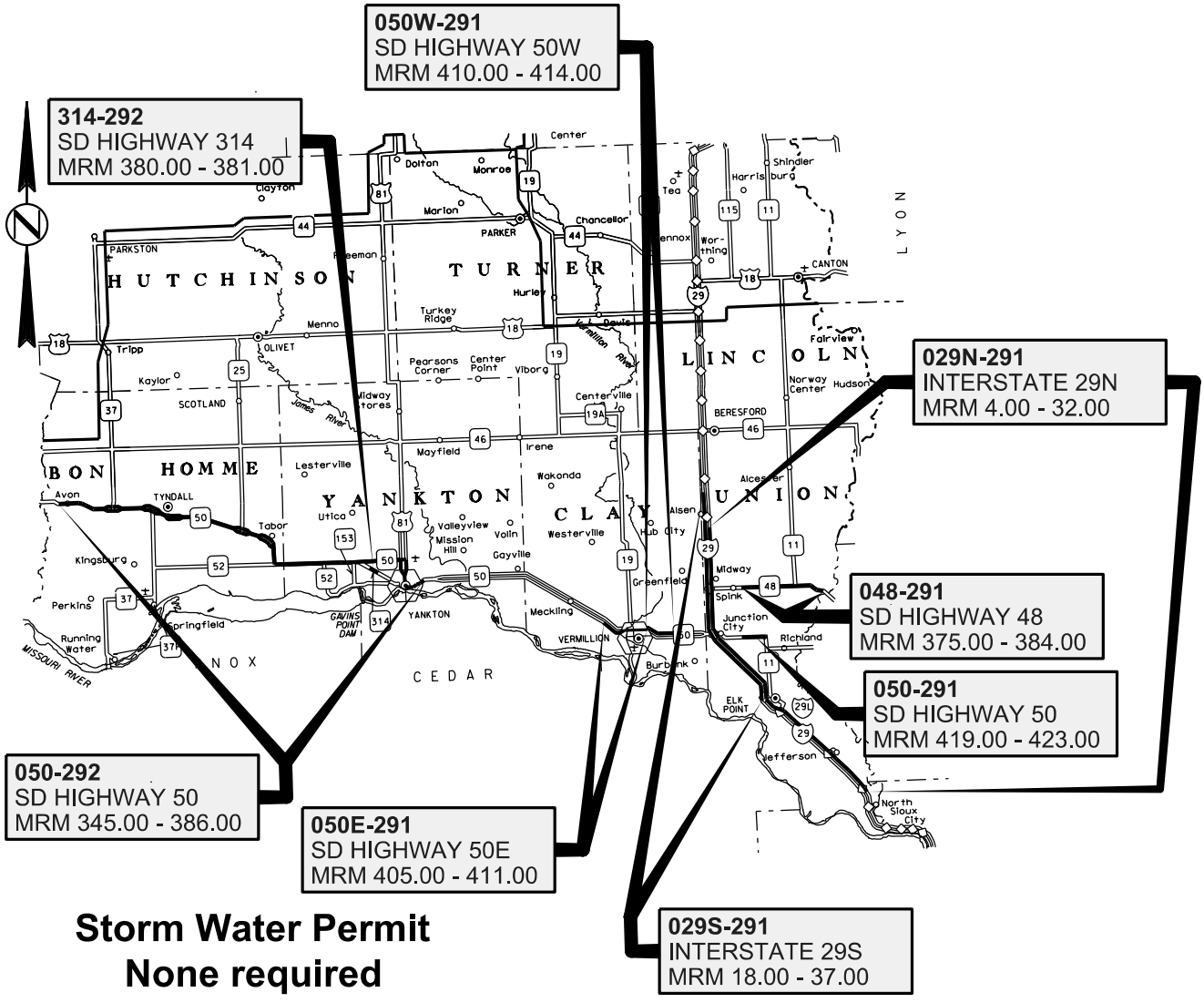
STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED

029N-291, 029S-291, 0314-292, 050-292, 048-291, 050E-291, 050W-291 & 050-291
BON HOMME, CLAY, UNION, & YANKTON COUNTIES

YANKTON AREA
PIPE AND EROSION REPAIR

PCN I2HT, I2HU, I2HV, I2HW, I2HX, I2HY, I2J0 & I2J1



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ESTIMATE OF QUANTITIES

029 N-291, PCN I2HT

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
110E0510	Remove Pipe End Section	1	Each
110E7500	Remove Pipe for Reset	18	Ft
110E7510	Remove Pipe End Section for Reset	5	Each
120E0010	Unclassified Excavation	3	CuYd
450E2008	18" RCP Flared End, Furnish	1	Each
450E2009	18" RCP Flared End, Install	1	Each
450E9000	Reset Pipe	18	Ft
450E9001	Reset Pipe End Section	5	Each
634E0010	Flagging	8	Hour
634E0100	Traffic Control	51	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
734E0010	Erosion Control	Lump Sum	LS

029 S-291, PCN I2HU

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
110E0510	Remove Pipe End Section	1	Each
110E7500	Remove Pipe for Reset	36	Ft
110E7510	Remove Pipe End Section for Reset	6	Each
450E2016	24" RCP Flared End, Furnish	1	Each
450E2017	24" RCP Flared End, Install	1	Each
450E8900	Cleanout Pipe Culvert	1	Each
450E9000	Reset Pipe	36	Ft
450E9001	Reset Pipe End Section	6	Each
634E0010	Flagging	10	Hour
634E0100	Traffic Control	51	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
734E0010	Erosion Control	Lump Sum	LS

ESTIMATE OF QUANTITIES (CONTINUED)

0314-292, PCN I2HV

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
110E7500	Remove Pipe for Reset	20	Ft
110E7510	Remove Pipe End Section for Reset	2	Each
450E9000	Reset Pipe	20	Ft
450E9001	Reset Pipe End Section	2	Each
634E0010	Flagging	6	Hour
634E0100	Traffic Control	51	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
734E0010	Erosion Control	Lump Sum	LS

050-292, PCN I2HW

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
110E0500	Remove Pipe Culvert	30	Ft
110E0510	Remove Pipe End Section	2	Each
110E7510	Remove Pipe End Section for Reset	2	Each
120E0010	Unclassified Excavation	5	CuYd
120E0600	Contractor Furnished Borrow	30	CuYd
450E2008	18" RCP Flared End, Furnish	1	Each
450E2009	18" RCP Flared End, Install	1	Each
450E4809	48" CMP 16 Gauge, Furnish	30	Ft
450E4810	48" CMP, Install	30	Ft
450E5231	48" CMP Flared End, Furnish	1	Each
450E5232	48" CMP Flared End, Install	1	Each
450E9001	Reset Pipe End Section	2	Each
450E9232	Slipline 48" Pipe	86	Ft
462E0250	Cellular Grout	7.0	CuYd
634E0010	Flagging	18	Hour
634E0100	Traffic Control	51	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
720E1010	PVC Coated Bank and Channel Protection Gabion	8.0	CuYd
734E0010	Erosion Control	Lump Sum	LS
831E0110	Type B Drainage Fabric	24	SqYd

ESTIMATE OF QUANTITIES (CONTINUED)

048-291, PCN I2HX

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
110E7500	Remove Pipe for Reset	36	Ft
110E7510	Remove Pipe End Section for Reset	6	Each
120E0010	Unclassified Excavation	10	CuYd
120E0600	Contractor Furnished Borrow	30	CuYd
450E9000	Reset Pipe	36	Ft
450E9001	Reset Pipe End Section	6	Each
634E0010	Flagging	12	Hour
634E0100	Traffic Control	51	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
700E0210	Class B Riprap	228.0	Ton
720E1010	PVC Coated Bank and Channel Protection Gabion	8.0	CuYd
734E0010	Erosion Control	Lump Sum	LS
831E0110	Type B Drainage Fabric	328	SqYd

