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SECTION 3 - WASTEWATER

PERFORMANCE STANDARDS

Wastewater system design shall meet the policies and guidelines of the current City of Newport Wastewater Master Plan, Newport Municipal Code, and the Oregon Department of Environmental Quality wastewater design guidelines; design system with a seventy-five (75) year life expectancy.

Design public wastewater systems within the public right-of-way (ROW) to provide gravity service to all areas of development.

Design wastewater system capacity for ultimate development density of the tributary area. The system shall allow for future system extension and for future development.

Do not discharge storm water, including street, roof, or footing drainage, into the wastewater system; removed storm runoff by a system of storm drains or by some other method separate from the wastewater system.

Do not discharge unpolluted or non-contact cooling waters into wastewater systems. The overflow drains and filter backwash lines of swimming pools and "hot tubs" shall drain into a wastewater sewer. As a condition of wastewater service, all developments will be required to provide public wastewater lines to adjacent upstream parcels in order to provide for an orderly development of the drainage area. This shall include the extension of waste mains in easements across the property to adjoining properties, and across or along the street frontage of the property to adjoining properties when the main is located in the street ROW. This shall include trunk sewers that are oversized to provide capacity for upstream development.

Locate all City owned wastewater within the public ROW for ease of maintenance, access, control of the facility, operation of the facility, and required replacement/repair. The City Engineer may approve an exception on a case-by-case basis. See Standard Drawing G-051.

Refer to Newport Municipal Code 5.15 Sewer System and Charges for information about City sewer codes.

Dry-wells

The City does not allow sanitary sewer dry wells in any location within 250 feet of a sewer main. Developers will be required to extend the sewer main to the new development for new development tie-in to City infrastructure.

CONFLICTS AND OBSTRUCTIONS

- **Utility Notification:** The contractor shall comply with the rules and regulations of the Oregon Utility Notification Center: OAR 952-001-0010 through 952-001-0090 and ORS 757.993. Provide at least forty-eight (48) hours' notice to all utility offices affected by the construction operation.
- **General:** Contractor may encounter various obstructions during the course of the work. Obtain maps and information regarding underground utilities from the utility owning and operating such utilities, but the City does not guarantee the location of such utilities. If the contractor interrupts the utility services because of the construction operation, the contractor shall notify the utility owner and the

City authorized representative immediately.

- **Protection:** The contractor shall exercise all due care in protecting existing underground and surface facilities and property along the route of the project. This protection shall include, but not be limited to, trees, yards, fences, drainage lines, mailboxes, driveways, shrubs, and lawns. Any existing facilities not specifically designated for alteration or removal that are damaged during construction shall be restored or replaced to an “in kind” or better condition, at the expense of the contractor.
- **Access:** The contractor shall maintain access to all property, including normal delivery service, mail service, and emergency services.
- **Abandoned Utilities:** Properly remove, grout, or plug all abandoned utilities at the discretion of the City authorized representative.

SANITARY SEWER SYSTEMS

Find minimum design standards for sewer facilities in the Oregon Department of Environmental Quality (DEQ) regulations, as detailed in the appropriate Oregon Administrative Rules (OAR), Division 52. City of Newport Design Standards may be more stringent. In cases where the City of Newport Standards are different from the requirements specified by DEQ, use the City of Newport Design Standards. In cases where the City of Newport lacks a design standard, designers shall refer to OAR Division 52, Appendix A – Sewer Pipelines, and OAR Division 52

In places where a gravity solution is not possible, two solutions exist, pressure sewers, and a regional pump station with force main. Regional pump stations will be determined through the City’s Wastewater Master Plan. Where the Wastewater Master Plan defines a regional pump station, all sewer flowing to the wet well will be by gravity. The City does not allow pumping from one pump station to another pump station. In addition, the City does not allow lines or pump stations to connect to the discharge line (force main) of any City owned pump station, until the first manhole at which force main line becomes a gravity flow line.

Designers may propose pressure sewers as an alternative. Pressure sewers are defined where each lot is served with a privately owned, operated, and maintained sewer pump that feeds to a pressure line in the public ROW. Do not connect any City owned or operated pump station to a pressure sewer system. The City Engineer or designee will evaluate each pressure sewer on a case-by-case basis. City does not allow pressure sewers to connect to the discharge line of any City owned pump station. The City is responsible only for the main line and not the individual pressure pumps connected to the main. A single pump station on a pressure sewer system cannot serve multiple lots. Each lot is required to have its own privately owned and operated pressure pump. The City is not responsible for any maintenance or operation of any privately owned pump station. When determining if a gravity system is not possible, the City will consider the long term operational and maintenance costs associated with any pressure sewer solution.

Where the system has no capacity the City does not permit additional flow into the City sewer system. The City defines capacity as the adequate ability to convey additional sewer flow during peak flow periods without violating criteria for surcharge, wet well capacity, or velocity. Distance from a municipal sewer line that has capacity is not a limitation on providing service. If, and only if, the City lacks capacity to provide sewer service to any development, the property owner can elect to consider on-site treatment and disposal for interim sewer needs until city sewer capacity is available. On-site treatment includes, but is not necessarily limited to, traditional septic tanks and leach fields or advanced treatment systems such as membrane technology. The City of Newport, Lincoln County and DEQ must approve the process selected for treatment; the selected treatment shall comply with local, state and federal laws

and regulations. The City allows on-site treatment only after the City Engineer determines in writing that the City's sewer system lacks capacity to provide sewer when the property owner needs the service.

Design any system to treat and dispose of sewer on-site be connected to City sewer within twelve (12) months of sewer system capacity becoming available, as determined by the City Engineer. The City Engineer can extend the twelve (12) month connection requirement to a date or event certain, based on the performance of the onsite system, the anticipated lifespan of the on-site system, the investment in the on-site system and/or other relevant factors. In addition, any on-site treatment system owner will be required to enter into an agreement with the City that clearly identifies the owner's responsibility to maintain and operate the facility. The agreement will also provide that the City is not required to maintain or operate these systems and that should they fail, the land owner is responsible for any necessary repairs or requirements to satisfy State and Federal law even if the laws have been amended since contract initiation with the City. Any federal and/or state permits to operate an on-site system shall be included as an attachment to the agreement. The recorded agreement shall be against the subject property and shall remain in effect even if transferring property. The City may elect that a trust, contract to operate the system, or similar permanent financial mechanism, be established to cover repair and maintenance costs for the system to remain in compliance for perpetuity.

At the time that the City develops sewer capacity to serve a site with an on-site system, the City can require the owner to connect to the City's collection system, per the Newport Municipal Code, if it is located within three hundred (300) feet of any property line, or as required under OAR 340-071-0160. Unless the City extends the connection requirement as provided above, this connection shall occur within twelve (12) months of capacity availability. The expense of such connection will be the responsibility of the property owner. Developer shall pay all applicable connection fees, including system development charges, upon connection to the municipal sewer system.

Approval for use of any alternative to gravity sewer shall be requested in writing.

Submit all design calculations and studies of wastewater conveyance systems in an organized, legible, and professional form for review. These calculations, bearing the signature and stamp of a registered professional engineer, shall also include a thorough list of assumptions used in making the calculations. The City will return all submittals that are not legible, are poorly organized, are inaccurate in the assumptions for the calculations, or are otherwise not in accordance with submittal requirements to the applicant for correction and re-submittal. Any work done on City sewer lines requires a ROW permit. A ROW permit application may be downloaded from www.newportoregon.gov or in hard-copy from the front desk of the Engineering Department in City Hall.

MINIMUM DESIGN CRITERIA

Velocity

Design all wastewater lines on a grade, which produces a mean velocity, when flowing half-full or full, of no less than two (2) feet per second and a minimum slope of .004.

