

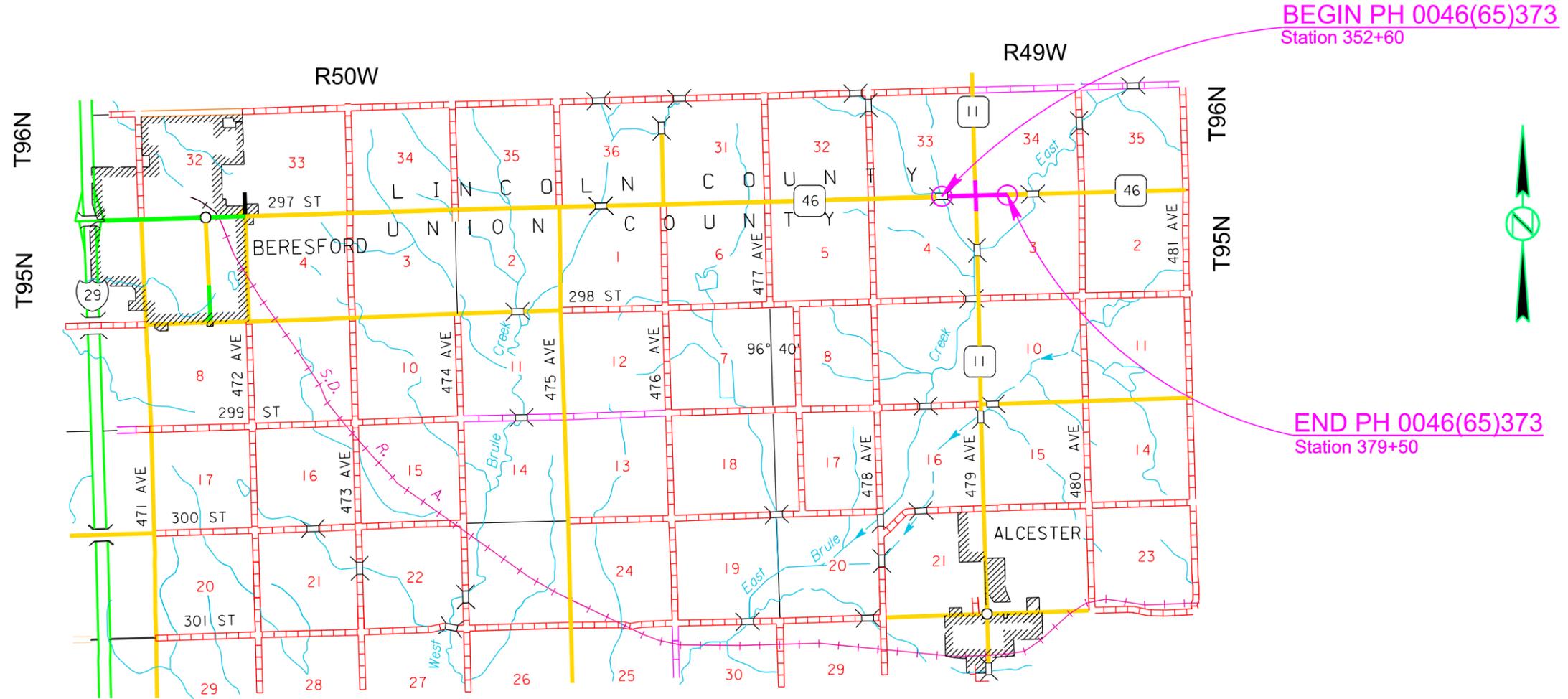
# SECTION B: GRADING PLANS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	PH 0046(65)373	B1	B25

Plotting Date: 08/01/2016

## INDEX OF SHEETS

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Plot Scale - 1:200

Plotted From - trpr17192

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**SECTION B ESTIMATE OF QUANTITIES**

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
009E3230	Grade Staking	1.671	Mile
009E3250	Miscellaneous Staking	0.691	Mile
009E3280	Slope Staking	0.691	Mile
009E3300	Three Man Survey Crew	40.0	Hour
100E0100	Clearing	Lump Sum	LS
110E0200	Remove Building	1	Each
110E0600	Remove Fence	2,600	Ft
110E1010	Remove Asphalt Concrete Pavement	517.5	SqYd
110E1100	Remove Concrete Pavement	179.1	SqYd
110E1650	Remove Bank and Channel Protection Gabion	12	Each
110E7510	Remove Pipe End Section for Reset	1	Each
120E0010	Unclassified Excavation	64,209	CuYd
120E2000	Undercutting	11,591	CuYd
120E6100	Water for Embankment	505.0	MGal
250E0020	Incidental Work, Grading	Lump Sum	LS
270E0040	Salvage and Stockpile Asphalt Mix and Granular Base Material	13,376.1	Ton
421E0100	Pipe Culvert Undercut	58	CuYd
450E0142	24" RCP Class 2, Furnish	118	Ft
450E0150	24" RCP, Install	118	Ft
450E0182	36" RCP Class 2, Furnish	4	Ft
450E0190	36" RCP, Install	4	Ft
450E0203	48" RCP Class 3, Furnish	104	Ft
450E0204	48" RCP Class 4, Furnish	46	Ft
450E0210	48" RCP, Install	150	Ft
450E2036	48" RCP Flared End, Furnish	2	Each
450E2037	48" RCP Flared End, Install	2	Each
450E2200	24" RCP Sloped End, Furnish	2	Each
450E2201	24" RCP Sloped End, Install	2	Each
450E4759	18" CMP 16 Gauge, Furnish	216	Ft
450E4760	18" CMP, Install	216	Ft
450E5406	18" CMP Safety End, Furnish	6	Each
450E5407	18" CMP Safety End, Install	6	Each
450E9001	Reset Pipe End Section	1	Each
600E0200	Type II Field Laboratory	1	Each
620E0020	Type 2 Right-of-Way Fence	1,405	Ft
620E0515	Type 1A Temporary Fence	900	Ft
620E1020	2 Post Panel	9	Each
620E1030	3 Post Panel	4	Each
720E1015	Bank and Channel Protection Gabion	22.5	CuYd
831E0110	Type B Drainage Fabric	68	SqYd

**GRADING OPERATIONS**

Water for Embankment is estimated at the rate of 10 gallons of water per cubic yard of Embankment minus Waste.

The estimated cubic yards of excavation and/or embankment required to construct outlet ditches, ditch blocks, and approaches are included in the earthwork balance notes on the profile sheets.

Special ditch grades and other sections of the roadway different than the typical section(s) shall be constructed to the limits shown on the cross sections. If significant changes to the cross sections are necessary during construction, the Engineer shall contact the Designer for the proposed change.

Generally, all shallow inlet and outlet ditches as noted on the plan sheets shall be cut with a 10-foot wide bottom with 5:1 backslopes. However, the Engineer may direct the Contractor to adjust the ditch width for proper alignment with the drainage structure.

Temporary fence and/or permanent fence shall be placed ahead of the grading operation unless otherwise directed by the Engineer.

The Contractor is advised that the Web Soils Survey for this area shows the surrounding soils have high silt content (>60%). Past experience with soils of this nature indicates that the moisture content is key to controlling embankment stability. Best practice is for the soil to be from optimum moisture to 4% below optimum moisture at the time of compaction (+0% to -4%). A moisture content approximately 2% below optimum moisture has worked well on past projects.

These soils are generally not problematic when building the lower portion of the embankment if they are placed with proper moisture and density control. However, they can become unstable under construction traffic, making them very difficult to use as subgrade topping material. The Contractor is advised to minimize the amount of time between the completion of the subgrade and the placing of granular materials over the subgrade top. Construction traffic on the completed subgrade, even after the placement of granular materials, should be kept to a minimum. It does not appear that building the upper subgrade with select topping will be practical.

**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. The utility contact information is provided elsewhere in the plans or bidding documents.

**MidAmerican Energy Company:** Please note that the overhead 69,000-volt electric line in the project area, along the east side of SD Hwy 11 and crossing SD Hwy 46 near 371+10, is continuously energized. The conductors (overhead wires) on this electric line are bare and uninsulated and contact with this electric line can cause serious injury or death. All people involved with any construction, maintenance, or similar activities within the vicinity of this electric line must be aware and remain aware of the hazards of working around this electric line, including maintaining proper safety clearances from this electric line.

**TYPE II FIELD LABORATORY**

The lab shall be equipped with an internet connection such as DSL, cable modem, or other approved service. The internet connection shall be provided with a multi-port wireless router. The internet connection shall be a minimum speed of 512 Kb unless limited by job location and approved by the DOT. Prior to installing the wireless router the Contractor shall submit the wireless router's technical data to the Area Office to check for compatibility with the state's computer equipment. The internet connection is intended for state personnel usage only. The Contractor's personnel are prohibited from using the internet connection unless pre-approved by the Project Engineer.

The Contractor shall submit a copy of each monthly bill for calls charged to this phone at the end of each month. The Project Engineer will then audit the bills to ensure all calls are legitimate and then initiate a Construction Change Order (CCO) to reimburse the Contractor for the actual phone calls made, including local and long distance calls. Reimbursement will not be made for fees associated with the purchase, installation, disconnection, monthly line charges, and incidentals involved in the installation, maintenance, and disconnection of the phone (including attachments). These items shall be incidental to the contract unit price per each for "Type II Field Laboratory".

**TABLE OF PIPE INSTALLATIONS**

Hwy	Location	Pipe Installations
SD46	353+75-70'L	18"- 84' CMP & 2 CMP Safety Ends
	361+00-51'L	18"- 68' CMP & 2 CMP Safety Ends
	363+46-50'R	18"- 64' CMP & 2 CMP Safety Ends
	371+63	48"- 150' RCP (CL3-58', CL4-46' & CL3-46') & 2 RCP Flared Ends
SD11	108+56	24"-118' RCP & 2 RCP Sloped Ends
	112+38-R	36"- 4' RCP and Remove & Reset Pipe End Section

**CORRUGATED METAL PIPE**

Corrugated metal pipes shall have 2 3/8-inch X 1/2-inch corrugations for 42-inch and smaller round pipe and 48-inch and smaller arch pipe unless otherwise stated in the plans. Corrugated metal pipes shall have 3-inch X 1-inch or 5-inch X 1-inch corrugations for 48-inch and larger round pipe and 54-inch and larger arch pipe unless otherwise stated in the plans.

The gauge of the corrugated metal ends shall match the thickest gauge of corrugated metal pipe it is connected to.

**PIPE FOR APPROACHES**

Class II reinforced concrete pipe, high density polyethylene pipe, corrugated polypropylene pipe, or steel reinforced polyethylene pipe may be substituted for corrugated metal pipe at approaches at no additional cost to the State.

If corrugated metal pipes are provided, the pipes shall be as specified in the CORRUGATED METAL PIPE note.

If high density polyethylene pipe, corrugated polypropylene pipe, or steel reinforced polyethylene pipe are provided, then the end sections shall be metal, be compatible, and conform to the type of end section as shown in the plans.

**SHRINKAGE FACTOR:** Embankment +30% for SD46  
+40% for SD11.

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**TABLE OF EXCAVATION QUANTITIES BY BALANCES**

Highway	Station to	Station	Excavation (CuYd)	* Undercut (CuYd)	Total Excavation (CuYd)	Out-of- Balance Exc. (CuYd)	** Waste (CuYd)	** Haul (CuYdSta)	** Out-of- Balance Exc. Haul (CuYdSta)
SD46	352+60	379+50	37030	8538	45568		3917	212100	
SD11	105+00	115+00	1876	3053	4929	3917		200	5600
Totals:			38906	11591	50497	3917	3917	212300	5600

\* The quantities for these items are in the Estimate of Quantities under their respective bid items.

\*\* The quantities for these items are for information only.

**TABLE OF UNCLASSIFIED EXCAVATION**

Excavation	38906
Undercut	11591
Topsoil	4855
Exc. for Deep Pipe Removal	1780
Salvaged Asphalt Mix and Granular Base Material (from cut sections)	3503
Salvaged Asphalt Mix and Granular Base Material (from fill sections)	3574
<b>Total</b>	<b>64209</b>

**UNDERCUTTING**

In all cut sections the earthen subgrade shall be undercut 2 feet below the earthen subgrade surface. The undercut material or other suitable material, as directed by the Engineer, shall then be replaced and compacted to the density specified for the section being constructed.

Shallow embankment sections, fills less than 2 feet in height measured at the finished subgrade shoulders, shall be undercut to ensure a minimum 2 foot height of earth embankment for the entire width of roadbed. The upper 6 inches of undercut material that consists of topsoil with a high humus content shall be used as topsoil, placed in the fill slopes outside the shoulders of the earthen subgrade, or placed in the lower portion (below 4 foot depth) in fills which are greater than 4 feet in height. The remaining undercut soil and soil obtained from adjacent excavation (excluding the upper 6 inches) shall then be replaced and compacted to the density specified for the section being constructed.

Undercutting depth shall be reduced to 6" over the box culvert from 352+60 to 352+80.

The plan shown quantity will be the basis of payment. However, if there are additional areas of undercut other than what is shown in the plans, the Engineer shall direct removal of these areas and the additional areas will be measured according to the Engineer.

The undercut quantities are listed in the Table of Excavation Quantities by Balances.

**PROCEDURES FOR DETERMINING UNCLASSIFIED EXCAVATION QUANTITY**

When plan quantities are used for payment, the Unclassified Excavation quantity shall be used for final payment.

The following paragraphs are general earthwork information and information in regards to computing the Unclassified Excavation quantity when final cross sections are taken in the field:

The Unstable Material Excavation quantity is included in the Excavation quantity listed in the Table of Unclassified Excavation. When finaling a project, the Unstable Material Excavation quantity shall be added to the Excavation quantity to compute the Unclassified Excavation quantity.

Out-of-Balance Excavation is material obtained from waste generated from excavation from other balances. The quantity of Out-of-Balance Excavation is included in the Excavation quantity in the balance where it is excavated and is paid for once as Unclassified Excavation.

The Topsoil quantity in the Table of Unclassified Excavation is an estimate. When finaling a project, the total quantity of field measured Topsoil shall be used in place of the estimated Topsoil quantity. The quantity of Topsoil from the cuts will be paid for twice as Unclassified Excavation, as it will be in both the Excavation and Topsoil quantities. This will be full compensation for Excavation, which includes necessary undercutting to provide space for placement of topsoil.

The Excavation quantities from individual balances and the Table of Unclassified Excavation have been reduced by the volume of in place surfacing that will be removed and/or salvaged.

Salvaged Asphalt Mix and Granular Base Material shall be paid for once as Unclassified Excavation. As shown in the Table of Unclassified Excavation, the estimated quantity of 3574 cubic yards of Salvaged Asphalt Mix and Granular Base Material from fill sections shall be added to the Excavation quantity to determine the Unclassified Excavation quantity. When finaling a project, the quantities of Salvaged Asphalt Mix and Granular Base Material from fill sections will not be adjusted according to field measurements. The quantity of Salvaged Asphalt Mix and Granular Base Material from cut sections will not be added to the Excavation quantity as it is already in the cuts on the final cross sections.

**HAUL**

Included in the Table of Excavation Quantities by Balances are Out-of-Balance Haul and Haul. They are not pay items and are for informational purposes only. The mass haul diagram is available as part of the bid package for use in figuring this haul.

Out-of-Balance Haul: Estimated quantity (CuYdSta) for moving material from an earthwork balance to another earthwork balance.

Haul: Estimated quantity (CuYdSta) for moving unclassified excavation material to the locations where it is needed throughout the earthwork balance.

