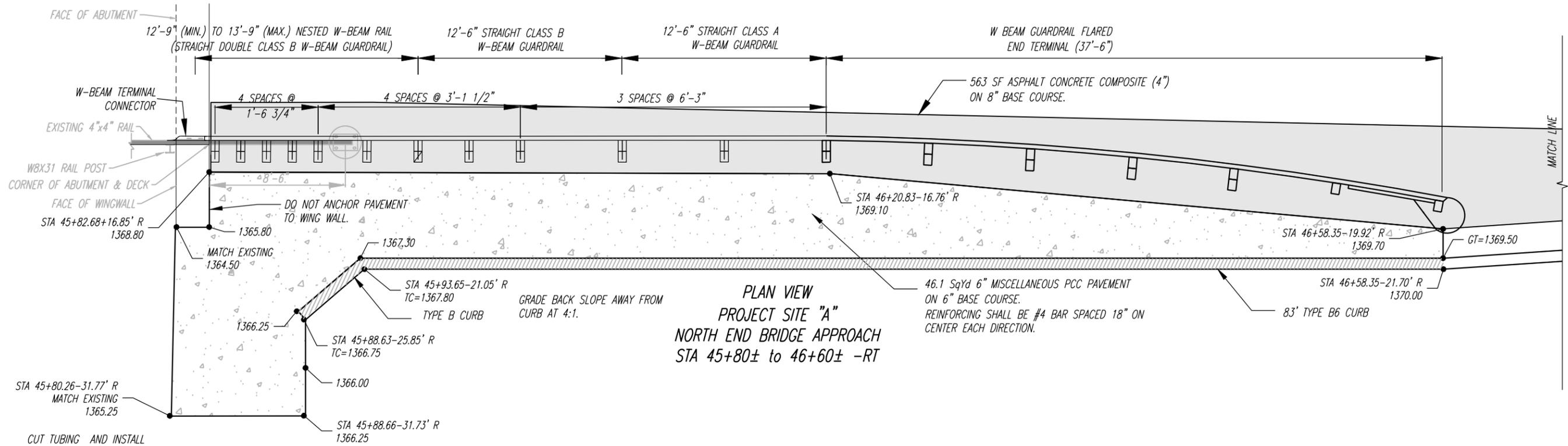


Z:\2013 PROJECTS\13105 BROWN CO. - RICHMOND LAKE GUARDRAIL RETROFIT\DESIGN\PLAN SHEETS\LAYOUT DETAILS.DWG 12/2/2015 2:47 PM

# APPROACH GUARDRAIL

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT PH 6525(03)	SHEET 19	TOTAL SHEETS 30
-----------------------	------------------------	-------------	--------------------

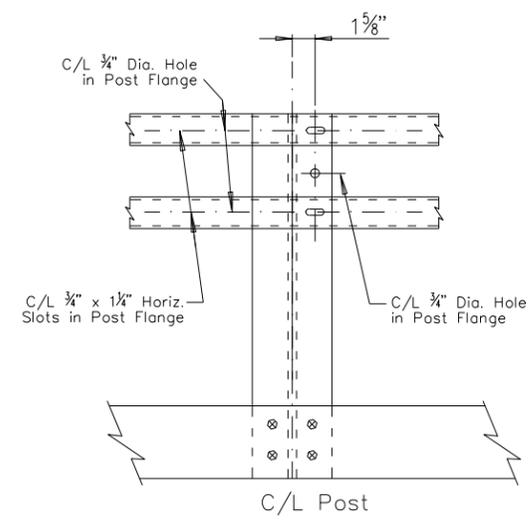
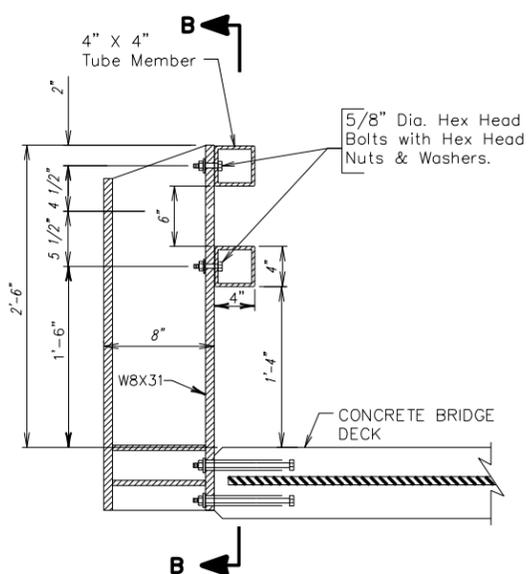
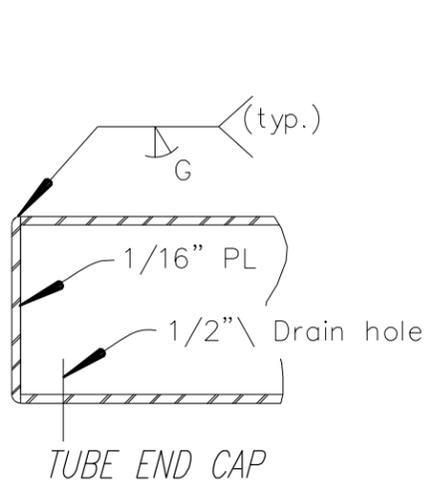
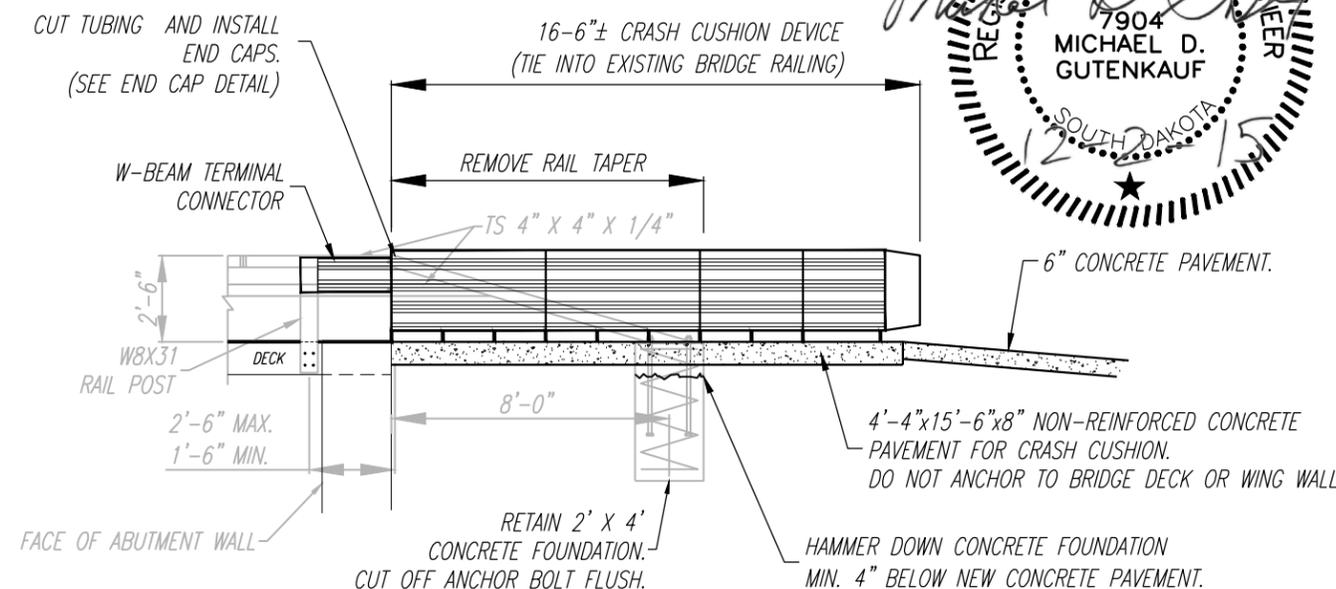
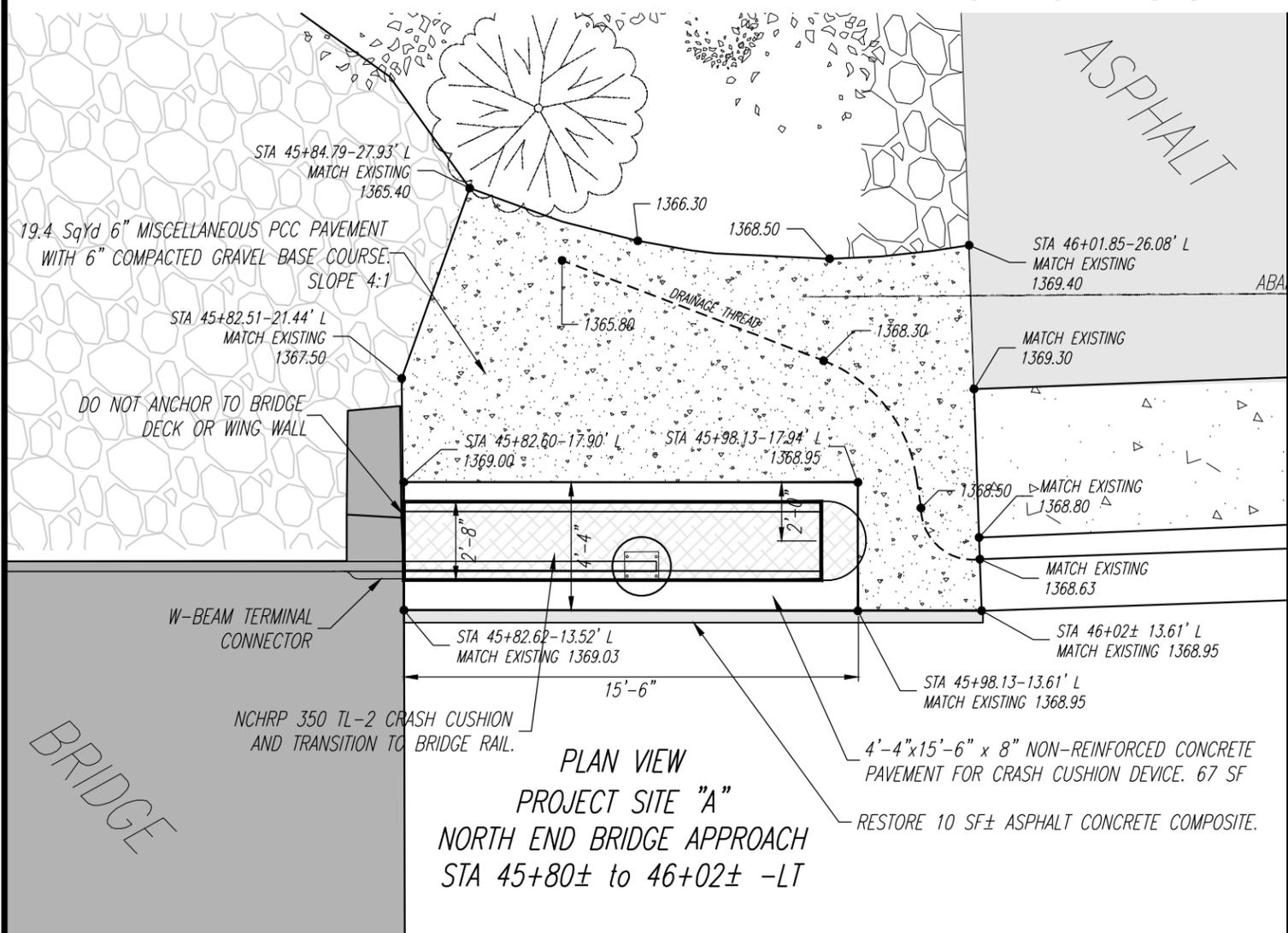


