

**ITEM NO. 865**  
**Bypass Pumping**  
**Small Diameter Sanitary Sewers**

**864.1 DESCRIPTION:** The work covered by this item consists of bypass pumping operations for existing sanitary sewers less than 24-inches in diameter in order to temporarily reroute sanitary sewer flows to prevent a sanitary sewage overflow (SSO) and to provide adequate and reliable sanitary sewer flow at all times during construction, while the tasked scope of work is executed.

1. The work also covered in this item is for the use of inflatable and mechanical pipe plugs.
2. The use of inflatable/mechanical plugs in the water and sewer industry is the standard method to temporarily plug a pipe where permanent flow control devices are not available or are not operating as designed.
3. An inherent danger exists with all inflatable products.
4. If any conditions with this equipment exist that may jeopardize the safety of workers or others, do not use it.
5. This item includes all requirements for implementing a temporary pumping system for the purpose of diverting sanitary sewage flow around any construction-related activity to an approved reintroduction point within the sanitary sewer system.
6. The Contractor shall minimize the health, safety, and regulatory risks by taking all reasonable measures to avoid an SSO.
7. All bypass systems shall comply with all the requirements of this section unless specifically noted otherwise.
8. The Contractor shall be responsible for the design of the bypass pumping plan and system. Contractor's bypass pumping system design shall be developed based upon the requirements of the Contract Documents.
9. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction
10. Pump and haul bypass systems shall not be allowed within the Edwards Aquifer Recharge Zone (EARZ) or for larger sanitary sewers with significant sewage bypass flows.
11. Contractor shall provide for temporary measures to convey sewage flows and avoid sewage spills should a storm event occur that generates sanitary sewer flows in excess of Contractor's bypass pumping system.

**864.1 REFERENCE STANDARDS:** Reference standards cited in this Specification Item No. 864 refer to the current reference standard published at the time of the latest revision date of this Specification Item No. 864.

1. San Antonio Water System (SAWS):
  - a. Specifications for Water and Sanitary Sewer Construction (2014)
  - b. SAWS Materials Specifications
2. City Of San Antonio (COSA) Standard Specifications for Construction
3. Texas Commission of Environmental Quality
  - a. TCEQ under 30 TAC Chapter 312, Subchapter G

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- b. Edwards Aquifer Recharge Zone (30 TCEQ § 213).
- 4. American Concrete Pipe Association
  - a. Concrete Pipe Design Manual

**864.2 SUBMITTALS:**

- 3. All submittals shall be in accordance with Owner's requirements. All submittals shall be approved by the Engineer prior to delivery of materials and commencing any portion of the proposed scope of work.
- 4. For all projects requiring bypass pumping, the Contractor shall prepare and submit a Bypass Pumping Plan (BPP).
  - a. The BPP shall be submitted a minimum of (2) two weeks prior to commencing any portion of the proposed scope of work and shall be approved by Engineer prior to beginning Work.
  - b. The BPP shall be signed and sealed by a professional engineer licensed in the State of Texas (Contractor's Engineer).
- 5. Contractor shall submit manufacturer's product data, instructions, recommendations, shop drawings, and necessary certifications in order for the proposed BPP to be reviewed and approved.
- 6. The following shall be submitted as part of the BPP:
  - a. A cover letter containing the following information;
    - i. The project name and job number.
    - ii. The name and address of the Contractor.
    - iii. Contact information of the Contractor's project manager, superintendent, foreman/supervisor, safety professional, etc.
    - iv. Resumes for qualified pump personnel and supervisors
    - v. A description and location of the planned bypass pumping work to be performed; include data for stationary and pump and haul bypass systems as applicable.
  - b. Emergency ("24/7") contact information for the bypass pumping subcontractor, if applicable. Make sure to include the name, cell phone number, and title of the person(s) onsite responsible for the bypass pumping operation.
  - c. The name, phone number, title, signature, and PE seal of the Contractor's Engineer preparing the BPP.
  - d. Copies of permits or other documents showing the Contractor has obtained all clearances necessary for installation and operation of the BPP.
  - e. If Contractor elects to use a combination of stationary bypass pumping and pump and haul for his bypass system,
  - f. Contractor's BPP shall identify the quantity of flows that will be pumped and pumped and hauled for each type of bypass system along with the points where flows will be removed and reintroduced into the sanitary sewer system.
  - g. Certificate of Compliance that the BPP complies with all SAWS and regulatory requirements and that all components have been designed by a professional engineer licensed in the State of Texas.

