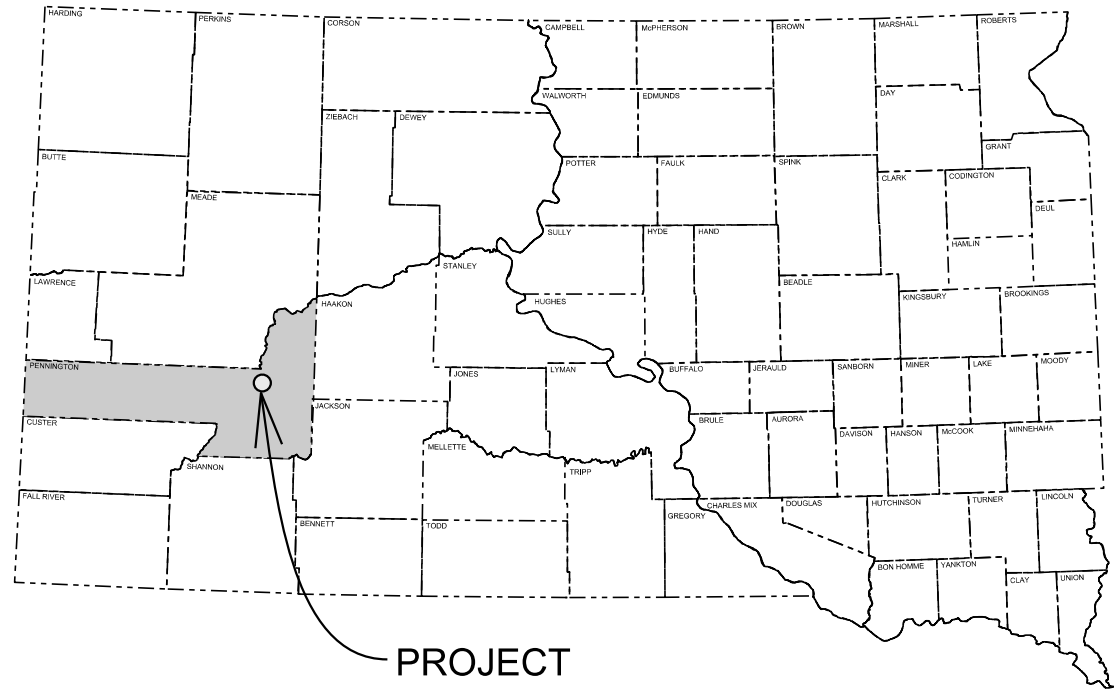


Plot Scale - 1:200

Plotted From - trc11610



PROJECT

STATE OF SOUTH DAKOTA  
DEPARTMENT OF TRANSPORTATION  
PLANS FOR PROPOSED

PROJECT 090 W-452  
INTERSTATE HIGHWAY 90  
PENNINGTON COUNTY

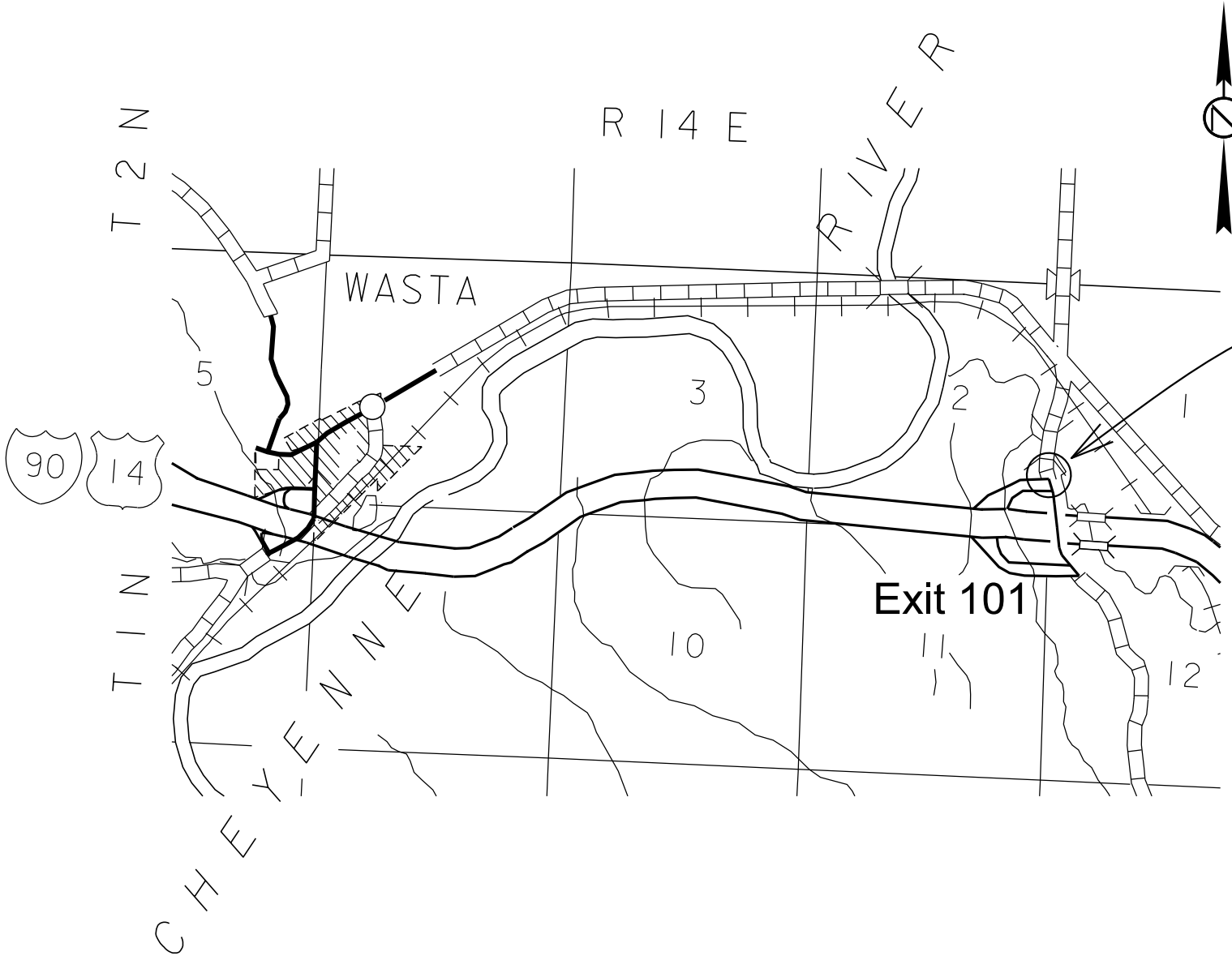
Remove & Replace Cattle Guard  
PCN i2wf

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090 W-452	1	14

Plotting Date: 04/29/2013

INDEX OF SHEETS

- 1 General Layout W/Index
- 2 - 4 Estimate With General Notes & Tables
- 5 Traffic Control
- 6 Plan Sheet
- 7 - 14 Standard Plates



**PROJECT**  
Exit 101

STORM WATER PERMIT  
None Required

ESTIMATE OF QUANTITIES

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
110E0550	Remove Cattle Guard	1	Each
110E0600	Remove Fence	50	Ft
110E1010	Remove Asphalt Concrete Pavement	32.0	SqYd
230E0100	Remove and Replace Topsoil	Lump Sum	LS
260E1010	Base Course	27.0	Ton
320E1200	Asphalt Concrete Composite	8.0	Ton
610E0124	24' Cattle Guard with Wings	1	Each
620E0020	Type 2 Right-of-Way Fence	50	Ft
620E1020	2 Post Panel	4	Each
634E0100	Traffic Control	749	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
734E0010	Erosion Control	Lump Sum	LS

SPECIFICATIONS

Standard Specifications for Roads & Bridges, 2004 Edition and Required Provisions, Supplemental Specifications and/or Special Provisions as included in the Proposal.

