

PROJECT

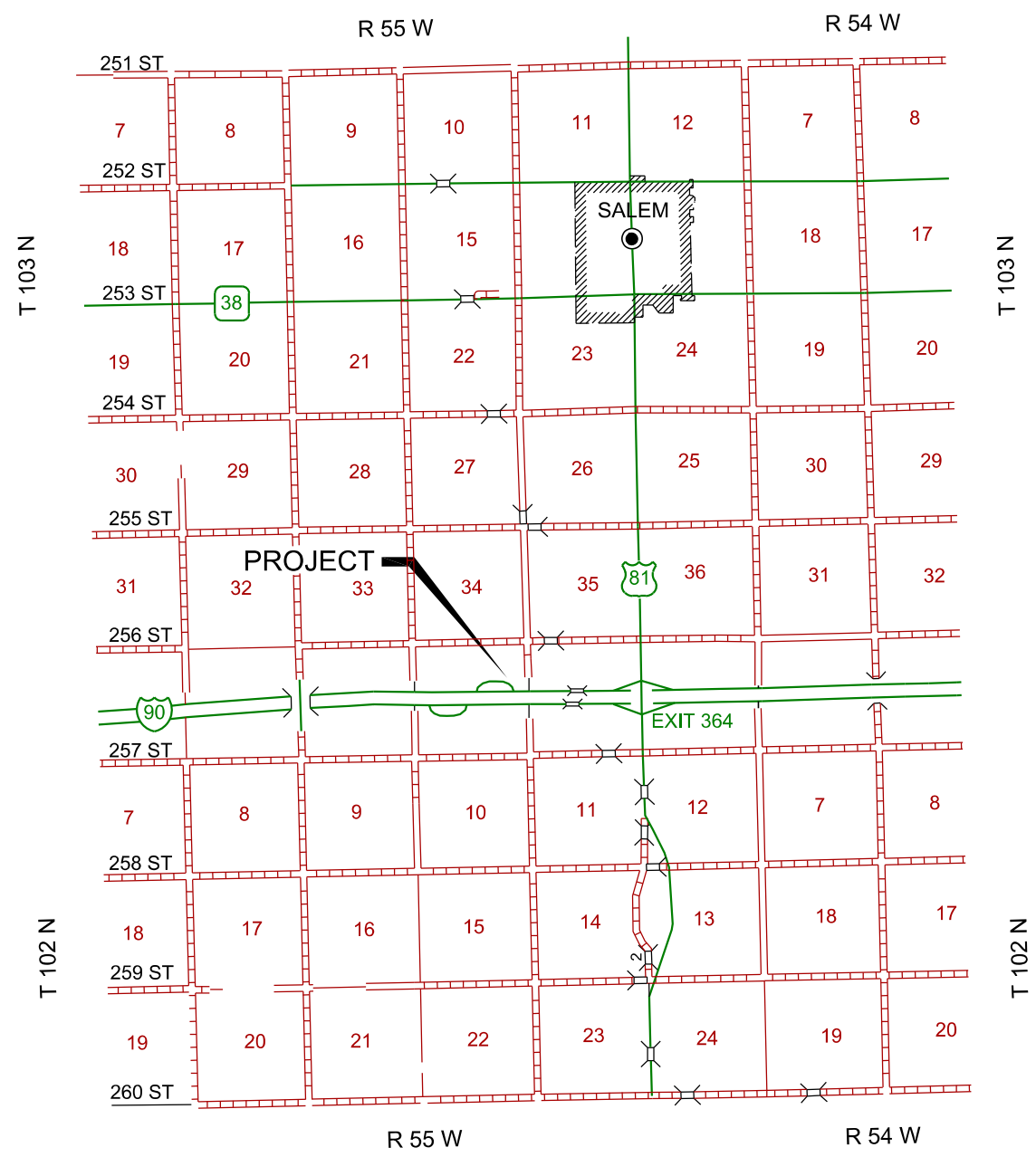
STATE OF SOUTH DAKOTA  
DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED  
**PROJECT IM 0908(106)362**  
**I90 WB SALEM REST AREA LAGOON**  
**MCCOOK COUNTY**

SEWER LAGOON GRADING / LIFT STATION  
PCN 082T

INDEX OF SHEETS

Sheet 1	Title Sheet
Sheets 2 - 18	General Notes
Sheet 19	Pipe Table
Sheet 20	Symbology & Legend
Sheet 21	Traffic Control
Sheets 22-23	Removal Locations
Sheets 24-25	Lagoon Layout & Install Locations
Sheet 26	Sewer Profile
Sheet 27	Cross Sections
Sheet 28	Typical Sections
Sheet 29	Erosion Control
Sheets 30-32	Lift Station Details
Sheet 33	MH Details
Sheets 34-46	Standard Plates



Plans Prepared by:  
**McLaur Engineering, Inc.**  
Sioux Falls, South Dakota



# ESTIMATE OF QUANTITIES

## GENERAL

STATE OF SOUTH DAKOTA	PROJECT IM 0908(106)362	SHEET 2	TOTAL SHEETS 46
-----------------------------	----------------------------	------------	-----------------------

Plotting Date: 6/25/2020

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
100E0020	Clear and Grub Tree	40	Each
110E0460	Remove Manhole	5	Each
110E0520	Remove Sewer Pipe	540	Ft
110E0605	Remove Chain Link Fence	564	Ft
110E1700	Remove Silt Fence	386	Ft
120E0010	Unclassified Excavation	6,290	CuYd
120E0600	Contractor Furnished Borrow Excavation	11,007	CuYd
230E0010	Placing Topsoil	1,082	CuYd
250E0020	Incidental Work, Grading	Lump Sum	LS
451E1006	6" PVC Sewer Pipe	45	Ft
451E1008	8" PVC Sewer Pipe	401	Ft
451E1600	Lift Station	1	Each
451E3412	6" Pipe Plug	6	Each
451E4208	8" Gate Valve with Box	1	Each
451E4944	6" Sewer Pipe Bedding Material	45	Ft
451E4945	8" Sewer Pipe Bedding Material	401	Ft
451E7016	Connect to Existing Sewer Main	1	Each
451E7017	Abandon Sewer Main	808	Ft
451E7020	Sewer Bypass Pumping	Lump Sum	LS
460E0100	Class A45 Concrete, Miscellaneous	5.0	CuYd
480E0200	Epoxy Coated Reinforcing Steel	240	Lb
621E0160	6' Chain Link Fence with Tension Wired Top	1,365	Ft
621E0420	Single Vehicular Swing Gate	1	Each
632E3203	Flat Aluminum Sign, Nonremovable Copy High Intensity	10.1	SqFt
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
635E6200	Miscellaneous, Electrical	Lump Sum	LS
671E1048	48" Manhole	1	Each
671E5502	2" Adjusting Ring for Manhole	2	Each
671E6007	Type A7 Manhole Frame and Lid	1	Each
700E0210	Class B Riprap	1,716.0	Ton
730E0202	Type B Permanent Seed Mixture	9	Lb
730E0212	Type G Permanent Seed Mixture	48	Lb
731E0200	Fertilizing	1.43	Ton
732E0100	Mulching	4.3	Ton
734E0010	Erosion Control	Lump Sum	LS
734E0602	Low Flow Silt Fence	1,542	Ft
734E0610	Mucking Silt Fence	107	CuYd
734E0620	Repair Silt Fence	386	Ft
831E0110	Type B Drainage Fabric	3,019	SqYd

All work will be constructed in accordance per the South Dakota Department of Transportation Standard Specifications for Roads and Bridges, 2015 Edition.

At completion of the project, all finish backfill, finish shaping, and finish grading within the project will create a finished product of quality (both in usage and appearance), will be done to the satisfaction of the Engineer, and will be incidental to construction with no specific pay item.

The Contractor may perform grading only during daylight hours, unless the Engineer approves additional hours.

### SUGGESTED SEQUENCE OF CONSTRUCTION

- 1) Removals
- 2) Excavation
- 3) Sanitary Sewer & Lift Station
- 4) Berms
- 5) Clay liner & Testing
- 6) Sanitary Sewer final hookups
- 7) Perimeter Fencing
- 8) Final Testing
- 9) Finish work
- 10) Seeding

The above sequence is a suggestion. The Contractor may provide a different sequence. The Contractor will provide a schedule of construction activities to be reviewed and approved by the Engineer before construction begins.

### MINIMUM TESTING REQUIREMENTS

A minimum of two compaction tests will be made for every six inch lift of every acre of clay liner. Minimum density requirements will be 97% of maximum dry density with moisture content at 0 to 3% above optimum in all areas that are to be clay liner.

Dikes and embankments will be constructed to at least 95% of maximum dry density.

Soil under the 18" clay liner will be compacted to at least 95% of maximum dry density in lifts not to exceed 6" compacted lift thickness. Tests will be conducted at a rate of 2 per acre of pond bottom and interior slopes.

Prior to putting the ponds into operation two percolations tests will be conducted verifying that the minimum hydraulic conductivity of the bottom liner and interior slopes has been met. The seepage from the lagoon must not exceed 1/16 in/day (1.8 x 10<sup>-6</sup> cm/sec or 6.3 x 10<sup>-2</sup> in/day). Percolation tests will be completed by the Contractor. Payment for percolation tests will be incidental to Unclassified Excavation.

A minimum of one compaction test will be made for every 200 feet of trench per 4 feet of depth. Minimum density requirements on all trenches will be 95% of maximum dry density in all areas.

### UTILITIES

Field verification of depth and location of utilities will need to be done before construction of the project proceeds.

SD One Call 1-800-781-7474

The Contractor will coordinate the relocation of all privately owned utility facilities when necessary to accommodate the new construction.

The Contractor will safe guard all utilities and coordinate his efforts to coincide with utility work in order to avoid interference and to minimize inconvenience between Contractors and the public.

Any damage to utilities because of the Contractor's carelessness will be repaired at the Contractor's expense.

Utility location as shown on the plan sheets may not be complete and accurate. The Contractor will call for utility locations in the field prior to beginning any excavation.

All underground utilities should be accurately located in the field by the respective utility companies before any excavation, and notification of such utilities will be the responsibility of the Contractor. Utilities as located within these plans are shown as a convenience to the Contractor, and the Engineer will not be held responsible for any omissions or inaccuracies.



STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0908(106)362	3	46

Plotting Date: 6/25/2020

## **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: <https://dot.sd.gov/media/documents/EnvironmentalProceduresManual.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 B: FEDERALLY THREATENED, ENDANGERED, AND PROTECTED SPECIES**

#### **COMMITMENT B2: WHOOPING CRANE**

The Whooping Crane is a spring and fall migratory bird in South Dakota that is about 5 feet tall and typically stops on wetlands, rivers, and agricultural lands along their migration route. An adult Whooping Crane is white with a red crown and a long, dark, pointed bill. Immature Whooping Cranes are cinnamon brown. While in flight, their long necks are kept straight and their long dark legs trail behind. Adult Whooping Cranes' black wing tips are visible during flight.

#### **Action Taken/Required:**

Harassment or other measures to cause the Whooping Crane to leave the site is a violation of the Endangered Species Act. If a Whooping Crane is sighted roosting in the vicinity of the project, borrow pits, or staging areas associated with the project, cease construction activities in the affected area until the Whooping Crane departs and immediately contact the Project Engineer. The Project Engineer will contact the Environmental Office so that the sighting can be reported to USFWS.

### **COMMITMENT C: WATER SOURCE**

The Contractor will not withdraw water with equipment previously used outside the State of South Dakota or previously used in aquatic invasive species waters within South Dakota without prior approval from the SDDOT Environmental Office. Thoroughly wash all construction equipment to prevent and control the introduction and spread of invasive species into the project vicinity.

#### **Action Taken/Required:**

The Contractor will obtain the necessary permits from the regulatory agencies such as the South Dakota Department of Environment and Natural Resources (DENR) and the United States Army Corps of Engineers (USACE) prior to water extraction activities.

Additional information and mapping of Aquatic Invasive Species in South Dakota can be accessed at: <http://sdleastwanted.com/maps/default.aspx>.

### **COMMITMENT D: WATER QUALITY STANDARDS**

#### **COMMITMENT D1: SURFACE WATER QUALITY**

Dawson Creek is classified as fish and wildlife propagation, recreation, irrigation, and stock watering waters. Because of these beneficial uses, special construction measures may have to be taken to ensure that this water body is not impacted.

#### **Action Taken/Required:**

The Contractor is advised that the South Dakota Surface Water Quality Standards, administered by the South Dakota Department of Environment and Natural Resources (DENR), apply to this project. Special construction measures will be taken to ensure the above standard(s) of the surface waters are maintained and protected.

#### **COMMITMENT D2: SURFACE WATER DISCHARGE**

The DENR General Permit for Temporary Discharge is required for temporary dewatering and discharges to waters of the state. The effluent limit for total suspended solids will be 90 mg/L 30-day average. The effluent limit applies to discharges to all waters of the state except discharges to waters classified as cold water permanent fish life propagation waters according to the ARSD 74:51:01:45. For discharges to waters of the state classified as cold water permanent fish life propagation waters, the effluent limit for total suspended solids will be 53 mg/L daily maximum.

The permittee has the option of completing effluent testing or implementing a pollution prevention plan for compliance with this permit. If the permittee develops a pollution prevention plan instead of total suspended solids sampling, the plan must be developed and implemented prior to discontinuing total suspended solids sampling. Refer to section 3.0 of the permit. If any pollutants are suspected of being discharged, a sample must be taken for those parameters listed in section 2.2 of the permit.

Refer to Commitment D1: Surface Water Quality for stream classification.

#### **Action Taken/Required:**

If construction dewatering is required, the Contractor will obtain the General Permit for Temporary Discharge Activities from the DENR Surface Water Program, 605-773-3351.

<http://denr.sd.gov/des/sw/swqformsandpermits.aspx>

The Contractor will provide a copy of the approved permit to the Project Engineer prior to proceeding with any dewatering activities. The approved permit must be kept on-site and as part of the project records.

Effluent monitoring, as a result of dewatering activities, will be summarized for each month and recorded on a separate Discharge Monitoring Report (DMR) and submitted to DENR monthly. Additional information can be found at <http://denr.sd.gov/des/sw/WhatisaDMR.aspx>

### **COMMITMENT E: STORM WATER**

Construction activities constitute 1 acre or more of earth disturbance and/or work in a waterway.

#### **Action Taken/Required:**

The DENR General Permit for Storm Water Discharges Associated with Construction Activities is required for construction activity disturbing one or more acres of earth and work in a waterway. The SDDOT is the owner of this permit and will submit the NOI to DENR 15 days prior to project start in order to obtain coverage under the General Permit. Work can begin once the DENR letter of approval is received.

The Contractor must adhere to the "Special Provision Regarding Storm Water Discharges to Waters of the State."

The Contractor will complete the DENR Contractor Certification Form prior to the pre-construction meeting. The form certifies under penalty of law that the Contractor understands and will comply with the terms and conditions of the permit for this project. Work may not begin on this project until this form is signed and submitted to DENR.

The form can be found at:

<https://denr.sd.gov/des/sw/eforms/CGPAppendixCCA2018Fillable.pdf>

The Contractor is advised that permit coverage may also be required for off-site activities, such as borrow and staging areas, which are the responsibility of the Contractor.

#### **Storm Water Pollution Prevention Plan**

The Storm Water Pollution Prevention Plan (SWPPP) will be developed prior to the submittal of the NOI and will be implemented for all construction activities for compliance with the permit. The SWPPP must be kept on-site and updated as site conditions change. Erosion control measures and best management practices will be implemented in accordance with the SWPPP.

The Storm Water, Erosion, and Sediment Control Inspection Report Form DOT 298, will be used for site inspections and to document changes to the SWPPP. A copy of the completed inspection form will be filed with the SWPPP documents and retained for a minimum of three years.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0908(106)362	4	46

Plotting Date: 6/25/2020

The inspection will include disturbed areas of the construction site that have not been finally stabilized, areas used for storage materials, structural control measures, and locations where vehicles enter or exit the site. These areas will be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures identified in the SWPPP will be observed to ensure that they are operating correctly and sediment is not tracked off of the site.

Information on storm water permits and SWPPPs are available on the following websites:

SDDOT: <https://dot.sd.gov/doing-business/environmental/stormwater>

DENR: <http://denr.sd.gov/des/sw/stormwater.aspx>

EPA: <https://www.epa.gov/npdes>

#### **COMMITMENT H: WASTE DISPOSAL SITE**

The Contractor will 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) will 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) will 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 Environmental Office and the Project Engineer.

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

1. Construction and/or demolition debris consisting of concrete, asphalt concrete, or other similar materials will be buried in a trench completely separate from wood debris. The final cover over the construction and/or demolition debris will consist of a minimum of 1 foot of soil capable of supporting vegetation. Waste disposal sites provided outside of the Public ROW will be seeded in accordance with Natural Resources Conservation Service recommendations. The seeding recommendations may be obtained through the appropriate County NRCS Office. The Contractor will control the access to waste disposal sites not within the Public ROW with fences, gates, and placement of a sign or signs at the entrance to the site stating, "No Dumping Allowed".
2. Concrete and asphalt concrete debris may be stockpiled within view of the ROW for a period of time not to exceed the duration of the project. Prior to project completion, the waste shall be removed from view of the ROW or buried and the waste disposal site reclaimed as noted above.

The above requirements will not apply to waste disposal sites that are covered by an individual solid waste permit as specified in SDCL 34A-6-58, SDCL 34A-6-1.13, and ARSD 74:27:10:06.

Failure to comply with the requirements stated above may result in civil penalties in accordance with South Dakota Solid Waste Law, SDCL 34A-6-1.31.

Cost associated with furnishing waste disposal site(s), disposing of waste, maintaining control of access (fence, gates, and signs), and reclamation of the waste disposal site(s) will be incidental to the various contract items.

#### **COMMITMENT I: HISTORICAL PRESERVATION OFFICE CLEARANCES**

The SDDOT has obtained concurrence with the State Historical Preservation Office (SHPO or THPO) for all work included within the project limits and all department designated sources and designated option material sources, stockpile sites, storage areas, and waste sites provided within the plans.

##### **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 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.

#### **GENERAL TRAFFIC CONTROL**

All temporary traffic control sign locations will be set in the field by the Contractor and verified by the Engineer prior to installation.

Portable sign supports will not be located on sidewalks, bicycle facilities, or other areas designated for pedestrian or bicycle traffic.

All construction operations will be conducted in the general direction of traffic movement.

If there is a discrepancy between the traffic control plans, standard plates, and the MUTCD, whichever is more stringent will be used, as determined by the Engineer.

Unless otherwise stated in these plans, work will not be allowed during hours of darkness.

Traffic Control Signs, as shown in the plans, are estimates. Contractor's operation may require adjustments in quantities, either more or less.

Fixed location signing placed more than 4 calendar days prior to the start of construction will be covered or laid down until the time of construction. The covers must be approved by the Engineer prior to installation. The cost of materials, labor, and equipment necessary to complete this work will be incidental to other contract items. No separate payment will be made.

All fixed location signs, sign posts, and breakaway bases will be removed within 7 calendar days following pavement marking.

All haul trucks will be equipped with an additional flashing amber light that is visible from the backside of the haul truck. The costs for the flashing amber lights will be incidental to the various related contract items.

The Contractor will furnish, install, maintain, and remove TRUCK CROSSING (W8-6) signs daily. The TRUCK CROSSING signs will be displayed always when haul vehicles are hauling material. When hauling conditions no longer exist, the signs will be covered or removed from view. The exact number and location will be determined during construction.

Construction vehicles will exit or enter the construction work zone at locations identified by the Engineer. At no time will construction vehicles utilize the maintenance crossovers or the Interstate median to exit or enter Interstate traffic.

#### **TRAFFIC CONTROL, MISCELLANEOUS**

All costs for traffic control, including signs, sign posts, plastic safety fence and Type 3 barricades, will be incidental to the contract lump sum price for "Traffic Control, Miscellaneous".



**INCIDENTAL WORK, GRADING**

The following is a list of major items of Incidental Work, Grading:

- 1.) Site cleaning: All work associated with cleaning the site will be incidental to the execution of the project. The Contractor will execute a thorough cleaning prior to substantial completion review by the Engineer – clean driveways/approaches and road pavements by brooming. Prior to Final Completion, Contractor will remove and dispose from the project site all construction waste, unused materials, and other debris resulting from construction activities.
- 2.) Protect in Place: All work associated with protecting the existing trees and fence in place.
- 3.) Finish Grading: All work associated with final grading of site to ensure adequate drainage and aesthetic appeal of site. Final grading will be approved by the Engineer for final acceptance.
- 4.) Verify Utilities/Elevation: All work associated with verifying the utility to determine flowline elevation for specific pipe grade determination.
- 5.) Utility Crossings: All work to coordinate relocations with utility companies and to avoid conflicts during necessary crossings.
- 6.) The removal and disposal of unmarked or abandoned conduit or pipe required in order to place the underground utilities at the proper horizontal or vertical locations.
- 7.) Salvaging Rip Rap: Contractor will salvage and replace all rip rap disturbed while installing transfer piping from proposed pond 3 to existing pond 2.
- 8.) Pumping Existing Lagoons: All work associated with pumping existing pond 1 and existing pond 2 in order to abandon and plug existing sewer pipe and construct splash pad and transfer piping from proposed pond 3.
- 9.) Prefilling Lagoon: After substantial completion of the earthwork is completed, the Contractor will be required to fill the lagoon to a minimum depth of 2' (low water elevation in the lagoon cell). This will be completed before vegetation can begin to grow. The Contractor will be responsible for furnishing and transporting the water required to pre-fill the lagoon. Water from existing ponds 1 & 2 may be used.

**INCIDENTAL WORK, GRADING**

Location	Remarks
Existing Pond 1	Pumping existing pond
Existing Pond 1	Prefilling pond after pumping
Existing Pond 2	Pumping existing pond
Existing Pond 2	Prefilling pond after pumping
Proposed Pond 3	Prefilling pond after earthwork is completed

**DRAINAGE**

Maintenance of drainage is the Contractor's responsibility. The Contractor must be aware of existing drainage conditions and facilities. The Contractor must provide for drainage during all phases of construction.

Damage caused by improper temporary drainage facilities will be repaired at the Contractor's expense and to the satisfaction of the Engineer and the owner.

**CLEAR AND GRUB TREES**

Trees will need to be removed within the limits of grading. The stumps and roots are to be completely removed. The method of stump removal is at the discretion of the Contractor. All debris from clearing and grubbing trees will be hauled off site.

**UNCLASSIFIED EXCAVATION**

Earthwork will be performed as shown on the plans. Due to the difficulty in making field measurements on this project and to expedite final payment, the computed quantity of Unclassified Excavation will be the basis of payment for this item. However, the Engineer will adjust the unclassified excavation quantity if during construction it is determined that the elevation of the floor and top of dike need to be adjusted. The Engineer may also elect to survey the floor of the lagoon after excavation of existing material has been removed and after the 18" clay liner has been installed.

All excavations made for underground utilities are incidental to the installation of that utility. All spoil material removed for pipe installation is the property of the Contractor and is to be removed from the project by the Contractor. All spoil material and costs for removing it are incidental to pipe installation costs.

The excess soil resulting from earthwork activities, if any, will become the property of the Contractor who will be responsible for its removal from the site.

Water for compaction of subgrade and embankments will be provided by the Contractor and used to maintain soil at or near optimum moisture content to obtain required density. Compaction of subgrade and embankments will be governed by the specified density method. Separate payment will not be made for water used for compaction of subgrade.

SHRINKAGE FACTOR: Embankment +30%

**TABLE OF UNCLASSIFIED EXCAVATION**

	(CuYd)
Pond Excavation	3,013
Topsoil Stripping	3,277
<b>Total:</b>	<b>6,290</b>



STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0908(106)362	5	46

Plotting Date: 6/25/2020

**CONTRACTOR FURNISHED BORROW EXCAVATION**

The Contractor will provide a suitable site for Contractor furnished borrow excavation material. The Contractor is responsible for obtaining all required permits and clearances for the borrow site. The borrow material will be approved by the Engineer. The borrow material for Clay Liner will meet all Clay Liner specifications. The plans quantity for "Contractor Furnished Borrow Excavation" as shown in the Estimate of Quantities will be the basis of payment for this item.

Restoration of the Contractor furnished borrow excavation site will be the responsibility of the Contractor.

Location	Contractor Furnished Borrow Excavation (CuYd)
Pond Embankment	7,414
Clay Liner	3,593
<b>Total</b>	<b>11,007</b>

**GRADING**

Prior to beginning construction of the proposed pond, the Contractor will strip and stockpile the top 12" of topsoil material from the surface of the existing area. This material will be used as topsoil for the exterior slopes of the pond.

After the topsoil has been stripped, the Contractor will salvage and stockpile all material from pond excavation. The pond area will be over excavated 18" to install the 18" clay liner.

The pond bottom should be as level as possible at all points. Finished elevations should not vary more than three inches from the average elevation of the bottom.

All fill (excluding topsoil) will be compacted to a minimum of 95% maximum dry density.

**ABANDON SEWER PIPE**

Existing 6" DIP Sewer Pipe entering existing pond 1 and existing pond 2 will be abandoned in place. Contractor will abandon pipe by installing 6" pipe plug in the outlet end of the pipe, and fill pipe completely with flowable fill from inlet end of pipe. All labor and materials required to abandon existing sewer will be incidental to the contract per Ft price for "Abandon Sewer Main". 6" Pipe plug will be incidental to the contract per Each price for "6" Pipe Plug".

**REMOVE PIPE**

Removal of existing sanitary sewer will be paid for at the contract unit price per foot for "Remove Sewer Pipe" respectively. Payment for removal of pipe will be full compensation for excavation, removal, and disposal of the pipe.

**SEWER MAIN**

All gravity sewer pipes 36" and smaller will be PVC and will conform to the requirements of the standard specifications

Pipe jointing will be accomplished in a relatively dry trench condition. No joints may be made under water. In the event that ground water is encountered, the Contractor will dewater the trench with suitable pumps and equipment. The cost of dewatering will be absorbed in the contract bid prices for those items associated with pipe construction

**SANITARY SEWER CONNECTIONS**

Pipe couplings will be used where it is necessary to connect two spigot ends of the same diameter pipe together and where bell and spigot connections are not possible. Pipe couplings will be "Power Seal Model 3541" as manufactured by Power Seal Pipeline Products Corporation, Adjustable Repair Coupling with 300 series stainless steel shear ring as manufactured by Mission Rubber Company, Inc., "Strong Back RC Series Repair Coupling," as manufactured by Fernco, Inc., or approved equal will be used on all pipe.

All labor and materials required to tie into the existing sewer will be incidental to the contract per each price for "Connect to Existing Sewer Main".

**TABLE OF CONNECT TO EXISTING SANITARY SEWER**

Station	Quantity (Each)
0+20.00 - 0.00' L	1
Total:	1

**SANITARY SEWER MANHOLE**

The plan shown quantities of the Manhole components such as "Type A7 Manhole Frame and Lid" and "2" Adjusting Ring for Manhole" will be the basis of payment for these items. All costs associated to furnish and install manholes according to the Manhole Details will be incidental to the contract unit price per each for the corresponding "48" Manhole" bid item.

The manholes will be set in accordance with the details in the plans and will have the pipe running continuously through the manhole where possible.

The depths shown are figured from the finished rim elevation to the lowest invert elevation. Any manholes in the streets may have to be adjusted to meet final surfacing elevations. All adjustments should be able to be done with concrete adjusting rings. All costs to adjust final manhole elevations will be incidental to the specific manhole constructed.

The inverts in the manholes will be constructed as shown in the sanitary manhole and pipe invert detail sheets. Care should be taken to ensure smooth flowlines and transitions through the manhole. All costs associated with furnishing and installing the manhole invert in accordance with the details will be incidental to the contract unit price per each for the manhole bid item.

Manhole frame and lid will be Type A7 with solid, gasketed lid.

**2-INCH PCC ADJUSTING RINGS**

2-inch PCC Adjusting Rings will be used to adjust the manholes to final grade. If one more 2-inch ring will put the lid elevation over the design elevation, the lid will be left lower than design. All cost to furnish and install adjusting rings to the correct elevation will be incidental to the contract unit price per each for "2" Adjusting Ring for Manhole".

**SEWER BYPASS PUMPING**

The Contractor will maintain existing sewer flow along this project at all times. The Contractor will present a plan for construction of the sanitary sewer system to the Engineer at least 2 weeks prior to beginning construction.

**POLYETHYLENE ENCASEMENT**

All valves, fittings, and other ductile iron appurtenances and pipe are to be wrapped with 8 mil. thick polyethylene in accordance with AWWA C-105.

**SLEEVES AND RETAINER GLANDS**

The Contractor will furnish and install all clamps, ready rods, blocking and cradling necessary for the project.

**CLASS A45 CONCRETE, MISCELLANEOUS & EPOXY COATED REINFORCING STEEL**

The concrete structures will be constructed as per the "Concrete Splash Pad", "Pond Outlet", "Pond Inlet", and "Concrete Valve Box Pad" details. All turtle guards shall be installed per the details and shall be incidental to the Class A45 Concrete.

A pond depth indicator will be installed in pond 1 at the location shown on the plans as per the "Lagoon Depth Indicator" detail.

All rebar will be epoxy coated #4 rebar. All concrete will be Class A45 structural concrete. All Class A45 concrete will have fly ash in accordance with Section 605 of the Standard Specifications.

**TABLE OF A45 CONCRETE & EPOXY COATED REINFORCING STEEL**

Structure	Location	Class A45 Concrete Quantity (CuYd)	#4 Epoxy Coated Rebar Quantity (Lb)
Concrete Splash Pad	Pond #1	1.3	40
Pond Inlet	Existing Pond #2	0.6	40
Pond Outlet	Pond #1	0.9	53
Depth Indicator	Pond #1	1.4	69
Valve Box Pad	Between Pond #1 & #2	0.4	19
Valve Box Pad	Between Pond #2 & #3	0.4	19
Total:		5.0	240

**FENCING, GATES, AND WARNING SIGNS**

The entire pond system will be fenced using a 6' chain link fence with top tension wire. This fence will be located away from the outside toe of the dike to facilitate dike mowing and maintenance operations.

Warning signs will have a minimum size of 26 inches by 14 inches with a minimum size letter of two inches. There will be a minimum of one warning sign on each side of the pond and every 500 feet along the fence.

Fencing, gates, and warning signs will be placed where shown in plans and will be constructed and placed according to the standard details shown in the plans. All gates will be provided with locks.

**PLACING TOPSOIL**

The Contractor will salvage and stockpile any existing topsoil for reapplication. It is the Contractor's responsibility to provide topsoil to finish the project. No extra payment will be paid for material brought in. The areas to be topsoiled comprise all graded areas except the interior of the lagoon.

Topsoil will be black in color, clumpless, placed at a thickness of a minimum of 4 inches, and approved by the Engineer. No gravel or rocks will be allowed in the topsoil.

The estimated amount of topsoil to be removed is 3,277 CuYd.

All costs associated with removing the topsoil will be incidental to the contract unit price per cubic yard for "Unclassified Excavation".

The estimated amount of topsoil to be placed is 1,082 CuYd

All costs associated with placing the topsoil will be incidental to the contract unit price per cubic yard for "Placing Topsoil".

**MYCORRHIZAL INOCULUM**

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

- 25% *Glomus intraradices*
- 25% *Glomus aggregatum or deserticola*
- 25% *Glomus mosseae*
- 25% *Glomus etunicatum*

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

**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 1,500 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:

<u>Product</u>	<u>Manufacturer</u>
Sustane	Sustane Corporate Headquarters Cannon Falls, Minnesota Phone: 1-800-352-9245 <a href="http://www.sustane.com">www.sustane.com</a>
Perfect Blend	Perfect Blend, LLC Bellevue, WA Phone: 1-866-456-8890 <a href="http://www.perfect-blend.com">www.perfect-blend.com</a>

**PERMANENT SEEDING**

The areas to be seeded consist of all newly graded areas to the high water line on the interior slope of the lagoon.

