

CHAPTER 3 SANITARY SEWER

3.01 General

Sanitary sewer refers to wastewater derived from domestic, commercial and industrial pretreated waste to which storm, surface, and ground water are not intentionally admitted. Pretreatment of industrial and commercial wastes shall follow all the requirements as set forth by the Washington State Department of Ecology (Ecology), as administered by the Wastewater Department (Centralia Public Works). These requirements are hereby included by reference. See the Centralia Municipal Code (CMC).

Any extension of City of Centralia's sanitary sewer system must be approved by the City of Centralia and must conform to the City of Centralia's Facilities Plan and General Sewer Plan, Washington State Department of Ecology (Ecology) and Washington State Department of Health (DOH) requirements.

Within the corporate City limits where a public sewer is within 200 feet, it must be used (CMC). In the endangered aquifer areas on Waunch and Fords Prairies, this requirement has also been legislated by the Lewis County Board of Health.

All vehicle and equipment wash facilities shall be zero discharge closed loop water recycling. The City will not allow discharge into the municipal sewer system.

Anyone who wishes to extend or connect to the City's sewer system should contact the Public Works Department for a Water/Wastewater Connection Application form.

Prior to the release of any water meters, all Public Works improvements must be completed and approved, all easements shall be recorded, all bonds received, and all applicable fees must be paid.

See Section 1.04 for definitions of specific sewers. Maintenance of the sanitary sewer lateral shall be the responsibility of the property owner.

3.02 Required Separation Between Water and Sanitary Sewer Mains

See Section 2.13 for requirements regarding sewer and water separation.

3.03 Staking

All surveying and staking shall be performed by an engineering or surveying firm capable of performing such work. The engineer or surveyor directing such work shall be licensed by the State of Washington.

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A pre-construction meeting shall be held with the City Engineer or their representative before staking begins. All construction staking shall be inspected by the City Engineer or their representative prior to construction. Staking shall be maintained throughout construction.

The minimum staking of sewer lines shall be as follows:

- 3.03.1 Centerline alignment must be staked with cuts and/or fills to flowline every 25 feet.
- 3.03.2 Manholes must be staked with hubs to include invert elevations of all pipes and top of rim elevations to finished grade.

3.04 Trench Excavation and Directional Drilling

3.04.1 Trench Excavation

Clearing and grubbing, where required, shall be performed within the easement or public right-of-way as permitted by the City and/or governing agencies. Debris resulting from the clearing and grubbing shall be disposed of by the owner or contractor in accordance with the terms of all applicable permits and/or regulations.

Trenches shall be excavated to the line and grade on the plans approved by the City. The minimum depth of cover measured from finished surface grade to the top of the pipe shall be 36 inches. Except for unusual circumstances, where pre-approved by the City, the trench sides shall be excavated vertically and trench width shall be no wider than the pipe outside diameter plus 24 inches. The trench shall be kept free of water. Surface water shall be diverted so as to not enter the trench. The developer/contractor shall maintain sufficient dewatering equipment on the job site to insure that these provisions are met.

The contractor shall perform all excavation so that all boulders, rocks, roots and other obstructions shall be entirely removed or cut out of the width of the trench and to a depth of 6 inches below the sewer main grade. The base of the trench must be solid so in some cases the contractor may have to over excavate to obtain a satisfactory base.

Trenching and shoring shall not proceed more than 40 feet in advance of the pipe laying, without approval of the City, and shall be in conformance with Washington Industrial Safety and Health Administration (WISHA) and Occupational Safety and Health Administration (OSHA) safety standards.

The bottom of the trench shall be finished to grade in such a manner that the pipe will have bearing along the entire length of the barrel.

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3.04.2 Directional Drilling

Before any directional drilling activity starts, the Contractor must make preparatory measures to confirm that the proposed bore path does not conflict with existing underground facilities.

The Contractor must physically locate underground facilities within the limits specified on the Drawings. The Contractor must expose and visually verify existing facility clearance from the drill path during drilling when underground facilities are within the limits specified below and where shown on the Drawings. Where conflict is indicated, such conflict must be resolved before drilling can start.

When the proposed bore path is within 36 inches of an existing underground facility or service lateral, the Contractor must visually verify that the Down Hole Assembly (DHA) safely clears the underground facility and that the underground facility is isolated from drilling fluid. Visual verification consists of exposing the underground facility while the DHA advances to allow visual observation that the DHA does not disturb the underground facility. The exposure and visual verification locations must be in alignment with the proposed bore path or advancing DHA.

If conflicting utilities are not visually verified, then post CCTV of the conflicting utilities will be required before final acceptance of the work.

Where sewer laterals are not located on the plans, the contractor shall camera and locate all laterals in the boring path before drilling begins.

