MICHIGAN

DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION

FOR

**ALTERATIONS TO SEPTIC SYSTEM**

UTL:CJD 1 of 4 APPR:DMG:RPB:06-16-23

**a. Description.** This work consists of alterations to the existing septic system including furnishing and installing a duplex sewage grinder pump system into the existing dosing tank as shown on the plans, PVC connection pipes, sewage pumps, check valves, discharge assembly, liquid level sensors, electrical panels, casings, seals, circuit breakers and switches, high water alarm and lights, low water alarm and lights, pump cycle timers, electrical relays, cable, conduit, concrete pump support pad, all other required materials, electrical devices, wiring, and retrofitting the existing valve chamber as shown on the plans including valves, pipe and fittings. The work also includes removal and salvage of existing effluent pumps and control panel, disposal of effluent, cleaning the tank, leak testing and repair, excavation and all other work as shown on the plans and necessary to complete the item.

**b. Materials.** Ensure all internal piping for the dosing tank is Schedule 40 PVC with watertight joints in accordance with *ASTM D2665*.

Sewage Pumps. Furnish two Nationally Recognized Testing Laboratory (NRTL) grinder type sewage pumps listed for wastewater application. Ensure the pump motor is capable of pumping approximately 50 gallons per minute (gpm) at 110 feet of head, and capable of passing a 3/4 inch solid.

Set the pumps to operate alternately. If one pump fails, ensure the remaining pump is set up to pump exclusively until the other pump is repaired. Furnish pumps equipped with a series of liquid level sensors for on/off, emergency, and alarm operations.

Furnish each pump with guides and a two-pipe guide rail system. Position the pumps to allow removal without entering the tank. Ensure lifting devices are stainless steel cable. Place the pumps on concrete pump pads in the dosing tank as shown on the plans.

Sewage Pump Controls. Furnish a single phase, 115/230 volt (V) circuit breaker for the pumps with a control "power on" indicating light. Provide electrical phase converter as required.

Furnish a hands-off automatic selector switch and run light for the pumps.

Furnish a liquid level sensor consisting of a mercury switch mounted in a smooth, chemical-resistant, waterproof and shock-proof casing, suspended on its own cable. Ensure the liquid- level sensor circuit is intrinsically safe in accordance with the *NEC, Class I, Division I, Group C and D* and is compatible with the pumps supplied.

Install a redundant stop level control sensor to stop the pumps in the event of stop level sensor malfunction. Ensure the control sensor also energizes a red indicating light. Equip the pump to start again on rising level while the red light stays energized until the redundant reset button is pressed manually.

Supply a high-water alarm system controlled by a normally closed liquid level sensor. Ensure the alarm circuit is fed from a separate branch circuit and includes a "power on" light, red warning light, and alarm test button. Incorporate the alarm and redundant shut off intrinsically safe relays on the control circuit. Install the warning light to be manually turned off after the pumps have resumed operation.

The high-water alarm level switch must also act as a redundant control sensor, activating the second pump while simultaneously activating the alarm system.

House the control panel in a *NEMA Type 4* enclosure with hinged door and neoprene gasket. Mount all power and control circuit breakers, indicating lights, push buttons, and selector switches in the enclosure. Ensure power and control circuit breakers are not mounted on the door. Install the control panel as shown on the plans and as approved by the Engineer. The color of the control panel must match all other electrical panels on the site. Mount the red indicating light on the control panel and as approved by the Engineer. Install a lightning arrester at the control box.

Furnish a redundant audio/visual alarm and install in the rest area’s janitor’s room as approved by the Engineer.

Physically isolate all intrinsically safe circuit devices and wiring from equipment and wiring operating at line voltage. Identify all control and power devices on a plate mounted adjacent to the device.

Furnish heavy duty type disconnects and circuit breakers rated at 600 V.

Furnish heavy duty industrial type control relays, push buttons, and selector switches.

Miniature type relays are prohibited. Ensure all indicating lights are "push-to-test" type. Ensure all electrical equipment is NRTL approved.

Install a runtime meter for each pump within the control panel. Ensure the runtime meter records the length of time each pump operates, cumulatively adding up the operation time after each successive use.

Ensure all cables within the recirculating tank are intrinsically safe and continuous with no splices or terminal connections unless such splices or connections are contained in a watertight, *NEMA Type 7* enclosure.

Equip the pumps with a line voltage AC magnetic starter with melting alloy-type thermal overload relay to be mounted in the pump control panel.

Valves. Gate valves for installation in the valve chamber must be resilient wedge valves suitable for use in sanitary sewer applications. Ensure the gate valves and check valves are in accordance with *AWWA C509*.

**c. Construction.** Ensure the Contractor is licensed to conduct work in Livingston County and must secure all necessary permits to perform this work.

Complete all work in accordance with the standard specifications, and all applicable federal, state, and local laws, ordinances, and codes.

Ensure the dosing tank is pumped by a certified sewage hauler licensed by the State of Michigan to remove and properly dispose of all existing sewage.

Remove and salvage pumps, floats, guide rails and control wiring from the existing dosing tank.

Remove the existing control panel, supports and conduit as approved by the Engineer.

Store salvaged pumps and control panel on site as directed by the Engineer. All salvaged material will remain the property of the Department.

Furnish wiring diagrams for the control panel schematic. Ensure wiring diagrams are approved by the Engineer.

Furnish one print copy and one electronic PDF copy of all operating instructions, repair parts lists, equipment manuals, and automatic control diagrams to the Engineer.

At the request of the Engineer, furnish on-site training for the operation and maintenance of the septic and electrical systems.

Submit shop drawings in PDF for all components associated with the alterations to the septic system. Ensure shop drawings are reviewed and approved prior to beginning work on the alterations to the existing septic system.

Complete the slope restoration in accordance with section 816 of the Standard Specifications for Construction and the special provision for Slope Restoration, Freeway as soon as possible following completion of the backfill but no longer than the time limitations in accordance with section 208 of the Standard Specifications for Construction. Slope the finished grade as shown on the plans to divert surface water.

**d. 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**

Alterations to Septic System Lump Sum

Sewage Pumps and Controls, Rem Lump Sum

Sewage Pump Each

Sewage Pump Controls Lump Sum

1. **Alterations to Septic System** includes all work necessary to retrofit the existing dosing tank and valve chamber as shown on the plans including dewatering if necessary, pumping and disposal of tank effluent, internal piping as necessary, concrete pump support pads, and installation of valves and piping in the valve chamber. Disposal of surplus materials, final cleanup, and other related work and materials required for the completion of the work will not be paid for separately but are included in the pay item **Alterations to Septic System**.

2. **Sewage Pumps and Controls, Rem** includes all work necessary to disconnect and remove existing pumps and electrical control panels.

3. **Sewage Pump** includes all work necessary to install the pump in the existing dosing tank complete and ready for operation.

4. **Sewage Pump Controls** includes installation of the control panel, steel support posts, conduit, wiring, phase converter, alarms and lights, sensors, circuit breakers, relays, runtime meter, magnetic starter, electrical connections, manuals and system training and all other related work and materials required for operation of the pump system as described herein.