STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	410D396 PCN I5JQ	1	28

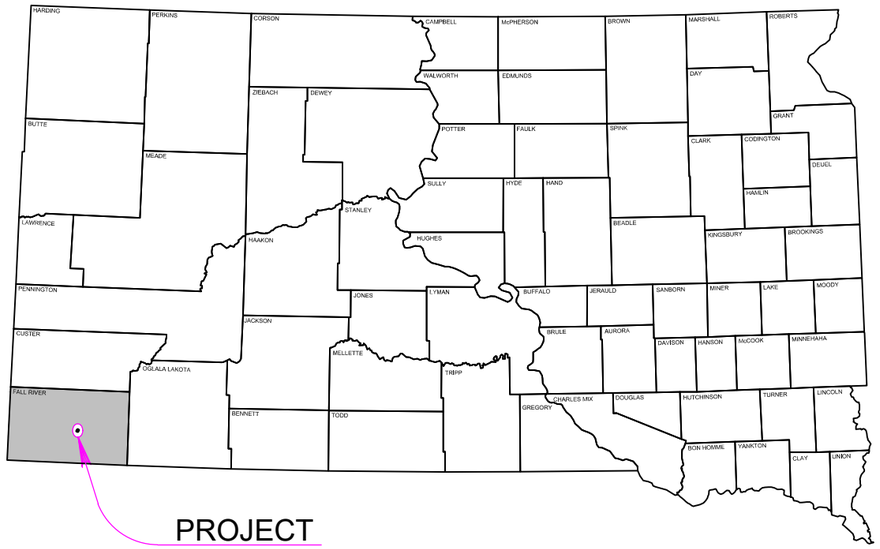
Plotting Date: 5/6/19

STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED

PROJECT 410D396
FALL RIVER COUNTY

HOT SPRINGS MAINTENANCE YARD AT MAVERICK JUNCTION
PCN I5JQ

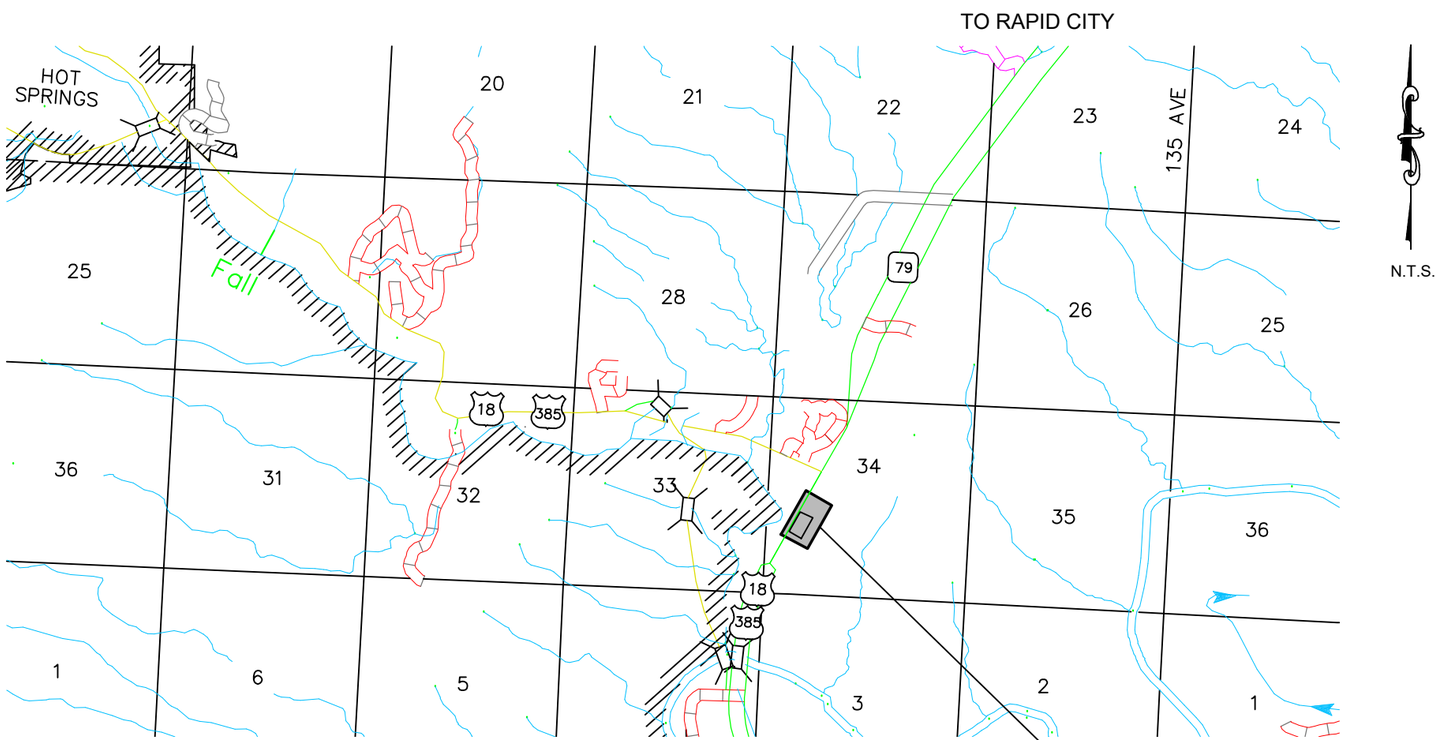


PREPARED BY:

FEC
- Civil Engineering
- Geospatial Solutions
- Water Resources
- Transportation
- Land Surveying

729 East Watertown St, Rapid City, SD 57701 ~ Phone: (605) 343-3311

INDEX OF SHEETS



PROJECT LOCATION MAP

NOT TO SCALE

EXISTING LEGEND

BOREHOLE	POWER POLE
CABLE TV OR TELEPHONE RISER	TYPE "E" INLET
ELECTRICAL JUNCTION BOX	TYPE "B" INLET
FIBER OPTIC VAULT	MAILBOX
BLACK HILLS FIBER	DELINEATOR
DECIDUOUS TREE	
CONIFEROUS TREE	EXISTING CURB AND GUTTER
DECIDUOUS HEDGE/TREE LINE	SANITARY SEWER LINE (S)
CONIFEROUS HEDGE/TREE LINE	STORM SEWER LINE (18" RCP)
DECIDUOUS BUSH	WATER LINE (W)
CONIFEROUS BUSH	WATER SERVICE LINE (WS)
STUMP	TELEPHONE\FIBER LINE (T/F)
2 POLE SIGN	OVERHEAD LINES (POWER, CABLE, ETC) (OH)
1 POLE SIGN	POWER LINE (P)
POST / BOLLARD	GAS LINE (G)
FIRE HYDRANT	FIBEROPTIC LINE (FO)
MONITORING WELL	CABLE TV LINE (TV)
CURB STOP	BARBED WIRE FENCE
IRRIGATION CONTROL VALVE	BUILDING LINE
GATE VALVE	PROPERTY LINE
WATER MANHOLE	SECTION LINE
TELEPHONE MANHOLE	EASEMENT LINE
STORM SEWER MANHOLE	MAJOR CONTOUR (100)
SANITARY SEWER MANHOLE	MINOR CONTOUR
CLEAN OUT	
GAS METER	
CONTROL POINT	
RIGHT-OF-WAY MARKER	
ELECTRICAL MANHOLE	
LIGHT POLE	
GUY WIRE ANCHOR	
LUMINAIRE	

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 8019
JOHN RAYMOND
MAY BEEK
SOUTH DAKOTA
5/9/19

STORM WATER PERMIT
Major Receiving Body of Water: Fall River, Cheyenne River
Area Disturbed: 4.0 Acres
Total Project Area: 9.3 Acres
Approx. Begin Lat/Long 43.3949/103.3990

Plotted from– kevinl

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ESTIMATE OF QUANTITIES

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
110E1050	Remove Asphalt Concrete Approach Pavement	83.5	SqYd
120E0010	Unclassified Excavation	2354	CuYd
230E0010	Placing Topsoil	67	CuYd
250E0010	Incidental Work	Lump Sum	LS
260E1050	Base Course, Salvaged Asphalt Mix	2678.0	Ton
270E0042	Salvage Asphalt Mix and Granular Base Material	2678.0	Ton
320E1200	Asphalt Concrete Composite	3767.7	Ton
380E4010	6" PCC Fillet Section	34.9	SqYd
450E0122	18" RCP Class 2, Furnish	42	Ft
450E0130	18" RCP, Install	42	Ft
450E2008	18" RCP Flared End, Furnish	1	Each
450E2009	18" RCP Flared End, Install	1	Each
650E0059	Modified Type B66 Concrete Curb and Gutter	82	Ft
650E0060	Type B66 Concrete Curb and Gutter	249	Ft
650E0360	Type BL66 Concrete Curb and Gutter	132	Ft
650E4360	Type D46 Concrete Curb and Gutter	59	Ft
650E6260	6" Concrete Valley Gutter	394.0	SqYd
670E9010	Type I Drop Inlet	1	Each
671E6035	Special Manhole Frame and Lid	1	Each
700E0110	Class A Riprap	40.1	Ton
730E0210	Type F Permanent Seed Mixture	3	Lb
731E0100	Fertilizing	252	Lb
732E0250	Fiber Mulching	315	Lb
734E0102	Type 2 Erosion Control Blanket	551	SqYd
734E0154	12" Diameter Erosion Control Wattle	582	Ft
734E0604	High Flow Silt Fence	65	Ft
831E0110	Type B Drainage Fabric	66	SqYd
900E1320	Construction Entrance	1	Each

SPECIFICATIONS

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

ENVIRONMENTAL COMMITMENTS

The SDDOT is committed to protecting the environment and uses Section A Environmental Commitments as a communication tool for the Engineer and Contractor to ensure that attention is given to avoid, minimize, and/or mitigate an environmental impact. Environmental commitments to various agencies and the public have been made to secure approval of this project. An agency with permitting authority can delay a project if identified environmental impacts have not been adequately addressed. Unless otherwise designated, the Contractor's primary contact regarding matters associated with these commitments will be the Project Engineer. These environmental commitments are not subject to change without prior written approval from the SDDOT Environmental Office.

Additional guidance on SDDOT's Environmental Commitments can be accessed through the Environmental Procedures Manual found at: http://www.sddot.com/resources/Manuals/EnvironProcManual.pdf

For questions regarding change orders in the field that may have an effect on an Environmental Commitment, the Project Engineer will contact the Environmental Office at 605-773-3098 or 605-773-4336 to determine whether an environmental analysis and/or resource agency coordination is necessary.

COMMITMENT E: STORMWATER

Construction activities constitute more than 1 acre of disturbance.

Action Taken/Required:

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

Construction activities constitute 1 acre or more of earth disturbance.

COMMITMETN H: WASTE DISPOSAL SITE

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

Action Taken/Required:

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

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

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

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

1. Construction and/or demolition debris consisting of concrete, asphalt concrete, or other similar materials shall be buried in a trench completely separate from wood debris. The final cover over the construction and/or demolition debris shall consist o a minimum of 1 foot of soil capable of supporting vegetation. Waste disposal sites provided outside of the Public 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 Public 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 wasted permit as specified in SDCL 34A-6-58. SDCL 34A-6-1.13, and ARSD 74:27:10:06.

COMMITMENT I: HISTORICAL PRESERVATION OFFICE CLEARANCES

State Historical Preservation Office (SHPO or THPO) concurrence has not been obtained for this project.

Action Taken/Required:

All earth disturbing activities not designated within the plans require a cultural resource review prior to scheduling the pre-construction meeting. This work includes, but is not limited to: Contractor furnished material sources, material processing sites, stockpile sites, storage areas, plant sites, and waste areas.

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

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

The Contractor will submit the cultural resources survey report to SDDOT Environmental Office, 700 East Broadway Avenue, Pierre, SD 57501-2586. SDDOT will submit the information to the appropriate SHPO/THPO. Allow **30 Days** from the date this information is submitted to the Environmental Engineer for SHPO/THPO review.

In the event of an inadvertent discovery of human remains, funerary objects, or if evidence of cultural resources is identified during project construction activities, then such activities will immediately cease and the Project Engineer will be immediately notified. The Project Engineer will contact the SDDOT Environmental Office to determine an appropriate course of action.

SHPO/THPO review does not relieve the Contractor of the responsibility
The Contractor is responsible for obtaining any additional permits and clearances for Contractor furnished material sources, material processing sites, stockpile sites, storage areas, plant sites, and waste areas that affect wetlands, threatened and endangered species, or waterways. The Contractor will not utilize a site known or suspected of having contaminated soil or water. The Contractor will provide the required permits and clearances to the Project Engineer at the preconstruction meeting.

UTILITIES

The Contractor will 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 will 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.

INCIDENTAL WORK

This work includes all miscellaneous items not included under the regular items covered by unit prices as listed in the proposal, but which must be performed in order to complete the contract. Specific Incidental items are shown on the drawings and will be paid for at the contract lump sum price for “Incidental Work.” Incidental work includes, but is not limited to the following:

1. Surface preparation including subgrade scarification and recompacting.
2. Removal of temporary Erosion and Sediment Control items.
3. Traffic Control.
4. Clearing and Grubbing.
5. Miscellaneous grading around Inlets, Outlets, and Riprap.
6. Sweeping.
7. Dust Control.
8. Protection of existing features/utilities.

CONSTRUCTION STAKING

Construction staking shall be provided by SDDOT

COORDINATION

Contractor shall coordinate with SDDOT to relocate equipment, stockpiles and any miscellaneous items located on site. SDDOT will be responsible for relocating items but shall require a minimum of five working days’ notice prior to relocating.

ON SITE SURFACING

The existing on-site surfacing material shall be considered “Asphalt Mix and Granular Base Material”. The Asphalt Mix and Granular Base Material shall be used for all base material called out in the plans. The contractor will not need to import base material. If additional material is needed it shall be the responsibility of the SDDOT.

Refer to Sheet 13 for Typical Sections and clean line cut and fill locations.

SEQUENCE OF OPPERATIONS

After Erosion and Sediment Control Measures are installed the contractor can begin excavating and salvaging the existing Asphalt Mix and Granular Base Material within the cut section. The contractor shall begin work in the areas identified as cut sections on Sheet 13. The top 9 inches of existing material shall be excavated and salvaged. Subgrade excavation, scarification and recompaction shall occur prior to placement of the salvaged material in the cut sections. The salvaged material shall then be placed at a minimum depth of 6 inches. The remainder of salvaged material shall then be placed in the areas identified as fill locations. The contractor shall place the salvaged material in a manner not to exceed design grades. If the amount of salvaged material does not cover the fill area, it shall be evenly spread and compacted so that the surface maintains positive drainage. Transitions from the cut and fill locations shall be done in a manner that maintains positive drainage away from buildings and allows drainage into the newly improved stormwater pond. Asphalt Concrete Composite shall be placed after all base material has been properly compacted and proof rolled.

PROCEDURES FOR DETERMINING UNCLASSIFIED EXCAVATION QUANTITY

The following paragraphs are general earthwork information and information in regard to computing the Unclassified Excavation quantity:

Unclassified Excavation includes the excavation of soil below subgrade, excavation of the salvaged material, and stripping topsoil.

The Topsoil quantity in the Table of Unclassified Excavation is calculated assuming an in-place depth of 4-inches. Topsoil removal shall be paid for as Unclassified Excavation. Plans quantity will be the basis of payment, no additional measurement or payment will be made. Topsoil Placement shall be at the locations where topsoil was removed and shall be paid for at the contract unit price per cubic yard for “Placing Topsoil.” Plans quantity will be the basis of payment, no additional measurement or payment will be made.

Salvaged Asphalt Mix and Granular Base Material will be paid for once as Unclassified Excavation. As shown in the Table of Unclassified Excavation, the estimated quantity of Salvaged Asphalt Mix and Granular Base Material from the cut area is 1785 cubic yards.

Table of Excavation is provided on Sheet 13.

SALVAGE AND STOCKPILE ASPHALT MIX AND GRANULAR BASE MATERIAL

The site is estimated to have approximately 9-inches of asphalt millings and granular base material. The estimated base material was identified by on-site personnel with knowledge of the site.

An estimated 2678 tons of asphalt mix and granular base material will be salvaged from the cut areas as generally identified on Sheet 13. The salvaged tonnage is calculated using 1.5 tons per cubic yard. The salvaged material shall be temporarily stockpiled on site at a location identified by the SDDOT during construction.

The quantity of Salvage Asphalt Mix and Granular Base Material may vary from the plans. The contractor shall measure the stockpile utilizing acceptable survey methods. Actual field measurements shall be the basis of payment for the Salvage and Stockpile Asphalt Mix and Granular Base Material. The conversion factor to determine quantities shall be 1.5 tons per cubic yard.

The measured stockpile quantity shall be the basis of payment for both the salvaging and placement of the Asphalt mix unless determined otherwise by the engineer.

Placement of the salvaged material shall be paid for at the contract unit price per ton for Base Course, Salvaged Asphalt Mix.

TABLE OF ASPHALT CONCRETE APPROACH PAVEMENT REMOVAL

Location	Quantity (SqYd)
Site Entrance	83.5
Total:	83.5

TABLE OF RIPRAP AND DRAINAGE FABRIC

Northing	Easting	Class A Riprap (Ton)	Type B Drainage Fabric (SqYd)
401891.2	1153688.2	4.6	9.7
401672.1	1153875.7	27.3	41.0
402282.6	1153814.5	8.2	15.0
	Totals:	40.1	65.7

TABLE OF ASPHALT CONCRETE COMPOSITE

Location	Quantity (Ton)
Entire Site	3767.7
Total:	3767.7

TABLE OF TYPE B66 CONCRETE CURB AND GUTTER

Northing	Easting	Quantity (Ft)
401895.9	1153706.1	131.9
402023.9	1153763.9	44.8
402071.4	1153790.7	72.3
	Total:	249.0

TABLE OF TYPE BL66 CONCRETE GUTTER

Northing	Easting	Quantity (Ft)
402045.5	1153775.1	6.0
4022199	1153878.1	125.9
	Total:	131.9

TABLE OF TYPE D46 CONCRETE GUTTER

Northing	Easting	Quantity (Ft)
402284.3	1153917.3	58.6
	Total:	58.6

TABLE OF TYPE MODIFIED TYPE B66 CONCRETE CURB AND GUTTER

Northing	Easting	Quantity (Ft)
402195.6	1153918.6	4.3
402189.9	1153943.6	36.9
402128.7	1153958.9	40.8
	Total:	82.0

6” PCC FILLET SECTIONS

Payment for “6” PCC Fillet Section” will be based on plans quantity. If additions or reductions to the area of PCC fillet sections are ordered by the Engineer, payment will be made in accordance with the contract unit price per square yard for “6” PCC Fillet Section”.