LANDOWNER NOTIFICATION

The Contractor shall coordinate with the adjacent landowner (Larry Schell 605 279-2236) for the removal of livestock prior to beginning work.

WORK DESCRIPTION

Work on this project will consist of the following:

1. Remove exiting cattle guard at Exit 101 crossroad north Right-of-Way line.
2. Install new cattle guard at Exit 101 crossroad north Right-of-Way line.

UTILITIES

Utilities are not planned to be affected on this project. If utilities are identified near the improvement area through the SD One Call Process as required by South Dakota Codified Law 49-7A and Administrative Rule Article 20:25, the Contractor shall contact the Project Engineer to determine modifications that will be necessary to avoid utility impacts.

The Contractor shall contact the involved utility companies through South Dakota One Call (1-800-781-7474) prior to starting work. It shall be the responsibility of the Contractor to coordinate work with the utility owners to avoid damage to existing facilities.

BALD EAGLE

Bald eagles are known to occur in this area. If a nest is observed within one mile of the project site, notify the Environmental Project Scientist of the DOT Environmental Office at 605-773-3268.

WHOOPING CRANE

The Whooping Crane is a spring and fall migratory bird in South Dakota that typically roosts overnight at a single location. If a Whooping Crane is sighted roosting in the vicinity of the project, borrow pit, or staging site associated with the project, notify the Environmental Project Scientist of the DOT Environmental Office at 605-773-3268 and cease construction activities in the affected area until the Whooping Crane departs.

WORK AFFECTING WATERWAYS

Storm Water

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.

HISTORICAL PRESERVATION OFFICE CLEARANCES

To obtain State Historical Preservation Office (SHPO) clearance, a cultural resources survey may need to be conducted by a qualified archaeologist. In lieu of a cultural resources survey, the Contractor could request a records search from Jim Donohue, State Archaeological Research Center (SARC). Provide SARC 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 no artifacts have been found on the site. The Contractor shall arrange and pay for the cultural resource survey and/or records search.

If any earth disturbing activities occur within the current geographical or historic boundaries of any South Dakota reservation, the Contractor shall obtain Tribal Historical Preservation Office (THPO) clearance. If no THPO exists, the required SHPO clearance shall suffice, with documentation of Tribal contact efforts provided to SHPO.

To facilitate SHPO or THPO responses, the Contractor should submit a records search or cultural resources survey report to the DOT Environmental Engineer, 700 East Broadway Avenue, Pierre, SD 57501-2586 (605-773-3268). Allow 30 days from the date this information is submitted to the Environmental Engineer for SHPO/THPO approval. The Contractor is responsible for obtaining all required permits and clearances for staging areas, borrow sites, waste disposal sites, and all material processing sites. The Contractor shall provide the required permits and clearances to the Engineer at the preconstruction meeting.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090 W-452	2	14

WASTE DISPOSAL SITE

The Contractor will be required to furnish a site(s) for the disposal of construction/demolition debris generated by this project.

Construction/demolition debris may 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 Engineer.

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

1. Construction/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/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”.
2. 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.

TABLE OF FENCE QUANTITIES

Station	L/R	Right-of-Way Fence		Post Panels	Gates	Remove Fence
		Type 2		2 Post Panel	Barbed Wire Gate	
		(Ft)		(Each)	(Each)	(Ft)
0+00	L/R	50		4	1	50
TOTALS:		50		4	1	50

SAWING IN EXISTING SURFACING

Where new asphalt concrete is placed adjacent to existing asphalt concrete, the existing pavement shall be sawed full depth to a true line with a vertical face. No separate payment shall be made for sawing.

ASPHALT CONCRETE PAVEMENT REMOVAL

Asphalt material approximately 6 feet wide on each side of the existing cattle guard shall be removed for the installation of the new cattle guard.

REMOVE CATTLE GUARD

Removal of the in-place structures shall include all foundations, grates, wings, and hardware. All cost associated with these items shall be incidental to the contract unit price per each for Remove Cattle Guard.

INSTALLATION OF NEW CATTLE GUARD

Foundations for the new Cattle Guard shall be precast.

BASE COURSE

Base Course shall be placed 12” deep.

Base Course shall be furnished by the Contractor.

All other requirements of the Standard Specifications for Base Course shall apply.

Water for compaction shall be incidental to contract unit price per ton for “Base Course”. Compaction shall be to the satisfaction of the Engineer.

ASPHALT CONCRETE COMPOSITE

Asphalt Concrete Composite shall be used to replace asphalt removed for the Cattle Guard installation.

Asphalt Concrete Composite shall be placed in two 2” lifts.

Mineral aggregate for the Asphalt Concrete Composite shall conform to the requirements of the Standard Specifications for Class E, Type 1

All other requirements in the Standard Specifications for Asphalt Concrete Composite shall apply.

The asphalt binder used in the mixture shall be PG 64-22, PG 64-28 or PG 64-34 Asphalt Binder.

REMOVE AND REPLACE TOPSOIL

Topsoil shall be salvaged and stockpiled prior to construction. Limits of this work, depth of salvage, and stockpile location will be directed by the Engineer. Following completion of construction, topsoil shall be spread evenly over the disturbed areas.

All cost associated with removing and replacing the topsoil shall be incidental to the lump sum price for “Remove and Replace Topsoil”.

The estimated amount of topsoil to be removed and replaced is 7 CuYd.

EROSION CONTROL

The contract lump sum price for Erosion Control shall include all material, equipment, and labor necessary to seed and fertilizer areas disturbed by construction of this project. The Engineer, at the time of construction, shall determine limits of the Erosion Control work.

The estimated area to be seeded is approximately 600 SqFt..

MYCORRHIZAL INOCULUM

Mycorrhizal inoculum shall consist of mycorrhizal fungi spores and mycorrhizal fungi-infected root fragments in a solid carrier. The carrier may include organic materials, calcinated clay, or other materials consistent with application and good plant growth. The supplier shall provide certification of the fungal species claimed and the live propagule count. The inoculum shall include the following fungal species:

<i>Glomus intraradices</i>	25%
<i>Glomus aggregatu</i>	25%
<i>Glomus mosseae</i>	25%
<i>Glomus etunicatum</i>	25%

All seed shall be inoculated with a minimum of 100,000 live propagules of mycorrhizal fungi per acre. All costs of inoculating the seed shall be incidental to the contract unit price per pound for the corresponding permanent seed mixture.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090 W-452	3	14

FERTILIZING

The Contractor shall apply an all-natural slow release fertilizer prior to seeding or placing sod. The all-natural fertilizer shall have a minimum guaranteed analysis of 4-6-4 and be USDA Certified BioBased. It should provide a minimum of 4% (N) nitrogen with a minimum water insoluble nitrogen (WIN) fraction of 3.2%, a minimum of 6% (P2O5) available phosphate, a minimum of 4% (K2O) soluble potash, and a maximum carbon to nitrogen ratio (C:N ratio) of 5:1. The all-natural fertilizer shall be free of weed-seed and pathogens accomplished through thermophilic composting, and not mechanical or chemical sterilization, to assure presence of beneficial soil microbiology. The fertilizer shall have a near neutral pH, a low salt index, a low biological oxygen demand, contain organic humic and fulvic acids, and have high aerobic organism counts. The fertilizer shall also be stable, free of bad odors, and be unattractive as a food source for animals. It should also be in a granular form that is easily spread.

The application rate is 34 pounds per 1,000 square feet.

The all-natural slow release fertilizer shall be from the list below or an approved equal:

Product

Sustane

Manufacturer

Sustane Corporate Headquarters  
Cannon Falls, Minnesota  
Phone: 1-800-352-9245  
<http://www.sustane.com/>

PERMANENT SEEDING

The areas to be seeded comprise of disturbed areas on the inslopes.

All permanent seed shall be planted in the topsoil at a depth of ¼” to ½”.