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- h. The Contractor's Engineer shall review all components of the submitted BPP for adequacy to the Contractor's selected design flow conditions and insure that all bypass pumping system components are of adequate size, strength, meet the reliability criteria specified herein.
- i. A description of the maximum amount of sanitary sewer flows to be bypassed by the Contractor's bypass pumping system and how the flow conditions will be monitored during system operations (including all flow measurement devices, calculations, equipment, or other sources of how data was obtained).
- j. Descriptions of all proposed bypass pumping components to be used.
- k. If applicable, describe all different bypass pumping phases.
  - i. Include bypass pump(s) size(s) and capacity, as well as the size(s) and capacity of the suction/discharge piping.
  - ii. The description shall also include manhole(s)/structure(s) depth(s) and size(s) that will be used during the bypass pumping operation, sanitary sewer plugging method and type of plugs to be used, flowmeter installation locations, etc.
- l. All plugs are required, submit a Plug Use Plan (PUP) according to the requirements of to this specification.
  - i. Contractor shall provide SAWS with adequate prior notification to allow SAWS to witness installation and removal of all plugs.
  - ii. Description of procedure for locating and recovering any lost plug.
- m. Description of minimum equipment on hand should an emergency plan be implemented, i.e. spare pump, emergency generator.
- n. The date and time the bypass pumping is expected to begin and be completed. Indicate if bypass pumping will take place outside normal work hours which are between 8 am to 5 pm Mondays through Fridays (except for SAWS observed holidays).
- o. Contractor shall reimburse SAWS for the overtime costs required by his bypass pumping testing outside of SAWS normal work hours.
- p. The pump curves, showing operating range. This shall include the proposed system curve, addressing the pump operation in relation to the suction/discharge piping's alignment with respect to restriction and/or elevations.
- q. Suction and discharge piping material(s) and capacity to be used for the bypass pumping operation, including the material(s) for any bend(s) and/or valve(s) that will be used.
- r. Location of sound attenuated pumps where required.
- s. A sketch showing the location of the pump(s) and the route of the suction, discharge, and diversion piping.
- t. If Contractor elects to use locations outside of the easements obtained by SAWS or locations that are not indicated for use on the BPP plan sheet, Contractor shall be solely responsible for obtaining the required easements and written documentation required for use of these locations, a copy shall be provided to SAWS prior to Contractor's use.
- u. A sketch detailing proposed restoration of the suction and discharge points

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- if the contractor proposed to make openings in the existing pipes or structures.
- i. If different than shown in contract documents, the new sketch shall be dimensioned and all-inclusive showing all SAWS manhole numbers that will be used for suction and discharge operations.
  - ii. If any other structure will be used for suction and/or discharge operations, then the nearest manhole(s) shall be labeled.
  - iii. The sketch shall include the name of any streets and/or major intersection in the area. All features possibly affected by the alignment of the BPP's components (driveways, vehicular traffic, residential or commercial dwellings (due to noise)) shall likewise be addressed.
- v. For pump and haul systems the sketch shall show the location of all system components along with the staging areas, haul routes, and an explanation of the expected cycle time of all aspects of the operation.
- w. Clear photographs of the manhole(s) interior that will be used for the bypass pumping operation, including pole camera photographs of pipes where plugs will be installed.
- i. All photographs will be labeled with the manhole number, date, and intended use of the manhole by the Contractor's BPP.
- x. A Traffic Control Plan that pertains solely to the bypass pumping operations. This may differ than the project's traffic control plan for the overall scope of work.
- i. The Traffic Control Plan shall include all required permits including street cut permits.
- y. Contractor shall maintain pedestrian and vehicular traffic and comply with ADA regulations for access to all residential and commercial property unless written approval is otherwise obtained from the property owner allowing for reduced access.
- z. An Emergency Plan detailing procedures to be followed in the event any portion of the bypass operation fails and causes either surcharging or an actual SSO. Contractor is herein advised that:
- i. The existing sanitary sewer system may surcharge during certain storm events. The Contractor's BPP must recognize this potential and accommodate it with sufficient bypass capacity, restoration of flow through the sanitary sewer system, or other measures acceptable to SAWS during these flow events. These measures shall be included in the submitted BPP.
  - ii. The Contractor's BPP cannot cause any surcharging that results in damage or SSOs.
  - iii. Any damage or SSOs during bypass pumping operations resulting from Contractor's bypass system shall be deemed a failure of BPP, and the Contractor must re-propose an improvement to their BPP for review and approved. A sanitary sewer surcharge is herein defined as any flows entering the manhole or structure (above the crown of the pipe). . Contractor shall be fully responsible for all damages and costs related to the installation, operation, and maintenance of Contractor's

