

SECTION 02740 TEMPORARY SEWER FLOW CONTROL

PART 1 – GENERAL

1.01 SCOPE

- A. The purpose of this section is to define the various methods of wastewater flow control including plugging/blocking and bypass/diversion pumping. Wastewater flow control shall maintain an efficient and uninterrupted level of service to the sewer system while performing investigative or construction operations.

1.02 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. Institute of Inspection, Cleaning, and Restoration Certification (IICRC): S500, Standard and Reference Guide for Professional Water Damage Restoration.
 - 2. “Standard Specifications for Wastewater System Construction”, December 2008 Edition, or most recent edition, Public Utilities Department, Unified Government of Athens-Clarke County, Georgia. ([Construction and Engineering | Athens-Clarke County, GA - Official Website \(accgov.com\)](https://www.accgov.com/Construction-and-Engineering-Athens-Clarke-County-GA-Official-Website))

1.03 DEFINITIONS

- A. Bypass Pumping: Temporary flow control accomplished by diverting flow away from the Work area using one or more pumps.
- B. Temporary Flow Control: Reducing, limiting, or excluding flow in or to a sanitary sewer, storm sewer, pump station, force main, or other facility as required for performing the Work under the Contract. Draining, handling, and disposal of sanitary sewage and stormwater from pipelines and other facilities as required for performing the Work under the Contract is also part of temporary flow control.

1.04 SYSTEM DESCRIPTION

- A. It is essential to operation of existing sewerage system that there be no interruption in flow of sewage throughout duration of Project.
- B. Provide facilities and controls required to intercept, convey, and discharge flow to be controlled; include standby and emergency equipment.
- C. Conform to regulatory requirements.
- D. Protect water resources, wetlands, and other natural resources.

- E. Temporary flow control shall be done in a manner that will not damage private or public property or create a nuisance or public menace. Flow shall be conveyed in enclosed pipes that are adequately protected from traffic or other hazards.
- F. Discharge:
 - 1. To sanitary sewer system.
 - 2. Dumping or free flow on private or public property, gutters, streets, or sidewalks is prohibited.
 - 3. Discharge or free flow to storm sewers, to surface waters or wetlands, or into the ground, is prohibited.
 - 4. Any discharge of sanitary sewer to the environment in any manner must be reported to the Owner.

1.05 QUALITY ASSURANCE

- A. Qualification documentation shall be submitted as required of the Contract Documents.
 - 1. The Contractor must meet all of the following criteria to be considered qualified to propose and/or bid on the subject Contract:
 - a. The Contractor, or their subcontractor, must document they, not their parent company, related company, or the experience of an individuals, have been in this line of business a minimum of 5 years.
 - 2. The Contractor, or their subcontractor, must document they not their parent company, related company, or the experience of an individual/s, have performed gravity sewer bypass/diversion pumping for the sizes of sewer mains and flows expected under this Contract in the past 3 years. This documentation shall include locations, references (including names and phone numbers), pipe sizes, pump sizes and pumping rates. This documentation must include a minimum of ten different projects and must cover the range of sizes of sewer mains and flows expected under this Contract.
- B. Experience:
 - 1. Experience documentation will be submitted as required of the Contract Documents. The Contractor shall provide the Engineer with written documentation acknowledging the supervisor and field crew leaders responsible for this Work have received the proper training, are certified, and have the requisite experience. This documentation will include dates of hands-on experience, employer, description of duties/experience, contact name and phone number. Documentation on any person shall not be longer than one page.

2. Supervisor of the field crews must be properly trained in this function and have a minimum of 3 years of experience in performing gravity sewer bypass/diversion pumping, to include safe working practices for the types of equipment and operation of the equipment used for this Contract.
3. Field crew leaders must be properly trained in the function and have a minimum of 2 years of experience in performing bypass/diversion pumping, to include safe working practices for the types of equipment and operation of the equipment used for this Contract.
4. No crewmembers shall enter confined spaces without the necessary certified training and documentation.