Manning Equation

When calculating minimum pipe slopes and velocities, the engineer shall use the Manning pipe friction formula.

Pipe Coefficient

The minimum pipe roughness coefficient for wastewater sewers shall be 0.013.

Inflow and Infiltration

Add an allowance of 1,000 gallons/acre/day for all land area in the basin served for calculation purposes.

Fats, Oils and Grease (FOG)

All Food Service Establishments (FSE) are required to install a grease removal device (GRD) for the kitchen or food/beverage preparation area. Clean and maintain all GRDs on a regular basis in order to ensure proper functioning and insect free performance.

FLOW CALCULATION

Average sanitary sewage flows shall be calculated using the most current land use zoning, and applying the unit rates shown in Table 4.1 below.

Flows generated by unusual land uses such as institutional or heavy industrial shall be based on actual (preferred) or estimated water consumption records. Base estimates on either an industry standard, or water consumption from a similar use.

Base projected flows for a development on the Wastewater Master Plan and Equivalent Dwelling Units (EDUs). Any subdivision building or proposing a community swimming pool that is connected to a sewer lift station shall be required to provide flow calculations and general information pertaining to volumes being discharged into the City's collection system for cleaning purposes. Additionally, there shall be a requirement mandating this procedure done during off peak hours. Furthermore, the pool maintenance staff shall be required to notify the City Collections staff prior to performing this work.

TABLE 4.1 Basis for Sanitary Sewage Flow Estimation

Land Use	Average Daily Flow
Residential	130 Gallons / Unit / Day
Non-Residential	427 Gallons / Acre / Day
School	347 Gallons / Acre / Day
Medical District Overlay	490 Gallons / Acre / Day
OSU-Cascades	490 Gallons / Acres / Day
Central Business District	185 Gallons / Unit / Day

Equivalent Dwelling Unit Calculations for known site conditions 130 Gallons/EDU/Day

Breakdown by Equivalent Dwelling Units

Residential Use

Land Use	Average Daily Flow
Single Family Dwelling	1 EDU
Two Family or Duplex Unit	2 EDU
Multi-Family	0.8 EDU / unit

Institutional Use

Land Use	Average Daily Flow
Schools	
Kindergarten	0.05 EDU / person

Elementary	0.08 EDU / person
Junior & Senior	0.10 EDU / person
College	0.15 EDU / student
Nursing Home	0.65 EDU / bed
Hospital	0.75 EDU / bed
Library	1 EDU

Commercial Use

Land Use	Average Daily Flow
Retail	1.0 EDU for first 2,000 SF floor area 0.5 EDU / Each additional 2,000 SF
Service & Repair Shop	1.0 EDU for first 1,800 SF floor area 0.5 EDU / Each additional 18,000 SF
Bank & Office	1 EDU / 2,000 SF
Medical, Dental, Veterinary	1.0 EDU / 1,000 SF floor area
Restaurant	1.0 EDU / 600 SF
Automobile service station	2 EDU
Barber Shop	0.30 EDU / Chair
Beauty Shop	0.38 EDU / Chair
Industrial, Manufacturing, Beverage Processor & Commercial Warehouse	0.09 EDU / person
Commercial laundry	2.58 EDU / 1000 Gallons of water use
Laundromat	1 EDU / machine
Theater	0.009 EDU / seat
Parks with restroom	1 EDU
Stadium	2 EDU
Swimming Pool	6 EDU
Dry Cleaners	3.10 EDU / 1,000 SF floor area
Recreational Roller Rink, Dance Hall	0.27 EDU / 1,000 SF floor area
Spa & Athletic facilities	6.67 EDU / 1,000 SF floor area
Armory	1 EDU
Carwash / wash stall	1.17 EDU
Pet Grooming	0.67 EDU / 1,000 SF floor area
Motel, Dormitories	0.40 EDU / room

Peak Factor (Domestic Flows Only)

Calculate sanitary sewage design flows by applying a peaking factor to the average daily flow. Do this by accumulating flows from the upper reaches of the system and multiplying the accumulated average daily flow at specific nodes.

Apply the following peaking factors to obtain the design peak flow at that point:

Average Domestic Flow	Peaking Factor
< 1.0 mgd	3.0
1.0 – 2.5 mgd	2.5
2.5 – 5.0 mgd	2.25
> 5.0 mgd	2.0

A qualified professional engineer shall determine peaking flows for large institutional, commercial, or heavy industrial point sources. Results require approval by the City Engineer or designee.

Base flow calculations on Manning's equation using the following values for n:

Pipe Material	Mannings 'n'
PVC pipe	0.009
HDPE pipe	0.009

Line Diameter and Velocity

Line diameters shall be computed using the procedures above to calculate the peak flow and selecting a diameter that will flow eighty percent full at that peak design flow [sewage depth/inside diameter (d/D \geq 0.8)]. For example:

- A six (6) inch line @ 0.006 ft/ft minimum grade flowing half full = 97.5 gpm
- An eight (8) inch line @ 0.004 ft/ft minimum grade flowing half full = 171.5 gpm

Design slopes and diameters for gravity sewers to maintain a minimum velocity of two (2) feet per second (fps) at the average daily flow rate. However, no design shall ever exceed eight (8) fps, to ensure the liquids do not surpass the solids.

Minimum Grade (Gravity)

Designers shall use the following minimum grades (based on PVC Manning's $n=0.013$, velocity two (2) feet per second (fps) at fifty (50) percent flowing full). Reference OAR 340 Division 52 for additional information:

Pipe Inner Diameter (inches)	Slope (feet per 100 feet)
4	1.5 min, 2 typ
6	0.75
8	0.40
10*	0.25
12	0.19
16	0.14
18	0.11
21	0.09
24	0.08
30	0.06

*10" sewer pipe not permitted with new construction unless otherwise approved by the City Engineer.

Inverted Siphons

Inverted siphons not permitted. If there are no practical alternatives for gravity sewer service without a siphon .

Flows in Pressure Sewers

Base flow calculations for pressure systems on the Hazen and William's equation using the following value for C:

Material	C Value
PVC	135

Minimum Velocity

Select line diameters for pressure sewers and force mains to maintain a minimum velocity of three (3) feet per second (fps) at the minimum pumping flow rate for variable flow pumps.

Maximum Velocity

Maximum velocity along any point in pressure sewers, including force mains, shall be eight (8) feet per second (fps).

Pressure Sewer Appurtenances

Design pressure sewers and force mains with a constant downstream elevation rise, with the discharge being the highest point in the line. Pumping downhill (the discharge elevation being lower than the pump elevation) not allowed.

Provide with freeze protection including insulated enclosures for all air or air/vacuum relief valves. A professional engineer shall design system. Designers shall assume minus ten (– 10) degrees F sustained outside temperature. Submit design calculations for air release valves with the plans.

Connection to Existing Sewers

Connections to, and extensions of, existing sewers will occur to facilitate new development. The City places certain requirements on the design engineer as to the permitted methods and/or locations. Make connections to existing manholes with the following guidelines:

- Core all manhole wall holes and base channels; approved Rubber Boots shall be used.
- Where the invert of the connecting pipe is two (2) feet or less above the invert out elevation, an inside-drop will be constructed utilizing Portland cement concrete. Wastewater entering the manhole will follow a smooth concrete channel transitioning evenly from the invert of the inlet pipe into main channel. City will not approve a wastewater design that allows wastewater to fall freely to the manhole base.
- Where the invert of the connecting pipe is more than two feet above the manhole shelf, the contractor will be required to construct an inside drop per Standard Drawing S-220 with the inlet pipe invert being located at the manhole shelf. The wastewater entering the manhole will follow a smooth concrete channel transition from the inlet pipe into the main channel.
- Core plastic pipe inserted thru manhole; install with Rubber Boot.
- Where the invert is required to enter below the shelf of the manhole, the inlet pipe will not enter below a point where the crown of the new inlet pipe is below the crown of the outlet pipe. If base damaged during this process, rebuild the manhole base. The wastewater will enter the main flow in a smooth channel transitioning from the inlet pipe to the main channel.
- No pipe will enter an existing manhole where the angle between the incoming flow and the outgoing flow is greater than ninety (90) degrees.