For Purpose of Extra Haul Computations:

$$\text{Average Haul} = (\text{Haul} + \text{Out-of-Balance Haul}) / \text{Unclassified Excavation} \\ = (212300 + 5600) / 64209 = 3.4 \text{ Sta.}$$

Compensation for "Extra Haul" will not be made for haul distances less than 5 stations. When payment for "Extra Haul" is authorized, the distance used for "Extra Haul" calculations shall be that in excess of 5 stations.

### UNSTABLE MATERIAL EXCAVATION

The areas of unstable material excavation are drawn on the cross sections with a normal depth of 2 feet. The estimated quantity of 1474 cubic yards of unstable material excavation shall be paid for at the contract unit price per cubic yard for "Unclassified Excavation".

All areas designated as Unstable shall be excavated. The unstable material excavated on this project shall be placed outside the subgrade shoulder in fill sections or stockpiled and used as topsoil.

Field measurement of unstable material excavation shall not be made. However, if there are additional areas of unstable material excavation other than what is shown in the plans, the Engineer shall direct removal of these areas and the additional areas will be measured according to the Engineer.

#### TABLE OF UNSTABLE MATERIAL EXCAVATION

Hwy	Station	to Station	L/R	Depth (Ft)	Quantity (CuYd)
SD46	353+50	359+00	L	2	653
	353+50	359+00	R	2	376
	371+00	372+00	L	2	123
	371+50	373+00	R	2	222
SD11	111+00	112+38	R	2	100
Total:					1474

### SALVAGE AND STOCKPILE ASPHALT MIX AND GRANULAR BASE MATERIAL

An estimated 13376.1 tons (7077.3 Cubic Yards) of asphalt mix and granular base material shall be salvaged from the entire length of the existing highways and stockpiled at a site furnished by the Contractor and satisfactory to the Engineer.

The quantity of salvage asphalt mix and granular base material may vary from the plans. No adjustment will be made to the contract unit price for variations of the quantity of "Salvage and Stockpile Asphalt Mix and Granular Base Material."

The following table is the estimate of salvageable material. The widths of salvageable material vary. The existing subbase material is not included in the estimate, but can be used if determined to be acceptable material. These quantities were used to compute the unclassified excavation quantities.

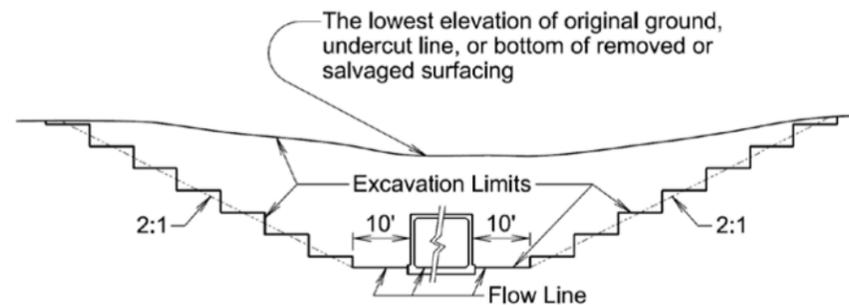
Hwy	Station	to Station	Depth (Inches)	Salvaged Material (CuYd)
SD46	352+60	379+50	13.4	5498.8
SD11	105+00	109+46	8.5	590.8
	110+02	115+00	16.0	987.7
Total:				7077.3

### EXCAVATION FOR DEEP PIPE REMOVAL

Included in the quantity of "Unclassified Excavation" are 1780 cubic yards of excavation for removal of deep pipe. Deep pipe are existing mainline pipe at depths of 10 feet or greater (measured from the flow line to the lowest elevation of either the existing ground line, undercut line, or bottom of removed or salvaged surfacing).

All work necessary to excavate and backfill the deep pipe including labor, equipment, and incidentals shall be incidental to the contract unit price per cubic yard for "Unclassified Excavation". Payment for deep pipe excavation shall be based only on plans quantity and measurement of these excavation quantities during construction shall not be performed.

The excavation quantities for deep pipe are not included with the earthwork balance quantities on the plans profile sheets. The quantities computed for excavation of the deep pipe are based on the limits shown in the drawing below. The drawing shows a box culvert for illustration purposes only; the limits are similar for a pipe.



#### TABLE OF EXCAVATION FOR DEEP PIPE REMOVAL

Station	Type	Quantity (CuYd)
371+63	Pipe	1780
Total:		1780

#### INCIDENTAL WORK, GRADING

Hwy	Station	L/R	Remarks
SD46	353+00 to 353+30	L	Provide minor channel excavation at the pipe outlet.
	363+46	R	Take Out 18"-56' RCP
	364+50	L	Take Out Mailbox
	371+63	L	Take Out 42"-115' RCP
SD11	371+63	L&R	Provide minor channel excavation at the pipe inlet and outlet.
	108+56	L	Take Out 24"-115' RCP
	111+82	L	Take Out 18"-98' CMP

#### INSLOPE TRANSITIONS

Type 2 inslope transitions are required on the east side of the existing reinforced concrete box culvert at 352+63. Refer to Standard Plate 120.05 for details.

### PIPE CULVERT UNDERCUT

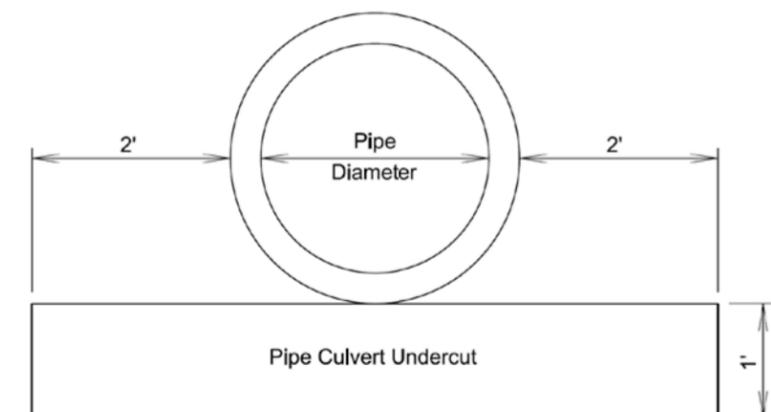
The table includes undercut for 36 inch and larger pipe culverts. The depth of undercut is an estimate and the actual depth necessary shall be determined during construction. Pipes listed may or may not require undercutting and pipes not listed may require undercutting. The Engineer will determine which pipe shall be undercut in accordance with Section 421 of the Specifications.

Highway	Station	Undercut Depth (Ft)	Quantity (CuYd)
SD46	371+63	1	54
SD11	112+38-R	1	4
Total:			58

The table below contains the rate for one-foot depth of pipe culvert undercut per foot of pipe length and should be used as an aid in determining the actual amount of undercut to be performed during construction. The table is derived from the drawing below and conforms to the Specifications. When calculating pipe culvert undercut, the length of pipe ends should be included in the overall pipe length.

Storm sewer and approach pipes do not require undercutting unless specified otherwise in these plans.

Pipe Diameter (In)	Round Pipe Undercut Rate for 1' Depth (CuYd/Ft)	Arch Pipe Undercut Rate for 1' Depth (CuYd/Ft)
24	0.2407	0.2577
30	0.2623	0.2847
36	0.2840	0.3110
42	0.3056	0.3337
48	0.3272	0.3596
54	0.3488	0.3827
60	0.3704	0.4105
66	0.3920	---
72	0.4136	0.4630
78	0.4352	---
84	0.4568	0.5123
90	0.4784	---



### REMOVAL OF BUILDING

Included in these plans is the removal and disposal of a building at 364+85-160'L. The building is a two story house constructed in 1935 with wood framing and concrete block basement walls. Upper level is 764 sf, main level is 1130 sf and basement is 1130 sf. The unattached garage at 364+50-235'L will be removed by the SDDOT prior to the project.

The building shall be removed in accordance with Section 110 of the Specifications and all local codes. The disconnecting and capping of utility services shall be the responsibility of the Contractor.

The building has not been inspected for asbestos. The Contractor shall be responsible for providing an asbestos inspection and following all local, state, and federal regulations regarding the removal of asbestos, if found. All costs for the inspection shall be incidental to the contract unit price per each for "Remove Building". All costs for removal of the asbestos shall be handled during construction by CCO.

All items located in and around the building will become property of the Contractor to dispose of properly including propane tank, septic system, sidewalk, landscaping, lights, home fixtures, appliances, etc. The furnace and air conditioner are in good condition and the Contractor may want to consider salvaging along with possible other items. Removal of these items shall be incidental to the contract unit price per each for "Remove Building".

### TABLE OF FENCE

Highway	Station	to Station	Side	ROW Fence	Fence Panels		Gates	Temporary Fence	Remove Fence
				Type 2 (Ft)	2 Post (Each)	3 Post (Each)	32' Barb Wire (Each)	Type 1A (Ft)	(Ft)
SD46	353+00	357+56	L	460	2	2	1		460
SD46	357+56	368+30	L						1250
SD46	371+13	379+70	R	890	7	2		900	890
SD11	111+55	112+10	L	55					
Totals =				1405	9	4	1	900	2600

Note: Right-of-way fence shall be constructed using alternate wood and steel posts.

### TABLE OF CONSTRUCTION STAKING

(See Special Provision for Contractor Staking)

Roadway and Description	Begin Station	End Station	Number of Lanes	Length (Ft)	Grade Staking			Miscellaneous Staking Quantity (Mile)	Slope Staking Quantity (Mile)
					Length (Mile)	Lane Factor	*Sets of Stakes		
SD 46 (2 Lanes AC Pavement)	352+60	362+51	2	991	0.188	1	2	0.376	0.188
SD 46 (Transition from 2 Lanes to 3 Lanes AC Pavement)	362+51	366+71	3	420	0.080	1.5	2	0.240	0.080
SD 46 (3 Lanes AC Pavement)	366+71	373+51	3	680	0.129	1.5	2	0.387	0.129
SD 46 (Transition from 3 Lanes to 2 Lanes AC Pavement)	373+51	377+71	3	420	0.080	1.5	2	0.240	0.080
SD 46 (2 Lanes AC Pavement)	377+71	379+50	2	179	0.034	1	2	0.068	0.034
SD 11 (2 Lanes AC Pavement)	105+00	109+48	2	448	0.085	1	2	0.170	0.085
SD 11 (2 Lanes AC Pavement)	110+00	115+00	2	500	0.095	1	2	0.190	0.095
Totals:								1.671	0.691

\* 2 = Blue Top Stakes (Embankment and Base Course)

\*\* Grade Staking Quantity = (Length) x (Lane Factor) x (Sets of Stakes)

### REMOVE CONCRETE PAVEMENT

An estimated 179.1 SqYd of concrete pavement shall be removed from 364+07 to 364+68 - 235'L (SD46). This is the driveway and floor slab of an existing garage. The garage will be removed by the SDDOT prior to the project.

### REMOVE ASPHALT CONCRETE PAVEMENT

An estimated 517.5 SqYd of asphalt concrete pavement shall be removed from the 200' long driveway at 364+00-L (SD46). This material may be salvaged if desired during construction. The quantity would then be changed to salvage and stockpile asphalt mix and granular base material.

### TABLE OF BANK AND CHANNEL PROTECTION GABIONS AND DRAINAGE FABRIC

Highway	Station	L/R	Bank and Channel Protection Gabion (CuYd)	Type B Drainage Fabric (SqYd)
SD46	371+63	R	12.0	34
SD11	108+56	R	4.5	15
SD11	112+38	R	6.0	19
Totals:			22.5	68

### BRACE PANELS FOR ROW FENCE

The E-Z Brace or an approved equal may be utilized as an alternate horizontal brace in the brace panels if approved by the Engineer. The E-Z Brace shall be attached to each wood post utilizing two 5/16" x 3" lag screws. Holes of appropriate diameter, based on wood post condition, shall be drilled before placement of lag screws. The following are contacts regarding the E-Z Brace:

Roger Papka  
E-Z Brace  
1160 Karen St.  
Watertown, SD  
57201  
605-881-6142

Dennis Mack  
E-Z Brace  
108 18<sup>th</sup> St. NE  
Watertown, SD  
57201  
605-881-4990

### TEMPORARY FENCE

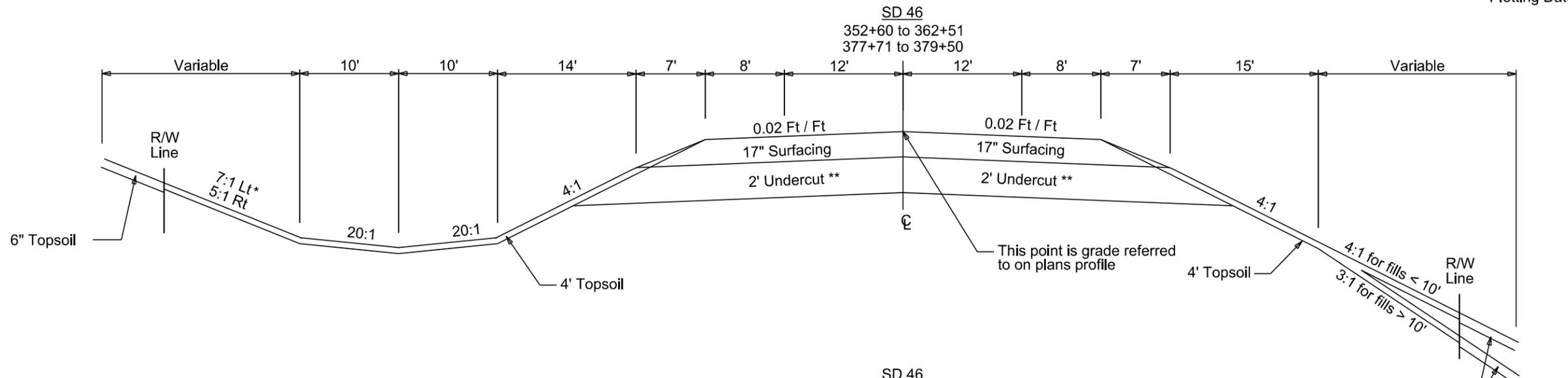
The Contractor shall verify the location of the temporary fence with the landowner prior to installation of the fence.