1.06 SITE CONDITIONS

- A. Obtain approval from Owner for placement of temporary flow control facilities within public right-of-ways.
- B. Existing facilities in vicinity of bypass pumping are shown on Drawings.
- C. Project is associated with a Georgia Department of Transportation (GDOT) bridge construction project.
- D. Bypass pumping is planned to be intermittent and sequenced to GDOT construction activities. Therefore, the bypass pumping system shall be prepared for multiple startups and shut-downs of pumps
- E. Bypass pumping equipment may be inactive for extended periods during the GDOT construction project.

1.07 SUBMITTALS

- A. Temporary Flow Control Plan
 1. Seven calendar days prior to any bypass/diversion pumping activity the Contractor shall submit electronic copies of the complete and detailed plan to the Engineer for review. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction. The Contractor may submit a general bypass/diversion pumping plan to be used when bypassing sewer mains. Once the Contractor has received written approval from the Engineer, the Contractor may use the plan without resubmittal.
 2. Peak Amount of Flow to be controlled:
 - a. Peak Dry Weather Flows: 500 gpm.
Dry Weather Pumps shall handle a minimum of 150% of Peak Dry Weather Flows.

- b. Peak Wet Weather Flows: 3,500 gpm.
Wet Weather Pumps shall handle a minimum of 125% of Peak Wet Weather Flows.
- 3. The bypass/diversion pumping plan submittal shall have sufficient detail to show the following:
 - a. Drawings indicating the location of:
 - 1) Temporary sewer plugs and bypass discharge lines.
 - 2) Where flow will be intercepted and discharged.
 - 3) Layouts and configurations of temporary flow control facilities and also showing locations relative to right-of-way easement, and property boundaries.
 - 4) Lowest overflow point upstream of the bypass/diversion.
 - 5) Downstream discharge plan including pipe routing plan and profile views.
 - 6) Sections showing suction and discharge pipe depth, embedment, joint restraints, thrust blocking and backfilling.
 - 7) Standby power location, if utilized.
 - 8) Location and position, in detail, where pipes cross roadways and driveways.
 - 9) Traffic Control Plan specifically applicable to temporary flow control adhering to requirements of applicable agencies and as may be specified in Contract Documents.
 - 10) Easement requirements for access, piping layout, and maintenance.
 - b. Staging area for pumps.
 - c. Sewer plugging method and types of plugs.
 - d. Number, size, material, location and method of installation of suction piping.
 - e. Number, size, material, location and method of installation of discharge piping.
 - f. Bypass pump sizes, capacity, number of each size to be onsite and the power requirements.

- g. System curve design calculations detailing the static lift, friction losses, velocity losses and flow velocities.
- h. Pump curves with the system curves plotted showing the pump operation range and confirming the pump size, horsepower and impeller required.
- i. Standby power generator size, if utilized.
- j. Acoustical information for equipment to be used showing compliance with noise control requirements.
- k. Noise control and abatement measures.
- l. Method of protecting discharge manholes or structures from erosion and damage.

B. Emergency Response Plan

- 1. The Contractor will provide an emergency response plan for each bypass/diversion pumping installation. The plan shall be followed in the event of failure of the bypass/diversion pumping system.
- 2. The Contractor shall provide names and phone numbers for 24-hour emergency contact. The Contractor shall have field personnel onsite at all times (24-hours a day) while performing bypass operations. The bypass operation shall never be left unattended or unsupervised.

C. Emergency Cleanup Plan

- 1. Prepare and submit not less than 10 days before scheduled date of temporary flow control activities.
- 2. As a minimum plan shall include the following:
 - a. Procedures for removal of sewage.
 - b. Procedures for determining nature and extent of damage and required restoration where restoration is possible.
 - c. Coordinate with Engineer.