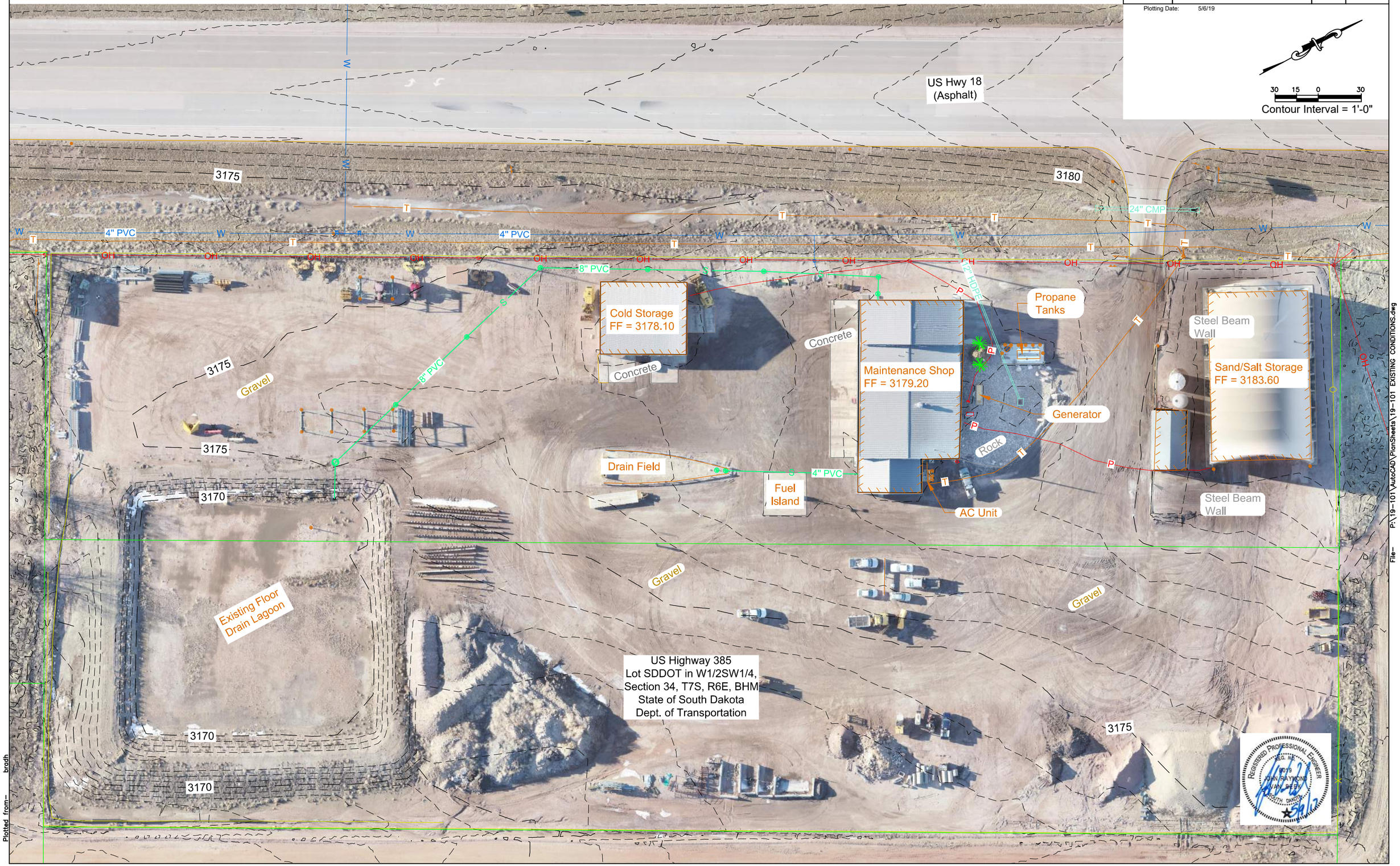
TABLE OF 6" PCC FILLET AND PAN SECTION

Northing	Easting		Quantity (SqYd)
402201.5	1153922.4	Fillet	4.4
402166.3	1153976.0	Fillet	30.5
		Total:	34.9

EXISTING CONDITIONS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	410D396 PCN I5JQ	5	28

Plotting Date: 5/6/19



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Plotted from– brodh

PERMANENT SEEDING

The areas to be seeded consist of all newly graded areas within the project limits except for the paved areas.

Type F Permanent Seed Mixture will consist of the following:

Grass Species	Variety	Pure Live Seed (PLS) (Pounds/Acre)
Western Wheatgrass	Arriba, Flintlock, Rodan, Rosana, Walsh	7
Green Needlegrass	Lodorm, AC Mallard Ecovar	4
Sideoats Grama	Butte, Pierre	3
Blue Grama	Bad River	2
Oats or Spring Wheat: April through May; Winter Wheat: August through November		10
	Total:	26

FERTILIZING

The Contractor will apply an all-natural slow release fertilizer prior to seeding or placing sod. The all-natural fertilizer will have a minimum guaranteed analysis of 4-4-4 and be USDA Certified BioBased. It should provide a minimum of 4% (N) nitrogen with a minimum water insoluble nitrogen (WIN) fraction of 2.07%, a minimum of 4% (P2O5) available phosphate, a minimum of 4% (K2O) soluble potash, and a maximum carbon to nitrogen ratio (C:N ratio) of 5:1. The all-natural fertilizer will be free of weed-seed and pathogens accomplished through thermophilic composting, and not mechanical or chemical sterilization, to assure presence of beneficial soil microbiology. The fertilizer will have a near neutral pH, a low salt index, a low biological oxygen demand, contain organic humic and fulvic acids, and have high aerobic organism counts. The fertilizer will also be stable, free of bad odors, and be unattractive as a food source for animals. It should also be in a granular form that is easily spread.

The fertilizer will be applied at a rate of 2,000 pounds per acre in accordance with the manufacturer's recommended method of application.

The all-natural slow release fertilizer will be as shown below or an approved equal:

Product	Manufacturer
Sustane	Sustane Corporate Headquarters Cannon Falls, Minnesota Phone: 1-800-352-9245 www.sustane.com
Perfect Blend	Perfect Blend, LLC Bellevue, WA Phone: 1-866-456-8890 www.perfect-blend.com

FIBER MULCHING

Fiber mulch will be applied in a separate operation following permanent seeding.

An additional 2% by weight of tackifier will be added to the fiber mulch product selected from the approved product list. If the product selected has guar gum tackifier included, then the additional 2% of tackifier will be guar gum. If the product selected has synthetic tackifier included, then the additional 2% of tackifier will be synthetic.

Fiber mulch will be applied at the rate of 2,500 pounds per acre.

The Contractor will allow the fiber mulch to cure a minimum of 18 hours prior to watering or any storm event to ensure proper cohesion between the soil and fiber particles.

All costs for the additional tackifier added to the fiber mulch including labor, equipment, and materials will be incidental to the contract unit price per pound for "Fiber Mulching".

The fiber mulch provided will be from the approved product list. The approved product list for fiber mulch may be viewed at the following internet site:

http://sddot.com/business/certification/products/Default.aspx

EROSION CONTROL WATTLE

Erosion control wattles for restraining the flow of runoff and sediment will be installed at locations noted in the table and at locations determined by the Engineer during construction. Refer to Standard Plate 734.06 for details.

The Contractor will provide certification that the erosion control wattles do not contain noxious weed seeds.

Erosion control wattles will remain on the project to decompose.

The erosion control wattle provided will be from the approved product list. The approved product list for erosion control wattle may be viewed at the following internet site:

http://sddot.com/business/certification/products/Default.aspx

TABLE OF EROSION CONTROL WATTLE

N	E	Diameter (Inch)	Location	Quantity (Ft)
401834.23,	1153644.67	12"	East Property Line	498
402282.17	1153863.18	12"	South of Access	32
401471.14	1153811.18	12"	South Outlet	24
401466.23	1153810.89	12"	South Outlet	28
			Total:	582

HIGH FLOW SILT FENCE

The high flow silt fence fabric provided will be from the approved product list. The approved product list for high flow silt fence may be viewed at the following internet site:

http://sddot.com/business/certification/products/Default.aspx

High flow silt fence will be placed at the locations noted in the table and at locations that will minimize siltation of adjacent streams, lakes, dams, or drainage areas as determined by the Engineer during construction. Refer to Standard Plate 734.05 for details.

TABLE OF HIGH FLOW SILT FENCE

N	E	Location	Quantity (Ft)
402166.55	1153933.27	North Pond Outlet	32
401523.60	1153832.17	South Pond Outlet	34
		Total:	66

EROSION CONTROL BLANKET

Erosion control blanket will be installed at the locations noted in the table and at locations determined by the Engineer during construction.

The erosion control blanket provided will be from the approved product list. The approved product list for erosion control blanket may be viewed at the following internet site:

http://sddot.com/business/certification/products/Default.aspx

TABLE OF EROSION CONTROL BLANKET

N	E	Location	Type	Quantity (SqYd)
401624.35	1153822.37	South Pond	2	551
			Total Type 2 Erosion Control Blanket:	551

SHAPING FOR EROSION CONTROL BLANKET

The ditches will be shaped for the erosion control blanket as specified on Standard Plate 734.01.

Shaping for erosion control blanket shall be incidental to the contract unit price per sq yd for the various types of erosion control blanket.

CONSTRUCTION ENTRANCE

The Contractor will install a Construction Entrance at locations where there is a potential for mud tracking and sediment flow from the construction site and work area onto a paved public roadway.

It is the Contractor's option to use the SDDOT Construction Entrance (See SDDOT Construction Entrance notes and details), a product from the list provided in these notes, or other products or processes as approved by the Engineer during construction.

If the Contractor elects to use one of the products listed in the table, then the Contractor will install the construction entrance product in accordance with the manufacturer's installation instructions or as directed by the Engineer.

The Contractor will maintain the construction entrance such that mud tracking and sediment flow will not enter the roadway or adjacent drainage areas. The construction entrance will be routinely inspected, and the Contractor will repair or replace material as deemed necessary by the Engineer.

All costs for furnishing, installing, maintaining, and removal of the construction entrance including equipment, labor, materials, and incidentals will be included in the contract unit price per each for "Construction Entrance".

The following table is a list of known construction entrance products available for use:

Product	Manufacturer
Grizzly Rumble Grate (10' width and 24' length required)	Trackout Control, LLC Tempe, AZ Phone: 1-800-761-0056 www.trackoutcontrol.com
Rumble Grid (12' width and 24' length including combination of grids and ramps required)	Pro-Tec Equipment, Inc. Charlotte, MI Phone: 1-800-292-1225 www.pro-tecequipment.com
Tracking Pad (12' width and 24' length (2 – 12'x12' pads) and 2 – 4'x4' turning flares)	Tracking Pads LLC Denver, CO Phone: 1-719-371-3791 www.trackingpads.com
FODS Trackout Control Mat (12' width and 10 mats To get a 70' length)	FODS, LLC Denver, CO Phone: 1-844-200-3637 getfods.com
DuraDeck and MegaDeck HD An adequate quantity is needed to prevent tires from becoming muddy (does not remove mud)	Signature Systems Group, LLC Flower Mound, TX Phone: 1-800-709-8151 www.duradeckmats.com

SDDOT CONSTRUCTION ENTRANCE

If the SDDOT Construction Entrance is utilized, then the Contractor will install the SDDOT Construction Entrance in accordance with these notes and the detail drawings.

Pit run material will be obtained from a granular source and will conform to the following gradation:

Sieve Size	Percent Passing
6"	100%
#4	0-60%
#200	0-20%

The pit run material will be compacted to the satisfaction of the Engineer.

The aggregate for the granular material will conform to the following gradation requirements:

Sieve Size	Percent Passing
3"	100%
2 ½"	90-100%
1 ½"	25-60%
¾"	0-10%
½"	0-5%

The granular material will be placed in 6" maximum lifts.

It is anticipated that the granular material will need to be periodically removed and replaced as it becomes inundated with mud and sediment.

The Reinforcement Fabric (MSE) will be in conformance with Section 831 of the Specifications. The Reinforcement Fabric (MSE) will be on the Approved Products List for this material or will be certified by the supplier to meet this specification prior to installation.

The Reinforcement Fabric (MSE) should be kept as taut as possible prior to placing.

Equipment will not be allowed on the Reinforcement Fabric (MSE) until the first lift of granular material is in place.

All seams in the Reinforcement Fabric (MSE) will be overlapped at least 2' and shingled.

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 9079
JOHN RAYMOND VAN BEEK
SOUTH DAKOTA
5/9/22

STORMWATER POLLUTION PREVENTION PLAN CHECKLIST
*(The numbers left of the title headings are **reference numbers** to the GENERAL PERMIT FOR STORM WATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITIES (Stormwater Permit))*

5.3 (2): STAFF TRAINING/SWPPP IMPLEMENTATION
To promote stormwater management awareness specific for this project, the Contractor's Erosion Control Supervisor should provide correspondence of how the SWPPP will be implemented. The Contractor's Erosion Control Supervisor is responsible for providing this information at the preconstruction meeting, and subsequently completing an attendance log, which should identify site-specific implementation of the SWPPP and the names of the personnel who attended the preconstruction meeting. Documentation of the preconstruction meeting will be filed with the SWPPP documents.

5.3 (3): DESCRIPTION OF CONSTRUCTION ACTIVITIES

- **5.3 (3a): Project Limits** (See Title Sheet)
- **5.3 (3a): Project Description** (See Title Sheet)
- **5.3 (4): Site Map(s)** (See Title Sheet and Plans)
- **Major Soil Disturbing Activities** (check all that apply)
  - ☐ Clearing and grubbing
  - ☐ Excavation/borrow
  - ☒ Grading and shaping
  - ☐ Filling
  - ☒ Other (describe): Paving
- **5.3 (3b): Total Project Area**
- **5.3 (3b): Total Area to be Disturbed**
- **5.3 (3c): Maximum Area Disturbed at One Time**
- **5.3 (3d): Existing Vegetative Cover (%)**
- **5.3 (3d): Description of Vegetative Cover**

- **5.3 (3e): Soil Properties:** SC
- **5.3 (3f): Name of Receiving Water Body/Bodies** Fall River (Cheyenne River)
- **5.3 (3g): Location of Construction Support Activity Areas** None external to site

5.3 (3h): ORDER OF CONSTRUCTION ACTIVITIES
The Contractor will enter the Estimated Start Date.

Description	Estimated Start Date
Install stabilized construction entrance(s).	
Install perimeter protection where runoff may exit site.	
Install perimeter protection.	
Install utilities, storm sewers, curb and gutter.	
Install inlet and culvert protection after completing storm drainage and other utility installations.	
Final grading.	
Final paving.	
Removal of protection devices.	
Reseed areas disturbed by removal activities.	

5.3 (5): DESCRIPTION AND MAINTENANCE OF CONTROL MEASURES
All controls will be maintained in good working order. Necessary repairs will be initiated within 24 hours of the site inspection report. Include the technical reasoning for selecting each control. (check all that apply)

Perimeter Controls (See Detail Plan Sheets)

Description	Estimated Start Date
☐ Natural Buffers (within 50 ft of Waters of State)	
☒ Silt Fence	
☐ Erosion Control Wattles	
☐ Temporary Berm / Windrow	
☐ Floating Silt Curtain	
☒ Stabilized Construction Entrances	
☐ Entrance/Exit Equipment Tire Wash	
☐ Other:	

Structural Erosion and Sediment Controls

Description	Estimated Start Date
☐ Silt Fence	
☐ Temporary Berm/Windrow	
☒ Erosion Control Wattles	
☐ Temporary Sediment Barriers	
☐ Erosion Bales	
☐ Temporary Slope Drain	
☐ Turf Reinforcement Mat	
☒ Riprap	
☐ Gabions	
☐ Rock Check Dams	
☐ Sediment Traps/Basins	
☐ Culvert Inlet Protection	
☐ Transition Mats	
☐ Median/Area Drain Inlet Protection	
☐ Curb Inlet Protection	
☐ Interceptor Ditch	
☐ Concrete Washout Facility	
☐ Work Platform	
☐ Temporary Water Barrier	
☐ Temporary Water Crossing	
☐ Permanent Stormwater Ponds	
☐ Permanent Open Vegetated Swales	
☐ Natural Depressions to allow for Infiltration	
☐ Sequential Systems that combine several practices	
☐ Other:	

Dust Controls

Description	Estimated Start Date
☐ Tarps & Wind impervious fabrics	
☐ Watering	
☐ Stockpile location/orientation	
☐ Dust Control Chlorides	
☐ Other	

Dewatering BMPs

Description	Estimated Start Date
☐ Sediment Basins	
☐ Dewatering bags	
☐ Weir tanks	
☐ Temporary Diversion Channel	
☐ Other:	

Stabilization Practices (See Detail Plan Sheets)
(Stabilization measures shall begin the following work day whenever earth disturbing activity on any portion of the site has temporarily or permanently ceased. Temporary stabilization shall be completed as soon as practicable but no later than 14 days after initiating soil stabilization activities (**3.18**))

Description	Estimated Start Date
☐ Vegetation Buffer Strips	
☐ Temporary Seeding (Cover Crop Seeding)	
☒ Permanent Seeding	
☐ Sodding	
☐ Planting (Woody Vegetation for Soil Stabilization)	
☐ Mulching (Grass Hay or Straw)	
☒ Fiber Mulching (Wood Fiber Mulch)	
☐ Soil Stabilizer	
☐ Bonded Fiber Matrix	
☐ Fiber Reinforced Matrix	
☐ Erosion Control Blankets	
☐ Surface Roughening (e.g. tracking)	
☐ Other:	

Wetland Avoidance
Will construction and/or erosion and sediment controls impinge on regulated wetlands? Yes ☐ No ☒ If yes, the structural and erosion and sediment controls have been included in the total project wetland impacts and have been included in the 404 permit process with the USACE.

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 9019
JOHN RAYMOND VAN BEEK
SOUTH DAKOTA
5/9/17

5.3 (6): PROCEDURES FOR INSPECTIONS

- Inspections will be conducted at least once every 7 days.
- All controls will be maintained in good working order. Necessary repairs will be initiated within 24 hours of the site inspection report.
- Silt fence will be inspected for depth of sediment and for tears to ensure the fabric is securely attached to the posts and that the posts are well anchored. Sediment buildup will be removed from the silt fence when it reaches 1/3 of the height of the silt fence.
- Sediment basins and traps will be checked. Sediment will be removed when depth reaches approximately 50 percent of the structure's capacity, and at the conclusion of the construction.
- Check dams will be inspected for stability. Sediment will be removed when depth reaches ½ the height of the dam.
- All seeded areas will be checked for bare spots, washouts, and vigorous growth free of significant weed infestations.
- Inspection and maintenance reports will be prepared on form DOT 298 for each site inspection, this form will also be used to document changes to the SWPPP. A copy of the completed inspection form will be filed with the SWPPP documents.
- The SDDOT Project Engineer and Contractor's Erosion Control Supervisor are responsible for inspections. Maintenance and repair activities are the responsibility of the Contractor. The SDDOT Project Engineer will complete the inspection and maintenance reports and distribute copies per the distribution instructions on DOT 298.