# TYPICAL GRADING SECTION

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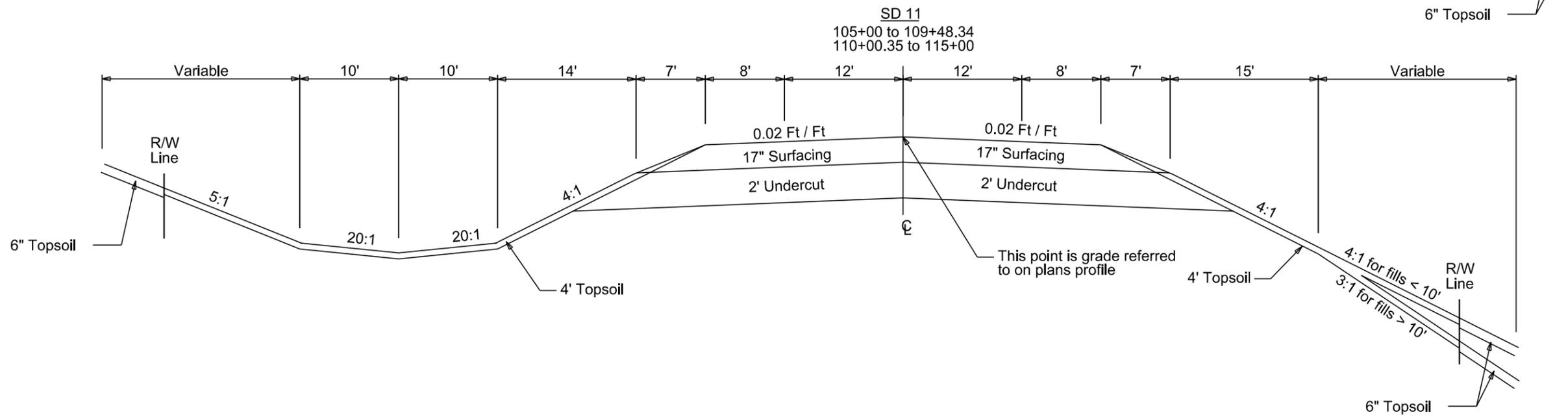
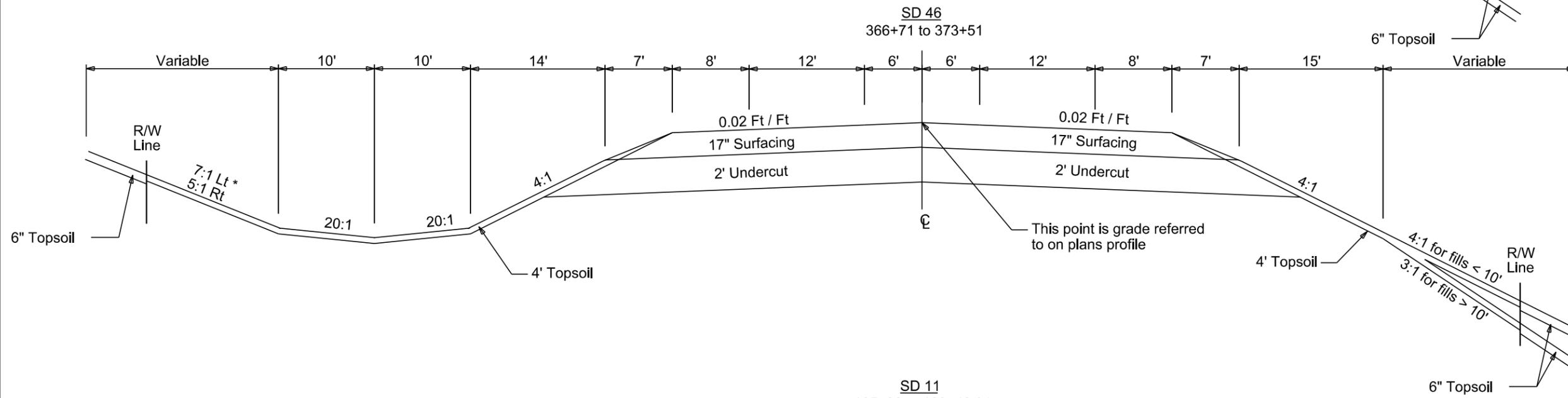
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Transitions:  
362+51 to 366+71  
373+51 to 377+71

\* 363+50 to 364+25 - 7:1 to 6:1  
364+25 to 364+75 - 6:1  
364+75 to 365+50 - 6:1 to 7:1

\*\* Provide 6" Undercut over the Box Culvert from 352+60 to 352+80



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# HORIZONTAL ALIGNMENT DATA

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## MAINLINE (SD46)

Type	Station		Northing	Easting
POB	343+31.41		295458.557	2955356.484
		TL= 2097.89      N 88°14'02" E		
PC	364+29.30		295523.214	2957453.374
PI	369+57.70	R = 95000.00      Delta = 0°38'15" L	295539.499	2957981.525
PT	374+86.09		295561.658	2958509.461
		TL= 2120.74      N 87°35'47" E		
POE	396+06.83		295650.595	2960628.338

## SD11

Type	Station		Northing	Easting
POB	95+94.40		294164.490	2958099.254
		TL= 1326.41      N 2°38'35" W		
PI	109+20.81		295489.490	2958038.091
		TL= 83.54      N 3°18'06" W		
PI	110+04.35		295572.888	2958033.279
		TL= 2635.30      N 3°18'06" W		
POE	136+39.65		298203.811	2957881.501

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The coordinates shown on this sheet are based on the South Dakota State Plane Coordinate System. South Zone (NAD 83/96);epoch 2002.00 Geoid 09; SF 0.99988953

# CONTROL DATA

STATE OF SOUTH DAKOTA	PROJECT PH 0046(65)373	SHEET B8	TOTAL SHEETS B25
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Plotting Date: 07/25/2016

HORIZONTAL AND VERTICAL CONTROL POINTS					
POINT	STATION & OFFSET	DESCRIPTION	NORTHING	EASTING	ELEVATION
BASE	127+79-67' L SD11	2' REBAR & CAP "SDDOT CONTROL POINT" - WEST SIDE OF HWY 11 SOUTH SIDE OF APPROACH - 1800' NORTH OF HWY 11&46 INTERSECTION	297340.768	2957863.997	1396.28
BASE1	North of Alignment SD11	DURANAIL - WEST SIDE OF HWY 11 SOUTH SIDE OF APPROACH - 1.5 MILES NORTH OF HWY 11 & 46 INT	303455.242	2957542.849	1430.67
CP1	349+09-75'R SD46	REBAR & CAP STAMPED "SDDOT CONTROL POINT" - SOUTH ROW LINE - SW CORNER OF APPROACH - 2100'+/- WEST OF INT OF HWY 46/11	295400.890	2955936.232	1343.14
CP2	356+22-75'R SD46	REBAR & CAP STAMPED "SDDOT CONTROL POINT" - SOUTH ROW LINE - 1400'+/- WEST OF INT OF HWY 46/11	295423.003	2956649.299	1337.12
CP3	369+57-42'L SD46	REBAR & CAP - NW RADIUS SHOULDER (GRAVEL) OF HWY 46 & 11 INTERSECTION	295583.049	2957979.272	1367.84
CP4	368+06-88'L SD46	REBAR & CAP - SW CORNER OF ABRASIVE SITE - 87' NORTH OF HWY 46 CL & 200' WEST OF HWY 11 CL	295623.168	2957827.234	1368.38
CP5	115+09-198'L SD11	REBAR & CAP - NW CORNER OF ABRASIVE SITE - 530' NORTH OF HWY 46 CL & 198' WEST OF HWY 11 CL	296065.466	2957806.421	1363.51
CP6	115+08-98'L SD11	REBAR & CAP - NE CORNER OF ABRASIVE SITE - 530' NORTH OF HWY 46 CL & 97' WEST OF HWY 11 CL	296070.194	2957906.363	1363.85
CP7	136+40-25'L SD11	REBAR & CAP - WEST SHOULDER - 1/2 MILE NORTH OF HWY 46&11 INTERSECTION	298202.634	2957856.511	1409.52

The coordinates shown on this sheet are based on the South Dakota State Plane Coordinate System. South Zone (NAD 83/96);  
 Epoch 2002.00 Geoid 09; SF = 0.99988953  
 The elevations shown on this sheet are based on NAVD 88.

Plot Scale - 1:200

Plotted From - trpr17192

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# LEGEND

STATE OF SOUTH DAKOTA	PROJECT PH 0046(65)373	SHEET B9	TOTAL SHEETS B25
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Plotting Date: 07/25/2016

Plot Scale - 1:200

Plotted From - Inpr17192

Anchor		Hedge		Shrub Tree		State and National Line	
Antenna		Highway R.O.W. Marker		Sidewalk		County Line	
Approach		Interstate Close Gate		Sign Face		Section Line	
Assumed Corner		Iron Pin		Sign Post		Quarter Line	
Azimuth Marker		Irrigation Ditch		Slough Or Marsh		Sixteenth Line	
BBQ Grill/ Fireplace		Lake Edge		Spring		Property Line	
Bearing Tree		Lawn Sprinkler		Stream Gauge		Construction Line	
Bench Mark		Mailbox		Street Marker		R. O. W. Line	
Box Culvert		Manhole Electric		Subsurface Utility Exploration Test Hole		New R. O. W. Line	
Bridge		Manhole Gas		Telephone Fiber Optics		Cut and Fill Limits	
Brush		Manhole Misc		Telephone Junction Box		Control of Access	
Buildings		Manhole Sanitary Sewer		Telephone Pole		New Control of Access	
Bulk Tank		Manhole Storm Sewer		Television Cable Jct Box		Proposed ROW (After Property Disposal)	
Cattle Guard		Manhole Telephone		Television Tower			
Cemetery		Manhole Water		Test Wells/Bore Holes			
Centerline		Merry-Go-Round		Traffic Signal			
Cistern		Microwave Radio Tower		Trash Barrel		Drainage Arrow	
Clothes Line		Misc. Line		Tree Belt			
Commercial Sign Double Face		Misc. Property Corner		Tree Coniferous		Remove Concrete Pavement	
Commercial Sign One Post		Misc. Post		Tree Deciduous		Remove Concrete Driveway Pavement	
Commercial Sign Overhead		Overhang Or Encroachment		Tree Stumps		Remove Asphalt Concrete Pavement	
Commercial Sign Two Post		Overhead Utility Line		Triangulation Station		Remove Concrete Sidewalk	
Concrete Symbol		Parking Meter		Underground Electric Line		Remove Concrete Approach Pavement	
Creek Edge		Pipe With End Section		Underground Gas Line		Remove Concrete Median Pavement	
Curb/Gutter		Pipe With Headwall		Underground High Pressure Gas Line		Remove Concrete Curb	
Curb		Pipe Without End Section		Underground Sanitary Sewer		Remove Concrete Curb and Gutter	
Dam Grade/Dike/Levee		Playground Slide		Underground Storm Sewer		Remove Concrete Gutter	
Deck Edge		Playground Swing		Underground Tank			
Ditch Block		Power And Light Pole		Underground Telephone Line		Detectable Warning	
Doorway Threshold		Power And Telephone Pole		Underground Television Cable		Pedestrian Push Button Pole and 30" x 48" Clear Space with 1.5% slope	
Drainage Profile		Power Meter		Underground Water Line			
Drop Inlet		Power Pole		Warning Sign One Post			
Edge Of Asphalt		Power Pole And Transformer		Warning Sign Two Post			
Edge Of Concrete		Power Tower Structure		Water Fountain			
Edge Of Gravel		Propane Tank		Water Hydrant			
Edge Of Other		Property Pipe		Water Meter			
Edge Of Shoulder		Property Pipe With Cap		Water Tower			
Elec. Trans./Power Jct. Box		Property Stone		Water Valve			
Environmental Sensitive Site		Public Telephone		Water Well			
Fence Barbwire		Railroad Crossing Signal		Weir Rock			
Fence Chainlink		Railroad Milepost Marker		Windmill			
Fence Electric		Railroad Profile		Wingwall			
Fence Misc.		Railroad R.O.W. Marker		Witness Corner			
Fence Rock		Railroad Signs					
Fence Snow		Railroad Switch					
Fence Wood		Railroad Track					
Fence Woven		Railroad Trestle					
Fire Hydrant		Rebar					
Flag Pole		Rebar With Cap					
Flower Bed		Reference Mark					
Gas Valve Or Meter		Regulatory Sign One Post					
Gas Pump Island		Regulatory Sign Two Post					
Grain Bin		Retaining Wall					
Guardrail		Riprap					
Guide Sign One Post		River Edge					
Guide Sign Two Post		Rock And Wire Baskets					
Gutter		Rockpiles					
Guy Pole		Satellite Dish					
Haystack		Septic Tank					

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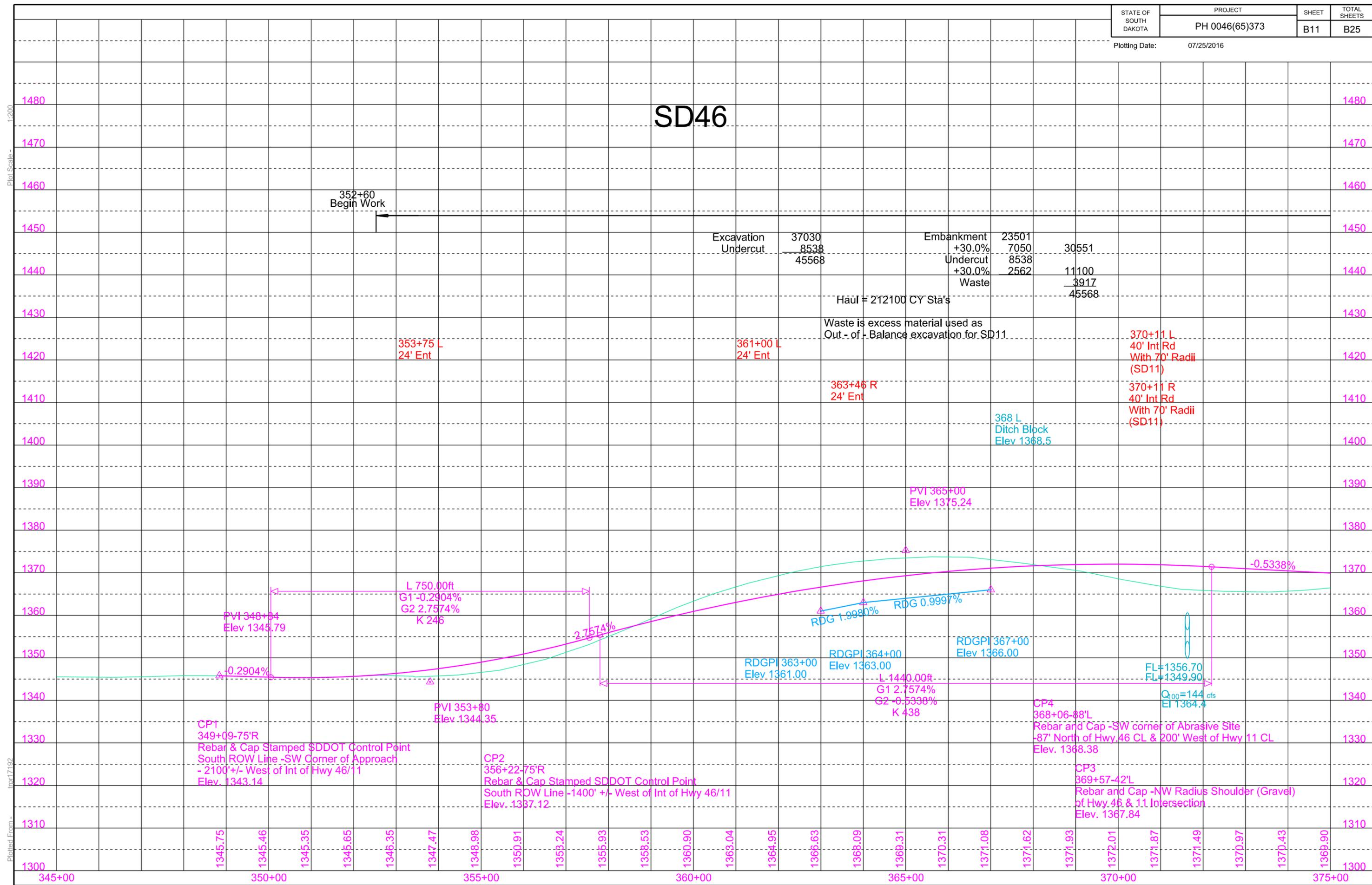
Plotting Date: 07/25/2016