- D. The Contractor must identify all pump stations and the lowest overflow point upstream of the plugging/block and/or bypass/diversion pumping. The Contractor may be required to station personnel at upstream overflow points.

1.08 SAFETY

- A. All Work shall be performed in accordance with OSHA standards and state and federal safety regulations.
- B. No person shall enter a confined space without the documented requisite training, certification, and entry permit.

PART 2 – PRODUCTS

2.01 EQUIPMENT AND MATERIALS

- A. Plugs
 - 1. Provide with taps for connection of pressure gauges and air hoses, and flow-through capability.
 - 2. Pipe Diameters 24 Inches and Smaller: Use mechanical plugs with rubber gaskets or pneumatic plugs with rubber boots.
 - 3. Pipe Diameters Larger than 24 inches:
 - a. Use inflatable bag stoppers made in two or more pieces.
 - b. Manufacturer: Lansas, Cherne Industries.
- B. Pumps
 - 1. Fully automatic, self-priming units that do not require use of foot valves or vacuum pumps in priming system.
 - 2. Solids handling design with ability to pump minimum 3-inch diameter sphere.
 - 3. Able to run dry for long periods of time to accommodate cyclical nature of flows.
 - 4. Engine: Equipped to minimize noise. Noise levels shall not exceed 86 dBA at a distance of 50 feet from source.
 - 5. Equipped with runtime clocks at fractional hour units, which shall be documented at every start and stop of the pumps.
- C. Electric Power Generators
 - 1. Be able to simultaneously start and run electric powered pumps required for flow to be controlled.

2. Equipped to minimize noise. Noise levels shall not exceed 86 dBA at a distance of 50 feet from source.
3. Include automatic transfer switch if flow control system is to operate unattended.

D. Standby Equipment

1. Peak dry weather, small pump. One to be available onsite.
2. Peak wet weather, large pump. One to be made available for delivery, installation, and operation within 8 hours for any reason as required by Owner.
3. Electric Power Generators: Minimum of one if temporary flow control system contains electric powered pump. Must be able to simultaneously start and run pumps required for flow to be controlled.

2.02 PIPE FOR FLOW DIVERSION

- A. Ductile Iron Pipe: Ductile iron pipe, as specified in the Athens-Clarke County Public Utilities Department Standard Specifications for Water Mains, is acceptable for use for flow diversion during construction.
- B. Steel pipe is permitted for flow diversion.
- C. High Density Polyethylene Pipe (HDPE) is permitted for flow diversion. Polyethylene material shall comply with the requirements for Type III polyethylene, C-5 and P-34 as tabulated in ASTM D1248 and has the Plastic Pipe Institute recommended designation PE3406. The material shall also have an average specific base resin density of between 0.94 g/cc and 0.955 g/cc (ASTM D1505). Pipe made from these resins must have a long-term strength (50 years) rating of 1,250 psi or more per hydrostatic design basis categories of ASTM D2837. The polyethylene resin shall contain antioxidants and be stabilized against ultraviolet degradation to provide protection during processing and subsequent weather exposure. The polyethylene resin shall have an environmental stress crack resistance condition C, as shown in ASTM D1693, to be greater than 500 hours, 20 percent failure. All pipes shall be made from virgin quality material. No rework compound, except when obtained from the manufacturer's own production of the same formulation shall be used. The polyethylene resin shall have an average melt flow index, condition E as shown in ASTM D1238, not in excess of 0.25 g/10 mm. Pipe shall be homogeneous throughout, and free of visible cracks, holes, foreign material, blisters, or other deleterious faults. Diameters and wall thickness shall be measured in accordance with ASTM D2122 and ASTM D3350. Pipe joining will be done by thermal butt fusion method in accordance with ASTM D2657.
- D. Polyvinylchloride (PVC) pipe is permitted for flow diversion. PVC pipe shall be rigid and securely coupled with a minimum number of connections. Glued PVC is not allowed.
- E. Lay flat hose is permitted for use with 2 inches and 3-inch gas powered portable pumps.