5.3 (7): POST CONSTRUCTION STORMWATER MANAGEMENT

Stormwater management will be handled by temporary controls outlined in "DESCRIPTION AND MAINTENANCE OF CONTROL MEASURES" above, and any permanent controls needed to meet permanent stormwater management needs in the post construction period will be shown in the plans and noted as permanent.

5.3 (8): POLLUTION PREVENTION PROCEDURES

5.3 (8a): Spill Prevention and Response Procedures

- **Material Management**
  - Housekeeping
    - Only needed products will be stored on-site by the Contractor.
    - Except for bulk materials the contractor will store all materials under cover and/or in appropriate containers.
    - Products must be stored in original containers and labeled.
    - Material mixing will be conducted in accordance with the manufacturer's recommendations.
    - When possible, all products will be completely used before properly disposing of the container off-site.
    - The manufacturer's directions for disposal of materials and containers will be followed.
    - The Contractor's site superintendent will inspect materials storage areas regularly to ensure proper use and disposal.
    - Dust generated will be controlled in an environmentally safe manner.
  - Hazardous Materials
    - Products will be kept in original containers unless the container is not resealable and provide secondary containment as applicable.
    - Original labels and material safety data sheets will be retained in a safe place to relay important product information.
    - If surplus product must be disposed of, manufacturer's label directions for disposal will be followed.
    - Maintenance and repair of all equipment and vehicles involving oil changes, hydraulic system drain down, de-greasing operations, fuel tank drain down and removal, and other activities which may result in the accidental release of contaminants will be conducted on an impervious surface and under cover during wet weather to prevent the release of contaminants onto the ground.
    - Wheel wash water will be collected and allowed to settle out suspended solids prior to discharge. Wheel wash water will not be discharged directly into any stormwater system or stormwater treatment system.
    - Potential pH-modifying materials such as: bulk cement, cement kiln dust, fly ash, new concrete washings, concrete pumping, residuals from concrete saw cutting (either wet or dry), and mixer washout waters will be collected on site and managed to prevent contamination of stormwater runoff.

- **Spill Control Practices**

  In addition to the previous housekeeping and management practices, the following practices will be followed for spill prevention and cleanup if needed.
  - For all hazardous materials stored on site, the manufacturer's recommended methods for spill cleanup will be clearly posted. Site personnel will be made aware of the procedures and the locations of the information and cleanup supplies.
  - Appropriate cleanup materials and equipment will be maintained by the Contractor in the materials storage area on-site. As appropriate, equipment and materials may include items such as brooms, dust pans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and metal trash containers specifically for cleanup purposes.
  - All spills will be cleaned immediately after discovery and the materials disposed of properly.
  - The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
  - After a spill a report will be prepared describing the spill, what caused it, and the cleanup measures taken. The spill prevention plan will be adjusted to include measures to prevent this type of spill from reoccurring, as well as clean up instructions in the event of reoccurrences.
  - The Contractor's site superintendent, responsible for day-to-day operations, will be the spill prevention and cleanup coordinator.

- **Spill Response**

  The primary objective in responding to a spill is to quickly contain the material(s) and prevent or minimize migration into stormwater runoff and conveyance systems. If the release has impacted on-site stormwater, it is critical to contain the released materials on-site and prevent their release into receiving waters. If a spill of pollutants threatens stormwater or surface water at the site, the spill response procedures outlined below must be implemented in a timely manner to prevent the release of pollutants.
  - The Contractor's site superintendent will be notified immediately when a spill or the threat of a spill is observed. The superintendent will assess the situation and determine the appropriate response.
  - If spills represent an imminent threat of escaping erosion and sediment controls and entering receiving waters, personnel will be directed to respond immediately to contain the release and notify the superintendent after the situation has been stabilized.
  - Spill kits containing appropriate materials and equipment for spill response and cleanup will be maintained by the Contractor at the site.
  - If oil sheen is observed on surface water (e.g. settling ponds, detention ponds, swales), action will be taken immediately to remove the material causing the sheen. The Contractor will use appropriate materials to contain and absorb the spill. The source of the oil sheen will also be identified and removed or repaired as necessary to prevent further releases.
  - If a spill occurs the superintendent or the superintendent's designee will be responsible for completing the spill reporting form and for reporting the spill to SDDENR.
  - Personnel with primary responsibility for spill response and cleanup will receive training by the Contractor's site superintendent or designee. The training must include identifying the location of the spill kits and other spill response equipment and the use of spill response materials.
  - Spill response equipment will be inspected and maintained as necessary to replace any materials used in spill response activities.

5.3 (8b): WASTE MANAGEMENT PROCEDURES

- **Waste Disposal**
  - All liquid waste materials will be collected and stored in approved sealed containers. All trash and construction debris from the site will be deposited in the approved containers. Containers will be serviced as necessary, and the trash will be hauled to an approved disposal site or licensed landfill. All onsite personnel will be instructed in the proper procedures for waste disposal and notices stating proper practices will be posted. The Contractor is responsible for ensuring waste disposal procedures are followed.

- **Hazardous Waste**
  - All hazardous waste materials will be disposed of in a manner specified by local or state regulations or by the manufacturer. Site personnel will be instructed in these practices, and the Contractor will be responsible for seeing that these practices are followed.

- **Sanitary Waste**
  - Portable sanitary facilities will be provided on all construction sites. Sanitary waste will be collected from the portable units which must be secured to prevent tipping and serviced in a timely manner by a licensed waste management Contractor or as required by any local regulations.

5.3 (9): CONSTRUCTION SITE POLLUTANTS

The following materials or substances are expected to be present on the site during the construction period. These materials will be handled as noted under the heading "POLLUTION PREVENTION PROCEDURES" (check all that apply).

- ☐ Concrete and Portland Cement
- ☐ Detergents
- ☐ Paints
- ☐ Metals
- ☐ Bituminous Materials
- ☐ Petroleum Based Products
- ☐ Diesel Exhaust Fluid
- ☐ Cleaning Solvents
- ☐ Wood
- ☐ Cure
- ☐ Texture
- ☐ Chemical Fertilizers
- ☐ Other:

Product Specific Practices

- **Petroleum Products**
  All on-site vehicles will be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers which are clearly labeled.

- **Fertilizers**
  Fertilizers will be applied only in the amounts specified by the SDDOT. Once applied, fertilizers will be worked into the soil to limit the exposure to stormwater. Fertilizers will be stored in an enclosed area. The contents of partially used fertilizer bags will be transferred to sealable containers to avoid spills.

- **Paints**
  All containers will be tightly sealed and stored when not required for use. The excess will be disposed of according to the manufacturer's instructions and any applicable state and local regulations.

- **Concrete Trucks**
  Contractors will provide designated truck washout facilities on the site. These areas must be self-contained and not connected to any stormwater outlet of the site. Upon completion of construction, the area at the washout facility will be properly stabilized.

5.3 (10): NON-STORMWATER DISCHARGES

The following non-stormwater discharges are anticipated during the course of this project (check all that apply).

- ☐ Discharges from water line flushing.
- ☐ Pavement wash-water, where no spills or leaks of toxic or hazardous materials have occurred.
- ☐ Uncontaminated ground water associated with dewatering activities.

5.3 (11): INFEASIBILITY DOCUMENTATION

If it is determined to be infeasible to comply with any of the requirements of the Stormwater Permit, the infeasibility determination must be thoroughly documented in the SWPPP.

7.0: SPILL NOTIFICATION

In the event of a spill, the Contractor's site superintendent will make the appropriate notification(s), consistent with the following procedures:

- A release or spill of a regulated substance (includes petroleum and petroleum products) must be reported to SDDENR immediately **if any one of the following** conditions exists:
  - The release or spill threatens or is able to threaten waters of the state (surface water or ground water)
  - The release or spill causes an immediate danger to human health or safety
  - The release or spill exceeds 25 gallons
  - The release or spill causes a sheen on surface water
  - The release or spill of any substance that exceeds the ground water quality standards of ARSD Chapter 74:54:01
  - The release or spill of any substance that exceeds the surface water quality standards of ARSD Chapter 74:51:01
  - The release or spill of any substance that harms or threatens to harm wildlife or aquatic life
  - The release or spill is required to be reported according to Superfund Amendments and Reauthorization Act (SARA) Title III List of Lists, Consolidated List of Chemicals Subject to Reporting Under the Emergency Planning and Community Right to Know Act, US Environmental Protection Agency.

- To report a release or spill, call SDDENR at 605-773-3296 during regular office hours (8 a.m. to 5 p.m. Central Standard Time). To report the release after hours, on weekends or holidays, call South Dakota Emergency Management at 605-773-3231. Reporting the release to SDDENR does not meet any obligation for reporting to other state, local, or federal agencies. Therefore, you must also contact local authorities to determine the local reporting requirements for releases. A written report of the unauthorized release of any regulated substance, including quantity discharged, and the location of the discharge shall be sent to SDDENR within 14 days of the discharge.

5.4: SWPPP CERTIFICATIONS

- **Certification of Compliance with Federal, State, and Local Regulations**

The Storm Water Pollution Prevention Plan (SWPPP) for this project reflects the requirements of all local municipal jurisdictions for storm water management and sediment and erosion control as established by ordinance, as well as other state and federal requirements for sediment and erosion control plans, permits, notices or documentation as appropriate.

- **South Dakota Department of Transportation**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Joanne M. Higlet

Authorized Signature (See the General Permit, Section 7.4 (1))

- **Prime Contractor**

This section is to be executed by the General Contractor after the award of the contract. This section may be executed any time there is a change in the Prime Contractor of the project.

I certify under penalty of law that this document and all attachments will be revised or maintained under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Authorized Signature

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 9019
JOHN RAYMOND VAN BEEK
SOUTH DAKOTA
5/9/17

CONTACT INFORMATION

The following personnel are duly authorized representatives and have signatory authority for modifications made to the SWPPP:

- **Contractor Information**:
  - Prime Contractor Name: _____
  - Contractor Contact Name: _____
  - Address: _____
  - _____
  - City: _____State: _____Zip: _____
  - Office Phone: _____Field: _____
  - Cell Phone: _____Fax: _____
- **Erosion Control Supervisor**
  - Name: _____
  - Address: _____
  - _____
  - City: _____State: _____Zip: _____
  - Office Phone: _____Field: _____
  - Cell Phone: _____Fax: _____
- **SDDOT Project Engineer**
  - Name: _____
  - Business Address: _____
  - Job Office Location: _____
  - City: _____State: _____Zip: _____
  - Office Phone: _____Field: _____
  - Cell Phone: _____Fax: _____
- **SDDENR Contact Spill Reporting**
  - Business Hours Monday-Friday (605) 773-3296
  - Nights and Weekends (605) 773-3231
- **SDDENR Contact for Hazardous Materials.**
  - (605) 773-3153
- **National Response Center Hotline**
  - (800) 424-8802.
- **SDDENR Stormwater Contact Information**
  - SDDENR Stormwater (800) 737-8676
  - Surface Water Quality Program (605) 773-3351

5.5: REQUIRED SWPPP MODIFICATIONS

- **5.5 (1): Conditions Requiring SWPPP Modification**
  The SWPPP must be modified, including the site map(s), in response to any of the following conditions:
  - When a new operator responsible for implementation of any part the SWPPP begins work on the site.
  - When changes to the construction plans, sediment and erosion control measures, or any best management practices on site that are no longer accurately reflected in the SWPPP. This includes changes made in response to corrective actions triggered by inspections.
  - To reflect areas on the site map where operational control has been transferred (including the date of the transfer) or has been covered under a new permit since initiating coverage under this general permit.
  - If inspections by site staff, local officials, SDDENR, or U.S. EPA determine that SWPPP modifications are necessary for compliance with the Stormwater Permit.
  - To reflect any revisions to applicable federal, state, or local requirements that affect the control measures implemented at the site.
  - If approved by the Secretary, to reflect any changes in chemical water treatment systems or controls, including the use of a different water treatment chemical, age rates, different areas, or methods of application.
- **5.5 (2): Deadlines for SWPPP Modification**
  Any required revisions to the SWPPP must be completed within 7 calendar days following any of the items listed above.
- **5.5 (3): Documentation of Modifications to the Plan**
  All SWPPP modification records are required to be maintained showing the dates of when the modification occurred. The records must include the name of the person authorizing each change and a brief summary of all changes.
- **5.5 (4): Certification Requirements**
  All modifications made to the SWPPP must be signed and certified as required in Section 7.4.
- **5.5 (5): Required Notice to Other Operators**
  If there are multiple operators at the site, the Contractor's Erosion Control Supervisor must notify each operator that may be impacted by the change to the SWPPP within 24 hours.

When modifications as described above occur, the SWPPP will be modified to provide appropriate protection to disturbed areas, all storm water structures, and adjacent waters. The SDDOT Project Engineer will modify the SWPPP using the DOT 298 form and drawings on the plan will be modified to reflect the needed changes. Copies of the DOT 298 forms and the SWPPP will be retained on site in a designated place for review throughout the course of the project. A copy of the DOT 298 form will be given to the Contractor Erosion Control Supervisor and a copy will be emailed to the SDDOT Environmental Section in accordance with the DOT 298 Form.

EROSION & SEDIMENT CONTROL

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	410D396 PCN I5JQ	12	28

Plotting Date: 5/6/19

Legend

- Erosion Control Wattles
- High Flow Silt Fence (SF)
- Type 2 Erosion Control Blanket (ECB)
- Construction Entrance (CE)
- Flow Direction

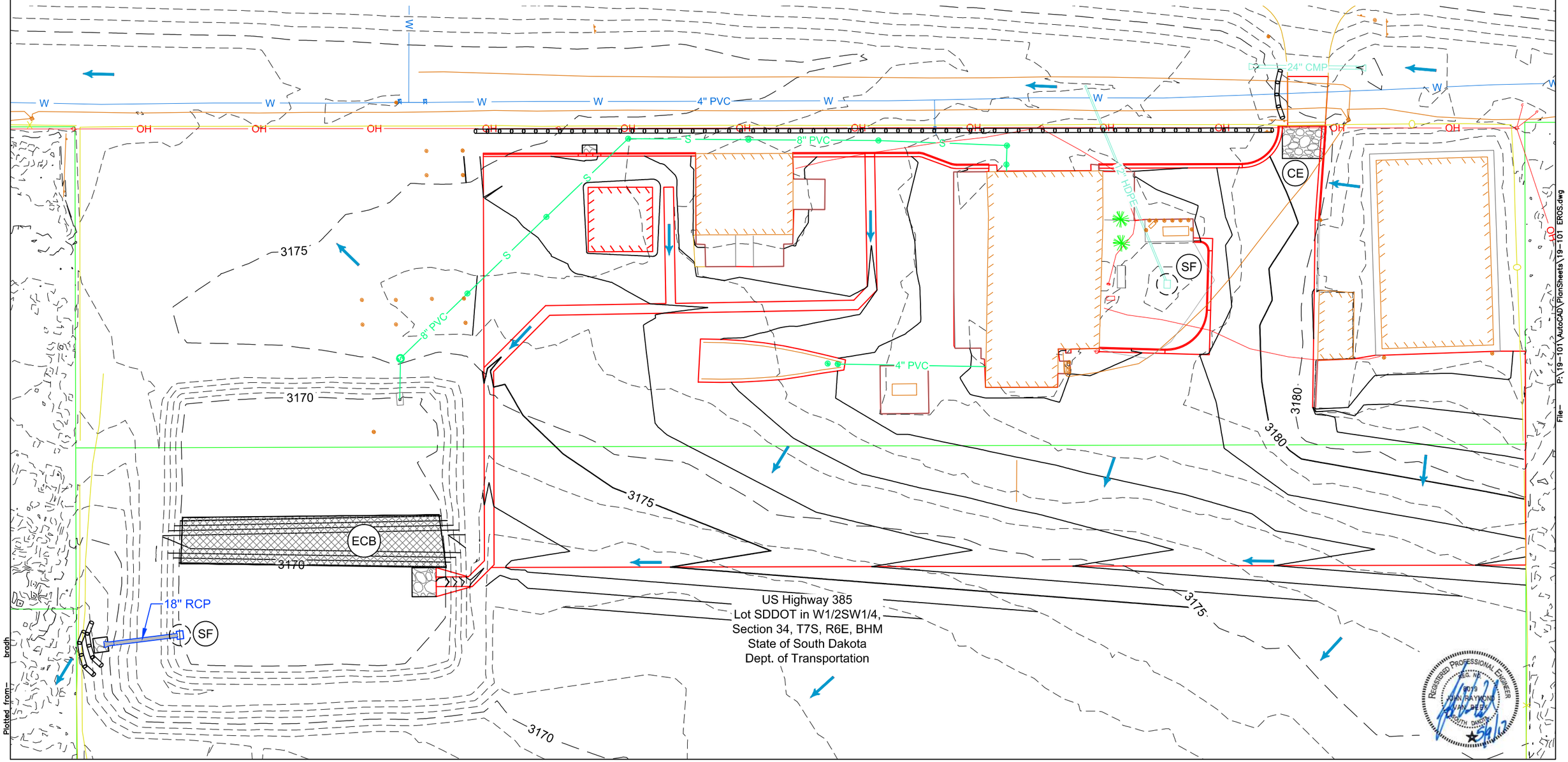
Notes:

The Intent of This Erosion Control Layout is to Provide Guidance for SWPPP Preparation and to Aid in the Process of Obtaining the Necessary Construction Permits. The Contractor is Responsible for the Means and Methods Required for Implementing any and all Construction Activities to be in Compliance with the SWPPP and Associated Permits.

Utility Information Shown on These Plans Concerning the Type, Size, and Location of Utilities Has Been Shown Based Upon the Best Information Available. The Contractor is Responsible for the Determination of the Exact Location of All Utilities. Prior to Beginning Construction, the Contractor is Responsible For Protecting all Existing Utilities in Place. Contractor Shall Coordinate All Relocations with the Utility Companies.

