

Guide Specification for Temporary Bypass Pumping Systems

1.1 Scope

- A. Under this item, the Contractor is required to furnish all materials, labor, equipment, power, and maintenance, etc. to implement a temporary pumping system for the purpose of diverting the existing flow around the work area for the duration of the project.
- B. The design, installation, and operation of the temporary pumping system 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 years, upon request. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction as supplied by the contractor.

1.2 Requirements for Submitting Bids

- A. The Contractor shall prepare with the vendor a specific, detailed description of the proposed pumping system and submit it and the vendor's references with the bid proposal. Bid proposals without an acceptable detailed plan, if requested, shall be rejected.
- B. The Contractor shall submit to the Customer detailed plans and descriptions outlining all provisions and precautions to be taken by the Contractor regarding handling of existing wastewater flows. This plan must be specific and complete, including such items as schedules, locations, elevations, capacities of equipment, materials, and all other incidental items necessary and/or required to ensure 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 by the Customer.
- C. The plan shall include but not be limited to the details of the following:
 - 1. Staging areas for pumps
 - 2. Sewer plugging method and types of plugs
 - 3. Size and location of manholes or access points for suction and discharge hose or piping
 - 4. Size of pipeline or conveyance system to be bypassed
 - 5. Number, size, material, location and method of installation of suction piping
 - 6. Number, size, material, method of installation and location of installation of discharge piping
 - 7. Bypass pump sizes, capacity, number of each size to be on site and power requirements
 - 8. Calculations of static lift, friction losses, and flow velocity (pump curves showing pump operating range shall be submitted)
 - 9. Standby power generator size, location
 - 10. Downstream discharge plan
 - 11. Method of protecting discharge manholes or structures from erosion and damage

12. Thrust and restraint block sizes and locations
13. Sections showing suction and discharge pipe depth, embedment, select fill and special backfill
14. Method of noise control for each pump and/or generator
15. Any temporary pipe supports and anchoring requirements
16. Design plans and computation for access to bypass pumping locations indicated on the drawings
17. Calculations for selection of bypass pumping pipe size
18. Schedule for installation of and maintenance of bypass pumping lines
19. Plan indicating selection of location of bypass pumping line locations

1.3 Equipment

- A. 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 shall be Power Prime's automatic self-priming pumps as manufactured by Power Prime Pumps or equal. 800-647-7246

- B. The Contractor shall provide the necessary stop/start controls for each pump.
- C. The Contractor shall include one stand-by pump of each size to be maintained on site. Back up pumps shall be online, isolated from the primary system by a valve.
- D. It is recommended that the pump be contained inside a temporary portable berm to contain any fuel or sewage that may spill during the normal course of operation.
- 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 "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.

Allowable piping materials will be _____

1.4 System Description

A. Design Requirements

1. Bypass pumping systems shall have sufficient capacity to pump a peak flow of ____ mgd. 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 main can be safely diverted around the section to be repaired. Bypass pumping systems will be required to be operated 24 hours per day.
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 system shall be capable of bypassing the flow around the work area and be sized to handle any amount of flow up to full available flow as defined by the customer into the work area as necessary for satisfactory performances of work.
4. The Contractor shall make all arrangements for bypass pumping during the time when the main is shut down for any reason. System must overcome any existence force main pressure on discharge.

B. Performance Requirements

1. It is essential to the operation of the existing system being bypassed that no interruptions in the flow occur throughout the duration of the project. To this end, 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 incoming flow before it reaches the point where it would interfere with his work, carry it past the work area and return it to the existing 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 divert the flow around the work area in manner that will not cause damage to, or surcharging of customers system and will protect public and private property from damage and flooding.
5. The Contractor shall protect water resources, wetlands, and other natural resources.

1.5 Field Quality Control and Maintenance

A. Test:

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

B. Inspection:

1. Contractor shall inspect bypass pumping system on a continuous basis to ensure the system is working correctly.

C. Maintenance Service:

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

2. Contractor shall monitor pump fuel levels if required and make arrangements for timely refueling as needed

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.