- F. Irrigation type piping is not allowed.
- G. No more than two pump discharge hoses will be allowed at any given time. The length of these hoses shall be limited at the direction of the Engineer.
- H. The Contractor, at a minimum, shall design all piping, joints and accessories to withstand twice the maximum operating pressure or 100 psi whichever is greater.
- I. If required the Contractor must provide air relief (air relief valves, etc.) on bypass/diversion pumping discharge piping to insure proper operation.
- J. All pumps used shall be fully automatic self-priming units and do not require the use of foot-valves or vacuum pumps in the priming system. The pumps may be electric, gas, or diesel powered, provided they meet all specified sound level requirements. If electric pumps are used, the combined generator/pump system shall meet the specified sound level requirements. All pumps used shall be constructed to allow dry running for long periods of time to accommodate the cyclical nature of effluent flows.
- K. Maintain sufficient equipment and materials onsite to ensure continuous and successful operation of bypass and dewatering systems.
 - 1. Keep standby pumps fueled and operational at all times.
 - 2. Maintain sufficient number of valves, tees, elbows, connections, tools, sewer plugs, piping, and other parts or system hardware onsite to ensure immediate repair or modification of any part of system as necessary.
- L. Unless specified otherwise in these Specifications or approved by the Engineer, all pumps (and generators if used) shall be fully sound attenuated and shall produce a noise level of 65 dB or less at a distance of 23 feet.
- M. The Contractor shall provide the necessary stop/start controls for each pump.

PART 3 – EXECUTION

3.01 GENERAL

- A. General
 - 1. Provide adequate capacity and size to handle existing flows plus additional flows that may occur during periods of rainstorm.
 - 2. Provide bypass flow capacity of at least 125 percent of wet-weather peak flow estimate.

3. Provide materials and equipment that will ensure continuous and successful operation of temporary flow control systems.
 4. Repair or modify systems as necessary.
 5. Unless otherwise shown or specified, materials and equipment may be new or used at Contractor's option.
- B. Prior to commencing each bypass/diversion pumping activity the Contractor must receive written approval from the Engineer.
 - C. Ensure all levels of sewage flow are continuously and effectively handled.
 - D. The Contractor shall use ingenuity and skill to develop a bypass/diversion pumping plan.
 - E. Install temporary flow control facilities only within public right-of-way, Owner's property, temporary construction easement, permanent easement, or easement obtained by Contractor.
 - F. During the entire time bypass pumping or plugging/blocking is engaged, the Contractor shall be required to man, operate, and maintain 24 hours per day, 7 days per week, including holidays, as required, to control flow and prevent spillage and/or leakage.
 - G. The back-up pump, appropriate piping, fuel, lubrication, and spare parts shall be incorporated into the bypass/diversion pumping arrangement at the site, ready for use in case of a breakdown.
 - H. At no additional cost to the Owner and Engineer, the Contractor will carry out a "trial run" or testing of the bypass/diversion arrangement on all sewers greater than 12 inches. This trial run must be conducted before the Engineer will accept the arrangement. The "trial run" shall demonstrate the incorporation of all standby equipment to handle flows when the main pump set is switched off. Failure of the "trial run" shall require the Contractor to revise the bypass/diversion arrangement to meet the requirements and to conduct another "trail run" for the Engineer's approval.
 - I. All materials used for bypass/diversion pumping shall be pre-approved by the Engineer prior to commencing pumping activities.
 - J. The plan must keep the wastewater flowing without discharge or spills into any adjacent creeks or on to the ground. No bypassing to ground surface, receiving waters, storm drains, or bypassing resulting in groundwater contamination or potential health hazards shall be permitted. The Contractor will seek and obtain inspection of each section of newly laid sewer before removing the flow diversion from service and placing the newly installed or rehabilitated section into service.
 - K. All pipe materials utilized in wastewater flow control shall be in good condition, and free of defects, and leaks. The Contractor, at no cost to the Owner and Engineer, shall

replace any defective material. Upon completion of the job, wastewater flow control materials shall be removed from the site.

