SECTION 31 2319 – DEWATERING (BMU)

PART 1.0 - GENERAL REQUIREMENTS

1.1 SCOPE OF WORK

A. Dewatering for utility trenches, including water, sanitary sewer, electric conduit and storm sewer pipe.

1.2 SECTION INCLUDES

A. Dewater excavations, including seepage and precipitation

1.3 RELATED REQUIREMENTS

A. SECTION 01 3000 – ADMINISTRATIVE REQUIREMENTS

B. SECTION 31 2333 – TRENCHING AND UTILTY BACKFILLING (BMU)

C. SECTION 31 2400 – ROADWAY EXCAVATION AND EMBANKMENT (COB)

D. SECTION 33 1000 – WATER UTILITIES (BMU)

E. SECTION 33 1419 – VALVE AND FIRE HYDRANTS (BMU)

A. SECTION 33 3100 – SANITARY SEWER UTILITIES (BMU)

1.4 DEFINITIONS

A. Dewatering: The process of draining rainwater or groundwater from an excavated area before construction can begin.

B. Well points: Small diameter wells that are connected to a header pipe and well point pump.

C. Deep well point: consists of a series of bored wells fitted with submersible pumps at the bottom. Each well is capable of creating a cone of depression around itself while drawing water to the surface.

D. Water Table: boundary between the unsaturated zone and the saturated zone underground.

1.5 REQUIREMENTS

A. Dewatering system shall be of sufficient size and capacity necessary to lower and maintain ground water table to an elevation at least 1 foot below lowest foundation subgrade or bottom of pipe trench and to allow material to be excavated in a reasonably dry condition. Materials to be removed shall be sufficiently dry to permit excavation to grades shown and to stabilize excavation slopes where sheeting is not required. Operate dewatering system continuously until backfill work has been completed.

B. Reduce hydrostatic head below any excavation to the extent that water level in the construction area is a minimum of 1 foot below prevailing excavation surface.

C. Prevent loss of fines, seepage, boils, quick conditions or softening of foundation strata.

D. Maintain stability of sides and bottom of excavation.

E. Construction operations are performed in the dry.

F. Control of surface and subsurface water is part of dewatering requirements. Maintain adequate control so that:

1. The stability of excavated and constructed slopes are not adversely affected by saturated soil, including water entering prepared subbase and subgrades where underlying materials are not free draining or are subject to swelling or freeze-thaw action.

2. Erosion is controlled.

3. Flooding of excavations or damage to structures does not occur.

4. Surface water drains away from excavations.

5. Excavations are protected from becoming wet from surface water, or insure excavations are dry before additional work is undertaken.

G. Permitting Requirements: The CONTRACTOR shall comply with and obtain the required State and County permits where the work is performed.

1.6 SUBMITTALS

A. Drawings and Design Data:

1. Submit drawings and data showing the method to be employed in dewatering excavated areas 30 days before commencement of excavation. Documentation shall include on-site contact person with contact's email and mailing address.

2. Material shall include: location, depth and size of wellpoints, headers, sumps, ditches, size and location of discharge lines, capacities of pumps and standby units, and detailed description of dewatering methods to be employed to convey the water from site to adequate disposal.

3. Detailed schedule showing dates when dewatering will commence and when dewatering will end.

B. Include a written report outlining control procedures to be adopted if dewatering problem arises.

1. Capacities of pumps, prime movers, and standby equipment.

2. Design calculations proving adequacy of system and selected equipment. The dewatering system shall be designed using accepted and professional methods of design and engineering consistent with the best modern practice. The dewatering system shall include the deep wells, wellpoints, and other equipment, appurtenances, and related earthwork necessary to perform the function.

3. Detailed description of dewatering procedure and maintenance method. Documentation shall include a anticipated volume of water being dewatered and approximately flowrate of pumping equipment.

a. Provided description of water treatment process or best management practices to be used to maintain water quality.

4. Materials submitted shall be in a format acceptable for inclusion in required permit applications to any and all regulatory agencies for which permits for discharge water from the dewatering system are required due to the discharge reaching regulated bodies of water.

1.7 DEWATERING PERMITS

A. The Contractor shall obtain any "DEWATERING PERMITS" required from local, state or federal agencies. The discharge area must be prior approved by the Engineer before initiating the dewatering.

B. The OWNER shall be responsible for submitting the Notice of Intent (NOI) to obtain coverage under the SWD General Permit for storm water Discharges Associated with Construction Activities to South Dakota Department of Agriculture and Natural Resources (SDDANR).

C. OWNER will not commence filling out the NOI until after the COONTRACTOR submits the necessary documentation as required in section 1.5 – SUBMITTALS.

D. CONTRACTOR shall execute and submit the CONTRACTOR AUTHORIZATION FORM for coverage Under the SWD General Permit for Stormwater Discharges Associated with Construction Activities to SDDANR.

