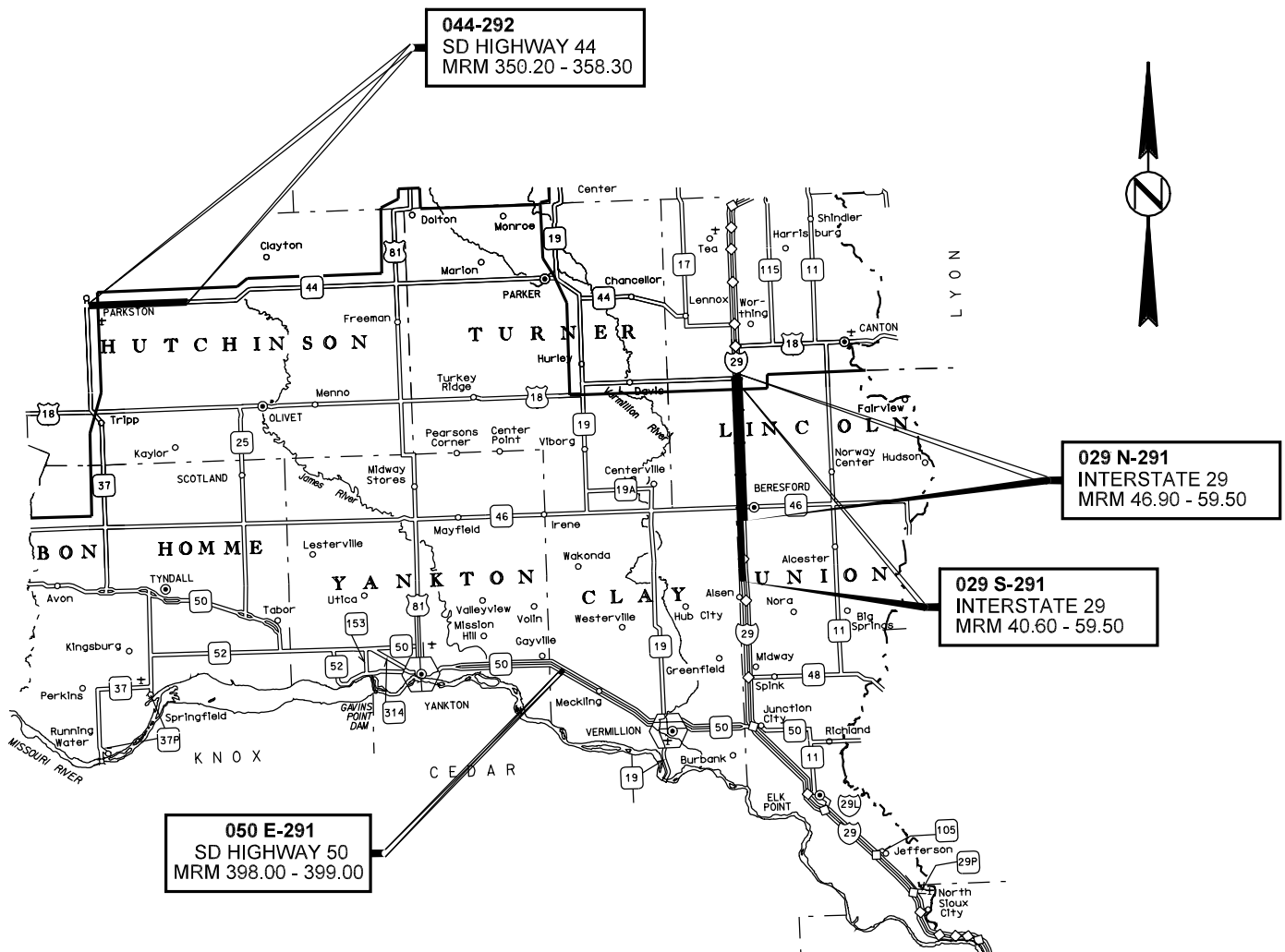


**STATE OF SOUTH DAKOTA  
DEPARTMENT OF TRANSPORTATION  
PLANS FOR PROPOSED  
029N-291, 029S-291, 044-292, 050E-291  
PCN I1SR, I1SS, I1ST, I1SU**

**CLAY, HUTCHINSON, LINCOLN, & UNION COUNTIES**

**YANKTON AREA  
PIPE AND EROSION REPAIR**



## INDEX OF PLANS SHEETS

Sheet 1	Location Map
Sheet 2	Index of Plan Sheets & Estimate of Quantities
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Sheet 10	Itemized List for Traffic Control
Sheets 11 to 20	Standard Plates

## ESTIMATE OF QUANTITIES

### 029 N-291, PCN I1SR

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
110E7500	Remove Pipe for Reset	54	Ft
110E7510	Remove Pipe End Section for Reset	11	Each
250E0010	Incidental Work	Lump Sum	LS
450E9000	Reset Pipe	54	Ft
450E9001	Reset Pipe End Section	11	Each
634E0010	Flagging	10	Hour
634E0100	Traffic Control	76	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
734E0010	Erosion Control	Lump Sum	LS

### 029 S-291, PCN I1SS

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
110E7500	Remove Pipe for Reset	28	Ft
110E7510	Remove Pipe End Section for Reset	6	Each
250E0010	Incidental Work	Lump Sum	LS
450E9000	Reset Pipe	28	Ft
450E9001	Reset Pipe End Section	6	Each
634E0010	Flagging	2	Hour
634E0100	Traffic Control	76	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
734E0010	Erosion Control	Lump Sum	LS

## ESTIMATE OF QUANTITIES (continued)

### 044-292, PCN I1ST

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
110E0600	Remove Fence	388	Ft
110E7500	Remove Pipe for Reset	36	Ft
110E7510	Remove Pipe End Section for Reset	6	Each
110E7530	Remove Cattle Pass for Reset	36	Ft
110E7540	Remove Cattle Pass End Section for Reset	4	Each
120E0010	Unclassified Excavation	53	CuYd
120E0600	Contractor Furnished Borrow	22	CuYd
250E0010	Incidental Work	Lump Sum	LS
450E9000	Reset Pipe	36	Ft
450E9001	Reset Pipe End Section	6	Each
560E5100	Reset Reinforced Concrete Cattle Pass	36.0	Ft
560E5101	Reset Reinforced Concrete Cattle Pass End Section	4	Each
620E0030	Type 3 Right-of-Way Fence	388	Ft
620E1020	2 Post Panel	12	Each
634E0010	Flagging	16	Hour
634E0100	Traffic Control	78	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
700E0210	Class B Riprap	184.0	Ton
700E0310	Class C Riprap	33.0	Ton
734E0010	Erosion Control	Lump Sum	LS
831E0110	Type B Drainage Fabric	307	SqYd

### 050 E-291, PCN I1SU

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
110E7500	Remove Pipe for Reset	18	Ft
110E7510	Remove Pipe End Section for Reset	1	Each
120E0600	Contractor Furnished Borrow	5	CuYd
250E0010	Incidental Work	Lump Sum	LS
450E9000	Reset Pipe	18	Ft
450E9001	Reset Pipe End Section	1	Each
634E0010	Flagging	2	Hour
634E0100	Traffic Control	76	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
734E0010	Erosion Control	Lump Sum	LS