1.6 Preparation

A. Precautions

1. Contractor is responsible for locating any existing utilities in the area selected for 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 customer. All costs associated with relocating utilities and obtaining all approvals shall be paid by the Contractor.
2. During all bypass pumping operations, the Contractor shall protect the customer's system (Pumping Station, Conveyance System Etc.) as applicable from damage inflicted by any equipment. The Contractor shall be responsible for all physical damage to the Customer's system caused by human or mechanical failure.

1.7 Installation and Removal

- A. The Contractor shall remove manhole sections or make connections to the existing conveyance system and construct temporary bypass pumping structures only at the access location indicated on the Drawings and as may be required to provide adequate suction conduit.
- B. Plugging or blocking of flows shall incorporate a primary or secondary plugging device. When plugging or blocking is no longer needed for performance and acceptance of work, it is to be removed in a manner that permits the sewage flow to slowly return to normal without surge, to prevent surcharging or causing other major disturbances downstream.
- C. When working inside manhole or force main, the Contractor shall exercise caution and comply with OSHA requirements when working in the presence of sewer gases, combustible or oxygen-deficient atmospheres, and confined spaces.
- D. The installation of the bypass pipelines is prohibited in all salt marsh / wetland areas. The pipeline must be located if possible off streets and sidewalks and on shoulders of the roads. 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 receipt of written permission from the Customer, 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 from the Customer.

Portable Pump

Part One – General

1.1 Section Includes

- 1.1.1 Requirements for providing portable sewage pumps.
- 1.1.2 The portable pumps shall be delivered to the owner within _____ weeks of contract commencement as stated in the notice to proceed.

1.2 System Description

- 1.2.1 The portable trash pump specified in this section will be able to pump _____.
- 1.2.2 The pump and accessories shall be supplied by the pump manufacturer.
- 1.2.3 The pump shall be fitted with a fully automatic priming system incorporating an air compressor, air ejector assembly, and an air/water separation tank. No water shall be required in the pump to achieve a prime. The air ejector shall operate on the discharge side of the compressor thus allowing no possibility of water being drawn into the air source. The pump must be capable of running totally dry for extended periods of time.
 - 1.2.3.1 The pumping system shall not use a vacuum pump nor require the use of a “foot” type valve. It shall contain no moving parts or protective float gear. A demonstration of the pump’s ability to repeatedly cycle from pump / snore / repriming / pump shall be required.
- 1.2.4 The diesel engine driven pump unit shall be mounted with tires that can be towed on the road at 50 MPH and shall be wired for over the road usage. Trailer must be DOT compliant.
- 1.2.5 Pump to be fully automatic, needing no form of adjustment on priming system. The pump shall be capable of static suction lifts to 28 feet, vertical, at sea level. It shall also be capable of operation using extended suction lines.
- 1.2.6 Equipment acceptance shall be contingent upon its ability to run in a completely dry condition for long periods of time. A demonstration will be required by the Engineer.
- 1.2.7 Design Requirements
 - 1.2.7.1 Requirements
 - Capacity _____ GPM
 - Total Dynamic Head _____ Feet
 - Operating Speed _____ RPM
 - Minimum Solids Handling Size _____ Inches
 - Impeller Diameter _____ MM
 - Suction Size _____ Inches
 - Discharge Size _____ Inches

Maximum Suction Lift
Minimum Duty Point

_____ Feet
_____ GPM at _____',
TDH (including a 15' suction lift)

1.3 References

- 1.3.1 ANSI B16.1 – standard for cast iron pipe flanges and flanged fittings

Part 2 – Products

2.1 Acceptable Manufacturers

- 2.1.1 The pump shall be model _____, size _____ as manufactured by Power Prime Pumps, Bakersfield, California or equal.

