Construction Specification for Sewer Bypass Flow Pumping

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TS 4.01.01 SCOPE

This specification covers the requirements related to sewer bypass flow pumping used for the temporary conveyance of trunk or local storm, combined or sanitary sewage flows around a Working Area.

The Work shall include the following: design of a fully operational temporary sewer bypass system, commissioning and decommissioning, spill prevention and cleanup, traffic protection and road crossings.

TS 4.01.02 REFERENCES

This specification refers to the following standards, specifications or publications:

Provincial Statute

Ontario Regulation 129/04 Licensing of Sewage Works Operators Regulation

City of Toronto Standard Specification

TS 4.60 Construction Specification for Utility Cut and Restoration

TS 4.01.03 DEFINITIONS

For the purpose of this specification, the following definitions apply:

Licensed Wastewater Collection Operator means a person licensed as an operator in the province of Ontario. The person performing operational duties holds a valid license under Ontario Regulation 129/04.

Engineer means the licensed individual or firm responsible for the design of the works or their designate and registered with the Professional Engineers of Ontario.

Temporary Sewer Bypass System means temporary piping, plugs, pumping and standby equipment installed and operated for the purpose of intercepting the incoming sewage flow, conveying the flow around the work area, and discharging the flow into the existing sewer system downstream of the work area.

TS 4.01.04 DESIGN AND SUBMISSION REQUIREMENTS

The Contractor shall prepare and submit the following:

a) Sewer Bypass Plan ensuring there is capacity and size to handle the existing peak flows and surcharge flow rates at all times during the bypass operation; and

b) Spill Response Plan.

The Sewer Bypass Plan and Spill Response Plan shall be submitted four weeks prior to the start of construction to the Contract Administrator.

TS 4.01.04.01 Sewer Bypass Plan

The Sewer Bypass Plan shall include all of the following:

- flow rates and any other hydraulic considerations provided by the City;
- size of the sewer to be bypassed;
- bypass connection proposed;
- site and equipment monitoring;
- staging areas for pumps;
- duration of each phase of the work;
- sewer plugging method, type and size of plugs;
- location of maintenance holes or access points for suction and discharge piping, including a suitable site map;
- size, material, location and method of installation of suction and discharge piping;
- characteristics of bypass pump such as size, capacity and power requirements;
- calculations of static lift, friction losses and flow velocity;
- pump curves showing pump operating range;
- characteristics of standby pump(s) such as size, capacity and power requirements;
- standby power generator(s) size and location, and refuelling requirements or restrictions or both;
- method of protecting discharge maintenance holes or structures from erosion and damage;
- method of noise control for each pump or generator or both;
- details of bypass pipe crossings, for example driveways and sidewalks;
- engineering plans depicting the work; and
- all provisions and precautions that will be taken during the bypass operations to prevent sewage backups, overflows and spills.

The Sewer Bypass Plan shall bear the seal and signature of an engineer qualified in municipal engineering.

TS 4.01.04.02 Spill Response Plan

A site-specific Spill Response Plan shall include the following:

- procedures for notification to the City and the Ministry of the Environment;
- mandatory regulatory reporting requirements;
- plan for investigating the cause of the spill;
- plan for containing the spill and addressing the source of the spill;
- determine if any service connections, storm drains, watercourses or other infrastructure that could be negatively affected by a spill;
- plan for preventing public exposure to the spill, including procedures for redirecting pedestrians and traffic away from the impacted area; and
- measures to be taken to avoid or mitigate the adverse effects of the spill on the environment.

TS 4.01.04.03 Acceptance

The sewer bypass and spill response plans should allow the City to understand the manner in which construction on the sewer is to take place, the flow rates accommodated by the bypass and contingency plans in case of a spill including cleanup. The plan or report shall be submitted in PDF format.

The construction shall start only after the City reviews and accepts the Sewer Bypass Plan and Spill Response Plan. The Contract Administrator will then issue the acceptance letter to the Contractor. The letter will indicate whether a pre-construction meeting is required and who should be contacted at the City prior to the start of construction.

Both plans shall be posted at the site office or site trailer during the sewer bypass operations.

TS 4.01.05 MATERIALS – Not Used

TS 4.01.06 EQUIPMENT

TS 4.01.06.01 Pumps

Provide electric or diesel powered fully automatic self-priming low noise pumps and low noise generators. The pumps shall be equipped with all necessary stop and start controls.

TS 4.01.06.02 Temporary Sewer Bypass Piping

The temporary sewer bypass piping shall be able to withstand pressures that are greater than the peak bypass pressure and the traffic load at road crossing ramps. Under no circumstances shall aluminum irrigation type piping or glued PVC pipe be used. The Contract Administrator shall approve discharge hose material type.

The sewer bypass pumping system shall have no visible leakage.