TABLE OF PIPE REPAIR

PROJECT NUMBER	MILEAGE REFERENCE MARKER	SIZE AND TYPE	REMOVE PIPE FOR RESET (FT)	REMOVE PIPE END SECTION FOR RESET (EACH)	REMOVE CATTLE PASS FOR RESET (FT)	REMOVE CATTLE PASS SECTION FOR RESET (EACH)	DITCH CLEANOUT AND SHAPING	CONTRACTOR FURNISHED BORROW (CUYD)	RESET PIPE (FT)	RESET PIPE SECTION (EACH)	RESET CATTLE PASS (FT)	RESET CATTLE PASS SECTION (EACH)	CLEAN CULVERT	SIDE OF ROAD, RAMP, OR BERM
029N	46.97	30 inch RCP	20	1					20	1				east
029N	49.5	18 inch RCP	10	1			YES		10	1			YES	east
029N	53.2	48 inch RCP	14	2					14	2				both/ramp
029N	53.45	18 inch RCP		2			YES			2			YES	both/ramp
029N	54.92	18 inch RCP		1						1				east
029N	56.33	24 inch RCP		1						1			YES	south/berm
029N	59.34	18 inch RCP		1			YES			1			YES	south/berm
029N	59.45	24 inch RCP	10	2					10	2			YES	both/ramp
029 N-291 SUBTOTAL			54	11	0	0		0	54	11	0	0		
029S	59.45	18 inch RCP		1						1				east
029S	56.33	24 inch RCP		1						1				south/berm
029S	53.45	18 inch RCP		1						1			YES	east/ramp
029S	51.3	42 inch RCP	20	1					20	1				west
029S	40.6	24 inch RCP	8	2			YES		8	2			YES	both/ramp
029 S-291 SUBTOTAL			28	6	0	0		0	28	6	0	0		
044-292	350.25	RC CATTLE PASS			18	2		6			18	2		both
044-292	350.7***	RC CATTLE PASS			18	2		6			18	2		both
044-292	352.3	triple 36 inch RCP						4						north
044-292	353.1	triple 36 inch RCP	36	6				6	36	6				both
044-292	353.9	triple 48 inch RCP**												north
044-292	358.28***	10 x 10 RC Box Culvert*											YES	both
044-292 SUBTOTAL			36	6	36	4		22	36	6	36	4		
050E-291	398.35	48 inch RCP Arch with CMP Ends	18	1			YES	5	18	1				west
		The Culvert at 398.35 is at the intersection of 454th Ave. on the south side of the road. The Culvert is RCP with special CMP Ends with concrete collar.												
050E-291 SUBTOTAL			18	1	0	0		5	18	1	0	0		
PROJECT TOTALS			136	24	36	4		27	136	24	36	4		

\* see plan notes for this site  
 \*\* see plan notes for this site  
 \*\*\*Fencing and fence removal is required at this location.

## **SPECIFICATIONS**

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

## **SCOPE OF WORK**

The scope of work on these projects shall include, but is not limited to the following:

1. Remove and reset separated pipe culvert and cattle pass sections and fence at cattle passes.
2. Install tie bolts on all sections.
3. Clean silt from ditches adjacent to pipe culverts.
4. Clean silt from inside pipe culverts.
5. Install riprap and erosion/sediment control as required.
6. Remove asphalt ditch liner and dispose of off site.
7. Grade and shape the area for the riprap in the pipe scour hole.
8. Grade and shape the area for the riprap channel and outlet.
9. Place the Type B Drainage Fabric and the Riprap.
10. Seed and mulch disturbed areas.

## **REINFORCED CONCRETE PIPE**

All reinforced concrete pipe used on this project is Class II unless otherwise noted in the plans.

## **TIE BOLTS FOR RCP/RCP ARCH CULVERTS**

Tie Bolts shall be installed at the inlet and outlet on all sections of new/reset culvert and on new/reset culvert ends (requires connection from existing culvert to new end section). Connection shall be made from the first section left in place to the first new/reset section and to all new/reset sections.

For informational purposes:

Field drilling will be required to install the tie bolts on reset culvert, on reset culvert ends and on existing culvert when installing a new/reset end section.

Cost for removing tie bolts for reuse, drilling tie bolt holes and providing, installing and reinstalling tie bolts shall be incidental to the contract unit prices for installing or resetting RCP Culverts and End Sections.

## **CONTRACTOR FURNISHED BORROW**

The Contractor shall provide a suitable site for Contractor Furnished Borrow material. The Contractor Furnished Borrow may be obtained from ditch cleanout at the pipe end in most locations.

The borrow material shall be approved by the Engineer.

Compaction of the fill material shall be to the satisfaction of the Engineer.

It is not anticipated that water for compaction will be required; however, if in the opinion of the Engineer the fill material is extremely dry, water may be ordered and placed to the satisfaction of the Engineer. Cost for water shall be incidental to the contract unit price per cubic yard for Contractor Furnished Borrow.

The basis for payment for Contractor Furnished Borrow will be plans quantity. Additional quantities will be included for payment only in the event that work sites other than those shown on the plans are added to the contract.

Restoration of the Contractor furnished borrow site shall be the responsibility of the Contractor.

The Contractor is responsible for obtaining all required permits and clearances for the borrow site.

### **HISTORICAL PRESERVATION OFFICE CLEARANCES**

To obtain SHPO clearance, a cultural resources survey may need to be conducted by a qualified archaeologist. The Contractor shall arrange and pay for this survey. In lieu of a cultural resources survey, the Contractor could request a literature search on the site and 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. Jim Donohue, State Archaeological Research Center at 605-394-1937 shall be contacted for a literature search.

If borrow material is furnished from within the current geographical reservation boundaries or historic boundaries of the Lake Traverse, Yankton, or Flandreau-Santee reservations, the Contractor shall obtain THPO (Tribal Historical Preservation Office) clearance from the Tribal Cultural Resources Officer. This requirement is in addition to the SHPO clearance. If no Tribal contact exists, the required SHPO clearance shall suffice, with documentation of Tribal contact efforts provided to SHPO.

To facilitate SHPO and THPO responses, the Contractor shall submit a cultural resources survey report or the results of the literature search along with a legal description of the site, a topographical map with the site clearly marked, and evidence of prior site disturbance to Terrence G. Keller, DOT Environmental Supervisor, 700 East Broadway Avenue, Pierre, SD 57501-2586 (605-773-3721). Allow 30 days from the date this information is submitted to the Environmental Supervisor for SHPO approval. The Contractor is responsible for obtaining all required permits and clearances for the borrow and/or waste disposal site(s) prior to commencing construction activities at the borrow and/or waste disposal site(s). The Contractor shall provide the required permits and clearances to the Engineer at the preconstruction meeting.

### **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 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 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.

### **CLEANING OF EXISTING PIPE AND DITCHES – INCIDENTAL WORK**

Material in the existing pipe culverts shall be cleaned out by water flushing or other approved methods. The sites that require cleanout are listed in the pipe table. This list is intended as a guide only. Additional sites may also need to be cleaned out. The Contractor shall visit the project to determine the extent of cleanout required. No additional payment shall be made for additional cleanout sites.

The ditches shall be excavated in each direction from pipe ends to obtain proper water flow through the pipe. The average length of excavation from the end of the pipe is 50 feet. Excavated material may be used as Contractor Furnished Borrow if soil is determined acceptable by the Engineer. Unacceptable soil shall be wasted outside the right-of-way by the Contractor. The sites that require ditch excavation are listed in the pipe table. This list is intended as a guide only. Additional sites may also need to be reshaped. The Contractor shall visit the project to determine the extent of ditch work required. No additional payment shall be made for additional sites.