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- bypass pumping operations including damages, clean up, fines, penalties, and other related costs.
- iv. Contractor to include minimum equipment on hand for implementing and emergency plan. (i.e. spare pump, emergency power source.)
  - aa. Where bypass piping is installed within the floodplain of waterways subject to flooding, the Contractor shall submit an anchorage plan and calculations to ensure that piping is properly anchored.
  - bb. The pipe shall be capable of remaining in place during a 100-year storm event.
  - cc. Anchorage plan and calculations shall be designed and sealed by a professional engineer licensed in the State of Texas (Contractor's Engineer). This shall be the same PE that sealed the BPP Certificate of Compliance.
  - dd. For pump and haul system, submit copy of Hauler's Transporter Registration as issued by TCEQ under 30 TAC Chapter 312, Subchapter G.
  - ee. For pump and haul system, submit information on licensed disposal site to be used by the Contractor
  - ff. Submit the checklist found at the end of this document confirming that all items required by this section are included in the BPP submittal.
  - gg. For all projects requiring the use of pipe plugs on pipes the Contractor shall furnish a submittal containing manufacturer's product data, instructions, recommendations and a project PUP. The PUP shall be submitted and approved by the SAWS engineer a minimum of (2) two weeks prior to commencing any portion of the proposed scope of work.

The following shall be submitted with the PUP:

- i. A cover letter containing the following information;
  - a) The project name and job number;
  - b) The name and address of the Contractor
  - c) Contact information of the Contractor's project manager, superintendent, foreman/supervisor, safety professional, etc.
  - d) Emergency (24/7) contact information for the staff responsible for operating and maintaining the plug. Include the name, phone number, email address and the person(s) onsite who is responsible for the project.
  - e) The name and contact information for the PUP preparer.
- ii. Plug Plan
  - a) The plan shall show where on the project site the contractor intends to use pipe plugs, including:
  - b) manhole numbers;
  - c) the upstream and downstream pipe diameters and pipe materials;
  - d) pipe slopes;
  - e) pipe depth;
  - f) pipe flow direction;
  - g) known peak or surcharge flow data;
  - h) types of plugs to be used;
  - i) types of restraint used;