3.04.3 The contractor shall maintain the presence of a "competent person" as defined by the Washington State Department of Labor and Industries (L&I), when any trench excavation and backfill work is being done at the project site.

The contractor shall submit a Statement of Qualifications for the on-site superintendent that will be in control of any directional drilling work prior to any work beginning. Such person shall have supervised, at a minimum, five similar projects in the previous five years.

3.05 Backfilling

3.05.1 Backfilling shall not commence until the pipe installation has been inspected and approved by the City Inspector.

3.05.2 Backfilling shall closely follow pipe installation so that no more than 40 feet is left open without approval of the City.

- 3.05.3 The backfill in the pipe zone shall be bedding material conforming to City of Centralia Standard Details for trench restoration.
- 3.05.4 If foundation material is required below the pipe zone, the material shall conform to Section 9-03.17 Class B of the WSDOT Standard Specifications.
- 3.05.5 The backfill between the bedding and road ballast shall be import backfill conforming to City of Centralia Standard Details unless otherwise approved. Native material may be used as backfill outside the roadway prism if it meets the specification requirements as indicated on the Standard Details and testing results are provided to the City for approval before use.
- 3.05.6 The backfill shall be placed in uniform horizontal lifts, not to exceed 1-foot in depth and compacted to the following percentage of maximum dry density; 90 percent in the pipe zone and 95 percent from the pipe zone to the finish grade as determined by ASTM D1557-80 (Modified Proctor). Compaction shall be by mechanical means.
- 3.05.7 At the conclusion of each day the trench shall be totally backfilled or steel plates shall be used so that there is no open excavation over night.

3.06 Street Patching and Restoration

See Sections 4.15 and 4.16 for requirements regarding street patching and trench restoration.

3.07 Testing

Prior to acceptance and approval of construction, the following tests shall apply to each type of construction.

- 3.07.1 Gravity Sewer Air Test: Prior to acceptance of the project, the gravity sewer pipe shall be subject to a low pressure air test per WSDOT/APWA Standard Specifications. The contractor shall furnish all equipment and personnel for conducting the test under the observation of the City Inspector. The testing equipment shall be subject to the approval of the City.

Immediately following the pipe cleaning, the pipe installation shall be tested with low pressure air.

The contractor shall make an air test for his own purposes prior to notifying the City to witness the test. The acceptance air test shall be made after the trench is backfilled and compacted and the roadway section is completed to subgrade.

All wyes, tees, and end of side sewer stubs shall be plugged with flexible joint caps,

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or acceptable alternates, securely fastened to withstand the internal test pressures. Such plugs or caps shall be readily removable and their removal shall provide a socket suitable for making a flexible jointed lateral connection or extension.

3.07.2 Gravity Sewer TV Inspection: Testing of the sewer main shall include a television inspection at the contractor's expense. Television inspection shall be done after the air test has passed and before the roadway is paved. Immediately prior to a television inspection, enough water shall be run down the line so it comes out the lower manhole and the line is flushed clean. All debris collected after flushing shall be removed and disposed of by the contractor at their expense. It shall be disposed of at a legal dump site for this type of waste.

The television report shall include a written log along with a CD of the video footage in a format that is compatible with the Lucy software used by the City of Centralia.

The audio portion of the video footage shall identify any laterals and defects seen. The on-screen counter footage shall be reset in each manhole. Each manhole shall be identified by location and numbering consistent with the plans.

Acceptance of the line will be made after the television inspection tape has been reviewed and approved by the City. Any tap to an existing system needs to be televised as well

3.07.3 Manhole Test: A vacuum test of all manholes is also required. The vacuum test shall be performed by creating a vacuum of 10 inches of mercury. If the vacuum does not drop in excess of 1-inch of mercury over the specified time period, the manhole passes test. The specified time period for every 2 feet of manhole depth is 5 seconds for a 48-inch diameter manhole and 6.5 seconds for a 60-inch manhole.

3.07.4 Force Main Hydrostatic Test: Prior to acceptance of the project, the pressure line and service lines shall be subjected to a hydrostatic pressure test of 100 psi for 15 minutes. Any leaks or imperfections developing under this pressure shall be remedied by the contractor. No air will be allowed in the line. The main shall be tested between valves. Insofar as possible, no hydrostatic pressure shall be placed against the opposite side of the valve being tested. The pressure test shall be maintained while the entire installation is inspected.

The contractor shall provide all necessary equipment and shall perform all work connected with the tests. Tests shall be made after all connections have been done. This is to include any and all connections as shown on the plan. The contractor shall perform all tests to assure that the equipment to be used for the test is adequate and in good operating condition and that the air in the line has been released before requesting the City to witness the test. The contractor shall give the City a 48 hours notification of the test.