Cleaning of existing pipe, ditch grading, and disposal of soil shall be included in the bid item for Incidental Work.

### **SALVAGING, STOCKPILING, AND PLACING TOPSOIL**

Prior to starting construction operations, a sufficient volume of topsoil shall be removed from the construction limits to cover the disturbed areas to the required thickness as indicated in these plans.

Following completion of grading operations, topsoil shall be spread evenly over the disturbed areas. The thickness will be approximately 4 inches.

Removal and replacement of topsoil will not be measured for payment but shall be incidental to the contract unit prices for the various bid items.

### **REMOVE AND RESET TYPE II OBJECT MARKERS**

The Contractor will be required to remove prior to the work and reset after the work the Type II Object Markers delineating the pipe ends. All costs for this work shall be incidental to the various bid items.

### **UTILITIES**

It is not anticipated that the utilities will interfere with construction however the Contractor is required to contact South Dakota One Call at 800-781-7474 to verify prior to construction. There is an underground power line running parallel to the riprap channel on SD 44 at MRM 358.28, approximately 4 feet south of the work area. Care should be taken not to disturb this or other utilities on the project.

### **GRADING OPERATIONS**

It is not anticipated that water will be required; however if in the opinion of the Engineer the fill material is extremely dry, water may be ordered and placed to the satisfaction of the Engineer. Cost for water shall be incidental to the contract unit price per cubic yard for Unclassified Excavation.

The Contractor shall not withdraw water directly from streams of the James, Big Sioux, and Vermillion watersheds without prior approval from the DOT Environmental Office, 605-773-5679. This note does not relieve the Contractor of his/her responsibility to obtain the necessary permits from other agencies such as DENR (Department of Environment and Natural Resources) and COE.

The estimated volume of excavation required to construct the riprap drainage channel at MRM 358.28 is 53 cubic yards. An estimated 20 cubic yards of the material excavated for the riprap will be used to fill in the washout that exists below the normal grade line and 33 cubic yards of the remaining material may be reused as Contractor Furnished Borrow if deemed acceptable by the Engineer. Any excess or unacceptable material will be removed from the right-of-way and disposed of by the Contractor. Compaction shall be to the satisfaction of the Engineer.

The drainage channel shall be constructed as a V ditch with 6 ft sides at a 4:1 slope resulting in a depth in the middle of 1.5 ft and the top of the V ditch should be flush with the existing ground. The drainage channel will be staked by the Engineer. The top and bottom of the channel shall be warped to match the existing ditch cross section. The channel shall be 12 feet wide and 60 feet long. The channel shall be excavated 2 feet deeper than final elevations to allow for the placement of 2 feet of Class B Riprap.

All costs for excavation and construction of the drainage channel shall be included in the contract unit price per cubic yard for Unclassified Excavation. The plans quantity for Unclassified Excavation shall be the basis of payment unless changes are ordered by the Engineer.

### **RIPRAP AND DRAINAGE FABRIC ON SD 44 PROJECT**

Class B Riprap shall be placed at a depth of two feet in both riprap locations. Type B Drainage Fabric shall be placed on all surfaces to be covered with Riprap. The Type B Drainage Fabric shall be properly lapped with two feet of overlap at all joints. Plans quantity under the riprap channel at MRM 358.28 is based on a channel 60 feet long by 12 feet wide, 2 feet deep resulting in 75 tons of Class B Riprap and 112 square yards of Type B Drainage Fabric. Plans quantity for the box culvert outlet at MRM 358.28 is based on the plans dimensions of 16 feet wide by 16 feet long, 2.5 feet deep resulting in 33 tons of Class C Riprap and 49 square yards of Type B Drainage Fabric. In addition to this quantity 146 square yards of Type B Drainage Fabric and 109 tons of Class B Riprap have been added for the scour hole location at MRM 353.9, based on the plans dimensions of 30 ft by 35 ft, 2 feet deep. Excavation of material at the MRM 353.9 location to obtain the plans dimensions shall be incidental to the various bid items. A factor of 1.4 tons per cubic yard was used to determine the riprap quantity.

All costs to place the Type B Drainage Fabric shall be included in the unit price per square yard for Type B Drainage Fabric. Plans quantity shall be the basis of payment unless changes are ordered by the Engineer.

All costs for furnishing and placement of the riprap shall be included in the contract unit price per ton for Class B and Class C Riprap.

### **REMOVAL OF EXISTING DITCH LINER AT MRM 358.28 ON SD 44**

The existing ditch liner is typically 3 feet wide semicircular black fiberboard, approximately 1 inch thick. The Contractor shall remove the liner from the riprap channel location and dispose of it at an approved site. It is anticipated that there are voids under the ditch liner. These voids and the area where the liner will be removed shall be filled and compacted with material excavated from this project to the satisfaction of the Engineer.

Removal shall be completed without disturbing the in place vegetation and channel above or below the removal area. Care should be taken to disturb as little additional area as possible to complete the removal and installation.

Removal of the ditch liner, including the disposal of the material as well as back filling the voids shall be incidental to the various bid items.

### **EROSION CONTROL**

The contract lump sum price for Erosion Control shall include all materials, equipment, labor and incidentals necessary to seed and mulch all disturbed areas. The area to be seeded and mulched is estimated at 2 acres.

### **DRILLS**

In addition to the drills specified in Section 730 of the Standard Specifications, other types of drills including no-till drills will be allowed as long as they have baffles, partitions, agitators, or augers which keep the seed distributed throughout the seed box and the seed is planted at a depth of 1/4" to 1/2".

### **FERTILIZING**

Application of fertilizer will not be required on this project.

### **CONSTRUCTION PRACTICES FOR STREAMS INHABITED BY TOPEKA SHINER**

The US Fish and Wildlife Service (USFWS) has designated Topeka Shiner Streams associated with this project. The Contractor shall adhere to the "Special Provision for Construction Practices in Streams Inhabited by the Topeka Shiner".

The DOT contacts for Topeka Shiner issues are the Project Engineer and the Environmental Office, Ruth Howell 605-773-5679.

### **TABLE OF TOPEKA SHINER STREAMS**

MRM	Stream Name
SD 44 358.28	Tributary to Dry Creek



### **PERMANENT SEEDING**

The areas to be seeded comprise of all newly graded areas within the project limits except for the areas covered by permanent erosion controls

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.

Type G Permanent Seed Mixture shall consist of the following:

Grass Species	Variety	Pure Live Seed (PLS) (Pounds/Acre)
Western Wheatgrass	Flintlock, Rodan, Rosana	7
Switchgrass	Dacotah, Forestburg, Nebraska 28, Pathfinder, Summer, Sunburst, Trailblazer	3
Indiangrass	Holt, Tomahawk	3
Big Bluestem	Bison, Bonilla, Champ, Pawnee, Sunnyview	3
Oats or Spring Wheat: April through July; Winter Wheat: August through November		10
Total:		26

An approved seed mixture from another project may be substituted on this project provided it includes at least 26 pounds per acre (PLS) total with at least 7 pounds per acre of Western Wheatgrass, and includes 10 pounds per acre Oats or Spring Wheat: April through July or Winter Wheat: August through November.

