

SECTION 02065

TEMPORARY BYPASS PUMPING SYSTEM AND TEMPORARY BYPASS PIPING

GENERAL

1.01 SCOPE OF WORK

- A. Design, furnish, install, operate, maintain, and remove all temporary bypass pumping and piping system(s) necessary for the construction of structures and piping as shown on the drawings.
 - 1. A temporary bypass piping system will be required to convey sewage temporarily from the new 30-inch PVC force main to the downstream 54-inch gravity trunk sewer manhole.
 - 2. A temporary duplex bypass pumping system will be required to temporarily pump sewage flow from the existing manhole east of the existing manhole to be replaced by this work.
- B. During work associated with the removal of the existing 24-inch force main and 30-inch gravity sewer and replacement with the new 30-inch force main system, existing force main discharge manhole, and required piping re-connections, the CONTRACTOR shall have operationally ready an online temporary bypass pumping and piping system. The specified areas in which bypass pumping and piping systems will be allowed is shown on the project plans.
- C. The CONTRACTOR shall be responsible for any and all violation notices, fines and remediation measures as a result of wastewater spillage or discharge associated with bypass pumping and piping activities and/or modifications and removal of existing structures and piping. The CONTRACTOR shall be responsible for all jobsite, motor vehicle traffic, and general public safety and protection during all work.
- D. The CONTRACTOR shall provide all trained and experienced labor and supervision for operating and maintaining the pumping and piping systems during the entire bypass pumping operation.
- E. The actual duration of bypass pumping and piping times depends on the CONTRACTOR's time required to perform the necessary pipe and structure removals, replacements, testing and connections. The actual bypass times may vary depending on the CONTRACTOR'S plan of work. The CONTRACTOR will not be granted additional monies for bypasses which extend beyond the approved plan of work time frame. The ENGINEER makes no estimations of the time required or need to bypass pump and provide temporary bypass piping.
- F. It is the intent for the bypass pumping system to operate and be controlled by a series of wastewater floats to automatically start and stop pumps, depending on water levels in the manhole(s). The system shall include an autodialer to alert and alarm the CONTRACTOR's and JEA's designated staff by cell phone communication of potential failures and prior to any high-water alarms. The CONTRACTOR shall be responsible for ensuring proper operation and maintenance of the bypass pumping system.

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- G. Any required Maintenance of Traffic Plan (MOT) to conduct the bypass pumping and piping work shall be approved by the City of Jacksonville (COJ) and installed and maintained by the CONTRACTOR.
- H. The location and security of the bypass pumps and piping shall be provided by the CONTRACTOR. Secured fencing, as a minimum, shall be provided around the pumping system.
- I. Should the existing manhole frame and cover, or top riser sections of the suction and/or discharge manholes need modification to install said piping, the CONTRACTOR shall include this work in its bid. All repairs after the work is complete shall be performed in accordance with JEA's latest standards.

1.02 RELATED WORK

- A. Related work for the pumping and bypass piping systems shall be as in the contract plans, documents, JEA Water and Wastewater Standards Manual of January 2018, as amended, regulatory permit conditions, and direction by JEA.

1.03 SUBMITTALS

- A. Submit to JEA, detailed plans and descriptions outlining all provisions and precautions to be taken by the CONTRACTOR to establish compliance with this Section. The bypass pumping and piping systems shall be designed by a Florida Professional Engineer and signed and sealed drawings, calculations, and equipment selections shall be submitted for review.
- B. The plans shall include but not limited to details of the following for any bypass pumping operation:
 - 1. Staging areas for pumps.
 - 2. Sewer plugging method and types of plugs.
 - 3. Number, size, material, location, and method of installation of suction piping.
 - 4. Number, size, material, method, of installation and location of installation of discharge piping.
 - 5. Bypass pump sizes, capacity, number of each size to be on site, power requirements, and fuel consumption and onsite storage requirements under full load.
 - 6. Hydraulic calculations of static lift, friction losses, and flow velocity (pump curves showing each pump's operation range shall be submitted).
 - 7. Downstream discharge piping, valve, and fittings plan.
 - 8. Method of protecting discharge structures from erosion and damage.
 - 9. Thrust and restraint block sizes, mechanical joint restraints and locations.
 - 10. Sections showing suction and discharge pipe depth, embedment, select fill and special backfill.
 - 11. Verification that the pumps and all stationary fossil fueled equipment meet and have been permitted under the City of Jacksonville Ordinance Code for Noise Control, Chapter 368 and are "residential silenced" equipped.
 - 12. Any temporary pipe supports and anchoring required.
 - 13. Design plans and computation for access to bypass pumping locations indicated on the drawings.

