

LACONIA WATER DEPARTMENT
WATER BOOSTER PUMP STATION
SPECIFICATIONS
REVISION NO. 9
May 20, 2009

1. The Laconia Water Department (LWD) shall not consider or accept a booster pumping station that services less than twenty five (25) single family residential units and services no more than 125 single family residential units. Any proposed station shall meet the following minimum standards and be submitted to LWD for approval by a registered professional engineer with experience in the design and construction of such facilities. The submittal shall be made to LWD in three (3) copies of a single complete preliminary design package. Following LWD's review and approval of the preliminary design documents, the engineer shall submit follow up submittals for final LWD approval. Construction shall not proceed without final LWD approval. Contractor shall coordinate construction with LWD to ensure LWD personnel are available to inspect the structure and equipment during construction. The cost of LWD inspection services shall be the responsibility of the contractor.
2. Pumping station structure shall be constructed of masonry or reinforced concrete materials. The station structure shall be constructed above grade; underground stations are unacceptable with the exception of underground PRV pits. They will comply with confined space entry regulations (stairs and exhaust fan). They will also be linked to LWD's SCADA system and use Ross valves for all PRV's.
3. The station structure shall be designed and constructed to minimize vandalism and blend architecturally with surrounding structures.
4. The station structure and piping shall be sized to accommodate future pumping equipment. The minimum design life shall be 25 years.
5. Standby electrical power shall be required to provide minimum fire flow pumping requirements, and shall power equipment with an automatic transfer switch. The generator will be housed in its own cabinet. The generator shall be housed inside the building. The generator will be fed by propane gas. The propane tank will be below ground. The propane tank will be provided by the developer. The system shall have muffling so as not to exceed 70 db at 20 feet.

6. All interior system piping (3 inch diameter and larger) shall be ductile iron or steel fusion bonded pipe. The steel pipe will be coated with water potable epoxy paint on both interior and exterior surfaces. Any piping under 3" shall be copper or brass. All gates will turn clockwise to open and counterclockwise to close.
7. Equipment shall have capability for local and remote pump control operations.
8. A pressure instrument shall be required (suction and discharge) and displayed on SCADA controlled " panelview ", and 4 to 20 ma output for remote radio transmission as described in item 7.
9. A reservoir elevation instrument shall be required (where applicable) and displayed on SCADA controlled " panelview ".
10. A flow measuring device such as a turbine meter or venturi tube with a minimum accuracy of 1.5% and local display with 4 to 20ma output for remote radio transmission as described in item 7 shall be required and registered in gallons.
11. Heat, ventilation, humidity control, interior lighting (fluorescent), and duplex outlets shall be required, and shall meet general commercial standards and codes. Wall insulation (R-19) and ceiling insulation (R-38) is required. The ceiling will be finished. Exterior lighting for the entry doors and driveway are to be controlled by a motion sensor. A bypass switch for the motion sensor will be located inside the station for continual lighting outside.
12. Shut-offs or isolation valves shall be required on the suction and discharge pipe of each pump. All valves shall conform to AWWA C-504 and shall be rated for a minimum 250 psi working pressure.
13. Each pump suction and discharge pipe shall include a compression type flexible coupling.
14. Non-slam wafer type check valves shall be required on each pump discharge.
15. An I-beam and trolley of sufficient capacity to accommodate the height and weight of the largest pump and motor shall be required.
16. The floor is to be pitched for drainage to reach the floor drain.
17. Doors shall be provided of adequate size to facilitate the removal of pumps and motors.
18. A 10 lb. ABC fire extinguisher will be required for fire suppression. It will be located on the interior wall next to the entry door.
19. Certified pump curves shall be required.
20. Bronze pump impellers shall be required.
21. Certified pump motor tests shall be required.
22. Three phase power will be required for the pump station with pump motors being furnished with power factor correction capacitors conforming to NEMA standards.
23. Motor control center shall be equipped with voltmeter, ammeter, wattmeter, and running time meter for each pump motor. (Phase failure / reversal protection relay shall be provided).