30 15 0 30

Contour Interval = 1'-0"



Plotted from– brady

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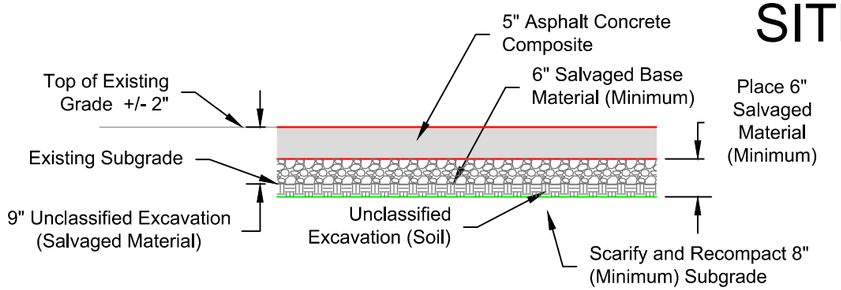
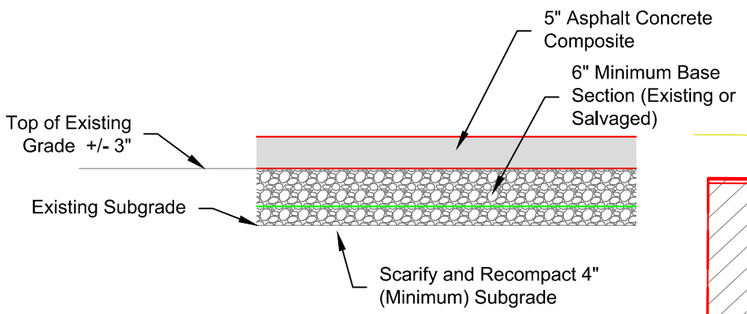
SITE EXCAVATION

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	410D396 PCN I5JQ	13	28

Plotting Date: 5/6/19



Typical Cut Section



Typical Fill Section

LEGEND

Cut Section

Fill Section

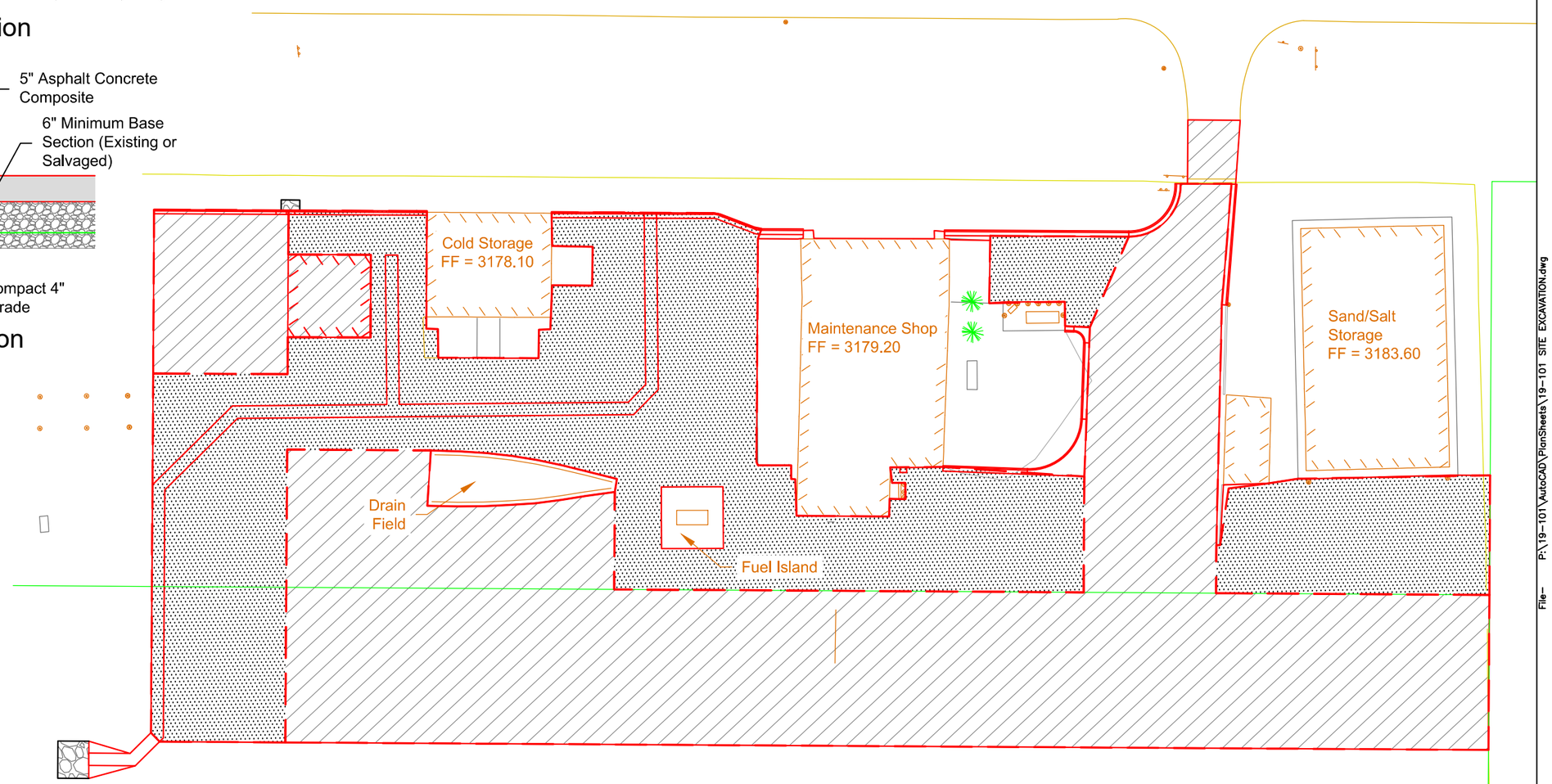


Table of Excavation

Salvage Granular Material (CuYd)	Excavation (CuYd)	Salvage Topsoil (CuYd)	Waste (+) Borrow (-) (CuYd)	Embankment (CuYd)	Embankment 20% Shrink (CuYd)	Stockpile Granular Material (CuYd)	Place Topsoil (CuYd)
1785	502	67	+3	416	83	1785	67
Total Excavation:		2354		Total Embankment:			2351

US Highway 385
Lot SDDOT in W1/2SW1/4,
Section 34, T7S, R6E, BHM
State of South Dakota
Dept. of Transportation

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 8079
JOHN RAYMOND LYNN PERRY
SOUTH DAKOTA
5/6/19

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Plotted from– brodh

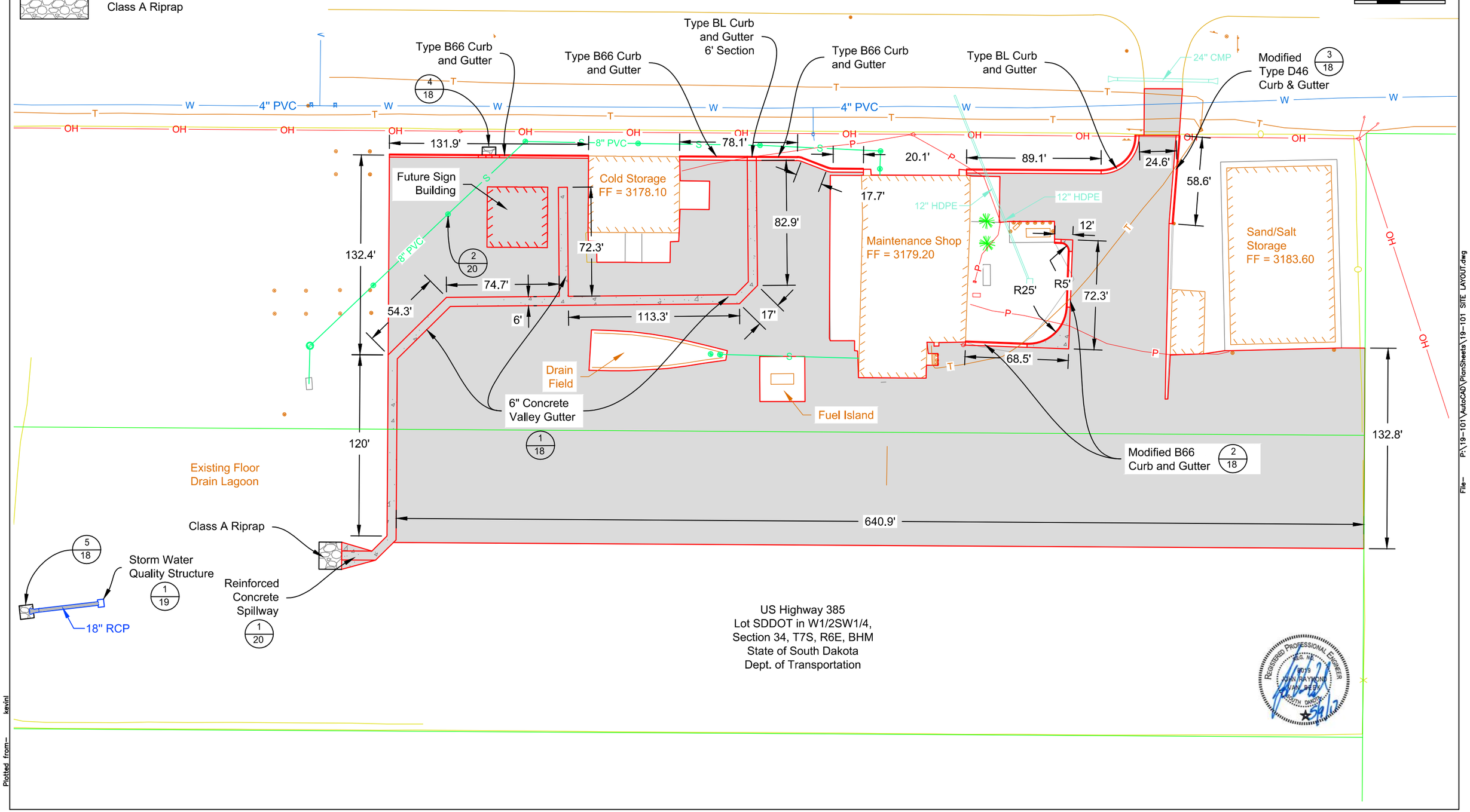
SITE LAYOUT

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	410D396 PCN I5JQ	14	28

Plotting Date: 5/6/19

LEGEND

- 6 Inch Concrete Valley Gutter Over 5 Inches of Base Material
- 5 Inches of Asphalt Over 6 Inches of Base Material
- Class A Riprap



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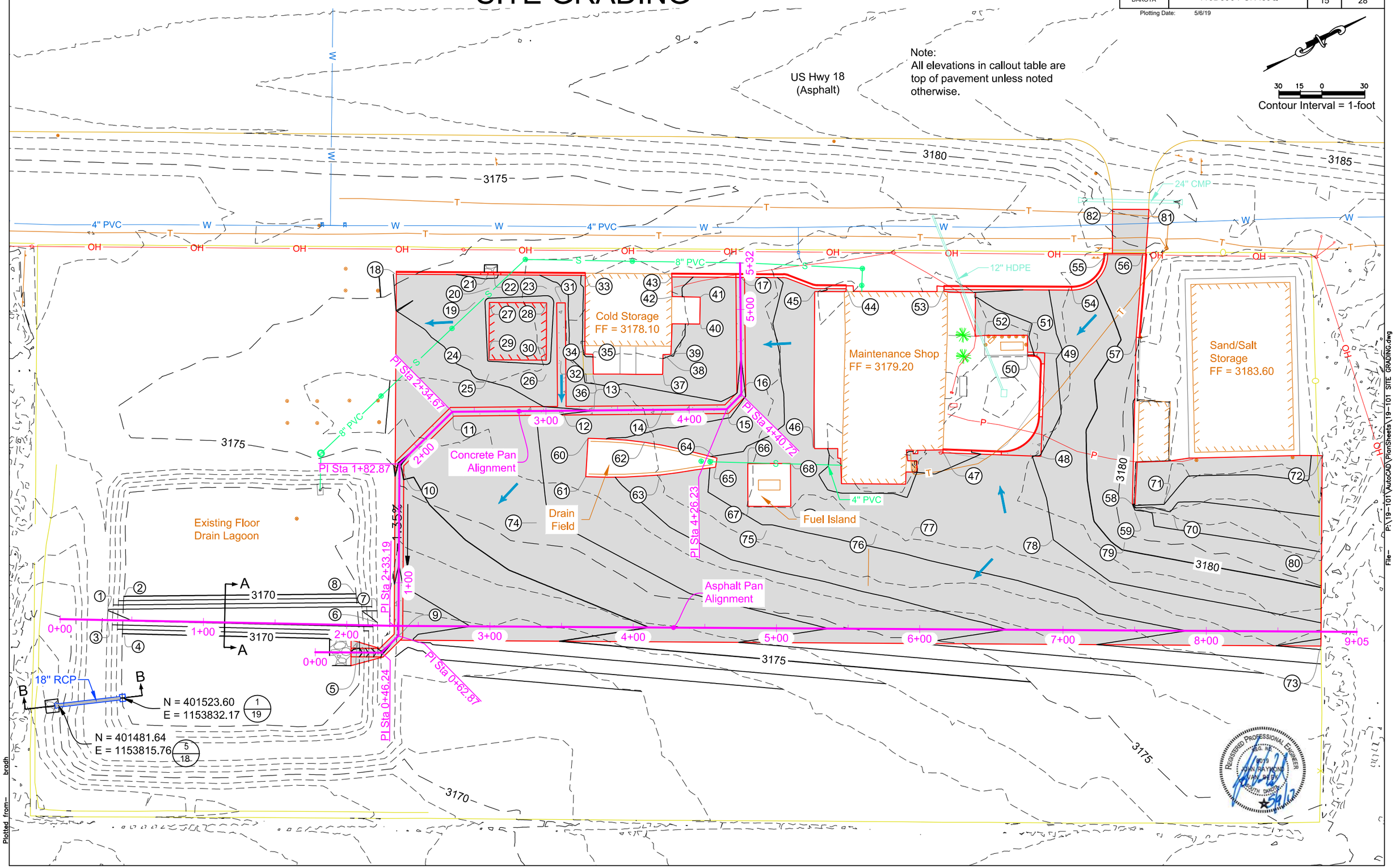
Plotted from— kevinl

SITE GRADING

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	410D396 PCN I5JQ	15	28

Plotting Date: 5/6/19



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GRADING INFORMATION

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	410D396 PCN I5JQ	16	28

Plotting Date: 5/10/19

ASPHALT PAN ALIGNMENT

PI#	STATION		NORTHING	EASTING
L1	0+00.00	N 29°09'29" E	401510.92	1153763.16
	2+33.19	233.19'	401714.56	1153876.78
L2	2+33.19	N 28°21'33" E	401714.56	1153876.78
	9+05.12	671.93'	402305.85	1154195.95

CONCRETE PAN ALIGNMENT

PI#	STATION		NORTHING	EASTING
L1	0+00.00	N 28°21'33" E	401657.25	1153867.16
	0+46.24	46.24'	401697.94	1153889.13
L2	0+46.24	N 16°38'27" W	401697.94	1153889.13
	0+62.87	16.63'	401713.87	1153884.36
L3	0+62.87	N 61°38'27" W	401713.87	1153884.36
	1+82.87	120.00'	401770.87	1153778.77
L4	1+82.87	N 16°38'27" W	401770.87	1153778.77
	2+34.67	51.80'	401820.51	1153763.93
L5	2+34.67	N 27°28'09" E	401820.51	1153763.93
	4+26.23	191.56'	401990.47	1153852.29
L6	4+26.23	N 17°31'51" W	401990.47	1153852.29
	4+40.72	14.49'	402004.28	1153847.93
L7	4+40.72	N 62°31'51" W	402004.28	1153847.93
	5+32.34	91.62'	402046.54	1153766.64