Remove the entire cleanout assembly, including the wye, when extending sewers from cleanouts.

Make new building service laterals at existing tees where possible.

When tees do not exist on the Public Wastewater Conveyance System, the new lateral sewer will enter the collection system through a "cored" opening with an approved connector saddle tap, or 'cut in' tee. Complete this connection in conformance with City standards.

ALIGNMENT AND COVER

ROW Location

Wastewater lines shall be located north and west from the ROW centerline as defined in Standard Drawing G-051. Make all changes in pipe direction at a manhole.

Sewers shall be located in the street ROW. If streets have curved alignments, the center of the manhole shall not be less than six (6) feet from the curb face on the outside of the curve, or the wastewater centerline less than six (6) feet from the curb face on the inside of the curve. City does not allow curved alignments in wastewater lines.

Do not place utility infrastructure within one foot of a survey monument location noted on a subdivision or partition plat per ORS 92.044 (7).

Waterline Crossings

Sanitary sewer line and water line crossings shall be designed per OAR 333-061 and/or AWWA standards, whichever is most stringent.

Minimum vertical pipe separation shall be twelve (12) inches, with reduction to six (6) inches vertical separation with approval from the City Engineer on a case-by-case basis.

- When a sanitary sewer main or lateral crosses a water main or lateral, the bottom of the water line shall be one-and-one-half (1.5) feet or more above the top of the sewer line, wherever possible. Center one full length of the water line at the crossing.
- Where water line crosses over the sewer line with a clearance of less than one-and-one-half (1.5) feet, or where the water line crosses under the sewer line, construct the sewer line with AWWA C-900 PVC pressure pipe for one full length of pipe. At the intersection, center length of pipe at a right angle with ten (10) feet on each side of the crossing water line. Install pipe with PVC gasket couplings specifically designed for transition from gravity sewer pipe to PVC water pipe.
- Provide a written report of findings indicating the reasons for reducing separation.

Minimum Cover

Place all new residential hillside subdivisions mainline and lateral sewers in the street at a depth sufficient to drain building sewers on the low side of the street.

Place wastewater sewers for residential areas in the street with the following minimum cover, Standard Drawing G-051:

Building Service Lateral - Six (6) feet
 Trunk and Collector Sewer
 In the roadway - Eight (8) feet
 In easements - Eight (8) feet

City Engineer may approve alternative cover depth where the topography is relatively flat and existing sewers are shallow.

For gravity sewer, the minimum inside diameter shall be eight (8) inches, unless otherwise approved by the City Engineer. Minimum size for pressure-collection system lines shall be four (4) inches, unless otherwise approved by the City Engineer.

Relation to Watercourses

Generally, the top of all wastewater sewers entering, crossing or adjacent to streams shall be at a sufficient depth below the natural bottom of the streambed to protect the sewer line. One (1) foot of cover is required where the sewer is in rock; three (3) feet of cover is required in other materials. In paved channels, place the top of the sewer line at least six (6) inches below finish grade of the bottom of the channel, except as provided above.

Sewers located along streams shall be located outside of the streambed and sufficiently removed from there to provide for future, possible stream channel widening. All manhole covers shall be watertight at or below the 100-year flood elevation.

Design sewers crossing streams or drainage channels to cross the stream as nearly perpendicular to the stream channel as possible, and shall be free from change of grade. The minimum cover shall be thirty-six (36) inches from the bottom of the streambed or drainage channel. Pipe material shall be Class 52 ductile iron or ASTM C-900 PVC with a twenty (20) foot length of pipe centered on the stream or drainage channel centerline. The pipe shall extend to a point where a one-to-one slope begins at the top of the bank then slopes down from the bank away from the channel centerline and intersects the top of the pipe. (No tees allowed in DI runs).

If designer is unable to meet the above cover requirements, a concrete encasement will be required. The City Engineer will review each deviation from the above requirements on a case-by-case basis.

SEWER MAIN DESIGN

Sewer facilities shall be designed using alignments in public ROW. Sanitary sewers shall be located as close to the roadway centerline as possible or centered within the ROW when no roadway exists. Sewers on curved roadways may vary from the centerline to minimize the use of manholes; however, the manholes themselves shall be located as close to the roadway centerline as possible. On narrow streets where locating the manhole on the center line of the roadway would force a water line in the same roadway to be located outside the paved area or within close proximity to the curb line, the manholes shall be located as close to six (6) feet from the roadway centerline as possible.

All sewer improvements shall terminate at a sewer manhole. City will allow stubbing sewer pipe for future extension for approved multi-phased, master planned developments only where approved by the City Engineer.

Sewer shall maintain a minimum ten (10) foot horizontal separation from all water mains and water services. Franchise utilities shall maintain two (2) feet horizontal separation and twelve (12) inches vertical from sewer services and ten (10) feet horizontal separation from sewer mains. City will grant a six-inch vertical separation from franchise utilities on a case-by-case basis. City does not allow ninety (90) degree fittings for sewer mains, unless otherwise specified. Sewer mains within private property, outside City of Newport ROW, shall be within a recorded sewer easement not less than twenty (20) feet wide, with the pipe centered in the easement. Additional easement width may be required as determined by sewer depth and topographic conditions, as determined by the City Engineer. See City of Newport Standard Drawing G-051 for utility locations.

Remove abandoned sewer mains from the ROW. The City prefers to remove sewer mains within City sewer easement, on private property, but contractor may abandon pipes in place, with approval from the City Engineer, provided City is abandoning sewer easement.

Pipe and fittings shall consist of one type of material throughout. City does not allow interchanging of pipe and fitting material.

Sanitary sewer pipe shall have flexible gasket joints. Joints on all fittings shall be the same as the joints used on the pipe. Furnish caps or plugs with each fitting, outlet, or stub, as required, with the same type of gasket or joint as the pipe.

Clearly identified each piece of pipe and fitting as to strength, class, and date of manufacture.

Depth

Minimum cover from finished grade to the outside top of the pipe for all sewer lines except sewer services shall be thirty-six (36) inches. If conditions do not allow for a thirty-six (36) inch depth consideration, the City Engineer will evaluate alternative on a case-by-case basis.

MANHOLES

Manholes shall conform to ASTM C 478.

Manholes shall be located at all changes in slope, alignment, pipe size, pipe material, and at all pipe junctions with present or future wastewater sewers. Manhole spacing shall not be greater than five hundred (500) feet. See Standard Drawing S-200 for manhole designs. They are suitable for most conditions. Do not show new designs or revisions on the construction drawings unless the standard designs are not suitable.

New or revised designs may be necessary if:

- One or more of the sewers to be connected to the manhole is over thirty-six (36) inches in diameter (smaller diameters may require a special design if the manhole is at an alignment change.)
- Connecting several sewers to the manhole.
- There is less than ninety (90) degrees between the incoming and outgoing sewer.
- The manhole will be subject to unusual structural loads.
- Diversion or other flow control measures are required.

Where encountering one or more of the above conditions, the design engineer shall draw the manhole base to determine if it is feasible to use designs shown in the Standard Drawings. It may be necessary to restrict installation options to a specific Standard Drawing specified by a note on the construction drawings. The City Engineer will need to approve design if a special design is required for any reason, it will be necessary to show the Drawing Number on the construction drawings and provide structural calculations as needed.