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- j) type of radio transmitting device.
- k) flow monitoring system plan
- l) airline regulator and gauge location
- iii. Calculations
  - a) Provide calculations of the maximum anticipated head pressure on the plug and the resultant tensile force required to restrain the plug prior to plug inflation and during plug removal.
  - b) Provide calculations of the required inflation pressure of the plug.
  - c) Calculations shall be sealed and signed by a professional engineer licensed in the state of Texas in civil or mechanical engineering, representing plug manufacturer.
- iv. Plug selection
  - a) Detail the plug selection for each installation including given conditions, pipe size and anticipated pressure requirements. Include in plan sleeves that will be used.
- v. Plug inspection:
  - a) Provide a manufacturer's inspection form detailing recommendations for plug inspection of plug condition before and after use; form to be signed by contractor staff responsible for plug installation prior to and after plug installation.
- vi. Monitoring plan
  - a) Provide a monitoring plan for observing the plug inflation pressure gauge and hoses. Monitoring shall be for 24-hours per day during the plug use duration.
  - b) Provide a written response plan for when the plug loses pressure.
  - c) Provide a plug retrieval plan.
- vii. Plug restraint details
  - a) Provide means and methods for anchoring, support, and bracing appropriate for anticipated operating pressure conditions
  - b) Size restraint (cable or chain) based on calculated loads using a safety factor of 4.
  - c) Eye bolts to be  $\frac{3}{4}$  inch min galvanized steel.
  - d) Provide multiple tie-off locations for chain or wire cable restraint, greater than or equal to calculated loads using a safety factor of 4 or greater. Tie off locations cannot be located on private property.
  - e) Rope of any kind is not an acceptable material for plug restraint.
  - f) Manufacturer's Literature
- hh. Provide manufacturer's literature on proper plug use and safety precautions, including available on-line training.

**864.3 EQUIPMENT AND MATERIALS:** The Contractor shall provide all necessary pumping equipment, piping and all other necessary appurtenances in order to maintain a reliable sanitary sewer flow in the sanitary sewer system (including any temporary manholes) at all times during construction for stationary pumping and pump and haul bypass pumping

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systems. All materials, equipment, etc., must be in good condition, and shall not have visible damage such as cracks, holes, foreign material, blisters, etc.

1. Plugs: Plugs must be selected and installed according to the size of the line to be plugged.
  - a. Plugs shall be secured and anchored to prevent plug movement or escape into the adjoining sanitary sewers should the plug fail.
  - b. All plugs shall be equipped with a radio transmitter that will be used to locate any plug that has escaped in the adjacent system.
  - c. The radio transmitter shall be designed for environment that it will be installed.
  - d. The Contractor shall also provide and keep on site the matching radio receiver that will be used to locate any plug that is lost in the adjacent system.
  - e. Plugs will be in good condition and reviewed by the Contractor for defects that might lead to failure prior to being installed.
  - f. The Contractor shall provide and sign a Plug Inspection form verifying plugs have been inspected.
  - g. All plugs shall include a non-corrosive/non-plastic name plate permanently anchored to both ends of the plug.
  - h. Name plate shall include SAWS Job no. permanently stamped, engraved or welded on the name plate with a minimum of 1 inch tall legible lettering.
  - i. Airline regulator and gauge shall be located outside excavation and shall be secured and anchored. Location shall be shown on the PUP.
  - j. An additional plug (for each size of plug used) must be onsite and ready to be installed in the event a plug fails or becomes dislodged. Plug(s) will be reviewed by the Inspector and/or Engineer for defects that might lead to failure prior to being installed.
  - k. Contractor shall immediately locate and remove any plug that has shifted its position, slipped within the pipe, dislodged, moved, or otherwise provided an indication that its suitability for use in plugging may be suspect or compromised.
  - l. Contractor shall immediately notify SAWS of any plug that has provided an indication that its suitability for use in plugging may be suspect or compromised and allow SAWS to observe plug removal and replacement.
  - m. It is also imperative that the Contractor notify the Inspector at the completion of the work in order to verify that all plugs have been removed from the system.
  - n. The Contractor shall provide all necessary equipment, plugs, hoses, gauges and necessary appurtenances to install the plug, maintain the plug during use and remove the plug at completion.
  - o. All plugs must be in good condition, and shall not have visible damage such as cracks, holes, tears, cuts, punctures, abrasions, loose or damaged fittings, cracks in castings and excessive wear.
  - p. All plugs 24-inches and larger shall have an air release valve for rupture protection.
  - q. All plugs shall be equipped with a radio transmitter locating device that