050E-291, PCN I2HY

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
110E7500	Remove Pipe for Reset	12	Ft
110E7510	Remove Pipe End Section for Reset	1	Each
450E8900	Cleanout Pipe Culvert	3	Each
450E9000	Reset Pipe	12	Ft
450E9001	Reset Pipe End Section	1	Each
634E0010	Flagging	6	Hour
634E0100	Traffic Control	51	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
734E0010	Erosion Control	Lump Sum	LS

ESTIMATE OF QUANTITIES (CONTINUED)

050W-291, PCN I2J0

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
110E0500	Remove Pipe Culvert	8	Ft
110E0510	Remove Pipe End Section	1	Each
110E7500	Remove Pipe for Reset	18	Ft
110E7510	Remove Pipe End Section for Reset	2	Each
450E4759	18" CMP 16 Gauge, Furnish	8	Ft
450E4760	18" CMP, Install	8	Ft
450E5211	18" CMP Flared End, Furnish	1	Each
450E5212	18" CMP Flared End, Install	1	Each
450E8900	Cleanout Pipe Culvert	1	Each
450E9000	Reset Pipe	18	Ft
450E9001	Reset Pipe End Section	2	Each
634E0010	Flagging	8	Hour
634E0100	Traffic Control	51	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
734E0010	Erosion Control	Lump Sum	LS

050-291, PCN I2J1

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
110E7500	Remove Pipe for Reset	8	Ft
450E8900	Cleanout Pipe Culvert	3	Each
450E9000	Reset Pipe	8	Ft
634E0010	Flagging	4	Hour
634E0100	Traffic Control	51	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
734E0010	Erosion Control	Lump Sum	LS

TABLE OF PIPE REPAIR

PROJECT	MRM	SIZE AND TYPE	REMOVE PIPE CULVERT (FT)	REMOVE PIPE END SECTION (EACH)	REMOVE AND RESET PIPE (FT)	REMOVE AND RESET PIPE END SECTION (EACH)	CONTR. FURN. BORROW (CUYD)	FURNISH AND INSTALL 18 INCH CMP (FT)	FURNISH AND INSTALL 18 INCH CMP FLARED END (EACH)	FURNISH AND INSTALL 18 INCH RCP FLARED END (EACH)	FURNISH AND INSTALL 24 INCH RCP FLARED END (EACH)	FURNISH AND INSTALL 48 INCH CMP (FT)	FURNISH AND INSTALL 48 INCH CMP FLARED END (EACH)	CLASS B RIP-RAP (TONS)	3' DEEP BANK AND CHANNEL PROTECTION GABIONS (CUYD)	TYPE B DRAINAGE FABRIC (SQYDS)	UN-CLASS. EXCAV. (CUYD)	CLEAN-OUT PIPE CULVERT (EACH)	SIDE OF ROAD, RAMP, OR BERM
029N-291	4.22	18" RCP		1		1				1							3		Both
029N-291	28.54	24" RCP			6	1													West
029N-291	28.94	18" RCP			6	1													East
029N-291	31.12	30" RCP			6	2													Ramp, Both
029N-291 SUBTOTALS			**-**	**1**	**18**	**5**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	
029S-291	18.51	18" RCP																1	End Ramp
029S-291	26.45	24" RCP				2													Both
029S-291	28.54	24" RCP			6	1													West
029S-291	36.38	24" RCP		1	30	1					1								Both
029S-291	36.65	24" RCP				2													Both
029S-291 SUBTOTALS			**-**	**1**	**36**	**6**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	
314-292	380.84	24" RCP			20	2													Both
314-292 SUBTOTALS			**-**	**-**	**20**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	
050-292	345.00	18" RCP		1						1					6x12x3/27 = 8	24	5		Both
050-292	355.52	48" CMP*	30	1								30	1						North
050-292	385.72	Twin 30" RCP				2													South
050-292 SUBTOTALS			**30**	**2**	**-**	**2**	**-**	**-**	**-**	**1**	**-**	**30**	**1**	**-**	**8**	**24**	**5**	**-**	
048-291	375.19	24" CMP															10		South
048-291	377.10	30" CMP					5								6x12x3/27 = 8	24			Both
048-291	383.46	Quad 72" RC Arch			36	6	25							228		304			Both
048-291 SUBTOTALS			**-**	**-**	**36**	**6**	**30**	**-**	**-**	**-**	**-**	**-**	**-**	**228**	**8**	**328**	**10**	**-**	
050E-291	405.99	24" RCP																1	South
050E-291	406.21	24" RCP																1	South
050E-291	410.84	18" RCP			12	1												1	South
050E-291 SUBTOTALS			**-**	**-**	**12**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	
050W-291	410.85	18" CMP	8	1				8	1									1	North
050W-291	411.60	18" RCP			12	1													Both
050W-291	413.13	24" RCP				1													South
050W-291	413.76	18" RCP			6														North
050W-291 SUBTOTALS			**8**	**1**	**18**	**2**	**-**	**8**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	
050-291	419.45	Twin 24" RCP			8													2	South
050-291	422.36	18" RCP																1	Both
050-291 SUBTOTALS			**-**	**-**	**8**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	
PROJECT TOTALS			**38**	**5**	**148**	**24**	**30**	**8**	**1**	**2**	**1**	**30**	**1**	**228**	**16**	**352**	**18**	**8**	

* See plan notes for culvert slipliner at this site.

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 sections.
2. Install tie bolts on all sections.
3. Clean silt from ditches adjacent to pipe culverts.
4. Clean silt from inside pipe culverts.
5. Grade and shape the area for the riprap in the pipe scour hole.
6. Grade and shape the area for the gabion installation areas.
7. Place the Type B Drainage Fabric and the Riprap or Gabions.
8. 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.

UTILITIES

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

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

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 some 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 State Historical Preservation Office (SHPO) clearance, a cultural resources survey may need to be conducted by a qualified archaeologist. In lieu of a cultural resources survey, the Contractor could request a records search from Jim Donohue, State Archaeological Research Center (SARC). Provide SARC with the following: a topographical map or aerial view on which the site is clearly outlined, site dimensions, project number, and PCN. If applicable, provide evidence that the site has been previously disturbed by farming, mining, or construction activities with a landowner statement that no artifacts have been found *on* the site. The Contractor shall arrange and pay for the cultural resource survey and/or records search.

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

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

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.

CLEANOUT PIPE CULVERT

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. The Contractor shall visit the project to determine the extent of cleanout required.

CLEANING DITCHES

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 Contractor shall visit the project to determine the extent of ditch work required.

Cleaning of existing ditches and disposal of soil shall be incidental to the various bid items.

Additional ditch excavation is required at some locations outside the average length of 50 feet as listed in the pipe table. 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. This work will be paid for as Unclassified Excavation. The basis for payment for Unclassified Excavation will be plans quantity. There will be no density requirements for Unclassified Excavation since it is for removal of silt in the ditches.

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.

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.

Cost for excavation for riprap and gabion placement shall be incidental to the contract unit price per ton for Class B Riprap and per cubic yard for PVC Coated Bank and Channel Protection Gabion.

RIPRAP AND DRAINAGE FABRIC

Class B Riprap shall be placed at a depth of two feet in 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 for the installation on SD48 at MRM 383.46 is 304 square yards of Type B Drainage Fabric and 228 tons of Class B Riprap for the scour hole downstream of the pipe. This quantity is based on the plans dimensions of 110 ft by 20 ft, 2 feet deep. Excavation of material along the edges will be required to provide for the installation of the riprap. Excavated material may be used as fill in areas that are greater than 2 feet deep. All other material excavated will be placed in the remainder of the scour hole downstream of the riprap location. Additional Contractor Furnished Borrow will also be required to fill the remainder of the scour hole. A factor of 1.4 tons per cubic yard was used to determine the riprap quantity.