# SD46

Plot Scale - 1:200

Plotted From - tpr17192

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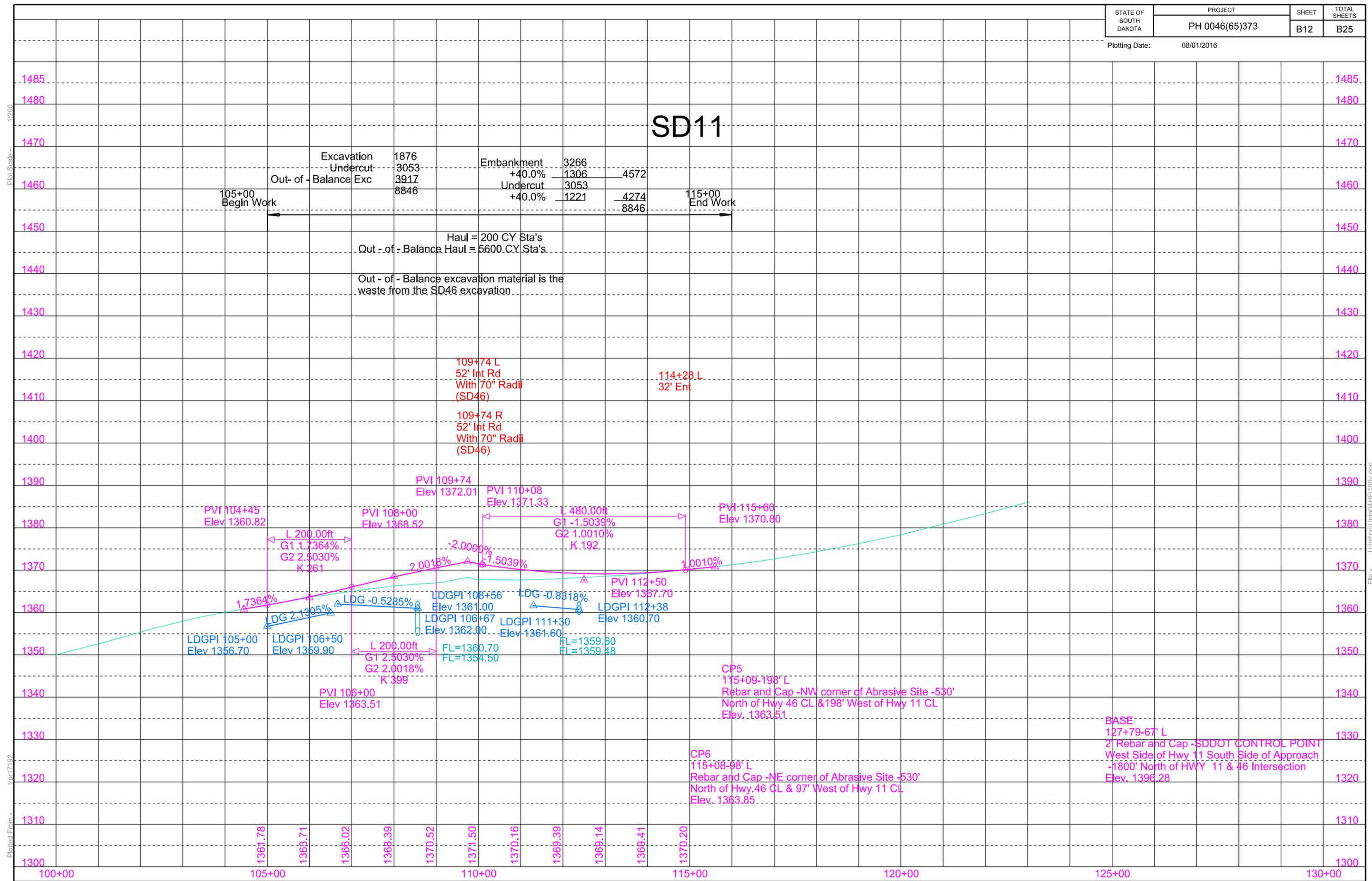


# SD11

Plot Scale - 1:200

Plotted From - tpr17192

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100+00      105+00      110+00      115+00      120+00      125+00      130+00

BASE  
127+79-67' L  
2" Rebar and Cap - SDDOT CONTROL POINT  
West Side of Hwy 11 South Side of Approach  
-1800' North of HWY 11 & 46 Intersection  
Elev. 1396.28

CP5  
115+09-198' L  
Rebar and Cap -NW corner of Abrasive Site -530'  
North of Hwy 46 CL & 198' West of Hwy 11 CL  
Elev. 1363.51

CP6  
115+08-98' L  
Rebar and Cap -NE corner of Abrasive Site -530'  
North of Hwy 46 CL & 97' West of Hwy 11 CL  
Elev. 1363.85



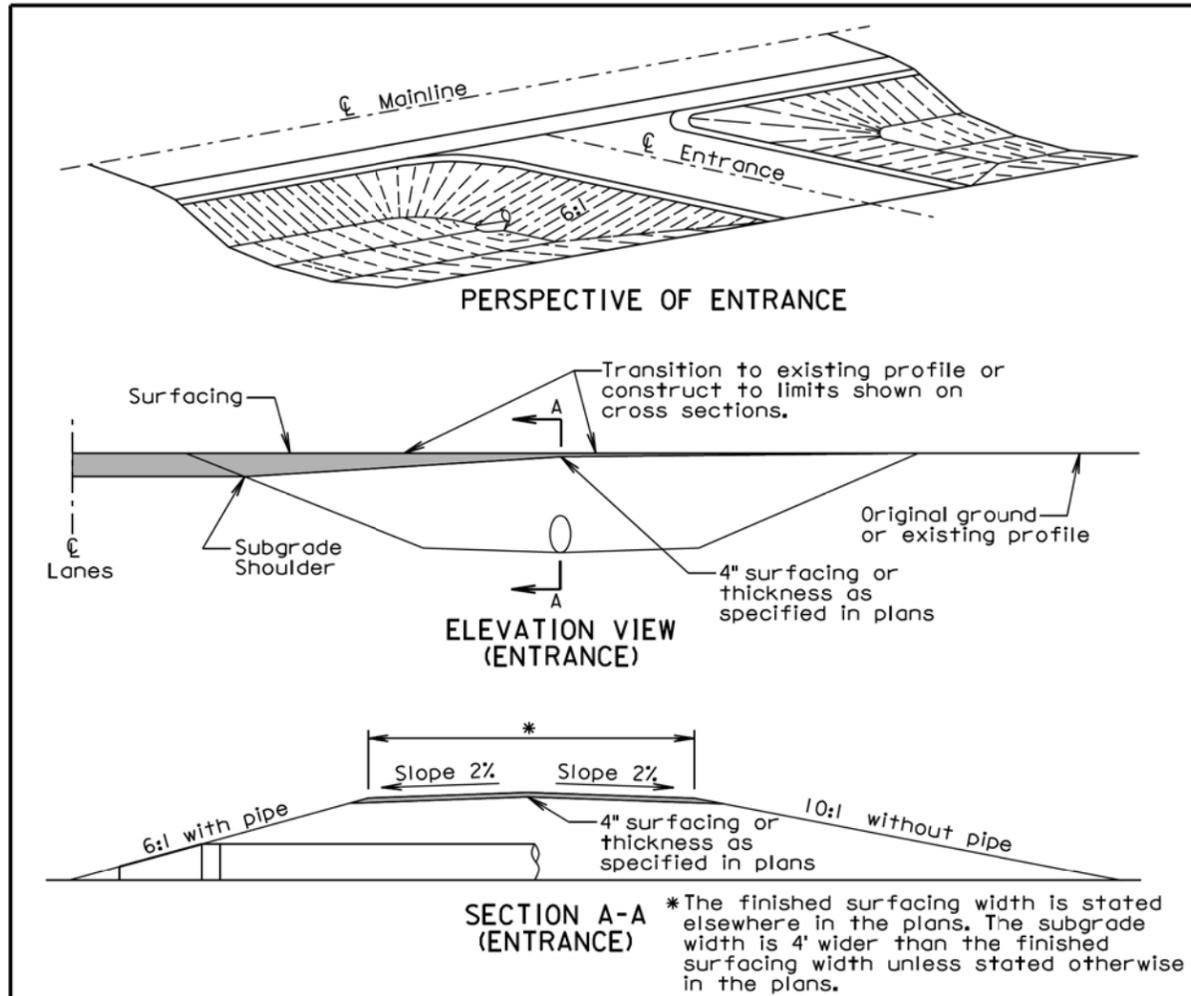
Plotting Date: 07/25/2016

Plot Scale - 1:200

# SD46



Plot Scale - 1:200



**GENERAL NOTES:**

The ditch section shown above in the perspective and elevation view is only for illustrative purposes.

A 6:1 inslope shall be constructed for an entrance when a pipe is required. A 10:1 inslope shall be constructed when a pipe is not required.

Pipe lengths shall be adjusted if necessary during construction to obtain the 6:1 slopes. For grading projects, the pipe lengths are estimated typically using a 4" thickness of surfacing directly over the subgrade above the pipe.

The transition area between the mainline inslope and the approach inslope for entrances shall be rounded to eliminate an abrupt transition.

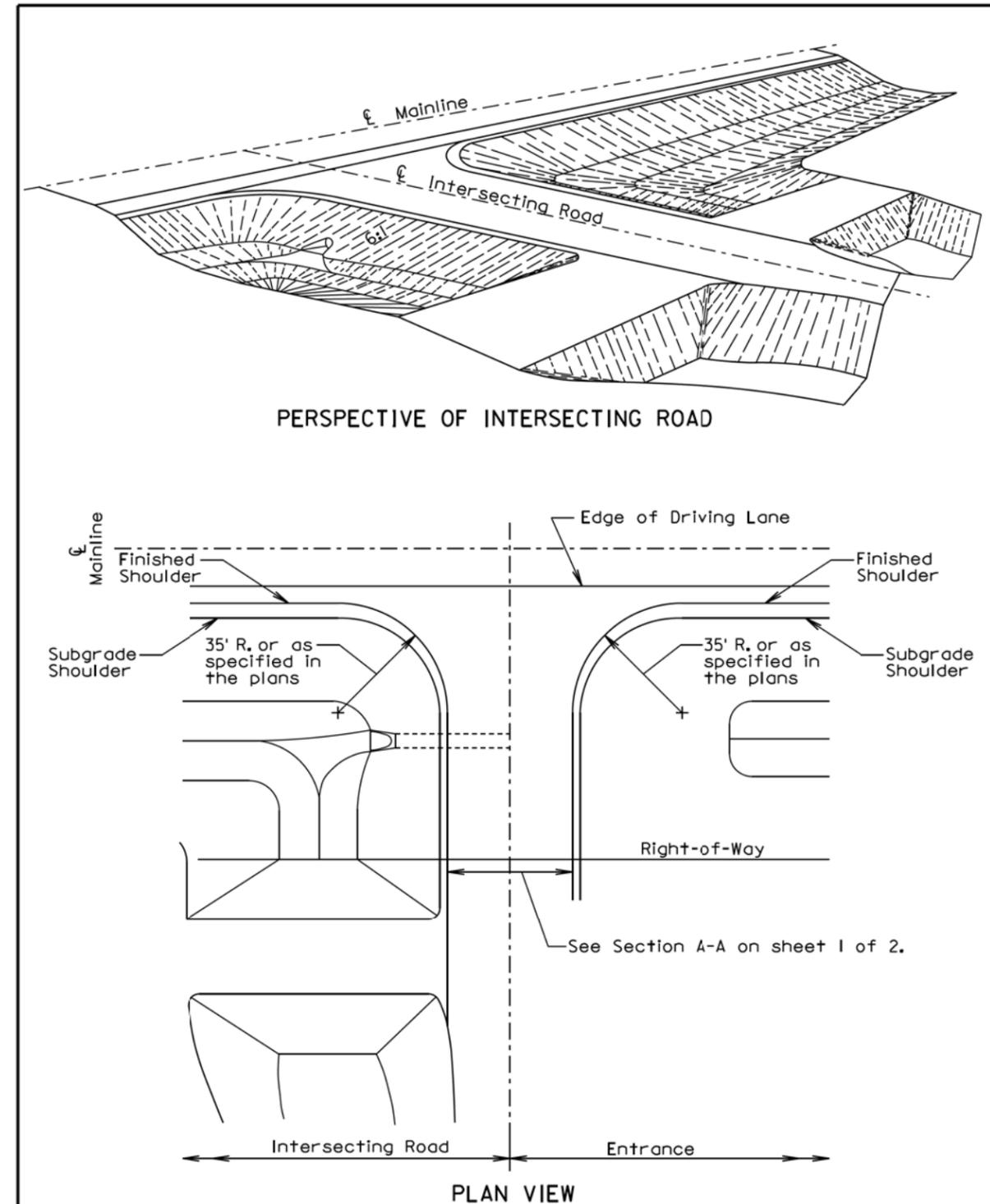
The turning radii shall be 35' for intersecting roads and entrances unless stated otherwise in the plans.

September 6, 2013

<b>S D D O T</b>	<b>INTERSECTING ROADS AND ENTRANCES</b>	PLATE NUMBER <b>120.01</b>
		Sheet 1 of 2

Published Date: 3rd Qtr. 2016

-Plotted From- tpr17192

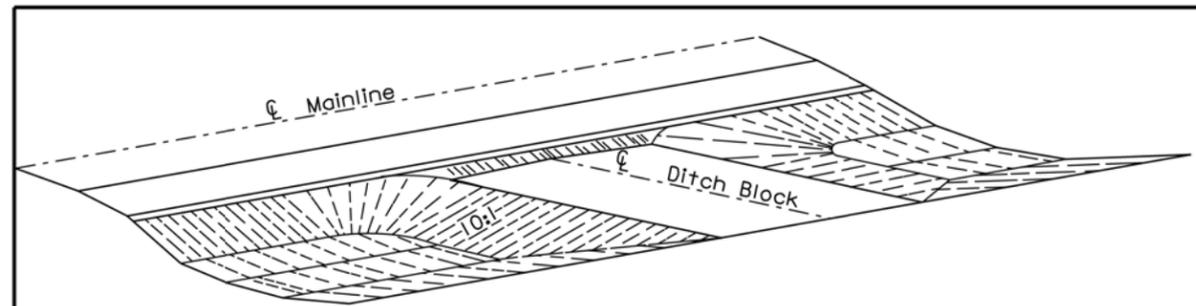


September 6, 2013

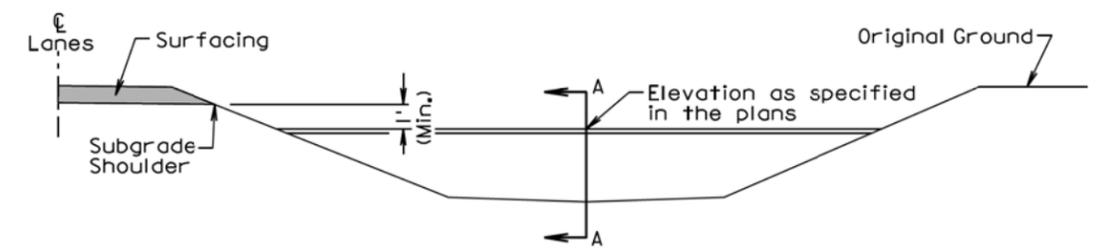
<b>S D D O T</b>	<b>INTERSECTING ROADS AND ENTRANCES</b>	PLATE NUMBER <b>120.01</b>
		Sheet 2 of 2