2.2 Equipment

- 2.2.1 Pump casings shall be spheroidal graphite cast iron. It shall be constructed so that the suction flow path is in axial alignment with the impeller eye. There shall be no turns, chambers, or valves between the suction line (or inlet) and the impeller.
- 2.2.2 Impellers: The pump impeller shall be of open non-clog type with pump out vanes on the back shroud. The impeller shall be three-bladed 316 stainless steel construction.
- 2.2.3 Wearplates shall be fully adjustable and replaceable. Wearplate clearances shall have no relationship to the ability of the pump to achieve a prime. Wearplate material to be 316 stainless steel.
- 2.2.4 Bearings and shafts: Each pump shall be fitted with a bearing bracket which contains the shaft and heavy duty ball or tapered roller bearings of adequate size to withstand imposed loads. Minimum ISO L10 bearing life to be _____ hours. Impeller shafts shall be of 431 stainless steel.
- 2.2.5 Seals: Seals shall be mechanical self-adjusting type with silicon carbide faces. The mechanical seal shall be cooled and lubricated by an oil bath reservoir requiring no maintenance or adjustment. Pump shall be capable of running dry, with no damage, for extended periods of time. All metal parts shall be of stainless steel. Elastomers shall be Buna-N or Viton.
- 2.2.6 Pump suction and discharge flanges: Cast iron in accordance with ANSI (B16.1) Class 150 raised face.
- 2.2.7 Pump gaskets: Compressed fiber and/or Teflon.
- 2.2.8 Pump O-Rings: Buna-N or Viton.
- 2.2.9 Pump shall be supplied with an internal type _____ check valve mounted on the discharge flange of the pump to allow unrestricted flow into the impeller. The _____ type check valve shall prevent inline return of flow when the pump is shut off. Non-return valve _____ shall be nitrile rubber, and shall be field replaced.

- 2.2.10 Diesel engine shall be _____ cooled engine. Engine shall drive pump by use of direct connected intermediate drive plate. Starter shall be 12 volt electric. Safety shut down switches for low oil pressure and mechanical shutdown for fan belt failure shall be provided. Battery shall have 180 AMP hour rating. Unit shall include a tachometer and hourmeter. Unit shall be a _____ or equal, rated at _____ HP (continuous) at _____ RPM. A certified continuous duty engine curve shall be supplied to the owner / engineer upon request.
- 2.2.11 Governor shall be mechanical type. Engine speed shall be adjustable to operate the pump between maximum and minimum design operating speeds.
- 2.2.12 Integral trailer fuel tank capacity shall be sufficient to provide at least _____ hours of operating time at full load. The engine shall be capable of operating satisfactorily on a commercial grade of distilled No. 2 engine oil.
- 2.2.13 Exhaust system shall include muffler and silencer of suitable size.
- 2.2.14 The pump and engine shall be trailer mounted with _____ type trailer hitch. Trailer shall be _____ axle and have tires of adequate size with the required load range ratings. Trailer shall be equipped with fenders, front and rear support stands, lifting bar, safety chains, side and rear reflectors, and receptacle for towing vehicle. Trailer design shall be in compliance with applicable DOT regulations.

2.3 Factory Painting

- 2.3.1 Pump, engine, base and trailer shall be shop primed and finish painted at the place of manufacture. Materials and thicknesses for priming shall be in accordance with manufacturer's standards. Colors shall be as specified by the authority engineer.

Part 3 – Execution

3.1 Manufacturer's Services

- 3.1.1 The manufacturer shall furnish the services of a competent factory representative to do the following:
- 3.1.1.1 Inspect the system prior to delivery, supervise the start up and testing of the system, and certify the system has been properly furnished and is ready for operation.
 - 3.1.1.2 Instruct the owner's operating personnel in the proper operation and maintenance of the system for a period of not less than one half day.

3.2 Tools and Spare Parts

- 3.2.1 The manufacturer shall furnish the following with the portable sewage pump system:
- 3.2.1.1 Spare parts required for normal maintenance for one year of operation
 - 3.2.1.2 A recommended list of spare parts for service beyond one year as provided above.

3.3 Warranty

3.3.1 The manufacturer shall furnish the following to the owner:

3.3.1.1 A copy of the engine manufacturer's _____ year parts and labor warranty upon request

3.3.1.2 A _____ year parts warranty issued by the manufacturer on the portable pump system. This warranty must cover all pump parts including the mechanical seal.