Type B Drainage Fabric shall be placed on all surfaces to be covered with Gabions. Plans quantity for the installation on SD48 at MRM 377.10 is 24 square yards of Type B Drainage Fabric.

Cost for placing Type B Drainage Fabric shall be included in the contract 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.

Cost for furnishing and placing riprap shall be included in the contract unit price per ton for Class B Riprap.

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. Cost for this work shall be incidental to the contract unit prices for the various items.

PERMANENT SEEDING AND MULCHING

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.

South Dakota native grown seed is an acceptable alternative to any of the seed varieties listed below. South Dakota native grown seeds used as an alternative shall conform to the same specification and requirements for that individual seed type.

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

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 to each site not more than 14 calendar days after the completion of the work at the site.

The area to be seeded and mulched is estimated at 0.4 acre.

Cost for seeding and mulching shall be incidental to the contract lump sum price for Erosion Control.

STORM WATER

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

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 ¼" to ½".

SLIPLINE PIPE AT SD50 MRM 355.52

The Contractor shall furnish and install slipliner pipe at locations specified in the Table of Slipline Pipe. This work consists of slipping high density polyethylene (HDPE) or polyvinyl chloride (PVC) pipe liner inside existing pipe and grouting the void between the liner and the existing pipe.

The Contractor shall submit a proposed procedure for sliplining pipes, including the grouting procedure, to the Engineer at least two weeks prior to beginning this work.

Slipliner pipe shall conform to one of the following types:

1. Closed Profile HDPE:
   Closed profile HDPE pipe shall meet the requirements of ASTM F894 and shall have a cell classification of 345464C in accordance with ASTM D3350. The pipe shall have a minimum Ring Stiffness Constant (RSC) classification of 160 lb/ft as defined in ASTM F894. Pipe joints shall be in accordance with the pipe manufacturer's recommendations and as approved by the Engineer.

2. Solid Wall HDPE:
   Solid wall HDPE pipe shall meet the requirements of ASTM F714 (SDR 32.5) and shall have a cell classification of 345464C in accordance with ASTM D3350. Pipe joints may be grooved press-on joints or heat fused as approved by the Engineer. Heat fused joints shall be fused in accordance with the pipe manufacturer's recommendations by an experienced operator of the heat fusion equipment.

3. PVC:
   PVC pipe shall meet the requirements of ASTM F949 with a minimum pipe stiffness of 46 psi. PVC pipe shall have a cell classification of 12454 in accordance with ASTM D1784. Pipe joints shall be elastomeric seals (gaskets) in accordance with the requirements of ASTM F477.

4. Spirally Wound PVC:
   Spirally wound PVC slipliner shall meet the requirements of ASTM F949 with minimum pipe stiffness of 46 psi. Pipe joints shall be in accordance with the pipe manufacturer's recommendations and as approved by the Engineer.

The diameter specified in the bid item description is the diameter of the existing pipe to be sliplined. The Contractor shall provide the largest diameter slipliner pipe that will fit into the existing pipe to maximize flow capacity.

Slipliner pipe shall have a smooth interior surface.

Slipliner pipe shall be joined into a continuous length with joints that are adequate for pushing, pulling, or winding the liner pipe through the existing pipe. The joints shall not allow seepage during pressure grouting. The outside diameter of the liner pipe shall not be increased at the joints to help with providing unrestricted insertion of the liner.

Prior to sliplining, the Contractor shall clean the existing pipe of all debris, silt, and obstructions to ensure that the slipliner pipe can be inserted, the grout will flow to all voids, and the inserted slipliner pipe will not be set upon or irregularly supported by such material. Cleaning shall be accomplished by the use of jet rodding equipment or other approved methods.

The slipliner pipe shall be inserted into the existing pipe by pushing, pulling, or winding methods that do not damage the slipliner pipe. The slipliner pipe shall be clean and substantially dry before insertion.

Slipliner pipe shall be held down due to floating during the grouting operation mainly to minimize the change in flowline, especially at the inlet end. This may be accomplished by attaching fasteners or blocks at the top of the pipe, adding weight to the invert, placing multiple grout lifts, or other means as approved by the Engineer.

Bulkheads shall be constructed at each end of the pipe. Each bulkhead shall be constructed to withstand the pressure of the grouting operation. The bulkhead shall extend from the end of the existing pipe inward a minimum depth of 18 inches. The bulkhead shall be free from leaks and the exterior surface shall be given a smooth trowel finish. The bulkhead at the inlet end shall be finished with a 45 degree mitered bevel transition between the existing pipe and the inside of the slipliner pipe with the slipliner pipe face pushed inside the existing pipe face.

SLIPLINE PIPE AT SD50 MRM 355.52 (CONTINUED)

Pressure grouting shall be done to ensure all the voids are filled between the slipliner pipe and the existing pipe including all breaks or holes in and around the existing pipe. Grouting pressures used shall ensure all voids are filled, but do not collapse or deform the slipliner pipe more than 5% of the diameter. Multiple grout lifts may be necessary to minimize pipe deflection for 60" diameter and larger pipe in accordance with the pipe manufacturer's recommendations. The Contractor shall provide a pressure gauge that will measure the grouting pressure and a means to accurately measure the volume of grout injected.

The grout shall be a cellular grout (grout with generated foam) with a minimum 28 day compressive strength of 100 psi. If no water is present within the sliplined pipe a low density grout may be used. When it is not possible to dewater the existing pipe or keep water out of the annular space during grouting a high density grout with a minimum of 70pcf shall be used. Cellular grout mix designs shall be submitted to the SDDOT Concrete Engineer for approval.

If grout holes are utilized, cylindrical wooden plugs or other approved plugs shall be inserted to plug holes until the grout has set. After the plugs are removed, the holes shall be filled with concrete.

The quantity of cellular grout was estimated based on void quantity between the slipliner pipe and the existing pipe, and an additional quantity if necessary was estimated for the void volume outside the existing pipe.

Cost for furnishing and installing the slipliner pipe, including work area excavation, backfilling, pipe cleaning, and incidentals necessary to satisfactorily complete the work shall be included in the contract unit price per foot for Slipline 48" Pipe.

Cost for furnishing and installing the cellular grout including bulkhead construction, inlet bevel construction, and incidentals necessary to satisfactorily complete the work shall be included in the contract unit price per cubic yard for Cellular Grout.

TABLE OF SLIPLINE PIPE

SD50	* Slipliner Design Inside Dia. (Inch)	Slipline 48" Pipe (Ft)	Cellular Grout (CuYd)
MRM 355.52	42	86	7.0
	Totals:	86	7.0

* The hydraulic design of the pipe was based on the slipliner inside diameter as noted in the TABLE OF SLIPLINE PIPE. If a smaller diameter liner is needed, contact the Design Engineer for approval.

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 or MASH crash-worthy requirements. The Contractor shall provide installation details at the preconstruction meeting for all breakaway sign support assemblies.

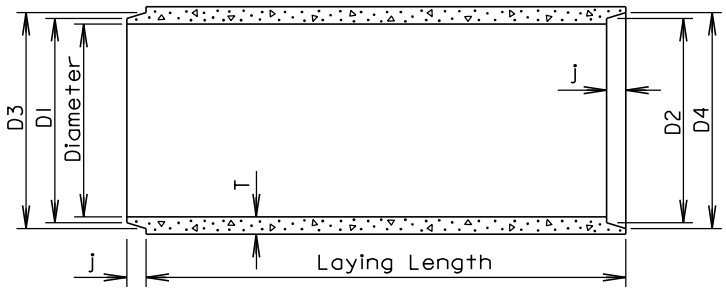
Sufficient traffic control devices have been included in these plans to sign one workspace. If the Contractor elects to work on additional sites simultaneously, the cost for additional traffic control devices shall be incidental to the contract unit price per unit for Traffic Control.