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- 3.07.5 Wet Well Test: A water test for all wet wells in accordance with the manhole test for gravity sewer shall be required.
- 3.07.6 Force Main Mandrel Test: A mandrel test of all force main, in accordance with Section 7-17.3(2)G of the WSDOT/APWA Standard Specifications is required.
- 3.07.7 Pump Station Tests: Pump operation, alarms, and electrical inspection of all lift stations is required.

3.08 Gravity Sewer

General

All sewers shall be designed as a gravity system whenever physically and/or economically feasible. Addition of new pumping stations is undesirable.

3.09 Gravity Sewer Design Standards

The design of any sewer extension/connection shall conform to City Standards, Ecology's "Criteria of Sewage Works Design" and any applicable standards as set forth herein and in Sections 1.02 and 1.06.

The layout of extensions shall provide for the future continuation of the existing system as determined by the City. Lateral stub outs for each individual lot along the main extension shall be provided. The lateral stub outs shall be capped at the right of way line of the lots. See also Section 1.18 for utility extension information.

New gravity sewer systems shall be designed on the basis of an average daily per capita flow of sewage of not less than 100 gallons per day. See the Ecology "Criteria" table: Design Basis for Sewage. The numbers are assumed to cover normal infiltration, but an additional allowance shall be made where conditions are unfavorable. Generally, laterals and submain sewers should be designed to carry, when running full, not less than 400 gallons daily per capita contribution of sewage. When deviations from the foregoing per capita rates are used, a description of the procedure used for sewer design shall be submitted to the Engineering Department for review and approval.

The General Notes found in the Standard Detail Section shall be included on any plans dealing with sanitary sewer design and/or construction.

3.10 Gravity Main Line

- 3.10.1 Sewer mains shall be sized for the ultimate development of the tributary area. Nothing shall preclude the City from requiring the installation of a larger sized main if the City determines a larger size is needed to meet the requirements for future

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service.

The minimum size for submains and mains shall be 8-inch inside diameter. The minimum size for a lateral within the street right-of-way shall be 6-inch inside diameter.

The design of the sewer line/system is subject to all other requirements as noted in this Chapter.

3.10.2 Main line sewers must be constructed using materials conforming to one of the following:

PVC pipe 6-inch to 15-inch diameter must meet either ASTM D 3034, SDR 35 solid wall pipe, or ASTM F 794 for solid seamless profile pipe.

PVC pipe 18-inch to 27-inch diameter shall conform to ASTM F 679 Type 1 only.

Ductile Iron, conforming to Section 9-05.13, WSDOT/APWA Standard Specifications and ANSI A21.51 or AWWA C151, and cement mortar lined. Minimum thickness shall be Class 51.

All joints for PVC pipe shall conform to ASTM D 3212 with rubber gaskets conforming to ASTM F 477.

3.10.3 Gravity sewer shall have a minimum depth of 36 inches to provide gravity service to adjoining parcels, adequate head room within manholes for maintenance personnel, future areas to be served, and vertical clearance between water and sewer lines. Actual depth will be determined by slope, flow, velocity, and elevation of existing system.

3.10.4 All building sewer connections to the main shall be made with a sanitary tee (wye) connection. Backflow prevention devices shall be provided as required by the Uniform Building Code (UBC) and Uniform Plumbing Code (UPC), W.A.C. 51.50. All new mains connecting to existing mains shall require the installation of a new manhole if not made at an existing manhole.

3.11 Connection to Existing System

3.11.1 At connection to existing system, all new sewer connections shall be physically plugged until all tests have been completed and the City approves the removal of the plug.

3.11.2 Connection of new main line pipe to existing manholes shall be accomplished by using provided knock-outs. Where knock-outs are not available, the manhole shall

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be core drilled for connection. The transition of connecting channels shall be constructed so as not to interrupt existing flow patterns. All connections shall utilize cor-seal grouting material. Manhole shall be vacuum tested after connection.

- 3.11.3 Connection of a pipe line to a system where a manhole is not available shall be accomplished by placing a concrete manhole base and setting manhole sections in accordance with the City of Centralia Standard Details. The existing pipe shall not be cut into until approval is received from the City.
- 3.11.4 Connections to manholes requiring a drop shall follow the criteria as outlined in Section 3.16.
- 3.11.5 Connections where an existing stub-out is not available or where a new building sewer is the same size as the existing main shall be accomplished by the installation of a new manhole.
- 3.11.6 Taps shall be done by use of a core drill and shall not be allowed to protrude into the existing main. The City shall be notified two (2) working days prior to any tap of a City sewer and a City Inspector shall be present to witness the tap. At the City's option, the City will install a tap for a fee after the contractor provides L&I acceptable access to the site.
- 3.11.7 All couplings shall be Fernco Strong Back RC couplings or an approved equal.