### **MULCHING (GRASS HAY OR STRAW)**

Bales with noxious weed contamination will be rejected and the Contractor will be required to remove the contaminated bales from the project. Mulch shall be applied at a rate of 2 tons per acre on all disturbed areas.

### **GENERAL MAINTENANCE OF TRAFFIC**

Removing, relocating, covering, salvaging and resetting of permanent traffic control devices, including delineation and culvert end markers, shall be the responsibility of the Contractor. Cost for this work shall be incidental to the contract unit prices for the various items unless otherwise specified in the plans. Any delineators and signs damaged or lost shall be replaced by the Contractor at no cost to the State.

Storage of vehicles and equipment shall be outside the clear zone and as near as possible to the right-of-way line. 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 to 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.

The Contractor shall provide documentation that all breakaway sign supports comply with FHWA NCHRP 350 crash-worthy requirements. The Contractor shall provide installation details at the preconstruction meeting for all breakaway sign support assemblies.

Sufficient traffic control devices have been included in these plans to sign one workspace. If the Contractor elects to work on additional sites simultaneously, the cost for additional traffic control devices shall be incidental to the contract unit price per unit for Traffic Control.

Flaggers will be paid for at the contract unit price per hour.

## ITEMIZED LIST FOR TRAFFIC CONTROL

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-1	48" x 24"	ROAD WORK NEXT ## MILES	0	24	34
G20-2A	36" x 18"	END ROAD WORK	2	17	
W6-3	48" x 48"	TWO WAY TRAFFIC (SYMBOL)	0	34	
W8-1	36" x 36"	BUMP	0	27	
W8-6	48" x 48"	TRUCK CROSSING	0	34	
W8-7	36" x 36"	LOOSE GRAVEL	0	27	
W8-9a	48" x 48"	SHOULDER DROP-OFF	0	34	
W13-1	24" x 24"	ADVISORY SPEED PLATE	0	16	
W20-1	48" x 48"	ROAD WORK ##### FT. OR AHEAD	2	34	
W20-4	48" x 48"	ONE LANE ROAD ##### FT. OR AHEAD	2	34	68
W20-7a	48" x 48"	FLAGGER	2	34	68
W20-7b	48" x 48"	BE PREPARED TO STOP	0	34	68
W21-1a	48" x 48"	WORKERS (SYMBOL)	0	34	
W21-3	48" x 48"	ROAD MACHINERY AHEAD	0	34	
W21-5	48" x 48"	SHOULDER WORK	2	34	
W21-5a	48" x 48"	RIGHT SHOULDER CLOSED	0	34	
W21-5b	48" x 48"	RIGHT SHOULDER CLOSED AHEAD	0	34	
TOTAL UNITS					306

#### TOLERANCES IN DIMENSIONS

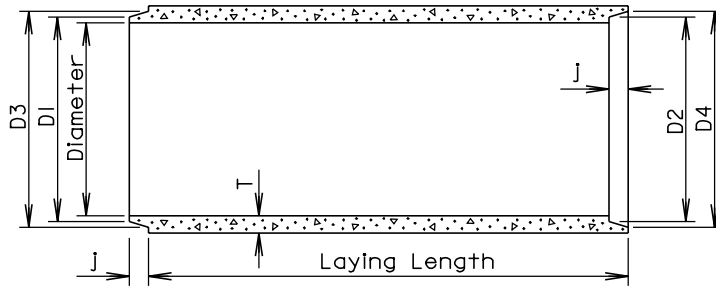
Diameter:  $\pm 1.5\%$  for 24" Dia. or less and  $\pm 1\%$  or  $\frac{3}{8}"$  whichever is more for 27" Dia. or greater.

Diameters at Joints:  $\pm 3/16"$  for 30" Dia. or less and  $\pm 1/4"$  for 36" or greater.

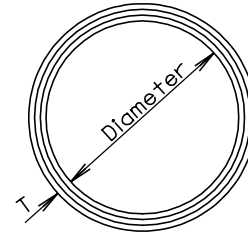
Length of joint (J):  $\pm 1/4"$ .

Wall thickness (T): not less than design T by more than  $5\%$  or  $\frac{3}{16}"$ , whichever is greater.

Laying length: shall not underrun by more than  $\frac{1}{2}"$ .



LONGITUDINAL SECTION



END VIEW

#### GENERAL NOTES:

Construction of R.C.P. shall conform to the requirements of Section 990 of the Standard Specifications for Roads and Bridges.

Not more than 2 four foot sections shall be permitted near the ends of any culvert. Four foot lengths shall be used only to secure the required length of culvert.

Diam. (in.)	Approx. Wt. /Ft. (lb.)	T (in.)	J (in.)	D1 (in.)	D2 (in.)	D3 (in.)	D4 (in.)
12	92	2	1 3/4	13 1/4	13 5/8	13 7/8	14 1/4
15	127	2 1/4	2	16 1/2	16 7/8	17 1/4	17 5/8
18	168	2 1/2	2 1/4	19 5/8	20	20 3/8	20 3/4
21	214	2 3/4	2 1/2	22 7/8	23 1/4	23 3/4	24 1/8
24	265	3	2 3/4	26	26 3/8	27	27 3/8
27	322	3 1/4	3	29 1/4	29 5/8	30 1/4	30 5/8
30	384	3 1/2	3 1/4	32 3/8	32 3/4	33 1/2	33 7/8
36	524	4	3 3/4	38 3/4	39 1/4	40	40 1/2
42	685	4 1/2	4	45 1/8	45 5/8	46 1/2	47
48	867	5	4 1/2	51 1/2	52	53	53 1/2
54	1070	5 1/2	4 1/2	57 7/8	58 3/8	59 3/8	59 7/8
60	1296	6	5	64 1/4	64 3/4	66	66 1/2
66	1542	6 1/2	5 1/2	70 5/8	71 1/8	72 1/2	73
72	1810	7	6	77	77 1/2	79	79 1/2
78	2098	7 1/2	6 1/2	83 3/8	83 7/8	85 5/8	86 1/8
84	2410	8	7	89 3/4	90 1/4	92 1/8	92 5/8
90	2740	8 1/2	7	95 3/4	96 1/4	98 1/8	98 5/8
96	2950	9	7	102 1/8	102 5/8	104 1/2	105
102	3075	9 1/2	7 1/2	109	109 1/2	111 1/2	112
108	3870	10	7 1/2	115 1/2	116	118	118 1/2

March 31, 2000

Published Date: 2nd Qtr. 2010

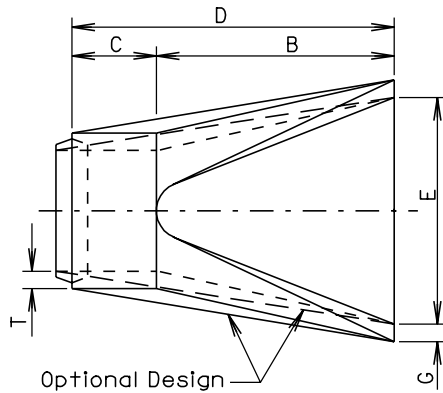
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**REINFORCED CONCRETE PIPE**