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14. Calculations for selection of bypass pumping pipe size(s).
 15. Schedule for installation of and maintenance of bypass pumping pipes, valves, and fittings.
 16. Plan indicating selection location of bypass pumping pipes.
 17. Details on pump controls and instruments to safely operate and alarm of conditions. Provide sequence of CONTRACTOR's emergency response contacts for the autodialers.
 18. An emergency response plan, which must also be reviewed and approved by the CONTRACTOR and submitted to JEA for comment.
- C. Plans for the bypass piping system shall include, but not be limited to the following:
1. Verification of all bypass piping sizes.
 2. Location of bypass pumping system.
 3. Narrative on any MOT requirements.
 4. Methods for protecting and securing the piping.

1.04 QUALITY ASSURANCE

- A. The design, installation, operation, and maintenance of the temporary pumping and piping systems shall be the CONTRACTOR's responsibility. The CONTRACTOR shall employ the services of a vendor who can demonstrate to JEA that it specializes in the design and operation of temporary raw sewage bypass pumping and piping systems. The vendor shall provide at least five (5) references of projects of a similar size and complexity as this project performed by this firm within the past three (3) years.
- B. The proposed bypass systems shall meet the requirements of all codes and regulatory agencies having jurisdiction.
- C. The bypass pumping and piping specialty vendor shall have been in business for a minimum of 15 years. They shall have a major service center within 150 miles of the project site, with on-call maintenance and service staff available to respond onsite within 2 hours of notification.
- D. The approved bypass pumping specialty contractors are:
1. Xylem/Godwin/Flygt
 2. Sunbelt Rentals, Inc.
 3. Thompson Pump and Manufacturing, Inc.
 4. United Rentals

1.05 SYSTEM DESCRIPTION

- A. The bypass pumping and bypass piping systems shall have sufficient capacity as described in this specification. The CONTRACTOR shall provide all pipeline plugs, pipe supports, line stops, pumps of adequate size to handle minimum and peak flows, and suction and discharge piping to ensure that the total flow can be safely diverted around proposed new work.
- B. Bypass pumping systems shall be capable of bypassing the flow around the work area and discharge into the identified existing JEA discharge manhole.

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- C. The bypass operation shall include all necessary controls and instruments to operate the system in automatic mode, adjust the number of pumps and provide alarms.
- D. Bypass pumping system friction and minor losses and the appropriate size and number of pumps shall be determined by the bypass pumping contractor's Florida licensed Professional Engineer in order to achieve the required flows.
- E. The bypass pumping vendor shall provide an onsite diesel fuel storage tank(s) and containment for the pumps. CONTRACTOR is responsible for providing fuel throughout the bypass pumping operations. The onsite fuel storage tank(s) shall be sized to store enough fuel for running the entire system (all pumps) for a minimum of 3 days continuously, under full load.
- F. It is essential to the operation of the existing sewer system that there will be no interruption in the flow of sewage throughout the duration of the project. The CONTRACTOR shall provide, maintain, and operate all temporary facilities such as dams, plugs, pumping equipment, conduits, all necessary power, and all other labor and equipment necessary to intercept the sewage flow before it reaches the point where it would interface with the work, carry it past the work and return it to the existing sewer downstream of the work without causing a spill or discharge of the sewage to the environment.
- G. 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.
- H. 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.
- I. The CONTRACTOR shall protect water resources, wetlands, and other natural resources.
- J. The design of the bypass pumping system for the local, gravity collection system shall handle the typical average daily flow conditions of 60 gpm and peak hour flow of 225 gpm. The bypass pumping system shall have a firm capacity of 225 gpm, minimum. At least one stand-by pump shall be provided.
- K. The design of the bypass piping system to be temporarily connected to the new 30-inch force main shall have the capacity for the typical average daily flow conditions of 4.85 mgd (3,365 gpm) and peak hour flow of 10.95 mgd (7,600 gpm).