Z:\2013 PROJECTS\13105 BROWN CO. - RICHMOND LAKE GUARDRAIL RETROFIT\DESIGN\PLAN SHEETS\LAYOUT DETAILS.DWG 12/2/2015 2:47 PM

# APPROACH GUARDRAIL

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT PH 6525(03)	SHEET 20	TOTAL SHEETS 30
-----------------------	------------------------	-------------	--------------------



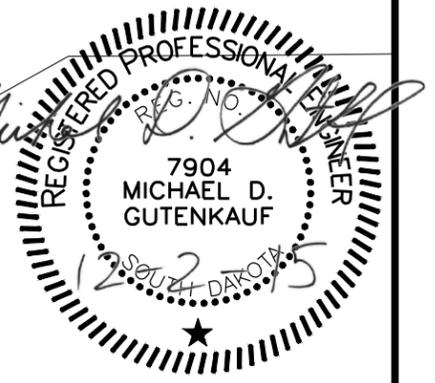
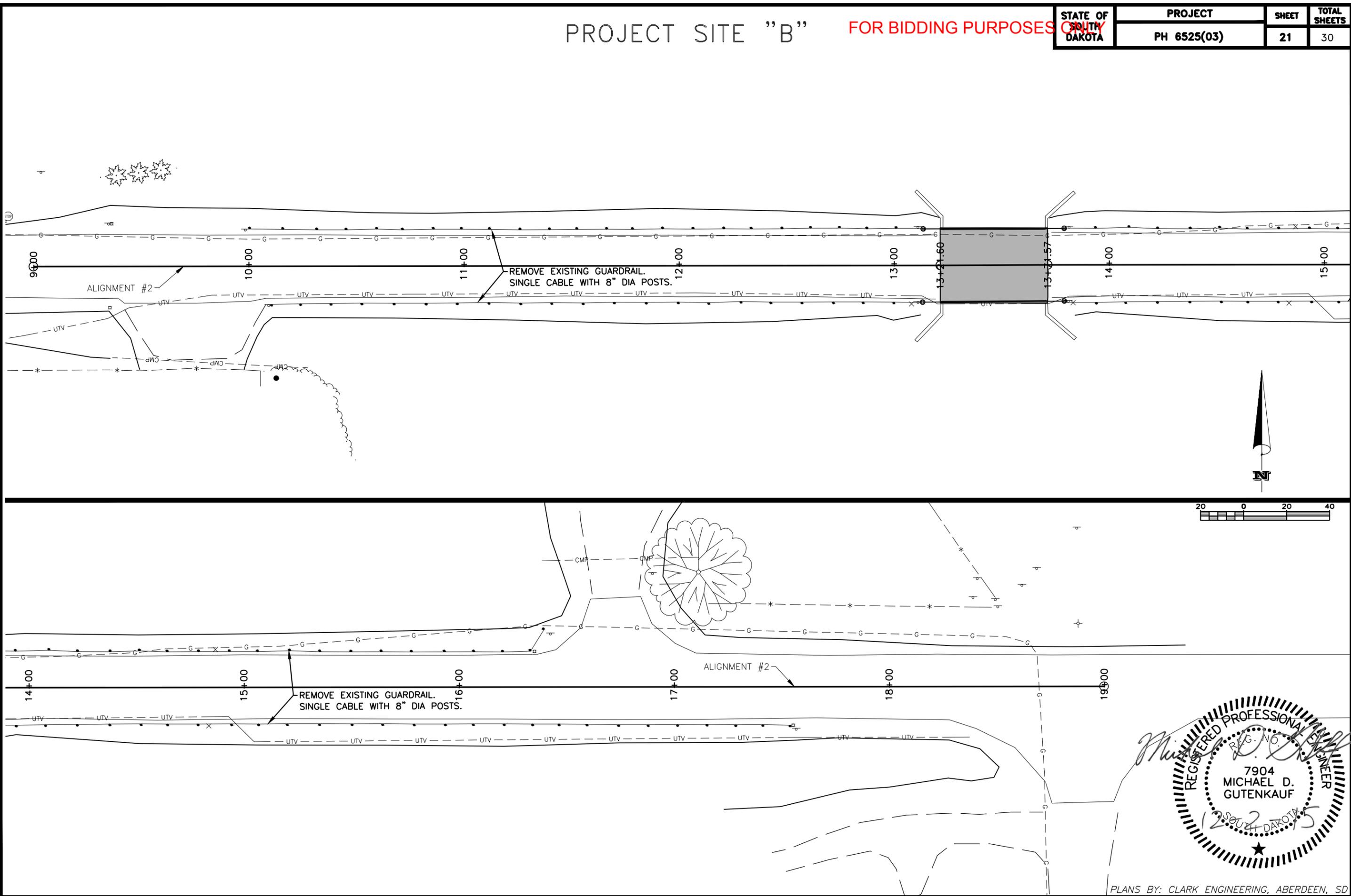
- GENERAL NOTES:
- W-BEAM GUARD RAIL, PIPE SLEEVES NUTS, WASHERS, AND PLATE WASHERS THAT GO WITH THESE SHALL BE GALVANIZED. BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED ACCORDING TO ASTM A153. PIPE SLEEVES SHALL BE GALVANIZED ACCORDING TO ASTM A123.
  - THE RAIL CAPS AND ADJACENT SURFACES OF THE REPAIR AREA SHALL BE SATISFACTORILY PAINTED TO MATCH THE EXISTING RAIL, IN ACCORDANCE WITH THE SPECIAL PROVISION FOR BRIDGE PAINTING. THE COLOR OF THE FINISHED COAT SHALL BE AN APPROVED GREEN, FEDERAL STANDARD NO. 24108, OR GALVANIZED IN ACCORDANCE WITH ASTM A153, DEPENDING ON EXISTING FINISH ON THE RAIL. THE NUTS, BOLTS, AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153.
  - ALL STRUCTURAL STEEL PARTS FOR THE TYPE T101 STEEL RAILING SHALL CONFORM TO ASTM A709 GR. 36. TUBES SHALL CONFORM TO ASTM A500 GR. B
  - W-BEAM APPROACH RAIL SHALL BE INSTALLED ON 3 CORNERS OF THE BRIDGE AND A CRASH CUSHION WILL BE INSTALLED ON THE NW CORNER OF THE BRIDGE. INSTALLATION OF W-BEAM AND CUSHION SHALL BE ACCORDING TO THE TYPICAL DETAILS ON THIS SHEET. REMOVAL OF THE EXISTING 8'-6"± BRIDGE RAIL TAPERS, INCLUDING CUTTING, REMOVAL OF THE TUBING, CAPPING THE TUBING, AND PAINTING, WILL BE PAID UNDER INCIDENTAL WORK.