24. All wiring within the pump station structure shall be run in conduit and meet or exceed the requirements of the National Electrical Code. Control panels and switchgear shall comply with NEMA standards and UL specifications.
25. All surfaces of the pumping equipment including piping, valves, pumps, motors, etc., shall be cleaned to a bright metal surface and receive a protective coating of a high-build epoxy paint system. All surfaces of the pumping station structure shall be coated with durable paint systems and colors approved by the LWD.
26. Minimum pumping flow rates shall be based upon the following :
 - a. Per Capita design shall be 120 gpcd
 - b. Domestic flow shall be based on maintaining 35psi at the highest fixture served or during fire flow.
 - c. Fire flow shall meet Insurance Service Office (ISO) criteria.
27. Recommended pump scheme :
 - a. One variable speed jockey pump to maintain constant pressure.
 - b. Two variable speed service pumps sized at 100% peak hourly flow
 - c. One variable speed fire pump sized as required.
28. Pump management and operational logic shall be controlled by a PLC (Programmable Logic Controller) for constant speed pumps and coupled to a PID (Programmable Integral Derivative) for control of variable speed pumps, as described in item 28. the control system shall have full local and remote (radio telemetry) capability. A written description of the pump system control logic shall be provided including up and down sequencing of pumps, automatic shutdown, pump failure conditions, etc.
29. Pumping station shall be equipped with Allen Bradley SLC 503 or higher controlled SCADA operations system. This equipment shall be compatible and integrated with the LWD primary telemetry system (located at the Water Treatment Plant) using MDS radios and relay system. All costs associated with PLC programming, Intellution I-FIX programming and graphics generation, licensing and proposed operations shall be the contractors responsibility, including the cost per channel for all alarms that will be tied into LWD's auto dialer alarm panel, and the tags required for each function. The cost per channel will be \$156.00 and the cost for each tag will be \$9.40. The LWD shall provide the services of a systems integrator to make the necessary program and graphics modifications to the SCADA system at the Water Treatment Plant at the contractors expense. Minimum capabilities shall include local and remote monitoring and control of station pumps, status and override capability, generator status which shall be on local control, suction and discharge pressures, flow, chemical monitoring, status including no heat, high water, power failure, intrusion and smoke/fire alarms. Additional requirements for power system, reset, KW usage and other criteria may be assigned by LWD to the station, as appropriate.

30. Surge control measures shall be required. VFD's or Smart Motor Controllers (SMC) manufactured by Magnatek, Powermaster, Allen Bradley or approved equal. Secondary mechanical surge control equipment (Ross Valve) will also be required. (See spec sheet).
31. A hydro pneumatic tank(s) rated at 1.5 times the system operating pressure with a combined capacity sufficient to absorb surging conditions and maintain system pressure during low flows shall be provided.
32. A high pressure relief device such as a recirculation or a pressure relief valve (Ross) to be determined by LWD.
33. Suction and discharge water service sampling taps shall be required.
34. Suction and discharge liquid filled pressure gauges with a minimum 4.5" face with 2 lb increments shall be required.
35. All taps will be a minimum of $\frac{3}{4}$ " to prevent tuberculation problems in the sample lines.
36. A chlorine injector shall be in place on the discharge side of the pumps for future chlorination. Also to be included shall be an LMI chemical feed pump with a 10 gallon day tank, a CL17 chlorine analyzer, a sampling sink for residual testing, a wall mounted eyewash station mounted near the chlorinator, and a first aid kit. Sizing of the chemical pump to be determined by LWD.
37. Two fire hydrants shall be installed; one before the station and one after the station. They will be located within a close proximity of the pump house. They will act as a bypass if pumping water cannot be achieved.
38. An electrical meter shall be provided at a convenient exterior location in a NEMA watertight enclosure with a hasp and lock.
39. The exterior grounds shall be suitably landscaped to blend with surrounding features and paved parking for two vehicles shall be required. Ground maintenance will be the responsibility of the association.
40. The pumping station and all associated equipment shall be guaranteed for a minimum of two years. A two year maintenance bond representing 5% of the capital cost of the station shall also be provided. O&M costs shall be incurred by the association through a contract with LWD. The cost of the utilities shall be paid by the association which will include electric, gas, heat, telephone, water, and sewer.
41. All work and materials shall conform in every aspect with applicable Federal, State, and local codes.
42. One set of spare parts for critical electrical and chemical systems shall be required and kept at the pump station.
43. If the Laconia Water Department ever takes ownership and it is not located in a public right-of-way, the pumping station shall be located on a separate parcel of land with warranty deed conveyance to the Laconia Water Department. The size of the parcel shall be suited to accommodate future expansion of the station. The parcel shall be fenced to LWD approval.
44. All plans and drawings must be stamped by licensed engineer; i.e. structural, electrical, etc.

CRITICAL SPARE PARTS

ELECTRICAL (SCADA)

1 - A/B 1746-P3 POWER SUPPLY
1 - A/B DIGITAL INPUT CARD
1 - A/B ANALOG INPUT CARD
1 - A/B 24VDC POWER SUPPLY
1 - A/B 12VDC POWER SUPPLY
1 - A/B DIGITAL OUTPUT CARD
1 - A/B ANALOG OUTPUT CARD

(PART NUMBERS TO BE DETERMINED BY THE SCADA INTEGRATOR)

CHEMICAL

1 REBUILDING KIT FOR LMI CHEMICAL PUMP TO INCLUDE :

ACRYLIC HEAD
DIAPHRAGM
BALL AND SEAT CARTRIDGES
4 - FUNCTION VALVE
SUCTION AND DISCHARGE TUBING