Published Date: 3rd Qtr. 2016

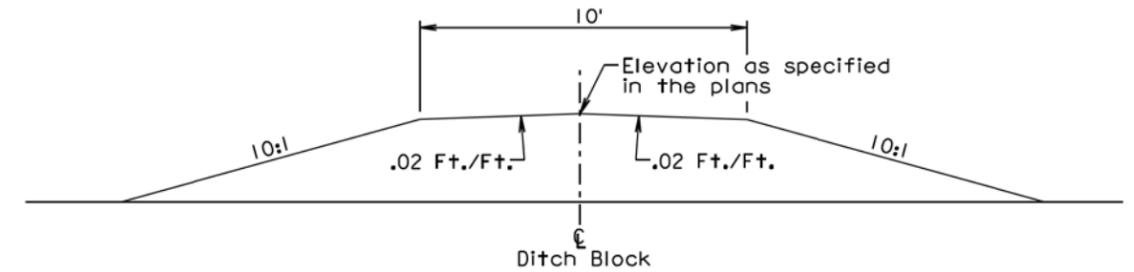
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PERSPECTIVE OF DITCH BLOCK



ELEVATION VIEW



SECTION A-A

**GENERAL NOTES:**

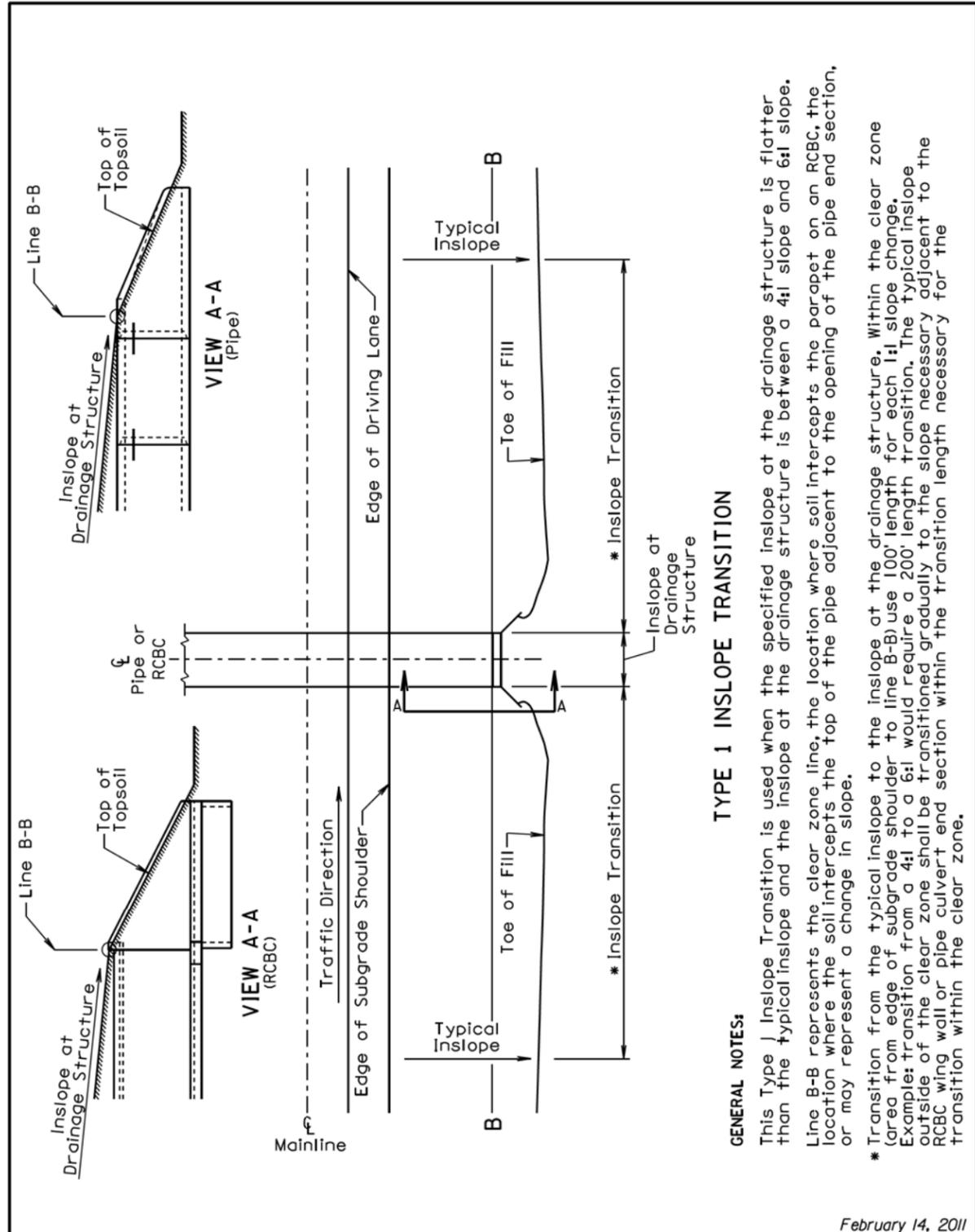
The ditch section shown above in the perspective and elevation view is only for illustrative purposes.

The inslopes of the ditch block shall be 10:1 or as specified in the plans.

The transition area between the mainline inslope and the ditch block inslope shall be rounded to eliminate an abrupt transition.

February 14, 2011

Published Date: 3rd Qtr. 2016	S D D O T	DITCH BLOCK	PLATE NUMBER 120.02
			Sheet 1 of 1



**TYPE 1 INSLOPE TRANSITION**

**GENERAL NOTES:**

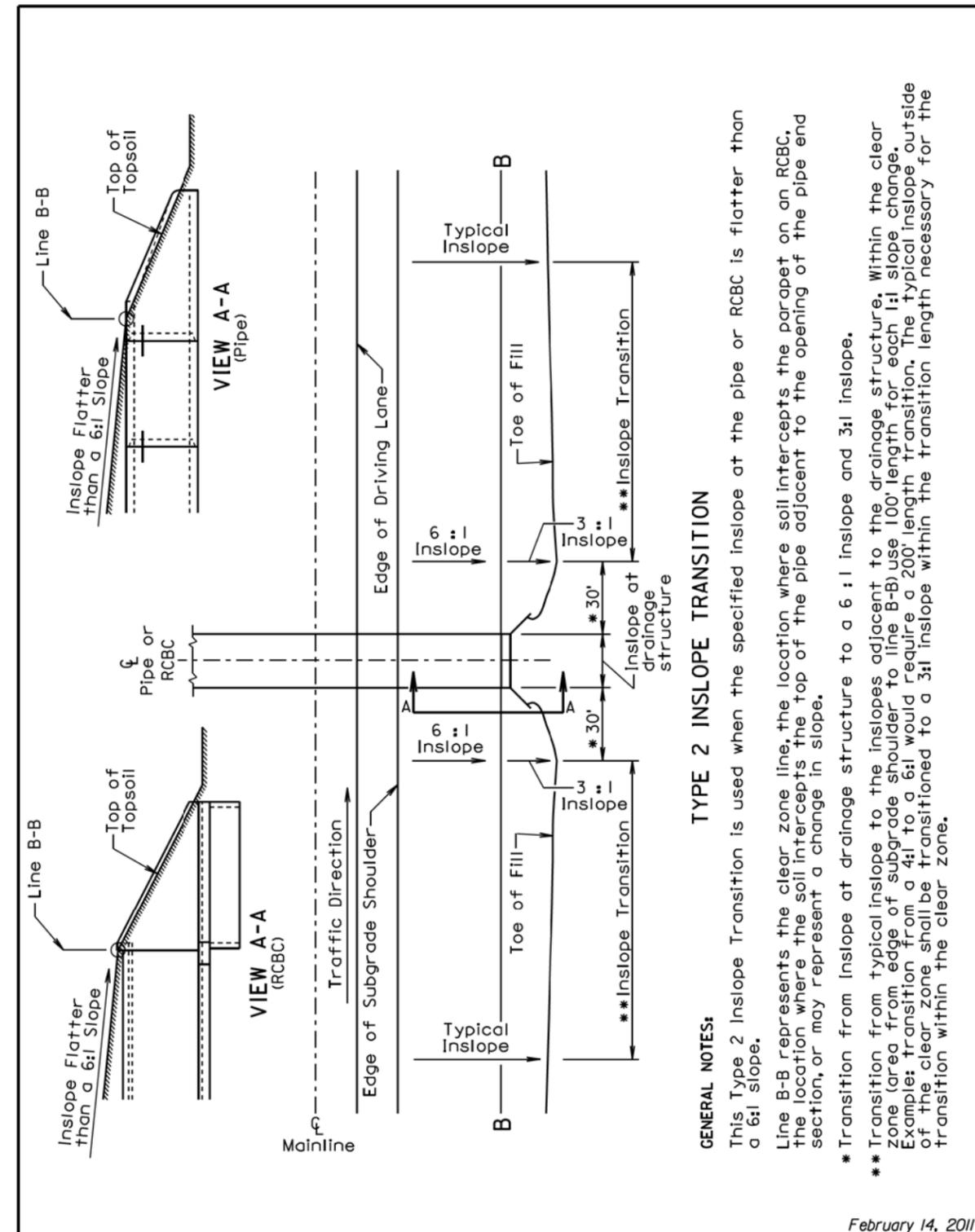
This Type 1 Inslope Transition is used when the specified inslope at the drainage structure is flatter than the typical inslope and the inslope at the drainage structure is between a 4:1 slope and 6:1 slope. Line B-B represents the clear zone line, the location where soil intercepts the parapet on an RCBC, the location where the soil intercepts the top of the pipe adjacent to the opening of the pipe end section, or may represent a change in slope.

\* Transition from the typical inslope to the inslope at the drainage structure. Within the clear zone (area from edge of subgrade shoulder to line B-B) use 100' length for each 1:1 slope change. Example: transition from a 4:1 to a 6:1 would require a 200' length transition. The typical inslope outside of the clear zone shall be transitioned gradually to the slope necessary adjacent to the RCBC wing wall or pipe culvert end section within the transition length necessary for the transition within the clear zone.

February 14, 2011

<b>SDDOT</b>	<b>INSLOPE TRANSITIONS AT PIPE CULVERTS OR REINFORCED CONCRETE BOX CULVERTS</b>	PLATE NUMBER <b>120.05</b>
		Sheet 1 of 2

Published Date: 3rd Qtr. 2016



**TYPE 2 INSLOPE TRANSITION**

**GENERAL NOTES:**

This Type 2 Inslope Transition is used when the specified inslope at the pipe or RCBC is flatter than a 6:1 slope. Line B-B represents the clear zone line, the location where soil intercepts the parapet on an RCBC, the location where the soil intercepts the top of the pipe adjacent to the opening of the pipe end section, or may represent a change in slope.

\* Transition from inslope at drainage structure to a 6:1 inslope and 3:1 inslope.

\*\* Transition from typical inslope to the inslopes adjacent to the drainage structure. Within the clear zone (area from edge of subgrade shoulder to line B-B) use 100' length for each 1:1 slope change. Example: transition from a 4:1 to a 6:1 would require a 200' length transition. The typical inslope outside of the clear zone shall be transitioned to a 3:1 inslope within the transition length necessary for the transition within the clear zone.

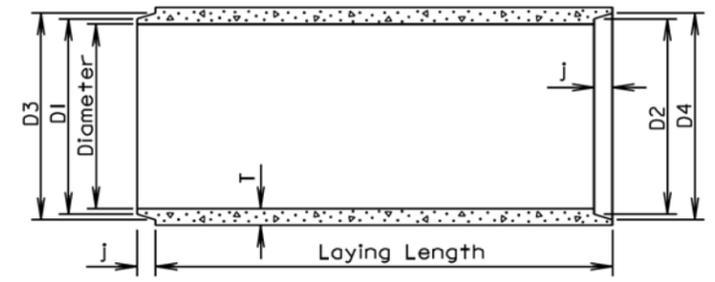
February 14, 2011

<b>SDDOT</b>	<b>INSLOPE TRANSITIONS AT PIPE CULVERTS OR REINFORCED CONCRETE BOX CULVERTS</b>	PLATE NUMBER <b>120.05</b>
		Sheet 2 of 2

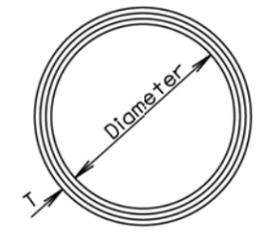
Published Date: 3rd Qtr. 2016

**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:  $\pm \frac{3}{16}$ " for 30" Dia. or less and  $\pm \frac{1}{4}$ " for 36" or greater.  
 Length of joint (J):  $\pm \frac{1}{4}$ ".  
 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:**

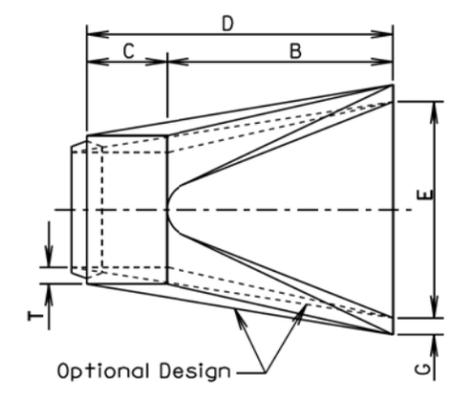
Construction of R.C.P. shall conform to the requirements of Section 990 of the Specifications.

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.