Z:\2013 PROJECTS\13105 BROWN CO. - RICHMOND LAKE GUARDRAIL RETROFIT\DESIGN\PLAN SHEETS\LAYOUT DETAILS.DWG 12/2/2015 2:47 PM

# PROJECT SITE "B"

FOR BIDDING PURPOSES

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	PH 6525(03)	21	30



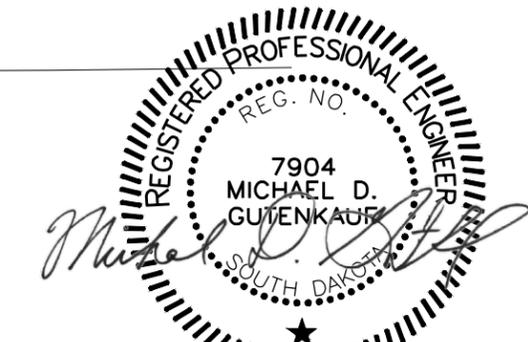
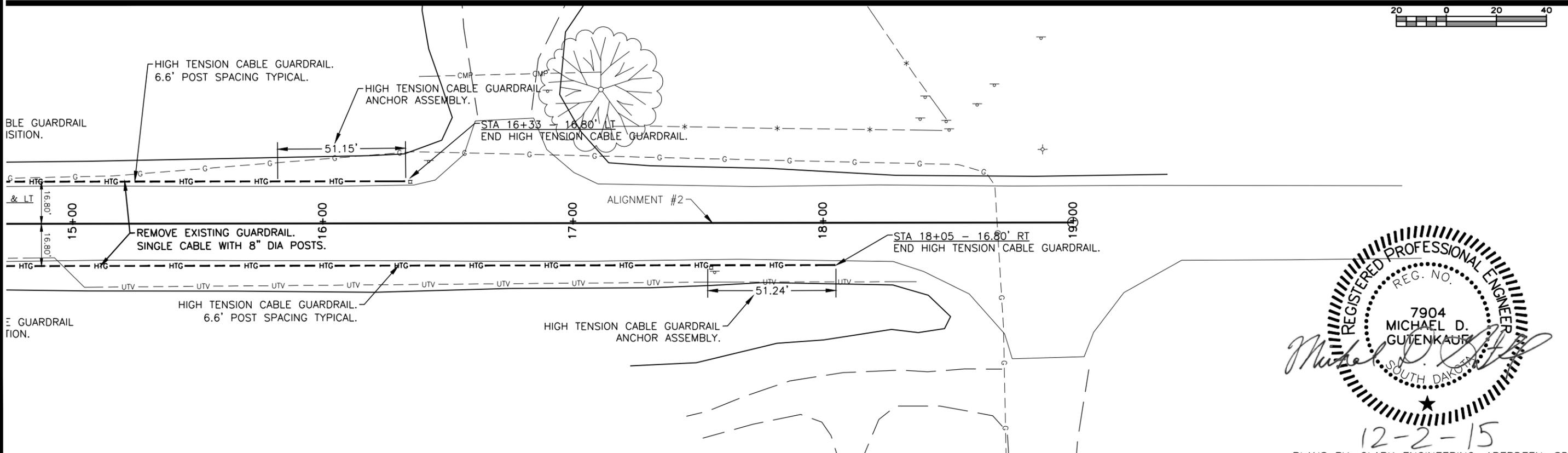
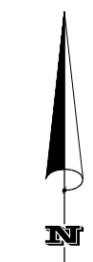
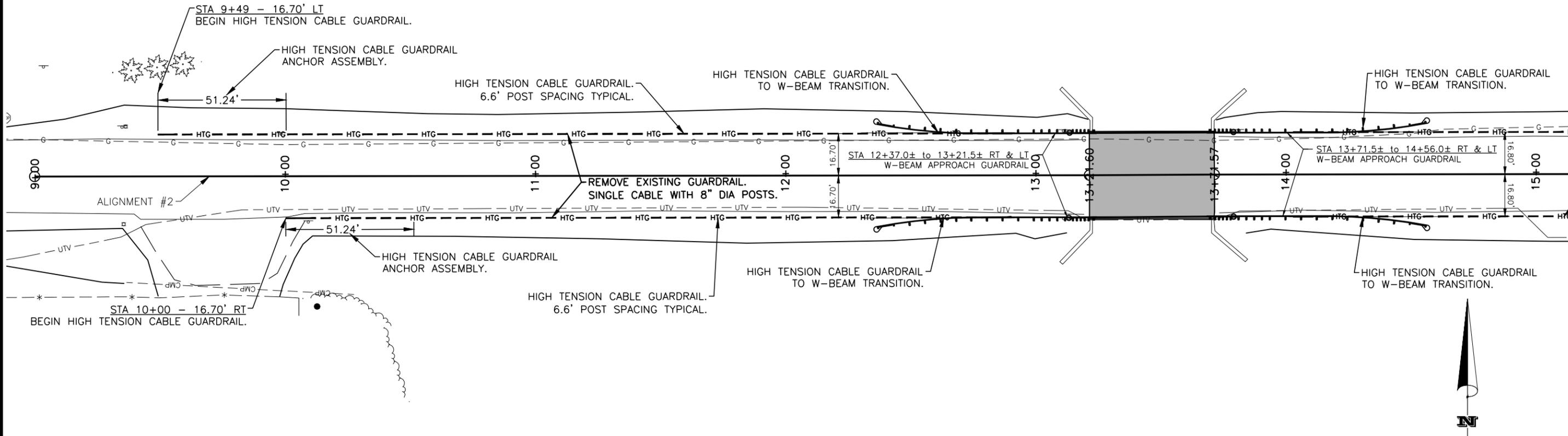
PLANS BY: CLARK ENGINEERING, ABERDEEN, SD

Z:\2013 PROJECTS\13105 BROWN CO. - RICHMOND LAKE GUARDRAIL RETROFIT\DESIGN\PLAN SHEETS\PLAN SHEETS - NORTH BRIDGE.DWG 12/2/2015 2:48 PM

# PROJECT SITE "B"

FOR BIDDING PURPOSES

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	PH 6525(03)	22	30



12-2-15

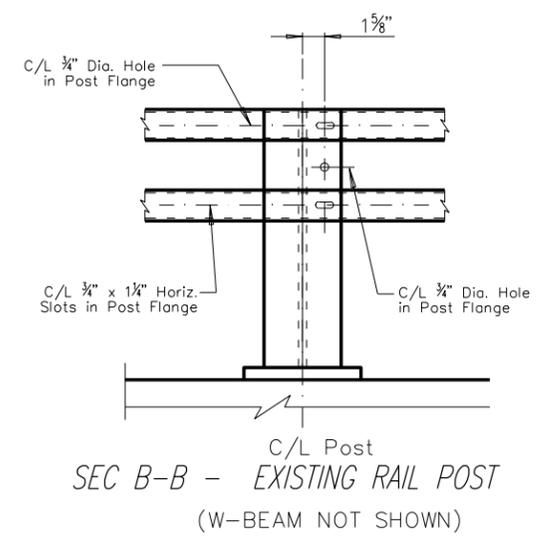
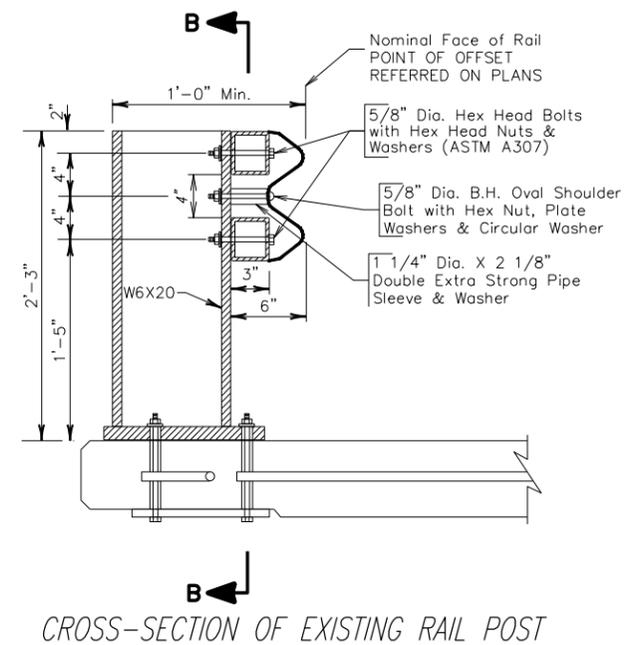
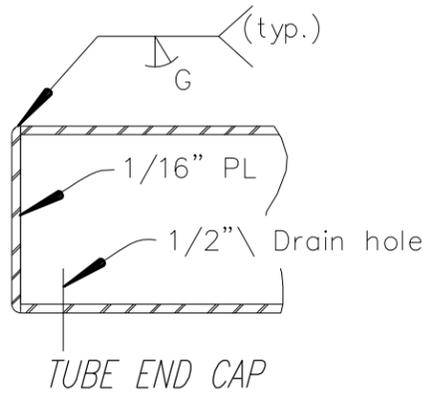
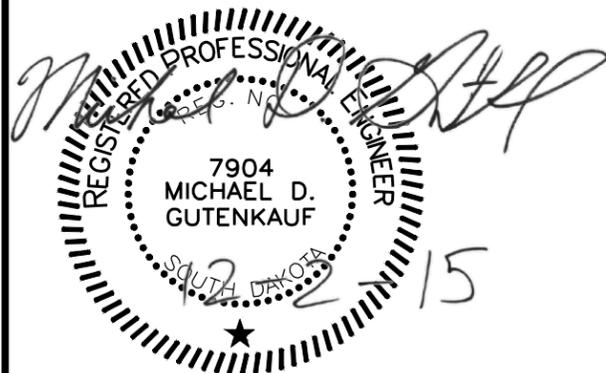
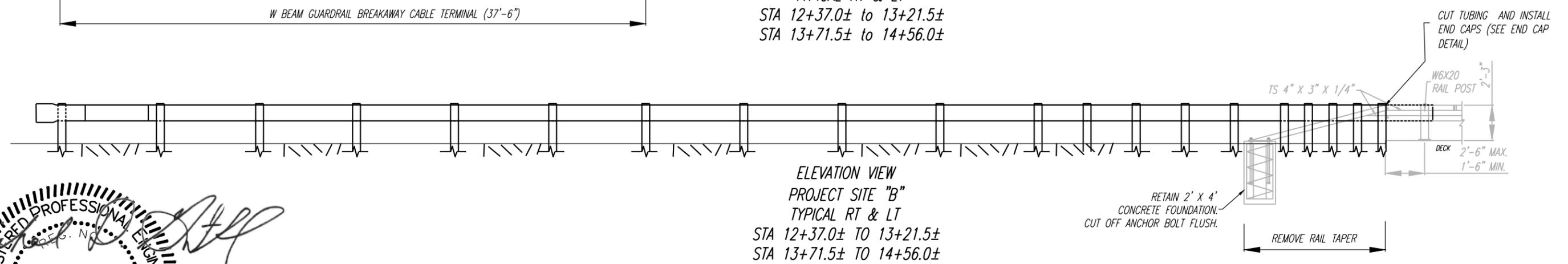
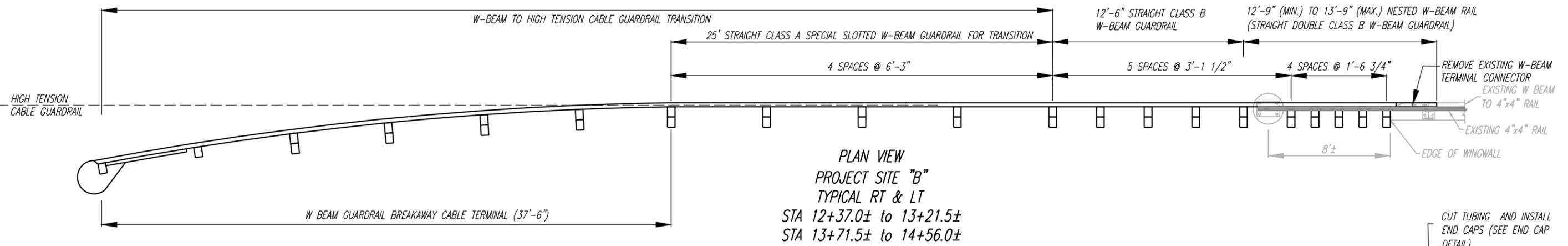
PLANS BY: CLARK ENGINEERING, ABERDEEN, SD