1. CONTRACTOR shall submit copy of executed form to Engineer for file keeping records.

E. CONTRACTOR shall execute and submit the “Add Temporary Discharge to Active Permit” form to SDDANR.

1. This form must be filled out by the CONTRACTOR to add dewatering information to the active construction stormwater permit. Form must include the active construction stormwater permit number.

2. CONTRACTOR shall submit copy of executed form to Engineer for file keeping records.

1.8 TEMPORARY WATER RIGHT PERMIT

A. A temporary water right permit may be required if the following types of water need to be pumped out of the construction site:

1. Ground Water

2. Surface Water

B. Dewatering the construction site due to precipitation will require a permit.

C. Permit applications can be filled out on-line and submitted to SDDANR.

PART 2.0 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. The CONTRACTOR shall furnish all materials, tools, equipment, facilities, and services as required for providing the necessary dewatering work and facilities. Provide back-up equipment as necessary for replacement and for unanticipated emergencies.

B. Provide piezometers for monitoring groundwater levels and other instruments and measuring devices as required.

PART 3.0 - EXECUTION

3.1 TRENCH DEWATERING REQUIREMENTS

A. The Contractor shall examine the Project site and conditions under which dewatering work is to be performed.

B. Install a dewatering system to lower and control ground surface water in order to permit excavation, construction of structure, and placement of backfill materials to be performed under dry conditions. Make the dewatering system adequate to pre-drain the water-bearing strata above and below the bottom of structure foundations, utilities and other excavations.

C. In addition, reduce hydrostatic pressure head in water-bearing strata below structure foundations, utility lines, and other excavations, to extent that water levels in construction area are a minimum of 1 foot below prevailing excavation surface at all times.

D. Provide and maintain drainage and dewatering equipment to remove and dispose of all surface water and ground water entering excavations, or other parts of the Work areas. Keep excavations dry during execution of Work, subgrade preparation, and continually thereafter until the pipeline or structure to be built therein is acceptable to the Engineer and backfilling operations are completed and acceptable to the Engineer.

E. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

F. No reinforcing steel shall be placed in water, and no water shall be allowed to rise over any reinforcing steel before the concrete has been placed. No water will be allowed to come in contact with any concrete within twenty-four (24) hours after placement unless shown on the Drawings or authorized by the Engineer.

G. Performance Requirements:

1. Dewatering systems shall provide for the following:

   a. Prevent flotation, uplift pressures, increased water pressures, and hydrostatic soil pressures, heaving, settlements, shifting, and related damage of existing or new structures, utilities, site items, and property

   b. Maintain excavations free of water to the extent required for the Work and observations of these areas by the Engineer.

   c. Prevent loss of soil material, boils, movement of fines, slope stability problems, undermining, and other disturbances to the existing soil and rock formations.

   d. Prevent surface water and dewatering discharge related damages.

   e. Coordinate with surface water control systems.

   f. Conform to applicable government regulations and accepted engineering and construction practices.

H. Dewatering

1. Prior to any excavation below the ground water table, place system into operation to lower water table as required and operate it continuously 24 hours a day, 7 days a week until utilities and structures have been satisfactorily constructed, which includes the placement of backfill materials and dewatering is no longer required.
2. Place an adequate weight of backfill material to prevent buoyancy prior to discontinuing operation of the system.
3. Contractor shall design, provide, and operate dewatering system to include sufficient trenches, sumps, pumps, hose, piping, well points, deep wells, and similar facilities, necessary to depress and maintain groundwater level below the base of each excavation during all stages of construction operations.
4. Design and operate dewatering system to avoid settlement and damage to existing structures and underground facilities.
5. Groundwater table shall be lowered in advance of excavation for a sufficient period of time to allow dewatering of fine grain soils.
6. Maintain groundwater level at excavations a minimum of one foot below pipe or two feet below structure excavation until the structure has sufficient strength and weight to withstand horizontal and vertical soil and water pressures from natural groundwater.
    a. Overexcavating trench bottom and placing trench stabilization material is not a substitute for dewatering.
    b. Trash pump or any pump that transfers solids is not acceptable
7. Operate dewatering system continuously, without interruption. Provide standby pumping facilities and personnel to maintain the continued effectiveness of the system. Do not discontinue dewatering operations without first obtaining Engineer's acceptance for such discontinuation.
8. Locate elements of temporary dewatering system to allow continuous dewatering operation without interfering with the Work to the extent practicable.

3.2 WATER DISPOSAL

A. Dispose of water removed from the excavations in such manner that:

1. Shall not be pumped into sanitary sewers,
2. Shall not endanger portions of work under construction or completed.
3. Shall cause no inconvenience to Government or to others working near site.
4. Shall comply with the stipulations of required permits for disposal of water.

B. Shall Control Runoff

1. The CONTRACTOR shall be responsible for control of runoff in all work areas including but not limited to: excavations, access roads, parking areas, laydown, and staging areas. The CONTRACTOR shall provide, operate, and maintain all ditches, basins, sumps, culverts, site grading, and pumping facilities to divert, collect, and remove all water from the work areas. All water shall be removed from the immediate work areas and shall be disposed of in accordance with applicable permits.