MANHOLES (PRESSURE)

Manholes are required in all pressure sewers where placing cleanouts, air release, or vacuum relief devices. Cleanout manholes shall not be more than five hundred (500) feet apart. As with gravity manholes, manholes shall be located on or near to pavement centerline.

MANHOLES (PRESSURE TO GRAVITY SEWER)

Place manholes where pressure sewers connect to gravity main lines after the point at which the

pressure line is in laminar non-pressurized flow. Install a minimum of one joint of gravity pipe prior to the manhole. Install the joint of gravity pipe at minimum grade, as practical.

MANHOLES (GRAVITY)

Manholes shall be located in a manner to provide unobstructed access for maintenance and inspection, to prevent stormwater infiltration, and to minimize the possibility of damage from vehicles or injury to pedestrians. Extend sewer mains as necessary to place new manholes at street intersections. Manholes shall be located on pavement centerline, at intersections, with spacing limited to not more than five hundred (500) feet. When no intersection exists within the spacing requirements, manholes shall be located in the pavement centerline. On narrow streets where locating the manhole on the center line of the roadway would force a water line in the same roadway to be located outside the paved area or within close proximity to the curb line, the manholes shall be located as close to six (6) feet from the roadway centerline as possible.

Manholes shall not be located within twenty-five (25) feet of street sag low points. Manholes located on mains larger than twelve (12) inches in diameter or at a pressure/gravity sewer intersection may require a lining for corrosion resistance.

Manholes for all piping in excess of twelve (12) inch diameter, **or manholes that have three or more inverts** must be sixty (60) inch in diameter and use an eccentric cone configuration with the manhole opening located over a point opposite the outlet pipe. All other manholes shall be a minimum of forty-eight (48) inch-diameter and use an eccentric cone configuration with the manhole opening located over a point opposite the outlet pipe.

City does not require existing forty-eight (48) inch-diameter manholes be replaced with sixty (60) inch-diameter manholes when additional invert(s) are added unless they meet the criteria discussed above. Separate the existing and new inverts by a minimum of twelve (12) inches in all directions.

Design each manhole with a minimum fall through the invert of not less than one-tenth (0.1) foot. Invert fall through manholes that divert flow more than forty-five (45) degrees or are sixty (60) inch diameter shall have a fall through the invert of not less than two-tenths (0.2) foot. At no time shall manholes direct flow more than ninety (90) degrees, preferably less, unless at intersections with multiple incoming inverts.

For pipes that are larger than eight (8) inch diameter, internal invert drops are limited to not more than two (2) foot differential between the invert in and the invert out. For pipes that are eight (8) inch diameter and smaller the internal invert drop is limited to one (1) foot differential between the invert in and the invert out. The City encourages designs that avoid the use of external drops through the adjustment of the grade of the pipe entering the manhole. Where designer cannot adjust pipe slope because of excess sewer velocities, inside-drops are required on all manholes when the differential exceeds requirements.

Alternate Manhole Features

For some alternate manhole features see Standard Drawing S-200, S-210, S-220, S-250, and S-260. Specifically note on the construction drawings where these features are required. Some examples are:

- Use flat tops in lieu of standard cones where there will be less than five (5) feet between the lowest pipe invert elevation and the top of the manhole lid. Do not use flat top manholes if a standard

frame will work with depth. Pre-approval required.

- If design Engineer expects floodwaters to cover manhole top or be below one hundred (100) year flood elevation use watertight manhole frames and covers. Avoid such conditions wherever feasible. For manhole joint seal, apply wrap-around heat-shrink protection sleeves as approved by City Engineer. In remote locations, the finish grade of the manhole casting needs to be two (2) feet above existing grade.
- Tamperproof manhole frames and covers are required in all areas outside the paved public ROW.

Establish standards for elevation differences at manholes to compensate for normal energy losses and to prevent surcharging of a sewer by a larger sewer. For purposes of slope calculation and for establishing elevation differences, give elevations at the intersection of the sewer centerlines (usually the center of the manhole). The rules for elevation differences at manholes are:

- The crowns of incoming sewers shall be at least as high as the crown of the outgoing sewer.
- If the incoming and outgoing sewers are of equal size and are passing straight through the manhole, design a two-tenths (0.2) foot. difference in invert elevations.
- If sewers intersect or the alignment changes at the manhole, the invert elevation difference shall be at least two-tenths (0.2) feet for zero (0) to forty-five (45) degrees of horizontal deflection angle, and at least two-tenths (0.2) feet for over forty-five (45) degree of horizontal deflection angle. City does not allow horizontal deflection angles greater than ninety (90) degrees.
- The slope of a sewer within a manhole shall be no less than the slope of the same sewer outside of the manhole.
- Drop connections are required when the vertical distance between flow-lines exceeds two (2) feet. Specify the diameter of the drop connection on the construction drawings. Provide smooth flow-lines with vertical distances of less than one (1) foot wherever feasible.
- All connections must enter the manhole through a channel in the base when connection to existing manholes. This does not include drop connections. The City Engineer shall approve inside-drop connections. Construct drop manholes per Standard Drawing S-220.
- Channels manhole base to maintain minimum velocity of no less than two (2) feet per second (fps). See Standard Drawing S-200 and S-210. Channels shall also allow for insertion of televised sewer inspection equipment into the pipe from outside of the manhole. Make all pipe connections with an approved Rubber Boot. Where conditions make compliance with these rules impractical, the City Engineer may make exceptions on a case-by-case basis. It will be necessary, however, for the designer to provide a complete analysis of the need for such designs. Design acceptance requires pre-approval by the City Engineer.

Manhole Placement

Where manholes are adjacent to but outside paved ROW, construct a paved access pad sufficient for service equipment to operate without blocking the traveled way. Where manholes are away from paved

ROW, a fourteen (14) foot wide two (2) inch thick paved all weather access road, with a six (6) inch base, or as approved by the City Engineer, shall be installed centered over the sewer line with six foot by six foot (6' x 6') asphalt or concrete pad around manholes. This paved access road shall be a minimum of fourteen (14) feet in width. Support facilities such as, but not limited to, vehicle turnaround or fencing with a lockable gate may be required at certain manhole locations. These requirements will be at the determination of the City Engineer or designee.

Location of manhole frame and covers in a vehicle wheel track is not acceptable. Location of the center of manholes within five (5) feet of the curb line is not acceptable. Location of manholes outside of paved areas is not acceptable.

SEWER LATERALS

Design sewer services perpendicular to the main sewer whenever possible and shall not be connected into any manhole. All sewer services shall have tracer wire and marking tape installed in conformance to Standard Drawing S-200.

Gravity sewer services are not to be less than four (4) inches in diameter. All other gravity sewer services and all pressure sewer services shall be the appropriate diameter for the application as specified by the designer and approved by the City Engineer.

Ninety-degree fittings for sewer services not permitted, unless otherwise specified. Sewer services shall have not less than twenty-four (24) inches of cover at the property line. If the service crosses a roadside ditch, or any low area, obtain twenty-four (24) inches of clearance at the crossing, measure for solid compacted backfill.

For all residential, commercial, industrial, or institutional parcels, each lot can only have a single service. On lots with multiple buildings, each building is required to have at least one service, but those services can only feed to a single service connected to a sewer main.



Figure 1: PVC Tee Fitting

Sewer services that cross property lines are discouraged and require approval from City Engineer. Width of the recorded easement is to be determined at the time of sewer approval, typically 10 feet wide with service centered in the easement. Abandoned pipes are to be removed per NMC (see Chapter 9.05 Utilities). Submit request to cut and cap all unused or abandoned service pipes within the ROW at the main to the City Engineer. Sewer services are the ownership of the property owner they service. The property owner is responsible for the maintenance of the sewer service from the main into the property, including any private pumps required for pressure sewer systems.