Type B 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
Switchgrass	Dacotah, Forestburg, Nebraska 28, Pathfinder, Summer, Sunburst, Trailblazer	3
Indiangrass	Holt, Tomahawk, Chief, Nebraska 54	3
Big Bluestem	Bison, Bonilla, Champ, Sunnyview, Rountree, Bonanza	3
Canada Wildrye	Mandan	2
Total:		18

Type G 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
Switchgrass	Dacotah, Forestburg, Nebraska 28, Pathfinder, Summer, Sunburst, Trailblazer	3
Indiangrass	Holt, Tomahawk, Chief, Nebraska 54	3
Big Bluestem	Bison, Bonilla, Champ, Sunnyview, Rountree, Bonanza	3
Oats or Spring Wheat: April through May; Winter Wheat: August through November		10
Total:		26

**EROSION CONTROL**

The estimated area requiring erosion control is 137,565 square feet. All costs for the erosion control work for furnishing, placing, and maintaining erosion control including equipment, labor, seeding, fertilizing, and mulching will be incidental to the contract lump sum price for "Erosion Control".

The limits of erosion control work will be determined by the Engineer during construction.

Plotting Date: 6/25/2020

**CLASS B RIP RAP**

Class B Rip Rap will be installed on the lagoon sideslope locations indicated on the plan sheets and in accordance with the details and specifications.

Class B Rip Rap will be placed on all lagoon sideslopes from the toe of the lagoon (1466.40) to the top of the berm (1474.40).

**TYPE B DRAINAGE FABRIC**

Drainage fabric will be installed under all locations where Class B rip rap is to be installed. Drainage fabric will be installed in accordance with manufacturer's recommendations. No construction traffic will be allowed on the drainage fabric. All seams will be overlapped in accordance with manufacturer's recommendations.

**LOW FLOW SILT FENCE**

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

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

Low flow silt fence will be placed at the locations noted in the plans 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 734.04 for details.

The Contractor will install all silt fence in accordance with the specifications. If the Contractor damages any silt fence during construction, it will be the Contractor's responsibility to fix or replace the damaged area at the Contractor's expense.

**REPAIR SILT FENCE**

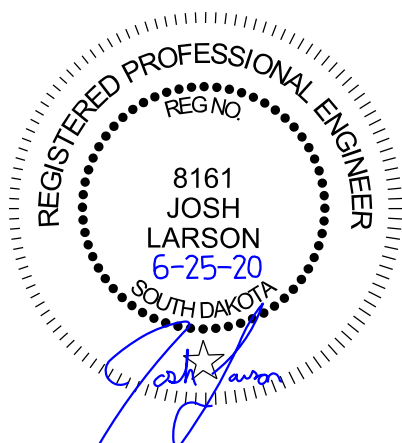
The estimated quantity of "Repair Silt Fence" will be 386 Ft.

**MUCKING SILT FENCE**

The estimated quantity of "Mucking Silt Fence" will be 107 CuYd.

**REMOVE SILT FENCE**

The estimated quantity of "Remove Silt Fence" will be 386 Ft.



## LIFT STATION

The work to be completed under the lump sum bid item "Lift Station" will include the furnishing of all labor, tools, material, and equipment necessary to complete and install the lift station system at the location and in accordance with details shown on the plans. This will include all trenching, pipe, gravel, concrete, backfill, fittings, blocking, jointing, wiring, testing and other incidentals to furnish a complete and fully operational lift station.

Payment for lift station will include all labor, materials, equipment, tools and necessary items to furnish and place the lift station as shown on plans; including barrel section, pumps, piping, float switches, pump rail system, lift cables, conduit, electrical connections, control panel, transfer switch, power disconnect switches, and any other items shown in the details which are not specifically paid for under another bid item.

### DUPLEX CONTROL PANEL

#### 1. General

##### 01. Intent

- A. The Contractor will furnish, install, and place a 230 volt, 3 phase, 3 HP duplex pump control panel into successful operation. Power supply to the control panel will be 230 volt, 1 phase. Power conversion to 3 phase for the control panel will be completed through the use of variable frequency drives placed after the incoming power breakers. The panel will be a custom built control panel specifically designed for wastewater applications, such as those designed and built by Quality Control and Integration, Inc. of New Prague, MN. or Engineer approved equal.

##### 02. References

- A. The entire system will be constructed in strict accordance with the latest published standards of NEMA, IEEE and ANSI. Wherever possible, control system components will be Underwriters Laboratory listed. All electrical systems and components installed in wet wells will comply with National Electrical Code requirements for Class I, Division I, Groups C and locations. When such equipment is exposed to weather, it will meet the requirements of weatherproof equipment (NEMA 4X). All control hardware and software will be factory assembled, wired and thoroughly tested prior to shipment.

##### 03. 3<sup>rd</sup> Party Approval

- A. The control panel will be built by a listed UL 698A Industrial Control Panel builder. The control panel submittal will contain a copy of the front page of the control panel builders UL698A standard that shows their UL file number.

##### 04. Experience

- A. All of the equipment listed herein will be furnished by a manufacturer with experience in furnishing comparable systems and will be of the latest and most modern design. The manufacturer will be capable of providing readily available Field Service for all equipment.
- B. The Contractor will be responsible for the correct operation of the equipment as specified.

##### 05. Submittal

- A. The Contractor will submit three (3) complete sets of the following information for the Engineer's approval:
  1. Dimension drawings, wiring and/or hydraulic drawings for field and pipeline mounted equipment.

2. Fabrication and nameplate legend drawings
3. Internal wiring and piping schematic drawings
4. System operational description

#### 06. Equipment General

- A. The purpose of specifying the equipment as done below is to establish a minimum standard for the equipment to be provided.

#### 07. Construction Standards

- A. Wire Numbers – Each wire in the control panel will be marked with a wire number that corresponds to the page and ladder rung of the schematic diagrams. A unique wire number will be provided between component contacts and coils.
- B. Color Coding – Wires will also be color coded as follows: 120 VAC Line = black; Neutral = white; Ground = green; Switched 120 VAC = red; + DC = blue, - DC = blue w/stripe, Foreign voltage = yellow, Intrinsically safe = light blue, or as otherwise approved by Engineer.
- C. Component Identification – Each component in the system will be identified by a unique number that corresponds to its coil's page and ladder rung location on the schematic drawings.
- D. Wire – AC control conductors will be 600 volt and a minimum of 18 gauge. DC control conductors will be a 300 volt and a minimum of 18 gauge. Control conductors will be UL Type MTW rated for 105° C. Analog conductors will be 22 gauge shielded twisted three conductor rated for 300 volts. Wire will be Beldon 8771 or equal. Shields will be grounded at the PLC or panel location. Power conductors will be sized per UL and NEC standards and rated for 600 volts. Conductors will be UL Type MTW, THHN or THWN rated for 90° C.

Control Terminals – All field control conductors will be connected to terminal blocks. Terminals will have marked wire. Connection of field control conductors directly to control panel components will not be allowed. They will be screw terminal type capable of terminating 10 to 26 gauge wire. Terminal bridge bars will be provided when it is necessary to bridge multiple like terminals together. Terminals and accessories will be Phoenix Contact or equal.

#### 08. Description of Operation

- A. Under normal operating conditions the pumps will cycle between the common stop float and start lead float. If the level rises to the start lag float the lag pump will start and run in parallel with the lead pump until the stop float opens. If the level continues to rise the high level float will close, causing the external alarm light to flash and an alarm horn to sound until silenced or the alarm condition is cleared. Both pumps will continue to run. If the level recedes past the common stop float, the low level float will open, cutout the pumps, and cause the external alarm light to flash and an alarm horn to sound until silenced or the alarm condition is cleared. The pumps will not restart until the level rises and closes the lead pump start float. The horn silence push button will be provided adjacent to the external alarm horn. Pressing the silence push button will silence the alarm horn and cause the external alarm light to go to a steady on state.
- B. The pumps will be cycled in usage such that the lead pump cycles back and forth between the two pumps, causing equal wear and usage on each pump.

#### 2. Components

##### 01. Power Entry

- A. Terminal blocks will be provided to accommodate a single source power feed. The terminals will be sized as required.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0908(106)362	8	46

Plotting Date: 6/25/2020

#### 02. Combination Starters

- A. Each pump will be provided with a manual motor starter and contactor. The starter will provide both magnetic short circuit protection and thermal overload protection of the motor circuit. Thermal overloads will provide class 10 ambient compensated protection. A Test trip mechanism will be provided. A power contactor will be provided to automatically start and stop its respective motor when called for by the automatic controls. The manual motor starter and power contactor will be provided by the same manufacturer and UL listed as a combination device.
- B. Each combination starter will be provided with an HOA (Hand-Off-Auto) switch, green running light, non-reset ETM (Elapsed Time Meter) and terminals to connect a normally closed (opens on high temperature) motor high temperature switch.

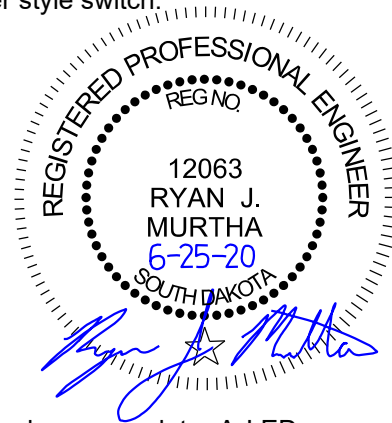
#### 03. Level Controller

- A. Wetwell level will be monitored and controlled by 5 intrinsically safe float switches.
- B. Normally open contacts will be provided for pump control. Red LED's will be provided to indicate alarm output on and green LED's will be provided to indicate pump control output on.
- C. Selector switches will be provided to select pump sequence (1-2/Auto/2-1), simplex or duplex operation, all pumps start enable on high level, N.O. or N.C. low level float input, alarm flashing or non-flashing outputs.
- D. A 0-3 minute adjustable time delay will be provided to delay the starting of each pump. The lead pump start time delay will be set at 5 seconds. The lag pump start time delay will be set at 10 seconds.
- E. A 0-3 minute off delay timer will be provided to prevent the lead pump from short cycling if the low level and common stop float switch fail to close.
- F. All LED, selector switch and timer functions will be labeled on the chassis.





04. Pilot Devices
- A. HOA switches
    - 1. HOA switches will be 3 position, lever style switch.
  - B. Running Timer Meters
    - 1. An elapsed time meter will be mounted on the operator panel for each pump. It will be 6 digit (99999.9 hours) non-reset electromechanical type.
  - C. Pilot Lights
    - 1. Pilot lights will be LED type. Lens color will be green for running, red for motor high temperature and amber for seal failure. The pilot lights will be full voltage.
  - D. Relays & Timers
    - 1. Control relays will be rated for general purpose duty. A LED will be provided to indicate relay coil status.
    - 2. Time delay relays will be rated for general purpose duty. LEDs will be provided to indicate "power on" and timing "out." The timing range will be adjustable from .1 second to 10 minutes.
    - 3. All relays and timers will be mounted on DIN rail.
05. External Alarm Light
- A. Provide an externally mounted, NEMA 4X, alarm light with a red lens. The alarm light will be a daylight visible LED light. The alarm light will flash at a minimum of 40 and a maximum of 60 times per minute. The lens will be GE Lexan and will be sealed for corrosion and weather resistance. The alarm light will be Sunburst II as manufactured by Ingram Products, Inc. or equal.
06. Enclosure Heater
- A. A 100 watt thermostatically-controlled, fan-driven heater will be provided. A thermostat will be provided to control the heater and maintain the enclosure temperature above 30 degrees F during all local weather conditions. The heater will be a DAH1001A as manufactured by Hoffman Enclosures Inc. or equal.
07. Lightning Arrestor
- A. Provide a metal oxide lightning arrestor on the incoming power lines.
08. Alarm Horn
- A. An alarm horn that produces a 103dB sound at 10' will be mounted on the base of the enclosure. The horn will be a panel mount vibrating horn rated for outdoor use, such as the 870P-N5 Series Horn produced by Edwards Signaling, or approved equal.
  - B. A silence pushbutton and relay will be provided. The silence pushbutton will be mounted adjacent to the horn. The silence pushbutton will be rated for UL type 4 applications.
09. Seal Failure
- A. Amber seal failure indicating lights will be provided for each pump. Voltage or current sensing relays, as required by the pump manufacturer will be provided to sense seal failure. The use of general purpose relays or neon lights for seal monitoring is specifically prohibited.



10. Motor Over Temperature
- A. Red, pump motor over temperature alarm indicating lights will be provided. The alarm light will remain on and the pump will not be allowed to restart until the motor has cooled and the reset button has been pressed.
11. Enclosure
- A. All control will be mounted in a 14 gauge 304 stainless steel NEMA/UL 4X enclosure. A drip shield will be provided over each outer door. All internal components will be mounted on a stainless steel or aluminum back plate. A stainless steel or aluminum operator panel will be provided for mounting of the HOAs, ETMs, pilot lights, and reset buttons. A padlock hasp will be provided on the enclosure door. Enclosure mounting tabs will be provided.

**PUMPS**

01. General
- A. Contractor will furnish and install, including all labor, materials, equipment and incidentals, two (2) new centrifugal submersible grinder pumps.
  - B. The centrifugal submersible grinder pumps will be designed to reduce all material found in normal domestic and light industrial sewage, including plastics, rubber, sanitary napkins, and disposable diapers into a finely ground slurry. The resultant slurry will then pumped through small diameter piping into a gravity interceptor.
  - C. The pumps will be manufactured by a company regularly engaged in the manufacture and assembly of similar units for a minimum of five (5) years. The pumps will be Barnes® model XGV30N2 Submersible explosion proof rated Sewage Grinder Pumps, or Engineer approved equal.
02. Operation Conditions
- A. Each pump will be capable of delivering the following performance points: 60 U.S GPM at 31 feet TDH
  - B. The pump motor speed will be 3450 rpm, 3 HP, 3 Phase, 60 Hertz, 230 Volts.
03. Construction
- A. Unit (s) will be Underwriters Laboratories listed for Class I, Group D, Division 1, hazardous locations. Third party recognition only or approvals other than UL will not be considered equivalent.
  - B. Each pump will be of the sealed submersible type. The volute, seal plates and motor housing will be constructed of high quality ASTM A-48 class 30 cast iron. All external mating parts will be machined and O-ring sealed on a beveled edge. Gaskets will not be acceptable. All fasteners and hardware exposed to the pumped liquids will be 300 series stainless steel.
  - C. Discharge connection will be a standard 2" inch NPT in the vertical position.
04. Electrical Power Cord
- A. Electrical power cord will be SOOW or W, water resistant 600V, 90°C, UL and/or CSA approved and applied dependent on amp draw for size.
  - B. The cord entry design will be such that it precludes specific torque requirements to insure a watertight and submersible seal.

- C. All incoming lead wires will be spliced in the motor terminal housing. After splicing, the terminal housing will be filled with epoxy to seal the outer cord jacket and the individual strands to prevent water from entering the motor housing. A secondary rubber pressure grommet will be provided as an additional sealing point and strain relief at the point of cord entry. Cord entry designs utilizing terminal boards to connect power cord leads with motor leads will not be acceptable.
  - D. Pump and control wiring will run continuously to the control panel through conduit and sealed fittings as required by state and local codes. All incoming power and control wires must pass through cord grips and sealed fittings with sealing compound as required by Underwriters Laboratories and State and Local code. Alternatively, the Contractor may be allowed to install an appropriately NEMA rate enclosure within the lift station as a junction box for pump and control wiring. The enclosure will be completely water and air tight and will allow entrance of the wires though sealed fittings. Submittal of all documents, including justification for the junction box will be the sole responsibility of the Contractor. Approval will be at the discretion of the Engineer.
05. Motor
- A. Single phase motors with a capacitor start, capacitor run design will not be allowed. A dual voltage three phase motor will be utilized with variable frequency drives for phase conversion. The pump will be designed to be non-overloading throughout the entire pump curve.
  - B. The rotor and stator assembly will be of the standard frame design and secured to the pump seal plate by four threaded fasteners allowing for easy serviceability. Motor designs incorporating shrink or press fit assembly between the stator and motor housing will not be acceptable.
  - C. The motor will be constructed with the windings operating in a sealed environment containing clean dielectric oil, making it capable of operating in a totally, partially or non-submerged condition for extended periods of time without damage due to the heat being generated. Air-filled motors will not be acceptable. The motor windings will be of Class F insulation. The motor will meet the standard NEMA design B for three phase.
  - D. No special tools will be required for pump and motor disassembly.
  - E. Pump will be equipped with heat sensors. They will be mounted and sized to provide protection to the pumps from overheating. They will automatically reset following return of pump to normal operating temperatures. The sensor will be connected so that the starter is tripped if a heat sensor opens.
06. Bearings and Shaft
- A. The motor shaft will be of 416 stainless steel. Protection against excessive temperature will be provided by heat sensor thermostat attached to the stator windings and connected in series with the contactor coil in the control panel.
  - B. The lower bearing will be of the single ball type to accept radial and thrust loads, and the upper bearing of the ball type for radial loads. Bearings will operate in an oil bath atmosphere for superior life. Permanently lubricated bearings are not acceptable.

07. Seals and Sensors

- A. The unit will utilize a tandem mechanical shaft seal arrangement and will operate in an oil atmosphere. The materials of construction will be carbon for the rotating face and ceramic for the stationary face, lapped and polished to a tolerance of one light band, 300 series stainless steel hardware, and all elastomer parts to be Buna-N. The seal will be commercially available and not a proprietary design of the manufacturer.
- B. The rotor and stator in the motor housing will be separated and protected from the pumped liquid by an oil-filled seal housing incorporating two seals in tandem. This seal housing will be equipped with two moisture sensing probes installed between the seals, and the sensing of moisture in the seal chamber will be automatic, continuous, and not require the pump be stopped or removed from the wet well. The sensor probes will be electrically isolated, with a resistor between each probe to eliminate grounding to the casing.

08. Impellers

- A. The pump impeller will be of the recessed vortex design. Pumps with standard centrifugal semi-open impeller designs will not be acceptable. The impeller will be of 85-5-5-5 bronze construction and machined for threading to the motor shaft. The impeller will be capable of being trimmed to meet specific performance characteristics.

09. Grinder Cutters

- A. The grinder mechanism will consist of a radial cutter threaded and locked on the motor shaft by a washer in conjunction with a countersunk flat head capscrew, and a shredding ring containing a minimum of fifteen flow passages with cutting edges.
- B. The shredding ring will be reversible to provide twice the cutting edge life. Both the shredding ring and radial cutter will be constructed of 440C stainless steel hardened to a min. Rockwell C55 and will be finish ground for a fine cutting edge. Two-stage cutter mechanisms requiring external adjustment for proper clearance are not acceptable.

10. Testing

- A. The pump manufacturer will perform the following inspections and tests in accordance with Hydraulic Institute type B standards before shipment from the factory:
  1. A check of the motor voltage and frequency will be made as shown on the name plate.
  2. A motor and cord insulation test for moisture content or insulation defects will be made per UL criteria.
  3. The pump will be completely submerged and run to determine that the unit meets three pre-determined hydraulic performance points.
  4. A written report will be available showing the aforementioned tests have been performed in accordance with the specifications.
  5. The pumps will be tested at start-up by a qualified representative of the manufacturer. A start-up report as provided by the manufacturer will be completed before final acceptance of the pumps.

11. Paint

- A. The pump (s) will be painted with an epoxy based paint or water based air dry enamel of 2.0 mil minimum thickness to prevent corrosion in a caustic environment.

12. Documentation

- A. The manufacturer, will supply a minimum of 3 sets of standard submittal data; Standard submittal data consist of:
  1. Pump catalog data;
  2. Pump performance curve;
  3. Break away fitting data;
  4. Access frame data;
  5. Typical installation drawing;
  6. Control panel data
  7. Panel wiring schematic;
  8. Accessory data;
  9. Installation & Operation Manuals with Parts List



**LIFT STATION MISCELLANEOUS**

01. Lift Cable

- A. Each pumping unit will be provided with a stainless steel lifting cable. The lifting chain will be of sufficient length to extend from the pump to the pump hoist. A stainless steel hook will be provided on the access frame, on which to attach the chains when not in use. The lifting chains will be sized to provide a minimum lifting capacity of 1000 lbs, to match the required minimum lifting capacity of the pump hoist.

02. Guide Rail System

- A. Guide Rail
  1. The guide rails will be Type 304 Stainless Steel Rails with Type 304 Stainless Steel Hardware. The rails will have a minimum diameter of 1", however, documentation will be provided to show that the supplied rails can handle the specified pumps. Rails will be larger if necessary to support the pumps.
  2. The guide brackets will be attached to the pump for positioning of the unit on the guide rail during installation or removal of the unit on the guide rail within the basin.
- B. Guide Rail Brackets
  1. The upper guide bracket will align and support the two guide rails of each pump at the top of the wet well. It will bolt directly to the frame of the lift station hatch for secure rail installation.
  2. Intermediate guide rail brackets will be installed at locations as per manufacturer's recommendations but will be placed at the 1/2 points on the guide rail at a minimum. The Contractor will ensure that sufficient intermediate guide rail brackets are present, such that the rail system can fully support the pumps, during raising and lowering, without deflection. The intermediate guide rail brackets will be Barnes #750941 for use with BAF-2020 discharge base elbow, or equal.
- 3. The rail floor guide will be a portion of the Discharge Base Elbow. The rails will be attached to the base elbow such that they remain stationary with the base elbow.

C. Discharge Base Elbow

1. A discharge base elbow, designed to mount directly on the sump floor, will be supplied for each pump. It will have a machined mating inlet connection. The design will be such that the pump to discharge connection is made without the need for any nuts, bolts or gaskets. The base elbow will also anchor and align the two guide rails. The elbow will be painted with waterborne hybrid acrylic/alkyd paint, powder coated, or otherwise protected from the caustic environment inside the lift station.
2. The discharge base elbow will support the pump at the required distance (as determined by pump manufacturer) from the basin floor to provide unrestricted flow of material into the pump.
3. A sealing flange/rail guide bracket will be mounted on each pump discharge. It will have a machined mating flange which matches the base elbow discharge connection. Sealing of this discharge connection will be accomplished by a simple linear downward motion of the pump culminating with the entire weight of the pumping unit supported entirely by the base elbow.
4. The discharge base elbow, with cast iron base, lower guide rail supports, and cast iron movable elbow which is free to ride up and down the guide rails, will be a Barnes BAF-2020 as manufactured by Crane Pumps & Systems, or equal.

03. Floats and Float Mounting Bracket

- A. The wetwell level will be monitored and controlled by five (5) liquid level control switches. The level sensors will be mercury-free snap action type switches mounted in a corrosion resistant polypropylene house. The switches will be designed for use in municipal lift station.
- B. Sufficient cable will be supplied to reach the control panel with no splices in the basin.
- C. A float mounting bracket will be provided with strain reliefs that support and hold the level control cords. The bracket will be fabricated from stainless and attached to the access frame with 300 series stainless steel fasteners. A dielectric spacer should be installed when bolting to an aluminum access frame. Continuous cords are to run from pump(s) and level controls to a control panel. No splices will be made in the wiring.
- D. Level controls will be set at the elevations indicated on the plans.
- E. Floats will be Eco-Float as manufactured by Anchor Scientific, Inc. or equal.

04. Discharge Piping

- A. Discharge piping will include all piping and fittings from the discharge base elbow up through the discharge manhole.
- B. All discharge piping will be Schedule 80 PVC, ductile iron pipe or stainless steel. The exterior of all ductile iron discharge piping and fittings will be coated in a Polyamine Epoxy Coating.
- C. Where piping passes through a wall, a watertight gasket or sealer will be used to make a watertight joint.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0908(106)362	11	46

Plotting Date: 6/25/2020

### LIFT STATION HATCH

The Lift Station Hatch will be an S1S (single leaf) series access frame and cover as manufactured by Halliday Products, Inc. of Orlando, Florida or approved equal. The hatch will have a 1/4" (7mm) thick one-piece, mill finish, extruded aluminum frame, incorporating a continuous concrete anchor.

A bituminous coating will be applied to the frame exterior where it will come in contact with concrete. Door panel will be 1/4" (7mm) aluminum diamond plate, reinforced to withstand a live load of 300 lbs. psf (1464 kg. psm). Uniform live load with a maximum allowable deflection of 1/150 of the span.

Doors will open to 90 degrees and automatically lock with a T-316 stainless steel hold open arm with release handle. For ease of operation, the hold open arm will incorporate a non-corrodible lift assist. Doors will close flush with the frame and rest on a built-in neoprene cushion/gasket. Hinges and all fastening hardware will be T-316 stainless steel. Unit will lock with a T-316 stainless steel slam lock with removable key and have a non-corrodible handle. Unit will have a padlock bar for securing the hatch in the closed position.

The hatch will have a secondary protective grating panel factory manufactured for the corresponding hatch. It will be constructed of 1" thick aluminum "I" bars and will have all T-316 Stainless Steel Hardware. The protective grating panel will be lockable with an owner-supplied padlock. The grating panel will be hinged with a positive latch to maintain it in an upright position and will be load rated consistent with the access cover. It will have a 6 inch viewing area on each lateral unhinged side of the grating panel to allow for observation and limited maintenance when in the closed position and will be powder-coated safety orange.

The hatch will have a minimum opening size of 30" x 54". The hatch will be positioned over the pumps as shown on the details.

### DISCHARGE MANHOLE HATCH

The Lift Station Hatch will be an S1S (single leaf) series access frame and cover as manufactured by Halliday Products, Inc. of Orlando, Florida or approved equal. The hatch will have a 1/4" (7mm) thick one-piece, mill finish, extruded aluminum frame, incorporating a continuous concrete anchor.

A bituminous coating will be applied to the frame exterior where it will come in contact with concrete. Door panel will be 1/4" (7mm) aluminum diamond plate, reinforced to withstand a live load of 300 lbs. psf (1464 kg. psm). Uniform live load with a maximum allowable deflection of 1/150 of the span.

Doors will open to 90 degrees and automatically lock with a T-316 stainless steel hold open arm with release handle. For ease of operation, the hold open arm will incorporate a non-corrodible lift assist. Doors will close flush with the frame and rest on a built-in neoprene cushion/gasket. Hinges and all fastening hardware will be T-316 stainless steel. Unit will lock with a T-316 stainless steel slam lock with removable key and have a non-corrodible handle.

The hatch will have a minimum opening size of 24" x 30". The hatch will be positioned over the manhole as shown on the details.

### LIFT STATION & DISCHARGE MANHOLE LINING

The lift station and the discharge manhole (MH#2) will be lined with an HDPE liner in accordance with the details and specifications for Manhole lining. All ductile iron pipe surfaces will be coated with a Polyamine Epoxy Coating to provide chemical resistance and hydrogen sulfide protection. When completed, no concrete or untreated iron surfaces will be left exposed to hydrogen sulfide or other chemicals within the lift station.

All cost associated with providing the linings to the lift station and discharge manhole in accordance with the standard plates and specifications will be incidental to the contract unit price per lump sum for "Lift Station". No separate payment will be made for the lining.

### LIFT STATION PUMP HOIST & CABLES

The Contractor will furnish and install a pump hoist capable capable of lifting a minimum of 500 lbs at maximum extension and 1000 lbs at no extension such as a Thern Model 5PT10-M1 Portable Davit Crane or Engineer approved equal.

The hoist will have a boom extension with a minimum of four positions. The hoist will be capable of rotating 360 degrees and the boom will be capable of elevating to approximately 45 degrees above horizontal through the use of a non-hydraulic pivot system, such as a screw jack. All parts of the hoist will be fully powder coated.

The hoist will be equipped with a spur gear hand winch with automatic brake for positive load control, capable of lifting and pulling up to 1000 lbs, such as Thern Model M4022PB or approved equal.

The pump hoist will be mounted by use of a flush mounted socket base in a concrete pad, directly adjacent to the lift station. The hoist will be positioned such that it is capable of maneuvering directly over the top and lifting both pumps.

Additionally the Contractor will furnish two lifting cables, one for each pump. The lifting cables will be a minimum of 1/4" Stainless Steel wire rope with an attached hook which fits the lift locations on the lift station pumps. The cables will be rated for 1000 lbs minimum capacity and the length will be sufficient to reach to the bottom of the lift station when the hoist is fully elevated.

The cables will be capable of being attached to a spur gear hand winch with automatic brake.

All materials, labor, tools, and equipment necessary to furnish and install the Pump Hoist, Base, and Cables will be incidental to contract unit price per lump sum for "Lift Station".

### LIFT STATION TRASH BASKET SYSTEM

The Contractor will furnish and install a trash basket system for the purpose of collecting debris that may otherwise damage pumping equipment in the wet well.

All cost associated to furnish and install the trash basket system in accordance with the details will be incidental to the contract unit price per lump sum for "Lift Station".

### MANUAL TRANSFER SWITCH

The manual transfer switch will be a heavy duty transfer switch as manufactured by Midwest Electric Products or approved equal. The transfer switch will be designed for single phase 230 V. The switch will be rated for 100 A. It will be housed in a NEMA 3R weatherproof enclosure constructed of G90 galvanized steel with a powder coat finish. Switch will have a padlock provision in all three On-Off-On positions. The enclosure door will also have a padlock provision.

The Owner will utilize a portable generator to power the lift station in the event of a power outage. The switch will have a power input receptacle for generator connection. The Contractor will coordinate with Owner maintenance workers to ensure receptacle is compatible with existing equipment. The Transfer Switch will be incidental to the lump sum bid item "Miscellaneous Work, Electrical".

### ELECTRICAL WIRING/HOOKUP

The power for the lift station will be 230V single phase. The Contractor will coordinate with Southeastern Electric to make the connection at meter socket. Southeastern Electric will install a new transformer near the proposed control panel. They will then install the power supply up to the meter socket which will be installed on the control panel mounting board. The Contractor will work with Southeastern Electric to ensure that an appropriate meter socket is installed.

The Contractor will have a licensed electrician verify, approve and execute the wiring of the lift station system. Prior to beginning electrical wiring, the Electrician will review their plan with the Engineer so that changes can be made if necessary.

The lump sum bid item "Miscellaneous Work, Electrical" will be full payment for completing all wiring necessary to produce an operating lift station and control system, in accordance with the Lift Station Control Center details and the specifications. This will include all materials, labor, equipment, and any incidentals necessary. Additional load centers and electrical boxes may be necessary to create a working system. These will be incidental to the "Miscellaneous Work, Electrical" bid item. This will include power hook-up and control wiring.

All wiring will be inspected by the appropriate State and local Electrical inspectors as necessary to ensure conformity to regulations.



**SHOP DRAWINGS AND CATALOG CUTS**

The Contractor will submit shop drawings and/or catalog cuts, design calculations, and letters of certification for lift station materials to the Project Engineer for approval.

**LIFT STATION START UP**

When the lift station is ready to be put into operation, the Contractor will notify the Engineer so that he may have maintenance personnel at the start up. The Contractor will go through the operation procedure with the Owner's maintenance personnel.

**LIFT STATION OPERATING AND MAINTENANCE MANUALS**

The Contractor will supply the Owner with three copies of operation and maintenance manuals for the lift station.