3.12 Manholes

Precast manholes shall meet the requirements of ASTM C 478 with either a precast base or a cast-in-place base made from 3000 psi structural concrete. Manholes shall be Type 1, 60-inch diameter minimum. The minimum clear opening in the manhole frame shall be 24 inches. Joints shall be rubber gasketed, conforming to ASTM C 443 and shall be grouted from the inside. Lift holes shall be grouted from the outside and inside the manhole. Grout shall be Tamms Red Bag 5-10 or 20 minute set or an approved equal. Grout shall be used in accordance with the manufacturer's recommendations. Concrete used around collars shall be Rapid Set concrete mix in the green bag manufactured by CTS Cement. Manholes constructed of other materials may be approved by the City Engineer, provided they meet the requirements of Section 2.318 of the Ecology "Criteria for Sewage Works Design". Material specifications need to be submitted for review before an alternate material will be considered, See standard drawings 3-02 and 3-03.

Eccentric manhole cones shall be offset so as to not be located in the tire track of a traveled lane.

Grade rings shall be a minimum of 2" and a maximum of 8" from top of cone or flat top to rim.

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All newly installed manholes shall be coated with Ravens 405 with minimum thickness of 125 mil, for corrosion inhibition purposes if antimicrobial manholes are not used.

Manholes 5 feet or less shall be a Type 3 style. See the Standard Drawings for details.

Manholes with multiple inlets shall be channeled as to accept the CCTV video camera inspection system.

Manhole frames and covers shall be cast iron castings marked "Sewer", conforming to the requirements of ASTM A-30, Class 25, and shall be free of porosity, shrink cavities, cold shuts or cracks, or any surface defects which would impair serviceability. Manhole frame and lids shall be Ergo Access assembly with cam lock security options and water resistant in either 4- or 6-inch heights. Any variation from this type of frame and cover must be approved by the City Engineer. Repairs of defects by welding or by use of smooth-on or similar material will not be permitted. Manhole rings and covers shall have machine-finished or ground-on seating surfaces so as to assure non-rocking fit in any position and interchangeability.

Manholes shall be equipped with a PRECO sewer guard watertight manhole insert or approved equal if new Ergo Access assembly water tight lids are not required by the City Engineer.

The casting device shall be such that the cover may be readily released from the ring and all movable parts shall be made of non-corrodible materials and otherwise arranged to avoid binding.

All casting shall be covered with a bituminous coating prior to delivery to the job site.

Safety steps shall be fabricated of polypropylene conforming to the ASTM D-4101 specification, injection-molded around a 0.5-inch ASTM A-615 grade 60 steel reinforcing bar. Steps shall project uniformly from the inside wall of the manhole. Steps shall be installed to form a continuous vertical ladder with rungs equally spaced in 12-inch centers.

Generally, gravity sewers shall be designed with straight alignment between manholes. Curved alignment may only be permitted when conditions warrant and with the advance approval of the City Engineer and the Centralia Public Works Department.

Manholes shall be provided at a maximum of 400-foot intervals, at intersections, and at changes in direction, grade, or pipe size. (See also Section 3.14.)

Minimum slope through the manhole shall be 0.10-foot from invert in to invert out.

Manholes shall have a minimum diameter of 60 inches.

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All exterior joints of the manhole shall be sealed with WrapidSeal as manufactured by Canusa Corrosion Protection and Sealing. This includes the joint between manhole sections and the entire set of adjustment rings. It shall be applied in accordance with the manufacturer's recommendation.

For pipes 15-inch diameter and larger, the size of the manhole shall be approved by the City Engineer.

3.13 Gravity Sewer Slope

All sewers shall be designed and constructed to give mean velocities, when flowing full, of not less than 2 feet per second based on Manning's formula using an "n" value of 0.013. Use of other practical "n" values may be permitted by the City if deemed justifiable on the basis of research or field data submitted.

The following minimum slopes shall be provided; however slopes grater than these are desirable.

Sewer Size, Inches	Minimum % Slope, % (Feet per 100 Feet)
8	0.40 (0.0040 Ft/Ft)
10	0.28 (0.0028 Ft/Ft)
12	0.22 (0.0022 Ft/Ft)
14	0.17 (0.0017 Ft/Ft)
15	0.15 (0.0015 Ft/Ft)
16	0.14 (0.0014 Ft/Ft)
18	0.12 (0.0012 Ft/Ft)
21	0.10 (0.0010 Ft/Ft)
24	0.08 (0.0008 Ft/Ft)
27	0.07 (0.0007 Ft/Ft)
30	0.06 (0.0006 Ft/Ft)
36	0.05 (0.0005 Ft/Ft)

Such decreased slopes will only be considered where the depth of flow will be 30 percent of the diameter or greater for design average flow. Whenever such decreased slopes are proposed, the design engineer shall furnish with the plans his/her computations of the depths of flow in such pipes at minimum, average, and daily or hourly rates of flow. Larger pipe size shall not be allowed to achieve lesser slopes. All main extensions shall be layed at the minimum slope for the design size to allow for future extension at the maximum depth.