PRODUCTS

2.01 PUMP SYSTEM

- 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 shall be diesel powered. No equipment including pumps shall exceed the noise limit of the City of Jacksonville Ordinance Code for Noise Control, Chapter 368 and shall be

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“residential silenced” equipped. If necessary to achieve this limitation, sound enclosures shall be provided. Work is within residential streets.

- B. Pump shall be capable of handling raw, unscreened, sanitary sewage containing solids and fibrous materials. Pumps shall be non-clog and shall be capable of passing 3-inch solids.
- C. All pumps used must be constructed to allow dry running for long periods of time to accommodate the cyclical nature of influent flows.
- D. Spare parts for the pumps and piping shall be kept on site as required. Adequate hoisting equipment for each pump and accessories shall be maintained on site.
- E. The vendor shall provide the necessary stop/start controls and alarms for each pump. Autodialers shall be used to alert of problems, if a header system is used to manifold the pumps, each pump shall include an autodialer.
- F. The total bypass pumping capability shall be a minimum as described above. All units shall be fully operational. Any unit which fails to operate at its rated capacity shall be repaired or replaced immediately. The CONTRACTOR is advised that the JEA has no control over the maximum flows that will occur in the sewer.
- G. The maximum allowable water level in the local collection system manhole serving the temporary bypass pumping system suction lines shall not exceed 4.0 feet.

2.02 PUMP DISCHARGE AND TEMPORARY BYPASS PIPING

- A. The pump discharge and temporary bypass piping may be of new or used materials and shall not leak during operation. Under no circumstances will aluminum “irrigation” type piping or solvent cemented PVC pipe be allowed.
- B. High density polyethylene (HDPE) pipe used for the pump discharge and temporary bypass piping shall comply with JEA Standard Specification Sections 755 I.6 and II.1.1. Used pipe shall have the nominal pipe diameter, pipe size (iron pipe size-IPS or ductile iron pipe size-DIPS), and dimension ratio (DR) readily visible on each pipe segment, or otherwise readily identifiable. The pipe used for the bypass shall have a DR equivalent or greater pressure rating than the specified test pressure. All HDPE pipe used for the bypass piping shall be of the same pipe size and dimension ratio, no exceptions. All pipe used for the bypass piping shall be free of gouges, cuts, scrapes or other physical deformities on the inside and outside barrel of the pipe equivalent to, or greater than, 10 percent in depth of a new pipe segment DR wall thickness.
- C. Only flanged joint or HDPE electro or thermal fused joint connections shall be allowed. Mechanically restrained adaptors are PROHIBITED on the discharge side of pumps, discharge header, inline fittings or the force main. Shop-fabricated flexible hose less than 8 feet in length with flanged ends may be used to connect pumps to discharge manifold. If used, flexible hose shall have a minimum pressure rating of 100 psi.

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- D. Electrofusion couplings are not allowed on pipe size larger than 12-inch diameter. They may be used on smaller pipes where the butt fusion method cannot be used. Electrofusion couplings and fittings shall be PE4710 HDPE, Cell Classification of PE 445574C as determined by ASTM D3350-05. Electrofusion couplings or fittings shall have a manufacturing standard of ASTM F1055. Couplings and fittings shall have the same pressure rating as the pipe unless otherwise specified on the plans. Approved manufacturers are Friatec, Central Plastics and Plasson.
- E. All bypass piping shall be pressure tested for 4 hours at 100 psi prior to beginning the work.

2.03 SEWER PLUGS

- A. Any sewer plugs required for bypass pumping shall be of the compressed air type and shall be capable of and suitably anchored for water heads to final grade.
- B. All sewer plugs shall have zero leakage.
- C. The CONTRACTOR shall supply plugs with sufficient supply hose to extend above grade and include an inline pressure gauge to be monitored daily (minimum) to ensure no leakage in each plug. Each plug shall be securely tethered to prevent a dislodged plug from flowing uncontrolled downstream in any pipe.