**CONCRETE THRUST BLOCKS**

The Contractor will brace all fittings including mechanical joint caps by means of poured concrete or precast concrete thrust blocks. No wood shimming or bracing will be allowed in conjunction with the concrete blocks. Poured concrete blocking will have a compressive strength of not less than 3,000 psi. Concrete will be poured against undisturbed earth. Care will be taken not to cover up joints, bolts, and fittings with concrete. Forms will be used if joints, bolts, and fittings cannot be otherwise adequately protected from concrete. If a concrete thrust block cannot be poured due to poor soil condition or inadequate support for blocking, restrained joints will be utilized. The cost for blocking is considered to be incidental to the installation of the fittings.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0908(106)362	12	46

Plotting Date: 6/25/2020

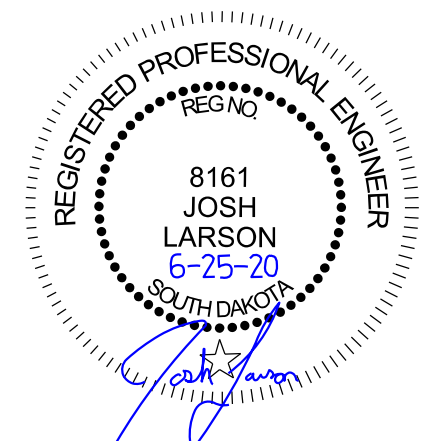


**FLOW CALCULATIONS**

Plotting Date: 6/25/2020

South Dakota Department of Transportation Salem Rest Area Lagoon System Design		
Year	Eastbound	Westbound
2017	1,101,000.00	1,087,000.00
2018	857,000.00	1,259,000.00
2019	756,000.00	1,081,000.00
3-year Average	904,666.67	1,142,333.33
Proposed Annual Usage	1,000,000.00	1,145,000.00
Future Development of 150%	<b>1,500,000.00</b>	<b>1,717,500.00</b>
Current combined Usage (Gal)	2,145,000.00	
Current combined Usage (CuFt)	286,765.00	
Projected Future combined Usage (Gal)	<b>3,217,500.00</b>	
Projected Future combined Usage (CuFt)	<b>430,148.00</b>	

South Dakota Department of Transportation Salem Rest Area Lagoon System Design		
Design Inputs		
Ave. BOD <sub>5</sub> =	0.17	lbs/100 gal/day
Ave. SS=	0.20	lbs/100 gal/day
Ave. gal/year=	3,217,500.00	gal
Ave gal/day=	8,815.07	gal
BOD <sub>5</sub> /day=	14.99	lbs/day
SS/day=	17.63	lbs/day
BOD <sub>5</sub> Analysis		
Max BOD <sub>5</sub> on primary cell =	30	lbs/acre
BOD <sub>5</sub> /day=	14.99	lbs/day
Primary Cell Acres=	0.70	Acres
BOD <sub>5</sub> on primary cell=	21.50	lbs/acre
Max BOD <sub>5</sub> on total system =	20	lbs/day
BOD <sub>5</sub> /day =	14.99	
Acres of entire system =	2.03	
BOD <sub>5</sub> on total system =	7.37	lbs/acre
SS Analysis		
SS=	17.63	lbs/day
Primary Cell Acres=	0.70	acres
SS on Primary Cell=	25.30	lb/acre
SS=	30	lbs/day
Acres of entire system=	2.03	acres
SS on Total System=	8.67	lb/acre



Plotting Date: 6/25/2020

### South Dakota Department of Transportation Salem Lagoon System Design

Existing Pond 1			Existing Pond 2			Pond 3 - Proposed New Primary Cell			Environmental Factors	
	Elevation	Area (sq Ft)		Elevation	Area (sq Ft)		Elevation	Area (sq Ft)		
Top of Pond	1,465.00	50,754	Top of Pond	1,466.00	48,250	Top of Pond	1,474.40	50,002	Precipitation	27 inches/year
High water	1,462.00	38,949	High water	1,463.00	38,528	High water	1,471.40	39,728	Evaporation	35 inches/year
Midpoint	1,460.50	33,576	Midpoint	1,461.50	34,006	Midpoint	1,469.90	34,930	Seepage DENR	22.8125 Inches/year
Low water (2' Min Depth)	1,459.00	28,557	Low water (2' Min Depth)	1,460.00	29,710	Low water (2' Min Depth)	1,468.40	30,358		
Bottom of Pond	1,457.00		Bottom of Pond	1,458.00		Bottom of Pond	1466.40			
Working Volume=	100,728	CuFt	Working Volume=	102,018	CuFt	Working Volume=	104,790	CuFt		
Precipitation Volume @ Top=	114,197	CuFt	Precipitation Volume @ Top=	108,563	CuFt	Precipitation Volume @ Top=	112,505	CuFt		
Evaporation Volume @ MidPoint=	97,930	CuFt	Evaporation Volume @ MidPoint=	99,184	CuFt	Evaporation Volume @ MidPoint=	101,879	CuFt		
Seepage DENR Volume @ MidPoint=	63,829	CuFt	Seepage DENR Volume @ MidPoint=	64,647	CuFt	Seepage DENR Volume @ MidPoint=	66,403	CuFt		
Yearly Usable Volume= Working Volume + Evap Volume + Seep Volume - Prec Volume (DENR)	148,291	CuFt	Yearly Usable Volume= Working Volume + Evap Volume + Seep Volume - Prec Volume (DENR)	157,286	CuFt	Yearly Usable Volume= Working Volume + Evap Volume + Seep Volume - Prec Volume (DENR)	160,568	CuFt		

Total System Storage DENR (CU FT)	<b>466,145.42</b>
Design Projected Yearly Usage (CU FT)	<b>430,148.00</b>



**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):
- **5.3 (3b): Total Project Area** 16.67 Acres
- **5.3 (3b): Total Area to be Disturbed** 2.24 Acres
- **5.3 (3c): Maximum Area Disturbed at One Time** 2.24 Acres
- **5.3 (3d): Existing Vegetative Cover (%)** 100%
- **5.3 (3d): Description of Vegetative Cover** Prairie Grasses
- **5.3 (3e): Soil Properties:** Loam
- **5.3 (3f): Name of Receiving Water Body/Bodies**
- **5.3 (3g): Location of Construction Support Activity Areas**

**5.3 (3h): ORDER OF CONSTRUCTION ACTIVITIES**

- **Special sequencing requirements** (see sheet).
- 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 around stockpiles.	
Install channel and ditch bottom protection.	
Clearing and grubbing.	
Remove and stockpile topsoil.	
Stabilize disturbed areas.	
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
<input type="checkbox"/> Natural Buffers (within 50 ft of Waters of State)	
<input checked="" type="checkbox"/> Silt Fence	
<input type="checkbox"/> Erosion Control Wattles	
<input type="checkbox"/> Temporary Berm / Windrow	
<input type="checkbox"/> Floating Silt Curtain	
<input type="checkbox"/> Stabilized Construction Entrances	
<input type="checkbox"/> Entrance/Exit Equipment Tire Wash	
<input type="checkbox"/> Other:	

**Structural Erosion and Sediment Controls**

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

**Dust Controls**

Description	Estimated Start Date
<input type="checkbox"/> Tarps & Wind impervious fabrics	
<input type="checkbox"/> Watering	
<input type="checkbox"/> Stockpile location/orientation	
<input type="checkbox"/> Dust Control Chlorides	
<input type="checkbox"/> Other	

**Dewatering BMPs**

Description	Estimated Start Date
<input type="checkbox"/> Sediment Basins	
<input type="checkbox"/> Dewatering bags	
<input type="checkbox"/> Weir tanks	
<input type="checkbox"/> Temporary Diversion Channel	
<input type="checkbox"/> Other:	

**Stabilization Practices (See Detail Plan Sheets)**

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

Description	Estimated Start Date
<input type="checkbox"/> Vegetation Buffer Strips	
<input type="checkbox"/> Temporary Seeding (Cover Crop Seeding)	
<input checked="" type="checkbox"/> Permanent Seeding	
<input type="checkbox"/> Sodding	
<input type="checkbox"/> Planting (Woody Vegetation for Soil Stabilization)	
<input checked="" type="checkbox"/> Mulching (Grass Hay or Straw)	
<input type="checkbox"/> Fiber Mulching (Wood Fiber Mulch)	
<input type="checkbox"/> Soil Stabilizer	
<input type="checkbox"/> Bonded Fiber Matrix	
<input type="checkbox"/> Fiber Reinforced Matrix	
<input type="checkbox"/> Erosion Control Blankets	
<input type="checkbox"/> Surface Roughening (e.g. tracking)	
<input type="checkbox"/> 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.

### 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 1/2 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 will 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. Hight*

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

**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.



# LEGEND

Plotting Date: 06-25-2020

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

# LEGEND (Traffic Control Sheet Only)

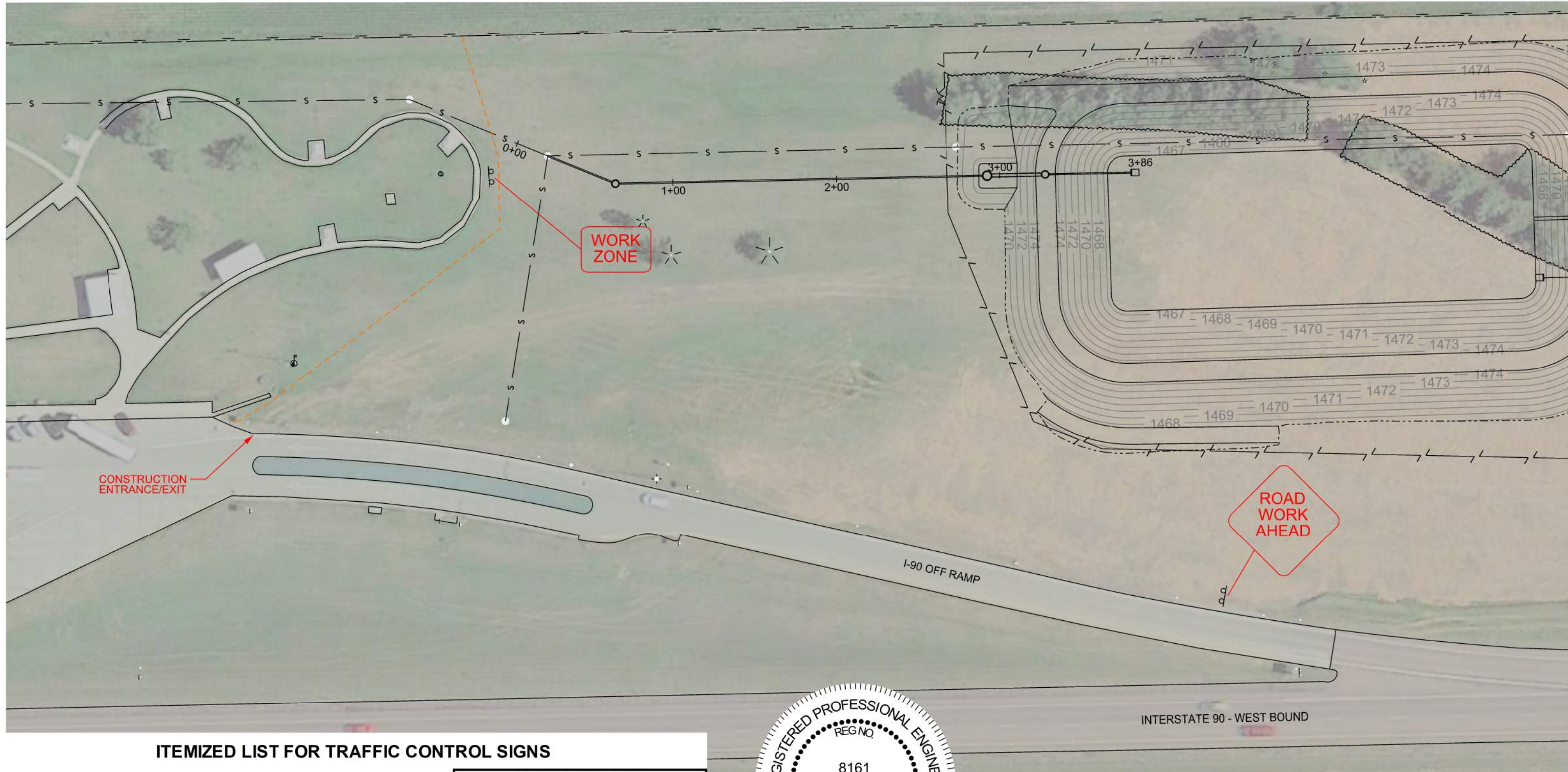
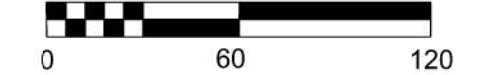
Orange Plastic Safety Fence

# TRAFFIC CONTROL PLAN

STATE OF SOUTH DAKOTA	PROJECT IM 0908(106)362	SHEET 21	TOTAL SHEETS 46
-----------------------	----------------------------	-------------	--------------------

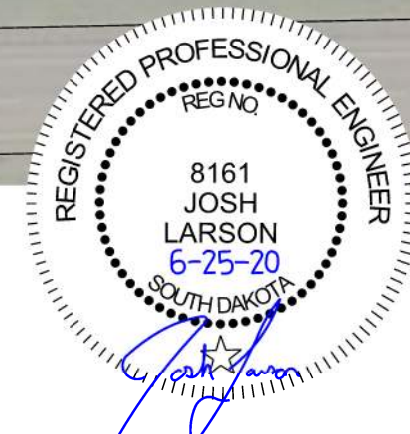
Plotting Date: 06-25-2020

SCALE: 1 INCH = 60 FEET



## ITEMIZED LIST FOR TRAFFIC CONTROL SIGNS

SIGN CODE	SIGN DESCRIPTION	CONVENTIONAL ROAD			
		NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
W20-1	ROAD WORK AHEAD	1	48" x 48"	16.0	16.0
G20-5aP	WORK ZONE (plaque) (Mounted on Type 3 Barricade)	1	24" x 18"	3.0	3.0
<b>CONVENTIONAL ROAD TRAFFIC CONTROL SIGNS SQFT</b>					<b>19.0</b>



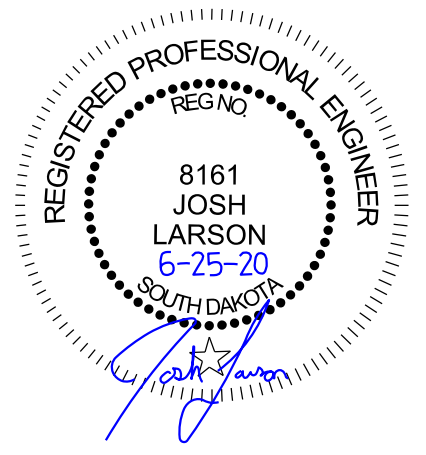
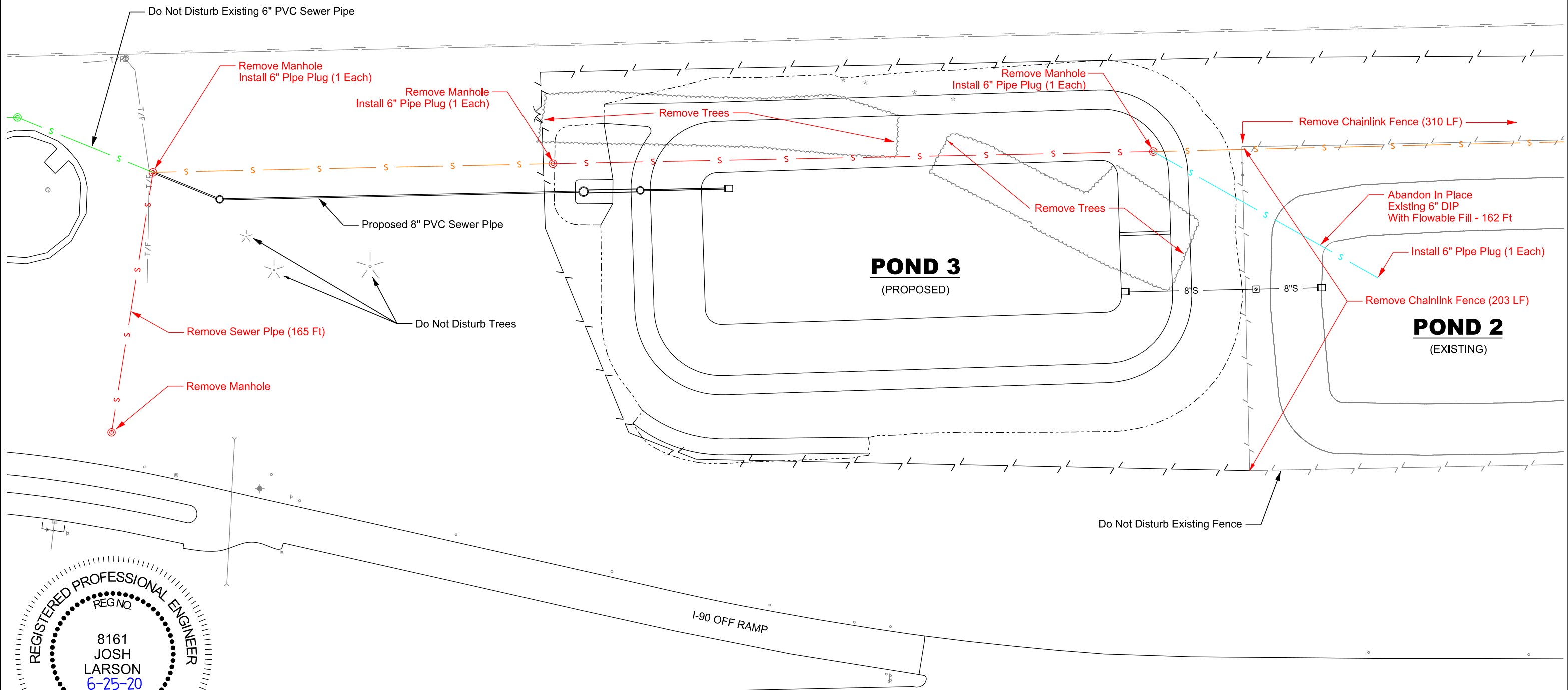
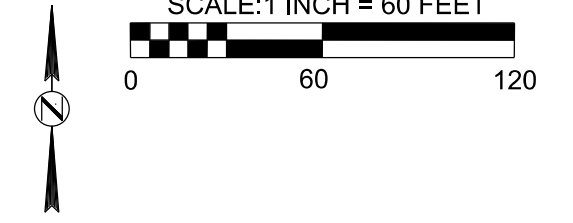
# REMOVAL LOCATIONS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0908(106)362	22	46

Plotting Date: 06-25-2020

## LEGEND (Removal Sheets Only)

- s — Do Not Disturb Existing Sanitary Sewer Main
- ⊙ Do Not Disturb Existing Sewer Manhole
- ⊙ Remove Existing Sewer Manhole
- s — Remove Existing Sanitary Sewer Main
- s — Abandon Existing Sanitary Sewer Main
- s — Flowable Fill & Abandon Existing Sanitary Sewer Main



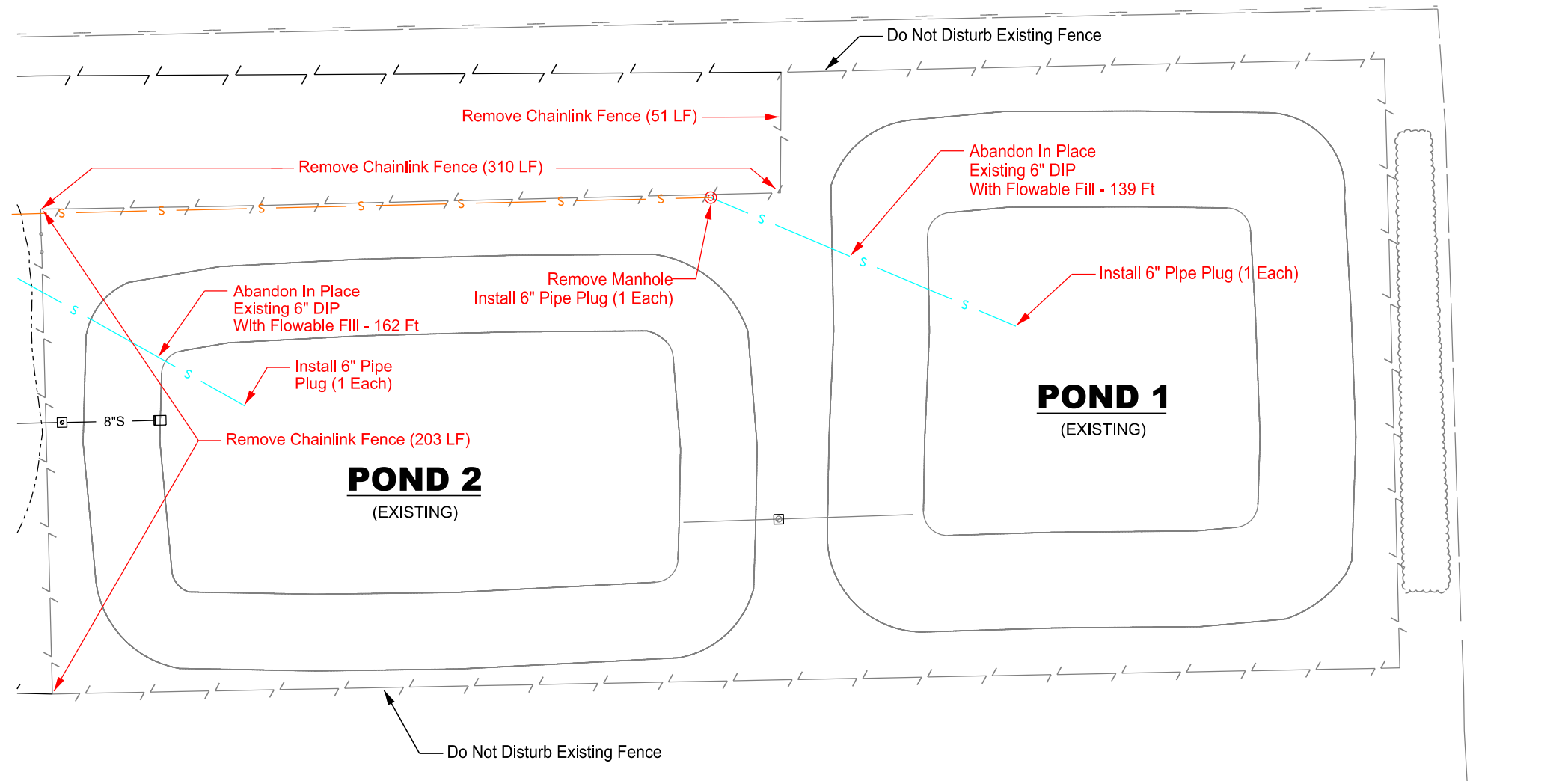
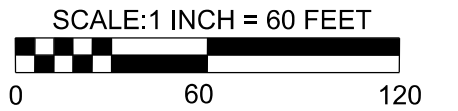
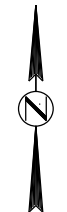
# REMOVAL LOCATIONS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0908(106)362	23	46

Plotting Date: 06-25-2020

## LEGEND (Removal Sheets Only)

- s — Do Not Disturb Existing Sanitary Sewer Main
- ⊙ Do Not Disturb Existing Sewer Manhole
- ⊙ Remove Existing Sewer Manhole
- s — Remove Existing Sanitary Sewer Main
- s — Abandon Existing Sanitary Sewer Main
- s — Flowable Fill & Abandon Existing Sanitary Sewer Main



# LAGOON LAYOUT & INSTALL LOCATIONS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0908(106)362	24	46
Plotting Date: 06-25-2020			

## LEGEND

- Top of Berm
- Top / Bottom of Pond
- Daylight
- 6" PVC Sewer Pipe
- 48" Manhole
- 1465 Design Contours
- Proposed Chainlink Fence
- Proposed Underground Electric
- Drainage Flow

CONNECT TO EXISTING SANITARY SEWER  
STA 0+20.00 - 0.00' L

INSTALL 6" PVC  
SANITARY SEWER PIPE  
STA 0+20.00 - 0.00' L to STA 0+64.99 - 0.00' L - 45 LF

INSTALL 48" SANITARY MANHOLE  
STA 0+64.99 - 0.00' L (MH #1)  
TYPE A7 MANHOLE FRAME AND LID (SOLID GASKETED)  
RIM = 1471.30  
DEPTH = 5.70  
IE E(8") = 1465.60  
IE W(8") = 1465.60

INSTALL 8" PVC  
SANITARY SEWER PIPE  
STA 0+64.99 - 0.00' L to STA 2+92.29 - 0.00' L - 228 LF

INSTALL 60" LIFT STATION  
STA 2+92.29 - 0.00' L

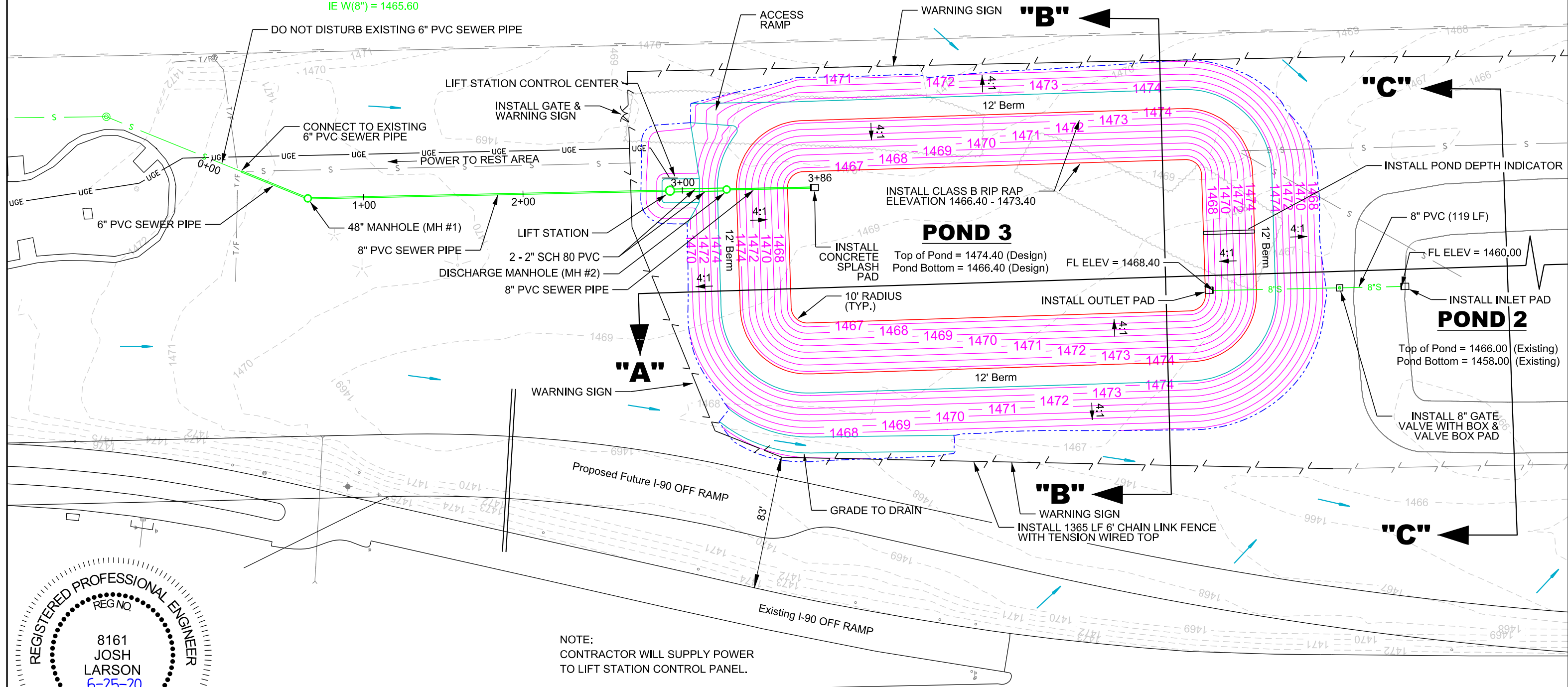
INSTALL 2" SCH 80 PVC  
SANITARY SEWER PIPE  
STA 2+92.29 - 0.00' L to STA 3+27.78 - 0.00' L - 80 LF

INSTALL 48" SANITARY MANHOLE  
STA 3+27.78 - 0.00' L (MH #2)  
TYPE A7 MANHOLE FRAME AND LID (SOLID GASKETED)  
RIM = 1475.40  
DEPTH = 3.67  
IE E(2") = 1473.40  
IE W(8") = 1471.73

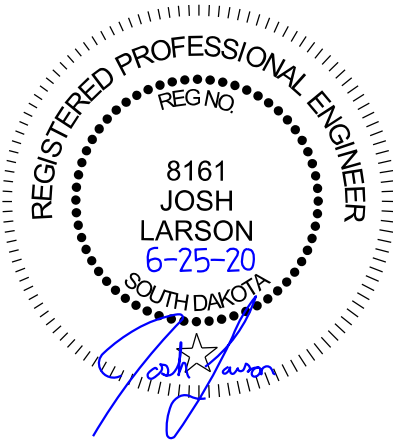
INSTALL 8" PVC  
SANITARY SEWER PIPE  
STA 3+27.78 - 0.00' L to STA 3+66.06 - 0.00' L - 40 LF

INSTALL 8" PVC  
SANITARY SEWER PIPE - 119 LF

SCALE: 1 INCH = 60 FEET



NOTE:  
CONTRACTOR WILL SUPPLY POWER  
TO LIFT STATION CONTROL PANEL.