Sewers shall be laid with uniform slope between manholes.

3.14 Increasing Size, Gravity Sewer

Manholes shall be provided where pipe size changes occur.

Where a smaller sewer joins a larger one, the invert of the larger sewer should be lowered sufficiently to maintain the same energy gradient. An approximate method for securing these results is to place the 80 percent depth point of both sewers at the same elevation.

3.15 High Velocity Protection

Where velocities greater than 15 feet per second are expected, special provisions such as thrust blocking and piping materials shall be made to protect against displacement by erosion and shock, and the presence of hydrogen sulfide gas.

3.16 Drops

Straight grades between invert out of last manhole and connection to existing are preferred over drops whenever possible. Care must be taken when designing steep grades so as not to create a situation of excessive velocity or excavation. Grade changes associated with "sweeps" shall not be allowed.

An inside drop connection shall be provided for a sewer entering a manhole at an elevation of 24 inches or more above the manhole invert. Where the difference in elevation between the incoming sewer and the manhole invert is less than 24 inches, the invert shall be filleted to prevent solids deposition.

Inside drop structures shall be constructed per the City standard drawing with a minimum of a Reliner B-10 drop bowl to accommodate the installation of the City's CCTV camera.

Outside drop structures shall be constructed per the City standard drawing. Outside drops must be pre-approved and will only be allowed in special cases by the City Engineer.

3.17 Cleanouts

Cleanouts are not an acceptable substitute for manholes. However, they may be used in lieu of manholes at the end of 8-inch diameter lines of not more than 150 feet in length. Location of cleanouts for building sewers are governed by the UPC.

All cleanouts in City right-of-way shall be extended to grade and a 3-foot square by 4-inch thick concrete pad shall be installed around all cleanouts that are not in the pavement area.

3.18 L laterals

3.18.1 Connection to Sanitary Sewer

A lateral refers to the extension from a building sewer, beginning 3 feet outside the outer foundation wall at the structure to the sanitary sewer main. Building sewers from the main to the right-of-way line shall be a minimum of 6-inch in diameter. Wye connections are required for lateral connections to dead-end main line pipes.

Maintenance of the entire building sewer is the responsibility of the property owner. The portion of line on private property shall be a minimum of 4-inch diameter for single-family and 6-inch diameter for duplex, commercial and industrial facilities. No laterals shall be connected directly to a manhole. New laterals shall be installed a minimum of two feet from a manhole or pipe joint on the main line. Where two laterals are installed adjacent to one another, two feet of separation between lateral connections is required.

Prior to connection of a building sewer to the public sewer, a side sewer permit must be obtained from the City. Design criteria for a building sewer are covered by the UPC and the C.M.C. Chapter 15.10. Acceptable pipe material is PVC or ductile iron, as specified in Section 3.10.2. All couplings shall be Fernco Strong Back RC couplings or an approved equal. The Uniform Plumbing Code requires backwater valves on building sewers where the finished floor elevation is below the rim of the upstream manhole. Backwater valves, if they are installed, must be located within the building footprint upstream of the cleanout. The City is not responsible for their installation, maintenance, or operation. Inspection of the building sewer is the responsibility of the Wastewater Department (Centralia Public Works). Testing and inspection procedures are similar to those for main installation (excluding television inspection).

3.18.2 Abandonment Procedures

Plastic, HDPE, Cast Iron or Ductile Iron Pipe: obtain a permit from the Public Works Department (1100 N Tower Avenue, Centralia, WA 98531), find the pipe at the property line and the City right a-way and cut the line and install a gasket cap or plug on/in the line. If this is not feasible, install a mechanical plug (Cherne end of pipe original gripper plug) to the pipe end and tighten firmly assuring that it won't slip down the line. Then mark the end with a 2X4 extended to the surface and call for an inspection before backfilling. If the line crosses an easement or another parcel, contact the property owner and receive permission to dig on their property to abandon your side sewer lateral at the City's right of way.

Concrete or Clay Pipe: obtain a permit from the Public Works Department (1100 N Tower Avenue, Centralia, WA 98531), find side sewer pipe at property

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line and the City right a-way cut line and insert an mechanical plug (Cherne original in side of pipe gripper plug) inside the pipe approximately one foot and tighten securely. Next fill the line end flush with non-shrink grout. Then mark the end with a 2X4 extended to the surface and call for an inspection before backfilling. If the line crosses an easement or another parcel contact the property owner and receive permission to dig on their property to abandon your side sewer lateral at the City's right of way.