GRADING CALLOUTS

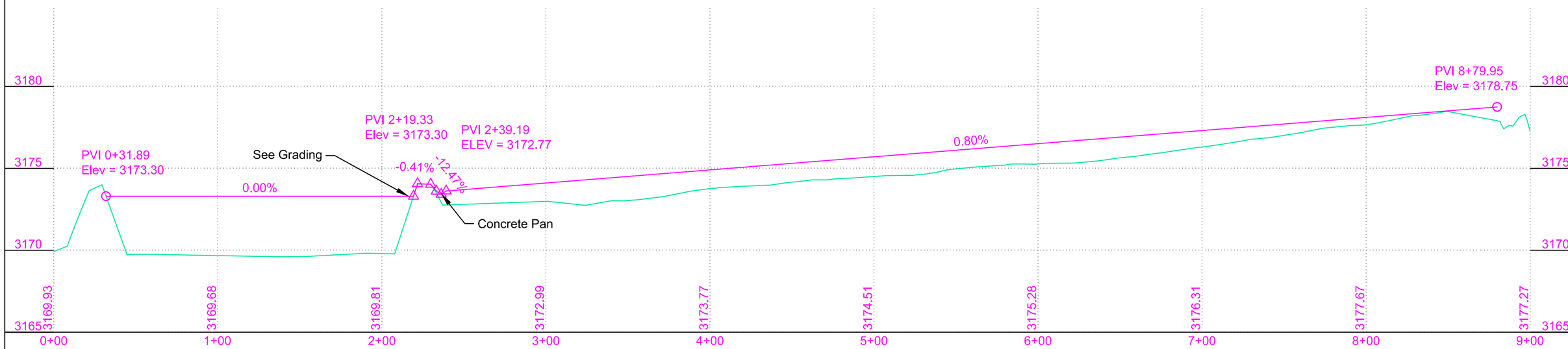
1.	N = 401543.53 E = 1153772.82 Elev = 3173.01	11.	N = 401820.51 E = 1153763.93 Elev = 3175.30	21.	N = 401887.35 E = 1153691.20 Elev = 3175.89	31.	N = 401923.11 E = 1153732.45 Elev = 3176.50	41.	N = 402010.87 E = 1153774.55 Elev = 3177.65	51.	N = 402200.02 E = 1153905.25 Elev = 3179.03	61.	N = 401881.45 E = 1153847.66 Elev = 3176.69	71.	N = 402228.78 E = 1154054.10 Elev = 3183.01	81.	N = 402316.10 E = 1153867.58 Elev = 3181.37
2.	N = 401558.70 E = 1153769.76 Elev = 3169.78	12.	N = 401888.40 E = 1153799.23 Elev = 3175.83	22.	N = 401890.87 E = 1153693.10 Elev = 3175.89	32.	N = 401904.13 E = 1153767.66 Elev = 3176.30	42.	N = 401993.76 E = 1153765.06 Elev = 3178.20	52.	N = 402173.58 E = 1153891.35 Elev = 3179.14	62.	N = 401929.04 E = 1153845.73 Elev = 3177.27	72.	N = 402342.21 E = 1154075.97 Elev = 3182.98	82.	N = 402293.78 E = 1153855.55 Elev = 3181.09
3.	N = 401539.73 E = 1153779.86 Elev = 3172.90	13.	N = 401908.03 E = 1153809.43 Elev = 3175.99	23.	N = 401919.05 E = 1153718.90 Elev = 3176.50	33.	N = 401947.18 E = 1153723.46 Elev = 3178.10	43.	N = 401999.92 E = 1153752.81 Elev = 3178.20	53.	N = 402163.63 E = 1153849.68 Elev = 3179.28	63.	N = 401927.99 E = 1153871.06 Elev = 3177.47	73.	N = 402278.94 E = 1154192.79 Elev = 3179.25		
4.	N = 401544.99 E = 1153793.78 Elev = 3169.71	14.	N = 401951.03 E = 1153831.79 Elev = 3176.35	24.	N = 401851.32 E = 1153739.19 Elev = 3176.10	34.	N = 401921.22 E = 1153771.80 Elev = 3178.11	44.	N = 402103.55 E = 1153817.18 Elev = 3179.27	54.	N = 402242.02 E = 1153891.95 Elev = 3179.45	64.	N = 401968.46 E = 1153879.22 Elev = 3178.07	74.	N = 401836.01 E = 1153859.96 Elev = 3175.81		
5.	N = 401687.87 E = 1153873.93 Elev = 3169.78	15.	N = 401990.47 E = 1153852.29 Elev = 3176.69	25.	N = 401855.37 E = 1153752.73 Elev = 3176.10	35.	N = 401926.01 E = 1153774.57 Elev = 3178.10	45.	N = 402083.23 E = 1153808.64 Elev = 3178.94	55.	N = 402276.23 E = 1153881.18 Elev = 3180.60	65.	N = 401964.58 E = 1153884.31 Elev = 3178.06	75.	N = 401975.26 E = 1153940.07 Elev = 3177.86		
6.	N = 401705.31 E = 1153869.24 Elev = 3174.00	16.	N = 402004.28 E = 1153847.93 Elev = 3176.81	26.	N = 401890.58 E = 1153771.72 Elev = 3176.30	36.	N = 401919.74 E = 1153786.91 Elev = 3177.32	46.	N = 402031.17 E = 1153905.10 Elev = 3178.79	56.	N = 402297.86 E = 1153892.84 Elev = 3180.84	66.	N = 401985.62 E = 1153892.75 Elev = 3178.36	76.	N = 402041.85 E = 1153978.38 Elev = 3178.29		
7.	N = 401709.11 E = 1153862.20 Elev = 3174.06	17.	N = 402041.95 E = 1153775.47 Elev = 3177.60	27.	N = 401879.10 E = 1153708.72 Elev = 3177.30	37.	N = 401962.43 E = 1153809.86 Elev = 3177.45	47.	N = 402109.44 E = 1153949.92 Elev = 3179.20	57.	N = 402266.40 E = 1153942.15 Elev = 3180.26	67.	N = 401971.74 E = 1153919.10 Elev = 3178.44	77.	N = 402062.95 E = 1153990.51 Elev = 3178.42		
8.	N = 401701.17 E = 1153843.78 Elev = 3169.83	18.	N = 401831.04 E = 1153660.84 Elev = 3176.21	28.	N = 401914.31 E = 1153727.71 Elev = 3177.50	38.	N = 401969.06 E = 1153797.74 Elev = 3178.14	48.	N = 402168.65 E = 1153984.28 Elev = 3179.03	58.	N = 402209.37 E = 1154043.68 Elev = 3180.94	68.	N = 402012.00 E = 1153906.66 Elev = 3178.75	78.	N = 402148.12 E = 1154039.51 Elev = 3178.97		
9.	N = 401713.87 E = 1153884.36 Elev = 3173.10	19.	N = 401870.30 E = 1153703.98 Elev = 3176.30	29.	N = 401860.12 E = 1153743.93 Elev = 3177.10	39.	N = 401974.04 E = 1153800.17 Elev = 3178.04	49.	N = 402204.92 E = 1153921.78 Elev = 3178.70	59.	N = 402208.70 E = 1154048.85 Elev = 3180.60	69.	N = 401998.14 E = 1153933.08 Elev = 3178.46	79.	N = 402192.11 E = 1154064.81 Elev = 3180.23		
10.	N = 401770.87 E = 1153778.77 Elev = 3174.94	20.	N = 401883.84 E = 1153699.92 Elev = 3176.30	30.	N = 401895.33 E = 1153762.91 Elev = 3177.30	40.	N = 402001.73 E = 1153790.98 Elev = 3177.78	50.	N = 402194.54 E = 1153915.76 Elev = 3179.06	60.	N = 401895.48 E = 1153824.79 Elev = 3176.79	70.	N = 402230.68 E = 1154064.05 Elev = 3181.49	80.	N = 402310.08 E = 1154132.67 Elev = 3181.08		

Note:
All elevations in callout table are top of pavement unless noted otherwise.

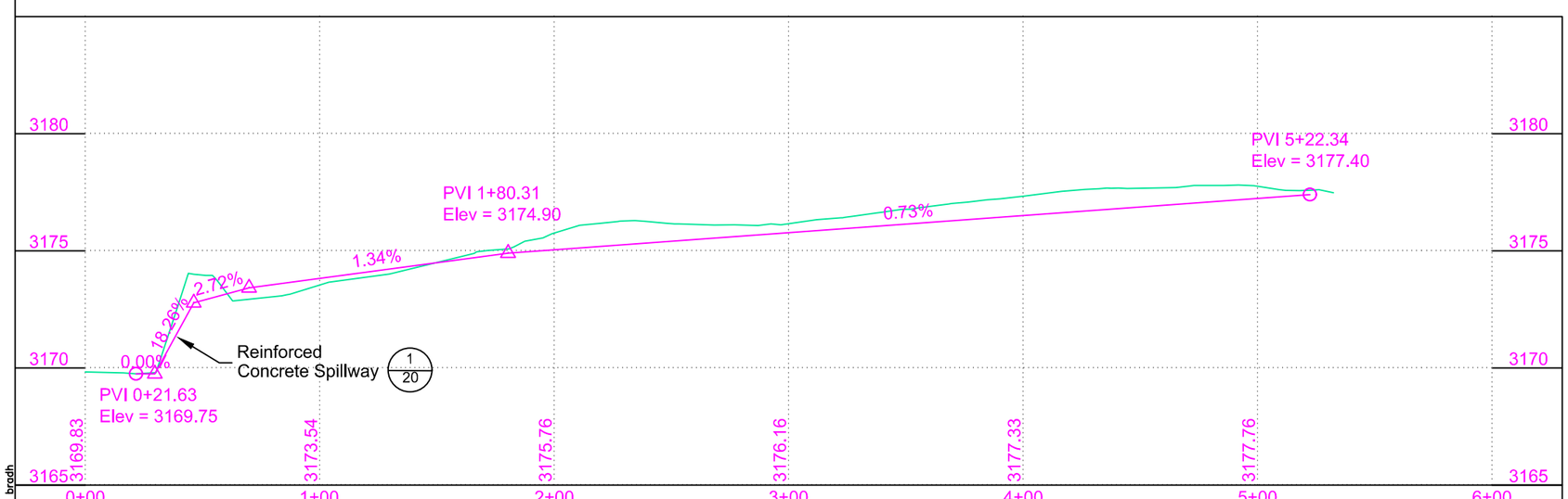
GRADING PROFILES

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	410D396 PCN I5JQ	17	28

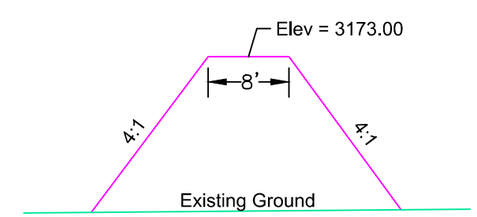
Plotting Date: 5/6/19



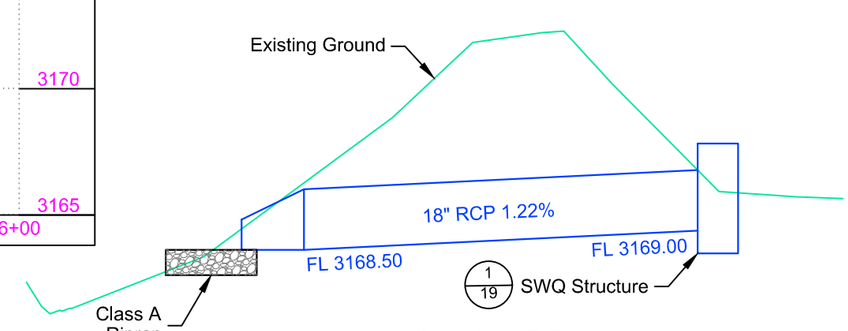
Asphalt Pan Profile



Concrete Pan Profile



Section AA



Section BB

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
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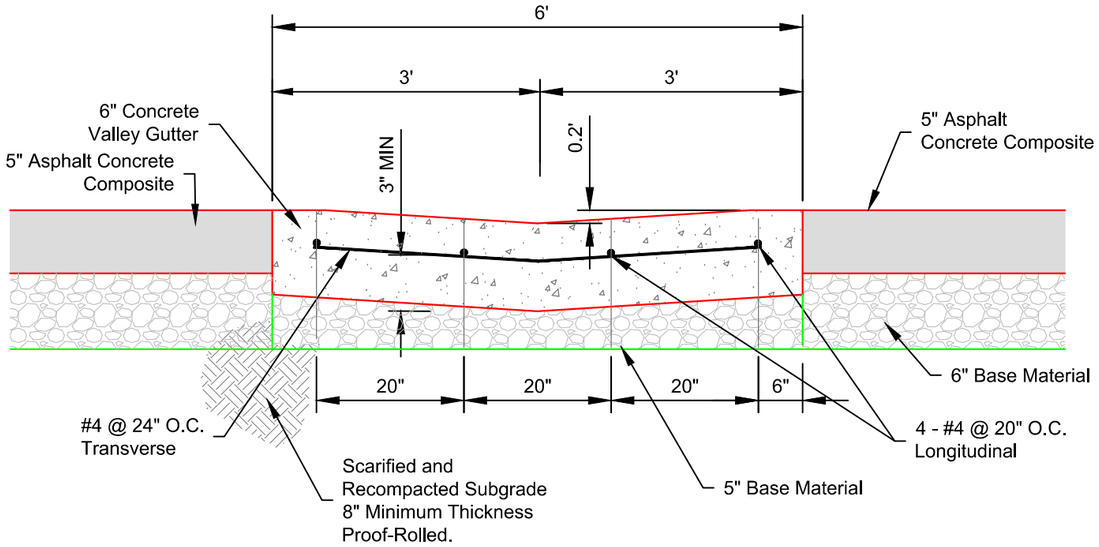
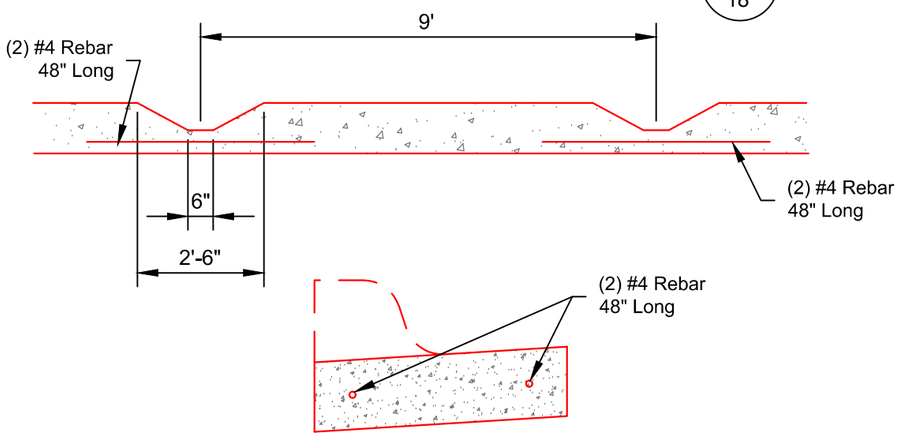
Plotting Date: 5/7/19



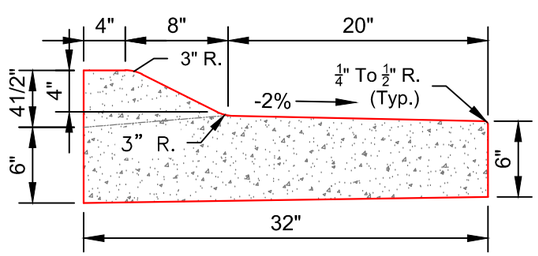
6" Concrete Valley Gutter

1 / 18



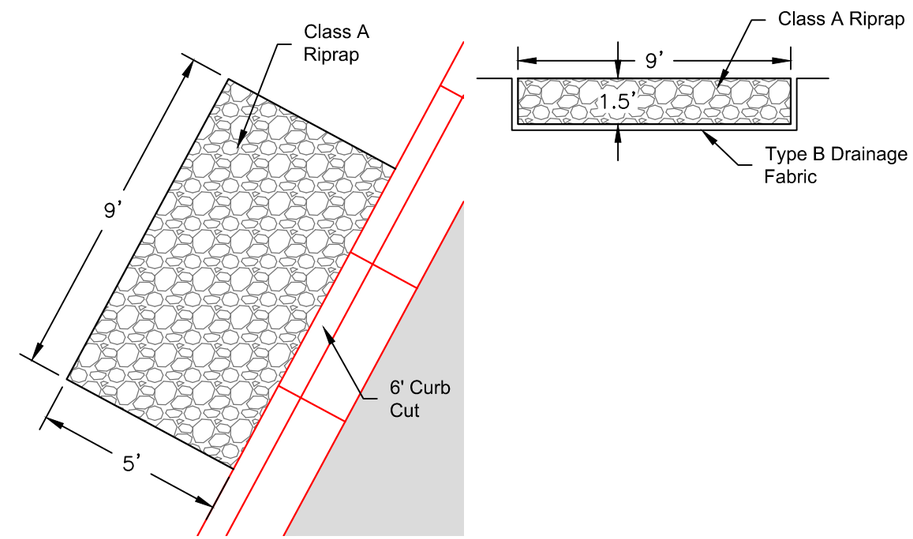
Modified Type B66 Curb and Gutter

2 / 18



Modified Type D46 Curb and Gutter

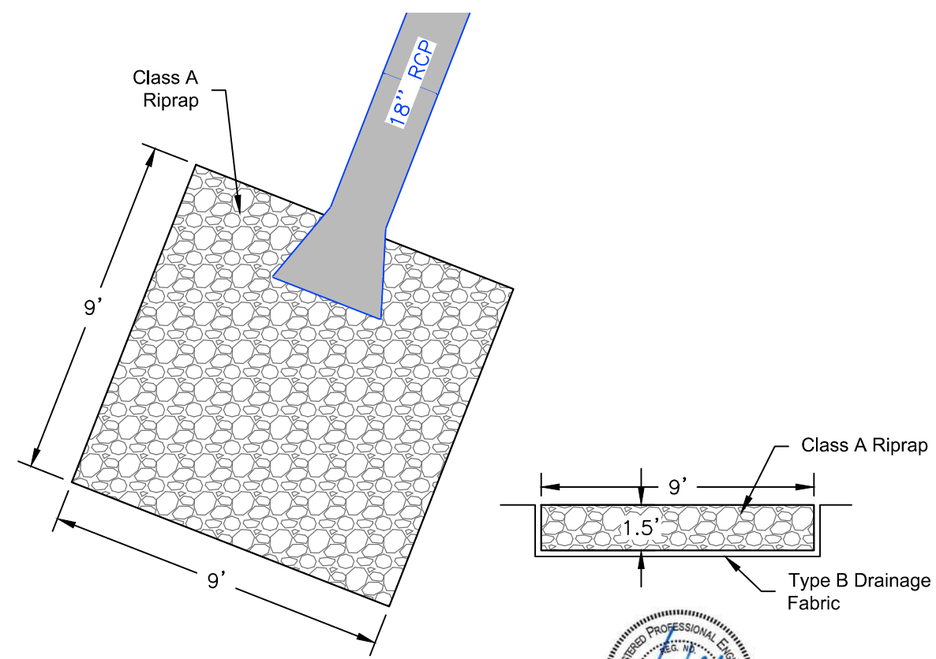
3 / 18



Riprap Detail

NTS

4 / 18



Riprap Detail

NTS

5 / 18

Plotted from– kevinl

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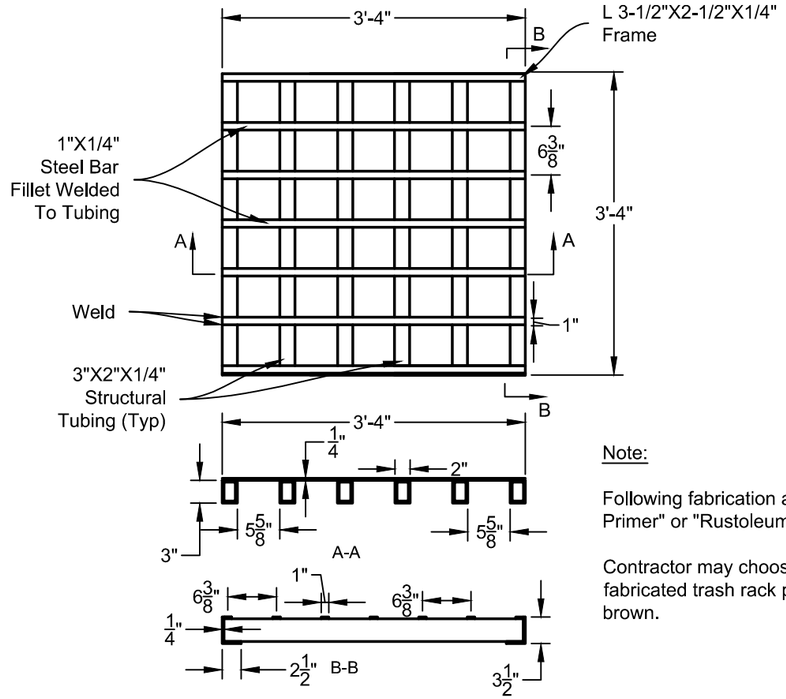
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	410D396 PCN I5JQ	19	28