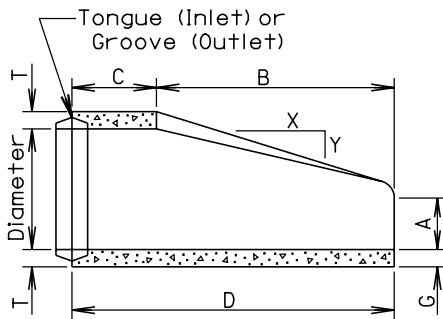
**PLATE NUMBER  
450.01**

Sheet 1 of 1

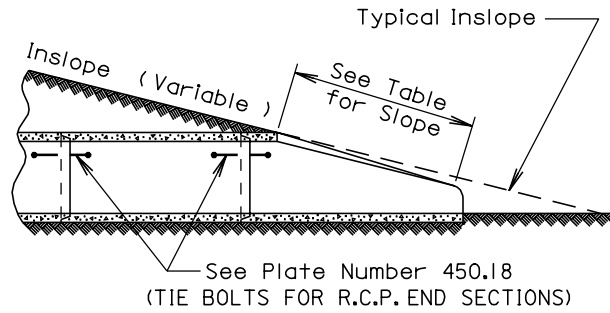
Plotting Date: 22-MAY-2010



TOP VIEW



LONGITUDINAL SECTION

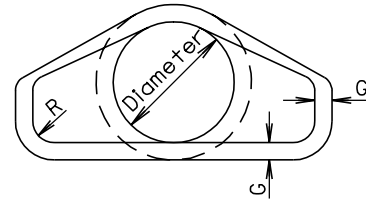


SLOPE DETAIL

**GENERAL NOTES:**

Lengths of concrete pipe shown on Plan Sheets are between flared Ends only.

Construction of R.C.P. Flared End shall conform to the requirements of Section 990 of the Standard Specifications for Roads and Bridges.



END VIEW

Dia. (In.)	Approx. Wt. of Section (lbs.)	Approx. Slope (X to Y)	T (In.)	A (In.)	B (In.)	C (In.)	D (In.)	E (In.)	G (In.)	R (In.)
12	530	2.4: 1	2	4	24	48 <sup>7</sup> / <sub>8</sub>	72 <sup>7</sup> / <sub>8</sub>	24	2	1 <sup>1</sup> / <sub>2</sub>
15	740	2.4: 1	2 <sup>1</sup> / <sub>4</sub>	6	27	46	73	30	2 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>2</sub>
18	990	2.3: 1	2 <sup>1</sup> / <sub>2</sub>	9	27	46	73	36	2 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>
21	1280	2.4: 1	2 <sup>3</sup> / <sub>4</sub>	9	36	37 <sup>1</sup> / <sub>2</sub>	73 <sup>1</sup> / <sub>2</sub>	42	2 <sup>3</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>2</sub>
24	1520	2.5: 1	3	9 <sup>1</sup> / <sub>2</sub>	43 <sup>1</sup> / <sub>2</sub>	30	73 <sup>1</sup> / <sub>2</sub>	48	3	1 <sup>1</sup> / <sub>2</sub>
27	1930	2.5: 1	3 <sup>1</sup> / <sub>4</sub>	10 <sup>1</sup> / <sub>2</sub>	49 <sup>1</sup> / <sub>2</sub>	24	73 <sup>1</sup> / <sub>2</sub>	54	3 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>2</sub>
30	2190	2.5: 1	3 <sup>1</sup> / <sub>2</sub>	12	54	19 <sup>3</sup> / <sub>4</sub>	73 <sup>3</sup> / <sub>4</sub>	60	3 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>
36	4100	2.5: 1	4	15	63	34 <sup>3</sup> / <sub>4</sub>	97 <sup>3</sup> / <sub>4</sub>	72	4	1 <sup>1</sup> / <sub>2</sub>
42	5380	2.5: 1	4 <sup>1</sup> / <sub>2</sub>	21	63	35	98	78	4 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>
48	6550	2.5: 1	5	24	72	26	98	84	5	1 <sup>1</sup> / <sub>2</sub>
54	8240	2: 1	5 <sup>1</sup> / <sub>2</sub>	27	65	33 <sup>1</sup> / <sub>4</sub>	98 <sup>1</sup> / <sub>4</sub>	90	5 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>
60	8730	1.9: 1	6	35	60	39	99	96	5	1 <sup>1</sup> / <sub>2</sub>
66	10710	1.7: 1	6 <sup>1</sup> / <sub>2</sub>	30	72	27	99	102	5 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>
72	12520	1.8: 1	7	36	78	21	99	108	6	1 <sup>1</sup> / <sub>2</sub>
78	14770	1.8: 1	7 <sup>1</sup> / <sub>2</sub>	36	90	21	111	114	6 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>
84	18160	1.6: 1	8	36	90 <sup>1</sup> / <sub>2</sub>	21	111 <sup>1</sup> / <sub>2</sub>	120	6 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>
90	20900	1.5: 1	8 <sup>1</sup> / <sub>2</sub>	41	87 <sup>1</sup> / <sub>2</sub>	24	111 <sup>1</sup> / <sub>2</sub>	132	6 <sup>1</sup> / <sub>2</sub>	6

March 31, 2000

Published Date: 2nd Qtr. 2010

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**R. C. P. FLARED ENDS**

**PLATE NUMBER  
450.10**

Sheet 1 of 1

Plotting Date: 22-MAY-2010



Use  $\frac{9}{16}$ " rod diameter and  $\frac{5}{8}$ " thread diameter for pipe wall thickness of 2" to  $3\frac{1}{4}$ ".  
 Use  $\frac{11}{16}$ " rod diameter and  $\frac{3}{4}$ " thread diameter for pipe wall thickness of  $3\frac{1}{2}$ " to  $6\frac{1}{2}$ ".  
 Use  $\frac{29}{32}$ " rod diameter and 1" thread diameter for pipe wall thickness of 7" and larger.