Demolished or Removed Buildings: The property owner or their contractor engaged in demolishing or removing any structure connected to the public sewer shall notify the City of such work, obtain an abandonment permit from the Public Works Department (1100 N Tower Avenue, Centralia, WA 98531), and shall expose and plug the side sewer connection of such structure at the property line in accordance with the requirements of these Standards. A Public Works Department inspector must observe and document all abandonments.

3.19 Lift Station Design Standards

The design of any lift station shall conform to City Standards, Ecology's "Criteria for Sewage Works Design" and applicable standards as set forth herein and in Sections 1.02 and 1.06. Each lift station shall be evaluated by the City Engineer for buoyancy resistance using site specific soil and groundwater information.

The following equipment and special modifications are standard requirements for all permanent wastewater lift stations constructed for the City of Centralia wastewater collection system. Lift stations shall be landscaped appropriately. The following are minimum standards and are not all inclusive.

- 3.19.1 The proponent is required to provide the City of Centralia a fee simple site outside existing right-of-way for construction of the lift station. The site shall have sufficient area with dimensions that allow for easy and safe access to the lift station.
- 3.19.2 A concrete slab 6 inches in depth shall surround the pump station wet well, with a minimum of 2 feet side exposure for all openings.
- 3.19.3 An access road that will support 20,000 pound axle loads throughout the year shall be provided from the nearest public road to the station, to allow for maintenance of the station.
- 3.19.4 Wet well shall be provided with a permanent attached, full depth, internal, polypropylene access ladder.
- 3.19.5 Station entry access shall be keyed to match all other City stations. The Best Lock

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key system shall be supplied for all other lock points and padlocks; a blank tumbler shall be supplied and the City will key the desired code.

- 3.19.6 Safety guards shall be provided for all exposed drive lines and couplings.
- 3.19.7 Spare parts shall be provided as recommended by the manufacturer, with a minimum of one spare impeller, one complete set of seals, filters, and one set of volute gaskets. Four (4) complete sets of O & M Manuals, and a list of the nearest dealers for spare parts and repairs shall be provided prior to acceptance.
- 3.19.8 The pumps, motors, and wet well shall be in compliance with current engineering practices. They shall be fully compatible as an assembly, and shall be engineered for the specific site. They shall be submersible pumps with stainless steel guide rails. There shall be a pressure gauge for the discharge pipe from each pump. The pumps shall be manufactured by Vaughn or approved by the City. All bolts, chains, and brackets shall be stainless steel.
- 3.19.9 The station shall be designed to have an isolation valve located in the discharge line no less than 12 pipe diameters from the wet well. Check valves shall have external arms to allow for back flushing. The check valve shall be as manufactured by Waterous and the isolation valve shall be a Dezuric plug valve with a quarter turn shut off. There shall also be a bypass pumping port included with a camloc fitting.
- 3.19.10 The isolation and check valve shall be housed in a precast concrete vault. The vault shall have a minimum size of 6-foot by 6-foot inside dimension. There shall be a bottom drain that drains back into the wet well. The vault hatch shall be a minimum of 3 feet (L) x 4 feet (W). The hatch shall be supplied with a safety net.
- 3.19.11 City water shall be provided to the station for hose down and pump seal supply. An approved backflow prevention device shall be provided on the water supply line to protect the public water system. The backflow device shall be tested and certified by a State-Certified Backflow Tester prior to acceptance of the system. The cost of the backflow prevention device, water service, and testing will be the developer's responsibility. If the station is located in the 100-year flood plain, all equipment, controls, and accessories shall be flood proofed.
- 3.19.12 The station shall have a pigging port for pigging the force main. Final design to be approved by the City of Centralia Wastewater Department. The station will also have a flow meter which shall be approved by the City.
- 3.19.13 The entire interior of the wet well and vault shall be coated. The interior coating shall be Ravens Lining 405. All exterior joints of the wet well and vault shall be wrapped with WrapidSeal as manufactured by Canusa Protection and Sealing.

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- 3.19.14 Pump stations up to 200 amp service will be 240 volt 3 phase 4 wire. Any above 200 amp will be 480 volt, 3 phase 4 wire. A transformer will be provided for outlets and lighting per standards. In a special case, where 3 phase power is not available, the City will consider a single phase pump station. Security lighting shall be provided for the station. There shall be a minimum of one light. If an overhead power service is used, the lines shall be located so that they do not interfere with the installation or removal of the mechanical equipment at the station. The cables shall be placed such that all work with the crane can meet the set back requirements from the cables.
- 3.19.15 All electrical equipment shall be enclosed in a free-standing, vandal-proof, all-weather enclosure, NEMA 3R or better. Electrical control panel shall be manufactured by Superior Custom Control, located at 125 27th NE, Seattle, WA 98125, 206-362-8866.
- 3.19.16 All pump stations shall have an emergency power hookup or an on-site emergency power generator. The City will make the decision regarding which will be required based on the flows and location of the proposed station. All equipment shall be listed, labeled, and approved for the application.
- 3.19.17 The electrical equipment shall include a 5 KVA minimum transformer for the 120 volt single phase equipment.
- 3.19.18 Lift station telemetry shall be current with the City of Centralia Telemetry System. If the catalog number changes, you will use the one that is the City Standards at the time of design approval.
- 3.19.19 Pump motors shall be 3 phase, 240 volt or 480 volt 4 wire as described in 3.19.14. They shall be high efficiency rated.
- 3.19.20 Wet well sizing criteria:

Provide a holding period not to exceed 10 minutes for the design average flow, per Ecology's "Criteria for Sewage Works Design", Section 3.222.