2.04 EMERGENCY RESPONSE PLAN

- A. The CONTRACTOR's emergency response plan shall have the following minimum components:
 - 1. 24-hour a day electronic monitoring of the pumping system
 - 2. A call path or sequence for an emergency an on-call staff response
 - 3. Requirements of on-site tools and parts
 - 4. Record keeping requirements
- B. The CONTRACTOR shall provide technician(s) capable of maintaining and troubleshooting the bypass system on-call in case of an emergency on a 24-hour basis to maintain or re-establish pump sets and level of the water. The Technician shall submit incident reports and turn them into JEA within 24 hours of any incident. The technician shall respond and be onsite to an emergency call within 2 hours of notification.
- C. The CONTRACTOR, JEA, and JEA Pump Station Plant Operator(s) shall be linked by cell phone 24-hours a day during the course of bypass operations. Any alarms shall initiate a call to the CONTRACTOR and JEA. JEA and CONTRACTOR shall each have a minimum of three (3) individuals listed within the 'calling tree'. If the first contact does not confirm receipt of the alarm call, then the next contact shall be called until the alarm is either confirmed and/or all three (3) contacts are called. JEA's link into the alarm status is only for informational purposes. The CONTRACTOR shall be responsible for all bypass alarm conditions, and shall be required to resolve the condition that is causing the alarm to occur.

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INSTALLATION

3.01 DESIGN

- A. The CONTRACTOR shall employ the services of a Florida licensed Professional Engineer to design the temporary piping, pumping and control systems. The design shall be submitted for approval. The temporary piping, pumping and control system plan and layout shall be approved by JEA before bypassing may begin.
- B. Approval of the design shall not relieve the CONTRACTOR from full responsibility for performance of the system.
- C. The temporary pumping plan shall include design information on the proposed pumps including operating conditions.

3.02 INSTALLATION

- A. System layout shall provide for ready removal and replacement of every pumping unit without affecting the others.
- B. No debris of any type shall be allowed in the piping system. Protective barriers and covers shall be installed in this regard. Any debris inadvertently allowed into the system shall be immediately removed.
- C. When pumping/bypassing is required, the CONTRACTOR shall supply the necessary pumps, conduits, and other equipment to divert the flow of wastewater around the work to be performed.
- D. The CONTRACTOR shall remove manhole sections or make connections to the existing gravity sewer, and/or force main system and construct temporary bypass pumping structures only as described in the specifications or as approved by JEA.
- E. When working inside manholes or force mains, the CONTRACTOR shall exercise caution and comply with OSHA and JEA requirements when working in the presence of sewer gases, combustible oxygen-deficient atmospheres, raw sewage, and confined spaces.
- F. The CONTRACTOR shall be responsible for furnishing the necessary material, equipment, labor and supervision to set up and operate the pumping and bypass piping systems. The bypass piping and pumping systems shall be fully inspected at least three times a day to ensure that the system is working correctly.
- G. The CONTRACTOR shall pressure test the piping for leaks prior to use.
- H. All bypass operations shall be properly secured and fenced. The CONTRACTOR shall install temporary barricade around all bypass equipment to restrict access to unauthorized persons. A minimum of new, 4-foot-high, orange safety fence with T-stakes every 10 feet shall be installed and maintained during the entire bypass.
- I. Provide all necessary MKOT plans in accordance with the COJ.

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3.03 FLOW CONTROL MEASURES

- A. The CONTRACTOR shall be responsible and liable for any wastewater spills and overflows resulting from improper operation or inadequacy of the bypass system, including reporting to regulatory agencies and paying the resulting fines and penalties.

3.04 REMOVAL AND RESTORATION

- A. The CONTRACTOR shall remove all pumping and temporary bypass systems components and restore any modifications to the existing manholes or structures as directed by JEA. Any soil containing grease, oil, or fuel from the pump engines shall be removed from the site and replaced with topsoil and sodded. All pavement, grassed and landscaped areas shall be restored to at least pre-construction condition.
- B. The sewer plugs and all appurtenances shall be removed and any damaged to the sewers or other pipes repaired.

END OF SECTION 02065