C. Excavation Dewatering

1. The CONTRACTOR shall be responsible for providing all facilities required to divert, collect, control, and remove water from all construction work areas and excavations.
2. Drainage features shall have sufficient capacity to avoid flooding of work areas.
3. Drainage features shall be so arranged and altered as required to avoid degradation of the final excavated surface(s).
4. The CONTRACTOR shall utilize all necessary erosion and sediment control measures as described herein to avoid construction related degradation of the natural water quality.
5. Dewatering equipment shall be provided to remove and dispose of all surface and ground water entering excavations, trenches, or other parts of the work during construction. Each excavation shall be kept dry during subgrade preparation and continually thereafter until the structure to be built, or the pipe to be installed therein, is completed to the extent that no damage from hydrostatic pressure, flotation, or other cause will result.

D. Water resulting from the dewatering operation shall be disposed of in a manner approved by the Engineer and South Dakota Department of Agriculture and Natural Resources (SD DANR). It shall not be pumped onto private property without the property owner's approval. Any damage to property, either public or private, shall be rectified to the satisfaction of the property owner and Engineer. All applicable permits must be obtained by the Contractor before the dewatering operation begins.

3.3 STANDBY EQUIPMENT

A. Provide complete standby equipment, installed and available for immediate operation, as may be required to adequately maintain de-watering on a continuous basis and in the event that all or any part of the system may become inadequate or fail.

3.4 CORRECTIVE ACTION

A. If dewatering requirements are not satisfied due to inadequacy or failure of the dewatering system (loosening of the foundation strata, or instability of slopes, or damage to foundations or structures), perform work necessary for reinstatement of foundation soil and damaged structure or damages to work in place resulting from such inadequacy or failure by CONTRACTOR, at no additional cost to OWNER.

3.5 DAMAGES

A. Immediately repair damages to adjacent facilities caused by dewatering operations.

3.6 REMOVAL

A. Insure compliance with all conditions of regulating permits and provide such information to the Resident Engineer. Obtain written approval from Resident Engineer before discontinuing operation of dewatering system.

PART 4.0 - MEASUREMENT AND PAYMENT

4.1 DEWATERING

A. No measurement or individual bid Item payment will be made for dewatering. Dewatering shall be considered incidental to the installation of the water main, water services and appurtenances.

OR

A. Dewatering, for water main and water services, shall be measured lump sum where trench dewatering is deemed necessary as an individual Bid Item on the Bid Form.

B. Payment will be at the contract lump sum price for dewatering methods furnished and installed. Payment shall be full compensation for discharge permits, pumps, dewatering wells, electrical source fees, power costs, materials, labor, equipment, and incidentals necessary to complete the work.

OR

A. Dewatering, for water main and water services, shall be measured to the nearest lineal foot where trench dewatering is deemed necessary as an individual Bid Item on the Bid Form. Dewatering on a lineal foot basis shall be payable when dewatering wells are deemed necessary and utilized, not for utilizing smaller pumps in the trench.

B. Payment will be at the contract unit price per foot for dewatering methods furnished and installed. Payment shall be full compensation for discharge permits, pumps, dewatering wells, electrical source fees, power costs, materials, labor, equipment, and incidentals necessary to complete the work.

4.2 DEWATERING DISCHARGE PIPE

A. Dewatering Discharge Pipe, for sanitary sewer main and sanitary sewer services, shall be measured lump sum (LS) for the installation of the header pipe. The header pipe is defined as the pipe from the project limits to the point of discharge.

B. Payment will be at the contract lump sum price for “DEWATERING DISCHARGE PIPE” and be considered payment for the dewatering methods furnished and installed. Payment shall be full compensation for discharge permits, pipes, road crossings, pumps, dewatering wells, diesel generator power sources, fuel costs, materials, labor, equipment, and incidentals necessary to complete the work.

4.3 DEWATERING HEADER PIPE

A. Dewatering Header Pipe, for sanitary sewer main and sanitary sewer services, shall be measured to the nearest lineal foot (FT) where trench dewatering is deemed necessary as an individual Bid Item on the Bid Form. Dewatering on a lineal foot basis shall be payable when dewatering wells are deemed necessary and utilized, not for utilizing smaller pumps in the trench.

B. Payment will be at the contract unit price as established in the bid for “DEWATERING HEADER PIPE” per foot for dewatering methods furnished and installed. Payment shall

be full compensation for discharge permits, pumps, dewatering wells, power source fees, power costs, materials, labor, equipment, and incidentals necessary to complete the work.

C. Water or sanitary sewer main, water services or other associated appurtenance will not be paid for at their unit price if groundwater is not lowered and maintained to an elevation at least 1 foot below bottom of pipe trench. Trench shall be dry and allow material to be excavated in a reasonably dry condition

END OF SECTION 31 2319