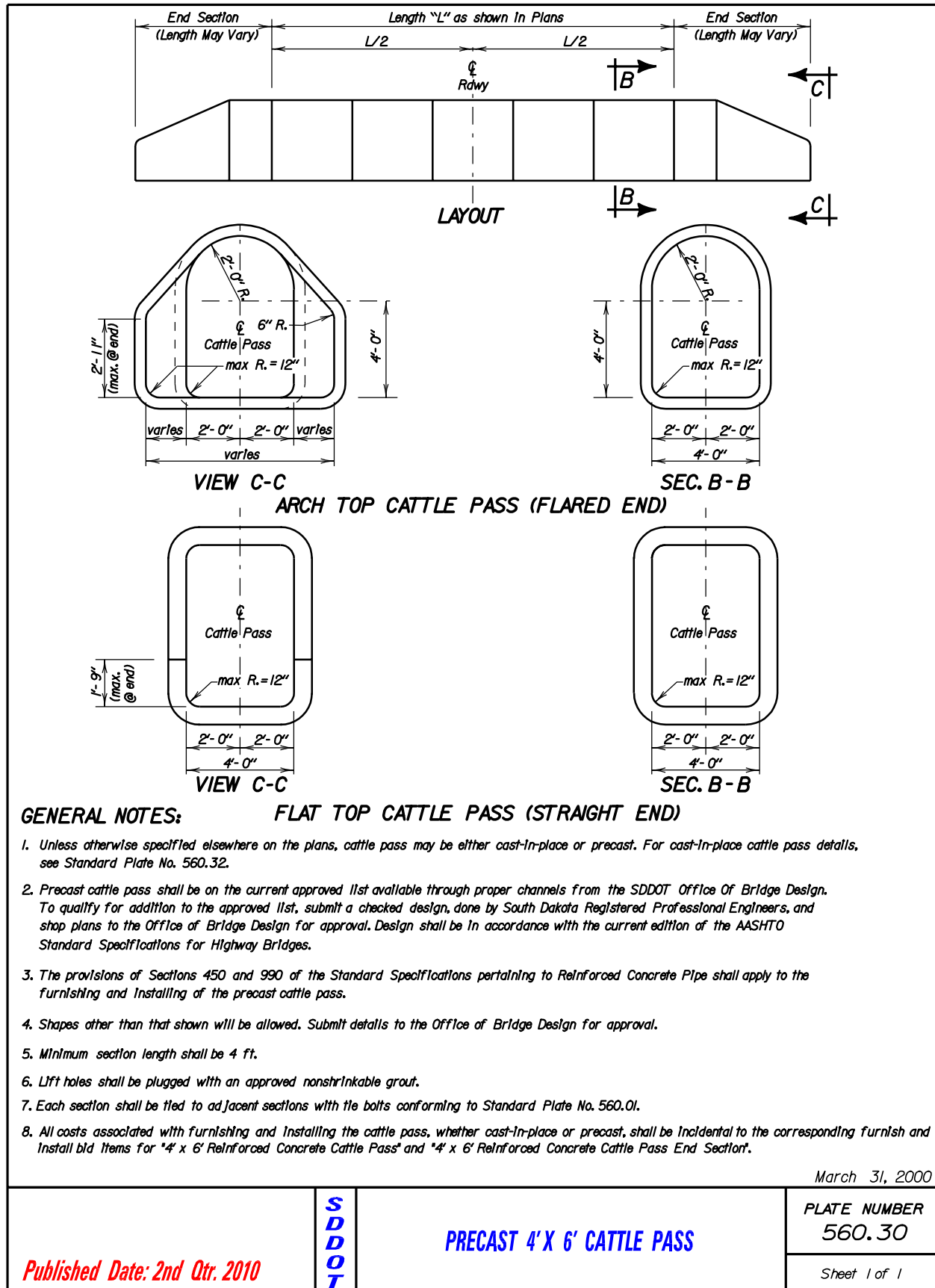


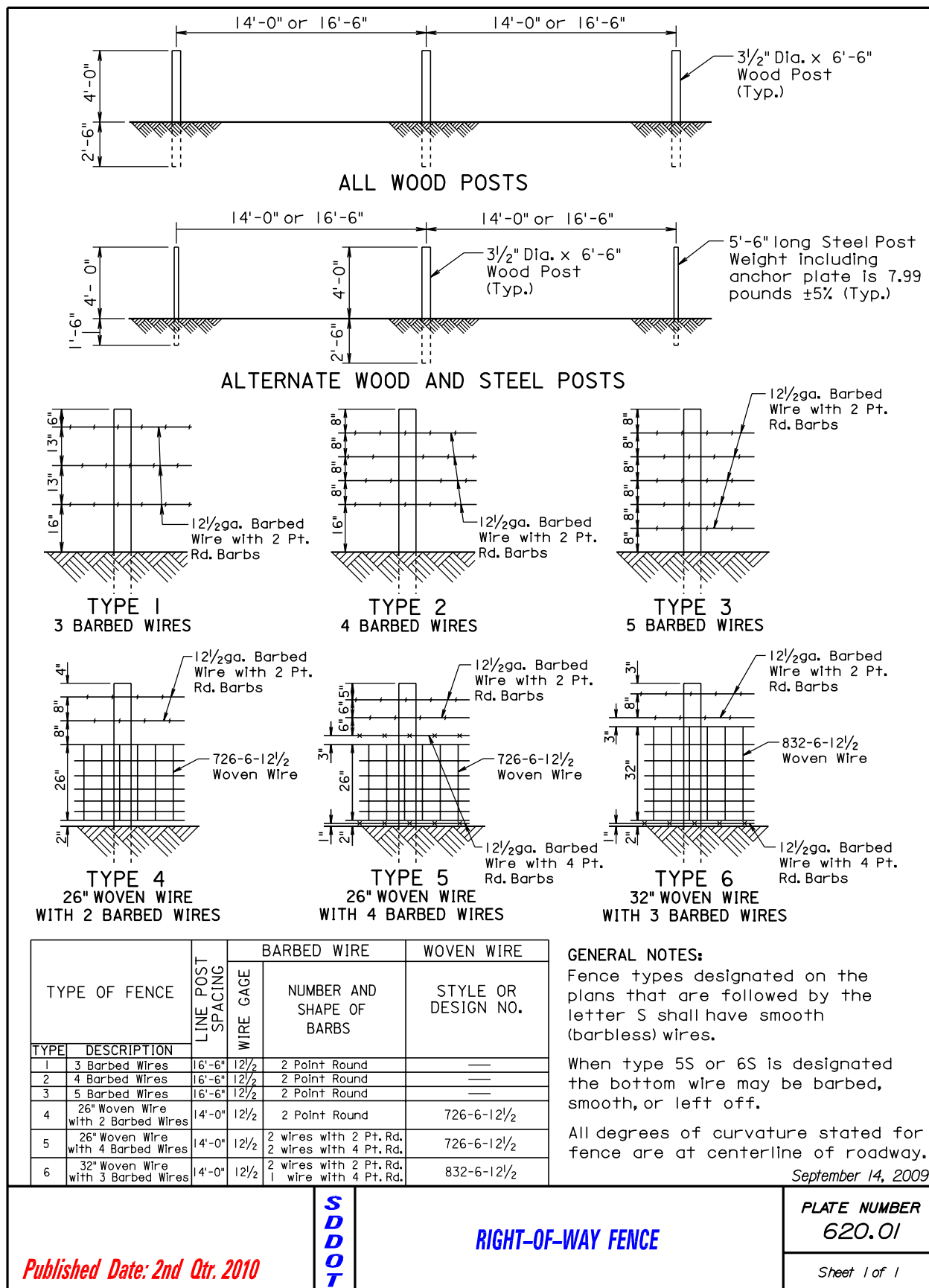
L = 4" for  $\frac{3}{4}$ " Bolt. L = 6" for 1" Bolt.  
Use  $\frac{3}{4}$ " Tie Bolts for pipe diameters less than 48".