All seed broadcast must be raked or dragged in (incorporated) within the top ¼” to ½” of topsoil when possible. This requirement may be waived by the Engineer during construction when raking or dragging is deemed not feasible by conventional methods.

The varieties listed for the seed mixture are preferred varieties. Native harvest seed will be allowed.

Type F Permanent Seed Mixture shall consist of the following:

Grass Species	Variety	Pure Live Seed (PLS) (Pounds/1000 SqFt)
Western Wheatgrass	Flintlock, Rodan, Rosana	2.5
Green Needlegrass	Lodorm	1.5
Sideoats Grama	Butte, Killdeer, Pierre, Trailway	1
Little Bluestem or Burralograss or Blue Grama	Badlands, Itasca Bowie, Cody, Tatanka Bad River, Willis	1
Regreen or QuickGuard: all year; Oats or Spring Wheat: April through May; Winter Wheat: August through November		3
Total:		9

SEQUENCE OF OPERATIONS – GENERAL NOTES

- Requests to deviate from the sequence of operations shall be submitted in writing to the Engineer for review. Approval of an alternate sequence of operations will only be allowed when the proposed changes meet with the Department’s intent for traffic control and sequencing of the work. An alternate sequence shall be submitted for review a minimum of one week prior to potential implementation.
- Unless otherwise stated in these plans, no work will be allowed during hours of darkness. Hours of darkness are defined, as ½ hour after sunset until ½ hour before sunrise.
- Storage of vehicles and equipment shall be as near the right-of-way as possible. Contractor’s employees should mobilize at a location off the right-of-way and arrive at the work sites in a minimum number of vehicles necessary to perform the work. Indiscriminate driving and parking of vehicles within the right-of-way will not be permitted. Any damage of the vegetation, surfacing, embankment, delineators, and existing signs resulting from such indiscriminate use shall be repaired and/or restored by the Contractor, at no expense to the State, and to the satisfaction of the Engineer.
- Existing guide, route, informational logo, regulatory, and warning signs shall be temporarily reset and maintained during construction. Removing, relocating, covering, salvaging and resetting of existing traffic control devices, including delineation, shall be the responsibility of the Contractor. Non-applicable signing shall be covered or removed during periods of inactivity. Periods of inactivity shall be defined as no work taking place for a period of more than 36 hours. The cost of removing or covering non-applicable signs shall be incidental to the contract lump sum price for, Traffic Control, Miscellaneous.
- Construction signing mounted on portable supports shall not be used for a duration of more than 3 days, unless approved by the Engineer. Construction signing that remains in the same location for more than 3 days shall be mounted on fixed location, ground mounted, breakaway supports.
- If inappropriate/conflicting pavement markings exist, the markings shall be removed and replaced with applicable temporary pavement markings when the work duration is more than 3 days. When the work duration is less than 3 days, the channelizing devices in the area where the pavement markings conflict shall be placed at a spacing of ½ G. Pavement marking removals shall be paid for at the contract unit price for Remove Pavement Marking, 4” or equivalent. Temporary pavement marking shall be paid for at the contract unit bid price for Temporary Pavement Marking. The additional channelizing devices shall be incidental to the contract lump sum price for Traffic Control, Miscellaneous.
- The quantity of Signs paid for will be for the greatest number of installations per sign in place at any one time regardless of the number of set-ups on the project.
- Any delineators and signs damaged or lost shall be replaced by the Contractor at no cost to the State.
- All materials and equipment shall be stored a minimum distance of 30’ from the traveled way during nonworking hours.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090 W-452	4	14

SEQUENCE OF OPERATIONS – GENERAL NOTES (Cont.)

- The Contractor shall provide documentation that all breakaway sign supports comply with FHWA NCHRP 350 or MASH crash-worthy requirements. The Contractor shall provide installation details at the preconstruction meeting for all breakaway sign support assemblies.
- The Contractor shall be required to have a person available 24 hour/day, 7 days/week to maintain traffic control devices. The name and cellular telephone number of this individual shall be given to the Engineer at the preconstruction meeting.
- The Contractor or designated traffic control subcontractor shall make night inspections at the initial set up of traffic control and every week thereafter to ensure the adequacy, legibility and reflectivity of each sign and device. A written summary of each inspection shall be given to the Engineer within 24 hours after completion of the inspection. The cost for the nighttime inspection work shall be incidental to the contract lump sum price for Traffic Control, Miscellaneous.
- Vehicles working in traffic or alongside traffic shall be equipped with a flashing amber light visible from all directions. The amber light shall be mounted on the uppermost part of the contractor’s vehicle. Lights must have peak intensity within the range of 40 to 400 candelas and must flash at 75 ± 15 flashes per minute. Vehicle flasher/hazard lights are not acceptable.
- All construction operations shall be conducted in the general direction of traffic movement.
- If there is a discrepancy between the traffic control plans, standard plates, and the MUTCD – whichever is more stringent shall be used, as determined by the Engineer.
- Temporary Road Markers shall be used for lane closure tapers or lane shift tapers. Temporary Road Markers used for tapers and shifts will not be measured for payment and will be incidental to the contract lump sum price for Traffic Control, Miscellaneous.
- Drums are required in all lane closure tapers.

TABLE OF TRAFFIC CONTROL DEVICES

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-2	36" x 18"	END ROAD WORK	3	17	51
R1-1	30" x 30"	STOP	2	21	42
W1-3	48" x 48"	REVERSE TURN SIGN (LEFT OR RIGHT)	4	34	136
W3-1	48" x 48"	STOP AHEAD (SYMBOL)	2	34	68
W13-1P	30" x 30"	ADVISORY SPEED PLATE	2	21	42
W20-1	48" x 48"	ROAD WORK #### FT. OR AHEAD	3	34	102
W20-4	48" x 48"	ONE LANE ROAD #### FT. OR AHEAD	2	34	68
*****		TYPE III BARRICADE - 8 FT. SINGLE SIDED	6	40	240
TOTAL UNITS					749

Plot Scale - 1:200

Plotted From - trc11610

# FIXED LOCATION SIGNS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090 W-452	5	14

Plotting Date: 04/29/2013



R 14 E

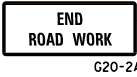
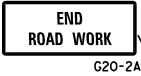
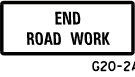
Sec. 2-T1N-R14E

Sec. 1-T1N-R14E

Sec. 11-T1N-R14E

Sec. 12-T1N-R14E

Exit 101



Jensen Road

Section Line

Section Line

33'

33'

R.O.W.

R.O.W.

R.O.W.

R.O.W.

R.O.W.

R.O.W.

R.O.W.

T  
|  
N

Plot Scale - 1:100

Plotted From - trc11610

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090 W-452	6	14

Plotting Date: 04/29/2013



Sec. 2-T1N-R14E

Sec. 1-T1N-R14E

Remove Fence  
0+00 - 33'R to 0+00 - 45'L

0+00 - 33'R  
Begin type 2  
0+00 - 13'R  
End type 2

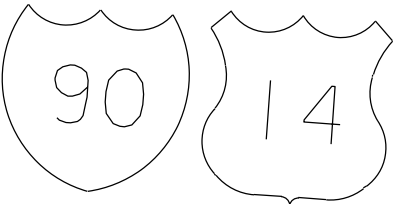
0+00  
Begin type 2  
0+00 - 45'L  
End type 2

0+00  
Install 24' Cattle Guard  
with Precast Foundation  
& 1-20' Barb Wire Bypass Gate

R.O.W.

R.O.W.