Where properties have sewer service utilizing a pressure sewer system, install a check valve on private property at the ROW line. Beyond the check-valve, and under a City plumbing permit, install an individual pump with sump in conformance to the Oregon State Plumbing Code. The homeowner or homeowner group owns and maintains all private pumps on their property. No lots shall pump into a force main (a sewer main close to a City pump station where force in main has not dissipated sufficiently for sewer main to have transitioned to a gravity sewer) without the approval from the City Engineer.

Service laterals are those public wastewater lines to which a private building sewer connects. See Standard Drawing S-300.

Connect each individual building site by a separate, private, building wastewater service line connected to the public sewer. Multifamily, commercial and industrial service laterals shall connect into the public mainline at a manhole. City Engineer may approve combined wastewater service lines but only when the property is such that, legally, it cannot be further divided. An example of this is a residential lot with a house and an unattached garage or shop with plumbing facilities.

The minimum inside diameter of a wastewater service lateral shall be four (4) inches and shall be equal to or greater than the building sewer diameter. Build service laterals to the same construction standards and of the same materials as the wastewater mainline. Laterals must be green colored pipes. Place service laterals in general ninety (90) degrees to the main wastewater line to avoid excessive exposure to other utilities during excavation for construction or maintenance of the service lines. The City Engineer may approve angles other than ninety (90) degrees, forty-five (45) degree minimum, special conditions such as cul-de-sac lots on a case-by-case basis. Make service line connections at manholes if such placement would not interfere with other present or future connections to the manhole.

The minimum slope of wastewater service lines shall be two (2) percent (1/4 inch per foot). City Engineer may approve a slope of one (1) percent, one-eighth (1/8) inch per foot, for unusual conditions on a case-by-case. It will be necessary, however, for the designer to provide a complete analysis of the need for any wastewater service lateral slope less than two (2) percent. The maximum slope shall be one hundred (100) percent, forty-five (45) degrees, or one (1) foot per foot.

Tees for service laterals, with a slope greater than one hundred (100) percent, shall have one-sixteenth (1/16th) or one-eighth (1/8th) bend to provide proper grade for service laterals. Install service laterals to the street ROW line or easement line. Install a watertight plug in end of the lateral with a two inch by four inch (2" x 4") standard wood marker placed from pipe invert to twelve (12) inches above finish grade. Paint the two inch by four inch (2" x 4") top green and mark with the depth of the lateral measured from ground to invert of pipe. Curb line and concrete gutter surface shall have an "S" branded into both surfaces at lateral crossing.

SEWER LATERAL CONNECTIONS

Sewer laterals shall be designed to connect to a main sewer line. Connection to a City sewer structure is prohibited. All sewer lines must have a cleanout in the ROW for aid in City location of laterals during utility locate requests and research of problems in the sewer system. Sewer laterals are owned and maintained by the property owner from building to connection at main line. City personnel will assist property owners within the purview of their job descriptions, but will not work on private lateral repairs.

Wyes

The City prefers the use of wyes in connecting laterals to the main. Wyes are installed in the direction of flow.



Figure 2: PVC Wye Fitting

Tees

Although tees may be used to connect a lateral to the main, they are not the preferred method.

Insert-a-tee

City does not allow use of insert-a-tees.

BYPASS PUMPING REQUIREMENTS

Plan for by-pass pumping when installing new laterals or repairing/retrofitting existing sewer laterals.

Bypass pump sanitary sewer and stormwater flows around the pipe section or manhole being repaired, replaced or retrofitted by plugging an existing upstream manhole and pumping the flow around the Work to a downstream manhole. Submit a bypass pumping plan to the Engineer at least forty-eight (48) hours before beginning bypass pumping. Use a pump with adequate capacity to handle existing flows and additional flow due to rain. Pumps shall not exceed a noise level of eighty-six (86) dB at a distance of fifty (50) feet. Do not operate bypass pumps at night except in an emergency. Do not discharge raw sewage onto private property or city streets, or into storm drain systems.

CLEANOUTS

City does not approve cleanouts as substitutes for manholes on public sewer lines. City permits cleanouts at the upper end of a sewer extension in preparation for a future construction phase and main line extension. If future extension requires a change in sewer alignment or grade, a manhole will be required at the cleanout location.

A clean out is required between public and private property just inside the ROW for location of lateral. The cleanout shall be flush with surface for easy location. Check the Oregon Specialty Plumbing Code for additional cleanout requirements on private property.

City does not allow the use of plastic cleanout lids in sidewalk areas. See Standard Drawing S-300 for cleanout box and cover.

WASTE CONTROL FROM INDUSTRIAL DEVELOPMENTS

Where necessary, and as determined by the City, any user of the sewer system shall provide, at their own expense, such preliminary treatment as may be necessary to reduce objectionable characteristics, or constituents within the City's prohibited discharges, that may cause pass through or interference, or to comply with water quality standards.

Some industrial facilities shall install a control vault to facilitate the observation, measurement, and sampling of the process wastewater from the facility. Such a control vault, when required, shall be twenty-four (24) hour accessible and constructed in accordance with plans approved by the City. The owner shall install and maintain control vault at his/her expense. After installation is complete, the owner shall provide the City with keys necessary to access the vault.

Plans, specifications, and any other pertinent information relating to proposed preliminary treatment facilities shall be submitted for the approval of the City Engineer or designee. Approval of plans and inspection of construction shall not relieve the owner from complying with discharge limitations.

The development is considered a Significant Industrial User (SIU) if the development will discharge

25,000 gpd or more and an additional permit will be required. City Engineer or designee shall issue this permit.

Industries that may be required to install a control vault include, but are not limited to:

Adhesive Manufacturing	Aluminum Forming	Any Industry Requiring Pretreatment
Asbestos Manufacturing	Battery Manufacturing	Black Carbon Manufacturing
Brewery	Coil Coating	Copper Forming
Dye Manufacturing/Processing	Electrical and Electronic Components Manufacturing	Electroplating
Feedlots	Ferroalloy Manufacturing	Fertilizer Manufacturing
Food Processing	Foundries (Metal Molding/Casting)	Glass Manufacturing
Frain Mills	Hospitals	Ink Formulation
Inorganic Chemical Manufacturing	Iron and Steel Manufacturing	Laboratories
Laundries	Leather tanning and finishing	Mechanical Product Manufacturing
Metal Finishing	Nonferrous Metal Manufacturing	Paint Formulation
Pesticide/Chemical Manufacturing	Petroleum Refining	Pharmaceutical Manufacturing
Porcelain Enameling	Printing and Publishing	Pulp, Paper and Paperboard Manufacturing
Rubber Manufacturing	Soap/Detergent Manufacturing	Steam Electric Power Generation
Sugar Processing	Tars, Asphalt Paving, and Roof Material Manufacturing	Textile Mills
Timber Products Processing	Wineries	

SAMPLE MANHOLE

Sample manholes must be located on private property, unless otherwise approved by the City Engineer. Sample manholes shall be located in a manner to provide complete accessibility, to prevent storm water infiltration and to minimize the possibility of damage from vehicles or injury to pedestrians. Sample manholes shall be located away from traffic and parking. Sample manhole placement shall allow easy access twenty-four (24) hours per day. Do not erect fences or walls around the manhole blocking access. Where sample manholes are constructed in unpaved areas, a 6' x 6' x 6" thick concrete pad shall be constructed around the rim.

Construct sample manholes on all commercial and industrial properties. Where there are multiple buildings on a site, the City Engineer may require each building's service lateral to have a sample manhole. Sample manholes shall always be installed downstream of a grease trap or oil water separators, when applicable. Place sample manholes connected to pressure sewer systems prior to onsite pressure-sewer manhole.

Sample manholes do not require sulfide resistant material. Drops between the inlet and outlet invert shall be five (5) percentage minimum or match existing pipe slope where installed on an existing service line.