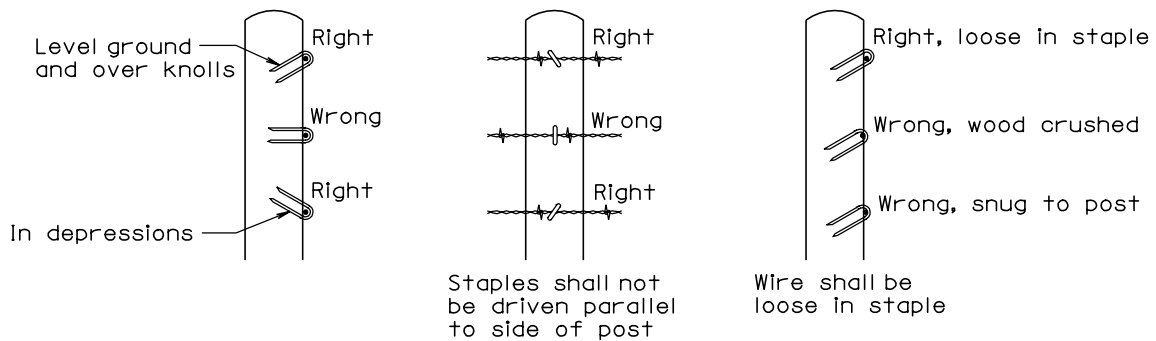


March 31, 2000

Sheet 1 of 1







## STAPLE INSTALLATION

### 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. 2010**

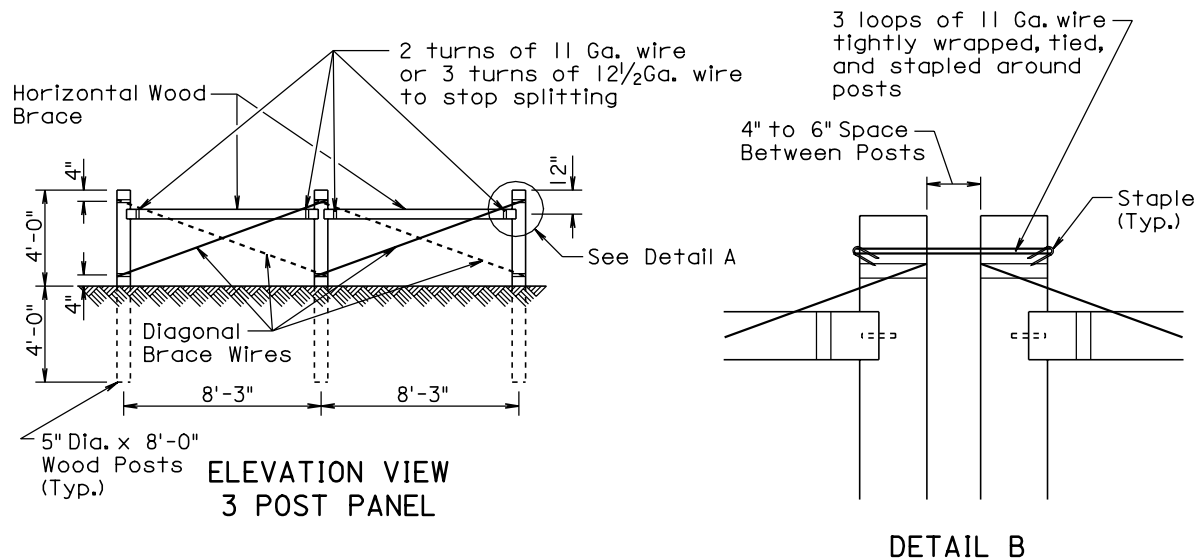
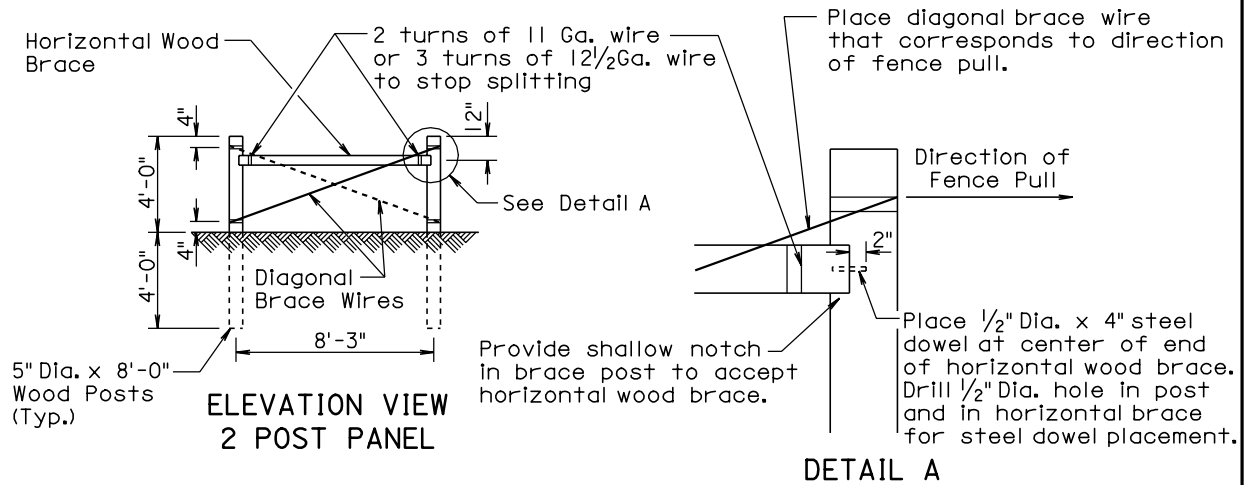
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**STAPLE INSTALLATION AND GENERAL  
RIGHT-OF-WAY FENCE NOTES**

**PLATE NUMBER  
620.02**

Sheet 1 of 1





**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

*Published Date: 2nd Qtr. 2010*

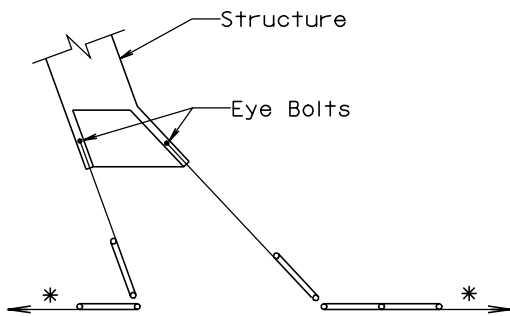
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**BRACE PANELS  
AND APPLICATIONS OF BRACE PANELS**

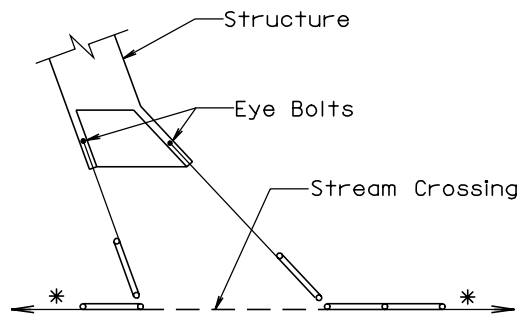
**PLATE NUMBER  
620.03**

Sheet 1 of 3

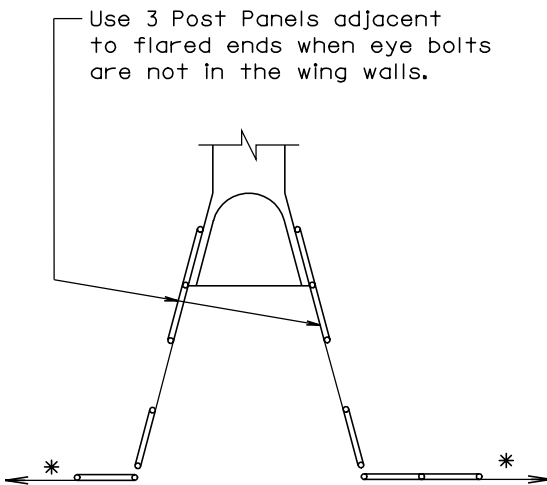
Plotting Date: 22-MAY-2010



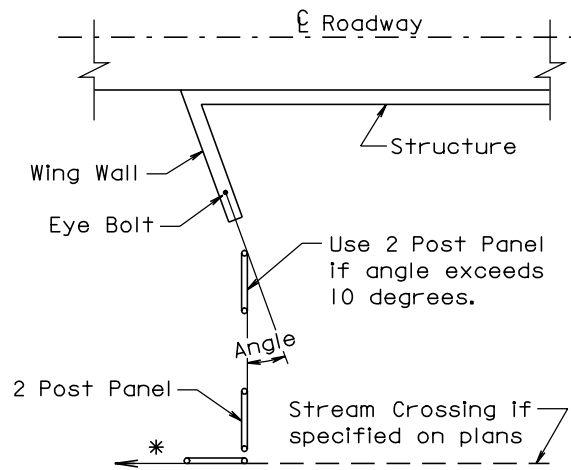
R.C. BOX CULVERT  
OR CATTLE PASS



STRUCTURE WITH STREAM  
CROSSING FENCE



R.C. BOX CULVERT  
OR CATTLE PASS



BRIDGE

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

March 31, 2000

*Published Date: 2nd Qtr. 2010*

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**BRACE PANEL APPLICATIONS AT STRUCTURES**

