City of South Burlington
Pump Station Design Criteria

Last revised February 25, 2022

The City recognizes "Guides for the Design of Wastewater Treatment Works" TR-16 (May 2016) prepared by the New England Interstate Water Pollution Control Commission as its guide for pump station design. All sewage pumping stations**,** public and private shall be designed in accordance with the TR-16 manual except as noted below.

Submersible Pump Stations: All sewage pumping stations shall utilize submersible pumps unless otherwise approved by the Water Quality Superintendent. Grinder stations shall not be permitted. It shall be possible to remove and replace the submersible pumps without dewatering the wetwell or disconnecting the piping. Pumps shall be of the pull-up design, using a lifting cable and stainless-steel guide rails for pump removal. The pump shall be connected to the fixed discharge piping with a self-locking coupling. Shaft seal failure or potential seal failure detection alarms shall be provided. Submersible pumps may also be used in a wetwell/drywell configuration if approved by the Water Quality Superintendent.

Minimum requirements for wastewater pump stations

A. Pump Requirements: 2 non-clog submersible sewage pumps, each pump designed to handle the peak design flow rate expected from the service area. The designer shall submit an analysis of capacity needs for the service area. Pumps shall be 3 phase. Pumps shall have a 4" discharge capable of passing a 3" solid unless approved by the Water Quality Superintendent.

B. Pump Station Electrical Service: The contractor shall be responsible for providing all materials and labor as required to comply with local and state electrical codes. All electrical connections for pumps will be made outside of the wetwell within a junction box. All electrical panels shall be UL listed.

C. Emergency Storage: Provide a minimum of 4.15 hours of storage above the alarm level without surcharging of the sewage collection system. Storage volumes shall be calculated in accordance with the State of Vermont DEC Written Guidance for Preparation of Emergency Action – Electrical Power Failure Plans and shall be based on the maximum daily flow volume being delivered over a 16-hour period. Pumpstations that do not meet the minimum storage requirements will be considered for approval by the Water Quality Superintendent if an onsite diesel generator and transfer switch capable of powering the entire pumpstation for a minimum of 168 hours is included.

D. Wetwell Level Sensor: The City has adopted a uniform standard for level control systems for all of its wastewater pumping stations. Level control systems shall be consistent with other pumping stations throughout the City which utilize three Muliti-trode MTR-3 control relays and a multi-trode stick (a multi-sensored probe) both manufactured by Flygt Corporation. Other equivalent systems will be considered but must have the approval of the Water Quality Superintendent.

E. Wetwell Level Monitoring: Shall consist of a Mission 850 unit, flow meter, radar level monitor and have the ability to monitor current on both pumps and a backup high level alarm float.

F. Submersible Duplex Pump Station Requirements:

- Two (2) pumps with plug and play quick connect cords and the ability of the cord to change the voltage of the motor
- Stainless steel rail system for pump removal
- Flush mounted Bilco or equivalent aluminum access cover
- HOA Switch for each pump
- Run lights for each pump
- Main disconnect switch
- Double throw switch with plug for city's portable generator
- 110V 20 Amp outlets in panel
- Elapsed time meters
- Lightning protection
- Switched exterior light
- Alternating selector switch
- Multitrode pump control
- Mission 850 system and monitoring sensors
- Paved access for service vehicles that can support 80,000 lbs.
- Spare parts

G. Valve Pit Requirements: Shut–off valves and check valves for submersible pumps shall be placed in a separate chamber for ease of maintenance

- Check valves (2)
- Gate valves (3)
- 4" emergency bypass connection with gate or quarter turn valve and shall include a stainless-steel female 4" camlock

H. Force Main Requirements: All force mains shall be a minimum of 4" in diameter and shall be designed for a minimum velocity of 3.0 feet per second. Maximum velocities shall be no greater than 7.0 feet per second unless otherwise approved by the Water Quality Superintendent.

I. Submittal Requirements: The design engineer shall submit plans on 24"x36" drawings and an electronic copy (pdf) showing appropriate plan and elevation views of the proposed pumping station and all calculations used in design. Elevations shall be based on USGS datum. The submittal shall identify the extent of the service area and an analysis shall be provided that identifies the full build-out requirements of the service area. An analysis shall be provided to assess the capacity and condition of downstream interceptors and pumping stations, in order to determine if adequate capacity is available downstream to handle the proposed flows**.** Upgrades to downstream facilities may be required prior to approval of any new proposed pumping stations.

J. Record Drawings: Prior to acceptance by the City, a complete set of as-built drawings shall be submitted to the Water Quality Superintendent. The as-built drawings shall be provided in both hard copy and electronic (pdf) format. The drawings shall be electronically drafted using AutoCAD drafting software and shall be stamped by a Professional Engineer who shall certify that the drawings provided represent the actual constructed conditions.