

SECTION 113 – BYPASS PUMPING

113.1 GENERAL

Work included in this section includes all work associated with bypass pumping operations.

113.1.1 SCOPE

- A. Under this item the Contractor is required to furnish all materials, labor, equipment, power, maintenance, etc. to implement temporary piping and pumping systems for the purpose of diverting the existing sanitary sewage, as well as surface and ground water flow around the work area for the duration of the project.
- B. The design, installation and operation of the temporary pumping systems shall be the Contractor's responsibility. The Contractor shall employ the services of a vendor who can demonstrate to the Engineer that he specializes in the design and operation of temporary bypass pumping systems. The vendor shall provide at least five (5) references of projects of a similar size and complexity as this project performed by his firm within the past three (3) years. The bypass systems shall meet the requirements of all codes and regulatory agencies having jurisdiction.
- C. Contractor will be required to operate and maintain all temporary bypass piping and pumping operations during the project installation. The contractor will be allowed to use the existing gravity sewer system only when it is not necessary to have the bypass systems operational for manhole/pipe installation.

113.1.2 SUBMITTALS

- A. The Contractor shall prepare with the vendor a specific, detailed description of the proposed temporary piping and pumping systems and the vendor's references. This submittal information shall include temporary bypass pumping operation details for the sewer throughout the project area including branch sewer systems, and service laterals.
- B. The Contractor shall submit to the Engineer detailed plans and descriptions outlining all provisions and precautions to be taken by the Contractor regarding the handling of existing storm water and wastewater flow. This plan must be specific and complete, including such items as schedules, locations, elevations, capacities of equipments, materials and all other incidental items necessary and/or required to insure proper protection of the facilities, including protection of the access and bypass pumping locations from damage due to the discharge flows, and compliance with the requirements and permit conditions specified in these Contract Documents. No construction shall

begin until all provisions and requirements have been reviewed and approved by the Engineer.

- C. The bypass plans shall include but not be limited to details of the following:
1. Staging areas for pumps;
 2. Sewer plugging method and types of plugs;
 3. Surface water damming;
 4. Number, size, material, location and method of installation of suction piping;
 5. Number, size, material, method of installation and location of installation of discharge piping;
 6. Bypass pump sizes, capacity, number of each size to be on site and power requirements;
 7. Calculation of static lift, friction losses, and flow velocity (pump curves showing pump operating range shall be submitted);
 8. Standby power generator size, location;
 9. Downstream discharge plan;
 10. Method of protecting discharge manholes or structures from erosion and damage;
 11. Thrust and restraint block sizes and locations;
 12. Sections showing suction and discharge pipe depth, embedment, select fill and special backfill;
 13. Method of noise control for each pump and/or generator;
 14. Any temporary pipe supports and anchoring required;
 15. Design plans and computation for access to bypass pumping locations indicated on the drawings;
 16. Calculations for selection of bypass pumping pipe size;
 17. Schedule for installation of and maintenance of bypass pumping lines;
 18. Plan indicating selection location of bypass pumping line locations.

113.1.3 EQUIPMENT

- A. All temporary bypass piping shall be HDPE SDR 32.5 or an approved equal.
- B. All pumps used shall be fully automatic self-priming units that do not require the use of foot-valves or vacuum pumps in the priming system. The pumps may be electric or diesel powered. All pumps used must be constructed to allow dry running for long periods of time to accommodate the cyclical nature of effluent flows. All pumps and/or generators must be constructed with acoustical enclosures that shall reduce pump and engine noise to 69 dB or less at a distance of 30 feet.
- C. The Contractor shall provide the necessary stop/start controls for each pump.
- D. The Contractor shall include one stand-by pump of each size to be maintained on site. Back-up pumps shall be on-line, insulated from the primary system by a valve.
- E. Discharge Piping – In order to prevent the accidental spillage of flows, all discharge systems shall be temporarily constructed of rigid pipe with positive, restrained joints. Under no circumstances will aluminum “irrigation” type piping or glued PVC pipe be allowed. Discharge hose will only be allowed in short sections and by specific permission from the Engineer.