Plotting Date: 5/7/19



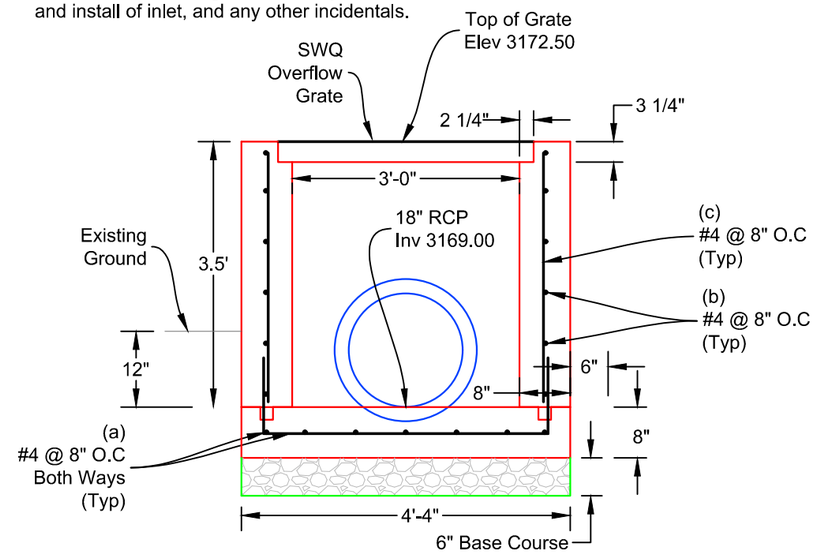
Note:

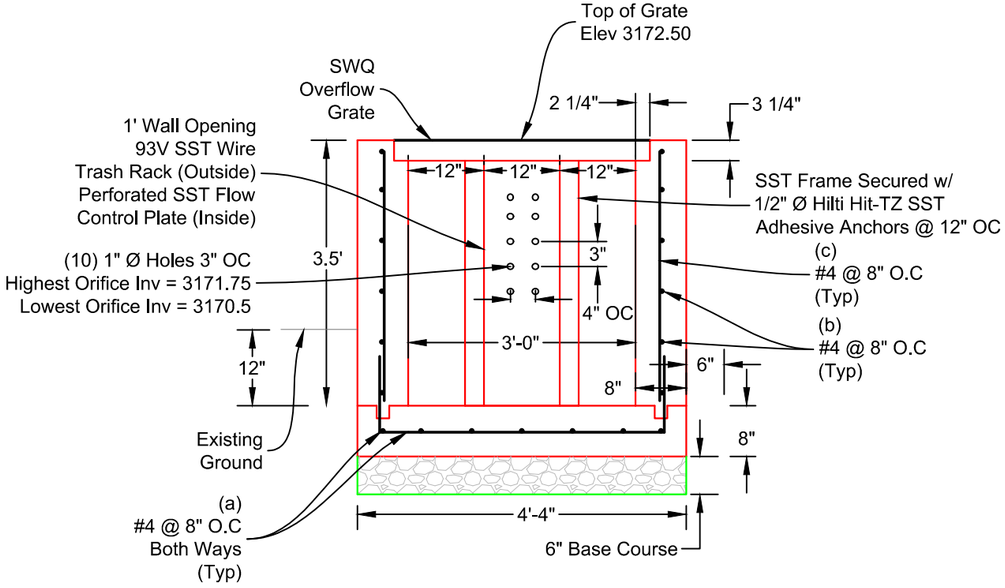
Following fabrication apply "10-99 Tremec Primer" or "Rustoleum number 5769".

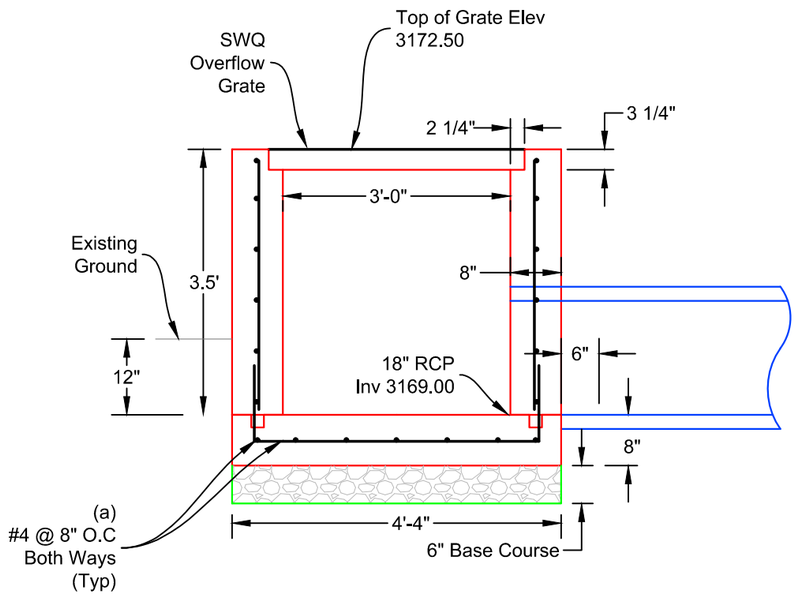
Contractor may choose to have the fabricated trash rack powder coated color brown.

Note:

Payment for the Type I Drop Inlet includes furnish and install of grate assembly, furnish and install of inlet, and any other incidentals.

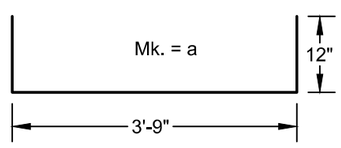






REINFORCING SCHEDULE

Mk.	No.	Size	Length
a	14	4	5' 9"
b	24	4	3' 9"
c	24	4	3' 3"



Class M6 Concrete = 1.6 Cu.Yd.

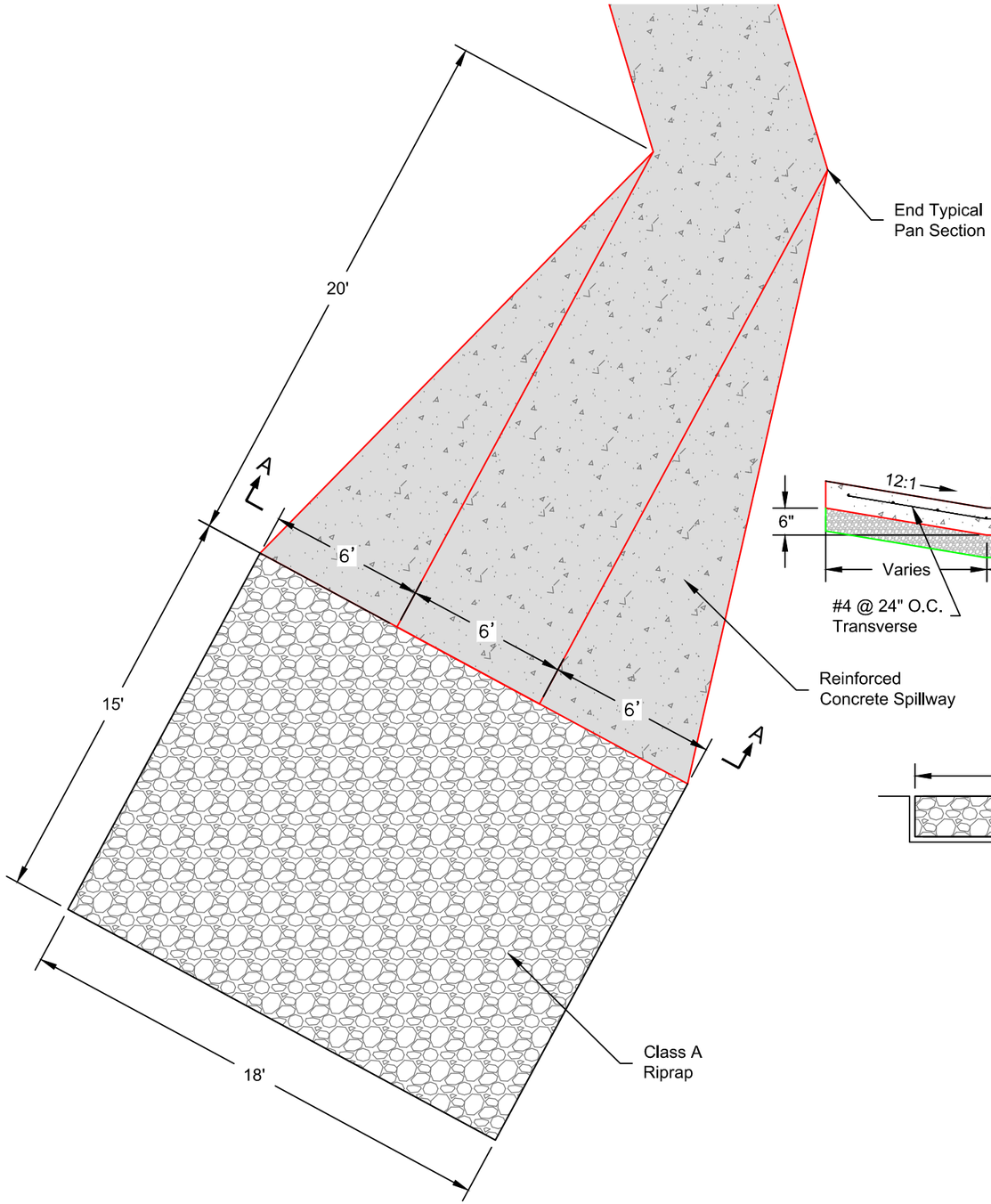
Type I Drop Inlet

NTS

1 / 19

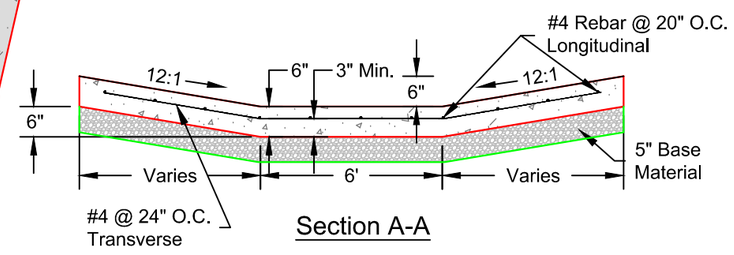
Plotted from– kevinl

File– P:\19-101\AutoCAD\PlanSheets\19-1010TL.dwg

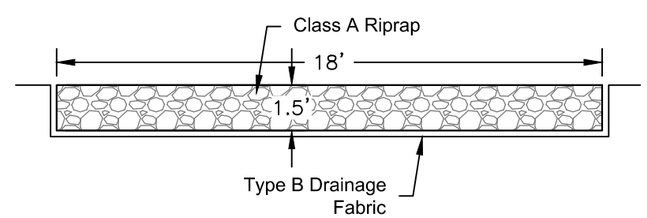


Reinforced Concrete Spillway

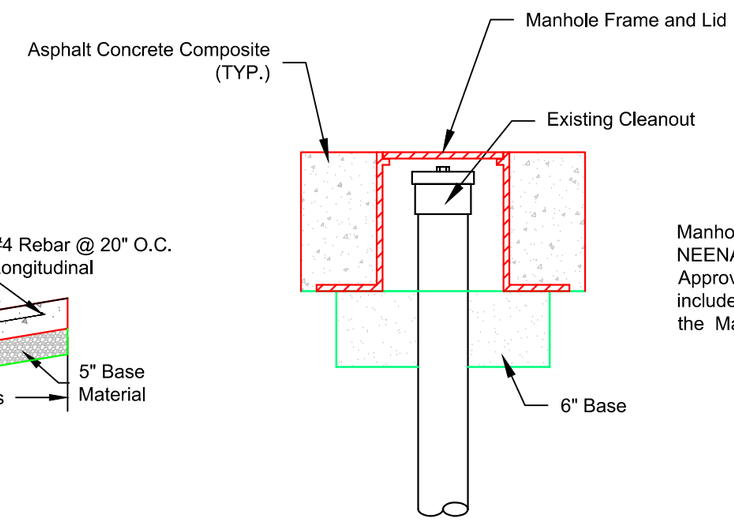
NTS 1/20



Section A-A



Riprap Section



Manhole Frame & Grate Shall be NEENAH R-1976 or Approve Equal. Payment shall include furnishing and installation of the Manhole Frame & Lid.

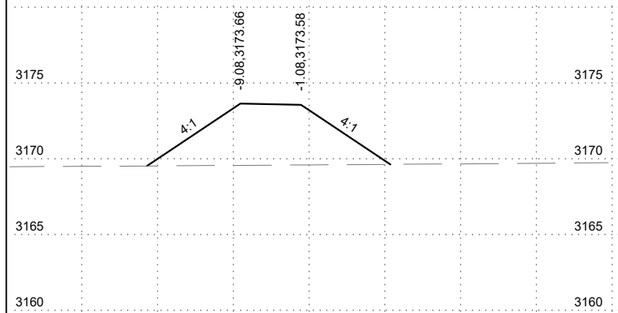
Manhole Frame & Grate

NTS 2/20

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	410D396 PCN I5JQ	21	28

Plotting Date: 5/6/19

REFER TO GRADING CALLOUTS
FOR MORE INFORMATION
(TYP)



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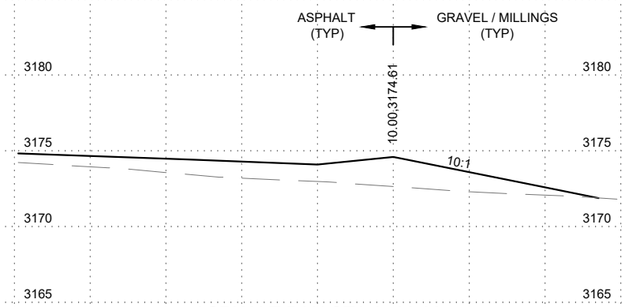

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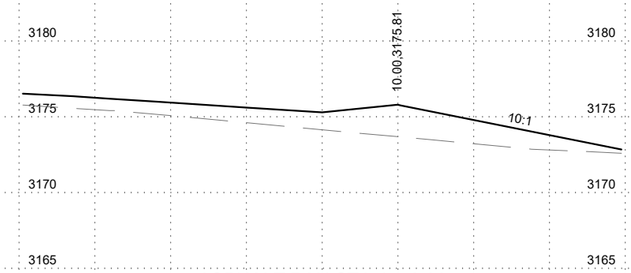

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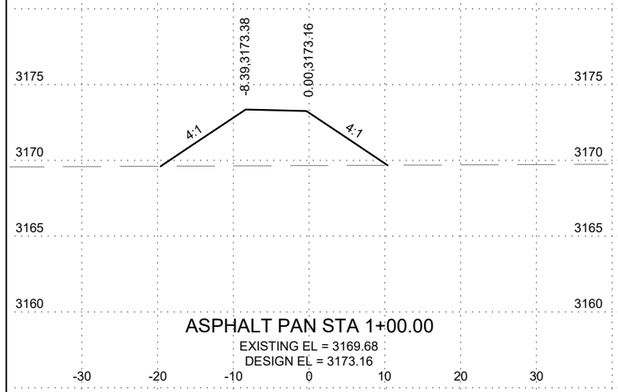

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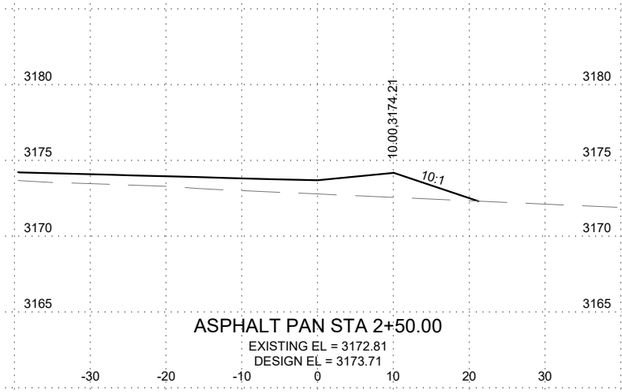

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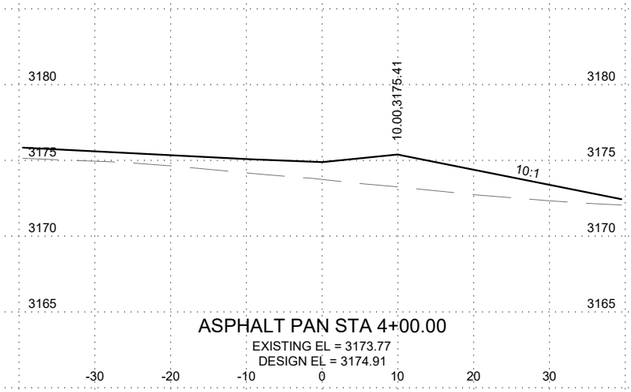

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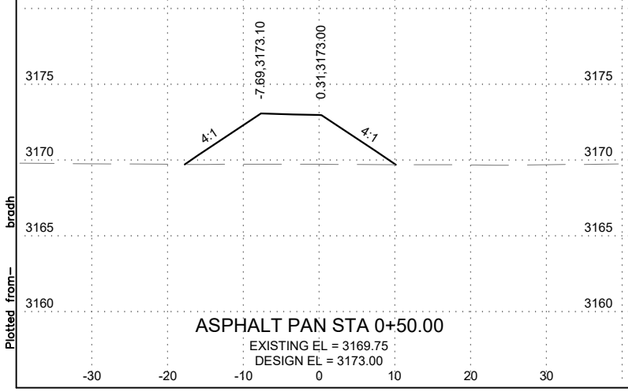
STA 0+50 TO STA 2+00 SHOWS
SWQ POND EMBANKMENT



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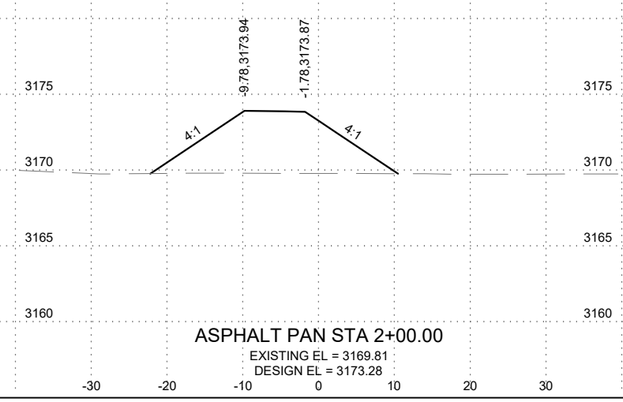

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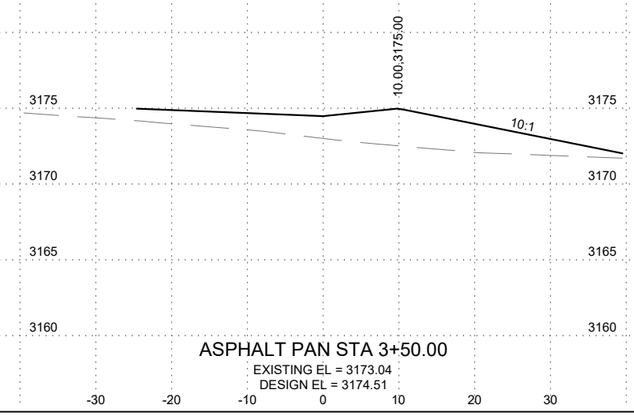

