MICHIGAN

DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION

FOR

**CONTAMINATED GROUNDWATER DEWATERING AND TREATMENT**

TRV:LCP 1 of 5 APPR:DMG:ALS:10-05-22

**a. Description.** This work consists of lowering the groundwater table to construct underground utilities and other excavations. This work may require the use of pumps for trench dewatering or well points, deep wells, or other measures to lower the groundwater.

Areas of groundwater contamination have been identified on the plans. If the groundwater removed during the dewatering process is contaminated, it cannot be discharged directly to the ground surface or a surface water body. Disposed of the water in one of three ways: 1.) to a sanitary sewer system, if permission is granted by the system owner, 2.) to a surface water body (by storm sewer) under a NPDES permit, or 3.) collected and hauled to a treatment or disposal facility approved by the Engineer. This work also includes the operation, monitoring, sampling, and analysis of any treatment system used for discharge to a sanitary sewer or surface water body (by storm sewer) or hauling to a treatment or disposal facility as needed.

The contaminated water must be handled in accordance with the MIOSHA Standard for Hazardous Waste Operations and Emergency Response (HAZWOPER). Applicable workers must work under the direction of an on-site supervisor and a site-specific safety and health plan and be trained and protected pursuant to the HAZWOPER standard.

Furnish to the Department, at the preconstruction meeting, documentation verifying the qualifications of Contractor personnel who would be performing the sampling and handling work. The Contractor must provide a Safety and Health Plan as required by the MIOSHA standard.

Dewatering and disposal of groundwater that is not contaminated is included in other items of work.

If the groundwater is lower than an elevation of 582 feet mean sea level (MSL) (approximately 8 feet below ground surface), the amount of contaminated groundwater which will require removal from the excavations during construction will be limited. The depth and elevation of the groundwater will be determined by the Engineer at a time approximately 3 months prior to construction. If groundwater elevation is lower than 582 feet MSL, dewater and dispose of impacted groundwater by hauling to an off-site treatment or disposal facility.

If groundwater elevation is higher than 582 feet MSL, dewater, treat in a mobile treatment system, and dispose of the contaminated groundwater. Discharge of the treated water will be to the sanitary sewer system, or MDOT storm water system through a NPDES permit. The depth and elevation of the groundwater will be determined by the Engineer at a time approximately 3 months prior to construction.

**b. Materials.** None specified.

**c. Well Points and Deep Wells.** Should groundwater control be performed by deep well and/or well point pumping systems, ensure it is done without damage to property or structures and without interference with the rights of the public, owners of private property, pedestrians, vehicular traffic, or the work of other Contractors. Any pumping methods used for dewatering and control of groundwater and seepage must have properly designed filters to ensure that adjacent soil is not pumped with the water, thus creating voids in the ground and around the face of the excavation or under existing structures. Ensure such filter design is reviewed and approved by the Engineer before placement.

Deep wells and/or well points in the area of contamination must discharge into header or collection pipes. All wells and piping required for this system are considered included with the unit cost for Contaminated Groundwater Dewatering and Treatment, Type 2.

Perform the dewatering operations in a proper and predetermined sequence with the trenching operations such that the circumference and face of the excavation are stable. The dewatering well diameter, pumping rate, and well spacing must provide adequate drawdown of the water level. Properly locate wells to intercept groundwater that otherwise would enter the excavation and interfere with the work. Install observation wells at key locations for observation of groundwater levels to provide a forewarning of deficiencies, if any, which might be developing with the dewatering system. The observation wells anticipated are, but not limited to, one per each two-hundred feet of groundwater dewatering and treatment system. Submit a plan for locations and monitoring frequency of the observation wells to the Engineer a minimum of 7 days in advance of placement of the dewatering system.

**d. Mobile Treatment System.** Provide a treatment system that treats water in accordance with the NPDES permit. A proposed schematic of the treatment system is included in this special provision.

Pump contaminated groundwater removed from the excavation into temporary holding tanks and passed through a treatment system which includes a particle filter, granular activated carbon for removal of petroleum and per- and polyfluoroalkyl substance (PFAS) compounds, and ion exchange resin or copper-treated activated carbon to remove the cyanide. Size these filters based on concentrations of contaminants found in the groundwater, the flow required to adequately dewater the trench or excavation and an effluent concentration that meets permit requirements.

Filters or settling devices are required before treatment to ensure that both the treatment and sanitary sewer systems and surface waters are not adversely affected by construction debris or increased sediment load. The disposal of this sediment will be paid for in accordance with the Special Provision for Non-hazardous Contaminated Material Handling and Disposal (LM).

The system must consist of two banks of carbon canisters in series. Place sampling ports at 3 locations within the system: the influent line, the lines between the carbon canisters, and the effluent line. Collect samples from all three sampling port locations at intervals close enough to ensure breakthrough of contamination on the second bank of canisters does not occur.

If sampling shows breakthrough has occurred on the first bank of carbon canisters, move the carbon canisters in the second bank to the first bank and fresh carbon must replace the spent carbon. The canisters with the fresh carbon must then be placed in the second bank. It is the responsibility of the Contractor to legally dispose of and/or regenerate the spent carbon.

MDOT may sample all 3 ports intermittently to ensure the system is being operated properly. Breakthrough of the contaminants from the carbon treatment system is not allowed. If it is found at any time that breakthrough of the second bank has occurred, it will be the sole responsibility of the Contractor to pay all additional costs, fees, and/or environmental fines that result.