**PLATE NUMBER  
620.04**

Sheet 1 of 1

Plotting Date: 22-MAY-2010

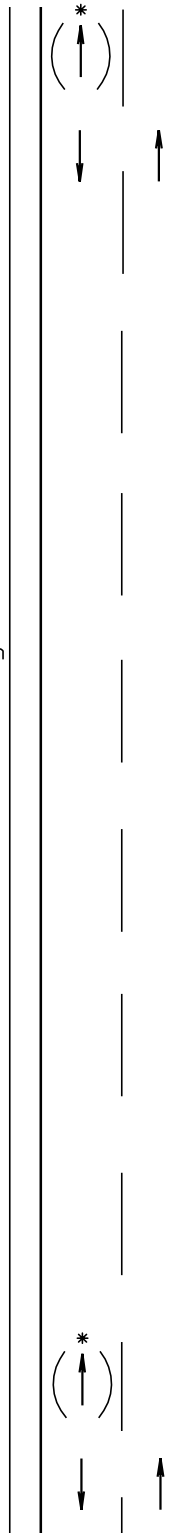
The signs illustrated are not required if the work space is behind a barrier, more than 2 feet behind the curb, or 15 feet or more from the edge of any roadway.

The signs illustrated shall be used where there are distracting situations; such as: vehicles parked on shoulder, vehicles accessing the work site via the highway, and equipment traveling on or crossing the roadway to perform work operations.

The ROAD WORK AHEAD sign may be replaced with other appropriate signs, such as the SHOULDER WORK sign. The SHOULDER WORK sign may be used for work adjacent to the shoulder.

\* If the work space is on a divided highway, an advance warning sign should also be placed on the left side of the directional roadway.

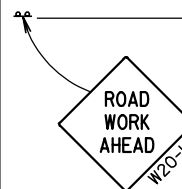
For short term, short duration, or mobile operations, all signs and channelizing devices may be eliminated if a vehicle with an activated flashing or revolving yellow light is used.



Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)
0 - 30	200
35 - 40	350
45 - 50	500
55	750
60 - 75	1000



A



July 1, 2005

*Published Date: 2nd Qtr. 2010*

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

# **GUIDES FOR TRAFFIC CONTROL DEVICES WORK BEYOND THE SHOULDER**

PLATE NUMBER  
**634.01**

Sheet 1 of 1

Plotting Date: 22-MAY-2010

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 type II barricades if traffic control must remain overnight or longer. During daylight hours, 42" cones may be used in lieu of drums or type II barricades along the centerline.

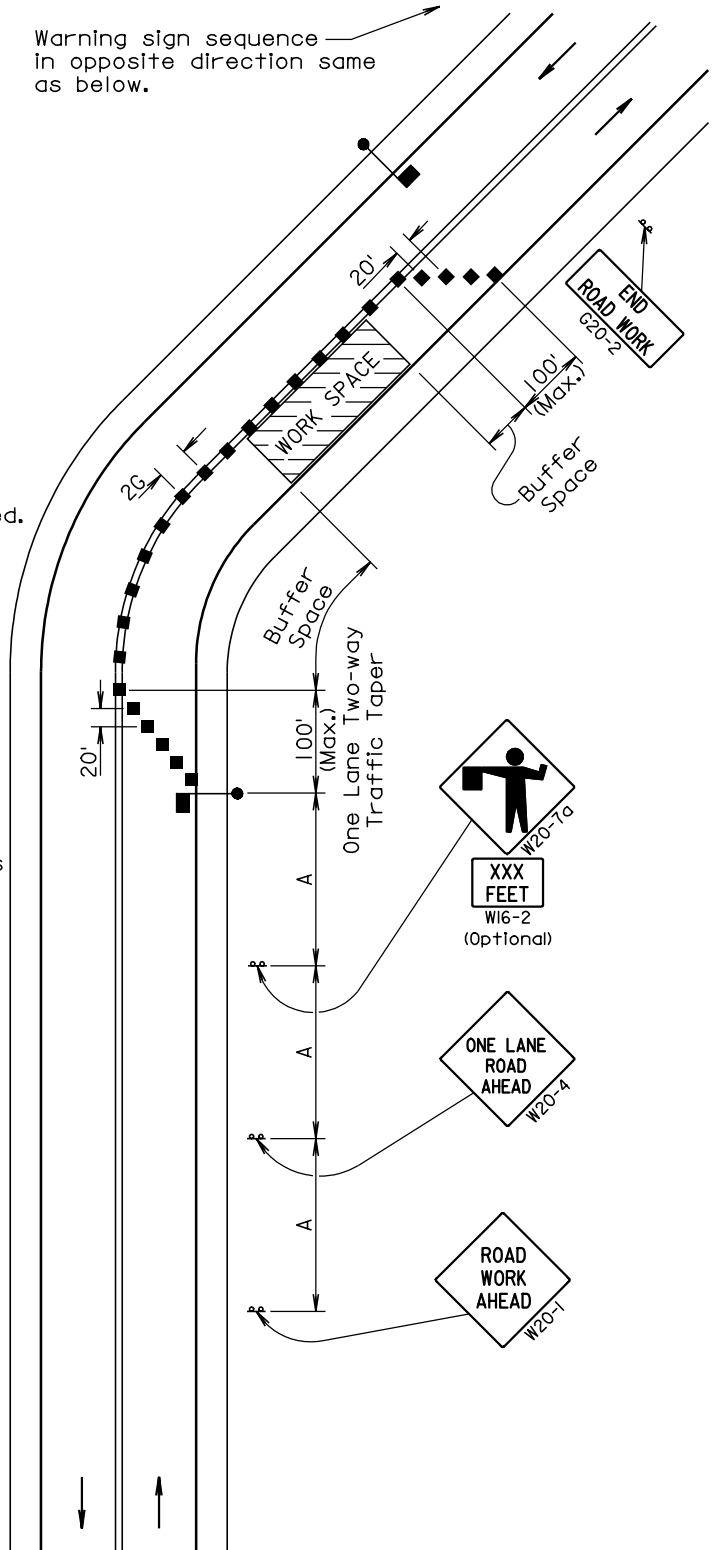
END ROAD WORK  
G20-2

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

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

The buffer space shall be a sufficient length so that the channelizing devices are visible to approaching traffic.

Warning sign sequence in opposite direction same as below.



June 26, 2006

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SDOT

GUIDES FOR TRAFFIC CONTROL DEVICES  
LANE CLOSURE WITH FLAGGER PROVIDED

PLATE NUMBER  
634.23

Sheet 1 of 1

Plotting Date: 22-MAY-2010