Z:\2013 PROJECTS\13105 BROWN CO. - RICHMOND LAKE GUARDRAIL RETROFIT\DESIGN\PLAN SHEETS\PLAN SHEETS - NORTH BRIDGE.DWG 12/2/2015 2:48 PM

# APPROACH GUARDRAIL

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	PH 6525(03)	23	30



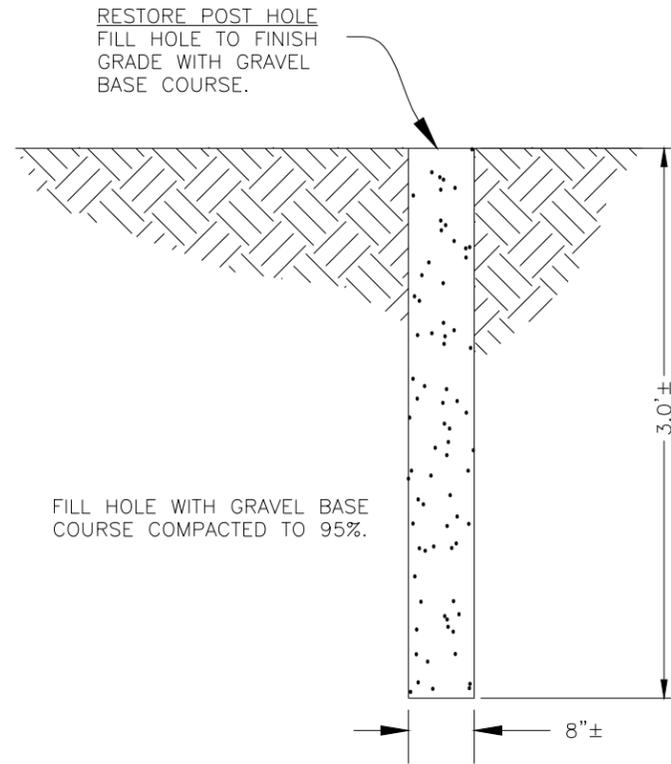
### GENERAL NOTES:

1. W-BEAM GUARD RAIL, PIPE SLEEVES NUTS, WASHERS, AND PLATE WASHERS THAT GO WITH THESE SHALL BE GALVANIZED. BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED ACCORDING TO ASTM A153. PIPE SLEEVES SHALL BE GALVANIZED ACCORDING TO ASTM A123.
2. THE RAIL CAPS AND ADJACENT SURFACES OF THE REPAIR AREA SHALL BE SATISFACTORILY PAINTED TO MATCH THE EXISTING RAIL, IN ACCORDANCE WITH THE SPECIAL PROVISION FOR BRIDGE PAINTING. THE COLOR OF THE FINISHED COAT SHALL BE AN APPROVED GREEN, FEDERAL STANDARD NO. 24108, OR GALVANIZED IN ACCORDANCE WITH ASTM A153, DEPENDING ON EXISTING FINISH ON THE RAIL. THE NUTS, BOLTS, AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153.
3. ALL STRUCTURAL STEEL PARTS FOR THE TYPE T101 STEEL RAILING SHALL CONFORM TO ASTM A709 GR. 36. TUBES SHALL CONFORM TO ASTM A500 GR. B
4. W-BEAM APPROACH RAIL SHALL BE INSTALLED ON ALL 4 CORNERS OF THE BRIDGE, ACCORDING TO THE TYPICAL DETAILS ON THIS SHEET. REMOVAL OF THE EXISTING 8' BRIDGE RAIL TAPERS, INCLUDING CUTTING, REMOVAL OF THE TUBING, W BEAM TERMINAL CONNECTOR, CAPPING THE TUBING, AND PAINTING, WILL BE PAID UNDER INCIDENTAL WORK.

Z:\2013 PROJECTS\13105 BROWN CO. - RICHMOND LAKE GUARDRAIL RETROFIT\DESIGN\PLAN SHEETS\LAYOUT DETAILS.DWG 12/2/2015 2:48 PM

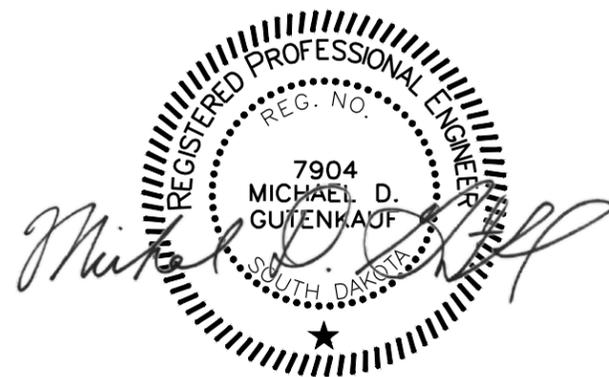
FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	PH 6525(03)	24	30

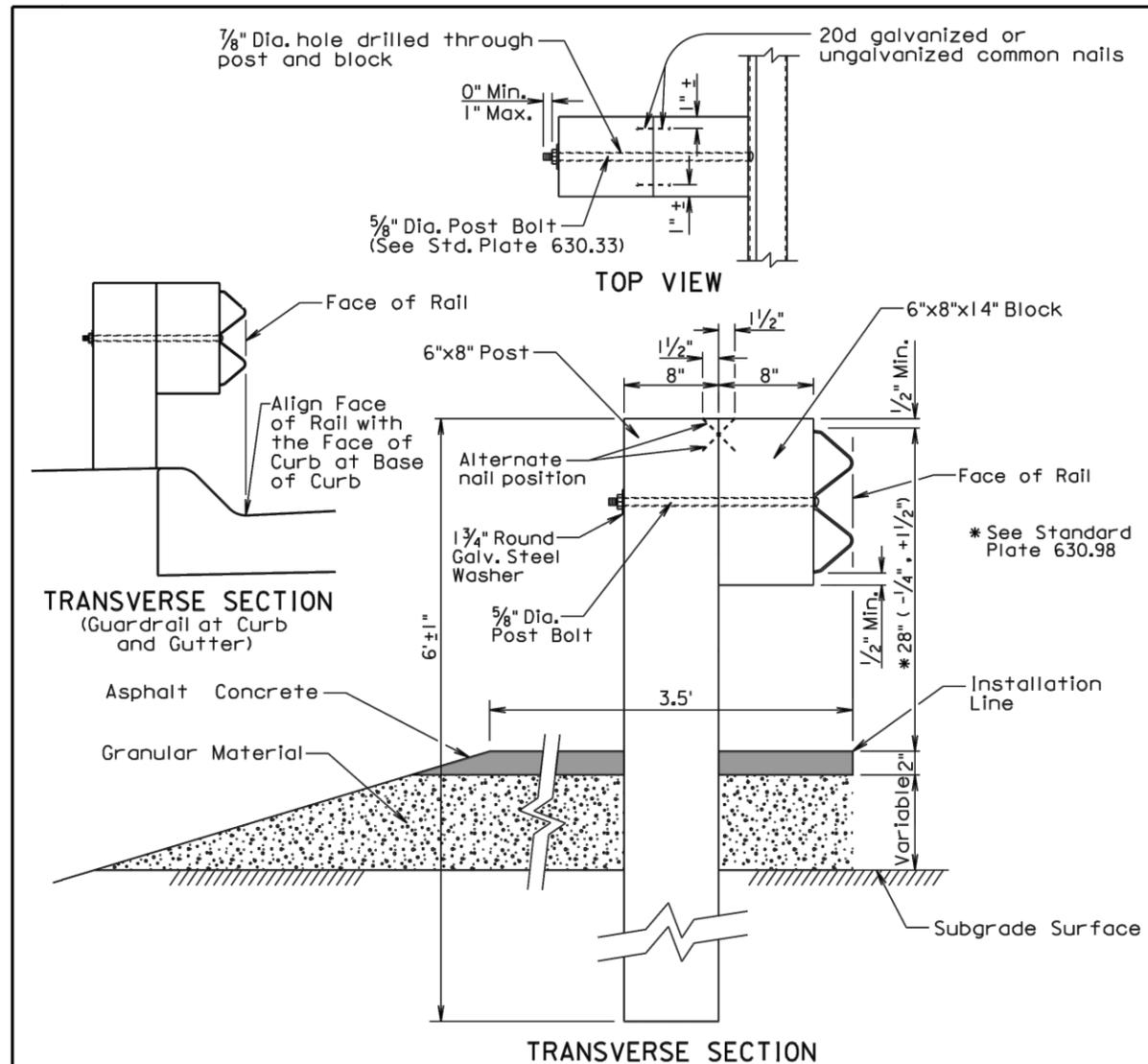


### ABANDON POST HOLE DETAIL

ALL COSTS FOR FURNISHING AND INSTALLING GRAVEL BASE COURSE FILL SHALL BE INCLUDED IN THE "INCIDENTAL WORK" BID ITEM. NO SEPARATE PAYMENT WILL BE MADE.