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- is activated by the plug losing air pressure.
  - r. The locating transmitter device shall be effective to a depth of 65 feet, and have a battery life of 1,000 hours when operated in pulse mode after activation.
  - s. All plugs shall have a protective sleeve.
  - t. If the plug is damaged, do not use the plug and remove it from the job site.
  - u. Contractor must be aware of the limitations associated with plugs..
2. Stationary Bypass Pumping Systems
- a. High-Density Polyethylene (HDPE) is the preferred pipe material for all bypass piping.
  - b. HDPE shall be used when bypass discharge pipe will be going through streams, storm water culverts, the Edward's Aquifer Recharge Zone, and/or environmentally sensitive areas.
  - c. At other locations, not within the Edward's Aquifer Recharge Zone, flexible discharge hose that is in good condition and does not leak, may be allowed subject to it acceptably passing testing.
  - d. HDPE pipe must be assembled and joined using couplings, flanges or fusion welding in order to avoid joint leakage. SAWS shall be notified in
  - e. HDPE fusion welding must be performed by personnel certified as fusion technician(s) by the manufacturer of HDPE pipe and/or fusing equipment. SAWS shall examine welds prior to use in BPP operation.
  - f. BPP shall indicate the proposed DR of the pipe to be used.
  - g. Rigid suction hose that is in good condition and does not leak may be allowed for withdrawal of flows from the suction point into the bypass pumps.
  - h. Pipe material other than HDPE shall be submitted to SAWS for approval. Neither "Irrigation type" pipe nor glued PVC pipe will be permitted.
  - i. Any hoses or pipes that leak shall be removed and replaced with non-leaking hoses or pipes.
  - j. Pumps must be fully automatic self-priming units that do not require the use of foot valves or vacuum pumps to prime the system.
  - k. No electric pumps will be allowed; all pumps must be diesel powered. Contractor shall provide suitable spill control and containment measures to avoid environmental contamination by pumps, fuels, or lubricants.
  - l. All pumps shall be open impeller solids handling type pumps, capable of passing a minimum of 3-inch diameter solids.
  - m. Contractor shall have one backup pump, equal in capacity to the largest pump in the system, connected into the bypass pumping system, and ready for operation in case any of the primary pumps fail.
  - n. The backup pump shall not be used in Contractor's calculations for determining the pumping capacity requirements for the stated flow conditions above.
  - o. Sound-attenuated pump enclosures shall be required on all projects where the bypass pumps are located within 50 feet of any residence, business, park, or other presence of people.



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- p. Contractor shall provide sufficient sound attention measures to comply with City of San Antonio noise limitation requirements.
- 3. Pump and Haul Bypass Pumping Systems
  - a. Pump and haul bypass pumping systems shall use good-quality vacuum trucks, equipment, and materials from manufacturers commonly engaged in the manufacture, service, and repair of these types of sanitary sewer service trucks and equipment.
  - b. All equipment shall be designed and manufactured for sanitary sewer service, shall function acceptably, be reliable, and free from leaks or other deleterious environmental impacts.
  - c. All equipment proposed for use in pump and haul bypass pumping shall have been maintained per the manufacture's recommendations.
  - d. Equipment service records shall be made available at SAWS request.
  - e. Any hoses or pipes that leak shall be removed and replaced with non-leaking hoses or pipes

**864.4 CONSTRUCTION:** During construction, it will be the Contractor's responsibility to maintain a safe and secure environment at all times.

- 1. All provisions and/or requirements of the BPP must be followed throughout the course of any bypass flow operations.
- 2. Contractor must notify the SAWS' Inspections Department 72 hours prior to commencing the bypass pumping operations.
- 3. SAWS requires the Contractor to manage the flow of wastewater in a planned and proactive manner.
- 4. Contractor shall be fully responsible for all damages and costs related to the installation, modification of existing manholes/structures, operation, and maintenance of Contractor's bypass pumping operations including damages, clean up, fines, penalties, and other related costs.
- 5. Bypass pumping systems shall be stationary systems consisting of portable pumps, piping, and appurtenances unless a "pump and haul" bypass system is accepted by SAWS.
- 6. Pump and haul bypass systems can use a relay system of vacuum trucks using a pump and haul approach to bypass sewage flows.
- 7. Where pump and haul bypass systems are allowed the Contractor may elect to submit using a pump and haul bypass system for these locations or to use a stationary bypass system.
- 8. The Contractor shall have full time (24-hour), onsite qualified pump personnel including supervision for monitoring the entire bypass installation while it is in operation.
- 9. The entire length of bypass piping shall be walked and inspected hourly to monitor for leaks.
- 10. High-level alarm notification to cell phones shall not eliminate this requirement.
- 11. Where bypass pumping systems exceed 1,500 feet in length or cannot be completely observed from the bypass pump location, at least one attendant shall be