113.1.4 SYSTEM DESCRIPTION

- A. Design Requirements:
 - 1. Bypass piping systems for the sanitary sewer and surface or ground water throughout the project area shall have sufficient capacity to convey the overall capacity of the existing sewer lines. The Contractor shall provide all pipeline plugs, pumps of adequate size to handle peak flow, and temporary discharge piping to ensure that the total flow of the sewer main can be safely diverted around the section to be lined.
 - 2. The Contractor shall have adequate standby equipment available and ready for immediate operation and use in the event of an emergency or breakdown. One standby pump for each size pump utilized shall be installed at the mainline flow bypassing locations, ready for use in the event of primary pump failure.
 - 3. Bypass pumping systems shall be capable of bypassing the flow around the work area and releasing any amount of flow up to peak flow as necessary for satisfactory performances of work.
 - 4. The Contractor shall make all arrangements for bypass pumping during the time when the sewer main is shut down for any reason.
- B. Performance Requirements:

1. It is essential to the operation of the sewerage system that there is no interruption in the flow of sewage throughout the duration of the project. Therefore, the Contractor shall provide, maintain and operate all temporary facilities such as dams, plugs, pumping equipment (both primary and back-up units as required), conduits, all necessary power, and all other labor and equipment necessary to intercept the sewage flow before it reaches the point where it would interfere with his work, carry it past his work area and return it to the existing tunnel and sewer system downstream of his work.
2. The design, installation and operation of the temporary pumping system shall be the Contractor's responsibility. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction.
3. The Contractor shall provide all necessary means to safely convey the sewage past the work area. The Contractor will not be permitted to stop or impede the main flows under any circumstances.
4. The Contractor shall maintain sewer flow around the work area in a manner that will not cause surcharging of sewers, damage to sewers and that will protect public and private property from damage and flooding.
5. The Contractor shall protect water resources such as adjacent wetlands and other natural resources.

113.2 FIELD QUALITY CONTROL AND MAINTENANCE

A. Test:

The Contractor shall perform leakage and pressure tests of the bypass pumping discharge piping using clean water prior to actual operation. The Engineer will be given 24 hours notice prior to testing.

B. Inspection:

Contractor shall inspect bypass piping and pumping systems every two hours to ensure that the system is working correctly. Any visible leaks shall be repaired by the contractor immediately and the owner's representative notified.

C. Maintenance Service:

The Contractor shall insure that the temporary pumping system is properly maintained and a responsible operator shall be on hand at all times when pumps are operating.

D. Extra Materials:

1. Spare parts for pumps and piping shall be kept on site as required.
2. Adequate hoisting equipment for each pump and accessories shall be maintained on the site.

113.2.1 PREPARATION

A. Precautions

1. Contractor is responsible for locating any existing utilities in the area the Contractor selects to locate the bypass pipelines. The Contractor shall locate his bypass pipelines to minimize any disturbance to existing utilities and shall obtain approval of the pipeline locations from the City and the Engineer. All costs associated with relocating utilities and obtaining all approvals shall be paid by the Contractor.
2. During all bypass pumping operation, the Contractor shall protect the main and all adjacent sewer lines from damage inflicted by any equipment. The Contractor shall be responsible for all physical damage to the main and all adjacent sewer lines caused by human or mechanical failure.

113.2.2 INSTALLATION AND REMOVAL

- A. The Contractor shall make connections to the existing sewer and construct temporary bypass pumping structures as may be required to provide adequate suction and/or bypass conduit.
- B. When working inside manholes, the Contractor shall exercise caution and comply with OSHA requirements when working in the presence of sewer gases, combustible oxygen-deficient atmospheres, and confined spaces.
- C. The pipeline must be located such that main line traffic and entrances are not adversely affected. When the bypass pipeline crosses local streets and private driveways, the contractor must place the bypass pipelines in trenches and cover with temporary pavement. Upon completion of the bypass pumping operations, and after the receipt of written permission from the Engineer, the Contractor shall remove all the piping, restore all property to pre-construction condition and restore all pavement. The Contractor is responsible for obtaining any approvals for placement of the temporary pipeline within public ways from the City.

113.3 MEASUREMENT AND PAYMENT

- A. When listed as a separate bid item, bypass pumping will be paid for as a lump sum item. The bid price is to include all pumps, piping and other appurtenances as necessary to divert sewer around the work area for the duration of the project.