12-2-15



**GENERAL NOTES:**

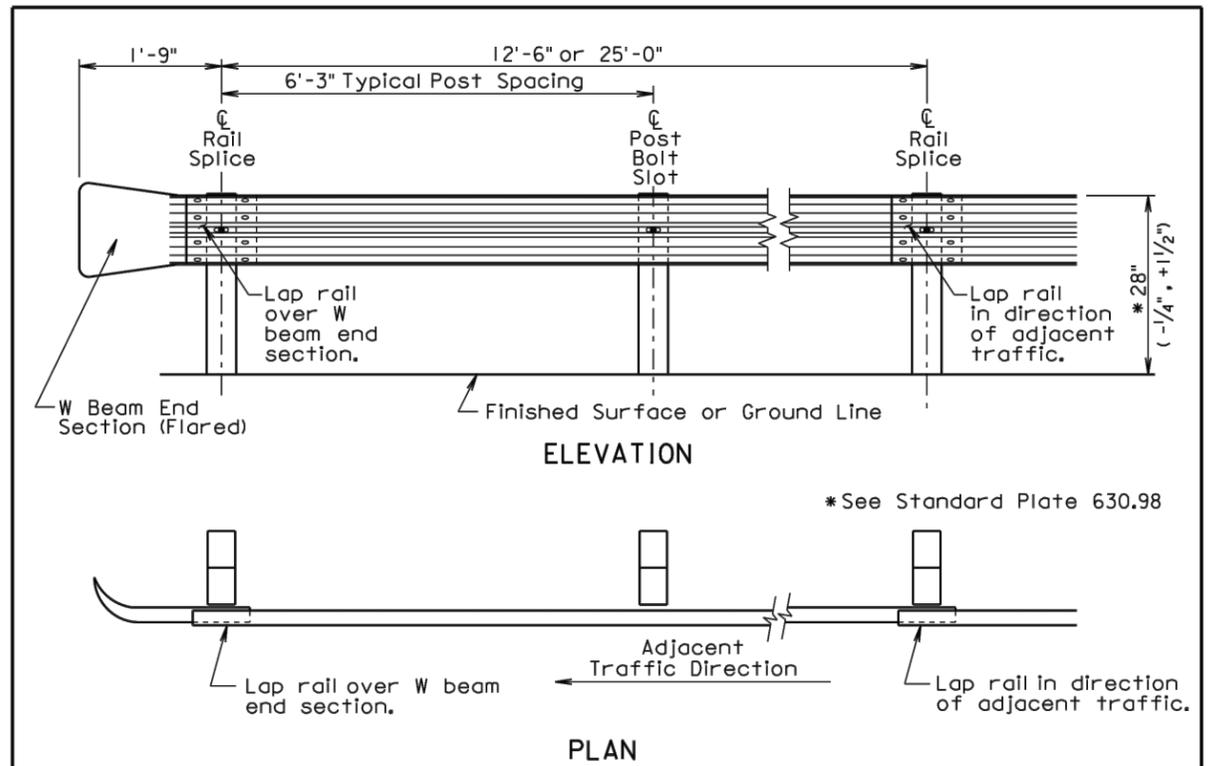
Asphalt concrete shall be the same type used elsewhere on the project or shall be as specified in the plans. If asphalt concrete is not specified in the plans, the asphalt concrete shall conform to the Specifications for "Asphalt Concrete Composite." For informational purposes, the Rate of Materials for the 3.5' wide section of asphalt concrete as shown above shall be 4.80 Tons per Station.

Granular material shall be the same type used elsewhere on the project or shall be as specified in the plans. If granular material type is not specified in the plans, the material shall conform to the Specifications for "Base Course". The granular material shall be placed the same thickness as the mainline surfacing or as specified in the plans.

The cross slope for the surfacing and subgrade surface shall be as specified in the plans (See Typical Sections and/or Cross Sections).

The top of post and top of block shall have a true square cut. The top of block shall be ±1 inch from the top of the post.

Published Date: 3rd Qtr. 2015	S D D O T	W BEAM GUARDRAIL POST INSTALLATION	June 26, 2015
		PLATE NUMBER 630.31	Sheet 1 of 1



POST SPACING	MAXIMUM DEFLECTION
6'-3"	5'-0"
3'-1 1/2"	3'-9"

\*See Standard Plate 630.98

For Informational Purposes Only

**GENERAL NOTES:**

All W beam rail shall be Type I.

There will be no separate payment for furnishing and installing W Beam End Sections (Flared) and W Beam Terminal Connectors. All costs for the W Beam End Sections (Flared) and W Beam Terminal Connectors shall be incidental to the contract unit price per foot for the respective "W Beam Guardrail" bid item.

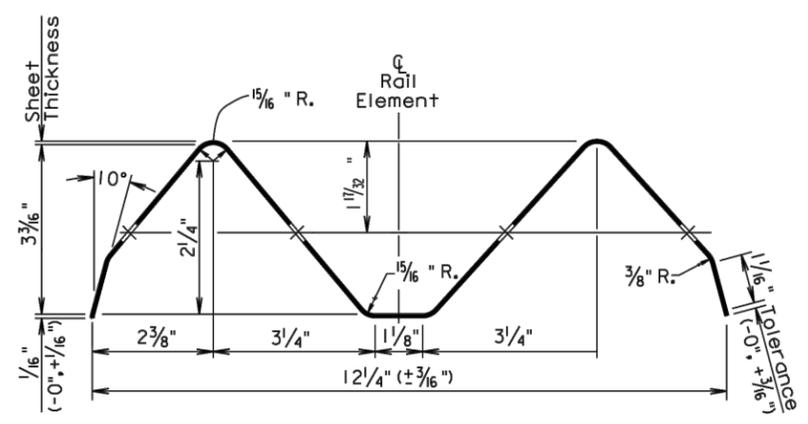
W beam rail section lengths may be 12'-6" and/or 25'-0". The combination of section lengths used shall be compatible with the total length of rail per site as shown in the plans.

W Beam End Sections (Flared) shall only be used in a one way traffic situation. See Standard Plate 630.80 for W Beam End Section (Flared) in the Beam Guardrail Trailing End Terminal.

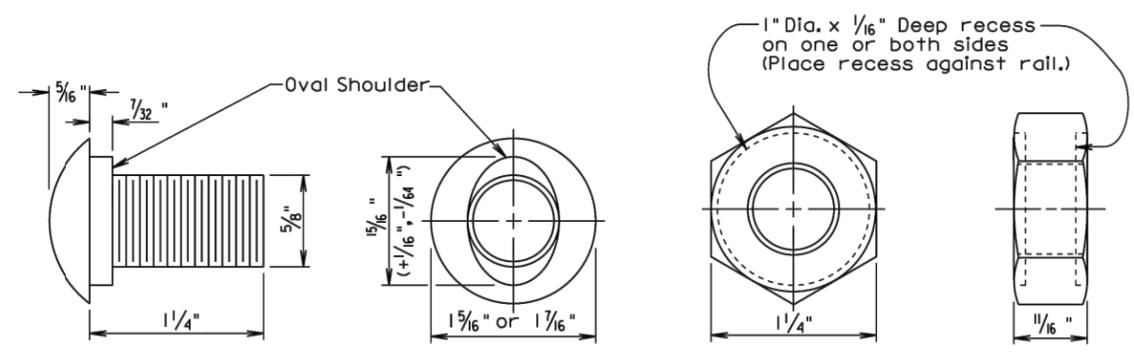
All costs for constructing W beam guardrail including labor, equipment, and materials including all posts, blocks, steel beam rail, and hardware shall be incidental to the contract unit price per foot for the respective "W Beam Guardrail" bid item.

Published Date: 3rd Qtr. 2015	S D D O T	W BEAM GUARDRAIL INSTALLATION	June 26, 2015
		PLATE NUMBER 630.32	Sheet 1 of 1

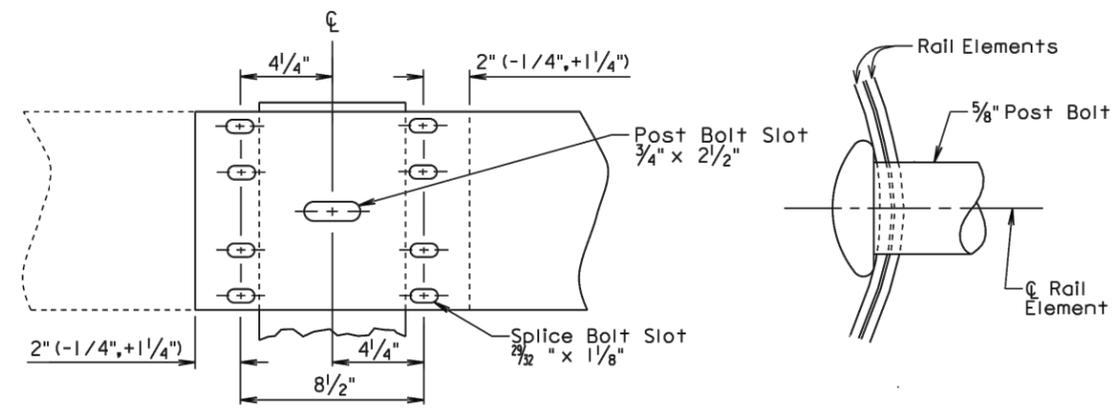
12/2/2015 2:48 PM Z:\2013 PROJECTS\13105 BROWN CO. - RICHMOND LAKE GUARDRAIL RETROFIT\DESIGN\RAIL DETAILS & STANDRAD PLATES\PLATES.DWG