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- assigned to the pump operation, and one additional attendant shall be assigned to walk and monitor the pipeline.
12. Prior to installing any plugs, the Contractor and SAWS shall inspect the existing pipe using a pole camera, for imperfections that might cause damage to the plug, cause the plug to not seal or function properly, or compromise the integrity of the pipe when the plug is inflated.
  13. If debris is present in the existing line to be plugged, it shall be removed prior to plug installation.
  14. The results of this inspection shall directly impact the planned plugging location(s). Contractor shall allow SAWS Engineer an opportunity to confirm that the location of plug(s) is acceptable.
  15. Lines inserted into any manholes or structures shall be constructed with elbows, or be otherwise angled, to direct discharge along the most efficient path for entry into the downstream line without causing unnecessary turbulence of flow.
  16. The termination point of the discharge piping shall extend to the crown of the pipe housed within the manhole or structure receiving the bypassed flows.
  17. Contractor shall provide continuous supply on-site fuel storage sufficient for 24-hour operation of the bypass pumping installation.
  18. Contractor shall protect all components of the bypass operations from vandalism and vehicular damage by making the site secure.
  19. Contractor shall minimize sanitary sewer odors by using lids, shroud covers, or any method accepted by the Inspector or Engineer.
  20. Contractor shall be solely responsible for any and all damages to private and/or public property caused by, or during, the installation, operation, and/or removal of the bypass pumping system. Contractor shall be fully responsible for all damages and costs related to the installation, operation, and maintenance of Contractor's bypass pumping operations including damages, clean up, fines, penalties, and other related costs.
  21. A lost plug shall require Contractor to pay a minimum of a \$25,000 fine for each plug lost, in addition to costs related to any damages, clean up, fines, penalties, and other related costs. These costs will not be considered for any additional payment.
  22. Once all work is completed and the bypass pumping operation is no longer required, the Contractor must disinfect and drain the entire BPP system in accordance with approved submittal.
  23. SAWS will not be responsible for additional traffic control measures that might be required by CoSA, Bexar County, TxDOT, or any other public entity having jurisdiction of the project location.
  24. Flow Tracking
    - a. Contractor shall continuously track all flows being bypassed. Flow monitoring data shall be provided to SAWS Inspector on a daily basis.
  25. Plug Installation
    - a. Safety
      - i. The Contractor shall be solely responsible for the safe and effective use of plugs, including the proper combination of

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- inflatable/mechanical plugs to block the sewer flow at both the upstream and downstream ends of a sewer bypass.
- ii. Inflatable plugs should be used only after receiving training as recommended by the manufacturer.
  - iii. An inherent danger exists with all inflatable products. If any conditions with this equipment exist that may jeopardize the safety of workers or others, corrective actions should be taken prior to the equipment use.
- b. Plugs
- i. Plugs must be selected and installed in accordance with the manufacturers recommendations.
  - ii. Plugs shall be tested prior to use. See Plug testing of this Specification.
  - iii. Plugs must be selected and installed according to the size of the line to be plugged.
  - iv. Spare plugs – Provide spare plugs on-site ready to be installed in the event a plug fails or becomes dislodged.
  - v. Plugs must be removed from the system upon completion of the work.
  - vi. Damages – The Contractor will be responsible for damages due to plugs being left in place or dislodged, including but not limited to:
    - 1. Damages to SAWS infrastructure or private property.
    - 2. Costs associated with sanitary sewer overflows including: regulatory fines; sewage and debris cleanup; debris disposal at an appropriate landfill; disinfection of all surfaces which have come in contact with the sewage.
    - 3. All costs associated with locating and retrieving lost or dislodged plugs.
    - 4. A lost plug shall require Contractor to pay a minimum of a \$25,000 fine for each plug lost. These costs will not be considered for any additional payment.
    - 5. If the plug is damaged, it shall be immediately removed from the job-site.