Exit 101





Plotting Date: 04/29/2013

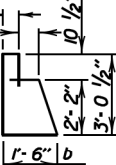
## SPECIFICATIONS

1. *Design Specifications: AASHTO Specifications for Highway Bridges, 1996 Edition (Service Load).*
2. *Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, Current Edition and required Provisions, Supplemental Specifications and/or Special Provisions as Included in the Proposal.*

## GENERAL NOTES

1. Design Loading: HS20-44 AASHTO.
2. Cattle Guards shall be constructed in accordance with Section 610.
3. All concrete shall be Class M6 in accordance with Section 462.
4. All reinforcing steel shall conform to ASTM A615, Grade 60.
5. Use 1 1/2" clear cover on all reinforcing steel except as shown.
6. All structural steel shall conform to ASTM A709, Grade 36. The End Welded Deformed Bar Anchors shall conform to ASTM A496. The 1/2"  $\phi$  x 6" Concrete Anchors shall conform to Section 970.2 (1). All bolts, nuts and washers shall conform to ASTM A307, except that lock washers shall conform to AISI B18.21.1.
7. Welding and weld inspection shall be in accordance with AWS D1.1 (Current Year).
8. 3/4"  $\phi$  Concrete Inserts shall be internally threaded for use with a standard galvanized A307 Bolt and shall be of such design that when installed in the concrete it will be capable of sustaining a safe working load in tension of 5500 pounds. The Inserts shall be galvanized or made of a corrosion resistant material.
9. The Armor Angles, Connecting Plates, Connecting Channels and Bearing Plates shall be painted with a paint system which conforms to Section 412.2A and shall be applied in accordance with the manufacturer's recommendations. The top coat shall be green in color, conforming to Federal Standard 24108.
10. If Cattle Guard must be installed to conform to a grade other than a zero grade, all elements of the Cattle Guard Foundation shall be built normal to the grade.
11. Alternate designs will be considered; submit detailed drawings and specifications of the proposed similar cattle guard through proper channels to the Office of Bridge Design for approval.
12. Soil Bearing Pressure shall be a minimum of 3000 psf as approved by the Engineer.

### MAKEUP QUANTITIES FOR PRECAST FOUNDATION UNITS

TYPE OF UNIT	BEARING PLATES		M6 CONC. (Cu. Yds.)	APPROX. WEIGHT OF UNIT (lb)	CHANNEL CONN. PLATES	REINFORCING SCHEDULE						
	6" Width	12" Width				Mk.	No.	Size	Length	Type	Bending Details	
6'-0"	2	2	0.9	3760	2	16'-0" Unit	b	6	4	9'-0"	2IA	 <p>Type 2IA</p> <p>NOTE: All dimensions are out to out of bars.</p>
8'-0"	2	3	1.2	4990	2		e	7	4	5'-8"	Str.	
10'-0"	2	4	1.5	6270	2							
						16'-0" Unit	b	7	4	9'-0"	2IA	
							e	7	4	7'-8"	Str.	
						16'-0" Unit	b	9	4	9'-0"	2IA	
							e	7	4	9'-8"	Str.	

BILL OF MATERIALS  
CATTLE GUARD FOUNDATIONS

NOTE:  
All dimensions are out to out of bars.

### **BILL OF MATERIALS FOR CATTLE GUARD FOUNDATIONS**

WIDTH OF CATTLE GUARD	PRECAST FOUNDATION UNITS			CONN. CHANNELS	CLAMP BOLTS	CONN. BOLTS
	6'- 0"	8'- 0"	10'- 0"			
10'			2	2	20	24
12'	4			2	24	36
14'	2	2		2	28	36
20'			4	2	40	36
24'		6		2	48	48
30'			6	2	60	48

March 31, 2000

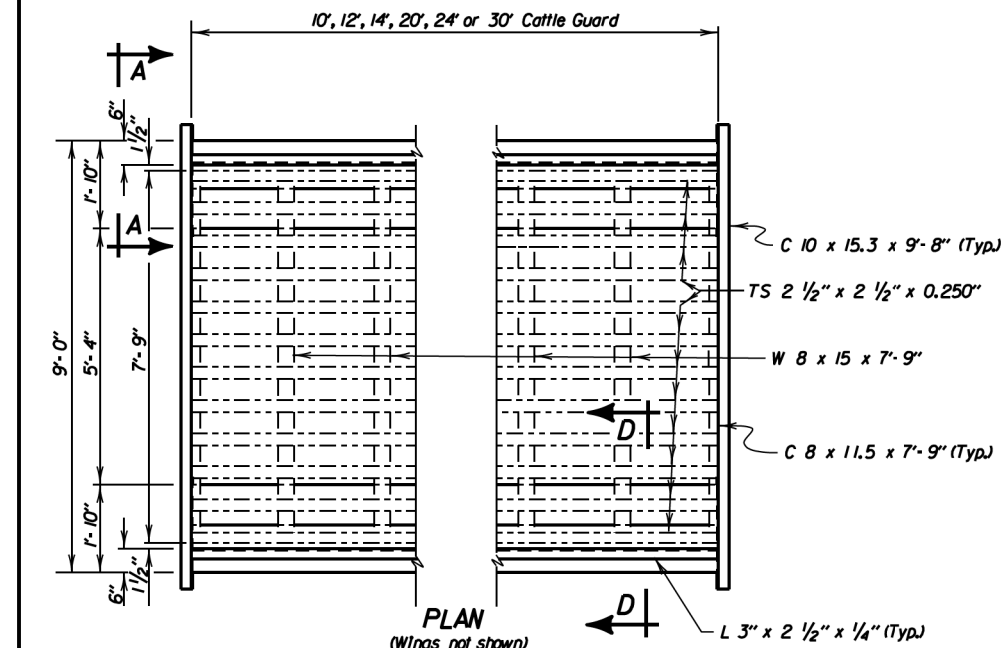
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## PRECAST CATTLE GUARD FOUNDATIONS

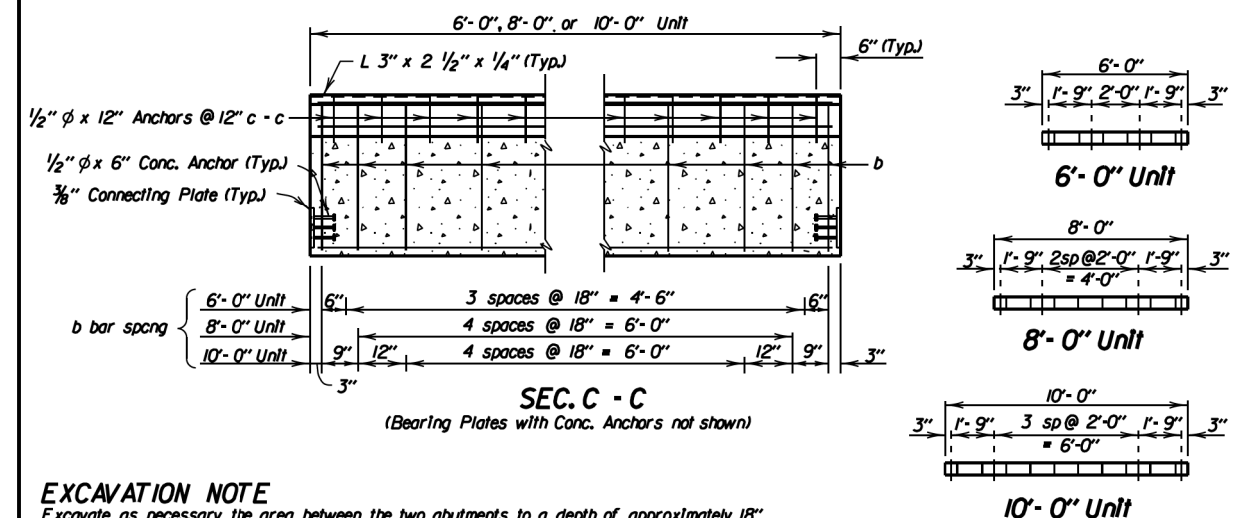
PLATE NUMBER  
610.02

Sheet 1 of 3

**Published Date: 2nd Qtr. 2013**



**PLAN OF PRECAST FOUNDATION UNITS**  
(Bearing Plates not shown)



**EXCAVATION NOTE**

**EXCAVATION NOTE**  
Excavate, as necessary, the area between the two abutments to a depth of approximately 18" above bottom of abutment footing elevation. Cut short outlet ditches from one or both ends of the cattle guard for drainage.