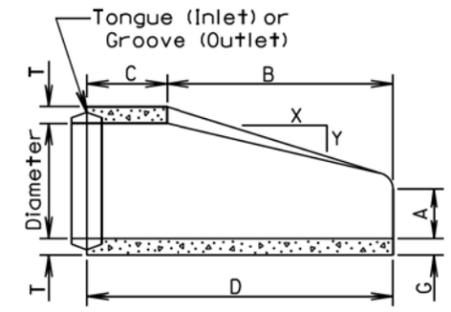
Diam. (in.)	Approx. Wt. /Ft. (lb.)	T (in.)	J (in.)	D1 (in.)	D2 (in.)	D3 (in.)	D4 (in.)
12	92	2	1 3/4	13 1/4	13 5/8	13 7/8	14 1/4
15	127	2 1/4	2	16 1/2	16 7/8	17 1/4	17 5/8
18	168	2 1/2	2 1/4	19 5/8	20	20 3/8	20 3/4
21	214	2 3/4	2 1/2	22 7/8	23 1/4	23 3/4	24 1/8
24	265	3	2 3/4	26	26 3/8	27	27 3/8
27	322	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 3/8
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

June 26, 2015

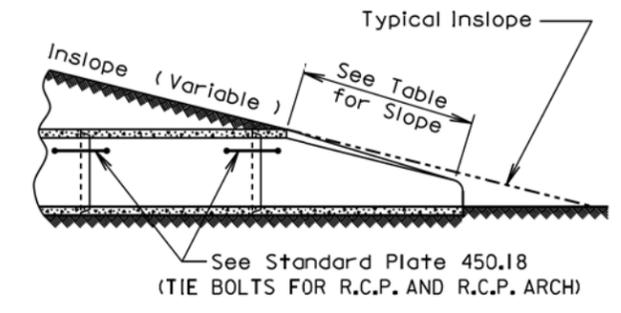
<b>S D D O T</b>	<b>REINFORCED CONCRETE PIPE</b>	PLATE NUMBER <b>450.01</b>
	Published Date: 3rd Qtr. 2016	Sheet 1 of 1



**TOP VIEW**



**LONGITUDINAL SECTION**

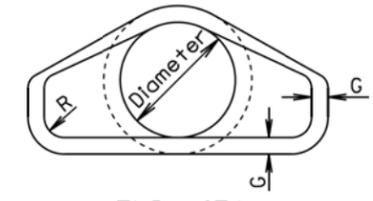


**SLOPE DETAIL**

**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 Specifications.



**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 1/8	72 1/8	24	2	1 1/2
15	740	2.4:1	2 1/4	6	27	46	73	30	2 1/4	1 1/2
18	990	2.3:1	2 1/2	9	27	46	73	36	2 1/2	1 1/2
21	1280	2.4:1	2 3/4	9	36	37 1/2	73 1/2	42	2 3/4	1 1/2
24	1520	2.5:1	3	9 1/2	43 1/2	30	73 1/2	48	3	1 1/2
27	1930	2.5:1	3 1/4	10 1/2	49 1/2	24	73 1/2	54	3 1/4	1 1/2
30	2190	2.5:1	3 1/2	12	54	19 3/4	73 3/4	60	3 1/2	1 1/2
36	4100	2.5:1	4	15	63	34 3/4	97 3/4	72	4	1 1/2
42	5380	2.5:1	4 1/2	21	63	35	98	78	4 1/2	1 1/2
48	6550	2.5:1	5	24	72	26	98	84	5	1 1/2
54	8240	2:1	5 1/2	27	65	33 1/4	98 1/4	90	5 1/2	1 1/2
60	8730	1.9:1	6	35	60	39	99	96	5	1 1/2
66	10710	1.7:1	6 1/2	30	72	27	99	102	5 1/2	1 1/2
72	12520	1.8:1	7	36	78	21	99	108	6	1 1/2
78	14770	1.8:1	7 1/2	36	90	21	111	114	6 1/2	1 1/2
84	18160	1.6:1	8	36	90 1/2	21	111 1/2	120	6 1/2	1 1/2
90	20900	1.5:1	8 1/2	41	87 1/2	24	111 1/2	132	6 1/2	6

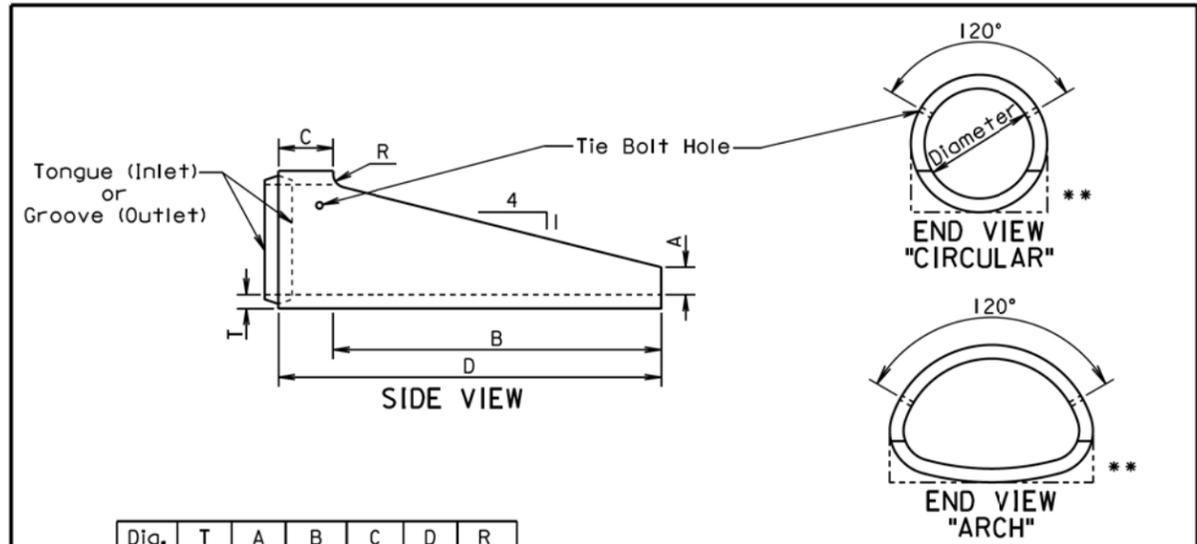
June 26, 2015

<b>S D D O T</b>	<b>R. C. P. FLARED ENDS</b>	PLATE NUMBER <b>450.10</b>
	Published Date: 3rd Qtr. 2016	Sheet 1 of 1

Plot Scale - 1:200

- Plotted From - tpr17192

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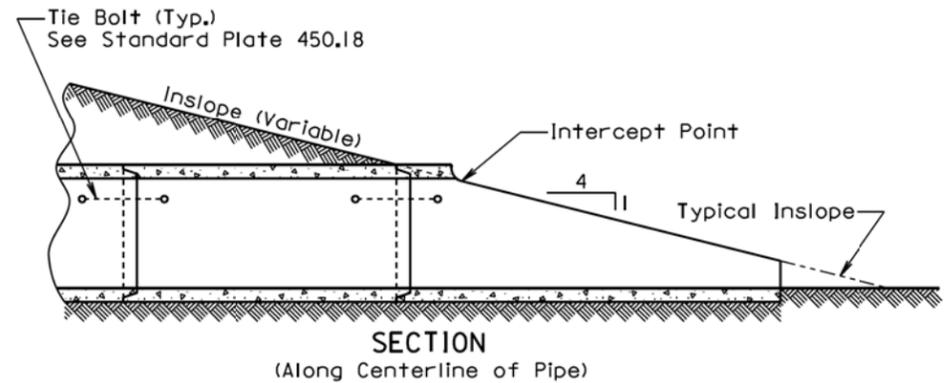


Dia. (in.)	T (in.)	A (in.)	B (in.)	C (in.)	D (in.)	R (in.)
FOR CIRCULAR PIPE						
24	3	6	72	12	84	3
30	3 1/2	7 1/2	90	12	102	3 1/2
FOR ARCH PIPE						
* 24	3	6	48	12	60	3
* 30	3 1/2	7 1/2	60	12	72	3 1/2
* 36	4 1/2	8 5/8	66	30	96	0
* 42	4 1/2	10	77 1/4	18 3/4	96	0

ALTERNATE

Dia. (in.)	T (in.)	A (in.)	B (in.)	C (in.)	D (in.)	R (in.)
FOR CIRCULAR PIPE						
24	3	9	72	12	84	0
30	3 1/2	11	90	12	102	0
FOR ARCH PIPE						
* 24	3	9	48	12	60	0
* 30	3 1/2	11	60	12	72	0

\* Equivalent Diameter of Circular R.C.P.  
 \*\* Acceptable Flat Bottom Alternate.



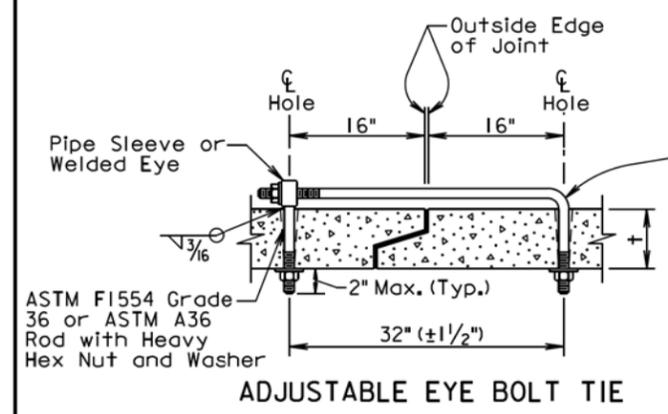
GENERAL NOTE:  
 The length of concrete pipe shown in the construction plans is between sloped ends.

September 22, 2006

<b>S D D O T</b>	<b>R. C. P. SLOPED ENDS</b>	PLATE NUMBER <b>450.13</b>
	Published Date: 3rd Qtr. 2016	Sheet 1 of 1

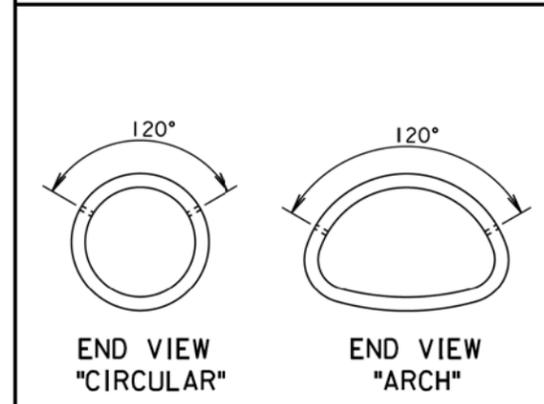
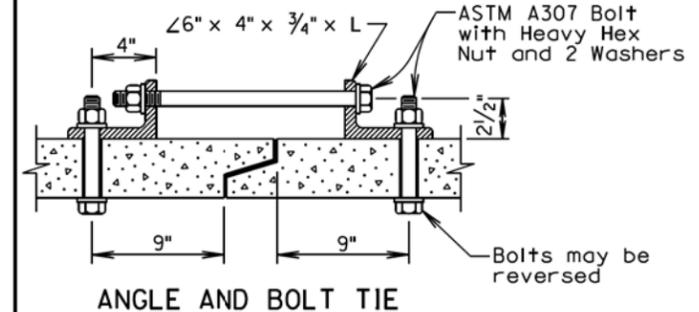
Wall "t" (in.)	Rod Dia. (in.)	Pipe Sleeve Dia. (nominal)
≤ 3/4	5/8	3/4
3/2-6/2	3/4	1
≥ 7	1	1 1/4

GENERAL NOTES:  
 Tie bolts shall conform to ASTM F1554 Grade 36 or ASTM A36. Nuts shall be heavy hex conforming to ASTM A563. Washers shall conform to ASTM F436.  
 Pipe Sleeve shall conform to ASTM A500 or A53, Grade B.  
 Galvanize adjustable eye bolt tie assembly in accordance with ASTM A153.



Pipe Dia. (in.)	"L" (in.)	Bolt Dia. (in.)
≤ 48	4	3/4
> 48	6	1

GENERAL NOTES:  
 Angles shall conform to ASTM A36.  
 Bolts shall conform to ASTM A307. Nuts shall be heavy hex conforming to ASTM A563. Washers shall conform to ASTM F436.  
 Galvanize angles, bolts, nuts, and washers in accordance with ASTM A153.



GENERAL NOTES:  
 In lieu of the tie bolts detailed above other types of tie bolt connections may be installed as approved by the Office of Bridge Design.  
 All pipe sections of R.C.P. and R.C.P. Arch shall be tied with tie bolts except for pipe located between drop inlets, manholes, and junction boxes. All pipe sections of pipes that only enter or exit drop inlets, manhole, and junction boxes shall be tied with tie bolts.  
 There will be no separate measurement or payment for the tie bolts. The cost for furnishing and installing the tie bolts shall be incidental to the contract unit price per foot for the corresponding bid item for R.C.P. or R.C.P. Arch.

February 28, 2013

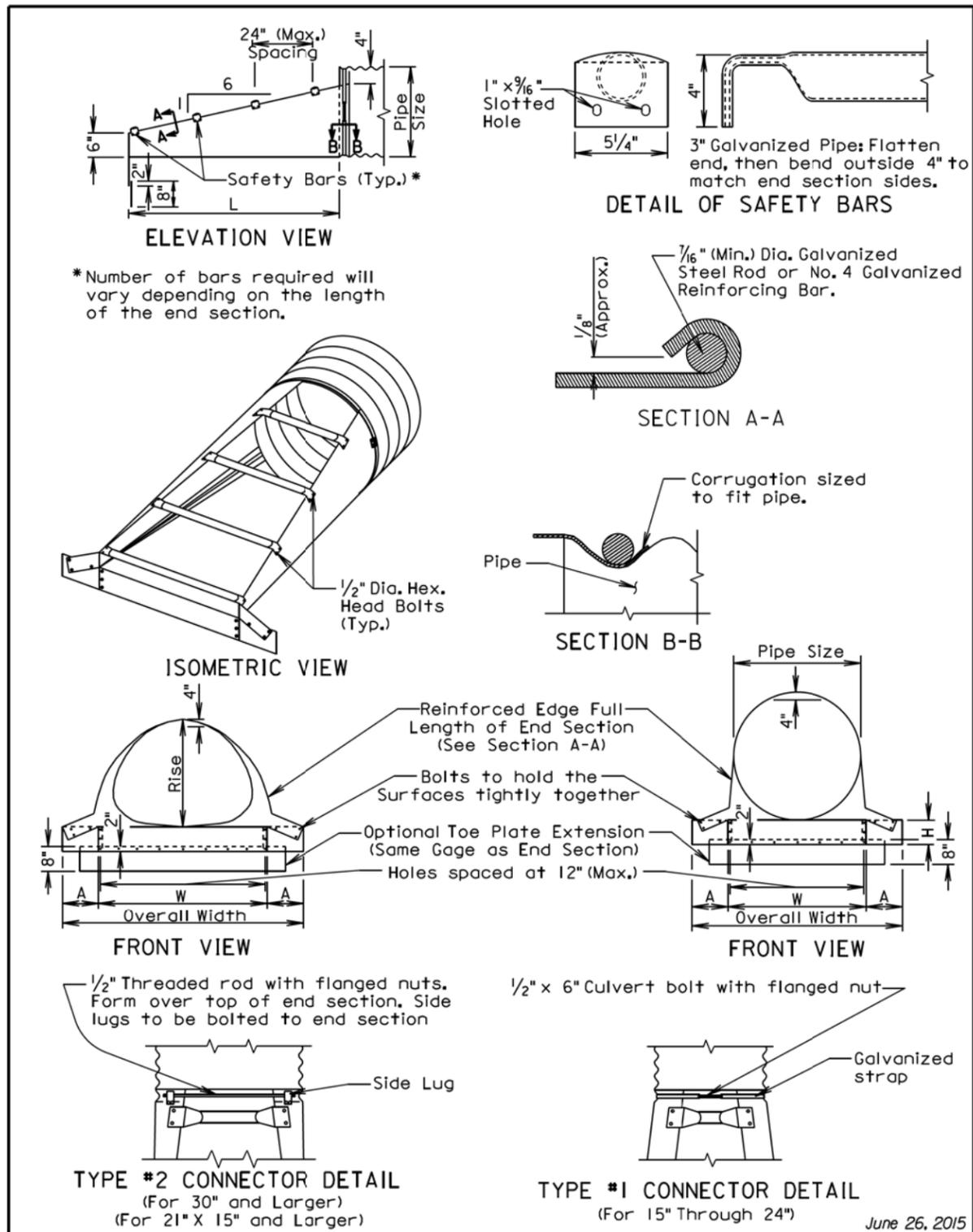
<b>S D D O T</b>	<b>TIE BOLTS FOR R.C.P. AND R.C.P. ARCH</b>	PLATE NUMBER <b>450.18</b>
	Published Date: 3rd Qtr. 2016	Sheet 1 of 1

Plot Scale - 1:200

- Plotted From - tpr17192

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Plot Scale - 1:200



June 26, 2015

<b>S D D O T</b>	<b>C. M. P. SAFETY ENDS</b>	PLATE NUMBER <b>450.38</b>
	Published Date: 3rd Qtr. 2016	Sheet 1 of 2

ARCH C.M.P. SAFETY ENDS										
Equiv. Dia. (Inch)	(Inches)		Min. Thick. Inch	Gage	Dimensions (Inches)			L Dimensions		
	Span	Rise			A	H	W	Overall Width	Slope	Length (Inch)
18	21	15	.064	16	8	6	27	43	6:1	30
21	24	18	.064	16	8	6	30	46	6:1	48
24	28	20	.064	16	8	6	34	50	6:1	60
30	35	24	.079	14	12	9	41	65	6:1	84
36	42	29	.109	12	12	9	48	72	6:1	114
42	49	33	.109	12	16	12	55	87	6:1	138
48	57	38	.109	12	16	12	63	95	6:1	168
54	64	43	.109	12	16	12	70	102	6:1	198
60	71	47	.109	12	16	12	77	109	6:1	222
72	83	57	.109	12	16	12	89	121	6:1	282

CIRCULAR C.M.P. SAFETY ENDS									
Pipe Dia. (Inch)	Min. Thick. Inch	Dimensions (Inches)					L Dimensions		
		Gage	A	H	W	Overall Width	Slope	Length (Inch)	
15	.064	16	8	6	21	37	6:1	30	
18	.064	16	8	6	24	40	6:1	48	
21	.064	16	8	6	27	43	6:1	66	
24	.064	16	8	6	30	46	6:1	84	
30	.109	12	12	9	36	60	6:1	120	
36	.109	12	12	9	42	66	6:1	156	
42	.109	12	16	12	48	80	6:1	192	
48	.109	12	16	12	54	86	6:1	228	
54	.109	12	16	12	60	92	6:1	264	
60	.109	12	16	12	66	98	6:1	300	

**GENERAL NOTES:**

Safety ends shall be fabricated from galvanized steel conforming to the requirements of the Specifications.