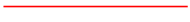









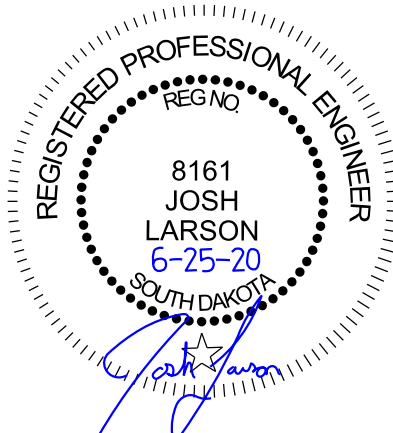
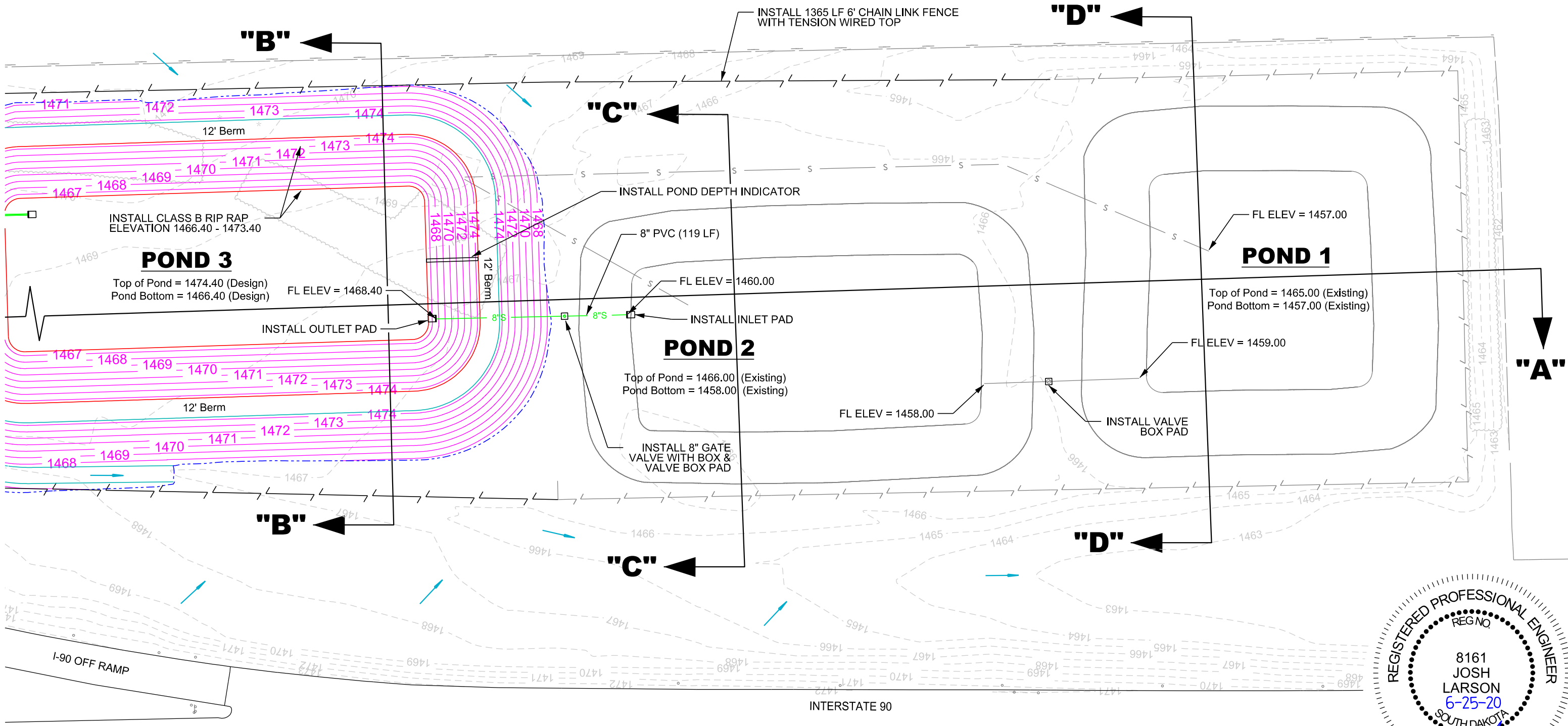
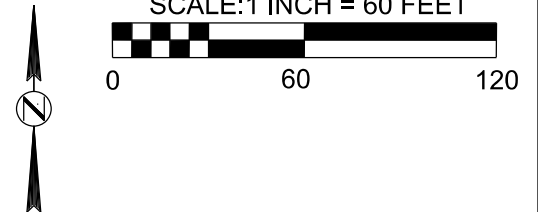


# LAGOON LAYOUT & INSTALL LOCATIONS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0908(106)362	25	46
Plotting Date: 06-25-2020			

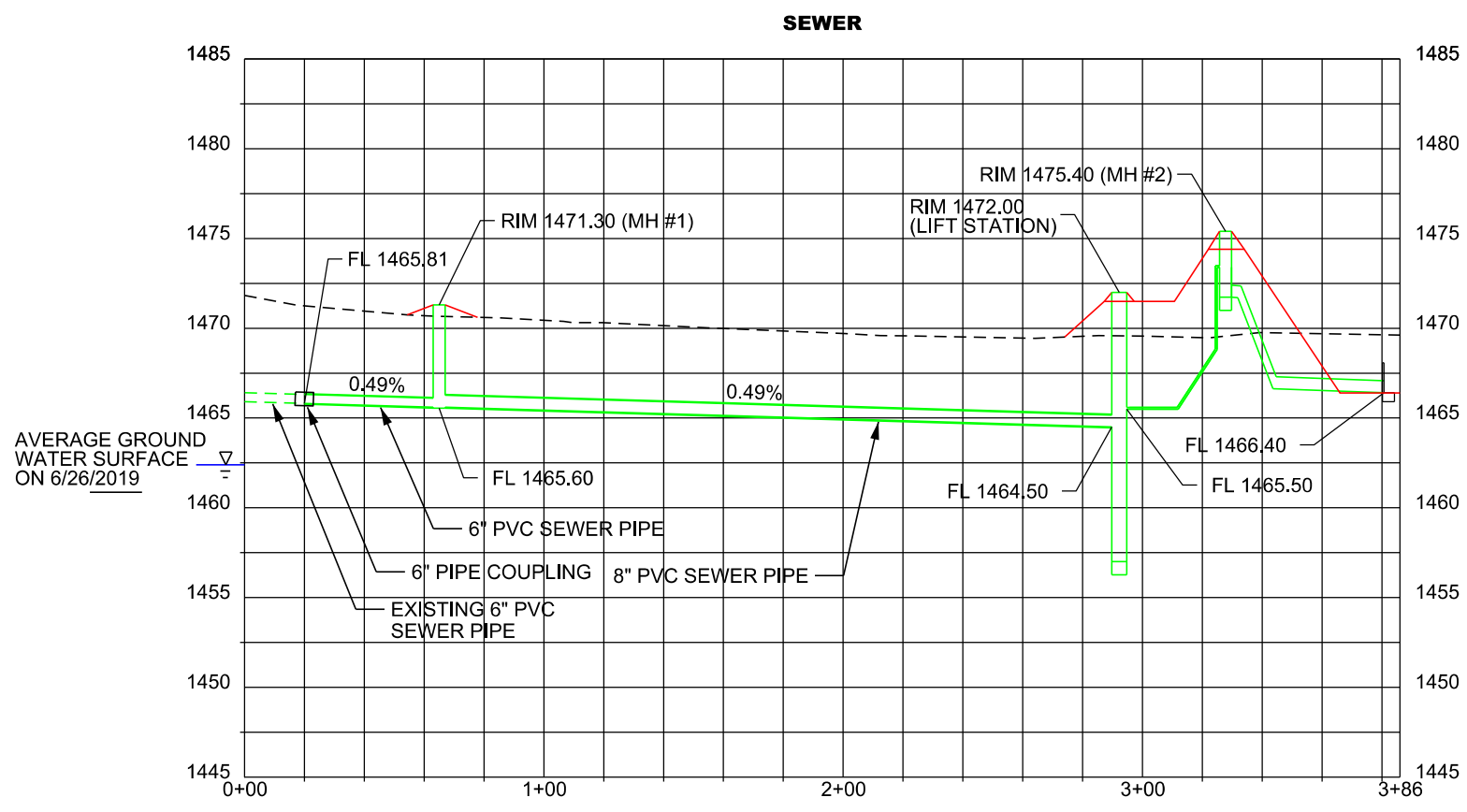
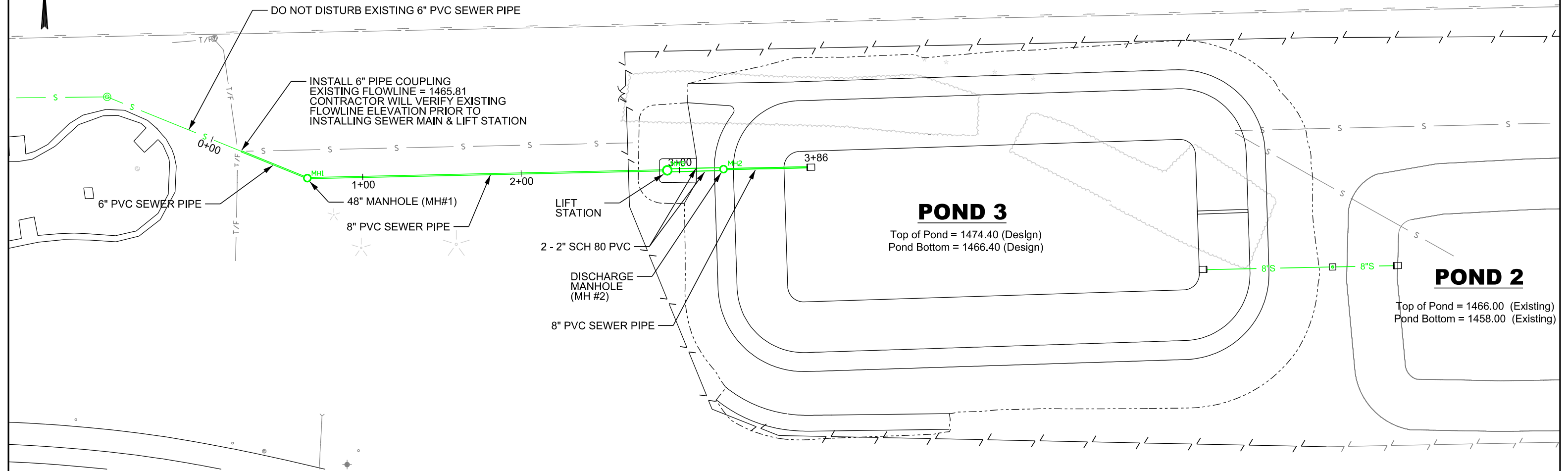
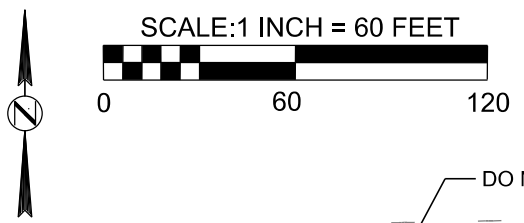
## LEGEND

-  Top of Berm
-  Top / Bottom of Pond
-  Daylight
-  6" PVC Sewer Pipe
-  48" Manhole
-  1465 Design Contours
-  Proposed Chainlink Fence
-  Proposed Underground Electric
-  Drainage Flow



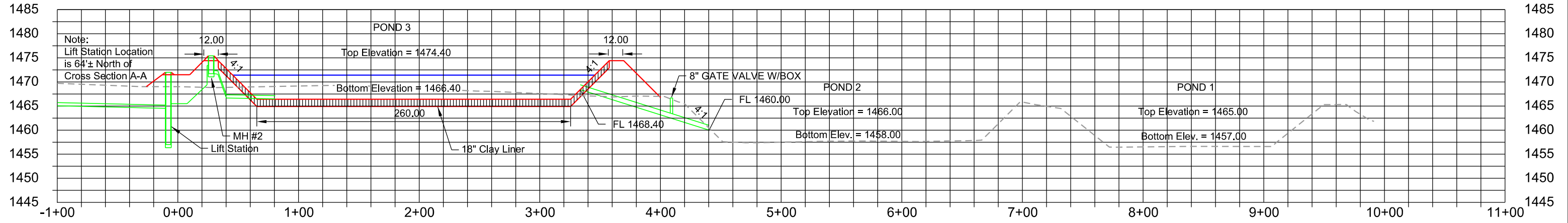
# SANITARY SEWER PROFILE

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0908(106)362	26	46
Plotting Date: 06-25-2020			

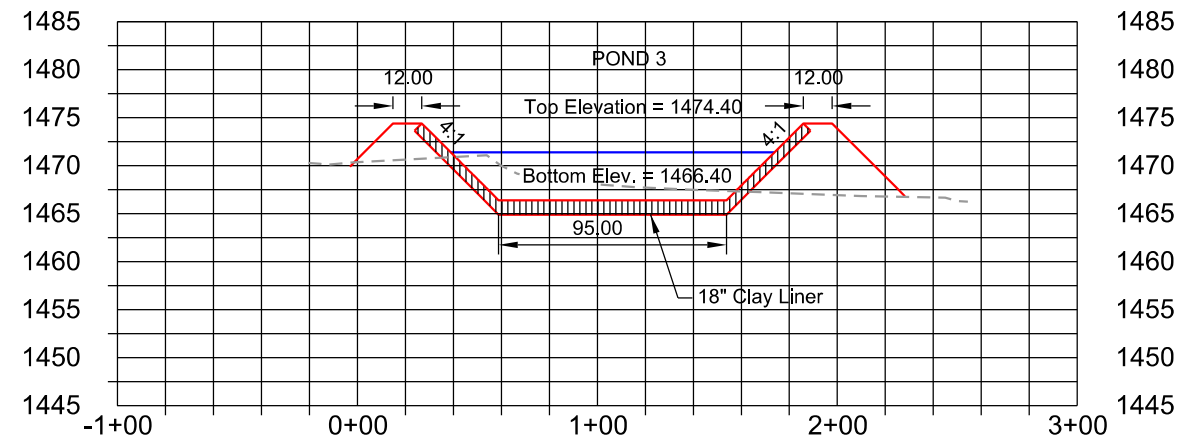


Plotting Date: 06-25-2020

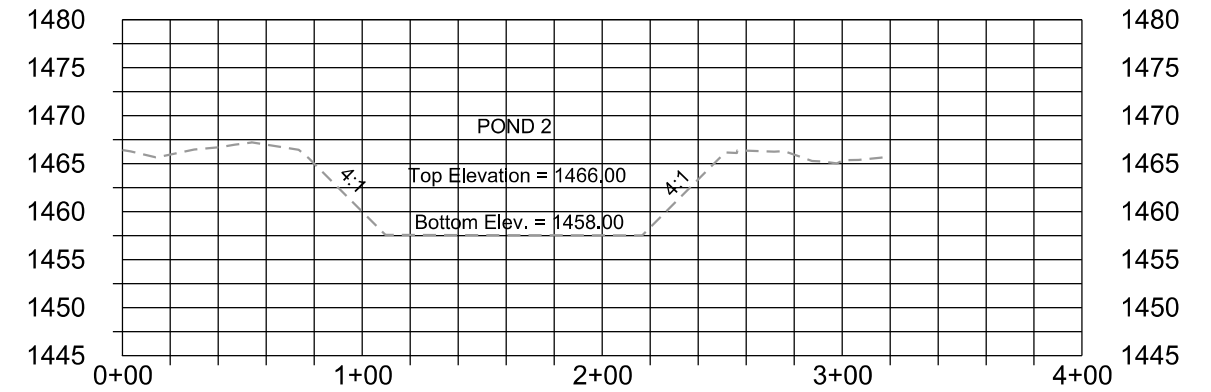
### Cross Section A-A



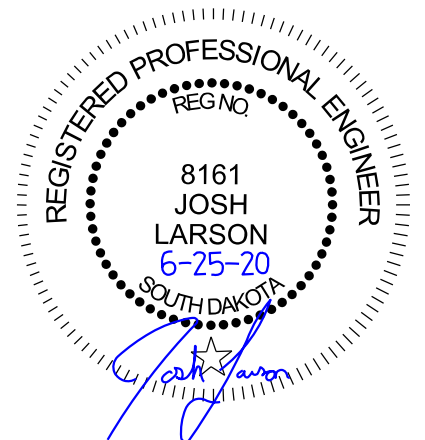
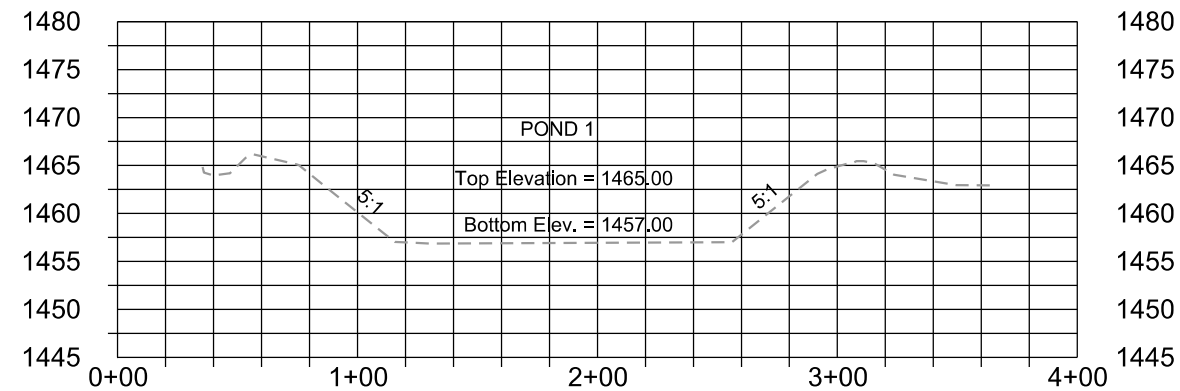
### Cross Section B-B



### Cross Section C-C



### Cross Section DD

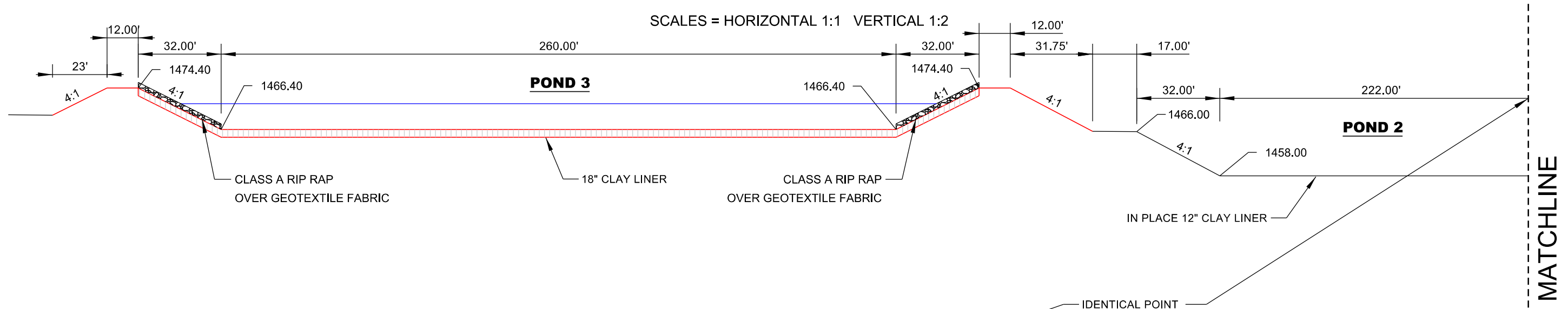


# TYPICAL GRADING SECTIONS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0908(106)362	28	46
Plotting Date: 06-25-2020			

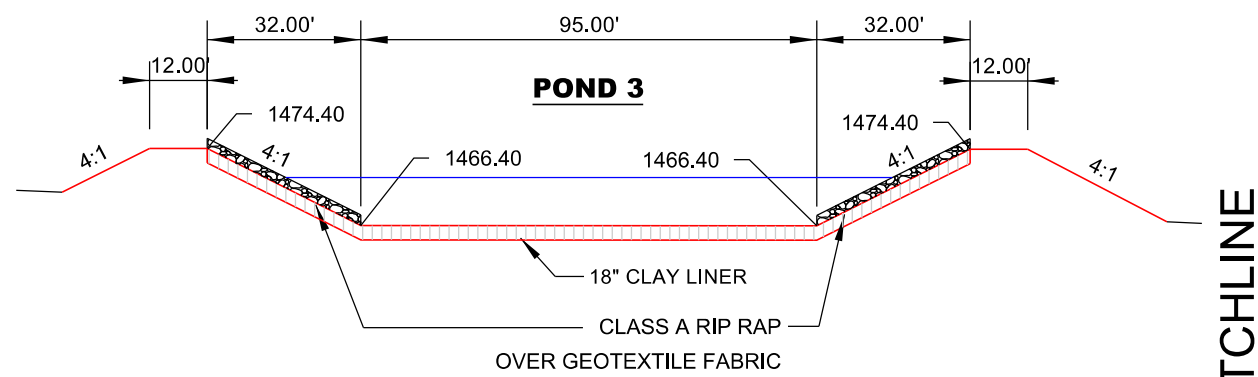
## SECTION "A" - "A"

SCALES = HORIZONTAL 1:1 VERTICAL 1:2



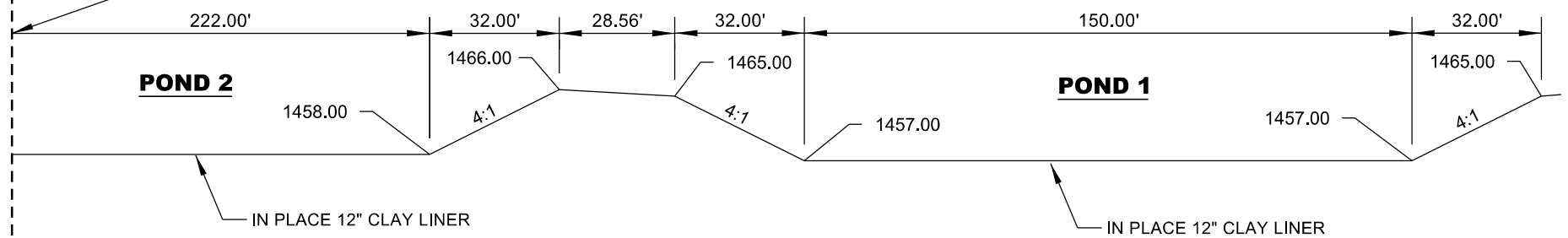
## SECTION "B" - "B"

SCALES = HORIZONTAL 1:1 VERTICAL 1:2



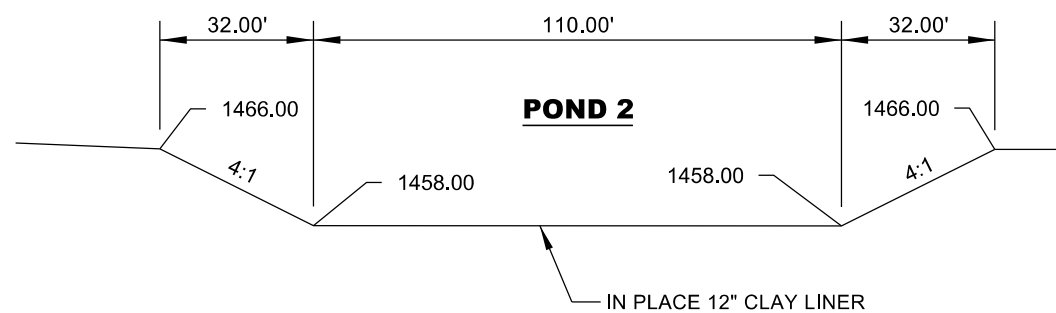
## SECTION "A" - "A"

SCALES = HORIZONTAL 1:1 VERTICAL 1:2



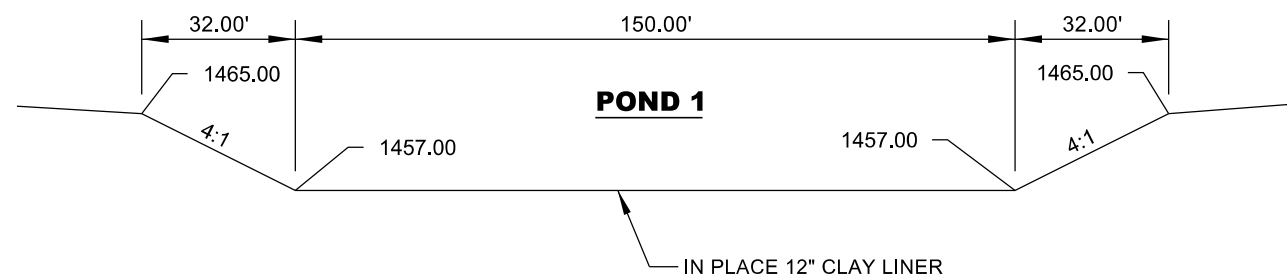
## SECTION "C" - "C"

SCALES = HORIZONTAL 1:1 VERTICAL 1:2








## SECTION "D" - "D"

SCALES = HORIZONTAL 1:1 VERTICAL 1:2



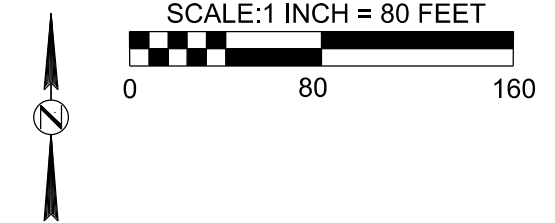
# LEGEND

-  TYPE G PERMANENT SEED MIXTURE
-  TYPE B PERMANENT SEED MIXTURE
-  CLASS B RIPRAP
-  LOW FLOW SILT FENCE
-  DRAINAGE FLOW

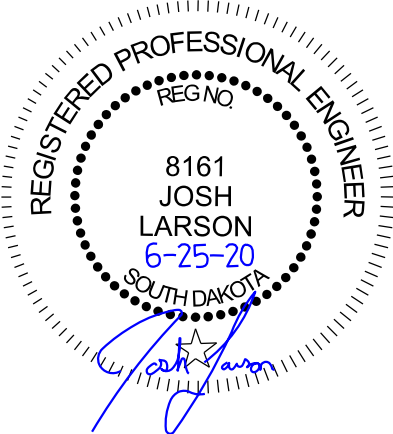
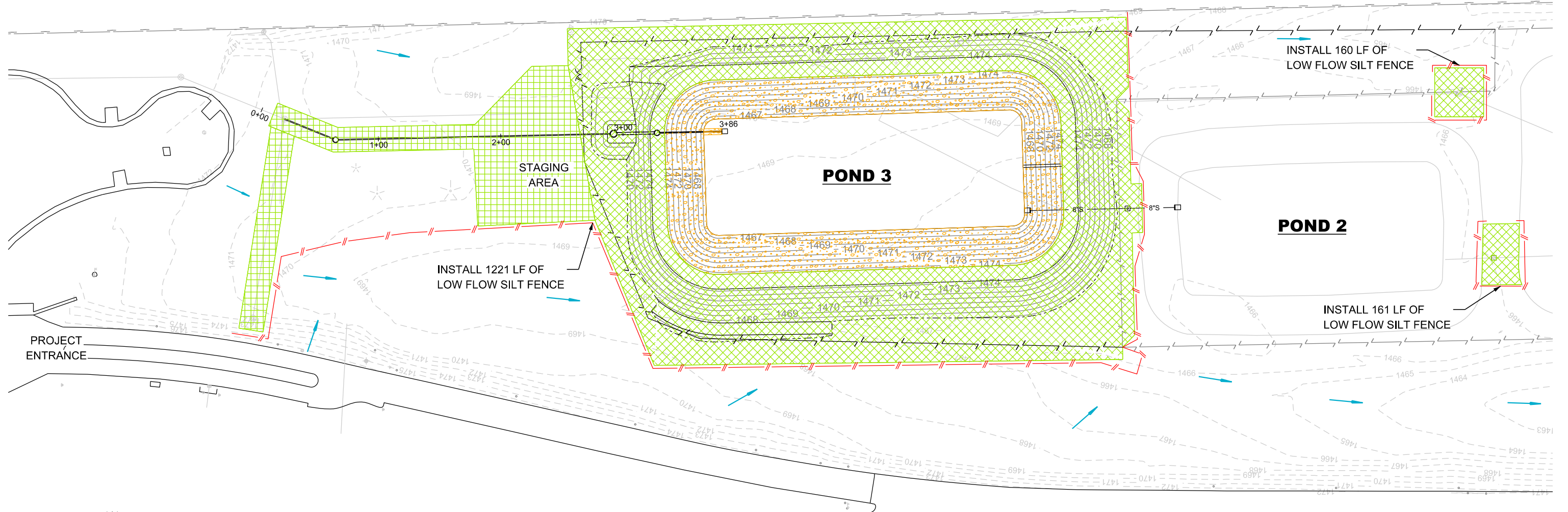
# EROSION CONTROL

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0908(106)362	29	46

Plotting Date: 06-25-2020

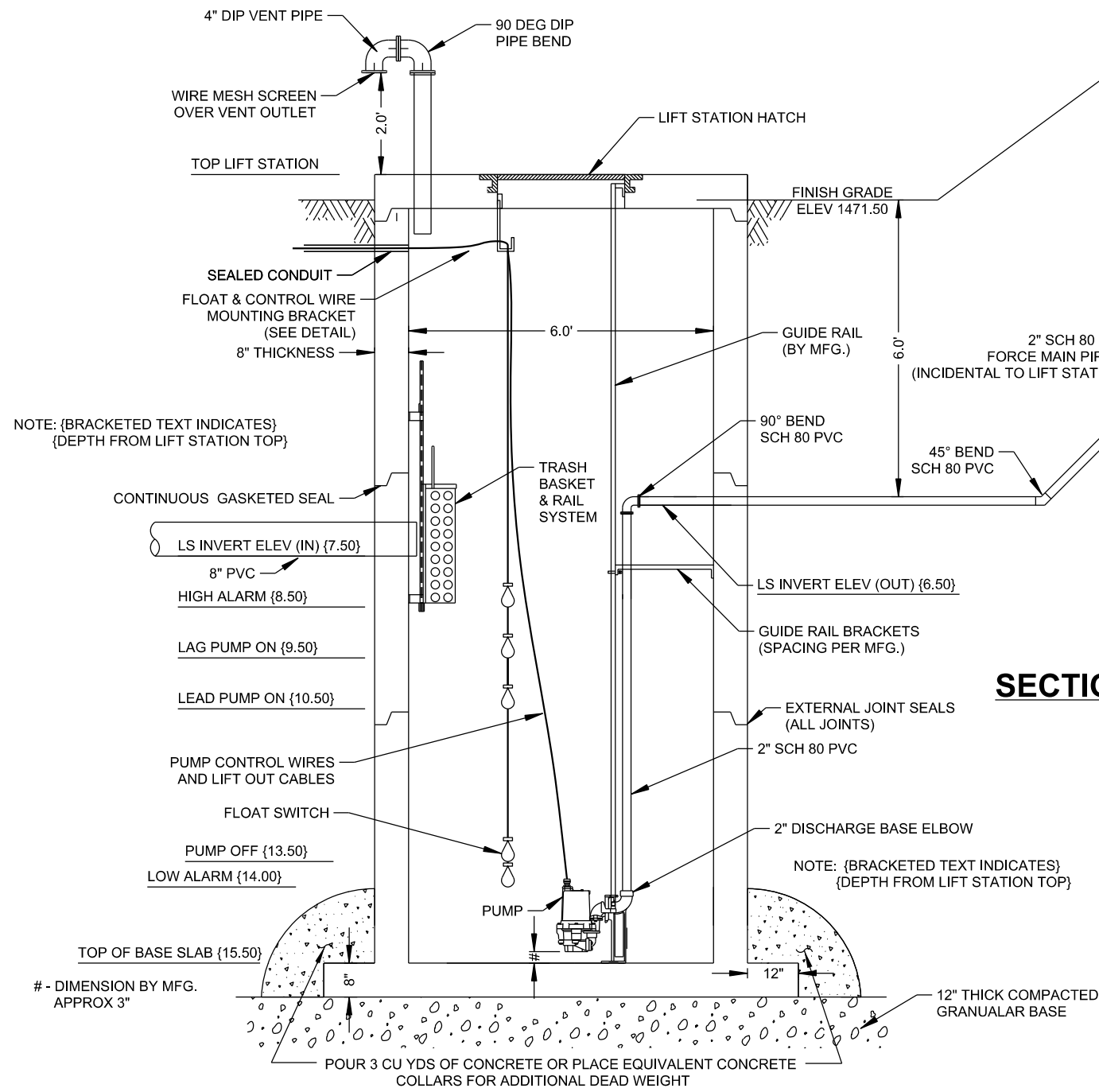
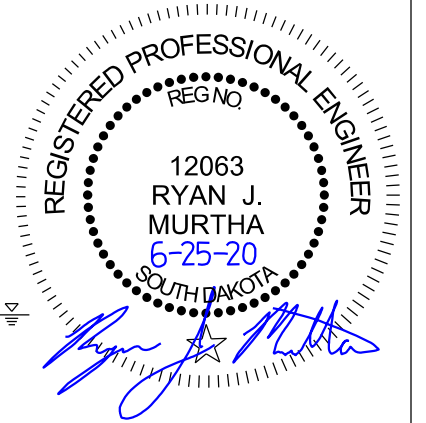


**NOTES:**  
 CONTRACTOR WILL MAKE EVERY EFFORT TO AVOID EXISTING DRAINAGE SWALES.  
  
 ANY AREAS DAMAGED BY CONTRACTOR WILL BE REPAIRED TO THE ORIGINAL CONDITION AT NO COST TO THE OWNER.



# LIFT STATION

Not to Scale



NOTE: {BRACKETED TEXT INDICATES}  
{DEPTH FROM LIFT STATION TOP}

# - DIMENSION BY MFG.  
APPROX 3"

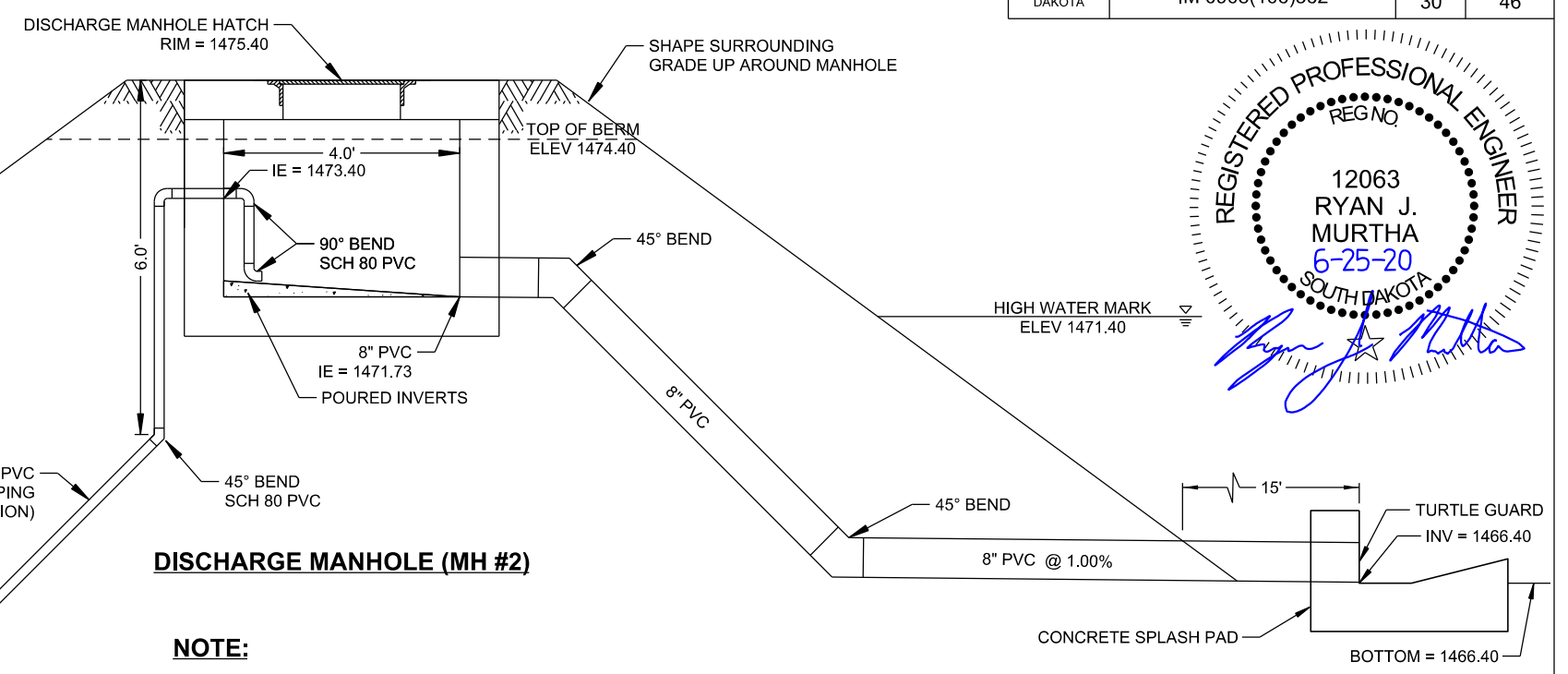
NOTE: MASS CONCRETE POURED AROUND BASE  
WILL BE DOWELED TO THE BASE WITH #5 REBAR

NOTE: BOUYANCY CALCULATIONS ARE BASED ON 8"  
WALL THICKNESS. IF SUBMITTED DESIGN CALCULATIONS  
PROVE THAT WALL THICKNESS CAN BE LESS THAN 8",  
ADDITIONAL CONCRETE WILL BE REQUIRED AROUND THE BASE.