**864.5 TESTING AND QUALITY CONTROL:** Testing and quality control will be required for stationary bypass pumping and pump and haul bypass systems as indicated below.

- 1. Contractor shall obtain and keep copies of all required permits on site prior to beginning Testing and throughout performance of the Work.
- 2. Contractor must prove to the Owner that the equipment, materials and all operational aspects and/or appurtenances related to the BPP are in good condition prior to commencing the bypass pumping operation.
- 3. Failure to do so will result in the Contractor not being permitted to continue with any construction work requiring bypass pumping operations.

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4. Contractor must notify the SAWS' Inspections Department 48 hours prior to commencing any testing.
5. Any flows surcharging the sanitary sewer system during the test and/or during actual bypass periods will deem the BPP to be unacceptable and must be revised and resubmitted for approval.
6. There will be no separate pay item if this condition occurs during the timeframe in which bypass pumping test and/or operations are underway during the project. **No testing of the bypass pumping operation shall be conducted between Thursday and Sunday, unless approved by SAWS Inspections.**
7. If bypass pumping will take place outside normal work hours which are between 8 am to 5 pm Mondays through Fridays (except for SAWS observed holidays), Contractor shall reimburse SAWS for the overtime costs required by his bypass pumping testing outside of SAWS normal work hours.
8. Stationary Bypass Pumping Systems
  - a. Discharge piping, joints and all accessories will be required to be hydrostatic tested.
  - b. SAWS Inspector must be notified 48 hours prior to any test commencing.
  - c. All piping, joints, and accessories shall be able to withstand at least twice the maximum system pressure or a minimum of 50 psi, whichever is greater. For any bypass operations proposed a test run of at least (2) two hours must be satisfactorily performed, prior to commencing any construction work.
  - d. The SAWS Inspector must acknowledge the start of the (2) two hour test.
  - e. Without the Inspectors' recognition that the (2) two our test has been initiated, the test will be deemed invalid.
  - f. Contractor shall provide both a strobe light type high level alarm, as well as alarm notification to their cell phones, as well as other appointed personnel to be identified by SAWS, and insure adequate alarm notification is attained prior to actual startup of the test period.
  - g. During the testing period, the Contractor shall install a Float Monitoring System in the upstream manhole from the suction location and/or pipe to confirm that the bypass pumping flow data shown in their BPP remains applicable.
  - h. The float monitoring system shall remain in the manhole and/or pipe for the duration of the bypass operation.
  - i. The data collected during the test and duration of the bypass operation shall be provided to the SAWS Inspector for evaluation and recording on a daily basis and at the Inspector's request.
  - j. It will be required of the Contractor to have personnel remain onsite at the flow monitoring system in order to continuously record (every 30 minutes) the flows during both the test and actual bypass pumping periods.
  - k. Contractor shall submit a copy of Testing Float Monitoring System Data log to SAWS upon successful completion of test within 3 business days to SAWS, failure to do so may result in the test being deemed invalid.