TS 4.01.07 CONSTRUCTION

Protect the environment, public, and private property from any damage during the construction and operation of the bypass system.

Minimize the interruption of existing services to the public, residents, and all facilities connected to the bypassed sewer.

TS 4.01.07.01 Licensed Wastewater Collection Operator

The temporary sewer bypass system shall be monitored at all times by the Contractor. The Contractor's employees must have the knowledge, experience and skill to maintain and operate all equipment and to switch to standby equipment if the need arises. The bypass system shall not be in operation unless it is monitored constantly by the Contractor's employee(s).

A licensed wastewater collection operator must be present on site for initial start up and shut down of a sewer bypass system to evaluate and inspect the process and the redirection of wastewater flow within the wastewater collection system. An engineer must approve any changes to the bypass system after the initial set up such as adding a pump to the bypass system due to spike in flows, removal of a pump, changing discharge point and so on. A Toronto Water licensed operator must be present to witness the changes.

Immediately after the flow is redirected, and again after the flow is reinstated, the licensed operator must be present on site during the flow redirection. The licensed operator shall also confirm that the locations of the sewer bypass suction and discharge points are in compliance with the approved Sewer Bypass Plan.

TS 4.01.07.02 Bypass Equipment and Piping

Place pumps in temporary containments/berms to contain any fuel or sewage that may spill during the bypass operations.

Prior to pumping, flush and clean the sewer section, or maintenance hole, where the suction pumping is located.

When requested by the Contract Administrator, submit the pump maintenance records, pump operation records and fuel monitoring records for review.

Provide standby equipment ready for immediate use in the event of emergency or equipment breakdown.

Perform leakage tests of the bypass system using clean water prior to the actual operation. Give the City 48-hour notice prior to testing.

TS 4.01.07.03 Noise

Minimize the emission of sound by using low noise pumps and generators and implement additional sound attenuation measures, such as soundproof canopy, acoustic foam insulation and anti-vibration devices in the sound sensitive areas.

The emission of sound from pumps and generators shall be according to Toronto Municipal Code, Chapter 591 Noise.

Apply for a permit for an exemption from a noise prohibition or noise limitation, if required.

TS 4.01.07.04 Plugging

Select sewer plugs based on the flow characteristics, size of the sewer and the location of the flow diversion point. Always provide a secondary plug, in the event the primary plug fails. Plug a sewer system by means and methods that will not cause any damage or blockage to the sewer pipes and maintenance holes.

Inspect all plugs for defects prior to every use.

When a plug is no longer needed, remove it gradually to allow flow to return gradually to the normal flow condition.

TS 4.01.07.05 Crossings

At all times keep the bypass piping within the limits of the Working Area and away from paved roadways and sidewalks.

When the bypass piping is crossing roadways, either construct traffic ramps or place the bypass pipelines in trenches and temporarily restore utility cuts according to TS 4.60.

TS 4.01.07.06 Removal, Cleanup and Restoration

Ensure all sewage from the bypass pipes, pumps and fittings is discharged to the specified sanitary or combined sewer. Flush the bypass system with potable water before removal.

Restore bypass pump areas to pre-bypass condition including any cleanup measures necessary due to fuel, oil or sewage leaks. All cleanup measures taken shall be documented.

The disposal or discharge shall be according to the requirements of Toronto Municipal Code, Chapter 681 Sewers.

TS 4.01.08 QUALITY ASSURANCE – Not Used

TS 4.01.09 MEASUREMENT FOR PAYMENT – Not Used

TS 4.01.10 BASIS OF PAYMENT

Payment at the Contract Price shall be full compensation for all labour, Equipment and Material to do the Work.

Appendix 4.01-A, April 2013
For Use While Designing and Administrating City Contracts

Note: This is a non-mandatory commentary appendix intended to provide information to a designer and contract administrator during the design and construction stage of a contract on the use of this TS specification in a City contract. This appendix does not form part of the standard specification. Actions and considerations discussed in this appendix are for information purposes only and do not supersede an owner's design decisions and methodology.

Notes to Designer:

The designer should specify the following in the Contract Documents:

– peak flows and surcharge flow rates (4.01.04.01)

The contractor should indicate the following:

– how many persons to monitor the flow at all times, for example 1 or 2 (4.01.07.01)
– how much standby equipment will be available, for example 1 or 2 sets (4.01.07.02)

The contract administrator will determine who needs to review the plans prior to acceptance:

– the Sewer Bypass Plan and Spill Response Plan are reviewed by Toronto Water or Engineering and Construction Services or both division staff. If revisions and resubmissions are required, this will be communicated through the Contract Administrator.

– the Sewer Bypass Plan and the Spill Response Plan is circulated to the manager of sewer asset planning in Toronto Water division for review and acceptance (4.01.04.03)

Other notes:

After witnessing any changes, the Toronto Water licensed operator will record any changes in a log (4.01.07.01).