ITEMIZED LIST FOR TRAFFIC CONTROL

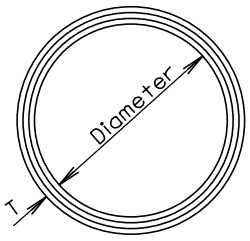
SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
E5-1	36" x 32"	EXIT GORE SIGN		24	
G20-2	36" x 18"	END ROAD WORK	2	17	34
R1-1	48" x 48"	STOP		34	
R1-2	48" x 48"	YIELD		34	
R2-1	30" x 36"	SPEED LIMIT __		23	
R2-1	36" x 48"	SPEED LIMIT __		29	
R2-1	48" x 60"	SPEED LIMIT __		38	
R2-6aP	36" x 24"	FINES DOUBLE		20	
R4-7	24" x 30"	KEEP RIGHT (SYMBOL)		18	
R5-1	48" x 48"	DO NOT ENTER		34	
R5-1a	42" x 30"	WRONG WAY		25	
R10-6	24" x 36"	STOP HERE ON RED		20	
R11-2	48" x 30"	ROAD CLOSED		27	
R11-3a	60" x 30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY		30	
R11-4	60" x 30"	ROAD CLOSED TO THRU TRAFFIC		30	
SW12-1b	120" x 60"	HIGHWAY WORKERS GIVE'EM A BRAKE		80	
W1-1	48" x 48"	LEFT OR RIGHT TURN ARROW		34	
W1-2	48" x 48"	LEFT OR RIGHT CURVE ARROW		34	
W1-3	48" x 48"	REVERSE TURN SIGN (LEFT OR RIGHT)		34	
W1-4	48" x 48"	REVERSE CURVE SIGN (LEFT OR RIGHT)		34	
W3-1	48" x 48"	STOP AHEAD (SYMBOL)		34	
W3-2	48" x 48"	YIELD AHEAD (SYMBOL)		34	
W3-3	48" x 48"	SIGNAL AHEAD (SYMBOL)		34	
W3-4	48" x 48"	BE PREPARED TO STOP	1	34	34
W3-5	48" x 48"	SPEED REDUCTION (__ MPH)		34	
W4-1	48" x 48"	MERGE (SYMBOL)		34	
W4-2	48" x 48"	LEFT OR RIGHT LANE ENDS (SYMBOL)		34	
W5-2	48" x 48"	NARROW BRIDGE		34	
W5-3	48" x 48"	ONE LANE BRIDGE		34	
W7-3a	30" x 24"	NEXT __ MILES		18	
W8-1	36" x 36"	BUMP		27	
W8-6	48" x 48"	TRUCK CROSSING		34	
W8-7	36" x 36"	LOOSE GRAVEL		27	
W8-9a	48" x 48"	SHOULDER DROP-OFF		34	
W8-11	48" x 48"	UNEVEN LANES		34	
W13-1	24" x 24"	ADVISORY SPEED PLATE		16	
W16-2	30" x 24"	SUPPLEMENTAL DISTANCE PLAQUE		18	
W20-1	48" x 48"	ROAD WORK AHEAD	2	34	68
W20-2	48" x 48"	DETOUR AHEAD		34	
W20-3	48" x 48"	ROAD CLOSED AHEAD		34	
W20-4	48" x 48"	ONE LANE ROAD AHEAD	2	34	68
W20-5	48" x 48"	LT. OR RT. LANE CLOSED AHEAD		34	
W20-7a	48" x 48"	FLAGGER	2	34	68
W21-1a	48" x 48"	WORKERS (SYMBOL)		34	
W21-2	36" x 36"	FRESH OIL		27	
W21-3	48" x 48"	ROAD MACHINERY AHEAD		34	
W21-5	48" x 48"	SHOULDER WORK	2	34	68
W21-5a	48" x 48"	RIGHT SHOULDER CLOSED	1	34	34
W21-5b	48" x 48"	RIGHT SHOULDER CLOSED AHEAD	1	34	34
*****	12" x 36"	TYPE III OBJECT MARKER		15	
*****	*****	TYPE III BARRICADE - 8 FT. SINGLE SIDED		40	
*****	*****	TYPE III BARRICADE - 8 FT. DOUBLE SIDED		56	
				TOTAL UNITS	**408**

TOLERANCES IN DIMENSIONS

Diameter: ±1.5% for 24" Dia. or less and ±1% or 3/8" whichever is more for 27" Dia. or greater.
Diameters at Joints: ±3/16" for 30" Dia. or less and ±1/4" for 36" or greater.
Length of joint (j): ±1/4".
Wall thickness (T): not less than design T by more than 5% or 3/16", whichever is greater.
Laying length: shall not underrun by more than 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

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REINFORCED CONCRETE PIPE

PLATE NUMBER 450.01

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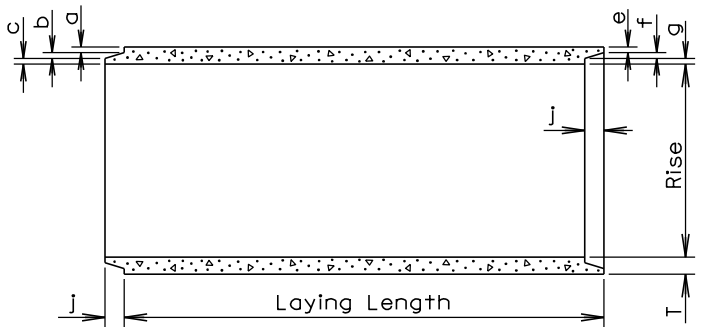
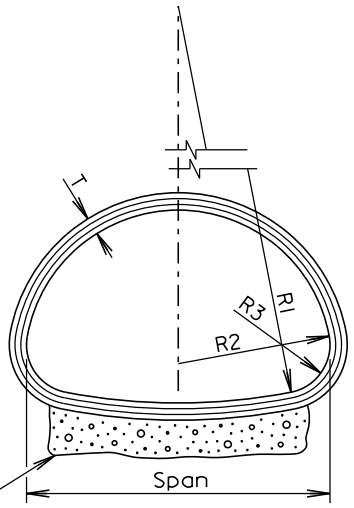


LONGITUDINAL SECTION



END VIEW

TOLERANCES IN DIMENSIONS

Radial dimensions at joints: ±1/8 " for 65" span or less and ±1/4 " for longer spans.
Rise and Span: ±2% of tabular values.
Length of Joint (J): ±1/4 ".
Wall thickness (T): not less than design T by more than 5% or 3/16 ", whichever is greater.
Laying length: shall not underrun by more than 1/2".

Gravel Bedding Material shall be supplied for 102" to 169" spans. It shall be placed to a thickness of 6" (min.) x 85% of the Span x Length of culvert and shall conform to the gradation requirements for gravel surfacing except material may be screened or may be plan provided material.