SECTION THROUGH W BEAM RAIL ELEMENT



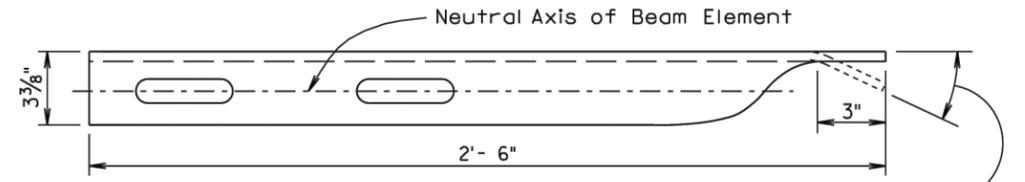
The Post Bolt is similar except the post bolt is 18" long.  
**SPLICE BOLT**  
 (5/8" BUTTON HEAD BOLT AND RECESS NUT)



Lap in direction of traffic.  
**RAIL SPLICE**

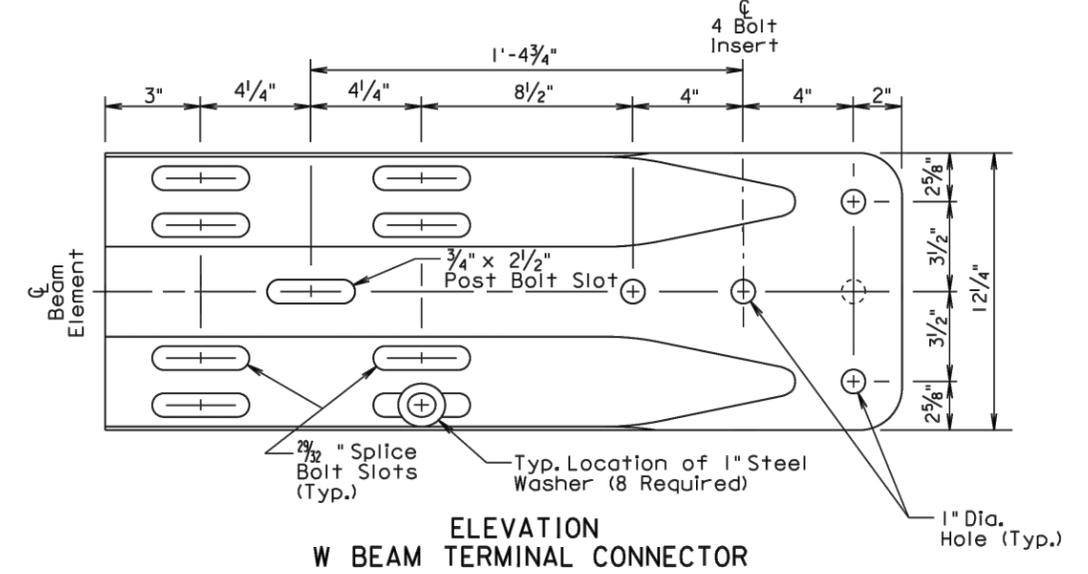
December 23, 2004

Published Date: 3rd Qtr. 2015	SD DOT	W BEAM RAIL, RAIL SPLICE, AND HARDWARE	PLATE NUMBER 630.33
			Sheet 1 of 1

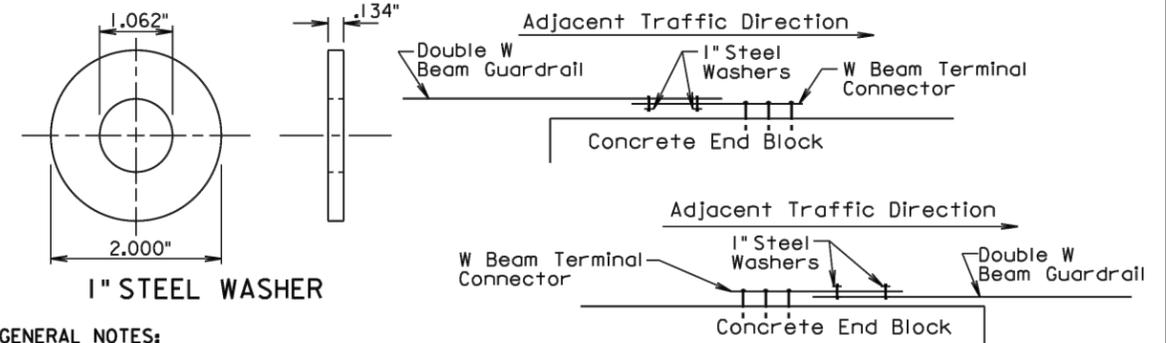


An extra hole and an approximate 26° bend shall be required only for the Breakaway Cable Terminal. The Modified W Beam Terminal Connector placement detail is shown on Standard Plate 630.47.

TOP VIEW



ELEVATION  
**W BEAM TERMINAL CONNECTOR**



**1" STEEL WASHER**

**GENERAL NOTES:**

- W Beam Terminal Connectors shall be 10 gauge.
- When the W beam terminal connector is used to connect the rail to the bridge, 1" steel washers shall be used at the lap splice and the washers shall be in direct contact with the 3" slots of the W beam terminal connector. See the drawings above for the typical locations of the 1" steel washers.
- There will be no separate payment for furnishing and installing the W Beam Terminal Connector. All costs for the W Beam Terminal Connector shall be incidental to the contract unit price per foot for the respective "W Beam Guardrail" bid item.

September 14, 2001

Published Date: 3rd Qtr. 2015	SD DOT	W BEAM TERMINAL CONNECTOR AND 1" STEEL WASHER	PLATE NUMBER 630.35
			Sheet 1 of 1

Z:\2013 PROJECTS\13105 BROWN CO. - RICHMOND LAKE GUARDRAIL RETROFIT\DESIGN\RAIL DETAILS & STANDRAD PLATES\PLATES.DWG 12/2/2015 2:49 PM

**PLAN**

2" Asphalt concrete surfacing with variable thickness granular material

1 Same inslope as mainline inslope  
 2 4:1 inslope  
 3 2:1 inslope or flatter, or inslope as specified in plans  
 4 Same slope as roadway cross slope

**GENERAL NOTES:**  
 The W beam guardrail flared end terminal shall be installed according to the manufacturer's installation instructions.  
 \*\*An adhesive object marker shall be placed on the end section buffer or extruder after placement of the end section buffer or extruder. The adhesive object marker dimensions may be 16" x 16" or other variation due to the shape of the end section buffer or extruder. A minimum of 256 square inches of object marker reflective sheeting area is required. The reflective sheeting shall be fluorescent yellow super or very high intensity. All costs for furnishing and installing the adhesive object marker shall be incidental to various contract items.  
 Asphalt concrete shall be the same type used elsewhere on the project or shall be as specified in the plans. If asphalt concrete is not specified in the plans, the asphalt concrete shall conform to the Specifications for "Asphalt Concrete Composite."  
 Granular material shall be the same type used elsewhere on the project or shall be as specified in the plans. If granular material type is not specified in the plans, the material shall conform to the Specifications for "Base Course". The granular material shall be placed the same thickness as the mainline surfacing or as specified in the plans.

December 16, 2014

<b>S D D O T</b>	<b>EMBANKMENT AND SURFACING FOR W BEAM GUARDRAIL FLARED END TERMINAL</b>	<b>PLATE NUMBER 630.45</b>
		Sheet 1 of 1

Published Date: 3rd Qtr. 2015

**ELEVATION**

2" thickness of compacted asphalt concrete with granular material.

Required wood breakaway post shall be inserted into steel tube.

Wood posts with 6"x8"x14" blocks (Typ.)

37'-6" Parabolic Curve

Payment Limits for Class A W Beam Guardrail

OFFSETS FOR BREAKAWAY CABLE TERMINAL	
POST	OFFSET
A	4.00'
B	2.79'
C	1.79'
D	1.01'
E	0.45'
F	0.11'

See Detail A (Sheet 2 of 3)

Class A W Beam Guardrail

Wood Breakaway Posts

Offsets shall be measured from the installation line to the face of the W beam guardrail.