**e. Sanitary Sewer or Surface Discharge.** Ensure monitoring, sampling, and analysis of the discharged water to the sanitary sewer or surface water (storm sewer) is done in accordance with the requirements of the NPDES permit under the direct supervision of a certified Industrial/Commercial Wastewater operator.

Monitor the volume of pretreated water discharged to the sanitary sewer system or storm sewer discharge by using a totalizing turbine type flow meter. Place the flow meter on the carbon system effluent line, ensure it is an in-line meter designed for high flow applications and has a flow totalizing register that is adequately sealed to eliminate fogging and condensation. Ensure the type of meter used is reviewed and approved by the Engineer before placement.

An NPDES permit is required to discharge the pretreated water as surface water. Ensure all requirements of the NPDES permit are met. Written permission from the wastewater treatment plant authority is necessary if the effluent is to be discharged to the sanitary sewer system. Provide a copy of the written authorization to the Engineer prior to discharging any water to the system.

Monitor the amount of flow being discharged to the sanitary sewer or storm sewer and documented daily by reading the register on the flow meter. Provide this information to the Engineer daily.

**f. Hazardous/Nonhazardous Material Handling.** Ensure all hazardous and nonhazardous waste is loaded and transported using properly trained personnel and placarded vehicles and have a hazardous or liquid industrial waste manifest, as required. All manifests are to be signed by the Engineer or their representative. The terms “hazardous” and “nonhazardous,” as used in this document, are defined in 1994 PA 451, Parts 111 and 121, the Natural Resources and Environmental Protection Act, as amended.

**g. Construction.** Determine the methods and materials required to accomplish this work, subject to approval of the Engineer before initiation or installation of any Contaminated Groundwater Dewatering and Treatment System.

Ensure the Contaminated Groundwater Dewatering and Treatment System is independent of other dewatering operations by a separate installation. Ensure the system is in use for as short a time as necessary. Take all appropriate precautions to prevent exacerbation of contamination.

The Engineer may order corrections in the system any time due to deficiencies in the system used to control the groundwater at no additional cost to the contract.

**h. Measurement and Payment.** The completed work, as described, will be measured and paid for at the contract unit price using the following pay items:

**Pay Item Pay Unit**

Contaminated Groundwater Dewatering and Treatment, Type 1 Gallon

Treatment System for Contaminated Groundwater, Site Lump Sum

Contaminated Groundwater Dewatering and Treatment, Type 2 Gallon

1. **Contaminated Groundwater Dewatering and Treatment, Type 1** includes the removal of groundwater from the trenched excavation(s), storage in temporary on-site holding tanks (frac tank), removal and hauling of contaminated groundwater from the site to an off-site treatment or disposal facility. Any cost for treatment of the water at the wastewater treatment or disposal facility is included with this pay item. There is no compensation for idled personnel or equipment due to any system corrections ordered by the Engineer to remedy deficiencies.

2. **Treatment System for Contaminated Groundwater, Site** includes the procurement and set up of the mobile treatment system to remove contaminants in accordance with the requirements of the NPDES permit and demobilization and disposal/regeneration of spent treatment media. **Treatment System for Contaminated Groundwater, Site** includes all materials, supplies, labor, equipment, power, and fuel necessary for the installation and removal of the Contaminated Groundwater Dewatering and Treatment System.

3. **Contaminated Groundwater Dewatering and Treatment, Type 2** includes the removal of groundwater from the trenched excavation(s), storage in temporary on-site holding tanks (frac tank), and the operation of the treatment system in accordance with the NPDES permit. **Contaminated Groundwater Dewatering and Treatment, Type 2** includes operation of the system, analysis of water samples, reporting, and discharge monitoring by a certified wastewater operator. Groundwater will be removed from the excavations as needed and stored in temporary holding tanks for treatment. The estimated total volume of extracted groundwater will not be generated at one time, but rather in batches as construction progresses. The water treatment system will not be operated continuously, but only when sufficient volume is available in a “batch” for treatment. **Contaminated Groundwater Dewatering and Treatment, Type 2** includes all materials, supplies, labor, equipment, power, and fuel necessary for the operation and maintenance of Contaminated Groundwater Dewatering and Treatment System and the disposal of all surplus materials. All costs associated with complying with the NPDES permit are included in this pay item. There is no compensation for idled personnel or equipment due to any system corrections ordered by the Engineer to remedy deficiencies.

Disposal of contaminated soil, excavated or displaced during the installation of the Contaminated Groundwater Dewatering and Treatment System, will be included in the pay item for **Non-hazardous Contaminated Material Handling and Disposal (LM)**.

This special provision is to be used when there is groundwater contaminated with petroleum, PFAS, or cyanide that needs to be dewatered. Petroleum contamination includes gasoline, diesel fuel, heating oil, kerosene, etc. and aromatic hydrocarbons such as benzene, toluene, ethylbenzene, and xylene. PFAS compounds include the list of 31 compounds recommended by EGLE for groundwater and surface water analysis. Cyanide includes total and free cyanide in the groundwater.

**SCHEMATIC OF CONTAMINATED GROUNDWATER DEWATERING AND TREATMENT SYSTEM, TYPE 2**

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