Provide for a minimum of 45 seconds pump run time per pump cycle, and a maximum of ten pump cycles per hour. The minimum size of wet well shall be 96-inch diameter with a minimum of 7 feet of depth below the elevation of the inlet. Station will also be evaluated for odor control and type during review.

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3.19.21 Lift station emergency storage criteria:

Option #1:

Emergency storage shall be provided for 2 hours of design average flow, using a peaking factor of 2. This calculation shall be submitted with the system design and must be approved by the City Engineer.

Note: The peaking factor was set at 2, rather than 3 or 4, due to the typical emergency being caused by power outage. All volume above area basements and below the hydraulic gradient may be used as emergency storage (wet well, conduit, manholes). This condition must be verified by calculation and submitted for approval by the City Engineer.

Option #2:

Provide emergency power on site per Ecology's "Criteria for Sewage Works Design", Section 3.34

3.19.22 The pump electrical controls shall be equipped to automatically alternate the pumps.

3.19.23 All replacement parts shall be available in the U.S.A. Permission in writing from the City shall be required and obtained prior to the review and approval of plans and specifications for the installation of a wastewater lift station.

3.19.24 Alarm and station status points:

- High wet well
- Pump 1 run
- Pump 2 run
- Pump 1 auto
- Pump 2 auto
- Pump 1 fail
- Pump 2 fail
- All pumps not auto

The contractor shall supply and install all sensors and auxiliary contacts for the above points and connect them with the appropriate size wire in conduit to terminal strip. The points terminated on the strip shall be identified by number and labeled showing the number and type.

3.19.25 All pump station sites shall be enclosed with a 6-foot chain link fence with slats. The fence shall conform to the WSDOT Standard Specifications and WSDOT

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Standard Plan L-20.10-03. The slats shall be redwood or an approved equal. Location of fence shall be approved by the City.

3.20 Pressure Sewer (Force Main) General

Low pressure systems, i.e., force mains, may be considered for situations where high ground water table or topography make gravity sewer impractical. If a system is approved a tracer wire installation will be required. However, STEP systems are not approved for the City of Centralia wastewater collection system.

3.21 Pressure Sewer Design Standards

The design of any sewer extension/connection shall conform to City Standards, Ecology's "Criteria for Sewage Works Design", and any applicable standards as set forth herein and in Sections 1.02 and 1.06.

The layout of extensions shall provide for the future continuation of the existing system as determined by the City. In addition, main extensions shall be extended to and across the side of the affected property fronting the main.

The system shall be designed at full depth of flow on the basis of an average daily per capita flow as shown on the Ecology table referenced in Section 3.09. A friction factor of 0.013 shall be used for Manning's "n" value.

New sewer systems shall be designed by methods in conjunction with the basis of per capita flow rates. Methods shall include the use of peaking factors for the contributing area, allowances for future commercial and industrial areas, and modification of per capita flow rates based on specific data (I/I). Documentation of the alternative method used shall be provided along with the plans.

The General Notes found in the Standard Detail Section shall be included on any plans dealing with pressure sanitary sewer design and/or construction.

3.22 Force Main

3.22.1 Material: Force mains for sizes up to 12 inches shall be ductile iron AWWA C151 Class 51 or PVC C900 with ductile iron fittings and gasketed joints. Tracer wire and brass wedge requirements are as in Section 2.03. For 14 to 24-inch mains, pipe shall be ductile iron AWWA C151 Class 51 or PVC C905 with ductile iron fittings and gasketed joints. A more rigid pipe may be required where unlimited trench widths occur. All ductile iron pipe and fittings shall be epoxy coated or PE lined and designed for use with corrosive materials.

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- 3.22.2 **Depth:** Force mains shall have a minimum 36 inches of cover to top of pipe. See Section 2.13 for sanitary sewer/water main crossings requirements.
- 3.22.3 **Velocity:** The minimum velocity allowed is 3 feet per second at average dry weather flow. Three feet per second is required to scour settled solids. Maximum velocity allowed shall be 6 feet per second.