Safety bars shall be fabricated from steel schedule 40 pipe in conformance with ASTM A53, grade B or HSS 3.5X.216 in conformance with ASTM A500, grade B.

Slotted holes for safety bar attachment shall be provided for all end sections.

Attachment to circular pipes 15" through 24" diameter shall be made with Type #1 straps. All other sizes shall be attached with Type #2 rods and lugs.

When stated in the plans, optional toe plate extension shall be punched and bolted to end section apron lip with 3/8" diameter galvanized bolts. Steel for toe plate extension shall be same gauge as end section. Dimensions shall be overall width less 6" by 8" high.

Installation shall be performed in accordance with the Specifications.

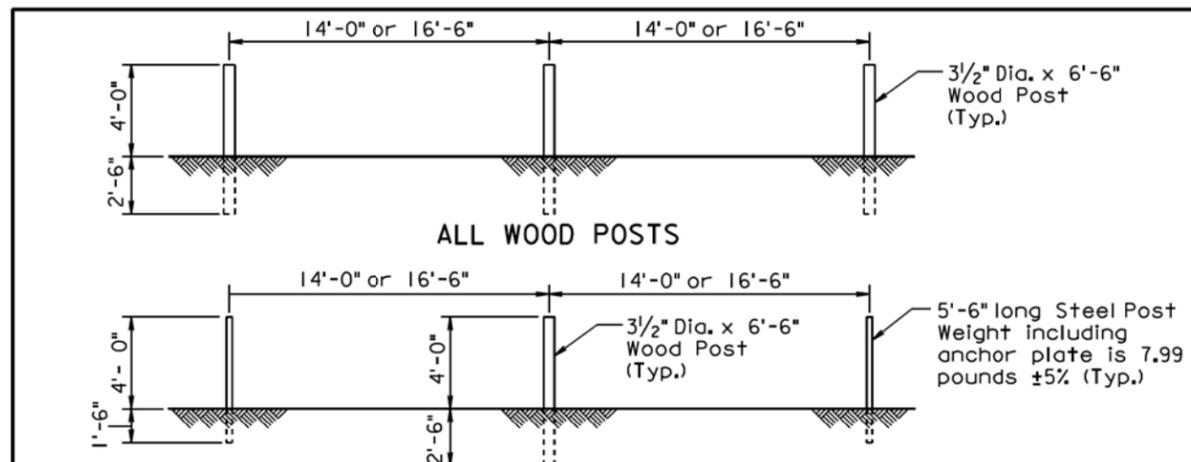
Cost of all work and materials required for fabrication and installation of safety ends shall be incidental to the bid items for the various sizes of safety ends.

June 26, 2015

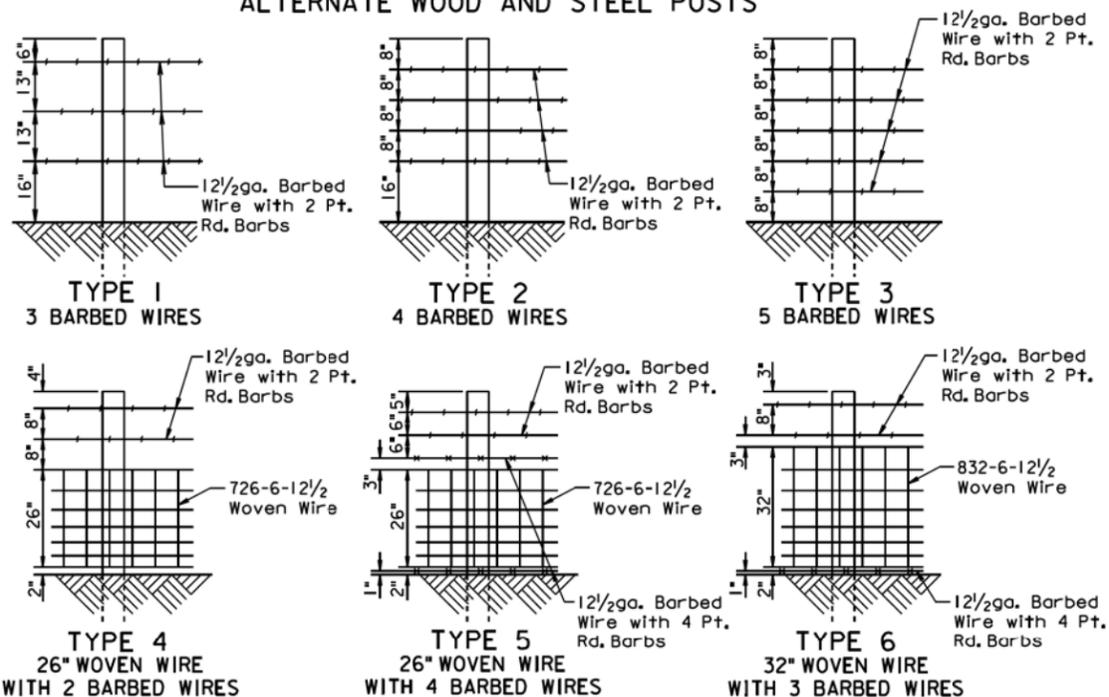
<b>S D D O T</b>	<b>C. M. P. SAFETY ENDS</b>	PLATE NUMBER <b>450.38</b>
	Published Date: 3rd Qtr. 2016	Sheet 2 of 2

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ALTERNATE WOOD AND STEEL POSTS



TYPE OF FENCE	LINE POST SPACING	BARBED WIRE		WOVEN WIRE	
		WIRE GAGE	NUMBER AND SHAPE OF BARBS	STYLE OR DESIGN NO.	
1	3 Barbed Wires	16'-6"	12/2	2 Point Round	---
2	4 Barbed Wires	16'-6"	12/2	2 Point Round	---
3	5 Barbed Wires	16'-6"	12/2	2 Point Round	---
4	26" Woven Wire with 2 Barbed Wires	14'-0"	12/2	2 Point Round	726-6-12/2
5	26" Woven Wire with 4 Barbed Wires	14'-0"	12/2	2 wires with 2 Pt. Rd., 2 wires with 4 Pt. Rd.	726-6-12/2
6	32" Woven Wire with 3 Barbed Wires	14'-0"	12/2	2 wires with 2 Pt. Rd., 1 wire with 4 Pt. Rd.	832-6-12/2

**GENERAL NOTES:**

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

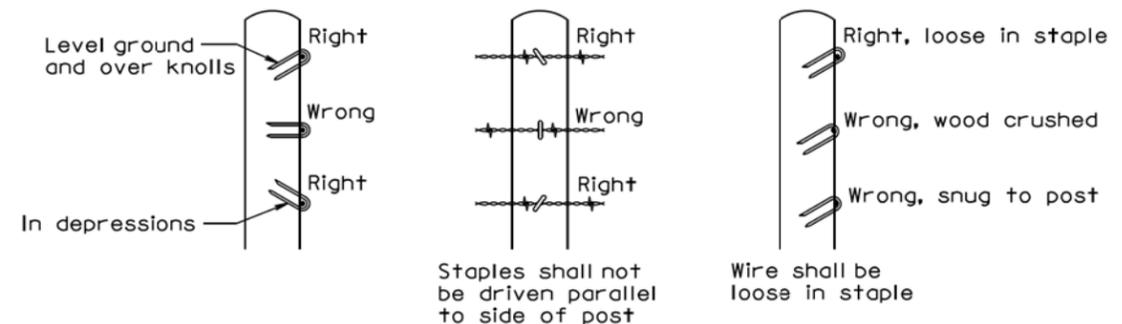
When type 5S or 6S is designated the bottom wire may be barbed, smooth, or left off.

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

September 14, 2009

December 23, 2004

Published Date: 3rd Qtr. 2016	<b>S D D O T</b>	<b>RIGHT-OF-WAY FENCE</b>	PLATE NUMBER 620.01
			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.

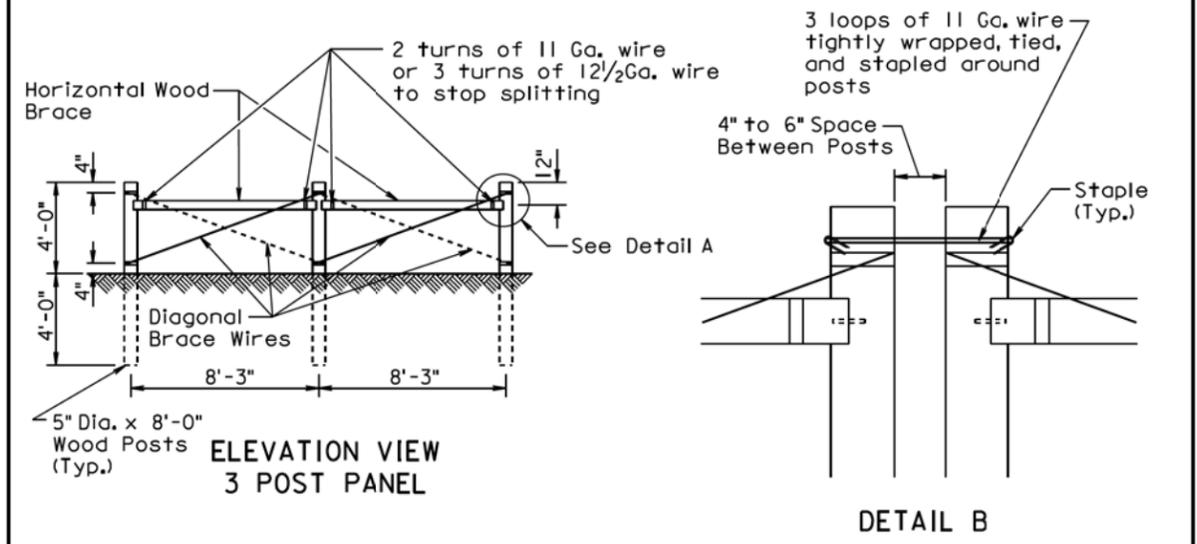
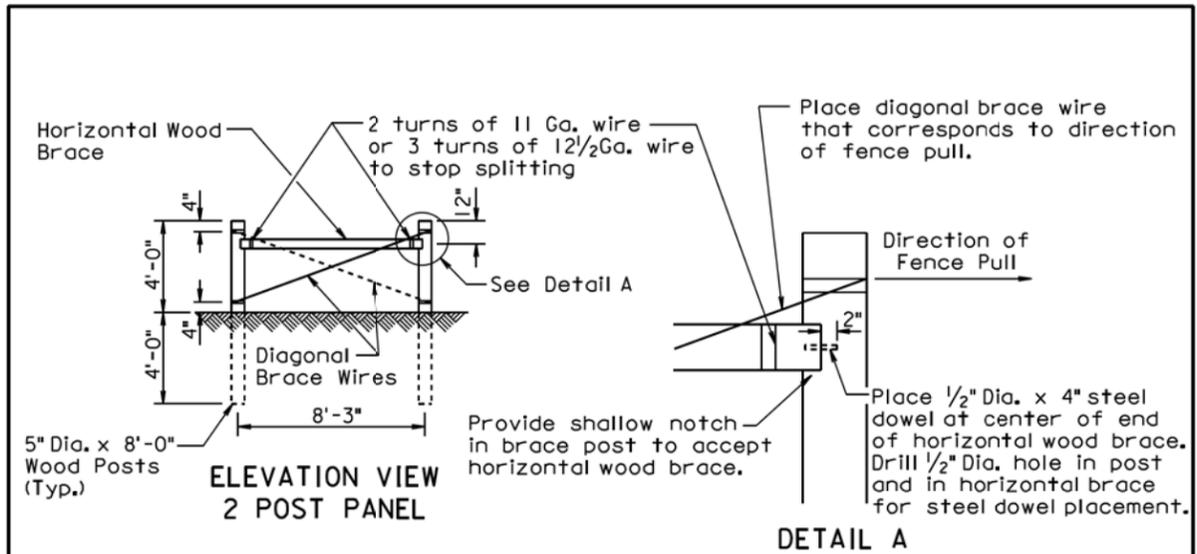
Right-of-Way fence on Interstate Projects shall be constructed one foot within the Interstate Right-of-Way lines except at bridge openings, cattle passes, and as otherwise directed by the Engineer.

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.

Published Date: 3rd Qtr. 2016	<b>S D D O T</b>	<b>STAPLE INSTALLATION AND GENERAL RIGHT-OF-WAY FENCE NOTES</b>	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.