When sample manholes are located on private property, the Building Department will inspect the sample manhole. The sample manhole will be inspected per Oregon Specialty Plumbing Code.

WASTEWATER PUMP STATION DESIGN

The City's policy is to install gravity sewer in all situations unless a design demonstrates to the City that gravity cannot service an area. The City of Newport recognizes that there may be cases where a sewer

pump station will be required due to topography or other reasons. In any case where a sewer pump station is being proposed, it needs to be verified in the most currently adopted Wastewater Master Plan that it is also showing the need for a pump station in the proposed location. There may be times where the Wastewater Master Plan does not reflect the desired location of a pump station in which case Developer must request a waiver. In such cases where requesting a sewer pump station through a waiver process, the designer should allow additional time for review. In no case will the City allow a pump station to connect to another force main or pressure sewer. Any pump station must have a dedicated force main that flows to a gravity manhole.

The City of Newport requires strict compliance with Oregon Revised Statute 672 for Professional Engineers. The professional design engineer must have had prior experience in designing similar systems. Unless otherwise indicated by the City, prior to the initiation of a study for any new pump station and/or sewer project, the Design Engineer shall submit qualifications for review, and approval by the City.

Design of pressure sewer facilities and sewage pumping stations shall conform to the City of Newport Standards and Specifications and the Oregon Department of Environmental Quality (DEQ) regulations as detailed in the appropriate Oregon Administrative Rules (OAR), Division 52. Designers shall refer OAR Appendix B – Raw Sewage Lift Stations, for detailed criteria.

All raw sewage pump stations shall use submersible pumps in the wet well. In some cases, the City will allow an immersible pump designed in a wet/dry well configuration. This will be determined at pre-design.

Provide all pump station mechanical equipment provided by a single provider, including the pumps, base, guide rails, etc. All electrical devices must be UL or CSA approved, and meet all NFPA and NEC codes and NFPA codes regarding classified areas. All pump stations are subject to submittal to DEQ for approval.

City maintained pump stations shall be located in dedicated tracts of land owned by the City or, when approved by the City Engineer, in a City of Newport easement. A hydrant shall be located at the frontage of the tracts / easement for cleaning the pump station wet well. The Design Engineer shall provide pump operation data, including pump curve, total dynamic head and calculations used to derive peak flow rate.

Schedule a pre-design meeting with the City. At the pre-design meeting, the City will provide a list of requirements for the pump station improvements. The Design Engineer shall come to the meeting with the design service area and anticipate flow rate information development by the service area. Prior to beginning the final design, the Design Engineer shall submit a pre-design report to the City for review, covering all aspects of the Pump Station Design, as described in the pre-design meeting and herein.

The following additional guidelines supplement the Oregon Standards.

Wet-wells

All Wet-wells, shall be concrete epoxy lined self-cleaning design per ASTM standards. A precast, circular Wet-well design is required unless otherwise approved by the City Engineer. City Engineer will review pre-packaged pump stations with fiberglass Wet-wells on a case-by-case basis, complying with Flygt standards or approved equal. Joints shall be keyed rubber ring per ASTM 443 with mastic gaskets and be

waterproof. The Design Engineer shall conduct a leak test by the City Observer with written documentation of the test provided.

Floors shall be sloped to drain to pump at a minimum of forty-five (45) degree.

The top of the Wet-well and associated valve pit shall be flush with the surrounding pavement. Top deck and lid of Wet-well and valve pit shall be flush with the surrounding pavement/grade with properly sized 316 Stainless Steel gooseneck vent installed in top of Wet-well.

The invert of the inlet to the Wet-well will be located in such a manner to reduce the turbulence in the Wet-well. This may require the pipe be sloped outside the Wet-well from the normal pipe depth with maximum slope of twenty-two-and-one-half (22.5) percent.

The Design Engineer shall calculate the buoyancy potential for the Wet-well assuming ground water level at the ground surface and an empty Wet-well. Use a factor of safety of a minimum of one-and-one-quarter (1.25) in the calculation and as deemed appropriate by the Design Engineer and approved by the City. Invert of inlet above operating flow level and designed to reduce turbulence.

Working Capacity

The minimum working capacity of the Wet-well, from pump off to pumps on, shall be determined at pre-design based upon estimated peak inflow rates and pump manufacturers recommendations.

Emergency Capacity

The emergency capacity of a wet well may be required under certain circumstances and shall be reviewed and approved by the City on a case by case basis and the City shall provide design criteria that must be met. This will be determined at pre-design.

Design Flow

Design pump stations and related components to discharge Peak Hourly Flow (PHF). The City shall review final design PHF for approval. Calculate the PHF using a combination of the following parameters:

- Average Residential Per Capita Flow per the City of Newport Collection System Master Plan.
- Infiltration and Inflow Allowance per the City of Newport Collection System Master Plan.
- Peak Hour (Diurnal) Flow Peaking Factor per the City of Newport Collection System Master Plan.
- Non-Residential Flow Factors per the City of Newport Collection System Master Plan.
- Apply Seasonal Peaking Factors per the City of Newport Wastewater Master Plan.

The Design Engineer shall review the City's Collection System Master Plan and DEQ guidelines for pump stations and develop the flow calculations for review and approval by the City of Newport in the Preliminary Design Report.

Design Life

Design and size Wet-wells to accommodate for the build-out within the identified basin(s) contributing to the pump station, unless otherwise approved by the City. Size and design pumps, motors, electrical systems and related components for a minimum twenty (20) year service life, unless receiving approval otherwise by the City. Structures shall be capable of a minimum seventy-five (75) year design life.

Wet-well Wiring

Submersible pump Wet-wells shall incorporate an electrical section for access to electrical boxes and seal-offs. The electrical section shall have a separate thirty (30) inch square hatch, a poured concrete

bottom, a minimum of eighteen (18) inches deep, and be open to the Wet-well. This area shall use explosion-proof seals and junction boxes supported and fastened to the floor directly under the hatch opening.

All pump cords and float cords shall run from the float suspension rod to the electrical section of the Wet-well vault. Pump power lines and float control lines shall terminate into copper-free, explosion-proof junction boxes. Boxes are to be traffic rated and approved by the City.

Acceptable products are:

- Utility Vault Hatch: Cat. # 3030 P, or
- Utility Vault Hatch: Cat. # 3030 AL

The invert of the lowest influent pipe to the Wet-well will enter no more than one (1) foot above the lead pump invert on setting, to reduce the turbulence in the Wet-well. This may require that the pipe be sloped outside the Wet-well from the normal pipe depth with maximum slope of twenty-two-and-one-half (22.5) degrees. Calculate the emergency storage time in the Wet-well to the invert elevation of the influent pipe in the last manhole prior to the sloped section.

Level Control

Provide level control by the use of a submersible level transducer or radar sensor located inside the wet well. Install a redundant level sensor. Supply one High-High level sensing float-switch type alarm in the Wet-well to provide backup pump start control and alarming in the event the primary level sensors become inoperable. This float switch will insure the lead pump activates to pump contents of the Wet-well out in the event of a primary level control failure.

Float controls shall be utilized as a redundant high and low alarm device and pump control capable of by-passing the control circuit, unless as determined by the City of Newport. The high level PLC and redundant float set point shall initiate the operation of the standby pump along with the high-level alarm. Use separate contacts for the alarm and operational points. Float controls shall be intrinsically safe and motor starters shall be NEMA rated. Float switches shall be of a weighted design, which do not require tying off in order to tip and operate properly. Floats shall be individually hung, at a distance no less than eight (8) inches apart from each other, from stainless steel uni-strut fastened to the concrete with stainless steel hardware and installed in such a manner as not to interfere with pulling pumps for maintenance and free of water turbulence.(see float suspension detail). Floats and other level control shall be intrinsically safe, run in their own conduit system, and terminate in their own explosion proof J-box. All clamps, straps, fasteners and other hardware shall be stainless steel.