## LIFT STATION

### LIFT STATION ELEVATIONS

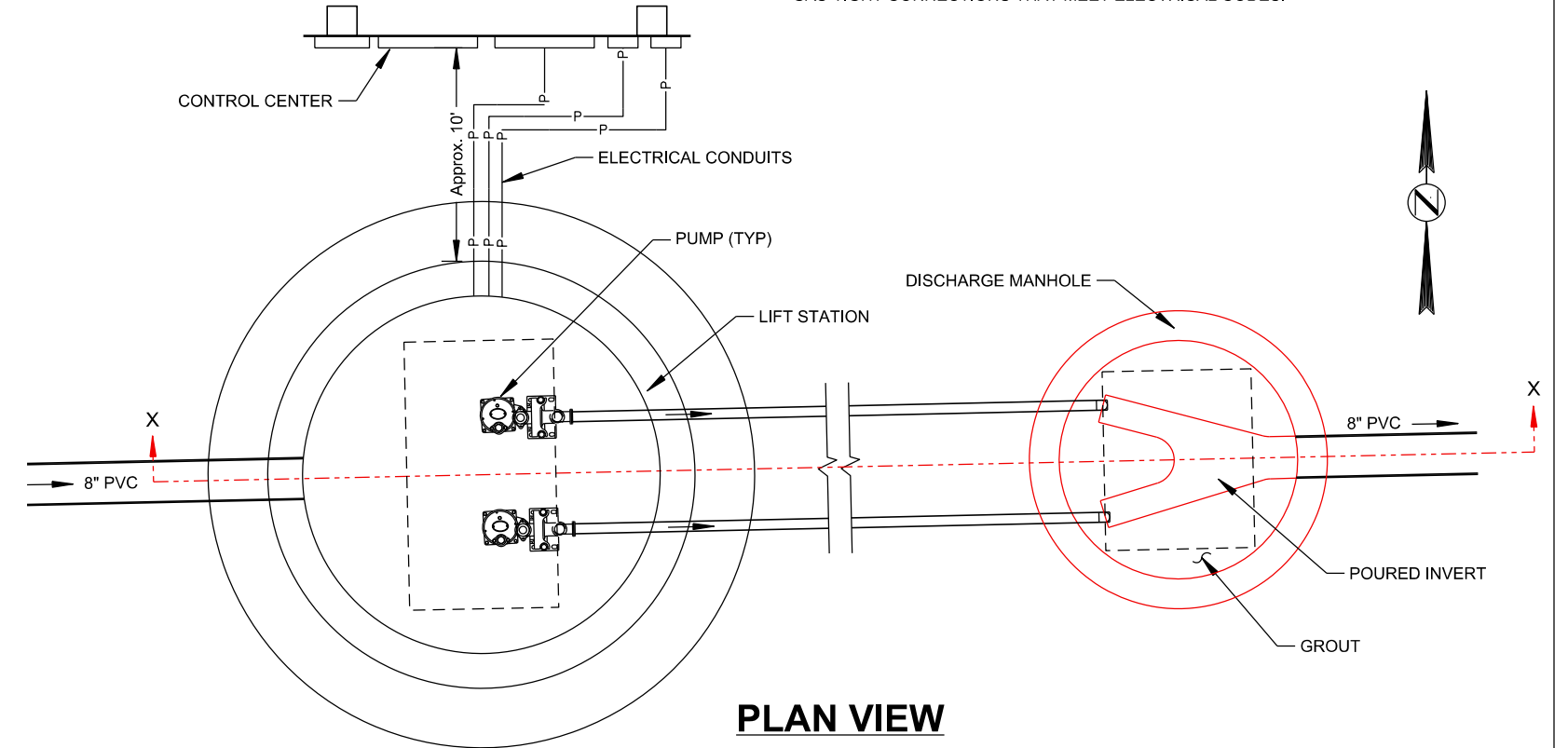
DESCRIPTION	ELEVATION	DEPTH FROM LS TOP
TOP LIFT STATION	1472.00	0.00
FINISHED GRADE	1471.50	0.50
LS INVERT ELEV (OUT)	1465.50	6.50
LS INVERT ELEV (IN)	1464.50	7.50
HIGH LEVEL ALARM	1463.50	8.50
LAG PUMP ON	1462.50	9.50
LEAD PUMP ON	1461.50	10.50
PUMP OFF	1458.50	13.50
LOW LEVEL ALARM	1458.00	14.00
TOP OF BASE SLAB	1456.50	15.50



## DISCHARGE MANHOLE (MH #2)

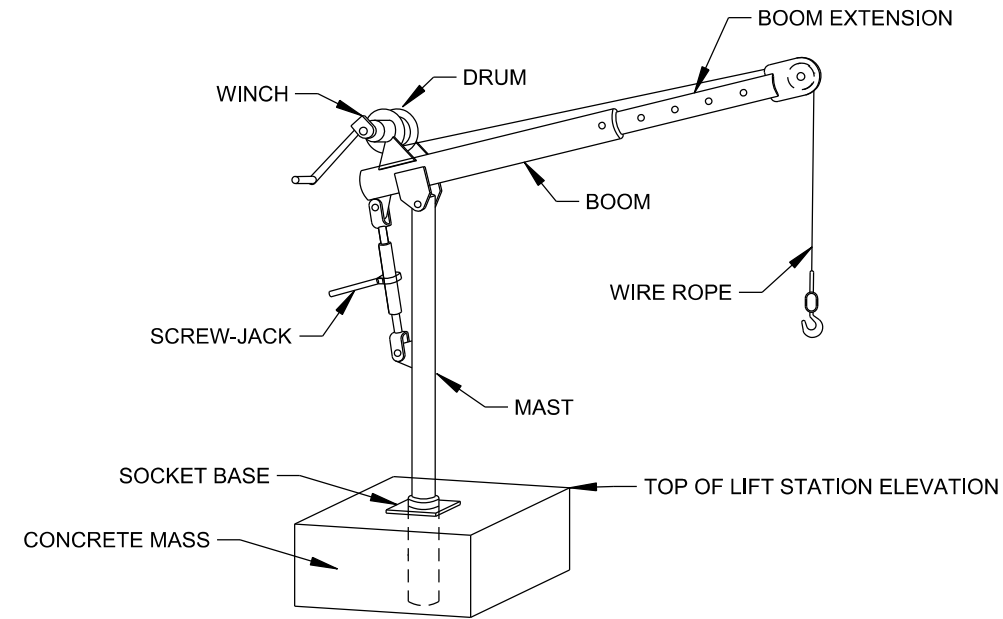
### NOTE:

1. THE DISCHARGE MANHOLE, MANHOLE LINING, ACCESS HATCH AND ALL FORCE MAIN PIPING FROM THE LIFT STATION DISCHARGE BASE ELBOW THROUGH THE DISCHARGE MANHOLE, INCLUDING BENDS, TEES, VALVES, BOTLS, GASKETS, AND BLOCKING, WILL BE INCIDENTAL TO THE CONTRACT LUMP SUMP PRICE FOR "LIFT STATION".
2. THE DIMENSIONS, SIZES AND LOCATIONS OF ALL OPENINGS IN THE PRECAST CONCRETE STRUCTURE WILL BE COORDINATED BY THE CONTRACTOR PRIOR TO FABRICATION.
3. THE PRECAST CONCRETE COVER WILL BE FARICATED WITH REINFORCEMENT EQUAL TO THE REINFORCEMENT FOR A ROUND TYPE II COVER SLAB WITH A DIMENSION EQUAL TO THE DIAMETER OF THE LIFT STATION.
4. ALL BACKFILL MATERIAL AROUND THE LIFT STATION WILL BE COMPACTED IN ACCORDANCE WITH TRENCH COMPACTION STANDARDS AND WILL BE INCIDENTAL TO THE LIFT STATION.
5. RUBBER MANHOLE BOOTS WILL BE USED AT ALL POINTS WHERE PIPES PENETRATE THE WALLS OF CONCRETE STRUCTURES.
6. ALL BRACKETS, SUPPORTS, NUTS, BOLTS, AND MISCELLANEOUS HARDWARE USED ON THE LIFT STATION WILL BE STAINLESS STEEL.
7. FLOAT ELEVATIONS MAY REQUIRE ADJUSTMENT PER MANUFACTURER'S RECOMMENDATIONS. ALL ADJUSTMENTS WILL BE APPROVED BY THE ENGINEER.
8. EACH JOINT OF THE LIFT STATION STRUCTURE WILL BE SEALED WITH FLEXIBLE GASKET MATERIAL CONFORMING TO THE SPECIFICATIONS. ADDITIONALLY, EACH JOINT OF THE WET WELL BARREL SECTION WILL BE SEALED WITH AN EXTERNAL JOINT SEAL WHICH CONFORMS TO THE SPECIFICATIONS.
9. ELECTRICAL AND CONTROL CONDUITS WILL BE SEALED IN THE CONTROL PANEL AND WET WELL WITH TWIST-LOCK WATER AND GAS-TIGHT CONNECTIONS THAT MEET ELECTRICAL CODES.



## PLAN VIEW

## PUMP HOIST



NOTES: THE PUMP HOIST WILL BE A THERN SERIES 5110 PORTABLE DAVIT CRANE, CAPABLE OF LIFTING A MINIMUM OF 500 LBS AT MAXIMUM EXTENSION AND 1000 LBS AT NO EXTENSION OR ENGINEER APPROVED EQUAL.

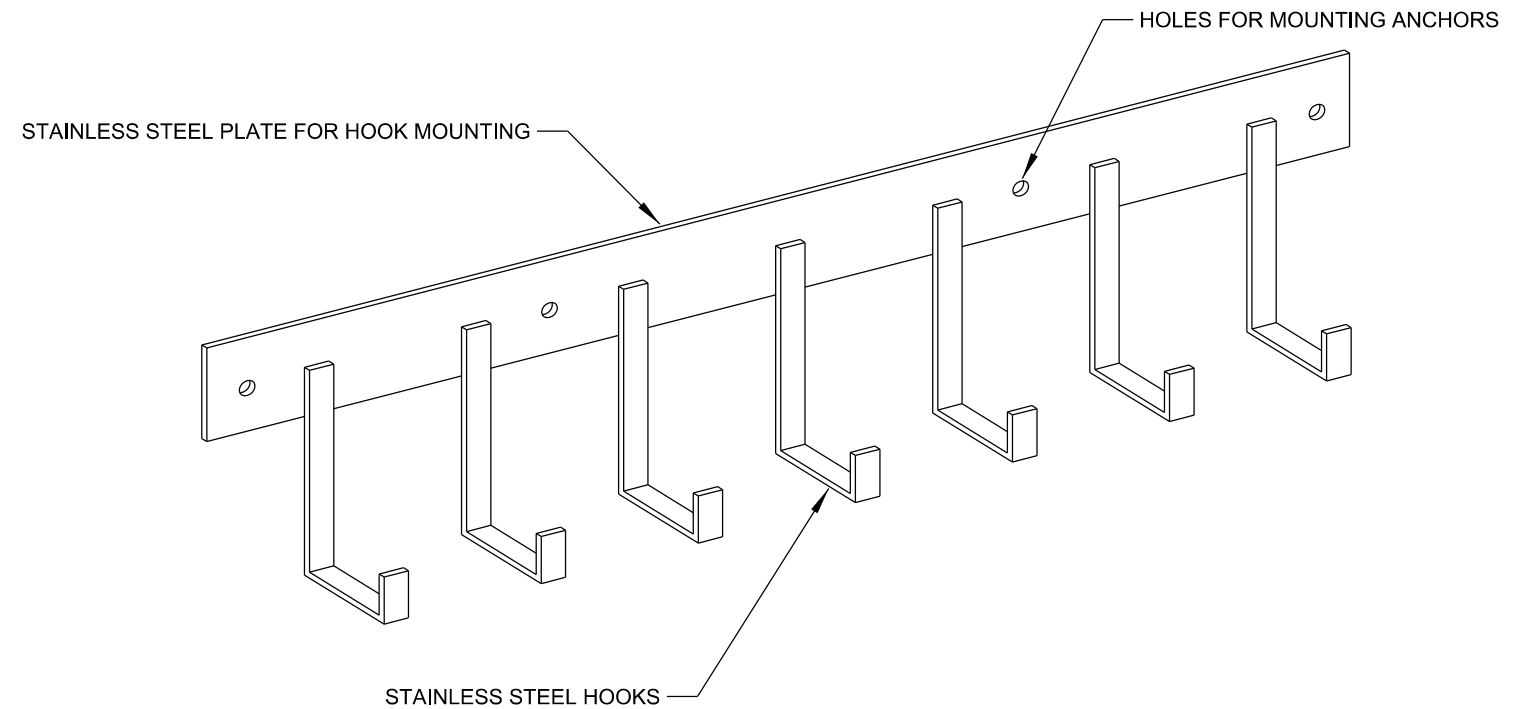
HOIST WILL HAVE A BOOM EXTENSION WITH A MINIMUM OF FOUR POSITIONS. THE HOIST WILL BE CAPABLE OF ROTATING 360 DEGREES AND THE BOOM WILL BE CAPABLE OF ELEVATING TO APPROXIMATELY 45 DEGREES ABOVE HORIZONTAL THROUGH USE OF A SCREW JACK AND PIVOT SYSTEM. ALL PARTS OF HOIST WILL BE FULLY POWDER COATED.

THE HOIST WILL BE EQUIPED WITH A SPUR GEAR HAND WINCH WITH AUTOMATIC BRAKE FOR POSITIVE LOAD CONTROL, CAPABLE OF LIFTING AND PULLING UP TO 1,000 LBS, SUCH AS THERN MODEL M4022PB, OR APPROVED EQUAL.

THE WIRE ROPE WILL BE A MINIMUM 1/4" STAINLESS STEEL WIRE ROPE WITH AN ATTACHED HOOK WHICH FITS THE LIFT LOCATIONS ON THE LIFT STATION PUMPS. THE WIRE ROPE WILL BE RATED FOR 1000 LBS MINIMUM CAPACITY AND THE LENGTH WILL BE SUFFICIENT TO REACH TO THE BOTTOM OF THE LIFT STATION WHEN THE HOIST IS FULLY ELEVATED.

THE PUMP HOIST WILL BE MOUNTED BY USE OF A FLUSH MOUNTED SOCKET BASE IN A CONCRETE PAD, DIRECTLY ADJACENT TO THE LIFT STATION. THE HOIST WILL BE POSITIONED SUCH THAT IT IS CAPABLE OF MANUEVERING DIRECTLY OVER TOP AND LIFTING BOTH PUMPS.

## MOUNTING BRACKET FOR CONTROL WIRES, FLOATS, AND CABLES



NOTES: THE CONTRACTOR WILL FURNISH AND INSTALL A STAINLESS STEEL MOUNTING BRACKET FOR THE PURPOSE OF HANGING FLOATS, LIFT CABLES, AND CONTROL WIRES.

THE MOUNTING BRACKET WILL CONSIST OF A STAINLESS STEEL PLATE, WITH HOLES FOR FASTENING THE POINT THE SYSTEM TO THE INSIDE OF THE LIFT STATION HATCH, AND SEVEN INDIVIDUAL HOOKS SPACED APPROXIMATELY 6" APART. THE HOOKS WILL BE STAINLESS STEEL STRAP METAL WHICH HAS BEEN BENT INTO A 'J' SHAPE AND WELDED TO THE MOUNTING PLATE, OR OTHER ENGINEER APPROVED EQUIVALENT.

ALL STEEL, WELDS, AND ANCHOR BOLTS WILL BE TYPE 304 STAINLESS STEEL.

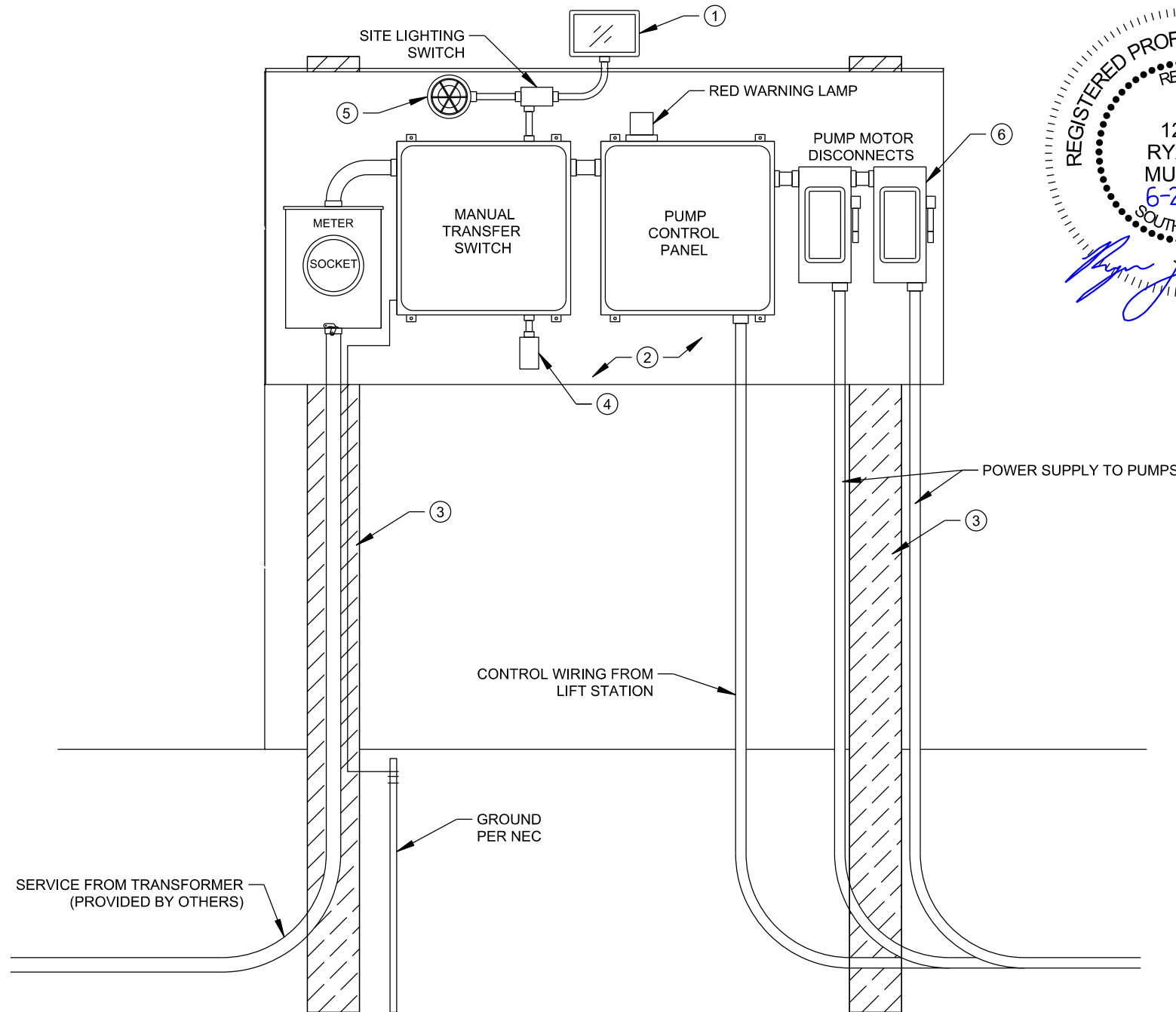
ALL COST ASSOCIATED WITH FURNISHING AND INSTALLING THE MOUNTING BRACKET WILL BE INCIDENTAL TO THE CONTRACT UNIT PRICE PER LUMP SUM FOR "LIFT STATION".



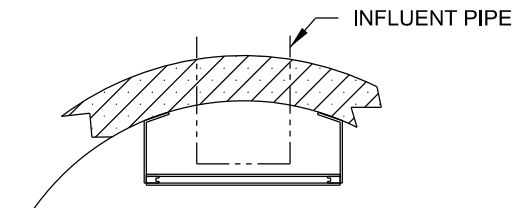
# LIFT STATION CONTROL CENTER DETAIL

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0908(106)362	32	46

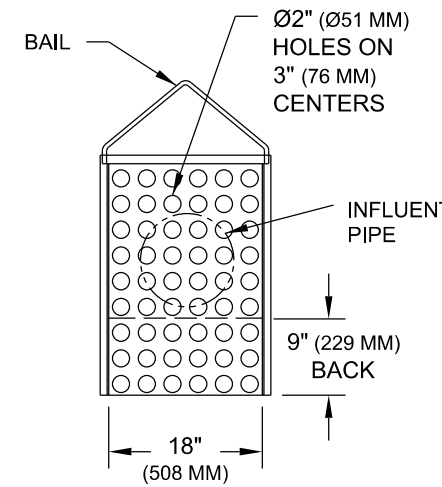
Plotting Date: 06-25-2020



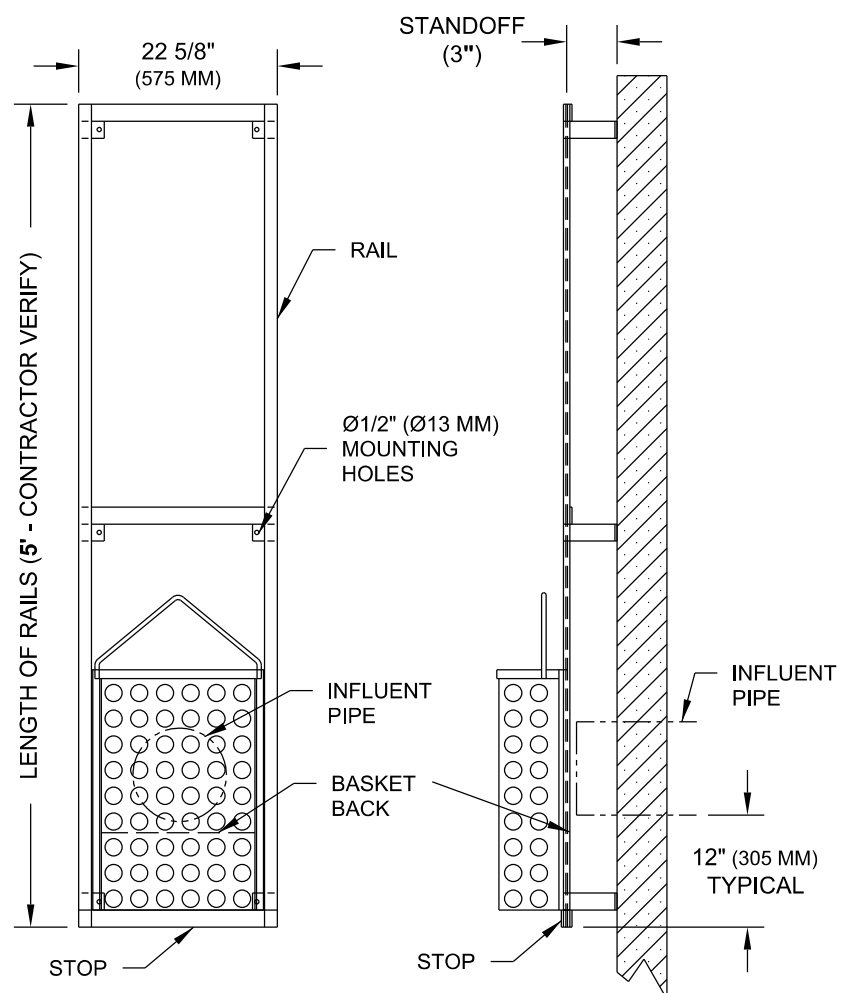
# TRASH BASKET SYSTEM



RAILS MOUNTED IN ROUND BASIN (PLAN VIEW)



BASKET (PROFILE VIEW)



BASKET AND RAILS (PROFILE VIEW)

- NOTES:
- PROVIDE A MINIMUM 4000 LUMEN LED LAMP FOR SITE LIGHTING, CONTROLLED BY SWITCH ON PANELBOARD.
  - GREEN TREATED MOUNTING PLANKS WILL BE 2"X10" OR 2"X12" AND FASTENED TO SUPPORT POSTS WITH 1/2"X6" GALV. LAG SCREWS OR BOLTS (6 PER PLANK).
  - SUPPORT POSTS WILL BE PENTA OR CREOSOTE TREATED WOOD, 6"X6" SQUARE, 10' LONG, SET PLUMB. USE 4' BURY.
  - PROVIDE 110V 20A CONVENIENCE RECEPTACLE.
  - PROVIDE 110V ALL WEATHER, WALL MOUNT EXTERIOR LIGHT WITH ALL METAL CAGE. LIGHT WILL BE WIRED TO BE ON AT ALL TIMES AS A VISUAL INDICATOR OF POWER TO THE LIFT STATION. BULB WILL BE 60W EQUIVALENT LED.
  - A PUMP MOTOR DISCONNECT WILL BE INSTALLED FOR EACH PUMP SO THAT POWER MAY BE FULLY SHUT OFF FOR EACH PUMP INDIVIDUALLY. DISCONNECTS WILL HAVE A PACKLOCK PROVISION IN THE OFF POSITION.

NOTES: THE TRASH BASKET SYSTEM WILL BE OF THE PERFORATED SCREEN STYLE BASKET, HAVING 2" DIAMETER HOLES ON 3" CENTERS. THE BASKET WILL BE MADE OF STAINLESS STEEL OR 0.080" (2mm) ALUMINUM WITH STAINLESS STEEL OR ALUMINUM TRACKING ANGLES AS PART OF THE BASKET FRAME. THE GUIDE RAILS WILL BE STAINLESS STEEL CHANNELS SIZED TO FACILITATE EASY OPERATION OF THE BASKET. AN ALUMINUM OR STAINLESS STEEL BASKET STOP WILL BE SUPPLIED.

THE TRASH BASKET SYSTEM WILL BE TYPE B1A SERIES TRASH BASKET SYSTEM AS MANUFACTURED BY HALLIDAY PRODUCTS, INC. OR ENGINEER APPROVED EQUAL.

CONSTRUCTION OF THE RAIL WILL BE ALL TYPE 304 STAINLESS STEEL AND THE BASKET WILL BE TYPE 304 STAINLESS STEEL OR 0.080" (2mm) ALUMINUM.

RAILS WILL BE ANCHORED AT INTERMEDIATE LOCATIONS, AS NECESSARY TO ENSURE RAIL SYSTEM IS SECURE AND CAN FULLY SUPPORT THE WEIGHT OF A FULL TRASH BASKET.

ADDITIONAL LOAD CENTERS/JUNCTION BOXES MAY BE NECESSARY TO COMPLETE ELECTRICAL SYSTEM. ALL PANELS, LOAD CENTERS, JUNCTION BOXES, MANUAL TRANSFER SWITCH, CONTROL PANEL, MOTOR DISCONNECTS, SITE LIGHT AND SWITCH, CAGED LIGHT, CONVENIENCE RECEPTACLE, FITTINGS, WIRING, AND INCIDENTALS WILL BE INCIDENTAL TO THE LIFT STATION WIRING.

SEE GENERAL NOTES FOR NOTES REGARDING PUMP CONTROL PANEL AND MANUAL TRANSFER SWITCH.



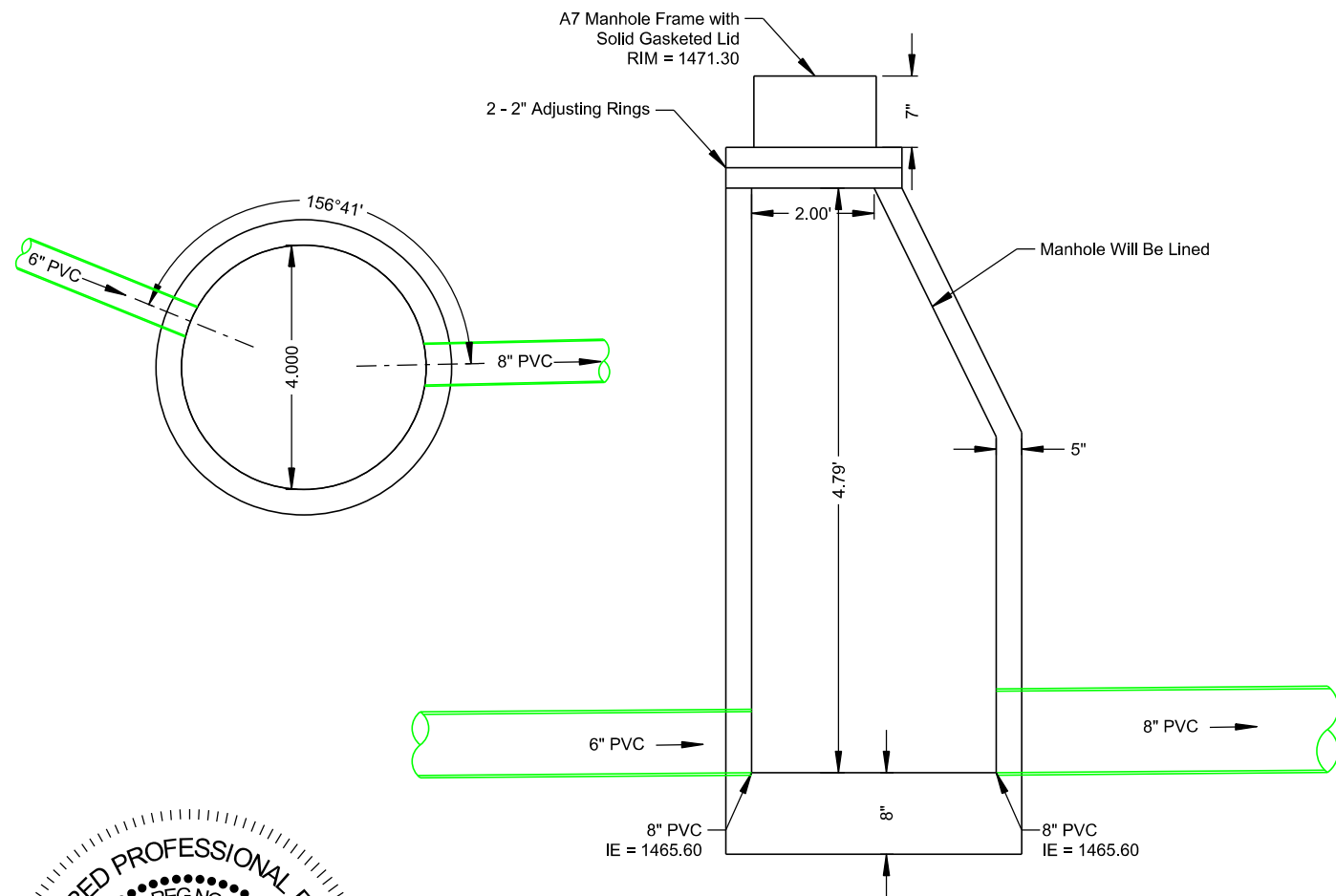
# MANHOLE DETAILS

Not to Scale

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0908(106)362	33	46

## MANHOLE #1

Sta. 0+64.99 - 0.00' L

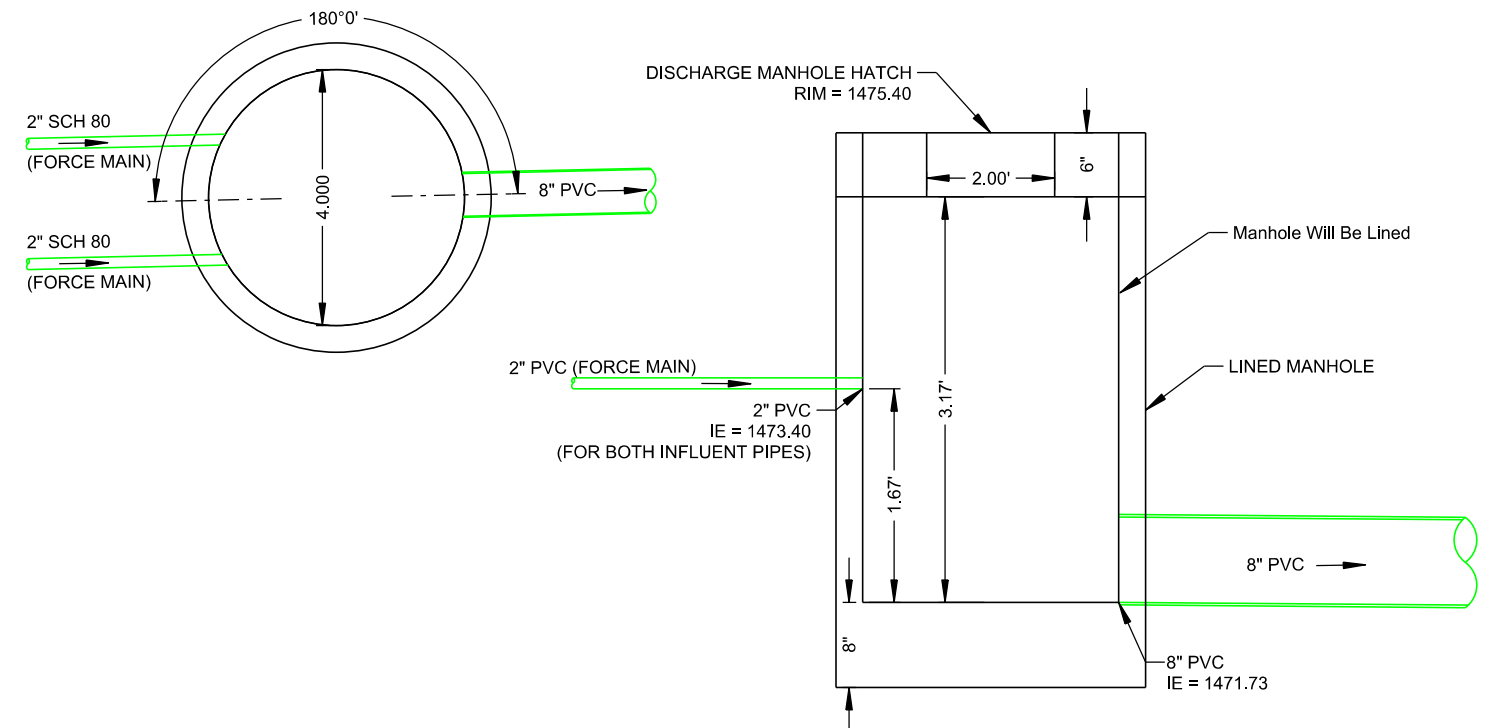


NOTE:  
 MANHOLES WILL BE ORDERED WITH THE INVERTS AND FLOW LINES PREFORMED.  
 NEW SEWER PIPE WILL CONNECT TO MANHOLES WITH BOOTS.  
 EXTERNAL JOINT SEALS WILL BE INSTALLED ON ALL JOINTS (INCIDENTAL TO MANHOLE).  
 MANHOLE WILL BE LINED IN ACCORDANCE WITH THE SPECIFICATIONS (INCIDENTAL TO MANHOLE).