* Size (in.)	Approx. Wt./Ft. (lb.)	Rise (in.)	Span (in.)	T (in.)	a (in.)	b (in.)	c (in.)	j (in.)	e (in.)	f (in.)	g (in.)	R1 (in.)	R2 (in.)	R3 (in.)
18	170	13 1/2	22	2 1/2	1 3/8	3/8	3/4	2	1 1/8	3/8	1	27 1/2	13 3/4	5 1/4
24	320	18	28 1/2	3 1/2	1 5/8	1/2	1 3/8	3	1 3/8	1/2	1 5/8	40 11/16	14 3/4	4 5/8
30	450	22 1/2	36 1/4	4	1 13/16	5/8	1 9/16	3 1/2	1 9/16	5/8	1 13/16	51	18 3/4	6 1/8
36	600	26 5/8	43 3/4	4 1/2	2	3/4	1 3/4	4	1 3/4	3/4	2	62	22 1/2	6 1/2
42	740	31 5/16	51 1/8	4 1/2	2	3/4	1 3/4	4	1 3/4	3/4	2	73	26 1/4	7 3/4
48	890	36	58 1/2	5	2 1/4	3/4	2	5	2	3/4	2 1/4	84	30	8 7/8
54	1100	40	65	5 1/2	2 1/2	3/4	2 1/4	5	2 1/4	3/4	2 1/2	92 1/2	33 3/8	10
60	1400	45	73 1/2	6	3 5/16	3/4	1 15/16	5	2 3/4	3/4	2 1/2	105	37 1/2	11
72	1900	54	88	7	3 13/16	1	2 3/16	6	3 1/4	1	2 3/4	126	45	13 5/16
84	2500	62	102	8	4 1/8	1	2 7/8	6	3 1/2	1	3 1/2	162 1/2	52	14 1/2
96	3300	78	122 3/8	9	4 1/2	1	3 1/2	7	4	1	4	218	62	20
108	4200	88	138 1/2	10	5	1	4	7	4 1/2	1	4 1/2	269	70	22
120	5100	96 7/8	154	11	5 1/2	1	4 1/2	7	5	1	5	301 3/8	78	24
132	5100	106 1/2	168 3/4	10		1	4	7	4 1/2	1	4 1/2	329	85 5/8	26 7/8

* Equivalent Diameter of Circular R. C. P.

GENERAL NOTES:

Construction of R.C.P. Arch 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.

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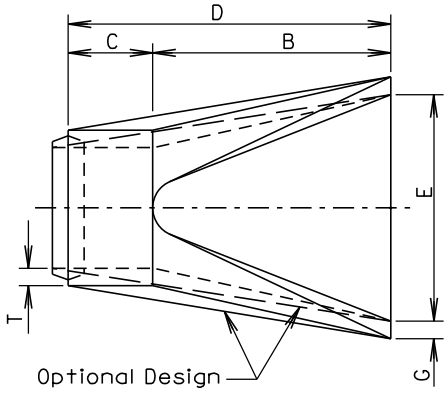
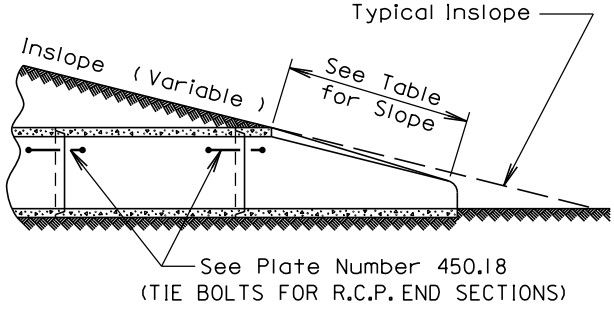


TOP VIEW

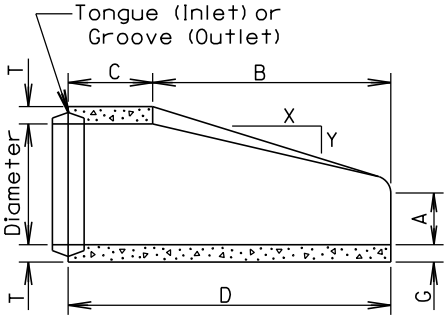


SLOPE DETAIL

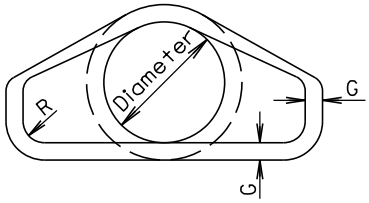
GENERAL NOTES:

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.



LONGITUDINAL SECTION



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 7/8	72 7/8	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

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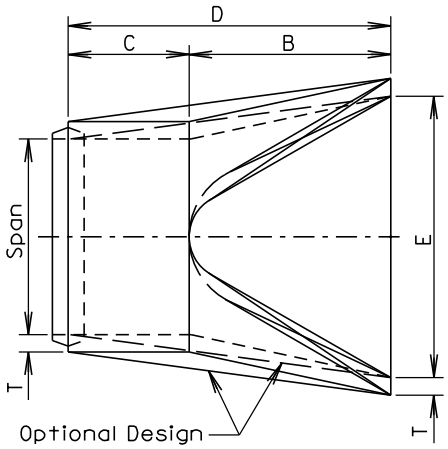
SDDOT

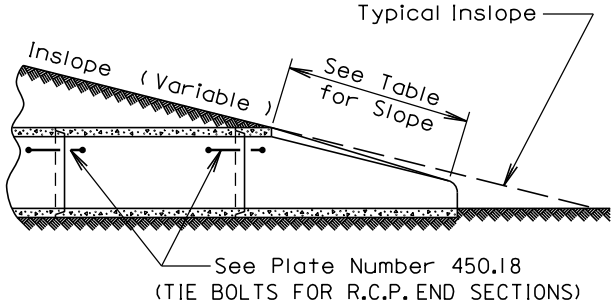
R. C. P. FLARED ENDS

PLATE NUMBER 450.10

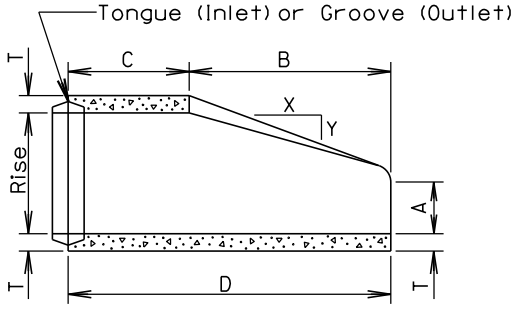
Sheet 1 of 1



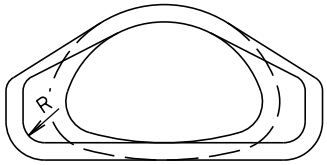
TOP VIEW



SLOPE DETAIL



LONGITUDINAL SECTION



END VIEW

GENERAL NOTES:

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

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

* Size (in.)	Approximate Weight of Section (lbs.)	Rise (in.)	Span (in.)	Slope (X:Y)	T (in.)	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	R (in.)
18	1100	13 1/2	22	3:1	2 1/2	7	27	45	72	36	2
24	1750	18	28 1/2	3:1	3 1/2	8 1/2	39	33	72	48	3
30	3300	22 1/2	36 1/4	3:1	4	9 1/2	50	46	96	60	3
36	4350	26 5/8	43 3/4	3:1	4 1/2	1 1 1/8	60	36	96	72	6
42	5250	31 5/16	51 1/8	3:1	4 1/2	15 13/16	60	36	96	78	6
48	6400	36	58 1/2	3:1	5	21	60	36	96	84	6
54	7850	40	65	3:1	5 1/2	25 1/2	60	36	96	90	6
60	9500	45	73 1/2	3:1	6	31	60	36	96	96	6
72	13550	54	88	2:1	7	31	60	39	99	120	6
84	17950	62	102	2:1	8	28 1/2	83	19	102	144	6

*Equivalent Diameter of Circular R. C. P.