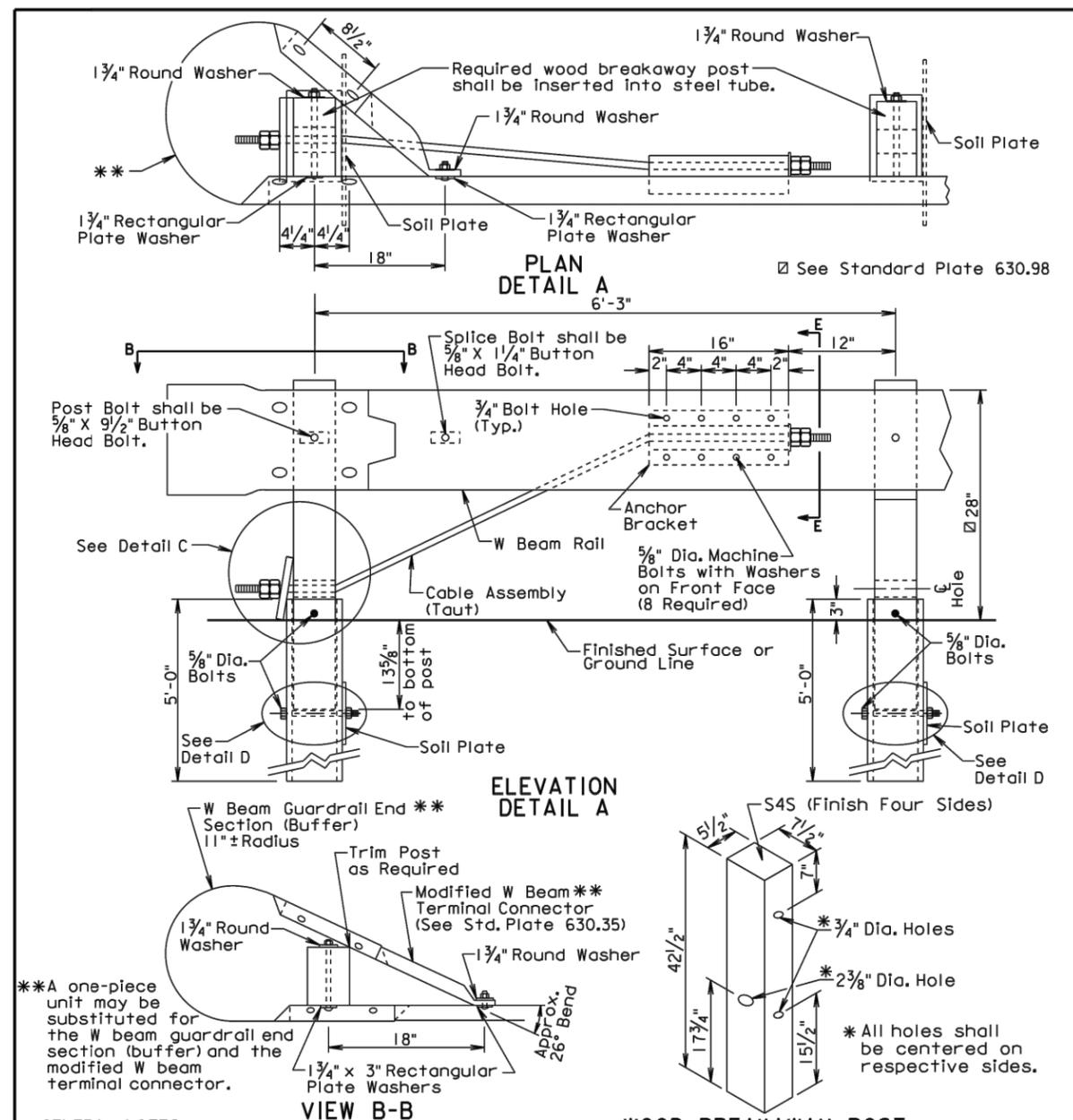
See Standard Plate 630.98

**GENERAL NOTES:**  
 The finished embankment surfacing cross slope shall match the roadway cross slope however, if a steeper cross slope is necessary the steepest allowable cross slope is 10:1.  
 Asphalt concrete shall be the same type used elsewhere on the project or shall be as specified in the plans. If asphalt concrete is not specified in the plans, the asphalt concrete shall conform to the Specifications for "Asphalt Concrete Composite."  
 Granular material shall be the same type used elsewhere on the project or shall be as specified in the plans. If granular material type is not specified in the plans, the material shall conform to the Specifications for "Base Course". The granular material shall be placed the same thickness as the mainline surfacing or as specified in the plans.  
 \*\*\*An adhesive object marker shall be placed on the end section buffer after placement of the end section buffer. The adhesive object marker dimensions may be 16" x 16" or other variation due to the shape of the end section buffer. A minimum of 256 square inches of object marker reflective sheeting area is required. The reflective sheeting shall be fluorescent yellow super or very high intensity. All costs for furnishing and installing the adhesive object marker shall be incidental to various contract items.  
 Costs for constructing the W Beam Guardrail Breakaway Cable Terminal including labor, equipment, and materials including the anchor bracket, cable assembly, steel tubes, soil plates, bearing plate, pipe sleeve, W beam end section (buffer), modified W beam terminal connector, and all necessary hardware shall be incidental to the contract unit price per each for "W Beam Guardrail Breakaway Cable Terminal".

December 16, 2014

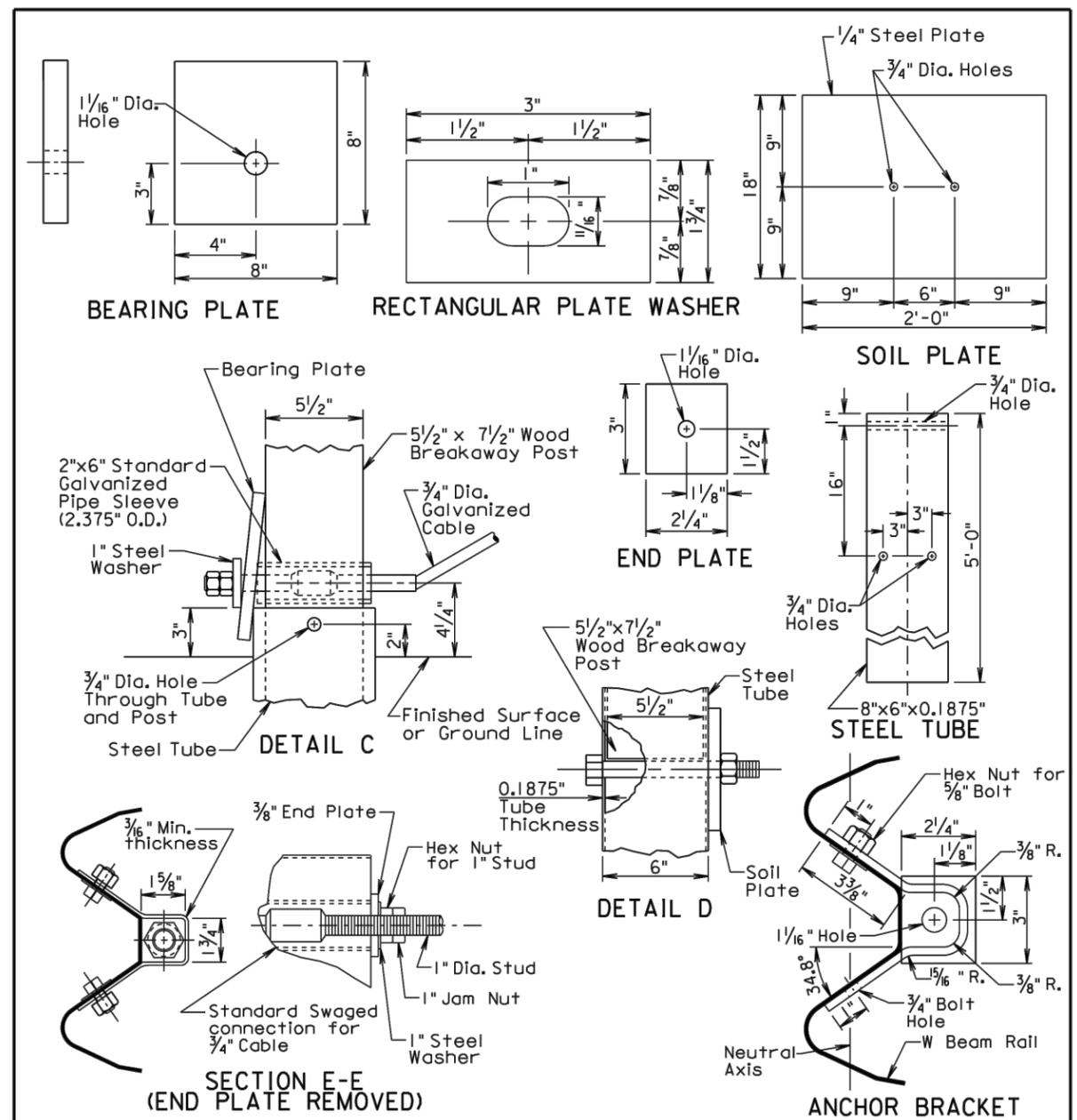
<b>S D D O T</b>	<b>W BEAM GUARDRAIL BREAKAWAY CABLE TERMINAL</b>	<b>PLATE NUMBER 630.47</b>
		Sheet 1 of 3