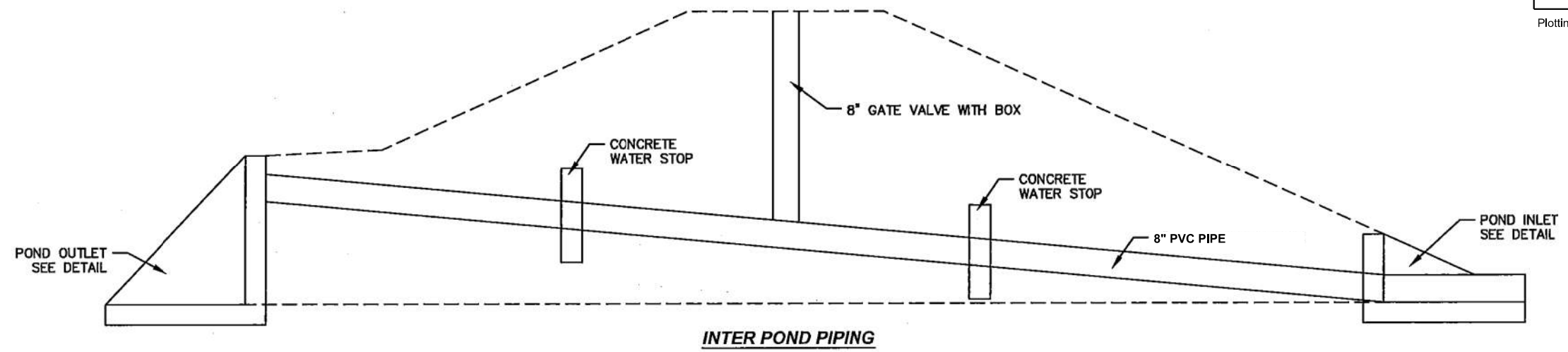


## MANHOLE #2 (DISCHARGE MANHOLE)

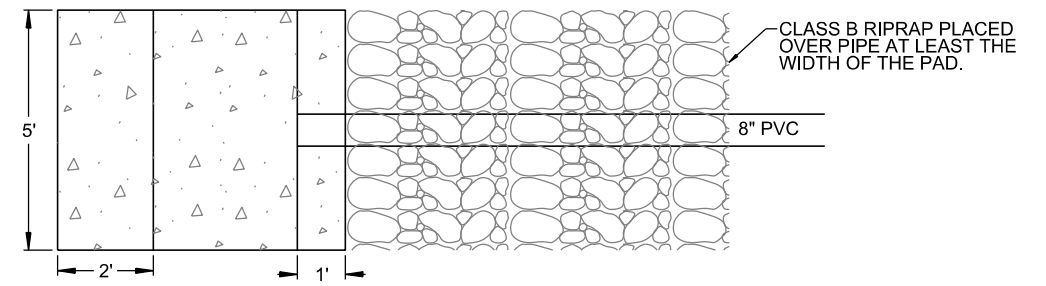
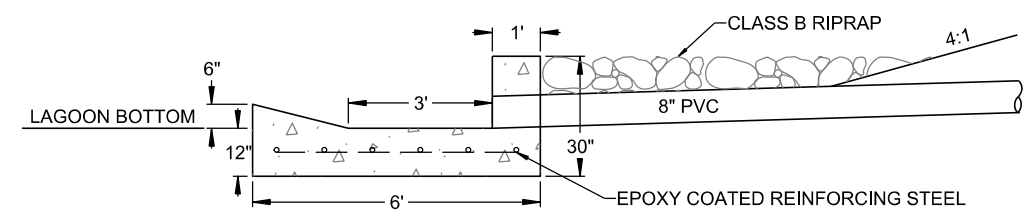
Sta. 3+27.78 - 0.00' L



NOTE:  
 DISCHARGE MANHOLE IS INCIDENTAL TO THE LIFT STATION. NO SEPERATE PAYMENT WILL BE MADE FOR THIS MANHOLE.  
 MANHOLES WILL BE ORDERED WITH THE INVERTS AND FLOW LINES PREFORMED.  
 NEW SEWER PIPE WILL CONNECT TO MANHOLES WITH BOOTS.  
 EXTERNAL JOINT SEALS WILL BE INSTALLED ON ALL JOINTS (INCIDENTAL TO MANHOLE).  
 MANHOLE WILL BE LINED IN ACCORDANCE WITH THE SPECIFICATIONS (INCIDENTAL TO MANHOLE).

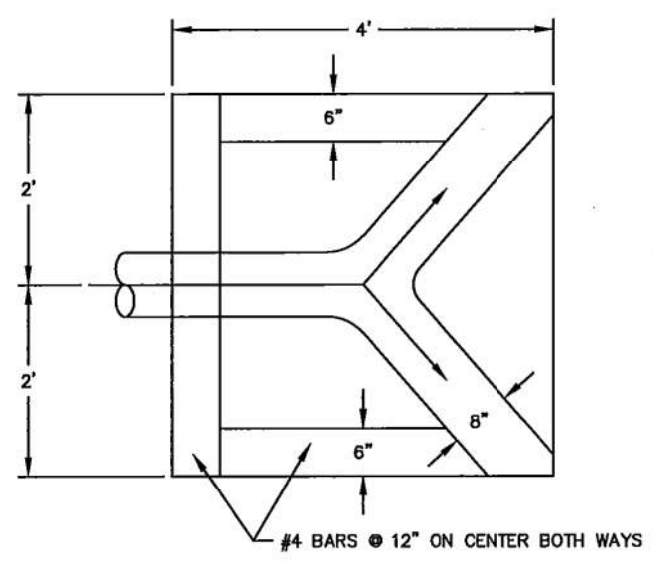
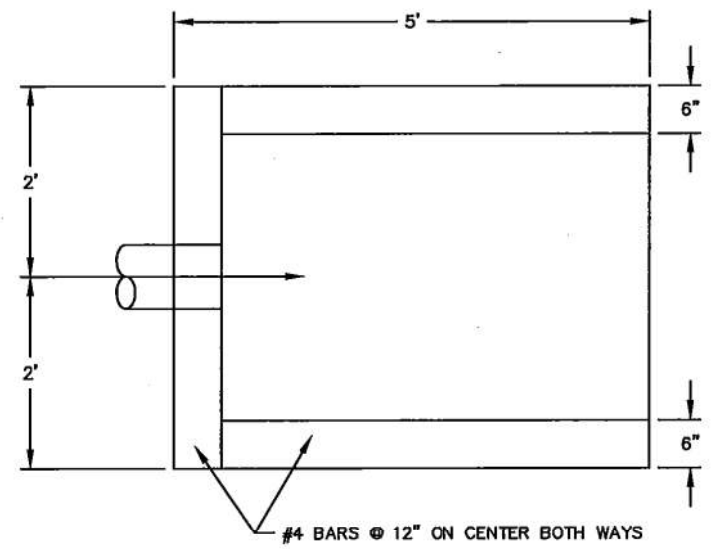


**INTER POND PIPING**

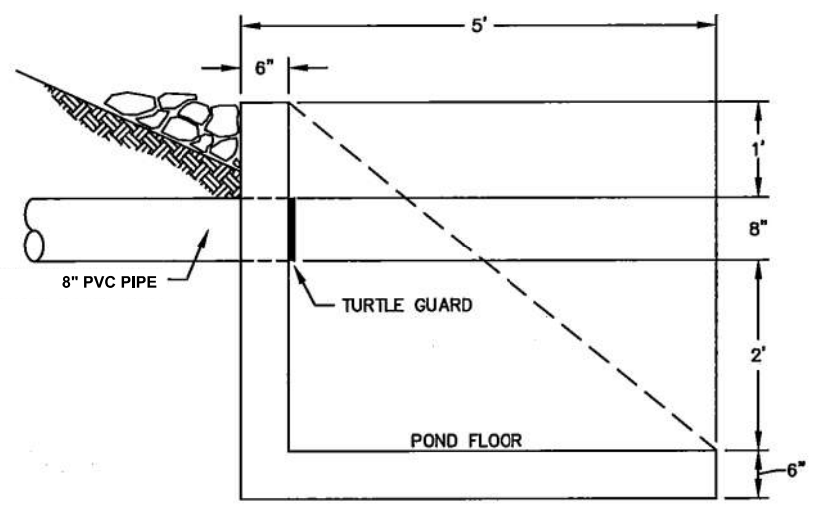


**CONCRETE SPLASH PAD**

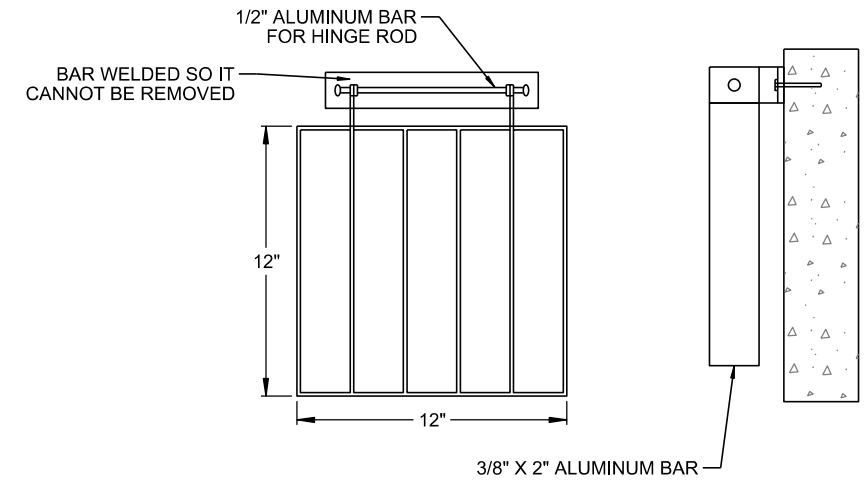
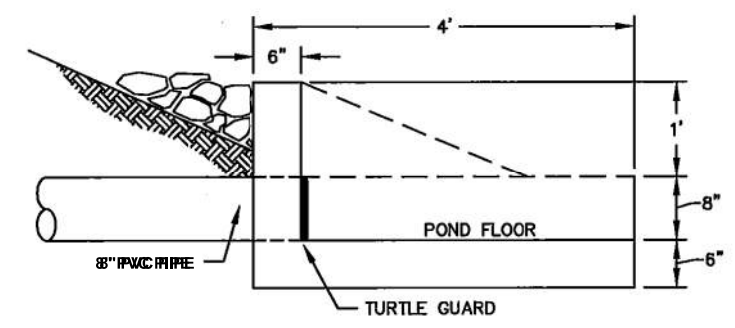
NOT TO SCALE



**POND INLET DETAIL**



**POND OUTLET DETAIL**



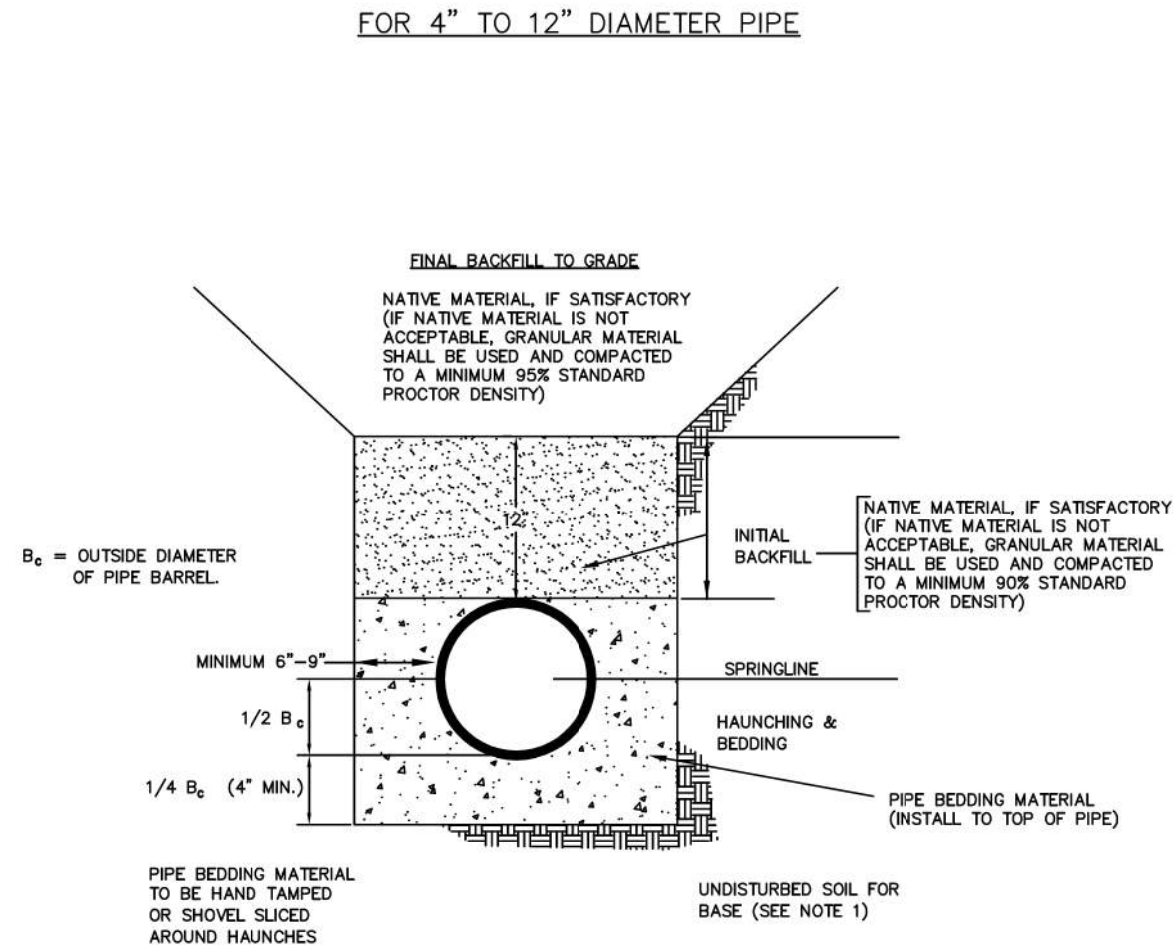
**HINGED RODENT/TURTLE GUARD**

NOT TO SCALE

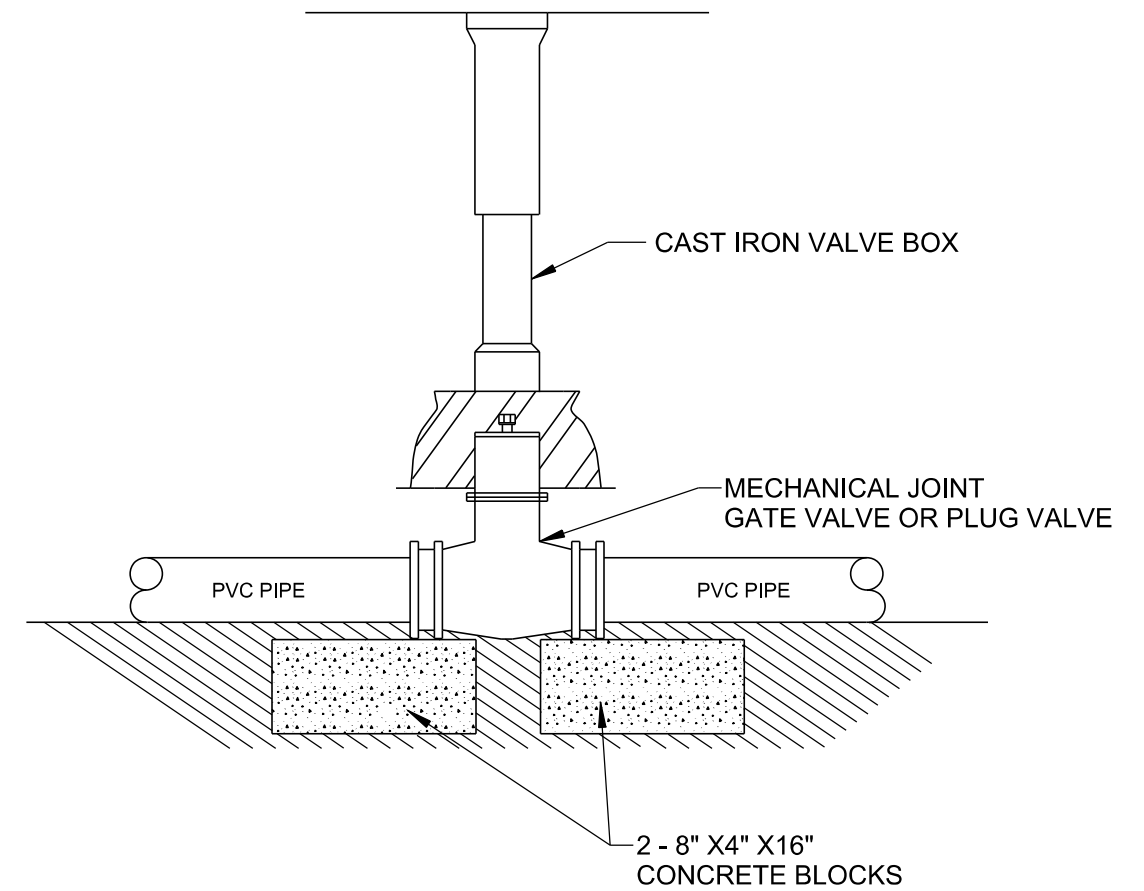
ALL COMPONENTS OF THE RODENT GUARD TO BE MADE OF 3/8" X 2" ALUMINUM BAR. ALL BOLTS, NUTS, AND WASHERS TO BE STAINLESS STEEL. THE ACTUAL GUARD MAY VARY BUT SHOULD CLOSELY RESEMBLE THIS DRAWING. ALL WORK TO CONSTRUCT AND INSTALL RODENT GUARD SHALL BE INCIDENTAL TO CLASS A45 CONCRETE.



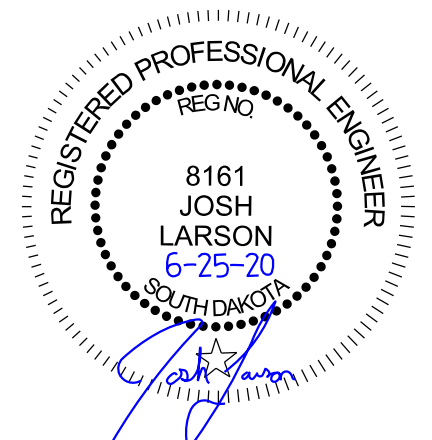
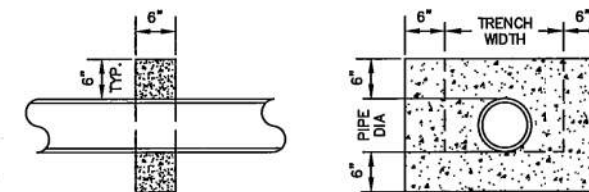
# BEDDING AND BACKFILL



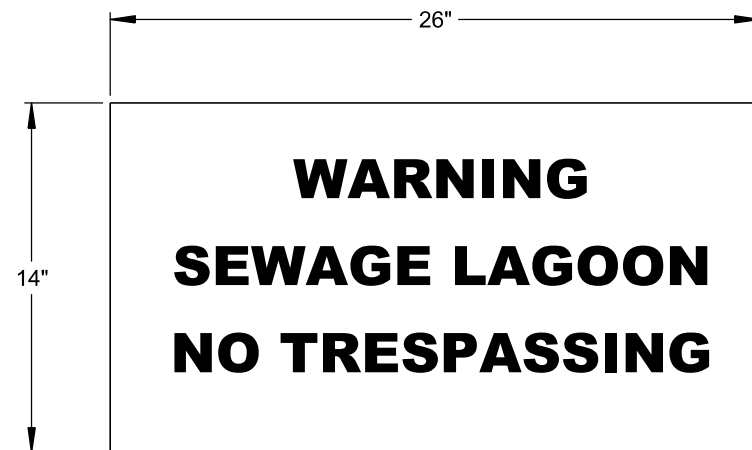
# GATE VALVE INSTALLATION



# CONCRETE WATERSTOP DETAIL



## WARNING SIGN DETAIL



The sign sheeting material will be in conformance with ASTM D4956 Type IV Sheeting.

The sign background color will be white with black letters.

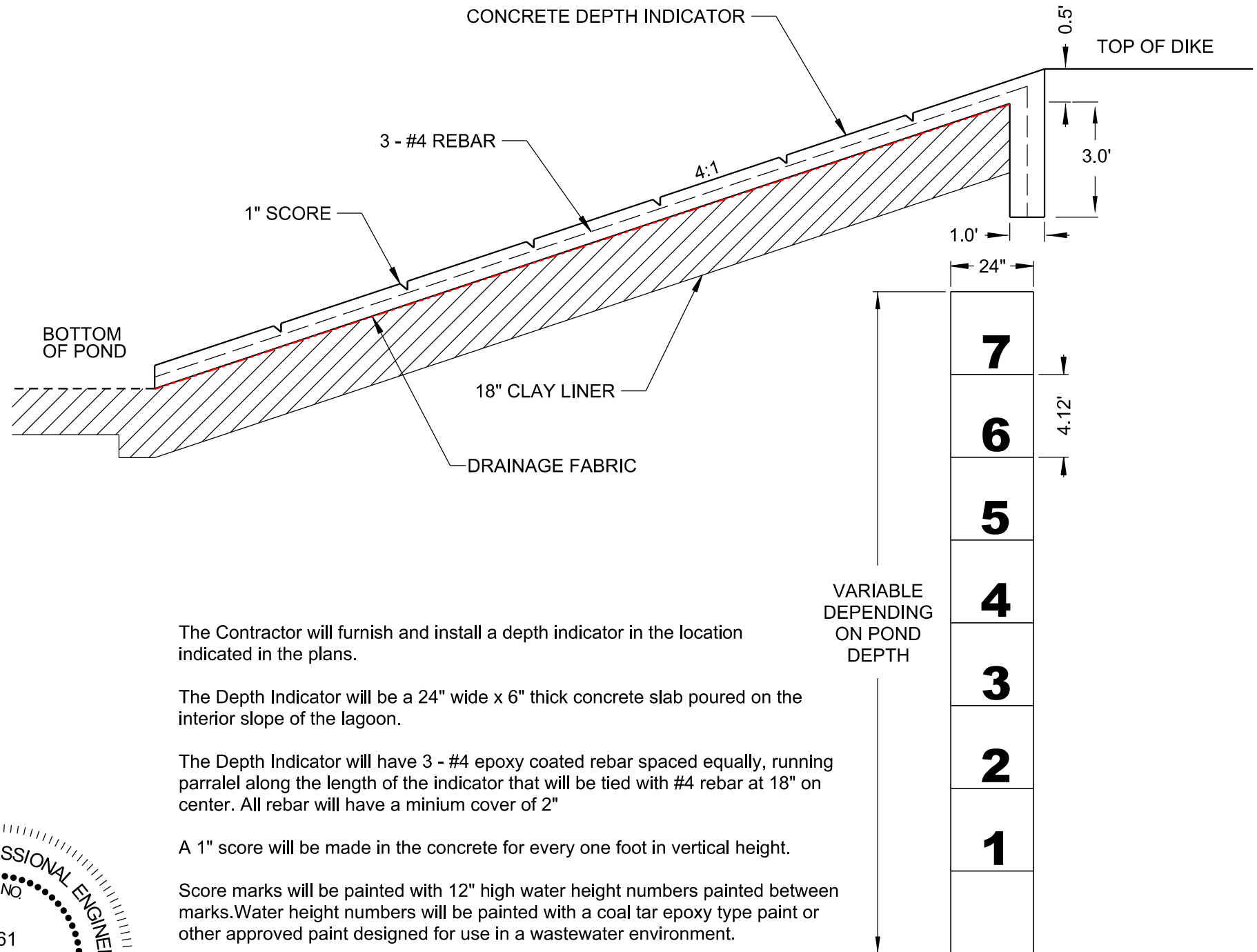
Letter height will be 2", with 2" spacing above and below the lettering and 2" between lines.

Signs will be installed at the locations shown on the plans.

All labor and materials necessary to furnish and install the signs on the chain link fencing will be incidental to the contract unit price per square foot for Flat Aluminum Sign, Nonremovable Copy High Intensity.



## LAGOON DEPTH INDICATOR DETAIL



The Contractor will furnish and install a depth indicator in the location indicated in the plans.

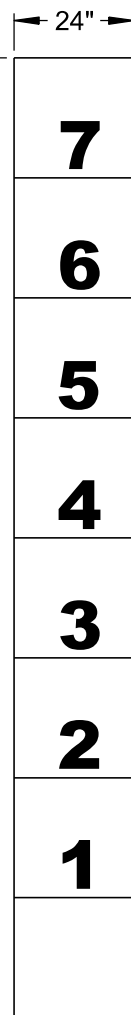
The Depth Indicator will be a 24" wide x 6" thick concrete slab poured on the interior slope of the lagoon.

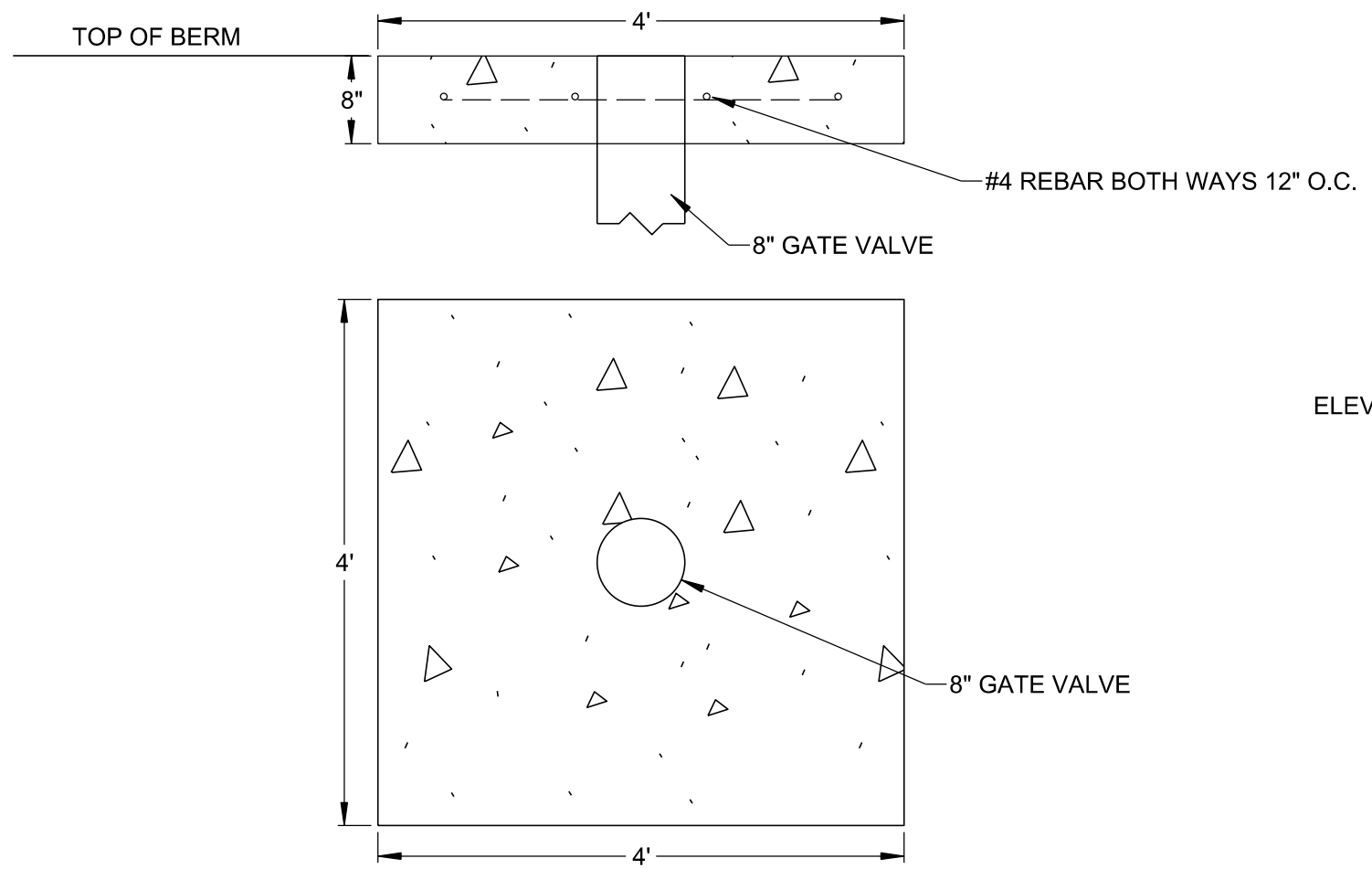
The Depth Indicator will have 3 - #4 epoxy coated rebar spaced equally, running parallel along the length of the indicator that will be tied with #4 rebar at 18" on center. All rebar will have a minimum cover of 2"

A 1" score will be made in the concrete for every one foot in vertical height.