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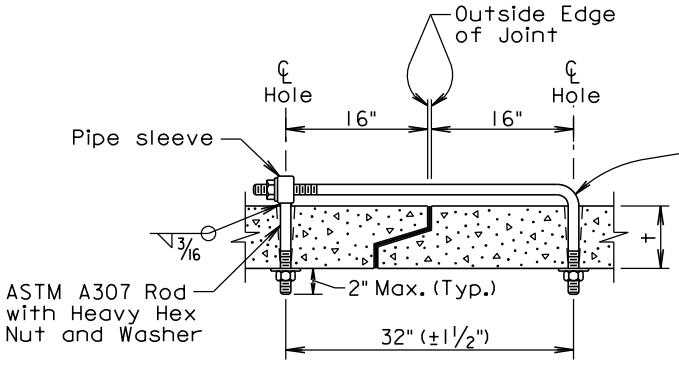
SDDOT

R. C. P. ARCH FLARED ENDS

PLATE NUMBER 450.11

Sheet 1 of 1

Wall "t" (in.)	Rod Dia. (in.)	Pipe Sleeve Dia. (nominal)
≤ 3¼	⅝	¾
3½-6½	¾	1
≥ 7	1	1¼



ADJUSTABLE EYE BOLT TIE

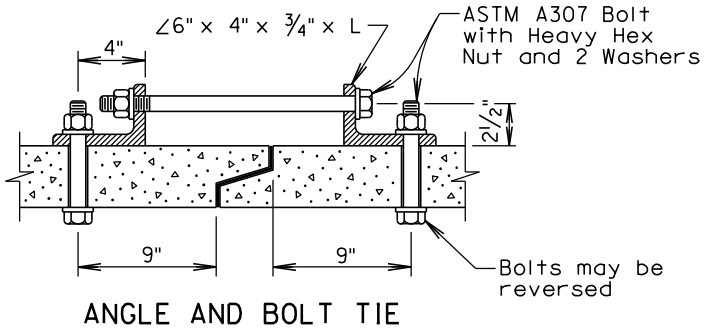
GENERAL NOTES:

Tie bolts shall conform to ASTM A307, Grade C. 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 adjustible eye bolt tie assembly in accordance with ASTM A153.

Pipe Dia. (in.)	"L" (in.)	Bolt Dia. (in.)
≤ 48	4	¾
> 48	6	1



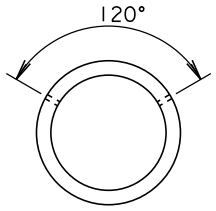
ANGLE AND BOLT TIE

GENERAL NOTES:

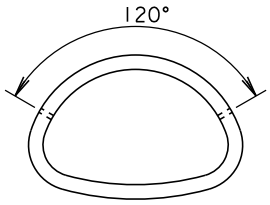
Angles shall conform to ASTM A36.

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.



END VIEW "CIRCULAR"



END VIEW "ARCH"

GENERAL NOTES:

In lieu of tie bolts detailed above, tecktonius fasteners or other type tie bolt connections may be installed if approved by the Engineer.

The first three sections (both inlet and outlet) of R.C.P. and R.C.P. Arch up to and including the 78" diameter or equivalent pipe shall be tied with tie bolts. Pipe sizes larger than 78" diameter or equivalent diameter shall have all sections tied. Each end section is considered as one section.

There will be no separate measurement or payment for tie bolts. The cost of 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.

September 14, 2011

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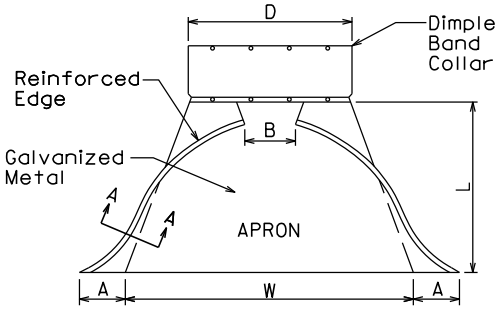
SDDOT

TIE BOLTS FOR R.C.P. END SECTIONS

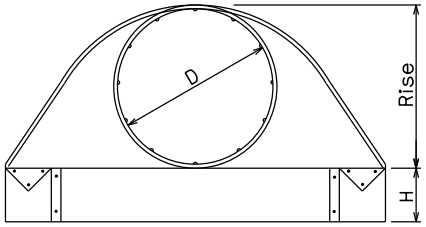
PLATE NUMBER
450.18

Sheet 1 of 1

Alternate Type Connector Sections may be used with approval of the Engineer.



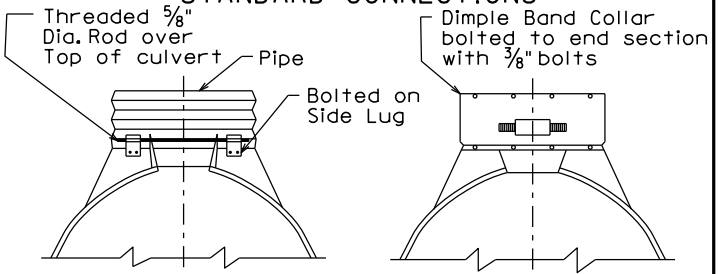
PLAN



ELEVATION

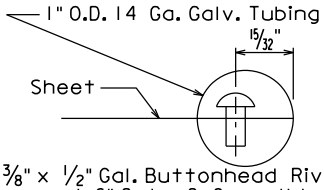
Dia. D (in.)	Ga.	DIMENSIONS (in.) A	B	H	L	W	Approx. Slope	Body
12	16	6	6	6	21	24	2½:1	1 Pc.
15	16	7	8	6	26	30	2½:1	1 Pc.
18	16	8	10	6	31	36	2½:1	1 Pc.
21	16	9	12	6	36	42	2½:1	1 Pc.
24	16	10	13	6	41	48	2½:1	1 Pc.
30	14	12	16	8	46	60	2½:1	1 Pc.
36	14	14	19	9	51	72	2½:1	2 Pc.
42	12	16	22	11	60	84	2½:1	2 Pc.
48	12	18	27	12	69	90	2¼:1	2 Pc.
54	12	18	30	12	78	102	2:1	3 Pc.
60	12	18	33	12	84	114	1¾:1	3 Pc.
66	12	18	36	12	87	120	1½:1	3 Pc.
72	12	18	39	12	87	126	1⅓:1	3 Pc.
78	12	18	42	12	87	132	1¼:1	3 Pc.
84	12	18	45	12	87	138	1⅙:1	3 Pc.

STANDARD CONNECTIONS



For 30" through 84"

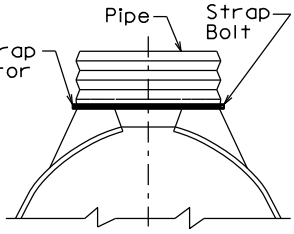
Alternate for all sizes



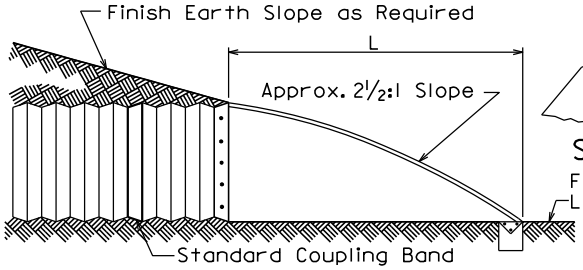
3/8" x 1/2" Gal. Buttonhead Rivets spaced 6" C. to C. Overall length of rivets=0.78"

TUBING ATTACHMENT DETAILS
SECTION A-A

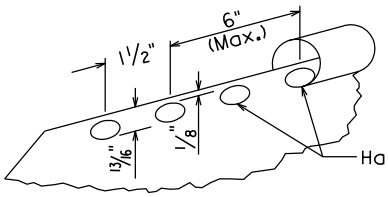
NOTE:
Tubing is slipped over the sheet and rivets or lugs prior to forming operations of the apron.



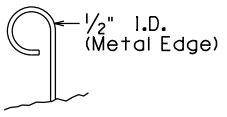
For 12" through 24" only



TYPICAL CROSS-SECTION



SECTION A-A (alternate)



SECTION A-A (alternate)

GENERAL NOTES:

All 3 pc. bodies shall have 12 Ga. sides and 10 Ga. center panels. Width of center panels shall be greater than 20% of the pipe periphery. Multiple panel bodies to have lap seams tightly joined by 3/8" Dia. galvanized rivets or bolts.