- L. Before any wastewater flow control equipment is installed, the Contractor shall de-silt the segment of sewer to be bypassed while it is still under flow. Subsequent jetting and final cleaning before inspection or repair shall be undertaken while the segment of sewer is bypassed.
- M. The Contractor shall locate bypass pipelines to minimize any disturbances to existing utilities and shall obtain approval of the pipeline locations from the Engineer.
- N. During all wastewater flow control operations, the Contractor shall protect manholes and all local sewer lines from damage inflicted by any equipment. The Contractor shall be responsible for all physical damage to mainlines, manholes, and all local sewer lines caused by human or mechanical failure.
- O. The Contractor shall complete all wastewater flow control activities with the minimum sound level compatible with accepted industry standards for sound attenuated temporary pumping systems.

3.02 PLUGGING AND BLOCKING

- A. Flow control may consist of blocking flow with mechanical or pneumatic plugs if only a small amount of flow needs to be controlled and adequate storage is available.
- B. The Contractor shall insert a sewer line plug into the line at a manhole upstream from the section being inspected or repaired. The plug shall be so designed so all or any portion of the flow can be released. Plugs should be secured to manhole to prevent movement downstream. Flows shall be shut off or reduced to within the maximum flow limits specified.
- C. Use primary and secondary plugs for each flow control location.
- D. When blocking flow is no longer needed for performance and acceptance of the Work, remove plugs in a manner that permits sewage flow to slowly return to normal without surcharging or causing other major disturbances downstream.
- E. Remove temporary plugs at end of each working day and restore normal flow. If downstream work is not or cannot be completed during workday, provide, operate, and maintain bypass pumping system or other method of flow control to accommodate flows.
- F. No Plumbers plugs will be allowed.

3.03 BYPASS/DIVERSION PUMPING

- A. When bypass/diversion pumping is required, a pump size shall be recommended by the Contractor and approved by the Engineer. The Contractor shall supply the necessary pumps, conduits, and other equipment to divert the flow of wastewater around the sewer section where the Work is to be performed. The bypass system shall have sufficient capacity to handle existing flows plus additional flow potentially occurring during periods of rainstorms as indicated from the flow monitoring program. The Contractor shall be responsible for furnishing the necessary labor and supervision to set up and operate the pumping and bypassing system. A “setup” consists of the necessary pumps, conduits, and other equipment required to divert the flow of wastewater from the start to finish of Work performed.
- B. Wastewater shall be pumped directly into the nearest available downstream manhole, provided the existing sewer has the capacity to transport the flow. The Contractor shall request the Engineer to determine the capacity of the downstream existing system. The Contractor shall request this determination 14 calendar days prior to the planned bypass/diversion pumping.
- C. The Contractor shall be responsible for keeping the pumps running continuously 24 hours a day, if required, until the bypass operation is no longer required.
- D. The Contractor shall have standby pumps at all times.
- E. Bypass pumping systems shall have sufficient capacity to pump peak flows in the pipes being bypassed (flows in the existing interceptor sewers can increase dramatically during periods of wet weather). The Contractor shall provide all pipeline plugs, pumps of adequate size to handle wet weather peak flows, and temporary discharge piping to ensure the total flow of the interceptor sewer is safely diverted around the section to be repaired. Wastewater flow control system will be required to be operated 24 hours per day.
- F. Maintenance personnel capable of starting, stopping, refueling, and maintaining the pumps and equipment during the bypass/diversion pumping operation shall continuously monitor pumps and equipment. If pumping is required on a 24-hour basis, engines shall be equipped in a manner to keep noise to a minimum.