Score marks will be painted with 12" high water height numbers painted between marks. Water height numbers will be painted with a coal tar epoxy type paint or other approved paint designed for use in a wastewater environment.

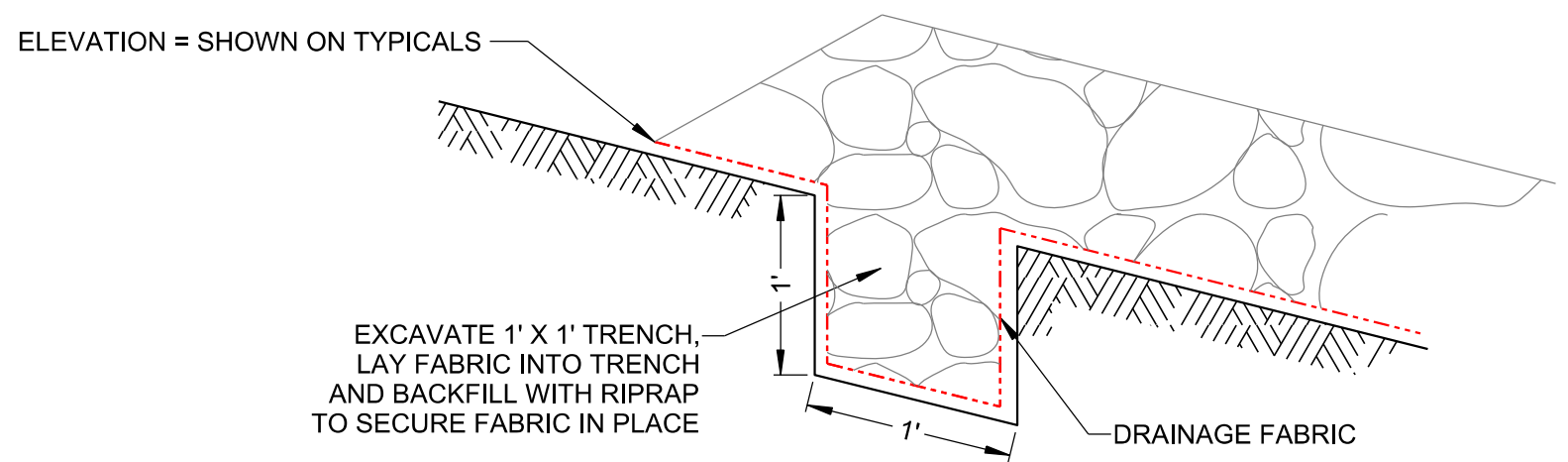
VARIABLE  
DEPENDENT  
ON POND  
DEPTH





## CONCRETE VALVE BOX PAD

NOT TO SCALE



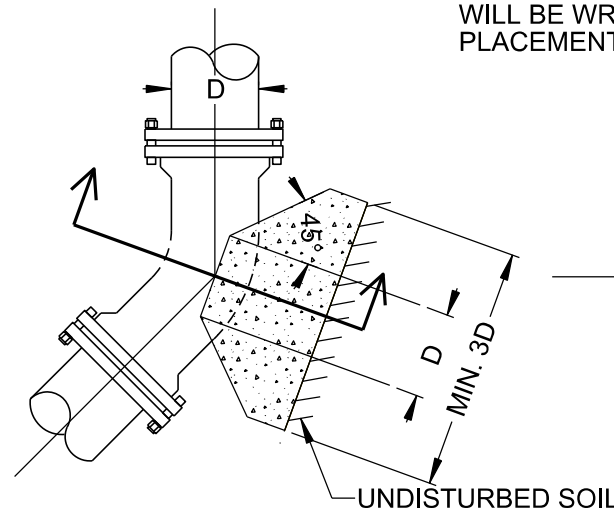
## FABRIC KEYHOLE DETAIL



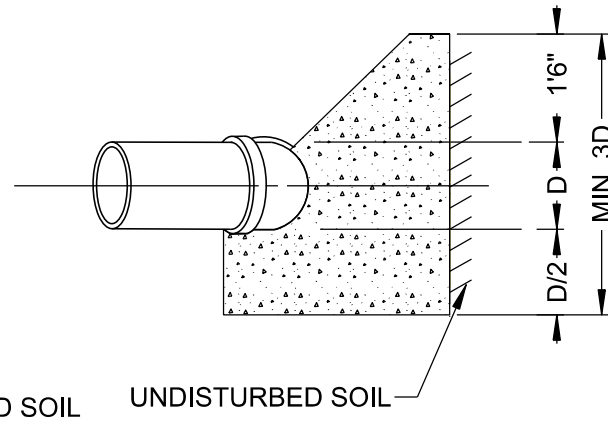


# THRUST BLOCKS

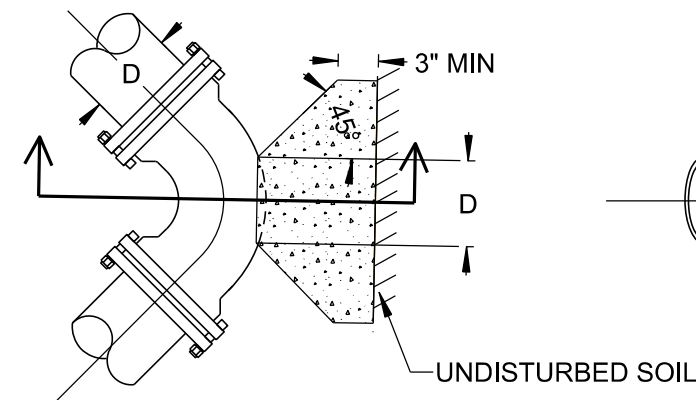
ALL FITTINGS, VALVES, AND HYDRANTS WILL BE WRAPPED IN PLASTIC PRIOR TO PLACEMENT OF THRUST BLOCKS.



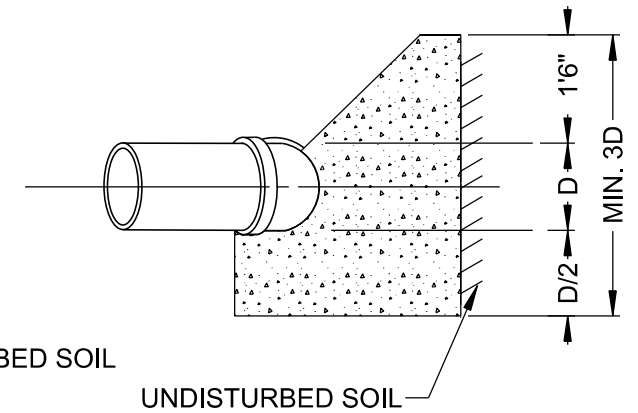
**PLAN VIEW**



**SECTION VIEW**



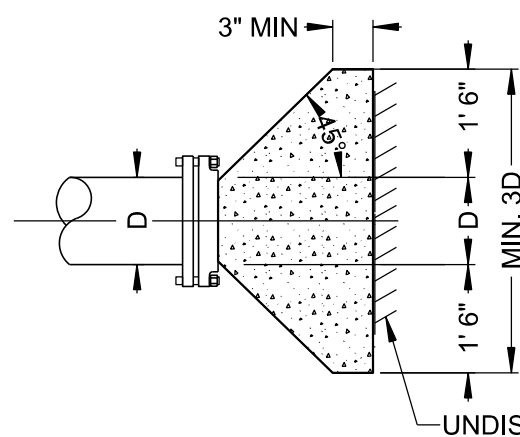
**PLAN VIEW**



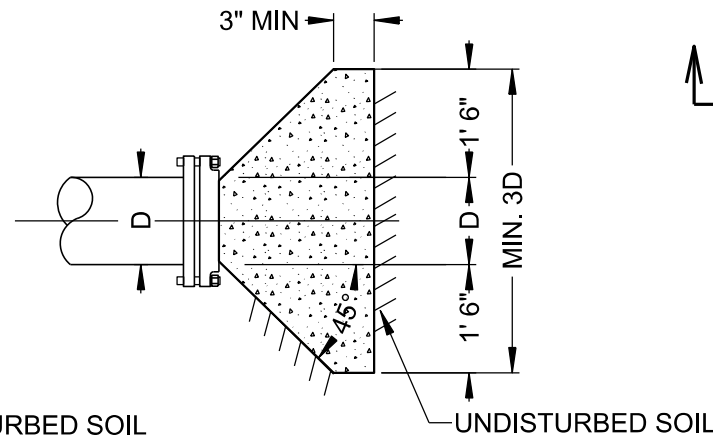
**SECTION VIEW**

**90° BEND**

**11-1/4°, 22-1/2° AND 45° BEND**

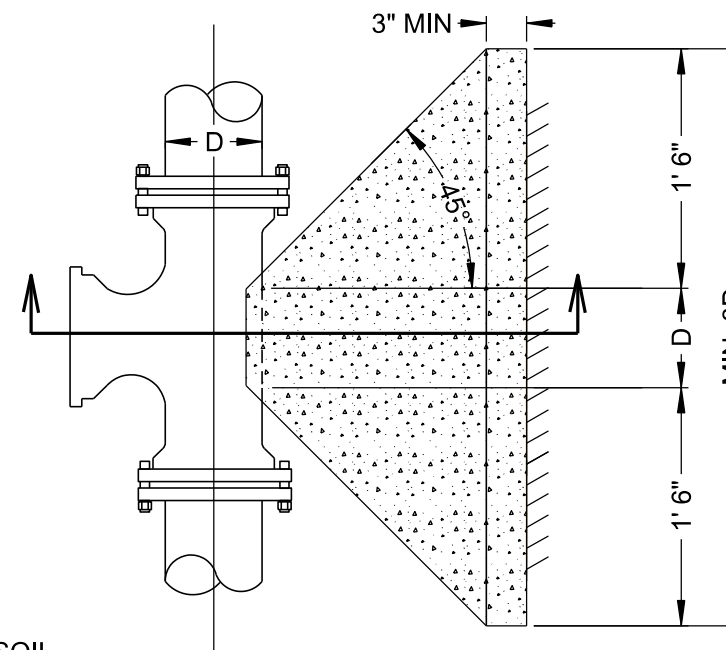


**PLAN VIEW**

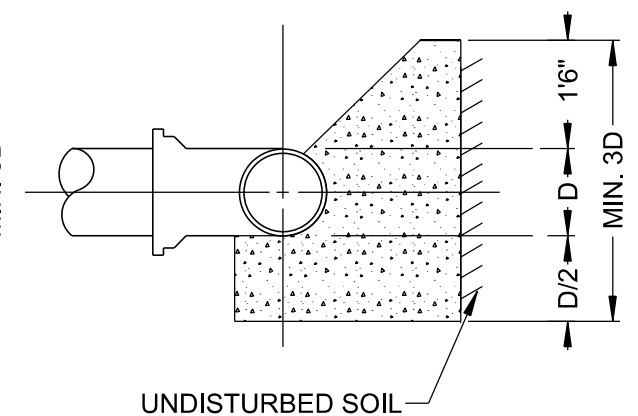


**SECTION VIEW**

**CAPS OR PLUGS**

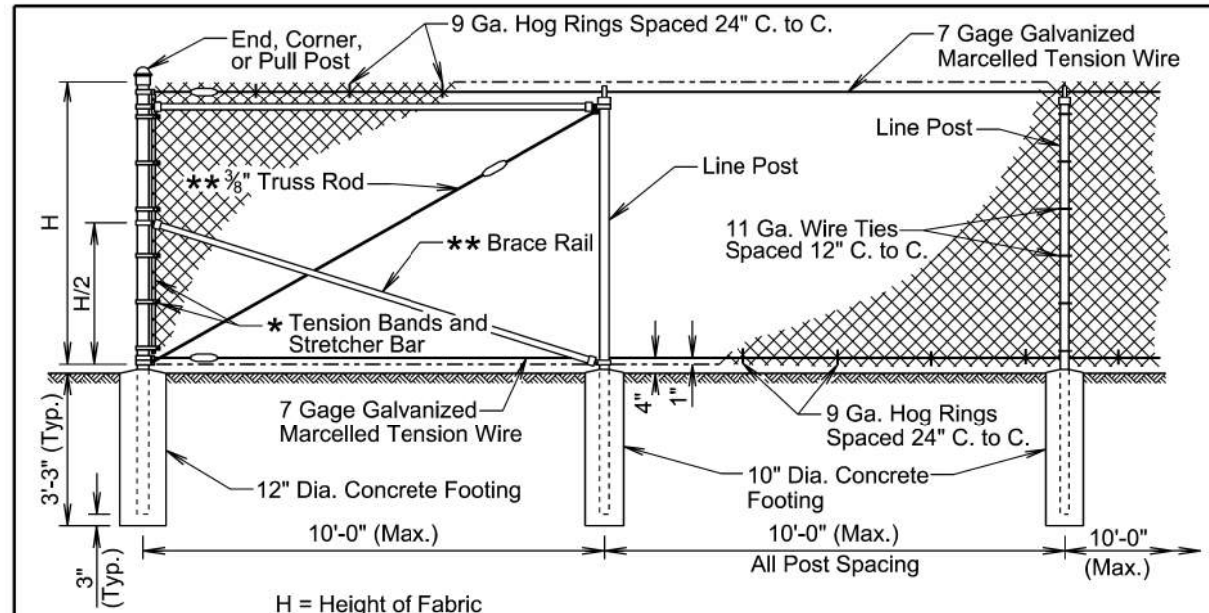


**PLAN VIEW**



**SECTION VIEW**

**TEE**



H = Height of Fabric  
 \* Tension bands will be spaced 12" c. to c.  
 \*\* Are not required for 3' through 5' height fences.  
 ○ Tightening device such as shown on standard plate 621.03

COMPONENT	END, CORNER, and PULL POST		LINE POST			BRACE RAIL	
	Round Pipe Nominal	Roll Formed Steel	Round Pipe Nominal	"C" Section	H Beam Steel	Round Pipe Nominal	Roll Formed Steel
Type of Fabrication							
Size	3.00" O. D.	3.5"x3.5"	2.50" O. D.	1.875"x1.625"	2.25"x1.70"	1.625" O. D.	1.625"x1.25"
Weight (lb. / Ft.)	5.79 or 4.64	5.14	3.65 or 3.12	2.34	3.43	2.27 or 1.84	1.35

**GENERAL NOTES:**

Specific details of the component parts of the fence will be approved by the Engineer. Commercially available items produced specifically for the use intended will be used wherever possible in the construction of the fence.

Height of the fabric will be as shown in the plans. Fabric is available at the following heights: 36", 42", 48", 60", 72", 84", 96", 108", 120", and 144". Fabric heights 60 inches and less will be knuckled at both selvages. Fabric heights 72 inches and higher will be knuckled at one selvage and twisted at the other selvage.

Chain link fabric will be 2-inch mesh, No. 9 gage galvanized wire securely fastened to tension wire, line post, rails, braces, and stretcher bars.

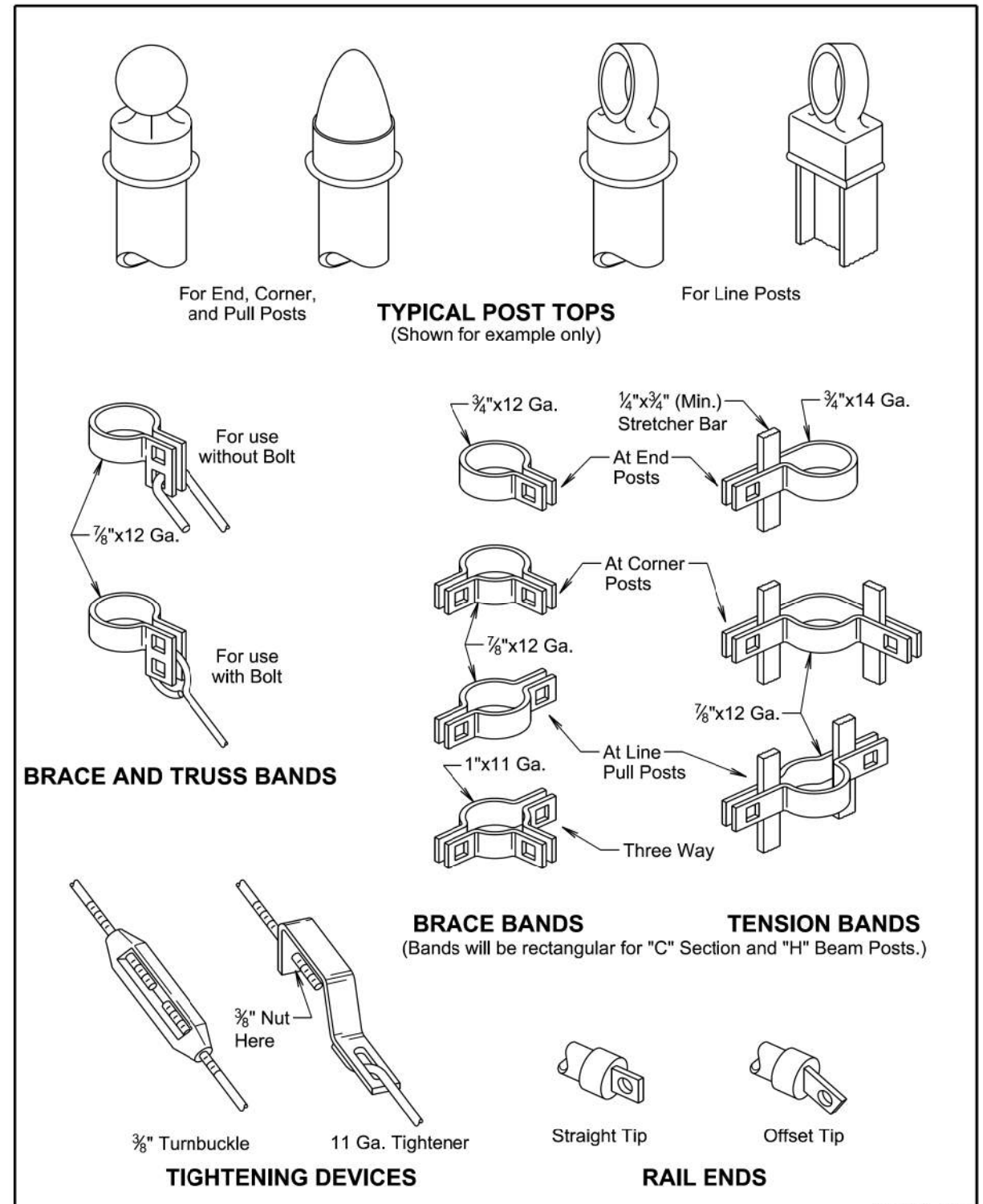
Fence may be constructed with either round pipe, "C" section, "H" beam, or roll formed steel components as shown in the table above. Line posts may be round pipe, "C" section, or "H" beam. The corner post and rails will be either round pipe or roll formed steel. The type of components used must be approved by the Engineer prior to installation.

All posts will have a means to securely hold the top tension wire in position and allow for the removal and replacement of a post without damaging the top tension wire.

Where fence must cross small bodies of water such as drainage areas or ponds that could freeze during the winter, use 11 gage hog rings. Provide only two ties per tension wire between line posts.

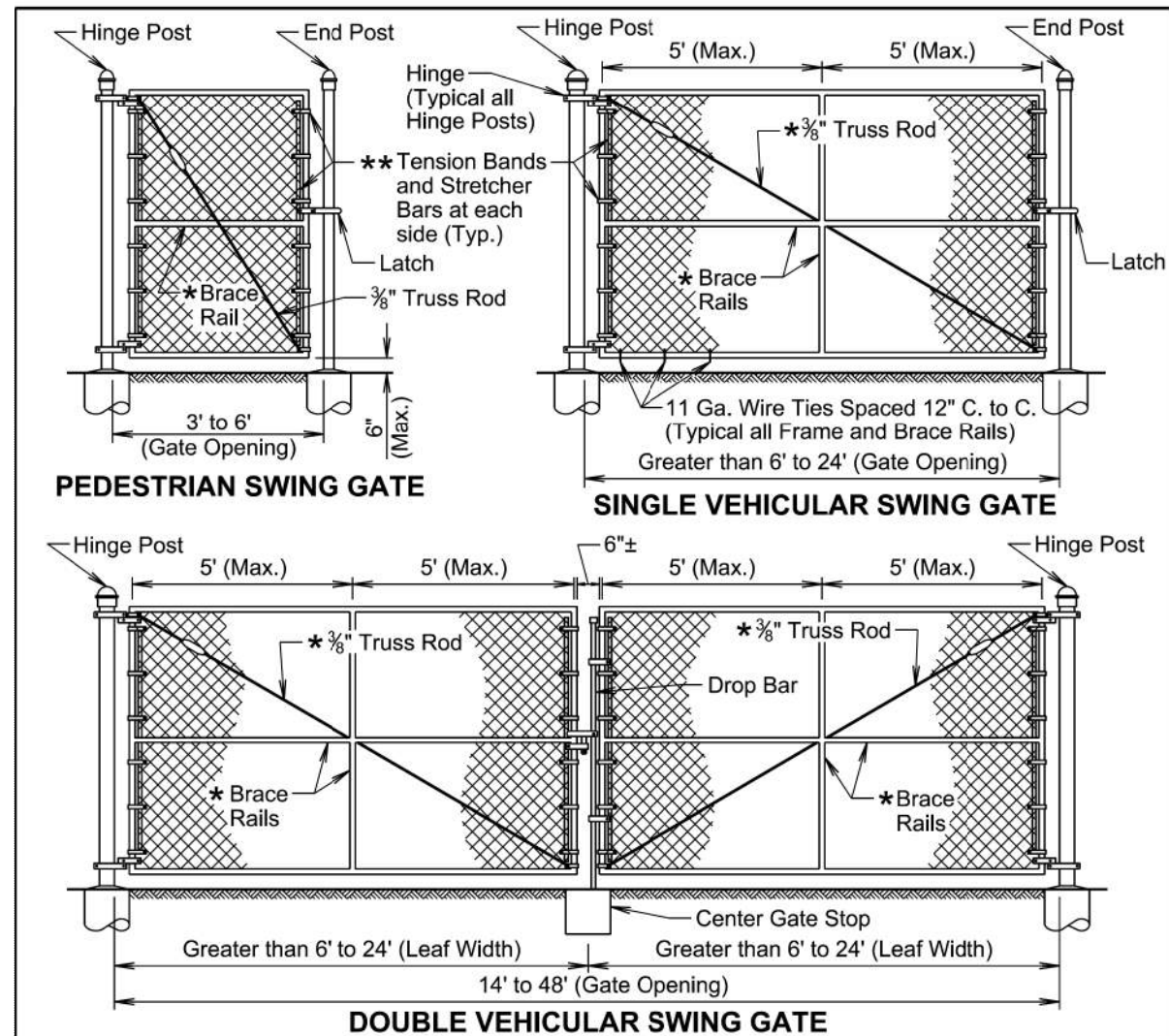
June 26, 2019

Published Date: 2nd Qtr. 2020	S D D O T	CHAIN LINK FENCE WITH TENSION WIRED TOP	PLATE NUMBER
			621.02
			Sheet 1 of 1



June 26, 2019

Published Date: 2nd Qtr. 2020	S D D O T	HARDWARE FOR CHAIN LINK FENCE	PLATE NUMBER
			621.03
			Sheet 1 of 1



1 Gate Opening Width	Hinge Post		Concrete Footing	
	Round Pipe Nominal	Roll Formed Steel	Depth	Diameter
3' to 6'	3.00"	3.50"x3.50"	36"	12"
> 6' to 13'	4.00"	—	42"	12"
> 13' to 18'	6.625"	—	48"	18"
> 18' to 23'	8.625"	—	48"	24"

- \* Are not required for gates 3' to 5' height or 5' or less in width.
- \*\* Tension Bands will be spaced 12" center to center.
- Tightening Device such as shown on standard plate 621.03
- 1 Leaf width for Double Vehicular Swing Gate
- 2 Will coincide with fence height

Gate Opening		Frame Pipe Nominal	Brace Rail Pipe Nominal
1 Width	2 Height		
3' to 8'	3' to 6'	1.50"	1.50"
> 8' to 23'	6'	1.90"	1.50"
> 8' to 23'	> 6' to 12'	1.90"	1.90"

**GENERAL NOTES:**  
 Gate frames may be constructed of bent or welded steel tubing, must be approved by the Engineer prior to installation, and installed in accordance with the Manufacturer's installation instructions.  
 Center gate stops must be approved by the Engineer prior to installation and will be installed in accordance with the Manufacturer's installation instructions.

June 26, 2019

<b>S D D O T</b>	<b>SWING GATES FOR CHAIN LINK FENCE</b>	PLATE NUMBER <b>621.10</b>
		Sheet 1 of 1
		Published Date: 2nd Qtr. 2020

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

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

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

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

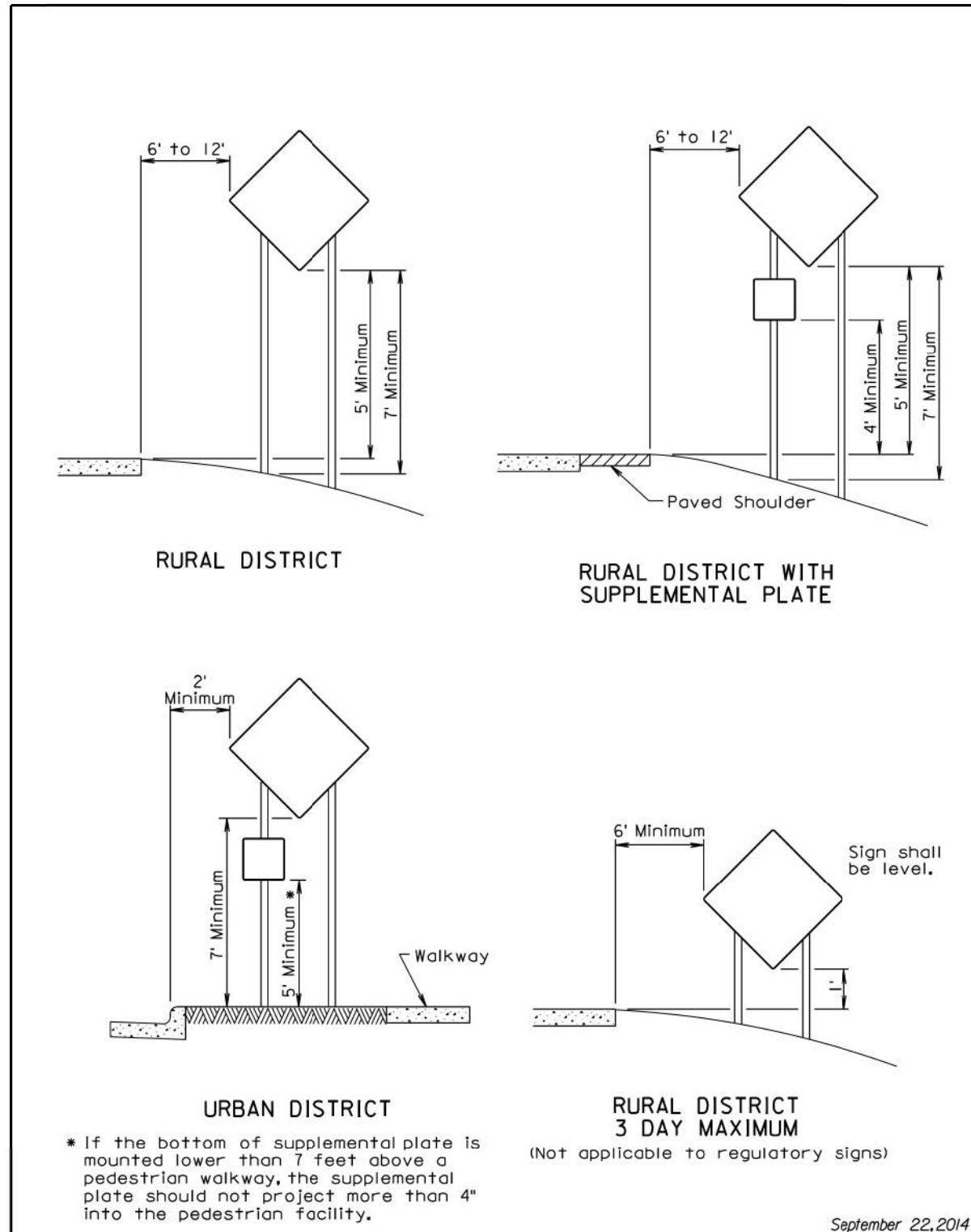
For short term, short duration, or mobile operations, all signs and channelizing devices may be eliminated if a vehicle with an activated flashing or revolving yellow light is used.

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)
0 - 30	200
35 - 40	350
45 - 50	500
55	750
60 - 80	1000

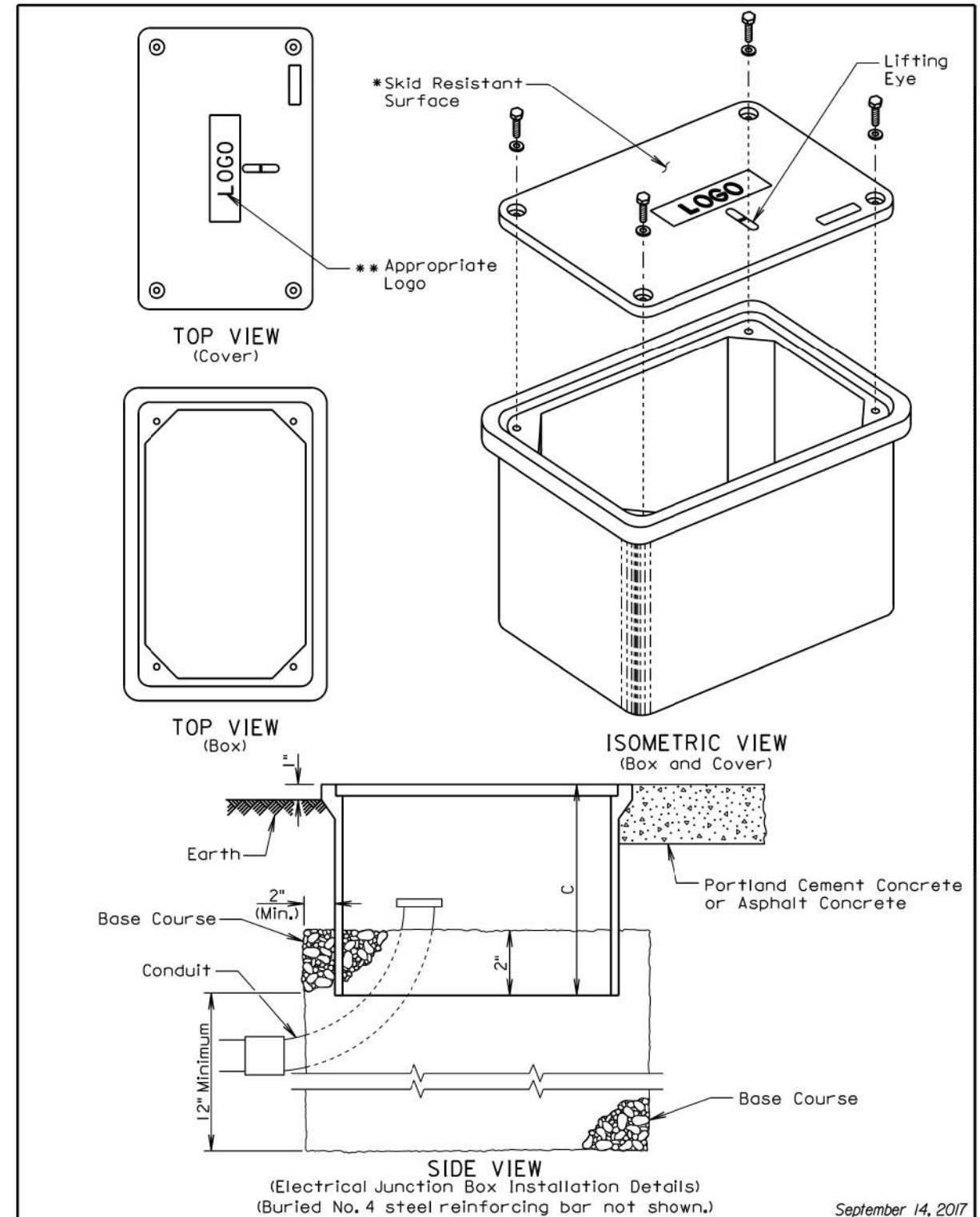
<b>S D D O T</b>	<b>GUIDES FOR TRAFFIC CONTROL DEVICES WORK BEYOND THE SHOULDER</b>	PLATE NUMBER <b>634.01</b>
		Sheet 1 of 1
		Published Date: 2nd Qtr. 2020

April 15, 2015





Published Date: 2nd Qtr. 2020	S D D O T	CRASHWORTHY SIGN SUPPORTS (Typical Construction Signing)	PLATE NUMBER
			634.85
			Sheet 1 of 1



Published Date: 2nd Qtr. 2020	S D D O T	ELECTRICAL JUNCTION BOXES TYPE 1 THROUGH TYPE 4	PLATE NUMBER
			635.65
			Sheet 1 of 2

**ELECTRICAL JUNCTION BOX**

TYPE	DESCRIPTION	APPROXIMATE COVER SIZE	MINIMUM DEPTH (C)
1	Open Bottom with Gasket	11"x18"	18"
2	Open Bottom with Gasket	13"x24"	18"
3	Open Bottom with Gasket	17"x30"	18"
4	Open Bottom with Gasket	30"x48"	24"

**GENERAL NOTES:**

The cover shall be gasketed with a minimum of two stainless steel bolts and washers.