For 60" through 84" sizes, reinforced edges shall be supplemented with galvanized stiffener angles. The angles will be 2" x 2" x 1/4" for 60" through 72" diameters and 2½" x 2½" x 1/4" for 78" and 84" diameters. The angles shall be attached by 3/8" diameter galvanized nuts and bolts.

Rivets and Bolts shall be 3/8" Dia. Min. for 10 Ga. and 12 Ga. sheet, and 5/16" Dia. Min. for 14 Ga. and 16 Ga. sheets. Tighten nuts with torque wrench to 25 lbs. torque.

March 31, 2000

Published Date: 2nd Qtr. 2012	SDDOT	**C.M.P. FLARED ENDS**	*PLATE NUMBER* 450.35
			Sheet 1 of 1

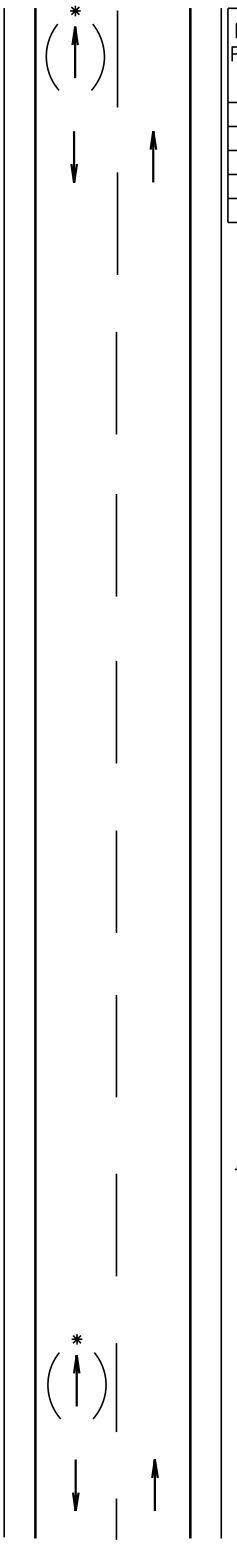
The signs illustrated are not required if the work space is behind a barrier, more than 2 feet behind the curb, or 15 feet or more from the edge of any roadway.

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.

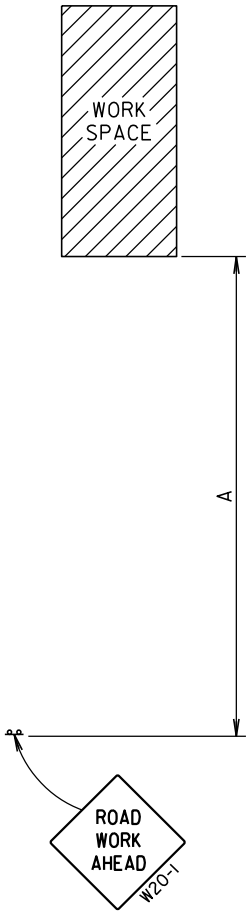
The ROAD WORK AHEAD sign may be replaced with other appropriate signs, such as the SHOULDER WORK sign. The SHOULDER WORK sign may be used for work adjacent to the shoulder.

* 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



July 1, 2005

Published Date: 2nd Qtr. 2012

SDDOT

GUIDES FOR TRAFFIC CONTROL DEVICES
WORK BEYOND THE SHOULDER

PLATE NUMBER
634.01

Sheet 1 of 1

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

Flagger

Channelizing Device

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

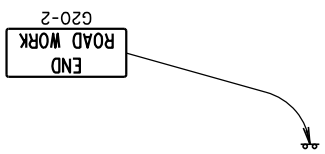
The ROAD WORK AHEAD and the END ROAD WORK signs may be omitted for short duration operations (1 hour or less).

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

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

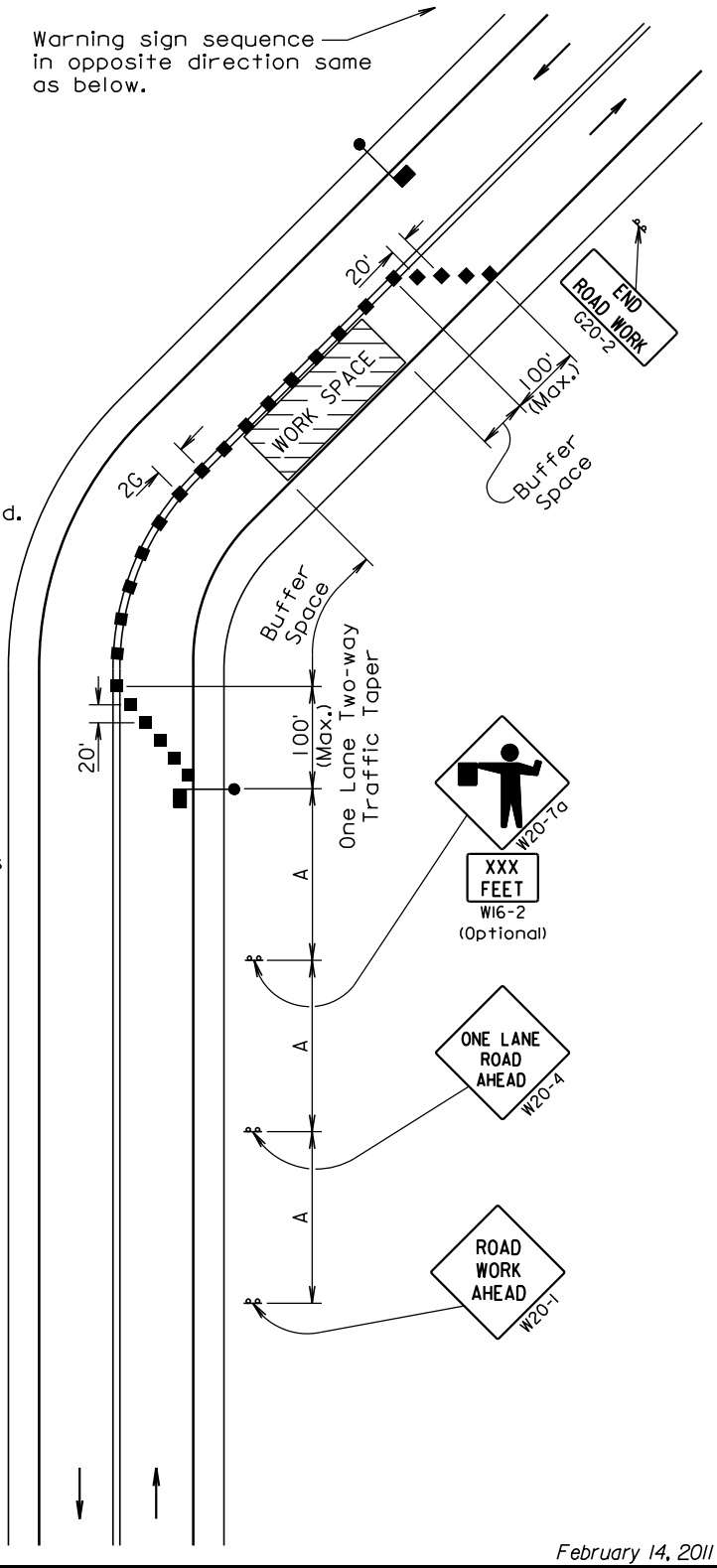
The channelizing devices shall be drums or 42" cones.