Use all applicable NEC and NFPA 820 requirements for explosive environments.

Hardware

All hardware and fasteners inside the Wet-well shall be stainless steel. Hatch assembly shall align with the slide rail system for pump removal. Rails shall be one piece, solid stainless steel construction of a two-rail design. Wet-well and valve pit access lid shall be as manufactured by Utility Vault 4872AL four-foot-by-six-foot (4' x 6') Double Door Aluminum suitable for H₂O loading with no cross bar (no manhole lids).

All wet well hatches will include an OSHA approved fall protection grating. It will be a minimum of T-316 stainless steel, two-piece, with a latch to hold it in the open position. Suggested manufacturers are

Flyght and Halliday Products. All hatches shall be full traffic rated suitable for H2O loading.

Pumps

All pump stations owned and maintained by the City of Newport shall be of immersible motor construction, unless otherwise determined by the City of Newport. Design pumps for continuous operating service for pumping raw, unscreened sewage, constructed to meet the intended service.

Mount the pumps on a 316 stainless steel guide rail lift out system provided by the manufacturer. The pump shall meet NFPA 820 and NEC requirements, be explosion proof, and shall be capable of passing a minimum three (3) inch solid diameter sphere. Specify three-phase services. Require single-phase power only for pumps with a maximum power of five (5) horsepower only as explicitly approved by the City.

The pumps shall be supplied by a distributor authorized to service them throughout warranty period and afterwards. The manufacturer shall warrant the pumps for a minimum period of two (2) years after the City has accepted them into service. Manufacturer shall provide certified pump tests for each pump installed.

All wetted parts shall be compatible and suitable for application with municipal raw wastewater and the corrosive environment associated with a typical municipal pump station, in addition to the specific materials requirements specified herein. Provide each pump with a stainless steel, stamped nameplate indicating the serial number, rated head and flow, impellor size, pump speed and manufacturer's name and model number.

Select Compatibility-Pumps and pump station equipment considering compatibility with other City Pump Stations. The City of Newport shall approve final selection.

The Design Engineer shall provide system curves that indicate the required pump operating conditions. Develop system curves for static head and dynamic losses due to suction and discharge piping, valves, and other sources of head loss. The Design Engineer shall select pump(s) that operate under the determined system curve conditions with the highest efficiency possible. Pumps selected shall operate under the manufacturer's recommended operating conditions and limitations. Submit all system and pump curve information for approval by the City Engineer.

Pump Types

Supply immersible pumps from one of the following approved manufacturers:

- Flyght (N-type impellor), or
- Approved equal.

The City does not allow self-priming pump stations.

Reliability and Redundancy

Design all pump stations to meet the EPA Class I reliability requirements, which includes pump redundancy, standby power provisions, and a telemetry/SCADA system. Pump redundancy shall mean adequate pump capacity to discharge the PHF with one unit out of service. All pump stations shall be constructed with a three pump system: a minimum two (2) pumps operating alternately and an additional pump as an installed backup unless otherwise determined by the City of Newport. All installed pumps shall be capable of assuming a lead, lag, or standby role

Pumping facilities shall be equipped with a backup control system, which shall operate the pumps in the

event the primary power and/or control system fails.

Furnish standby power and telemetry systems per these standards. Supply all new, expanded, or upgraded pump stations with a permanently installed onsite generator with a functional automatic transfer switch with the capacity to operate all pumps, controls, lights and any other necessary equipment to operate the station simultaneously. The backup generator shall automatically transfer during loss of power and automatically re-transfer upon resumption of electrical utility power. The generator set shall be equipped with outputs capable of integrating pertinent information via the City of Newport SCADA system. Those outputs shall be, but are not limited to, the following factors: generator run, generator low temperature, generator low oil pressure, generator failed to start, amperage, and voltage. Fuel the backup generators by natural gas unless otherwise approved by the City of Newport.

Allowable Generator Manufacturers:

- Katolight
- Kohler,
- Or approved equal

Telemetry and SCADA

The City of Newport shall approve design and install of the telemetry system. Ancillary telemetry systems may be required in addition to the standard data transmission telemetry. Additional hardware and software may be required as determined by the City.

Supervisory Control And Data Acquisition (SCADA) software may be required as determined by the City of Newport. The software shall be installed in a panel mounted Human Machine Interface (HMI). The HMI shall be industrial quality with a touchscreen view panel as approved by the City of Newport. The Allen Bradley brand is currently the only HMI allowed in the City of Newport.

Pump Control Panels

Pump panel shall be manufactured using discrete components by a nationally recognized manufacturer. Control pump operation an Allen Bradley Programmable Logic Controller (PLC) unless otherwise determined by the City of Newport. Program the PLC for alternating pumping sequences and utilizing the Lead, Lag, Standby concept. The PLC shall be capable of integration with the current City of Newport Utility SCADA system. The PLC shall interface with an intrinsically safe level sensor that produces an isolated 4-20 mA signal for pump control. In all selected applications, redundant level controllers will be required with PLC programming to include operator selection and differential alarm settings.

Panels shall include hand, off, auto selector switches, alternating switch with lead selection capability, if applicable, phase failure/reversal relay, starter auxiliary contacts for telemetry use, elapsed time meters, and high-level alarm contacts for telemetry. HOA switches, alternating switches, handles for pump breakers, branch and control circuit breaker, reset buttons, over-temp and seal lights and resets shall be operable from the exterior of the control panel door. Mount all electrical power transfer switches externally to the control panel and inside the pump station enclosure. Properly label all wires; tie wrapped, and laid in wire way as to maintain a professional installation. Cut sheet for products along with computer generated wiring schematics, and equipment layout diagrams all properly labeled showing the entire system shall be approved through the permit process and submitted to Public Works prior to startup of the system. In addition, supply all operational, maintenance, warranty, and informational documentation including pump curve, electrical schematics, and pump information plate as provided by the manufacturer to the City at start-up.

Design all pump stations 3-phase power. Wire all stations receiving 240-volt 3-phase line power so the high leg is on B phase at the first connection after the utility company connection, with clockwise rotation, wired and labeled according to the NEC. If the pumps require counterclockwise rotation, make the change at the pump starter. Wire all 460-volt stations according to the NEC with clockwise rotation. If changing pump rotation, make change at the pump starter. Allowed Panel Manufacturers: Powers of Automatron, Renco, Pump Tech. Circuit breaker and contactor permitted: Cutler Hammer, Square "D", General Electric.

Electrical Enclosure

All electrical devices must be UL or CSA approved, meet NEC codes and NFPA codes regarding classified areas. All pump stations are subject to submittal to the Department of Environmental Quality (DEQ) for approval. All electrical components (Pump panel, telemetry, circuit breaker panel, transfer switches, etc.) shall be installed in a free standing, floor mounted, 2-door, and Nema 12 enclosure. The size shall be a minimum of seventy-two (72) inches x seventy-two (72) inches x twenty (20) inches deep and shall include a back panel on which to mount equipment. Mount a paddle lockable hasp above the exterior handle. The panel shall be on twelve (12) inch high floor stands and securely mounted to a poured concrete base, which extends at least twelve (12) inches past the edge of the panel on all sides.

The panel shall be located outside of the Class 1 Division 2 area as defined by NFPA 820. In no case shall the panel be less than sixty (60) inches from any Wet-well hatch or electrical hatch opening and sixty (60) inches from any Wet-well vent.

Acceptable Products:

- Hoffman A-727220ULP Enclosure,
- Hoffman A-72P72 Back Panel,
- Or approved equal.