Published Date: 3rd Qtr. 2015



December 16, 2014

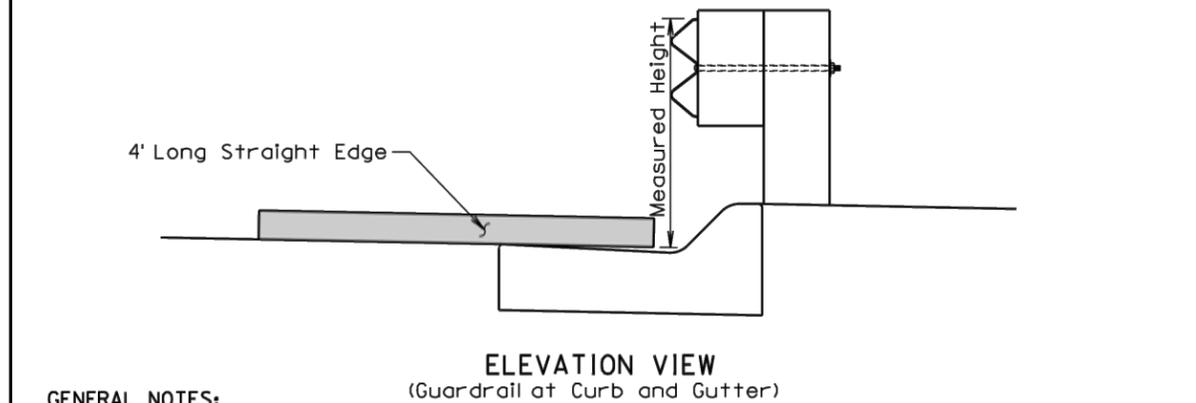
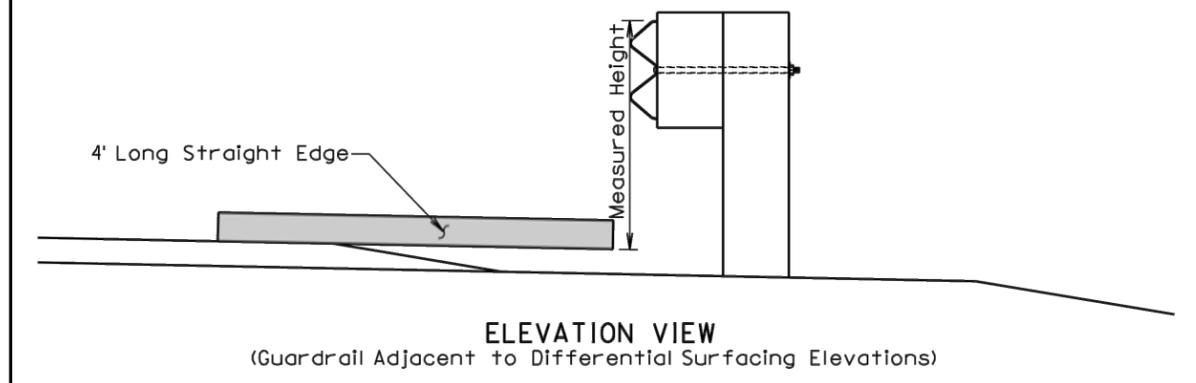
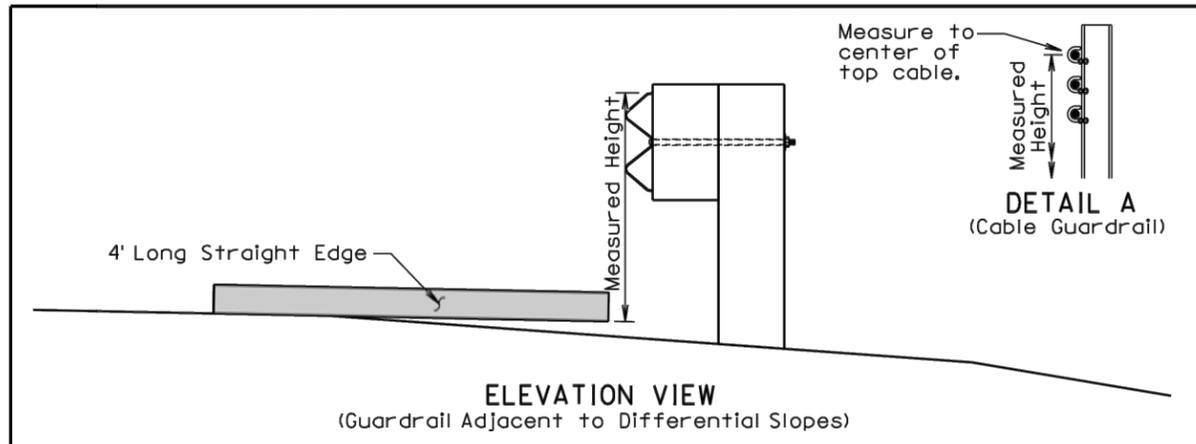
Published Date: 3rd Qtr. 2015	S D D O T	W BEAM GUARDRAIL BREAKAWAY CABLE TERMINAL	PLATE NUMBER 630.47
			Sheet 2 of 3



December 16, 2014

Published Date: 3rd Qtr. 2015	S D D O T	W BEAM GUARDRAIL BREAKAWAY CABLE TERMINAL	PLATE NUMBER 630.47
			Sheet 3 of 3

12/2/2015 2:49 PM Z:\2013 PROJECTS\13105 BROWN CO. - RICHMOND LAKE GUARDRAIL RETROFIT\DESIGN\RAIL DETAILS & STANDRAD PLATES\PLATES.DWG



**GENERAL NOTES:**

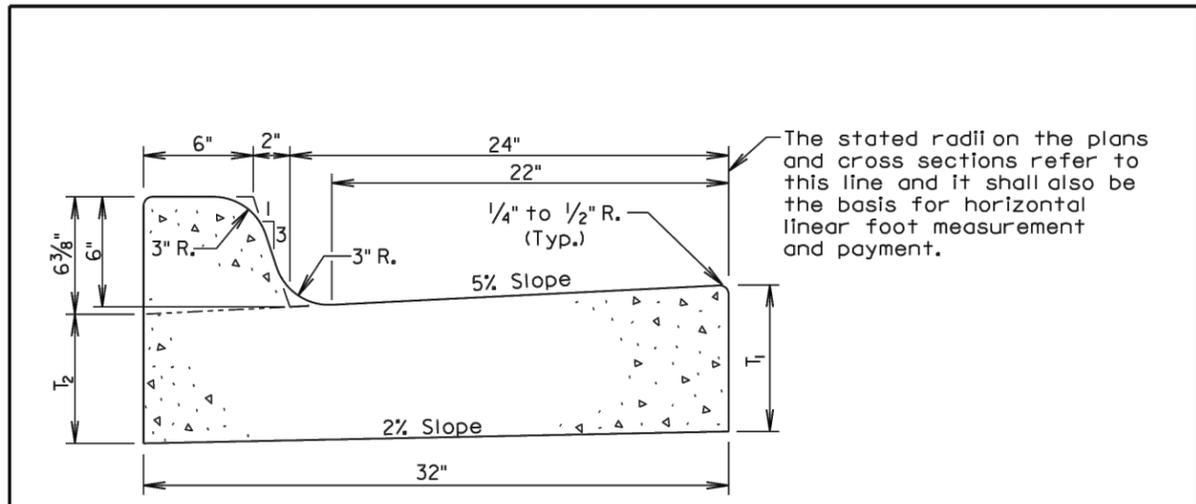
The W Beam guardrail shown is for illustrative purpose. The guardrail height for all types of guardrail systems shall be measured in accordance with this standard plate.

When measuring height of cable guardrail or cable barrier the height shall be measured to the center of the top cable. See Detail A.

June 26, 2010

<b>S D D O T</b>	<b>MEASURING GUARDRAIL HEIGHT</b>	PLATE NUMBER <b>630.98</b>
		Sheet 1 of 1

Published Date: 3rd Qtr. 2015



Type	T <sub>1</sub> (Inches)	T <sub>2</sub> (Inches)	Cu. Yd. Per Lin. Ft.	Lin. Ft. Per Cu. Yd.
B66	6	5/16	0.057	17.7
B67	7	6/16	0.065	15.4
B68	8	7/16	0.073	13.7
B68.5	8.5	7 9/16	0.077	13.0
B69	9	8/16	0.081	12.3
B69.5	9.5	8 9/16	0.085	11.7
B610	10	9/16	0.090	11.2
B610.5	10.5	9 9/16	0.094	10.7
B611	11	10/16	0.098	10.2
B611.5	11.5	10 9/16	0.102	9.8
B612	12	11/16	0.106	9.4

**GENERAL NOTES:**

When concrete curb and gutter longitudinally adjoins new concrete pavement, the method of attachment shall be by one of the methods shown on Standard Plate 380.11.

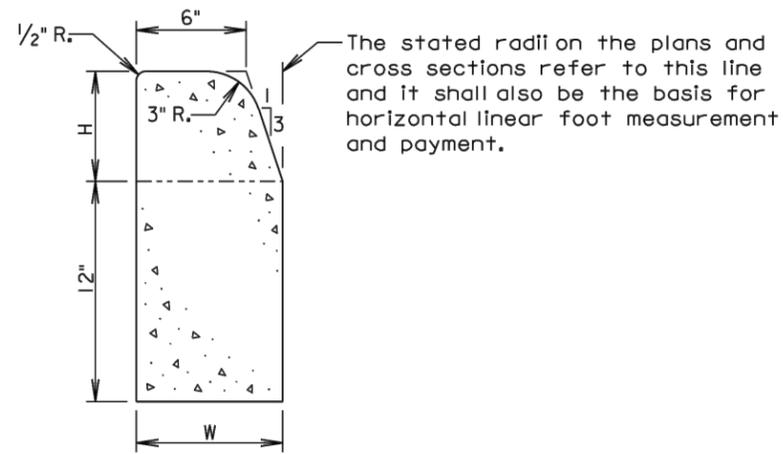
See Standard Plate 650.90 for expansion and contraction joints in the curb and gutter.

<b>S D D O T</b>	<b>TYPE B CONCRETE CURB AND GUTTER</b>	PLATE NUMBER <b>650.01</b>
		Sheet 1 of 1

Published Date: 3rd Qtr. 2015

Z:\2013 PROJECTS\13105 BROWN CO. - RICHMOND LAKE GUARDRAIL RETROFIT\DESIGN\RAIL DETAILS & STANDARD PLATES\PLATES.DWG 12/2/2015 2:49 PM

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	PH 6525(03)	30	30



Type	H (Inches)	W (Inches)	Cu. Yd. Per Lin. Ft.	Lin. Ft. Per Cu. Yd.
B6	6	8	0.0353	28.4
B7	7	8 <sup>3</sup> / <sub>8</sub>	0.0383	26.1
B8	8	8 <sup>5</sup> / <sub>8</sub>	0.0414	24.1
B9	9	9	0.0449	22.3
B10	10	9 <sup>3</sup> / <sub>8</sub>	0.0485	20.6

**GENERAL NOTES:**

The concrete for the Type B Concrete Curb shall comply with the requirements of the Specifications for Class M6 Concrete.

A 1/2" preformed expansion joint filler shall be placed transversely in the curb at the following locations:

1. At each junction between the radius return of curb and curb which is parallel to the project centerline.
2. At each junction between the existing curb and new curb or curb and gutter.
3. At each junction between the curb and existing sidewalk to the depth of the sidewalk.

See Standard Plate 650.90 for contraction joints in the curb.

June 26, 2015

<i>Published Date: 3rd Qtr. 2015</i>	<b>S D D O T</b>	<b>TYPE B CONCRETE CURB</b>	PLATE NUMBER <b>650.02</b>
			Sheet 1 of 1