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



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

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



February 14, 2011

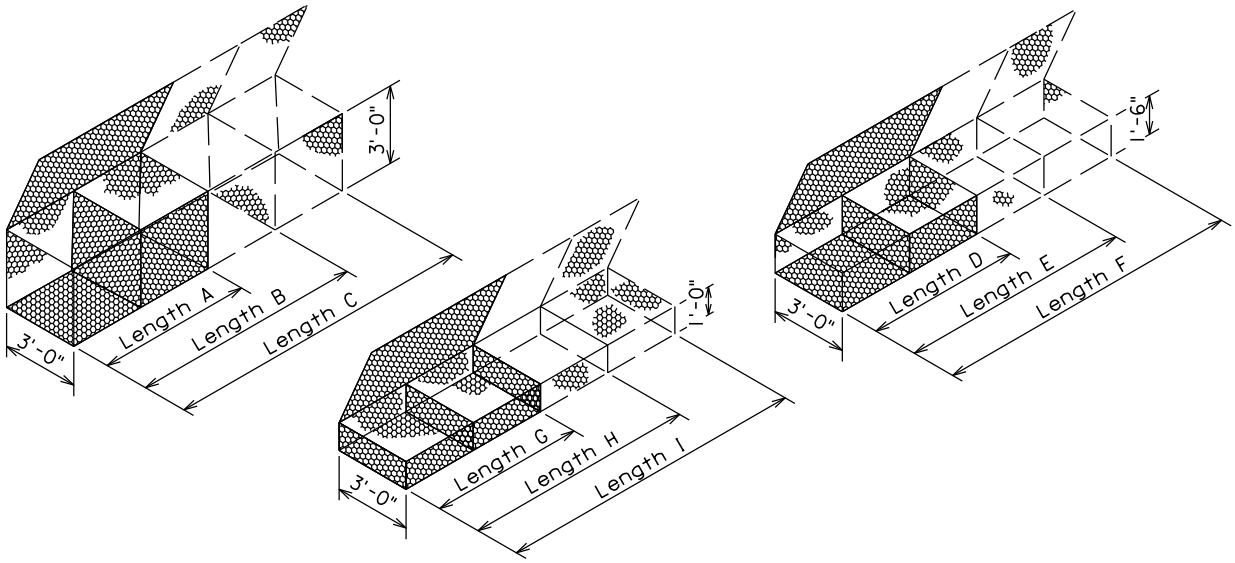
Published Date: 2nd Qtr. 2012

SDDOT

GUIDES FOR TRAFFIC CONTROL DEVICES
LANE CLOSURE WITH FLAGGER PROVIDED

PLATE NUMBER
634.23

Sheet 1 of 1



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 A641 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 ½ 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.

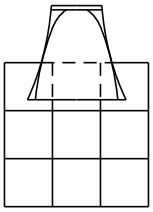
Wire lacing or interlocking type fasteners shall be used for gabion assembly and final construction of gabion structures. Interlocking fasteners for galvanized gabions shall be high tensile 0.120 inch diameter galvanized steel wire measured after galvanizing. The galvanizing shall conform to ASTM A641-92 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 1. 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

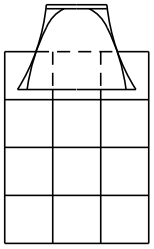
Published Date: 2nd Qtr. 2012	SDDOT	**BANK AND CHANNEL PROTECTION GABIONS**	*PLATE NUMBER* 720.01 *Sheet 1 of 1*

12", 18", & 24" RCP & CMP
12", 18", & 24" RCP Arch & CMP Arch



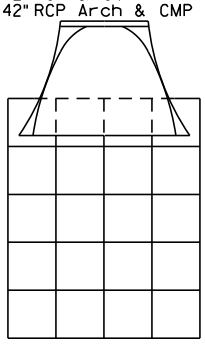
4.5 Cu. Yds.

30" & 36" RCP & CMP
30" & 36" RCP Arch & CMP Arch



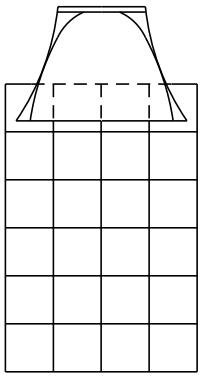
6.0 Cu. Yds.

42" RCP & CMP
42" RCP Arch & CMP Arch



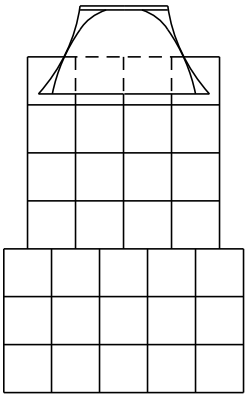
10.0 Cu. Yds.

48" & 54" RCP & CMP
48" & 54" RCP Arch & CMP Arch



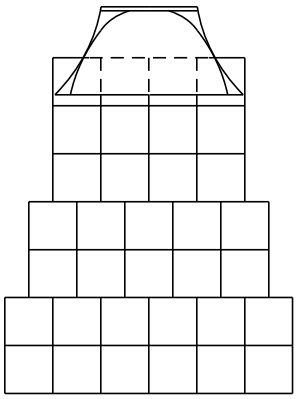
12.0 Cu. Yds.

60" RCP & CMP
60" RCP Arch & CMP Arch



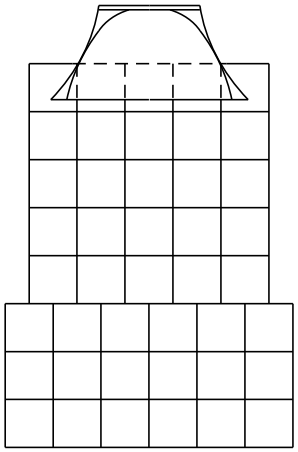
15.5 Cu. Yds.

66" RCP & CMP



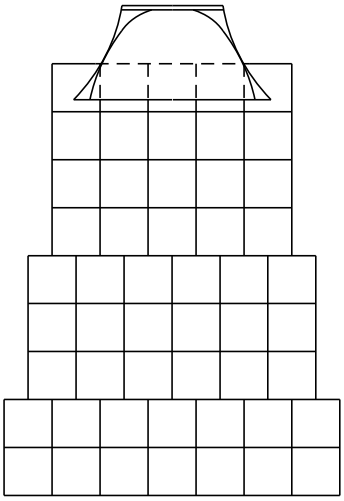
17.0 Cu. Yds.

72" RCP & CMP
72" RCP Arch & CMP Arch



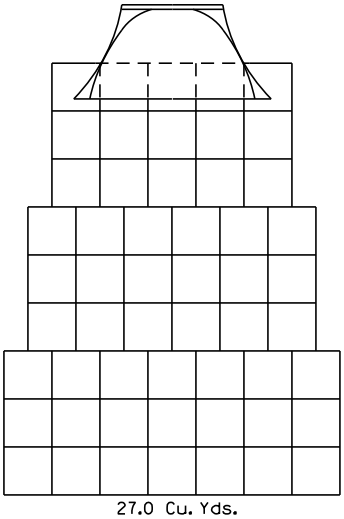
21.5 Cu. Yds.

78" RCP & CMP



26.0 Cu. Yds.

84" RCP & CMP



27.0 Cu. Yds.

GENERAL NOTES:

Gabions at outlets of C. M. pipe and R. C. pipe shall be placed under the end section a distance of 2' from the outlet end of the section. For C. M. pipe end section installations, the upper fabric of the gabions shall be modified to accommodate the metal end section in a manner approved by the Engineer.

Quantities shown on this standard plate are based on standard gabion sizes D, E, and F (See Standard Plate 720.01).

June 26, 2001

Published Date: 2nd Qtr. 2012	SDDOT	BANK AND CHANNEL PROTECTION GABION PLACEMENT UNDER PIPE END SECTIONS	PLATE NUMBER 720.03 Sheet 1 of 1