3.04 FLOW CONTROL PRECAUTIONS

- A. Where the wastewater flow is plugged/blocked, the Contractor shall be responsible for taking sufficient precautions to protect public health. The sewer lines shall also be protected from damage. The following shall apply:
 - 1. No wastewater shall be allowed to back up into any homes or buildings.
 - 2. No wastewater shall overflow any manholes, cleanouts, or any other outlet.

3. Customers upstream of the flow control area shall be able to use all their water and sewer utilities without interruption.
 4. If any of the above occur or are expected to occur, the Contractor shall provide bypass/diversion pumping to alleviate one or all of the conditions. Additionally, the Contractor shall observe the conditions upstream of the plug and be prepared to immediately start bypass/diversion pumping, if needed.
- B. Any sump pumps, bypass pumps, trash pumps, or any other type of pump, pulling wastewater or any type of material out of the manhole or sewer, shall discharge the material into another manhole, or appropriate vehicle or container approved by the Engineer. Under no circumstances shall this material be discharged, stored, or deposited on the ground, swale, road, or open environment.
 - C. The Contractor shall take appropriate steps to ensure all pumps, piping, and hoses carrying raw wastewater are protected from traffic. Traffic control shall be performed in accordance with the requirements of the governing agency.
 - D. Prior to any wastewater flow control operations the Contractor will identify the pump station/s and lowest overflow point upstream of the planned plugging/blocking or bypass/diversion. During operations the Contractor will monitor the pump stations and lowest points to ensure overflow does not occur.
 - E. In the event, during any form of "Sewer Flow Control," raw wastewater is spilled, discharged, leaked, or otherwise deposited in the open environment, the Contractor shall immediately stop overflow and shall immediately report overflows to the Engineer. The Contractor shall be responsible for any cleanup of solids and stabilization of the area affected. This Work shall be performed at the Contractor's expense with no additional cost to the Owner or Engineer. The Contractor shall also be responsible for notifying the Engineer and complying with any and all regulatory requirements for cleaning up the spill at no additional cost to the Owner. The Contractor shall be responsible for any fines assessed by regulatory agencies including the Georgia Environmental Protection Division (EPD).
 - F. During wastewater flow control operations, the Contractor shall take proper precautions to prevent damage to existing sanitary sewer facilities, flooding, or damage to public or private property.
 - G. The Contractor shall make repairs, replacements or rebuilds, as directed by the Engineer, to any portion of the sewer system damaged during any plugging or bypass/diversion pumping operation. All such repairs, replacements, and rebuilding shall be paid for by the Contractor.
 - H. The Contractor shall make such provisions, as are necessary, for handling all flows in existing sewers, connections, and manholes by pipes, flumes, or by other approved

methods at all times, when his operations would, in anyway, interfere with normal functioning of those facilities.

- I. The Contractor shall be responsible for the removal of any debris and sedimentation in the existing sewers, laterals, and manholes, etc., attributable to his Work under this Contract. The Contractor is responsible for the proper disposal of these items. The debris and liquids are to be disposed of properly in accordance with all applicable laws.

3.05 FIELD QUALITY CONTROL

- A. Hydrostatic Pressure Test for Pump Bypass System:
 1. Prior to operation, test each section of discharge piping with maximum pressure equal to 1.5 times the maximum operating pressure of system.
 2. Notify Engineer and Owner 48 hours prior to testing.

3.06 CLEANUP

- A. Keep premises free from accumulations of waste materials, rubbish, and other debris resulting from the Work.
- B. Disturbed Areas: Upon completion of bypass pumping operation, clean disturbed areas not designated for alterations by Contract Documents, restoring to condition, including pavement restoration, at least equal to that which existed prior to start of the Work.
- C. Before bypass pumping system is broken down and moved to next section or removed at the completion of the Work, discharge sewage remaining in bypass discharge pipeline and pumping equipment to working sewer.

END OF SECTION