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- l. Data log shall be in column format with each line entry indicating the time, elapsed time of test, level of flow indicated in manholes, total flow being pumped by the BPP system, and any comments pertaining to the test.
  - m. Any failure of equipment, or activities associated with the bypass pumping operations contributing to either a surcharge or SSO, shall be deemed a failed test.
  - n. The test shall then be stopped and any necessary cleanup or reporting efforts performed.
  - o. The BPP will need to be revised, resubmitted and approved prior to the test initiating again.
  - p. Any effort by SAWS or other third parties to mitigate damages resulting from any surcharging or SSOs shall be the direct and sole responsibility of the Contractor. This includes any related fines, penalties, or damages to public or private property
  - q. Plug Testing
    - i. Plugs shall be tested prior to use. The inflatable plug shall be placed inside of a structurally sound pipe or conduit and inflated to its operating pressure and monitored for 24 hours to observe it holds the required pressure. This testing shall be performed in accordance with the manufacturer's recommendations. Inflating a plug when it is not constrained or overinflating the plug creates a risk of being injured by pieces of the plug exploding if it fails.
9. Pump and Haul Bypass Pumping Systems
- a. Contractor shall perform a full scale demonstration test of his proposed pump and haul bypass system to prove that his system can be successfully used for bypass pumping at the proposed locations.
  - b. Contractor's test shall use all of the equipment and staff that will operate the bypass pumping system during performance of the Work.
  - c. Traffic control systems required during the Work shall be utilized during the test.
  - d. Withdrawals and discharges of flow shall be from or into the manhole locations identified in the Contractor's BPP except for pump and haul system.
  - e. This requirement is intended to demonstrate to SAWS that the Contractor's proposed BPP is capable of providing satisfactory bypass pumping prior to Contractor beginning the Work, including the size and number of trucks and cycles times.
  - f. Pump and haul system flow shall be disposed of in a TCEQ licensed facility and all manifests shall kept and submitted to SAWS.
  - g. Disposal pump and haul flow in a nearby manhole is not acceptable.

**864.7 MEASUREMENT:**

1. Measurement for the work specified herein will be by lump sum and as required by the contract documents.

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2. Measurement of the work for pipe plugs shall be incidental to the work and will not have a separate pay item.

**864.8 PAYMENT:**

1. Payment of the “Lump Sum” bid for Bypass Pumping shall be in accordance with the following:
  - a. Any effort required for multiple set-ups and operations shall be included in the lump sum price.
  - b. When initial set-up and operation of the bypass pumping system begins (including a successful test), 20% of the “Lump Sum” cost will be paid as applicable to the bypass system used; stationary bypass pumping or pump and haul bypass systems.
  - c. 60% of the “Lump Sum” cost will be paid over equal monthly payments (estimated from the BPP or other documentation approved by the Inspector) during the course of the bypass pumping operation as applicable to the bypass system used; stationary bypass pumping or pump and haul bypass systems.
  - d. 20% of the remaining “Lump Sum” cost will be paid upon an acceptable removal and/or disassembly of all components of the BPP, including site cleanup as applicable to the bypass system used; stationary bypass pumping or pump and haul bypass systems.
  - e. For multi-bypass pumping setups, payment will be proportional to the overall amount of the established bid line item.
  - f. Any damages, repairs, etc., to private or public property will not be considered for any additional payment.

**BYPASS PUMPING PLAN (BPP) SUBMITTAL CHECKLIST**

- Cover Letter with required information
- Certificate of Compliance signed and sealed by Contractor's Engineer
- Contractor's Engineer's contact information
- Manufacturer's product data, instructions, recommendations, shop drawings and certifications
- Sanitary Sewer Flow Management Description and calculations
- Bypass Pumping Description (including Plug Use Plan) to include flow diversion
- Bypass Pumping Schedule
- A non-corrosive/non-plastic name plate permanently anchored to both ends of the plug. (legible)
- Pump and System Curve Information
- Piping Information
- Plug Submittal
- Transmittal Submittal
- Plug Inspection Form
- Plug Testing Certification
- System Sketch
- Sketch of the location of Air Regulator and Gauge
- Manhole and Pole Camera Photographs
- Traffic Control Plan (if necessary)
- Emergency Spill Response Plan
- Anchorage Design for Piping in Floodplain (if necessary)
- Plug Monitoring Plan
- Plug Recovery Plan
- Floodplain Permits (if necessary)
- Street Cut Permits (if necessary)
- Other Permits (Contractor shall list as required)
- Anchorage Design for Piping in Floodplain (if necessary)
- Required Notifications (Contractor shall list as required)
- Contact List with Contact Information (Contractor shall list as required)
- Emergency (24/7) Contact Information
- Contractor's Engineer's PE Seal
- Daily flow monitoring data:
- Testing Float Monitoring System Data log

**End of Specification**