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REGISTERED PROFESSIONAL ENGINEER
REG. NO.
9019
JOHN RAYMOND
VAN BEEK
SOUTH DAKOTA

Plotted from– brodh

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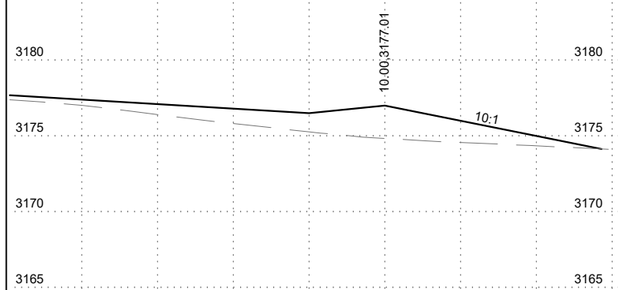
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	410D396 PCN I5JQ	22	28

Plotting Date: 5/6/19



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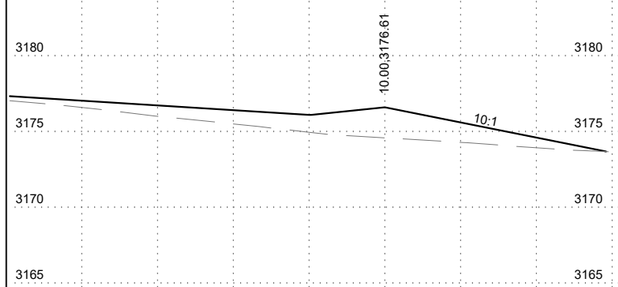

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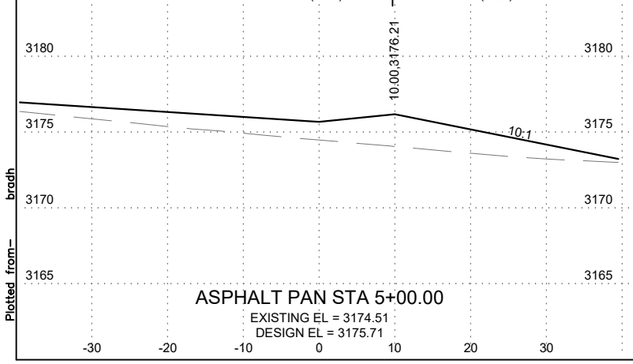
REFER TO GRADING CALLOUTS
FOR MORE INFORMATION
(TYP)

ASPHALT (TYP) ← → GRAVEL / MILLINGS (TYP)



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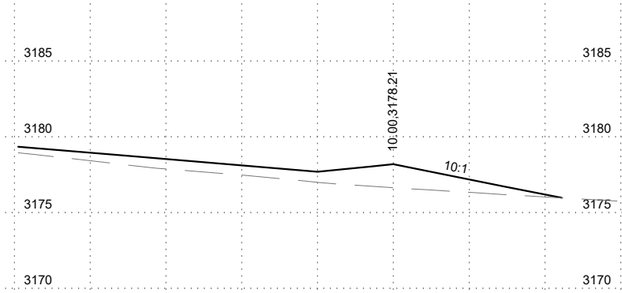

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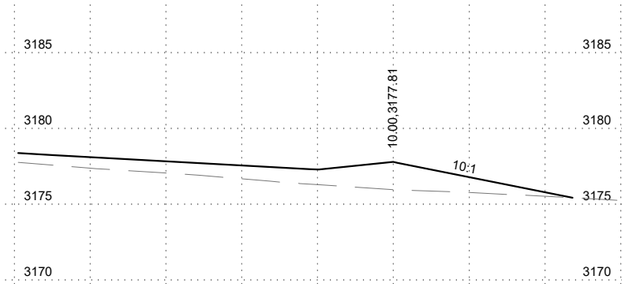

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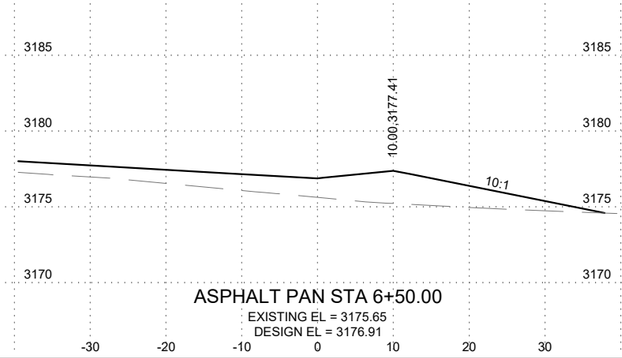

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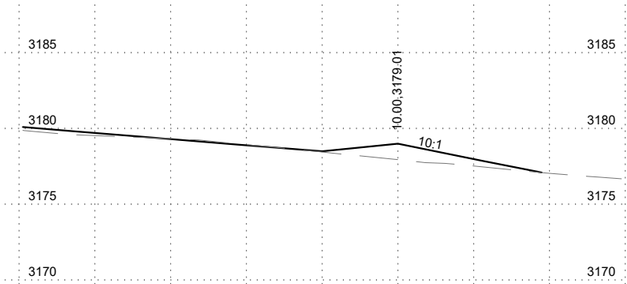

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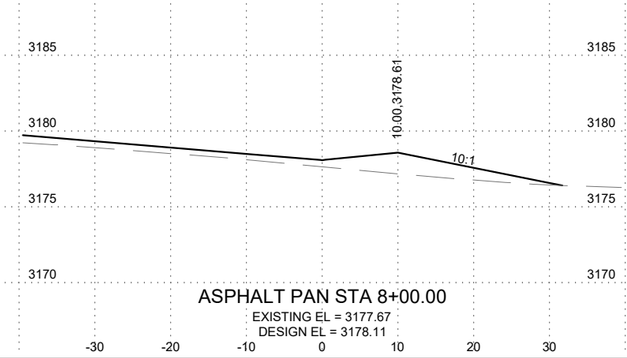

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REGISTERED PROFESSIONAL ENGINEER
REG. NO. 9019
JOHN RAYMOND
VAN DEEN
SOUTH DAKOTA

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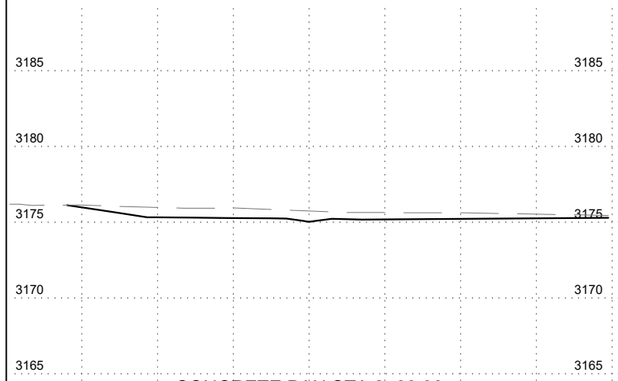
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	410D396 PCN I5JQ	23	28

Plotting Date: 5/6/19



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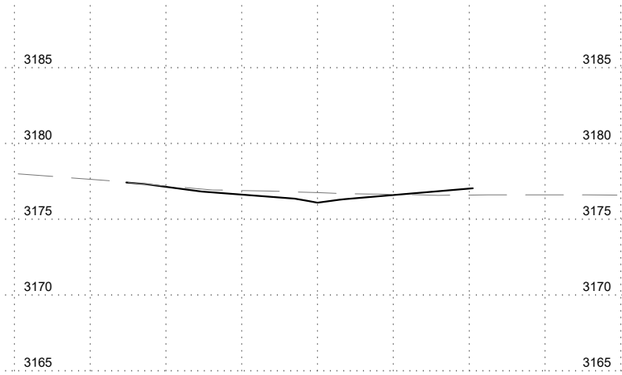

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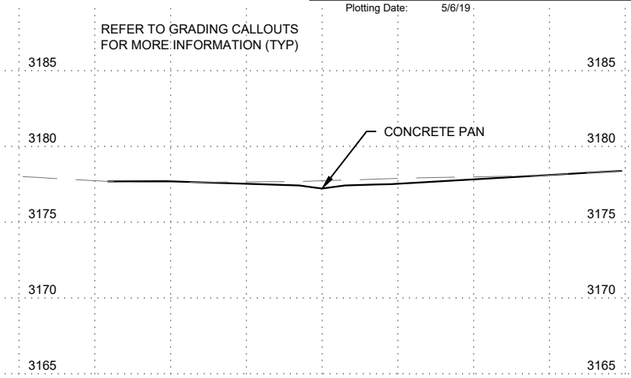

CONCRETE PAN STA 5+00.00
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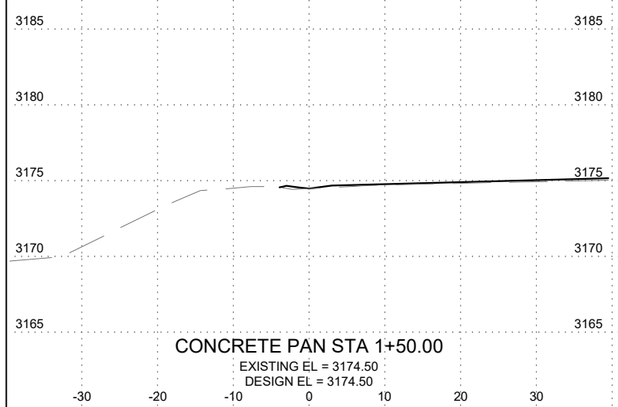

CONCRETE PAN STA 1+50.00
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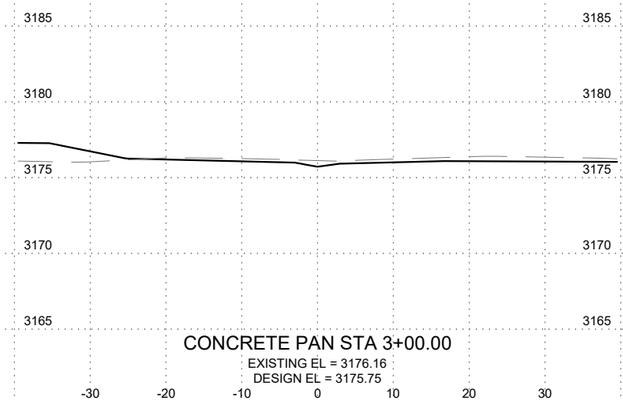
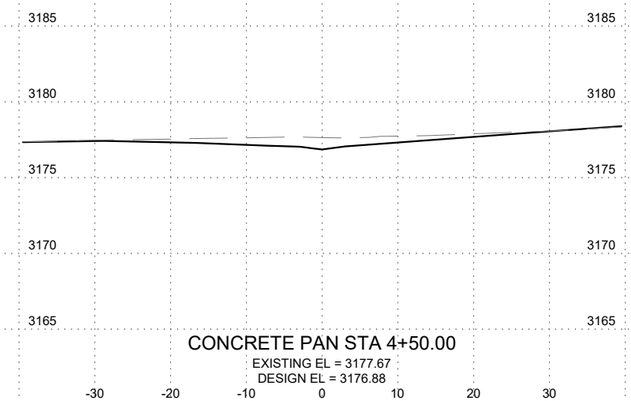


CONCRETE PAN STA 3+00.00
EXISTING EL = 3176.16
DESIGN EL = 3175.75



CONCRETE PAN STA 4+50.00
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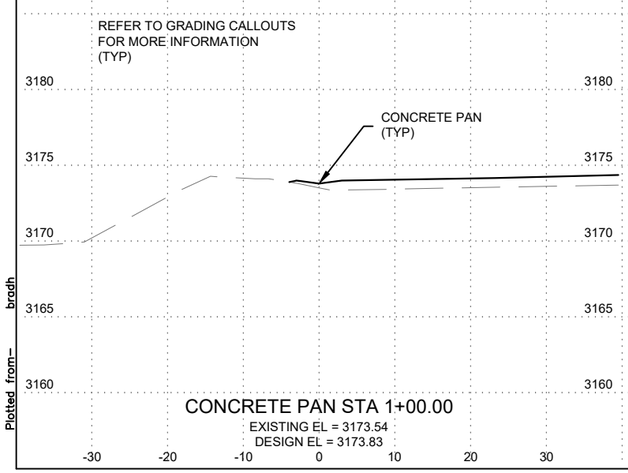
DESIGN EL = 3176.88



CONCRETE PAN STA 1+00.00
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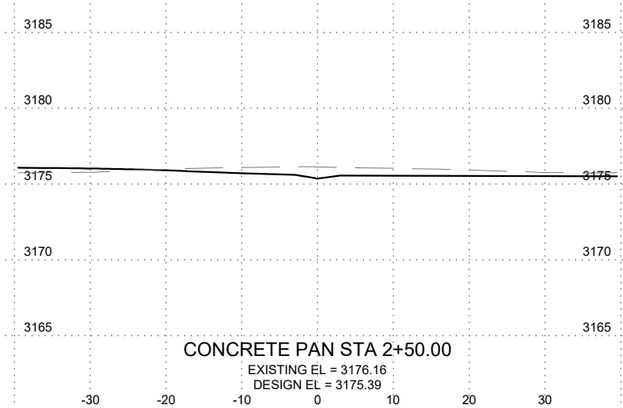
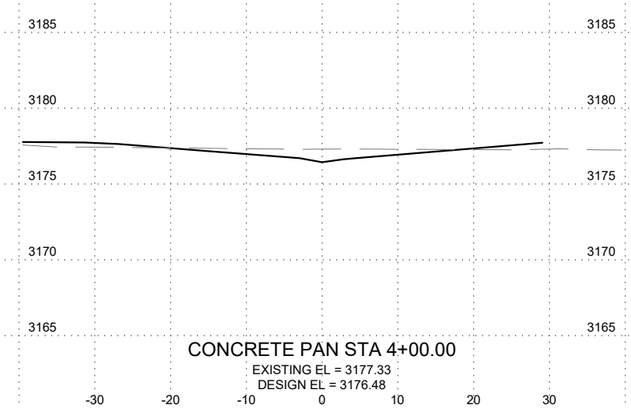
DESIGN EL = 3173.83



CONCRETE PAN STA 2+50.00
EXISTING EL = 3176.16
DESIGN EL = 3175.39



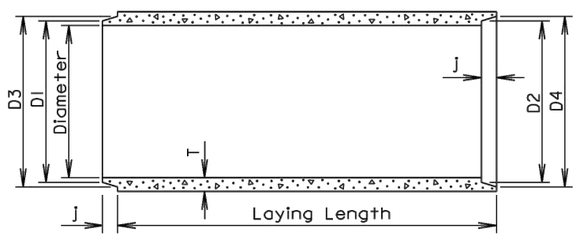
CONCRETE PAN STA 4+00.00
EXISTING EL = 3177.33
DESIGN EL = 3176.48

Plotted from— brodh

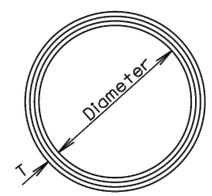
File— P:\19-101\AutoCAD\PlanSheets\19-101XSEC.dwg

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 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 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

June 26, 2015

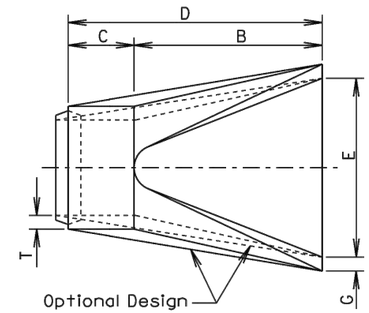
Published Date: 1st Qtr. 2019

SDDOT

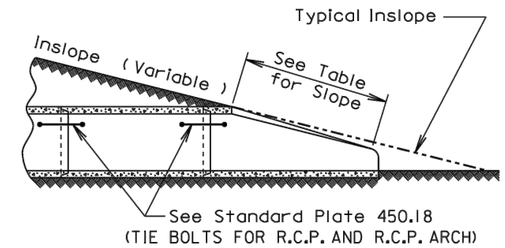
REINFORCED CONCRETE PIPE

PLATE NUMBER 450.01

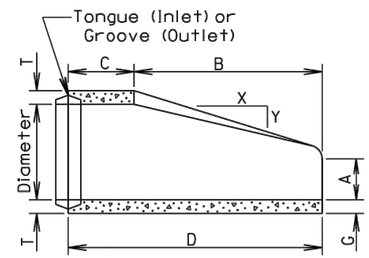
Sheet 1 of 1



TOP VIEW



SLOPE DETAIL

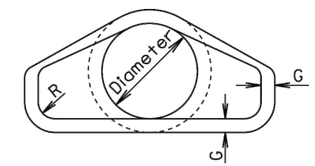


LONGITUDINAL SECTION

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 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

June 26, 2015

Published Date: 1st Qtr. 2019

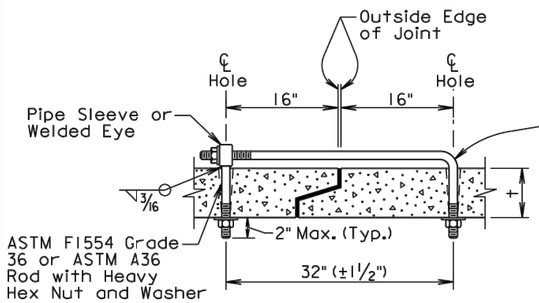
SDDOT

R. C. P. FLARED ENDS

PLATE NUMBER 450.10

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

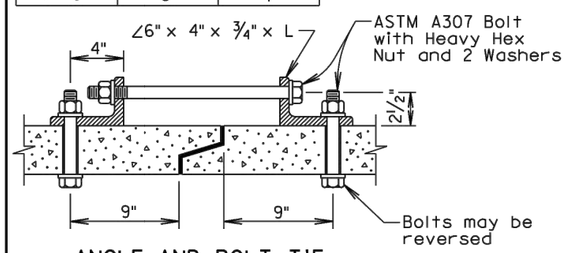
GENERAL NOTES:

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

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



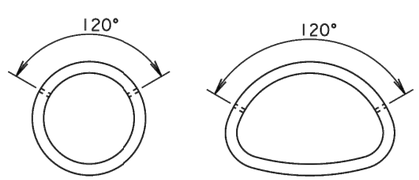
ANGLE AND BOLT TIE

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:

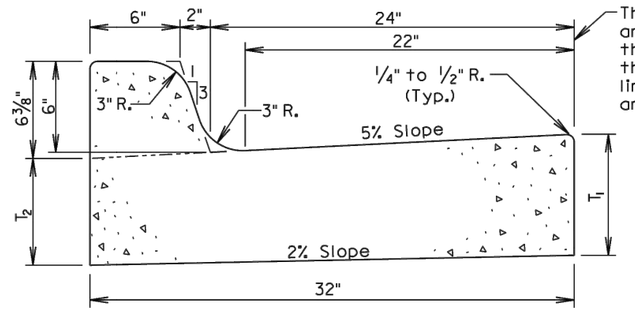
In lieu of the tie bolts detailed above other types of tie bolt connections may be installed as approved by the Office of Bridge Design.