### BEARING PLATE SPACING DETAILS

March 31, 2000

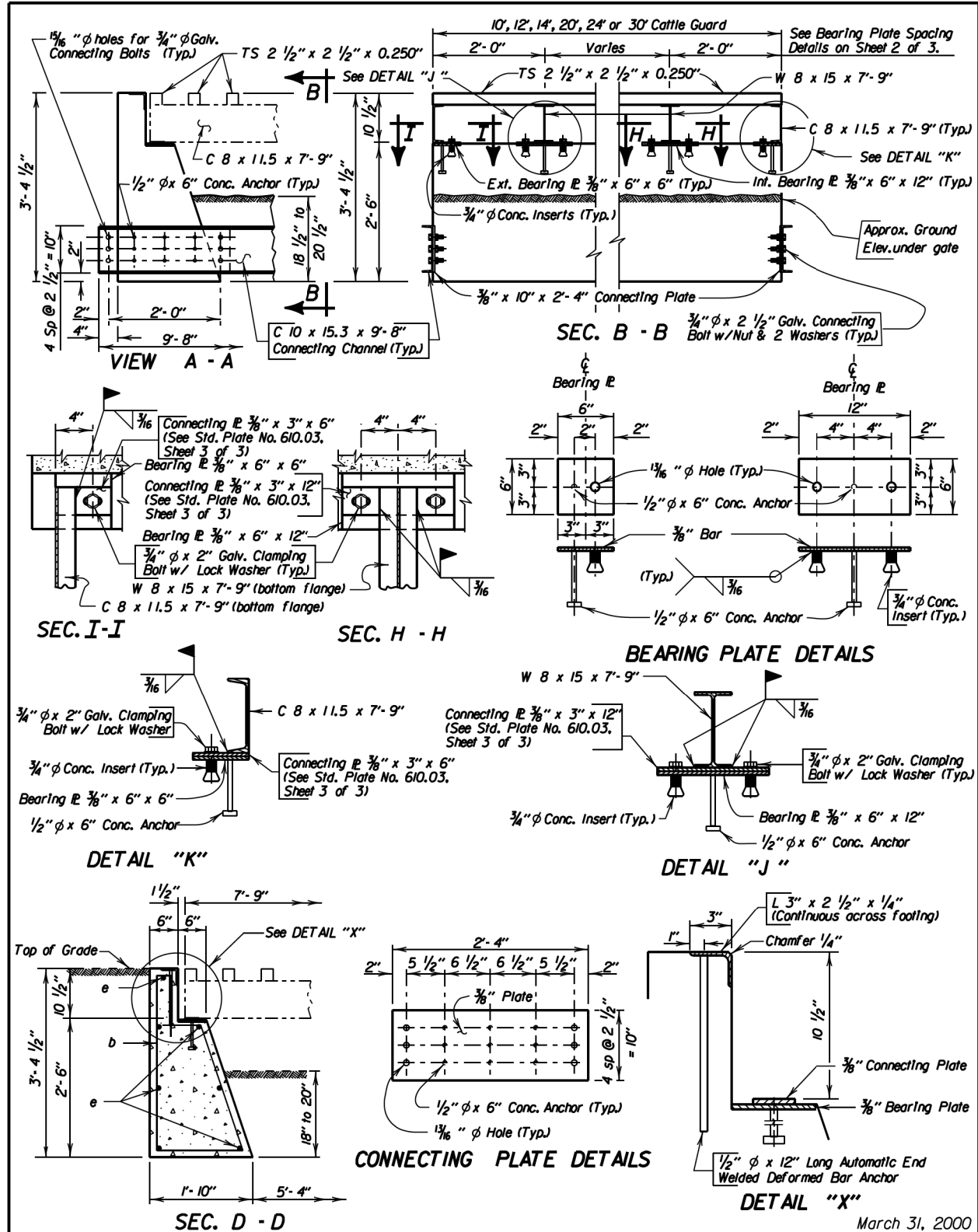
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## PRECAST CATTLE GUARD FOUNDATIONS

PLATE NUMBER  
610.02

Sheet 2 of 3

**Published Date: 2nd Qtr. 2013**



Published Date: 2nd Qtr. 2013	S D D O T	PRECAST CATTLE GUARD FOUNDATIONS	PLATE NUMBER 610.02
			Sheet 3 of 3

**SPECIFICATIONS**

- Design Specifications: AASHTO Specifications for Highway Bridges, 1996 Edition (Service Load).
- Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, Current Edition and required Provisions, Supplemental Specifications and/or Special Provisions as Included in the Proposal.

**GENERAL NOTES**

- Design Loading: HS20-44 AASHTO.
- Cattle Guards shall be constructed in accordance with Section 610.
- All structural steel shall conform to ASTM A709, Grade 36. Structural tubing shall conform to ASTM A500, Grade B. All bolts and nuts shall be galvanized and shall conform to ASTM A307. All lock washers shall be galvanized and shall conform to AISI B18.21.1.
- Welding and weld inspection shall be in accordance with AWS D1.1 (Current Year).
- Cattle Guard Grate, Wings and Connecting Plates shall be painted with a paint system which conforms to Section 412.2A and shall be applied in accordance with the manufacturer's recommendations. The top coat shall be green in color, conforming to Federal Standard 24108.
- Grate Sections may be combined to obtain larger grate widths. Refer to Detail of Multiple Installation Joint on this sheet when larger grate widths are required.
- Cattle Guard Grate & Wing Details shall be used in conjunction with Cast-In-Place or Precast Cattle Guard Foundation Details on Std. Plate No. 610.01 or 610.02 when Cattle Guard Foundations are required.
- Alternate designs will be considered; submit detailed drawings and specifications of the proposed similar cattle guard grate or wing through proper channels to the Office of Bridge Design for approval.

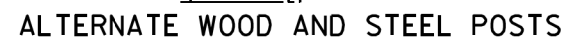
INFORMATIONAL QUANTITIES					
ITEM	UNIT	QUANTITY			
		10' GRATE	12' GRATE	14' GRATE	2-WINGS
Structural Steel	Lb.	1496	1783	2070	114

BILL OF MATERIALS FOR CATTLE GUARD GRATES						
WIDTH OF CATTLE GUARD	CATTLE GUARD GRATE			CONNECTING PLATES		GRATE CONN. BOLTS
	10'- 0"	12'- 0"	14'- 0"	6"	12"	
10'	1			4	8	---
12'		1		4	10	---
14'			1	4	12	---
20'	2			4	18	6
24'		2		4	22	6
30'	3			4	28	12

Published Date: 2nd Qtr. 2013	S D D O T	CATTLE GUARD GRATE AND WING	PLATE NUMBER 610.03
			Sheet 1 of 3







GENERAL NOTES:

Fence types designated on the plans that are followed by the letter S shall have smooth (barbless) wires.

When type 5S or 6S is designated  
the bottom wire may be barbed,  
smooth, or left off.

All degrees of curvature stated for  
fence are at centerline of roadway.

September 14, 2009



GENERAL NOTES:

The Right-of-Way fence shall consist of barbed wire or a combination of woven wire and barbed wire. The barbed wire and/or woven wire shall be fastened to all wood posts or fastened to alternating wood and steel posts. Only wood posts shall be used for brace panels. Gates shall be of the type designated in the plans or as otherwise directed by the Engineer. Fence shall be constructed conforming to the details on the standard plates and in the plans unless otherwise directed by the Engineer.

Right-of-Way fence on Interstate Projects shall be constructed one foot within the Interstate Right-of-Way lines except at bridge openings, cattle passes, and as otherwise directed by the Engineer.

Right-of-Way fence other than on Interstate Projects shall be constructed within one foot of the Right-of-Way on the Landowner's side except at bridge openings, cattle passes, and as otherwise directed by the Engineer.