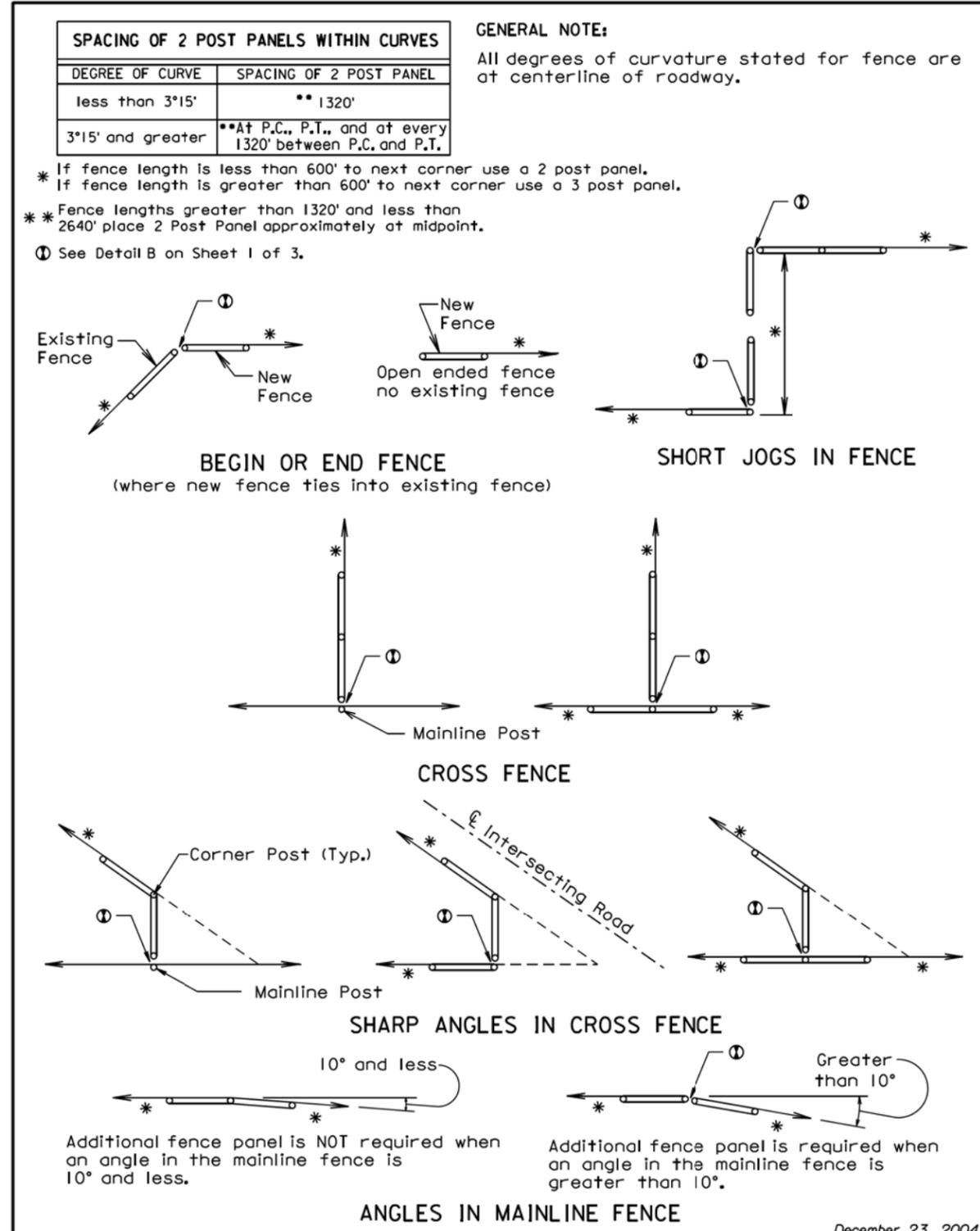
Horizontal wood braces shall consist of 4" dia. x 8' wood posts or rough 4" x 4" x 8' timbers.

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

<b>S D D O T</b>	<b>BRACE PANELS AND APPLICATIONS OF BRACE PANELS</b>	PLATE NUMBER 620.03
		Sheet 1 of 3

Published Date: 3rd Qtr. 2016



December 23, 2004

<b>S D D O T</b>	<b>BRACE PANELS AND APPLICATIONS OF BRACE PANELS</b>	PLATE NUMBER 620.03
		Sheet 2 of 3

Published Date: 3rd Qtr. 2016

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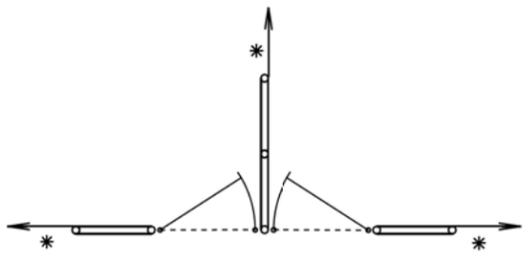
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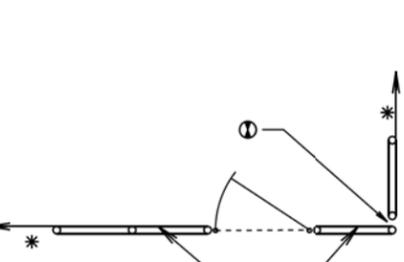
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**ENTRANCE  
(NOT ON CORNER)**



**DOUBLE ENTRANCES**



**ENTRANCES AT CORNERS**

**GATES**

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

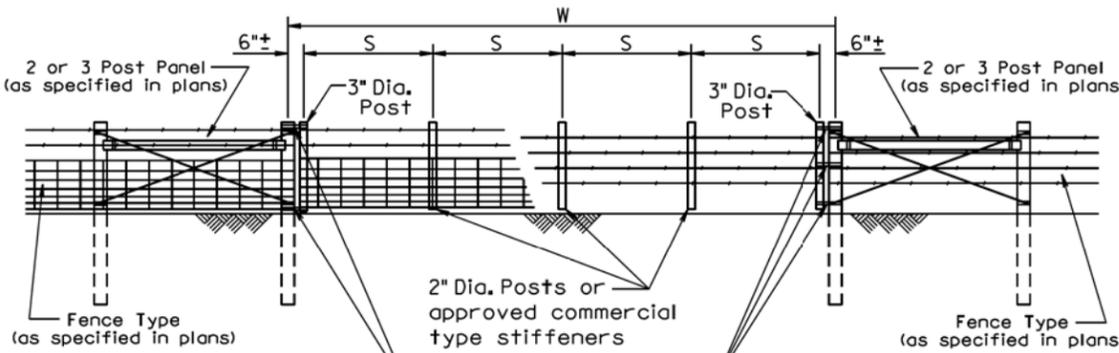
Fence type shall be same as adjacent fence type or as directed by the Engineer.

\* 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

<b>S D D O T</b>	<b>BRACE PANELS AND APPLICATIONS OF BRACE PANELS</b>	PLATE NUMBER <b>620.03</b>
	Published Date: 3rd Qtr. 2016	Sheet 3 of 3



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.

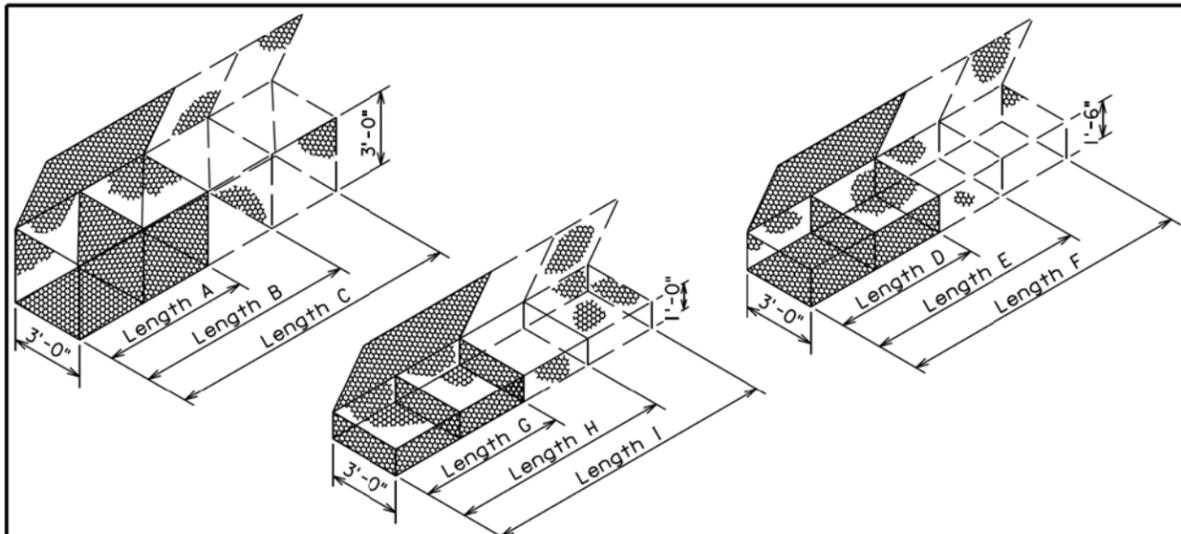
All costs for furnishing and constructing the wire gate(s) shall be incidental to the contract unit price per Ft for the respective Right-of-Way fence bid item.

March 31, 2000

<b>S D D O T</b>	<b>WIRE GATES</b>	PLATE NUMBER <b>620.20</b>
	Published Date: 3rd Qtr. 2016	Sheet 1 of 1

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**GABION DETAILS  
STANDARD SIZES**

SIZE	LENGTH	WIDTH	HEIGHT	NUMBER OF CELLS	CAPACITY, Cu. Yd.
A	6'-0"	3'-0"	3'-0"	2	2.0
B	9'-0"	3'-0"	3'-0"	3	3.0
C	12'-0"	3'-0"	3'-0"	4	4.0
D	6'-0"	3'-0"	1'-6"	2	1.0
E	9'-0"	3'-0"	1'-6"	3	1.5
F	12'-0"	3'-0"	1'-6"	4	2.0
G	6'-0"	3'-0"	1'-0"	2	0.7
H	9'-0"	3'-0"	1'-0"	3	1.0
I	12'-0"	3'-0"	1'-0"	4	1.3

Above Dimensions subject to mill tolerances.

**GENERAL NOTES:**

Lacing and internal connecting wire shall be 0.0866 inch diameter steel wire ASTM A541 Class 3 soft temper measured after galvanizing and for PVC coated gabions shall be 0.0866 inch diameter steel wire measured after galvanizing but before PVC coating.

The lacing procedure is as follows:

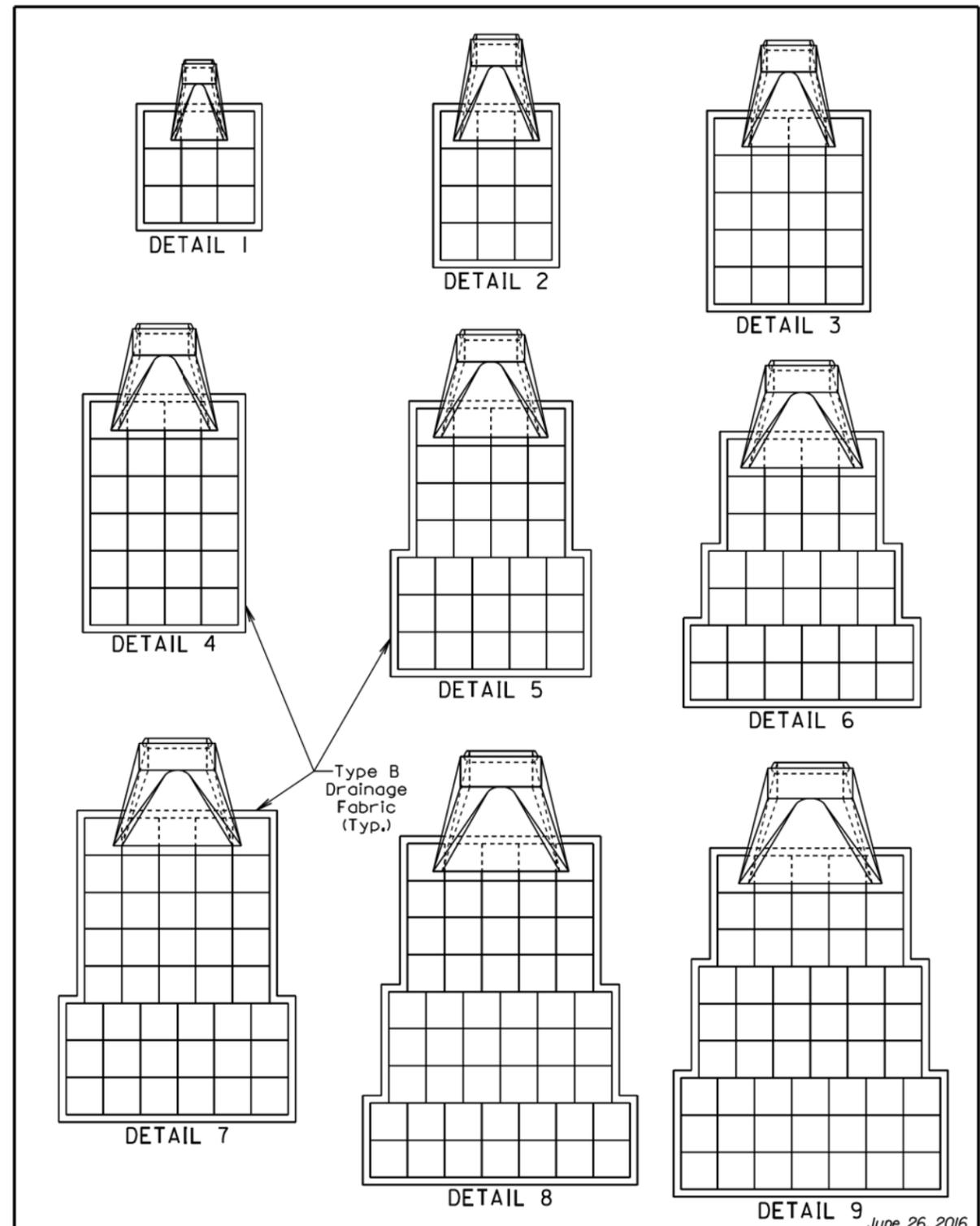
1. Cut a length of lacing wire approximately 1 1/2 times the distance to be laced but not exceeding 5 feet.
2. Secure the wire terminal at the corner by looping and twisting.
3. Proceed lacing with alternating single and double loops at a spacing not to exceed 6 inches.
4. Securely fasten the other lacing wire terminal.

Wire lacing or interlocking type fasteners shall be used for gabion assembly and final construction of gabion structures. Interlocking fasteners for galvanized gabions shall be high tensile 0.120 inch diameter galvanized steel wire measured after galvanizing. The galvanizing shall conform to ASTM A641-92 Class 3 coating. Fasteners shall also be in accordance with ASTM A764, Class II, Type III.

Interlocking fasteners for PVC coated gabions shall be high tensile 0.120 inch diameter stainless steel wire conforming to ASTM A313, Type 302, Class I. The spacing of the interlocking fasteners during all phases of assembly and construction shall not exceed 6 inches. All fasteners shall be placed where the mesh weaves around the selvage wire at the vertical and horizontal joints.

June 26, 2001

<b>S D D O T</b>	<b>BANK AND CHANNEL PROTECTION GABIONS</b>	PLATE NUMBER <b>720.01</b>
	Published Date: 3rd Qtr. 2016	Sheet 1 of 1



June 26, 2016

<b>S D D O T</b>	<b>BANK AND CHANNEL PROTECTION GABION PLACEMENT UNDER PIPE END SECTIONS</b>	PLATE NUMBER <b>720.03</b>
	Published Date: 3rd Qtr. 2016	Sheet 1 of 2

Plot Scale - 1:200

ESTIMATED QUANTITIES *				
	Detail	Pipe Diameter (Inches)	Gabion (Cu. Yd.)	Type B Drainage Fabric (Sq. Yd.)
RCP, RCP Arch, CMP, and CMP Arch	1	12, 18, and 24	4.5	15
	2	30 and 36	6.0	19
	3	42	10.0	29
	4	48 and 54	12.0	34
	5	60	15.5	43
	6	66	17.0	47
	7	72	21.5	57
	8	78	26.0	68
	9	84	27.0	70

**GENERAL NOTES:**

Gabions at outlets of CMP and RCP shall be placed under the end section a distance of 2' from the outlet end. For CMP end section installations, the upper fabric of the gabions shall be modified to accommodate the metal end section as approved by the Engineer.

\* Gabion and type B drainage fabric quantities on this standard plate are based on standard gabion sizes D, E, and F as depicted on Standard Plate 720.01.

Type B drainage fabric shall be placed under the gabions and around the exterior sides (perimeter) of the gabions as approved by the Engineer. The type B drainage fabric shall be in conformance with Section 831 of the Specifications. Measurement and payment of the type B drainage fabric shall be in conformance with Section 720 of the Specifications.

June 26, 2016

<p><i>Published Date: 3rd Qtr. 2016</i></p>	<p><b>S D D O T</b></p>	<p><b>BANK AND CHANNEL PROTECTION GABION PLACEMENT UNDER PIPE END SECTIONS</b></p>	<p>PLATE NUMBER 720.03</p>
			<p>Sheet 2 of 2</p>

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