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

Published Date: 1st Qtr. 2019	SDDOT	TIE BOLTS FOR R.C.P. AND R.C.P. ARCH	PLATE NUMBER 450.18
			Sheet 1 of 1



The stated radii on the plans and cross sections refer to this line and it shall also be the basis for horizontal linear foot measurement and payment.

Type	T_1 (Inches)	T_2 (Inches)	Cu. Yd. Per Lin. Ft.	Lin. Ft. Per Cu. Yd.
B66	6	5 1/16	0.057	17.7
B67	7	6 1/16	0.065	15.4
B68	8	7 1/16	0.073	13.7
B68.5	8.5	7 9/16	0.077	13.0
B69	9	8 1/16	0.081	12.3
B69.5	9.5	8 9/16	0.085	11.7
B610	10	9 1/16	0.090	11.2
B610.5	10.5	9 9/16	0.094	10.7
B611	11	10 1/16	0.098	10.2
B611.5	11.5	10 9/16	0.102	9.8
B612	12	11 1/16	0.106	9.4

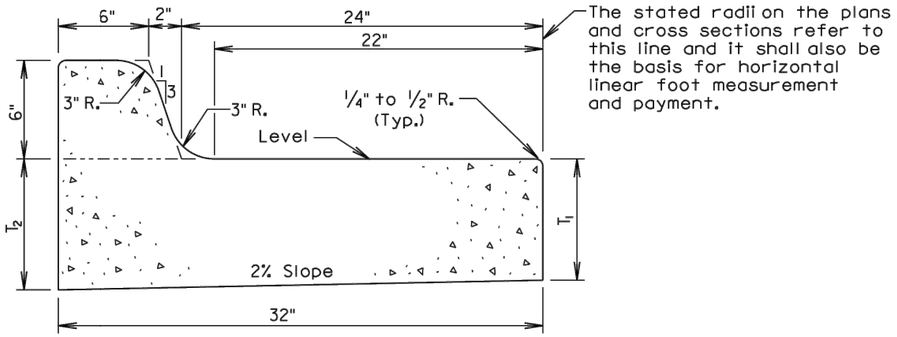
GENERAL NOTES:

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

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

September 6, 2008

Published Date: 1st Qtr. 2019	SDDOT	TYPE B CONCRETE CURB AND GUTTER	PLATE NUMBER 650.01
			Sheet 1 of 1



The stated radii on the plans and cross sections refer to this line and it shall also be the basis for horizontal linear foot measurement and payment.

Type	T_1 (Inches)	T_2 (Inches)	Cu. Yd. Per Lin. Ft.	Lin. Ft. Per Cu. Yd.
BL66	6	6 5/8	0.063	15.9
BL67	7	7 5/8	0.071	14.1
BL68	8	8 5/8	0.080	12.5
BL68.5	8.5	9 1/8	0.084	11.9
BL69	9	9 5/8	0.088	11.4
BL69.5	9.5	10 1/8	0.092	10.9
BL610	10	10 5/8	0.096	10.4
BL610.5	10.5	11 1/8	0.100	10.0
BL611	11	11 5/8	0.104	9.6
BL611.5	11.5	12 1/8	0.108	9.3
BL612	12	12 5/8	0.112	8.9

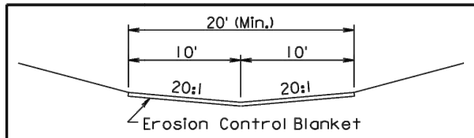
GENERAL NOTES:

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

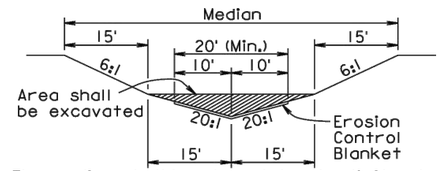
See Standard Plate 650.90 for expansion and contraction joints in the curb and gutter.

September 6, 2006

Published Date: 1st Qtr. 2019	SDDOT	TYPE BL CONCRETE CURB AND GUTTER	PLATE NUMBER 650.05
			Sheet 1 of 1

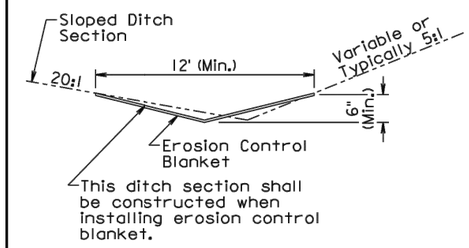


STANDARD DITCH SECTION

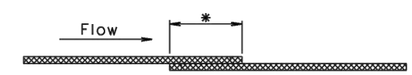


The median shall be shaped to the limits shown in this detail where the erosion control blanket will be placed.

MEDIAN SECTION



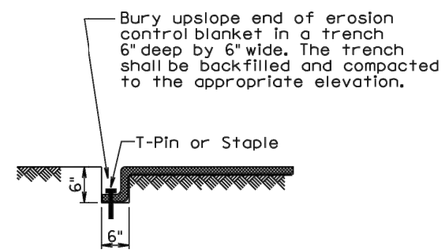
SLOPED DITCH SECTION



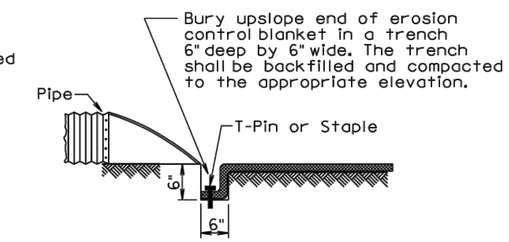
* Use a 4" (Min.) overlap wherever two widths of erosion control blanket are applied side by side.

* Use a 6" (Min.) overlap wherever one roll of erosion control blanket ends and another begins.

OVERLAP DETAIL



TRENCH DETAIL



PIPE END DETAIL

GENERAL NOTES:

Prior to placement of the erosion control blanket, the areas shall be properly prepared, shaped, seeded, and fertilized.

Erosion control blanket shall be unrolled in the direction of the flow of water when placed in ditches and on slopes. The upslope end of the erosion control blanket shall be buried in a trench 6" wide by 6" deep. There shall be at least a 6" overlap wherever one roll of erosion control blanket ends and another begins, with the upslope erosion control blanket placed on top of the downslope erosion control blanket.

The erosion control blanket shall be pinned to the ground according to the manufacturer's installation recommendations.

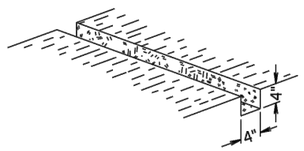
After the placement of the erosion control blanket, the Contractor shall fine grade along all edges of the blanket to maintain a uniform slope adjacent to the blanket and level any low spots which might prevent uniform and unrestricted flow of side drainage directly onto the erosion control blanket.

All ditch sections shall be shaped when installing the erosion control blanket. All costs for shaping the ditches shall be incidental to the contract unit price per foot for "Shaping for Erosion Control Blanket".

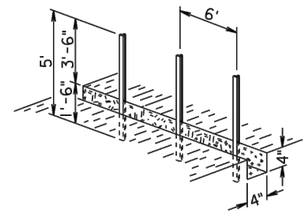
December 23, 2004

Published Date: 1st Qtr. 2019	SDDOT	EROSION CONTROL BLANKET	PLATE NUMBER 734.01
			Sheet 1 of 1

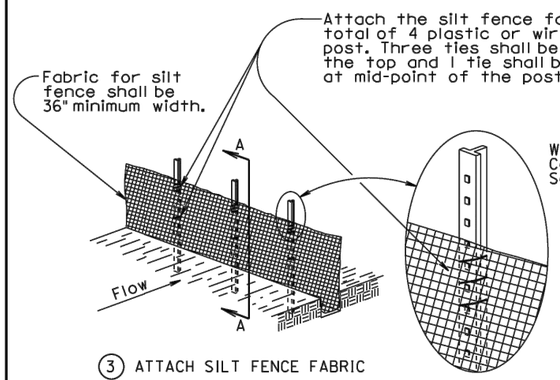
MANUAL HIGH FLOW SILT FENCE INSTALLATION



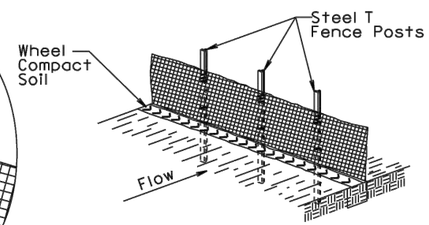
1 EXCAVATE TRENCH



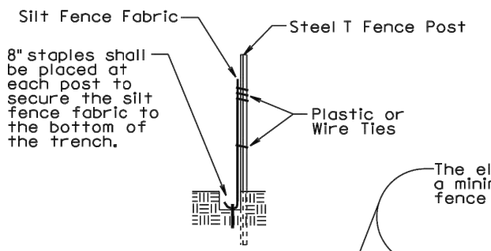
2 DRIVE STEEL T FENCE POSTS



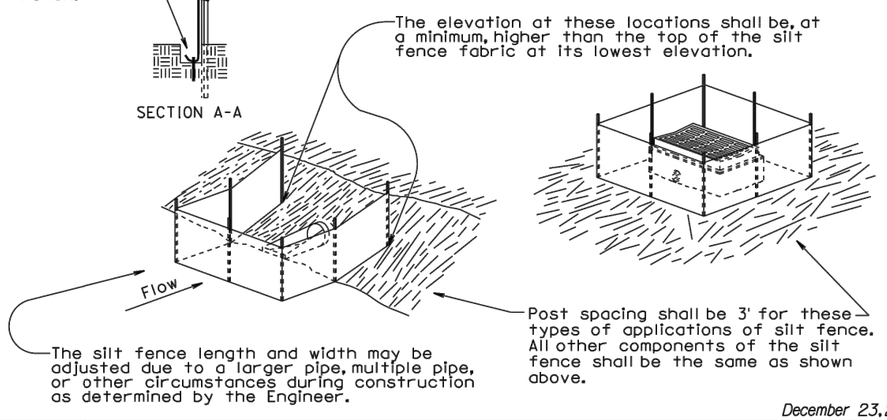
3 ATTACH SILT FENCE FABRIC



4 BACKFILL TRENCH AND WHEEL COMPACT SOIL



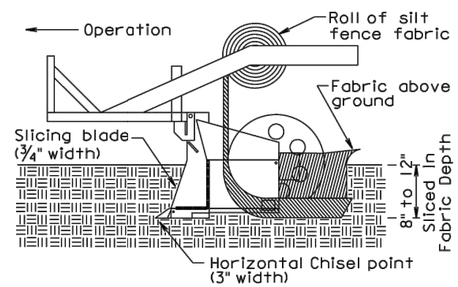
SECTION A-A



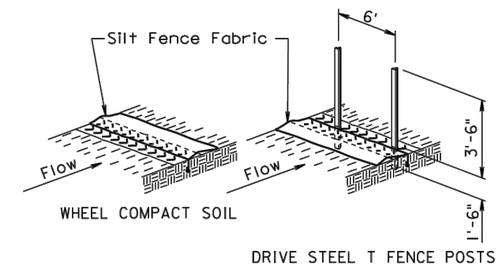
December 23, 2003

Published Date: 1st Qtr. 2019	SDDOT	HIGH FLOW SILT FENCE	PLATE NUMBER 734.05
			Sheet 1 of 2

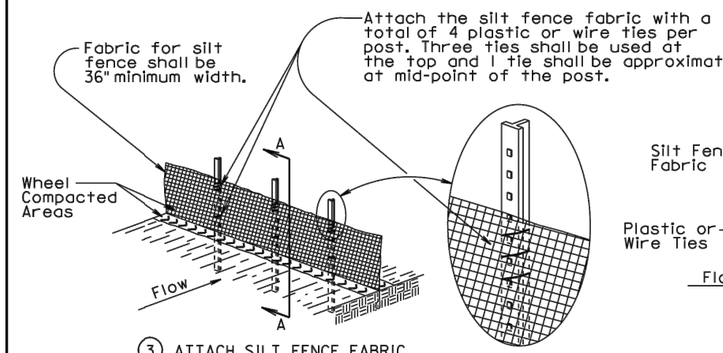
MACHINE SLICED HIGH FLOW SILT FENCE INSTALLATION



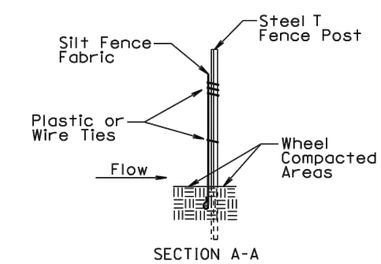
1 INSTALL SILT FENCE FABRIC BY MACHINE SLICING METHOD.



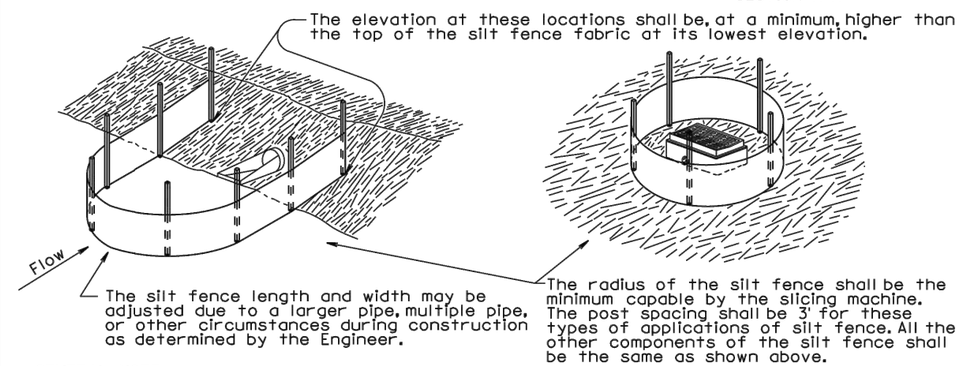
2 WHEEL COMPACT SOIL ABOVE SLICED IN PORTION OF FABRIC AND THEN DRIVE STEEL T FENCE POSTS.



3 ATTACH SILT FENCE FABRIC



SECTION A-A



GENERAL NOTE:

If a trench can not be dug or the silt fence fabric can not be sliced in due to the type of earthen material (such as rock), then a row of 30 to 40 pound sandbags butted end to end shall be provided on top of the extra length of silt fence fabric to prevent underflow.

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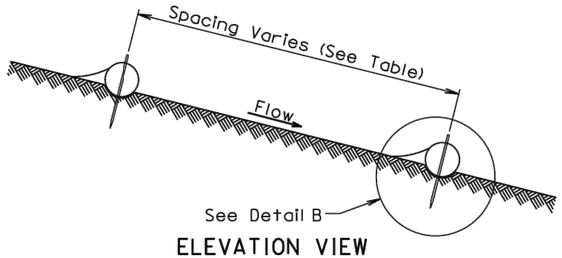
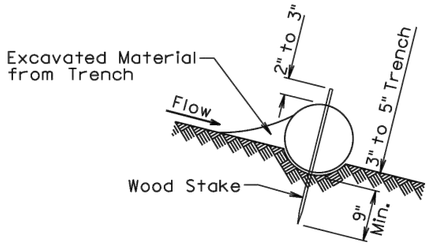
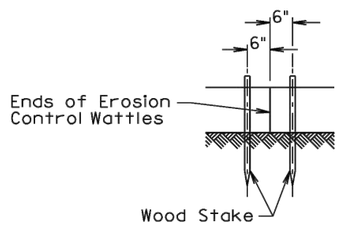


ELEVATION VIEW
CUT OR FILL SLOPE INSTALLATION

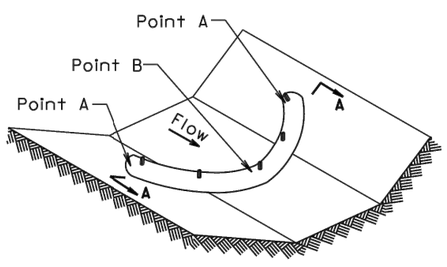
CUT OR FILL SLOPE INSTALLATION	
Slope	Spacing (Ft)
1:1	10
2:1	20
3:1	30
4:1	40



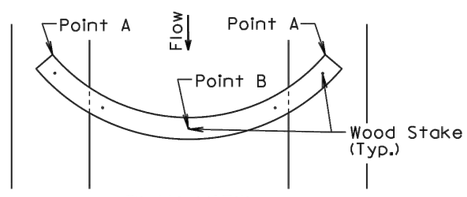
DETAIL B
(TYPICAL OF ALL INSTALLATIONS)



DETAIL C

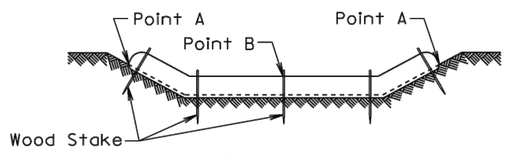


ISOMETRIC VIEW
DITCH INSTALLATION



PLAN VIEW
DITCH INSTALLATION

DITCH INSTALLATION	
Grade	Spacing (Ft)
2%	150
3%	100
4%	75
5%	50



SECTION A-A

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SDDOT

EROSION CONTROL WATTLE

PLATE NUMBER 734.06

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GENERAL NOTES:

At cut or fill slope installations, wattles shall be installed along the contour and perpendicular to the water flow.

At ditch installations, point A must be higher than point B to ensure that water flows over the wattle and not around the ends.

The Contractor shall dig a 3" to 5" trench, install the wattle tightly in the trench so that daylight can not be seen under the wattle, and then compact the soil excavated from the trench against the wattle on the uphill side. See Detail B.

The stakes shall be 1"x2" or 2"x2" wood stakes, however, other types of stakes such as rebar may be used only if approved by the Engineer. The stakes shall be placed 6" from the ends of the wattles and the spacing of the stakes along the wattles shall be 3' to 4'.

Where installing running lengths of wattles, the Contractor shall butt the second wattle tightly against the first and shall not overlap the ends. See Detail C.

The Contractor and Engineer shall inspect the erosion control wattles once every week and within 24 hours after every rainfall event greater than ½". The Contractor shall remove, dispose, or reshape the accumulated sediment when necessary as determined by the Engineer.

Sediment removal, disposal, or necessary shaping shall be as directed by the Engineer. All costs for removing accumulated sediment, disposal of sediment, and necessary shaping shall be incidental to the contract unit price per cubic yard for "Remove Sediment".

All costs for furnishing and installing the erosion control wattles including labor, equipment, and materials shall be incidental to the contract unit price per foot for the corresponding erosion control wattle bid item.

All costs for removing the erosion control wattle from the project including labor, equipment, and materials shall be incidental to the contract unit price per foot for "Remove Erosion Control Wattle".

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EROSION CONTROL WATTLE

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