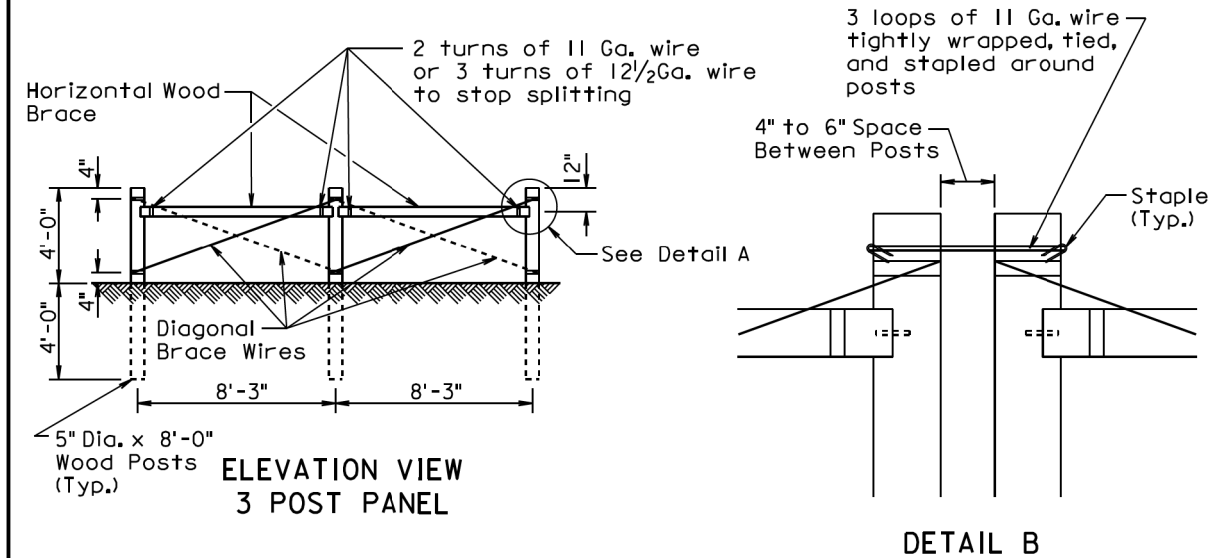
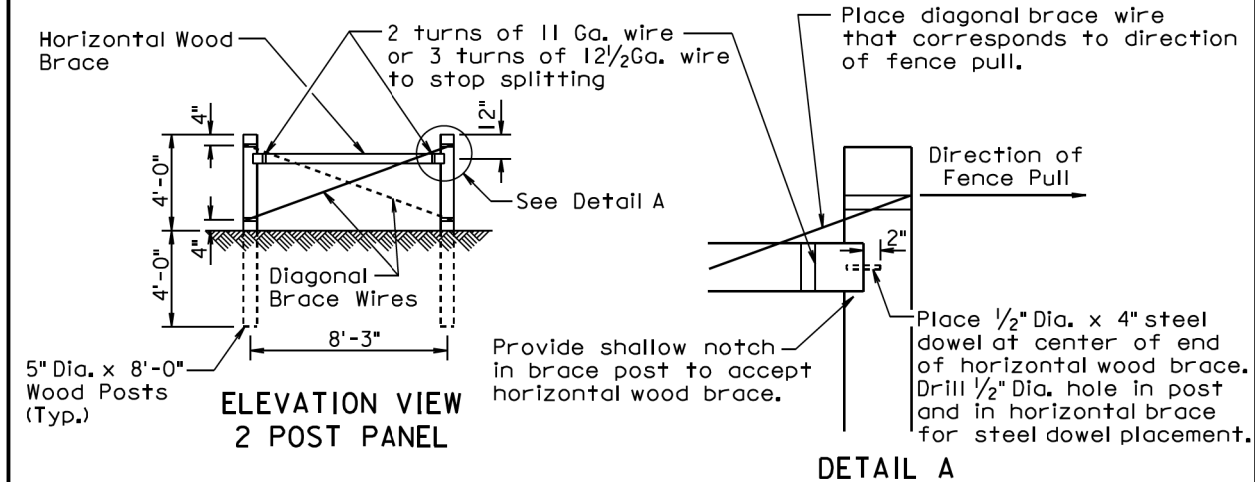
Barbs shall be fabricated from zinc coated 14 ga. wire. Two point barbs shall be wrapped twice around one main strand at 4" spacings and the four point barbs shall be interlocked and wrapped around both main strands at 5" spacings.

The gages of wire and wood post lengths and sizes are the minimum acceptable unless otherwise specified in the plans. The tolerances for steel posts shall be as stated in AASHTO M281. Woven wire shall conform to design and specifications of ASTM A116 and barbed wire shall conform to ASTM A121.

December 23, 2004

**Published Date: 2nd Qtr. 2013**

**Published Date: 2nd Qtr. 2013**



**GENERAL NOTES:**

Two Post Panels shall be installed at least every 1320' between corners.

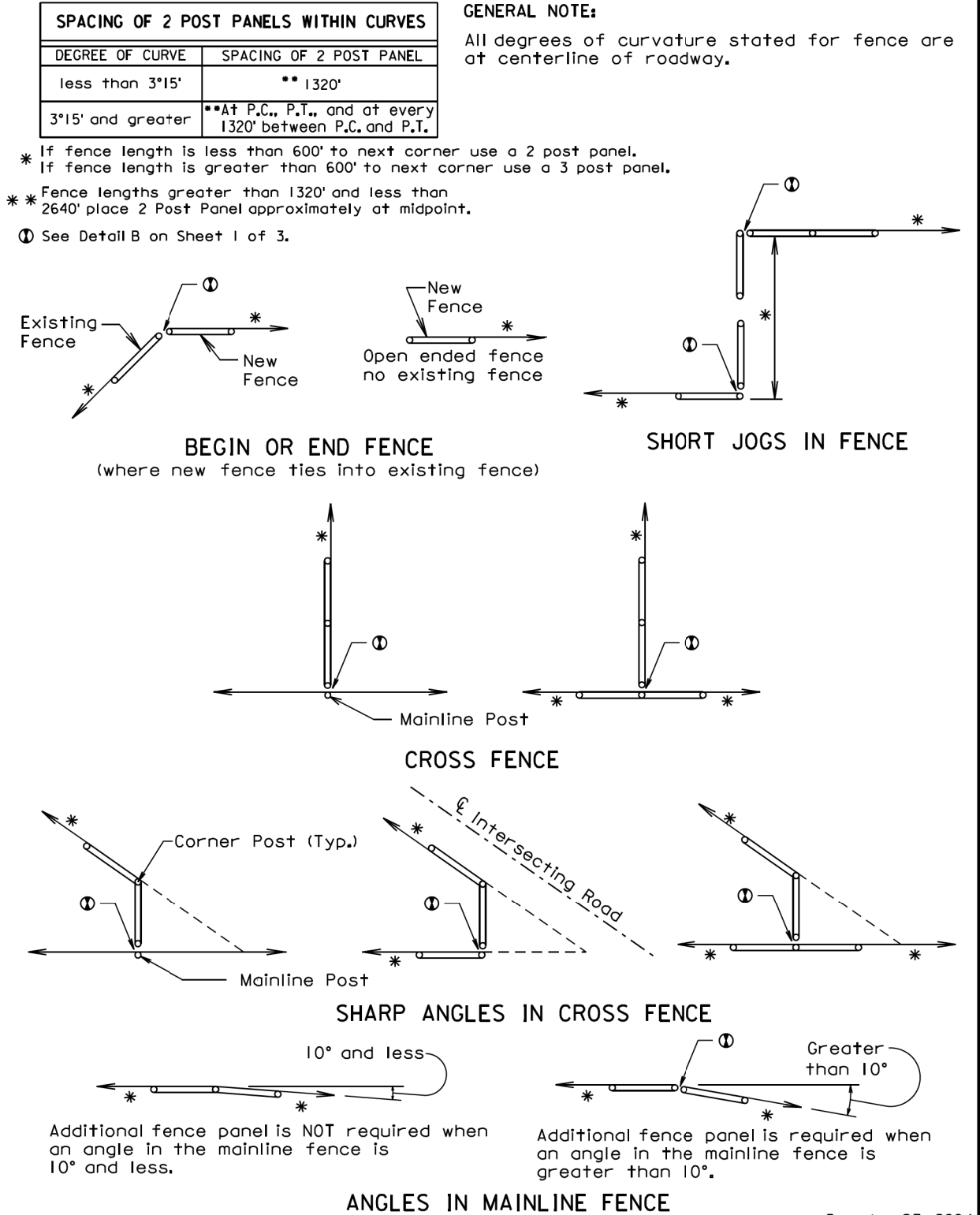
Two Post Panels shall be installed at any sharp vertical angle crest points and as directed by the Engineer.

