State of Oregon

Department of Environmental Quality Guidelines

Guidelines for Making Sewage Pump Station Plan-Review Submittals

1. To help expedite DEQ's OAR 340-52 review, sewage pump station plan/specification submittals should include:

Copy of any predesign report or study that may have been performed. Copy of system sizing and design basis calcs. For example, normally force-main velocity of 4 to 6 ft/sec should be used to assure pickup and scour of keyed grit, with 3.5 ft/sec as a minimum.

Hydraulics/ headloss calcs, pump curve, and system head curve. The curves should reflect both old pipe conditions and new (C-factors of about 100-120 for old pipe, and about 150 for new pipe at start-up). Pump motors need to be sized to preclude overloading in low-head or zero-head start-up situations.

The pump starts-per-hour calculation should be based on an inflow rate of 50% pump design capacity. The result should be used to calculate the minimum operating pool.

Wetwell buoyancy calculations.

For any uncommon equipment design or sizing calculations, provide manufacturer's curves, cut-sheets, or specs where applicable (such as blowers and airflow meters, electronic level controllers, variable-speed drives, dual force mains, chemical feeders, generators, compressors, etc.).

Plan and profile sketch of force main, unless shown in plans. Show profile and connection details at discharge point. Show any air valves and what type (vacuum release, air release, or combination, with sizing, material specs, cutsheet, housings, and any water hammer calcs).

Wetwell and force main detention time calcs, based on initial conditions at station start-up and at buildout.

Engineer's description of sewage overflow point and subsequent drainage when station or power fails. Describe potential for human or household pet contact, discharge to creek, well contamination, etc.

Describe type of standby power and type of alarm telemetry equipment required or approved by city to assure EPA Reliability Class I with respect to sewage overflows.

If city does not desire to have standby power or telemetry of alarms with 24-hour response at the station, or available on call, then provide copy of city's evaluation and rationale for lesser reliability. Class II station reliability may be justifiable

considering available storage and the power utility's maximum outage for the service grid, or considering the absence of adverse health or environmental impacts due to a sewage overflow.

If the city does not desire to have a water service at the station, then provide a copy of letter or memorandum stating city's waiver of the water service requirement along with city's proposed program or method for maintaining wetwells and cleaning contaminated equipment at the station.

2. A schedule of design data needs to be listed in the plans. Tabulation should be similar to "Pump Station Design Data Example" (attached).

3. A schedule of alarm elevations and alarm conditions needs to be listed in the plans. Include dedicated alarm for the sewage overflow elevation. If a dedicated overflow alarm is not desired, provide copy of city's proposal or method for achieving compliance with DEQ's requirements on reporting raw sewage overflows from the station.

4. The plans should also provide a site plan and electrical/control drawings, including a one-line power supply diagram.

5. Provide copy of engineer's evaluation of capacity of downstream sewers to accommodate pumpage without surcharging.

6. Where an existing pump station is being refurbished, expanded, or evaluated, the engineer needs to conduct a corrosion check of the discharge manhole. Often the manhole and nearby concrete sewer are on the verge of collapse by the time a station is upgraded.

A visual check from street level will not be conclusive. A corrosion check will involve kneeling by the open manhole and probing around the inside cone with a knife or screwdriver blade to determine the extent of concrete deterioration inside the roof of the manhole. The transmittal letter should describe the date, type of tool or probe used, and results.

If significant corrosion is found, then further investigations are warranted. For example, measurement of the extent of crown loss will require a manned descent. To determine the extent of corrosion damage downstream may require TV'ing.

Critical repairs should be made immediately. Sulfide controls may also have to be designed into the project. Discharges of H2S into a gravity sewer should not exceed 0.1 mg/l, in accordance with our guideline for H2S field testing (available on request).

7. Engineer's statement regarding project inspection per OAR 340-52-015(1)(e).

8. Engineer's statement regarding O&M manual. The final O&M manual is due by 50% construction, after which it must be reviewed and approved prior to start-up per OAR 340-52-040(4). Cities in Oregon have had several operational problems including failures and constant callouts due to allowing start-up without an approved manual. The design engineer is the logical author of the manual, and plan transmittals should state whether the engineer has been retained to write it.

9. Copy of city's statement regarding approval of plans, signifying the city engineer's review and concurrence on items 1 - 6 above. We do not want to be reviewing plans without knowing whether they meet city requirements.

10. Technical activities fees are applicable for station reviews as set forth in OAR 340-45-075(3)(b). The fees are typically modified each year and can be found in Table 70F at the following link: http://www.deq.state.or.us/wq/wqpermit/docs/340-045-0075Tables70AH.pdf, or by contacting the applicable regional plan review engineer by phone. Alternatively we can invoice the responsible city or utility through our Business Office. As plans with checks may be diverted to our Business Office, it may often expedite the review process to mail the fee in a separate envelope.

INQUIRIES

Inquiries about these guidelines should be directed to DEQ regional water-quality plan review engineers.

Attachment: Design Data "Example"

SEWAGE PUMP STATION DESIGN DATA EXAMPLE

In plans and reports, print a tabulation of the following items for all sewage pump stations:

PUMP STATION	**Location @ ?**
Type	Duplex self-priming? Submersible?
Pump Type	Constant-speed non-clog? VS?
Capacity	?? gpm @ ?? ft Total Dynamic Head
Pump HP (each)	?? HP
Level Control Type	Bubbler w/ duplex compressors??
Overflow Point	Overflow elevation and location
Overflow Discharge	Trout Creek? Playground? Sinkhole?
Avg. Time to Overflow	?? hours @ zz gpm design avg Q
Auxiliary Power Type	Portable diesel generator?
Location	City Shops? STP?
Output	?? KW?
Fuel Tank Capacity	? hours ?
Transfer Switch	Auto? Manual?
Alarm Telemetry Type	Autodialer ? Radio telemetry?
EPA Reliability Class	I ? or II (if no back-up)?

FORCE MAIN

Length, Type	x00' of ?" PVC?
Profile	Continuously Ascending & z%?
Discharge Manhole	28th and Nobby?
Air Release Valves	None?

Vacuum Release Valves	One at high point, 28th & Annie???

*Average Detention	xy? min @ start-up, yz min @ ult.
Sulfide Control System	Backdrainage? Aeration? None?

AIR INJECTION SULFIDE CONTROL SYSTEM (only if any)

Compressor HP, Type	4.5 HP receiver-mounted reciprocating?
Standard Injection Rate	8 SCFM?
Actual Air Rate	3.2 SCFM @ 50' TDH?
Air Flowmeter Capacity	0.5 - 5 CFM? 30 - 300 CFH?

CHEMICAL FEED SULDFIDE CONTROL SYSTEM SYSTEM (if any)

Type	50% Peroxide? Permanganate?
	12% Hypochlorite?
Pump Type	VS Diaphragm?
Capacity	x gph?
Reaction time	y minutes available
Dose control	meter? stroke counter?

BACKDRAINAGE SULFIDE CONTROL SYSTEM (only if any)

Control Valve Type	Pneumatic Pinch? Knife-gate?
Valve Size	4"?

*If average detention in the main exceeds 25 to 30 minutes between pump cycles at start-up, sulfide controls are probably be needed. (Calculation: detention time, minutes = average gpm daily flow tributary to station / total volume contained in force main, gallons.)