The cover shall have a lifting eye.

\*The surface of the cover shall have a minimum wet and dry coefficient of friction value of 0.5 as determined by ASTM F609.

\*\*The cover of the junction box shall have the appropriate logo in one inch size letters and shall be recessed. When the junction box contains cables or wires for a traffic signal then the logo shall be "Signal". When the junction box contains lighting conductors then the logo shall be "Lighting".

The electrical junction boxes shall comply with the American National Standards Institute (ANSI)/Society of Cable Telecommunications Engineers (SCTE) 77 2007 Specification for Underground Enclosure Integrity. The loading requirement for all the electrical junction boxes shall be Tier 8 of ANSI/SCTE 77 2007.

The electrical junction boxes shall be UL listed.

For junction boxes located outside of pavement, a No. 4 steel reinforcing bar with a minimum length of 18" shall be buried adjacent to the long side of the junction box. All costs associated with furnishing and placing the steel reinforcing bar shall be incidental to the contract unit price per each for "Type - Electrical Junction Box".

September 14, 2017

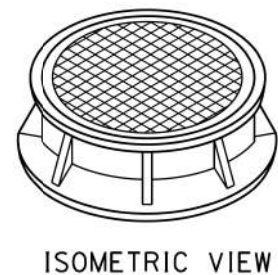
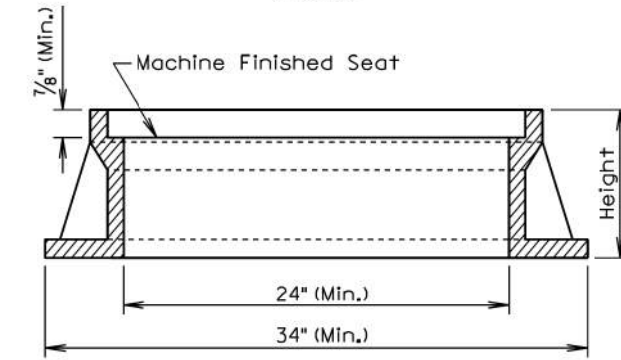
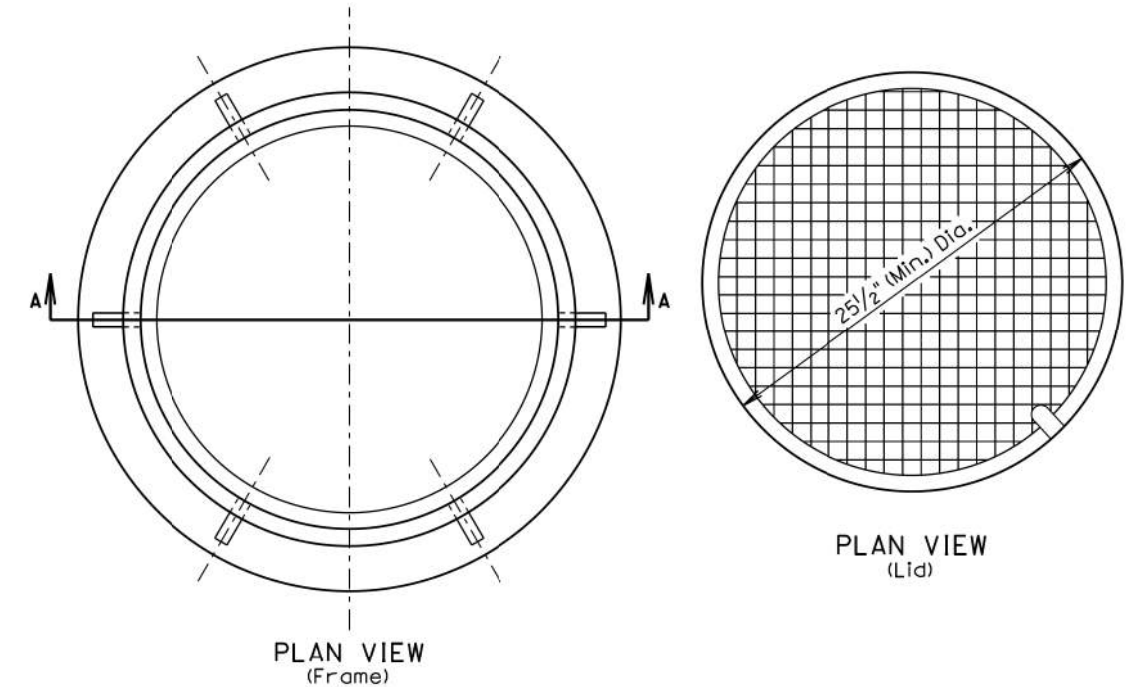
**S  
D  
D  
O  
T**

**ELECTRICAL JUNCTION BOXES  
TYPE 1 THROUGH TYPE 4**

PLATE NUMBER  
635.65

Sheet 2 of 2

Published Date: 2nd Qtr. 2020



TYPE	HEIGHT (Inches)	MINIMUM WEIGHT (Lb.)
A7	7	400
A8	8	440
A9	9	470
A10	10	480

**GENERAL NOTE:**

Geometric pattern on top of lid other than that shown shall be approved by the Engineer.

June 26, 2016

**S  
D  
D  
O  
T**

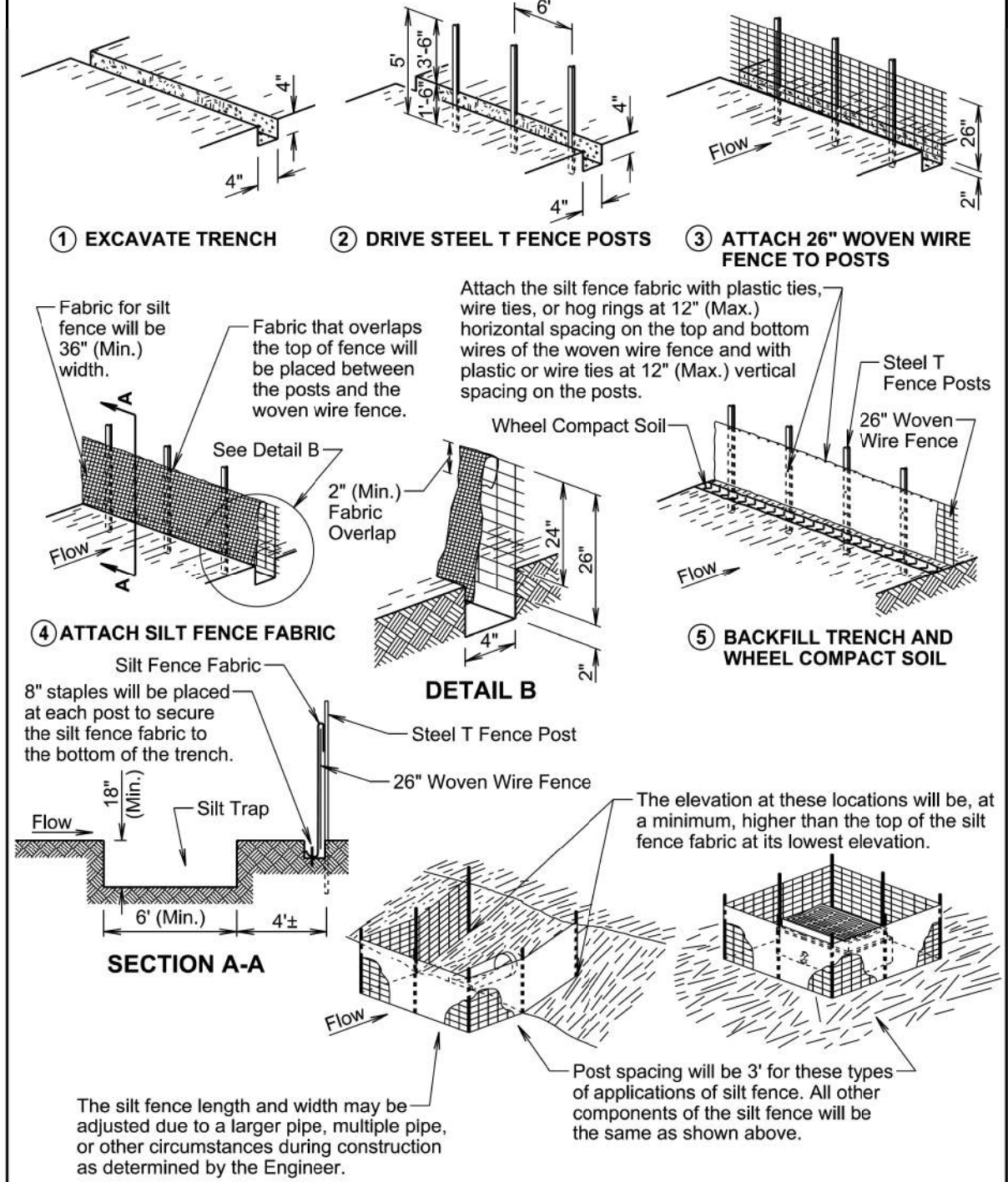
**TYPE A MANHOLE FRAME AND LID**

PLATE NUMBER  
671.10

Sheet 1 of 1

Published Date: 2nd Qtr. 2020

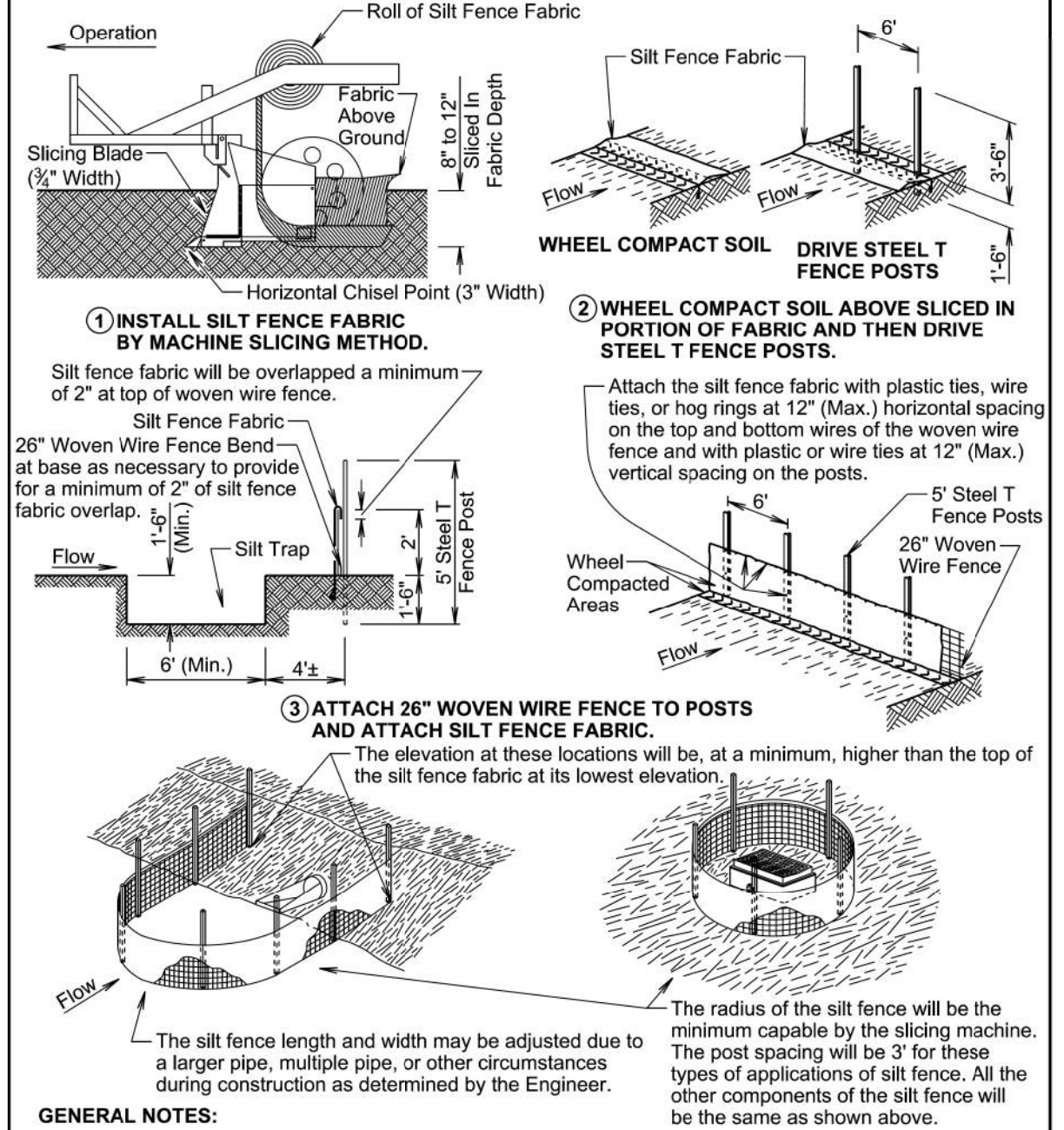
### MANUAL LOW FLOW SILT FENCE INSTALLATION



February 14, 2020

<b>S D D O T</b>	<b>LOW FLOW SILT FENCE AND SILT TRAP</b>	PLATE NUMBER <b>734.04</b>
		Sheet 1 of 2
	Published Date: 2nd Qtr. 2020	

### MACHINE SLICED LOW FLOW SILT FENCE INSTALLATION



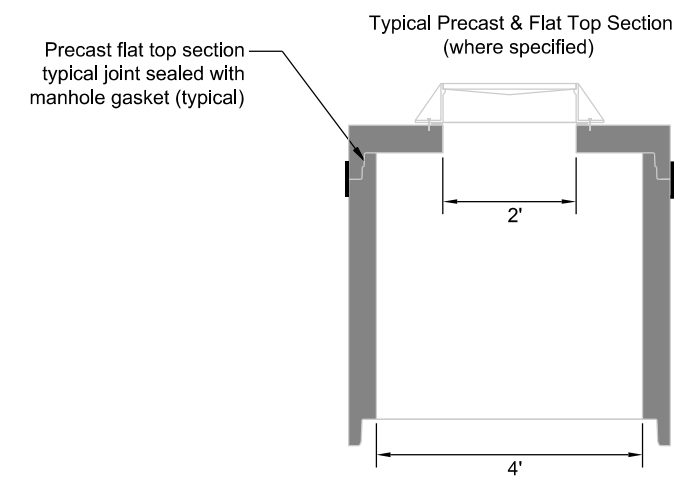
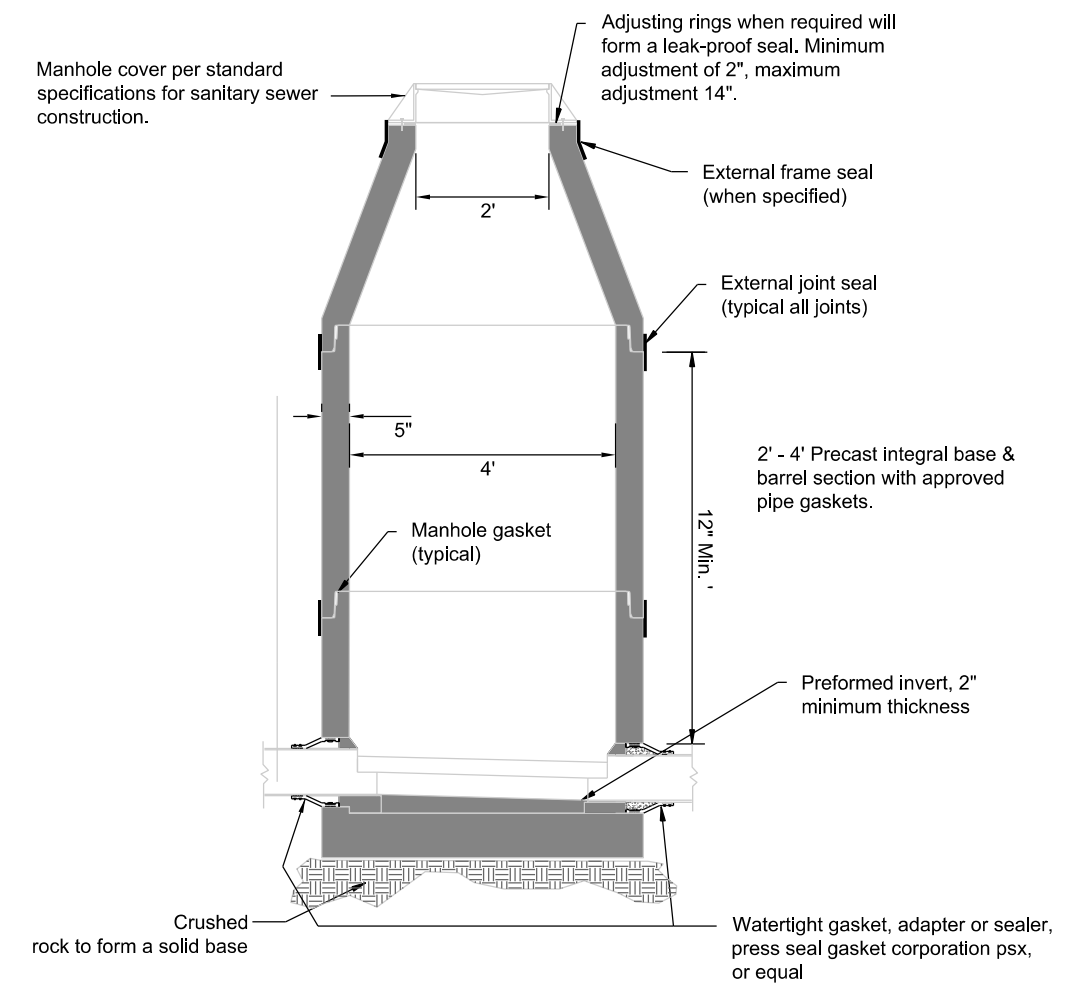
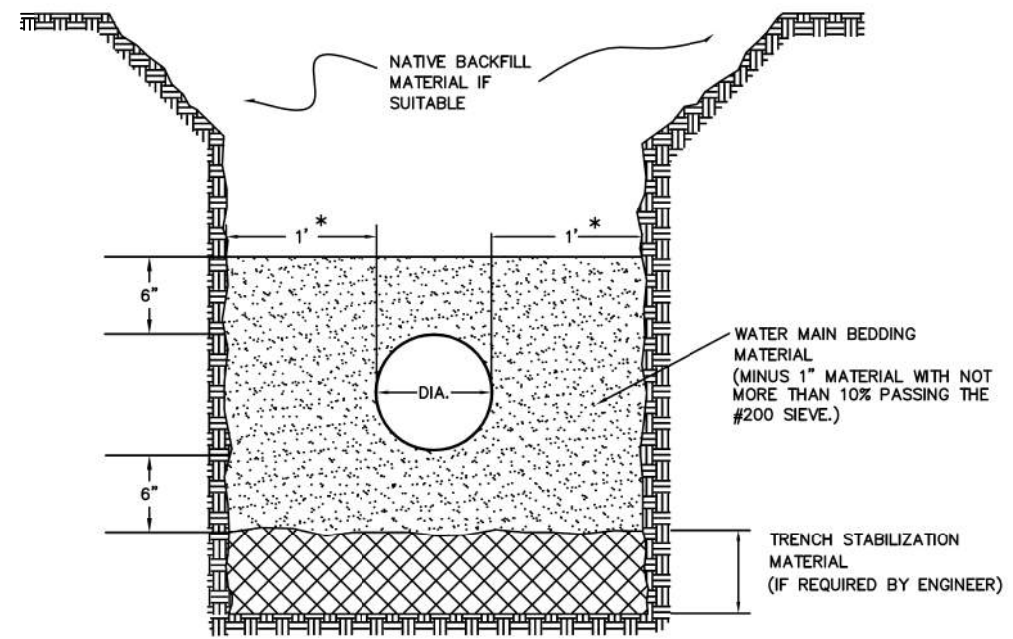
**GENERAL NOTES:**

A silt trap will be provided when specified by a plan note. All costs for constructing the silt trap will be incidental to the contract unit price per cubic yard for "Silt Trap".

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 will be provided on top of the extra length of silt fence fabric to prevent underflow.

February 14, 2020

<b>S D D O T</b>	<b>LOW FLOW SILT FENCE AND SILT TRAP</b>	PLATE NUMBER <b>734.04</b>
		Sheet 2 of 2
	Published Date: 2nd Qtr. 2020	



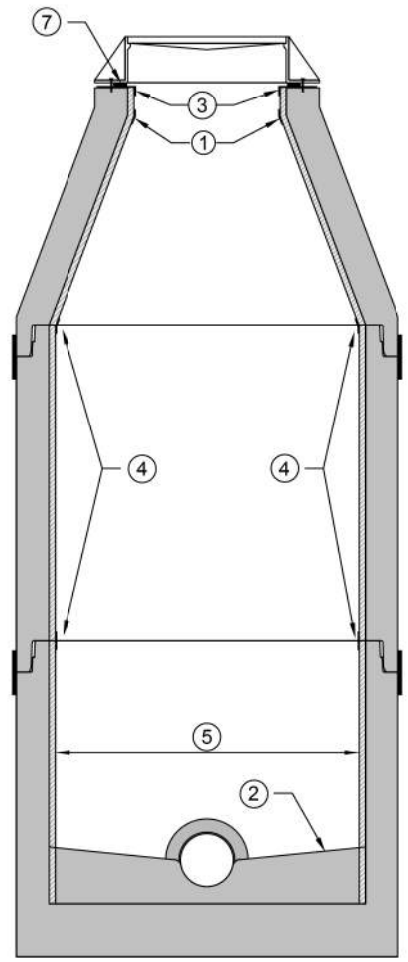
PIPE SIZE DIAMETER	TRENCH WIDTH	TRENCH HEIGHT	TRENCH AREA	PIPE AREA	WATER MAIN BEDDING MAT. AREA	WATER MAIN BEDDING MAT. TONS/LF
4"	28"	16"	3.11 SQ.FT.	.09 SQ.FT.	3.02 SQ.FT.	0.21
6"	30"	18"	3.75 SQ.FT.	.20 SQ.FT.	3.55 SQ.FT.	0.25
8"	32"	20"	4.44 SQ.FT.	.35 SQ.FT.	4.10 SQ.FT.	0.29
10"	34"	22"	5.19 SQ.FT.	.55 SQ.FT.	4.65 SQ.FT.	0.33
12"	36"	24"	6.00 SQ.FT.	.79 SQ.FT.	5.22 SQ.FT.	0.37
16"	40"	28"	7.78 SQ.FT.	1.40 SQ.FT.	6.38 SQ.FT.	0.45
20"	44"	32"	9.78 SQ.FT.	2.18 SQ.FT.	7.60 SQ.FT.	0.53
24"	48"	36"	12.00 SQ.FT.	3.14 SQ.FT.	8.86 SQ.FT.	0.62
30"	60"	42"	17.50 SQ.FT.	4.91 SQ.FT.	12.59 SQ.FT.	0.88

\* IF >30" USE DIA./2 ON EACH SIDE OF WATER MAIN PIPE.  
 \* LENGTH BASED ON ONE (1) FOOT OF MAIN.



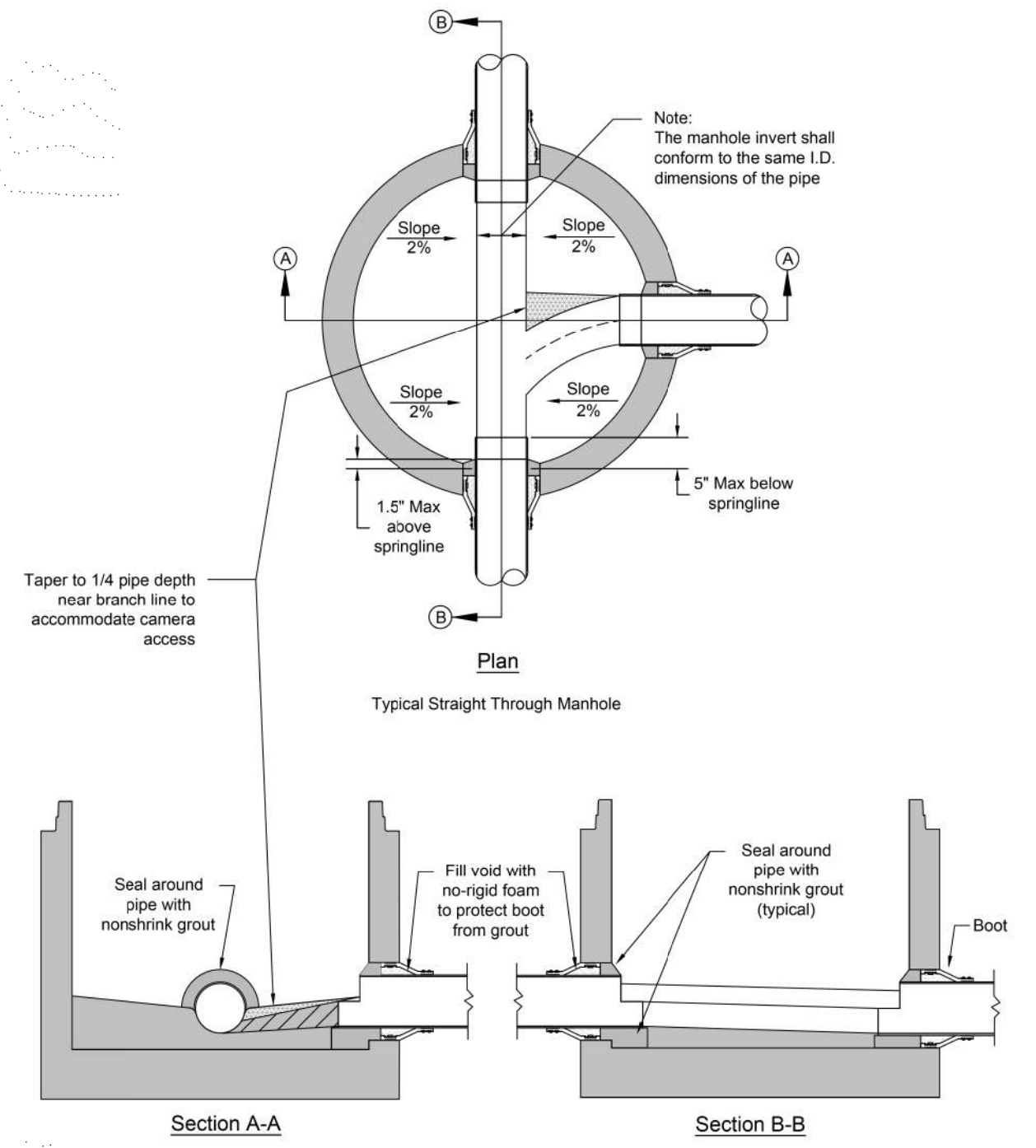
Force Main Bedding Detail

Sanitary Sewer Manhole

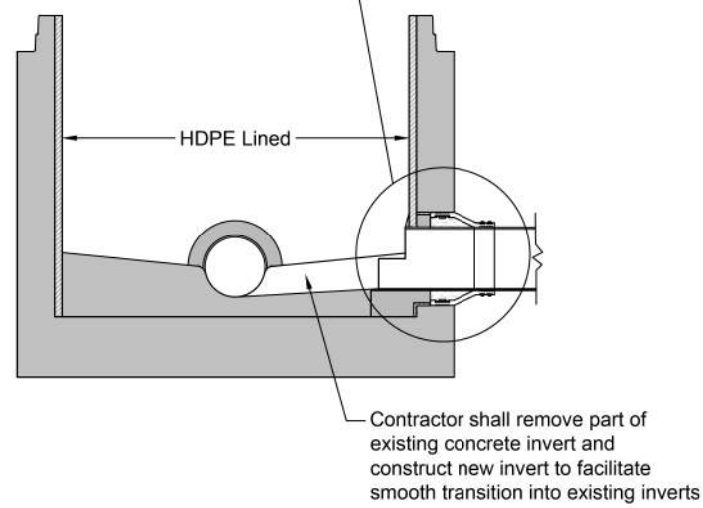
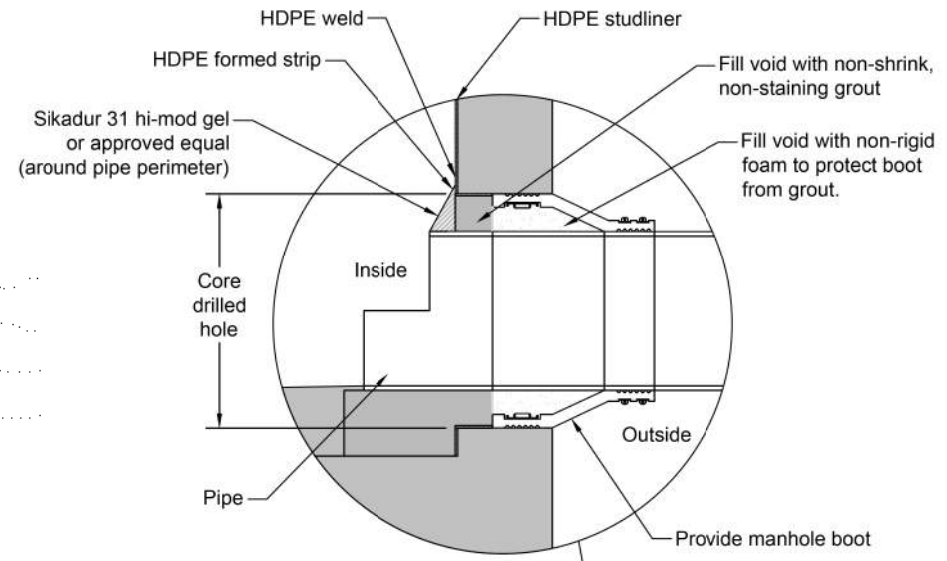


- ① Preformed corner weld strip or weld to be installed.
- ② Pre-formed bench and invert.
- ③ Install pre-cut turnback cap on corbal section.
- ④ Weld strips are required when gap is greater than 1/2 inch.
- ⑤ All concrete surfaces, except the inverts, which will be exposed to sewer gases shall be lined. This includes all concrete pipe surfaces if concrete pipe is used.
- ⑥ Installation of the manhole liner shall conform to the requirements of the supplemental specifications.
- ⑦ Where adjusting rings are allowed and/or required, plastic adjusting rings shall be used when conditions allow for their use. The top and interior face of the top concrete adjusting ring shall be lined. If concrete adjusting rings are used, the seal between the casting and top adjusting ring shall be made with 3/16" to 1/4" thick continuous trowelable butyl rubber. The butyl rubber material shall be continuous around the entire casting flange surface.
- ⑧ All manholes with influent or effluent 10 inches or greater shall be lined with HDPE or an approved equal liner material. All structures located within 400' of 18" diameter or greater trunkline shall also be lined.

## Sanitary Sewer Manhole Lined Type



## Manhole Bench and Invert Detail



## Sanitary Sewer Lined Manhole Pipe Connection