Horizontal wood braces shall consist of 4" dia. x 8' wood posts or rough 4" x 4" x 8' timbers.

Diagonal brace wires shall be fabricated with 4 strands of 9 Ga. galvanized wire twisted tight. The diagonal brace wires shall be installed in accordance with the direction of the fence pull. Two diagonal brace wires are required if fence pull is in both directions.

December 23, 2004

S D D O T	BRACE PANELS AND APPLICATIONS OF BRACE PANELS	PLATE NUMBER
		620.03
		Sheet 1 of 3
Published Date: 2nd Qtr. 2013		



December 23, 2004

S D D O T	BRACE PANELS AND APPLICATIONS OF BRACE PANELS	PLATE NUMBER
		620.03
		Sheet 2 of 3
Published Date: 2nd Qtr. 2013		

**ENTRANCE (NOT ON CORNER)**

Fence type shall be same as adjacent fence type or as directed by the Engineer.

**DOUBLE ENTRANCES**

Fence type shall be same as adjacent fence type or as directed by the Engineer.

**ENTRANCES AT CORNERS**

**GATES**

\* If fence length is less than 600' to next corner use a 2 post panel.  
If fence length is greater than 600' to next corner use a 3 post panel.

① See Detail B on Sheet 1 of 3.

December 23, 2004

S D D O T	BRACE PANELS AND APPLICATIONS OF BRACE PANELS	PLATE NUMBER 620.03
		Sheet 3 of 3
		Published Date: 2nd Qtr. 2013

2 or 3 Post Panel (as specified in plans)

6"±

S

W

3" Dia. Post

2" Dia. Posts or approved commercial type stiffeners

Fence Type (as specified in plans)

No. 9 Galv. Wire stapled to brace panel post

2 or 3 Post Panel (as specified in plans)

6"±

3" Dia. Post

Fence Type (as specified in plans)

No. 9 Galv. Wire wrapped 3 times around the brace panel and gate posts and stapled to the brace panel post.

W Gate Width (ft.)	S Post Spacing
16	3 @ 5'-0" ±
20	4 @ 4'-9" ±
24	4 @ 5'-9" ±
30	5 @ 5'-10" ±
40	6 @ 6'-6" ±

**GENERAL NOTES:**

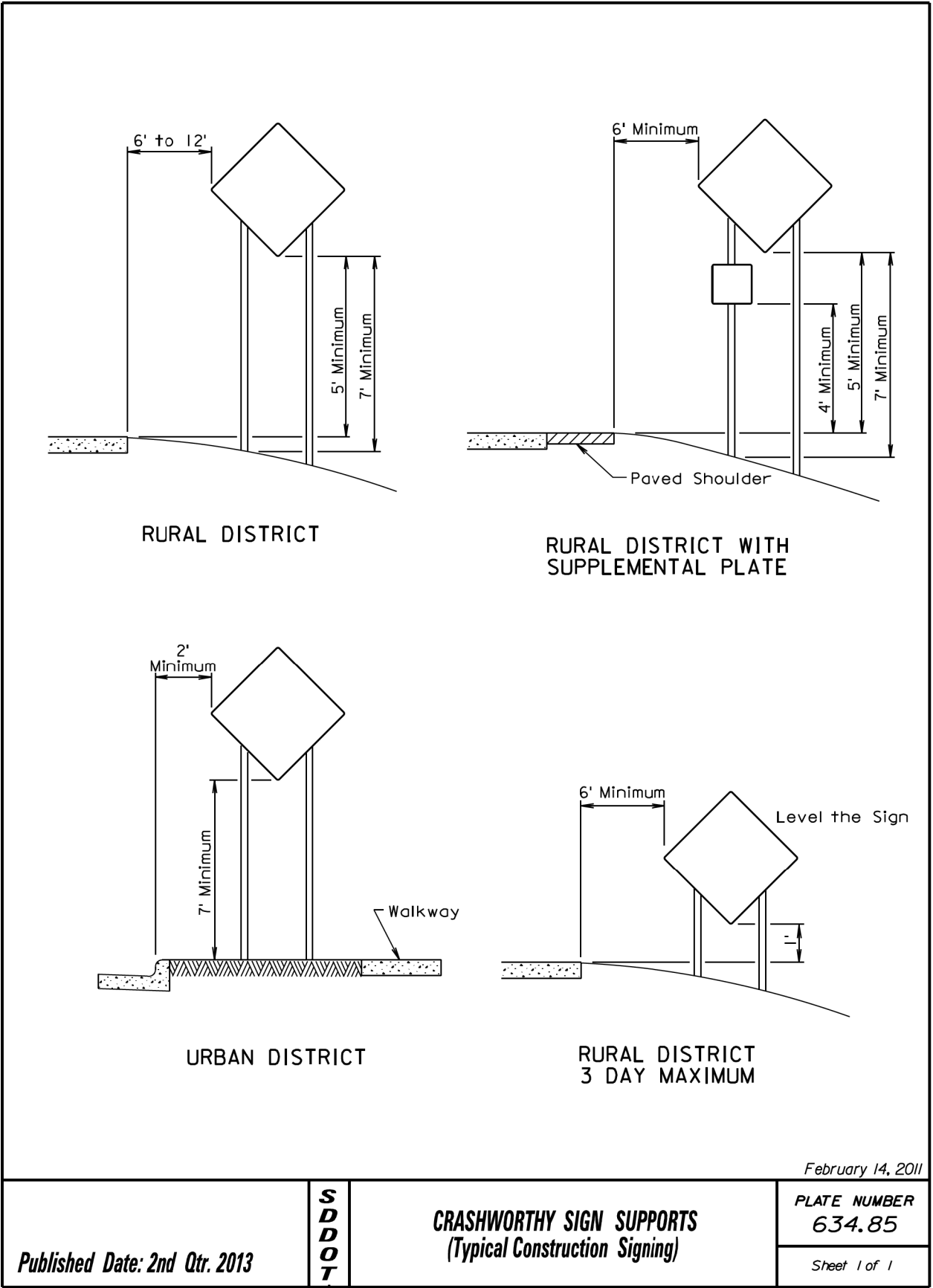
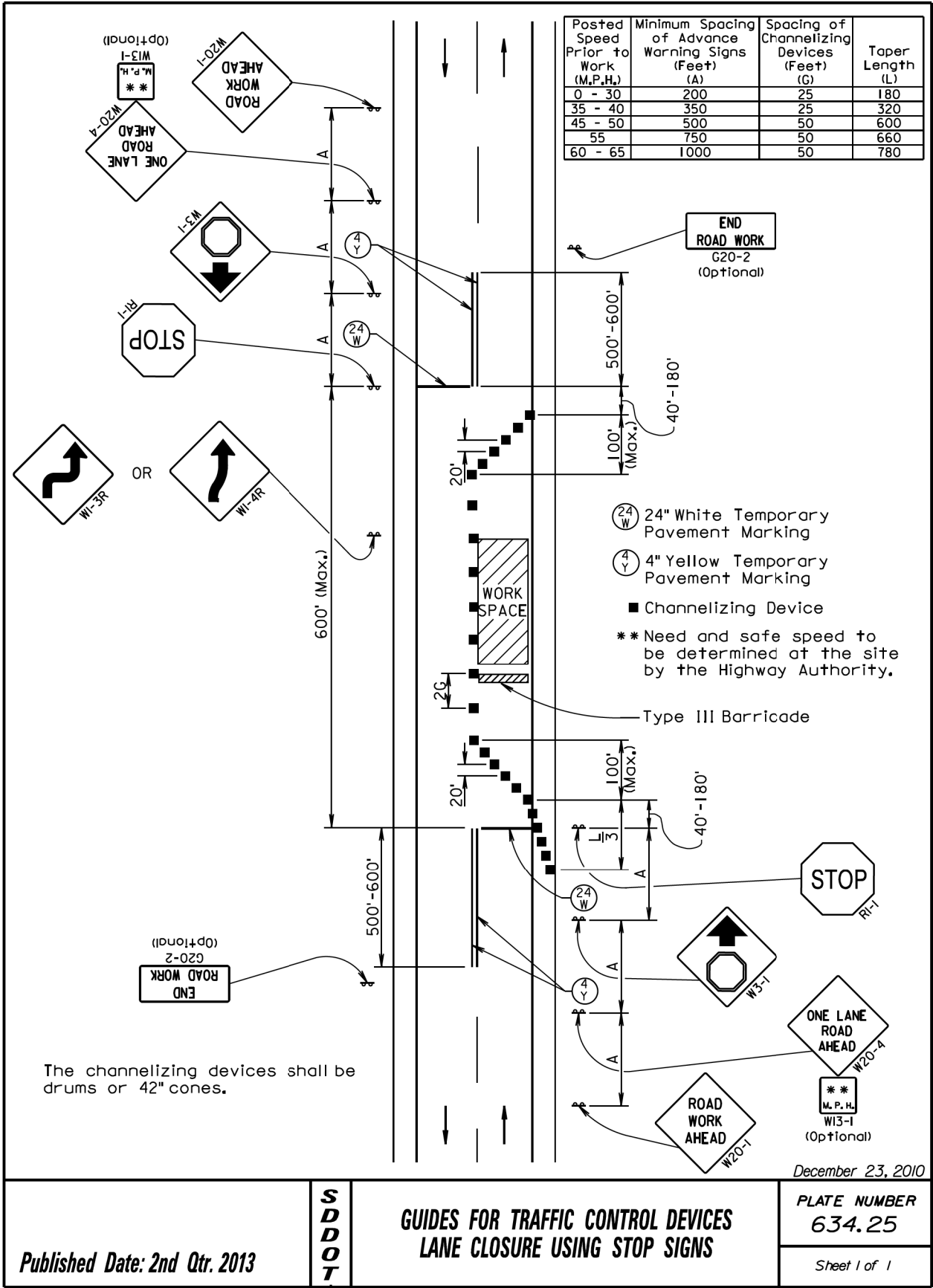
Creosote treatment of the gate posts will not be accepted.