The enclosure shall contain a 200 cfm; thermostatically controlled cooling fan located in the lower right or left hand sidewall. Locate a seven-inch-by-seven-inch (7" x 7") louvered plate with filter on the upper wall opposite the cooling fan. There shall also be an 800-watt, 120-volt electric fan forced heater with separate thermostat. Baseboard and residential can type heaters shall not be acceptable, nor shall open unguarded axial type cooling fans. A toggle switch controlled porcelain keyless fixture with 100-watt bulb installed on the upper back wall shall be included along with a 15-amp GFI receptacle. Next to the outlet box shall be a four (4) Square steel box with raised steel switch cover for use as a telemetry power switch. Feed the power source for the telemetry switch from the pump-panel control circuit.

Wire all this and other utilization and distribution equipment including air compressors, light and heat from or to a source other than the pump control panel, control circuit and/or control transformer. This will require adding a small six (6) or eight (8) circuit panel tapped off the load side of the pump control panel disconnecting. In the case of a 480-volt pump-station a properly sized step down transformer with disconnects shall be required.

Wire all these components in EMT conduit, rigid steel conduit, or liquid tight metallic flex.

Acceptable Products:

- Cooling fan Hoffman A-PA6AXFN
- Louver / filter Hoffman A-VX66, AFLT66

- Heater Hoffman D-AH8001B
- Light Lithonia 9875
- Electrical panels may be required to be enclosed in a pump station building as determined by the type and quantity of the equipment used.

Standby Generator Receptacle

The pump-station panel enclosure shall include a Crouse Hinds reverse contact (S22) generator receptacle with back box. Size appropriately for the pumps and station; wire through a manual transfer switch in such a way to back up power to the entire station using the City of Newport standard generator set. Mount the receptacle no less than 36-inches above grade and shall be securely fastened to the enclosure using minimum 5/16-inch diameter bolts. The wiring configuration must conform to the City standard.

Install the receptacle as an additional electrical backup system and shall be installed in accordance with all applicable codes.

Acceptable products:

- 240 Volt Crouse Hinds, reverse service, 200 Amp AREA 204126S22
- Appleton AR 200 44 RS
- Appleton 200 Amp 22 Deg. Turn, Reverse Service, AP 200 44 P4RS

Hydrogen Sulfide Protection

Each station may require a chemical treatment basin per City specification; City shall approve each odor/corrosion control system for the individual station. Odor containment systems may include valves, tanks, pumps, piping, containment, secondary containment, and other pertinent appurtenances as required by the City of Newport.

Station Access

Design all pump stations to allow for ease of access for equipment and operation of equipment.

Equipment Access

Design drawings and specifications shall incorporate all applicable and reasonable provisions to maximize efficient removal, replacement and maintenance of all equipment. This includes but is not limited to adequate clearances, sufficient anchorage, hoists, hatches and platforms as necessary.

Site Access

Provide site access such that a maintenance vehicle and/or vector truck park off-road and on the pump station site without hindering area traffic. Install paved access to the station at all times. The access shall allow a vehicle, including the City's Jet Rodder Combination Truck, with a twenty (20) foot W.B. ten (10) foot overhang, front/back, to park over the Wet-well without blocking any traffic lanes or pedestrian walkways. Access shall be level as possible, but shaped to drain away from Wet-well. Show all paving on construction plans with approval by the Engineering Division prior to construction. A ten (10) foot clear space shall be required between existing, proposed, or future equipment, including a twelve-foot-by-twenty-foot (12' x 20') designated generator area, and fencing on all sides of the pump station.

Station Fencing

Enclose stations in a chain link fence with sixteen (16) foot wide gate with sight screening vinyl slats.

There shall be a double gate at least sixteen (16) feet wide. There shall be sufficient room inside the fence for a concrete pad six (6) feet wide and nine (9) feet long next to the Wet-well and electrical panel. The City will review and approve each installation on an individual basis. Support all gates with wheels; City Engineer will consider alternate fencing materials on an individual basis. Fencing shall be at the tract property line and there shall be a minimum ten (10) foot clear space between the fence line and any existing, proposed or future pump-station equipment/structures. City will consider alternate fences if maintained by adjacent HOA.

Force Main Cleanout

Each station shall have a pig launch with a one (1) inch ball valve with a brass swivel fitting with brass plug mounted in the center of the flange to permit the attachment of jet rodder hose. There shall be a plug valve on the discharge side of the pig launch.

Flow Metering

Each sewer pump station will have an inline electro-magnetic flowmeter installed on the station discharge main in the vault. There must be no moving parts, or obstruction in the flow. The flowmeter can be used A.C. or D.C. model signal, using a 120-volt A.C. power source. Design the meter for and approved for wastewater use with an accuracy of one (1) percent. The meter must be programmable with a built-in keypad, with data storage. Mount the transmitter in the station enclosure. There must be 4-20 mA inputs and outputs, with an interface capable of communicating with the City's RTUs and/or SCADA system. Install the meter according to the manufacturers specifications with the O and M manual supplied to the City. Install and connect all necessary conduit and wires for electrical power and communications. Provide and install a downstream plug valve downstream from the meter at a distance required by the manufacturer of the meter for accurate operation and a properly sized spool piece of the same piping material to facilitate removal of the flow meter.

Acceptable manufacturers: Krohne, Endress & Hauser, Yokogawa, or approved equal

Bypass System

Each pumping station shall be equipped with a sewage bypass system unless otherwise determined by the City. The Bypass System shall consist of a manhole prior to the pumping station wet well and a discharge port located on the discharge pressure pipe. The manhole shall be readily accessible and located on the site of the pumping station. City does not allow any manholes under cover or inside any of the on-site buildings. Install the discharge port on the discharge pipe immediately after exiting the pumping station. The discharge port shall be readily accessible and on the same site as the pumping station. Construct port of six (6) inch ductile iron extended vertically twelve (12) inches above grade. Install a 6-inch plug valve with a four-inch-by-six-inch (4" x 6") cast iron, flanged concentric reducer and a four (4) inch aluminum camlock fitting with a lockable cover.

Safety Systems

Each pumping station must conform to all applicable OSHA safety regulations. Additional safety devices such as fall protection and atmosphere monitoring devices may be required as determined by the City of Newport.

Lift Station Standards

Provide an example plan set for lift station design as part of Lift Station Plan Set.

WASTEWATER DESIGN STANDARDS

Standard Manhole

Standard manholes have a cone top and are used for depths over six feet. See Standard Drawing S-200 for construction details.

Doghouse Manhole

Doghouse manholes are used when an existing pipe has too much flow to divert during construction. Pipes remain intact until base and doghouse barrel section is in place. See Standard Drawing S-204 for construction details. See Standard Drawings S-210 and S-210B for cast-in-place base requirements.

Flat-top Manhole Pipes Less than 24" Diameter

Flat-top manholes are used in shallow depths of six (6) feet or less. See Standard Drawing S-205 for construction requirements.

Manhole Base Standard Details

Cast-in-place manhole bases require a rebar cage in the pour. See Standard Drawing S-210 for construction details. See Standard Drawing S-210B for rebar layout.

Cast-In-Place Rebar Cage

Rebar cage for poured-in-place manhole bases. See Standard Drawing S-210B for details. See Standard Drawing S-210 for further cast-in-place details.

Standard Inside Drop Manhole

City does not allow outside drop manholes. If building on a slope and a drop manhole is needed, an inside drop is recommended. Drop manholes must be approved by the City Engineer. See Standard Drawing S-220 for construction requirements.

Manhole Cover and Frame Details

See Standard Drawing S-250 for details.

Manhole Frame Grade Adjustment

See Standard Drawing S-260 for construction requirements.

Standard Service Connection and Lateral

See Standard Drawing S-300 for construction details.

End of Main Line Clean Out

See Standard Drawing S-306 for details.

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WASTEWATER STANDARD DRAWINGS