The type of fencing in the gate shall be of the same type as specified for the adjacent Right-of-Way fence.

All costs for furnishing and constructing the wire gate(s) shall be incidental to the contract unit price per Ft for the respective Right-of-Way fence bid item.

March 31, 2000

S D D O T	WIRE GATES	PLATE NUMBER 620.20
		Sheet 1 of 1
		Published Date: 2nd Qtr. 2013

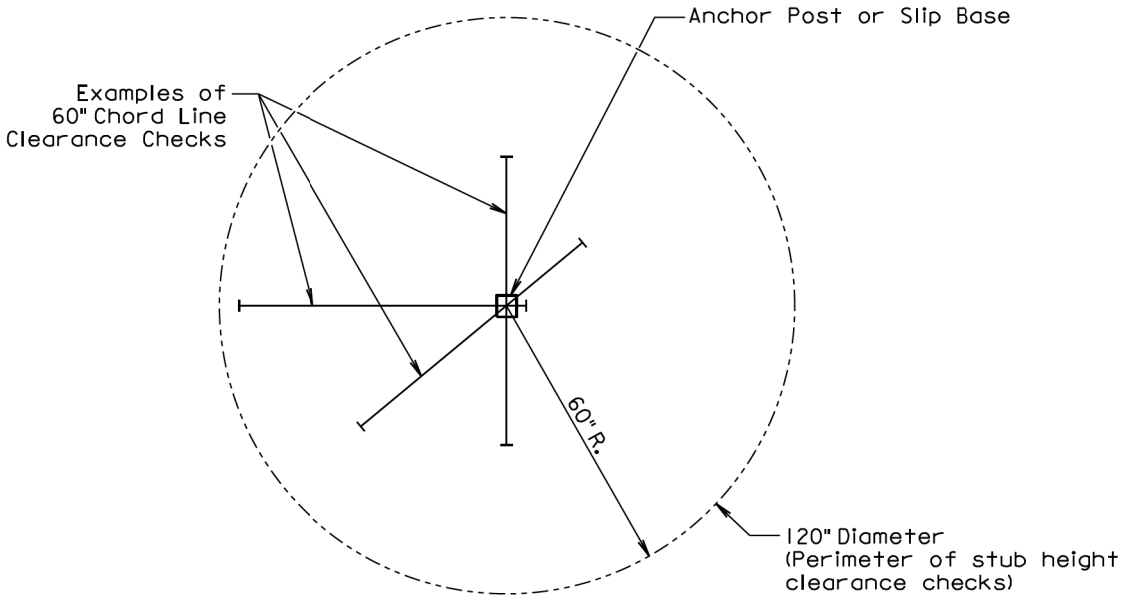


1:200  
Plot Scale -

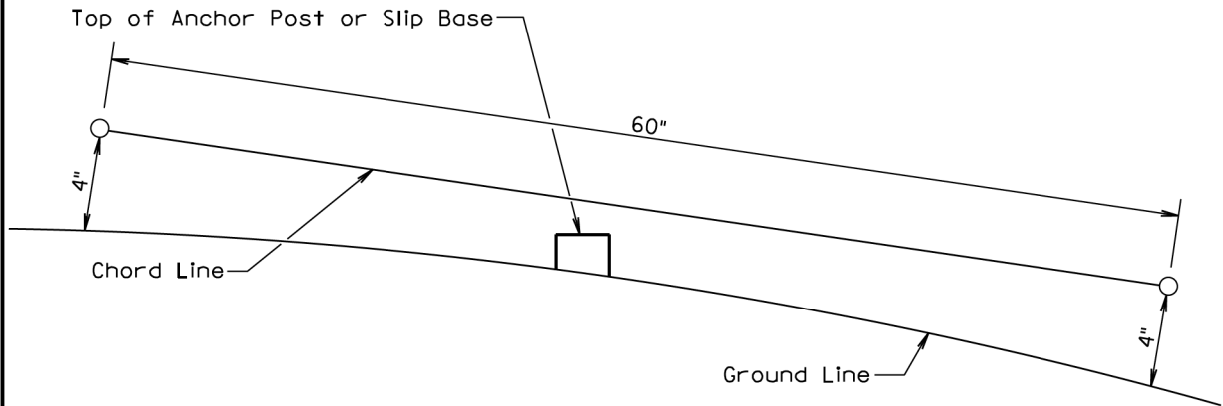
trc11610  
- Plotted From -

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090 W-452	14	14

Plotting Date: 04/29/2013



PLAN VIEW  
(Examples of stub height clearance checks)



ELEVATION VIEW

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

Published Date: 2nd Qtr. 2013	S D D O T	BREAKAWAY SUPPORT STUB CLEARANCE	PLATE NUMBER 634.99
			Sheet 1 of 1

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