3.23 Pressure Sewer Surge Protection

PVC pipe is subject to fatigue failure due to cyclic surge pressures. Lift stations shall be constructed to minimize rapid changes in velocities and a properly sized surge tank and "soft start and stop" pump controls shall be used.

3.24 Pressure Sewer Air/Vacuum Valves

Air release valves and air/vacuum valves shall be located at the high points of the line within a standard 48-inch manhole or a comparable sized, approved vault. Air release valves shall be fitted with an activated carbon canister to absorb compounds with disagreeable odors prior to releasing the air to the surrounding area. Grades shall be designed to minimize the need for air/vacuum valves when practical. Vehicular access to valve is required for maintenance.

3.25 Force Main Drain

Provisions to drain a force main to facilitate repairs or to temporarily remove force main from service shall be provided. This may be accomplished through the use of a valved tee connected to a drain line at the low point of the line. A manhole shall be set over the force main at the valved tee.

3.26 Pressure Sewer Thrust Blocking

Location of thrust blocking shall be shown on plans. Thrust block concrete shall be Class B poured against undisturbed earth. A plastic barrier shall be placed between all thrust blocks and fittings.

See Standard Drawings 2-10 and 2-18 in the Water Chapter. Designed and approved restraining joint systems may be allowed in lieu of thrust blocking. Restraining joint brand, type and size shall be specified on the plans.

3.27 Force Main Termination

Hydrogen sulfide (H₂S) odors and the buildup of sulfuric acid (H₂SO₄) occur in the operation of a force main. To mitigate these conditions, some type of control method(s) shall be used. This may include chemical addition at the pump station and/or the re-aeration

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of the wastewater at or near the terminus. Re-aeration may include the following:

Construction of a vault housing an aspiration assembly.

The use of hydraulic fall (vertical siphon) within the terminal manhole.

High velocity discharge with smooth transition so as to not cause splashing of force main into the downstream gravity sewer.

These methods all require an adequate source of fresh air at the vault or manhole. At a minimum, the manhole at the terminus and the manholes directly upstream and downstream of the terminus shall be coated with Raven 405 or approved equal which is resistant to sulfuric acid and hydrogen sulfide. The sewer line pipe connecting the manhole at the terminus to the downstream manhole shall also be protected from the effects of hydrogen sulfide. If the existing pipe is not PVC, the existing line must be coated with an approved product. All new manholes installed on the City's system shall also be coated.

3.28 Pump Station Upgrades

The addition of a new pump station or new gravity sewer main extension may cause new flows high enough to make improvements at existing pump stations necessary. Any required upgrades of existing stations shall conform to these standards for a new station.

3.29 Residential Grinder Pumps

3.29.1 A grinder system is a facility consisting of a holding tank, grinder pump and pressure piping system for conveying the wastewater and solids into the gravity sewer system.

3.29.2 The City may allow the installation of residential grinder pumps where feasible. The Wastewater Department (Centralia Public Works) will make the final decision regarding the approval of a grinder pump installation.

Feasible:

1. *Only where a gravity sewer system does not exist and it is physically impossible to accommodate the installation of a gravity main extension.*

2. *Special circumstances make standard methods unusable.*

3.29.3 The grinder pump system shall be designed in accordance with Section C1-10 Alternative Systems of the Ecology "Criteria for Sewage Works Design" and these guidelines.

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3.29.4 The Proposed grinder pump system shall be submitted and approved by the City of Centralia Wastewater Department.

The owner shall be responsible for the power bill for the life of the system.

An emergency/backup power supply may be required for larger or commercial systems and shall be the responsibility of the customer.

3.29.5 **Odor/Corrosion Control**

All grinder systems shall be required to mitigate for odors and corrosion.

At a minimum, the manholes directly upstream and downstream of the connection point to the City's gravity sewer main shall be coated with Ravens 405 or an approved equal. If the main line pipe between the two manholes is not PVC, then it must be coated with an approved product as well. All new manholes installed on the City's system shall also be coated. Carbon canisters manufactured by SweetStreet must be installed in the coated manholes.

All other systems must be evaluated for the potential to cause odors and corrosion by an engineer licensed within the State of Washington.

All calculation used to determine said potential and proposed odor/corrosion mitigation efforts shall be submitted to the City for review.

The developer/contractor shall be responsible for all costs accrued during the review process, which may include outside consultation from a licensed engineering firm contracted to the City.

If it is found that the minimum requirements or proposed mitigation efforts are insufficient the City will prescribe an acceptable solution.

All costs incurred in the development of a City provided solution shall be the responsibility of the developer/contractor.

3.29.8 Commercial grinder systems that have kitchen or cooking facilities, such as churches, community gathering places, restaurants, schools, etc., shall require installation of a grease trap/grease interceptor.

3.29.9 All commercial/industrial installation may be required to install a flow meter at the owner's expense if deemed necessary by the Wastewater Department (Centralia Public Works).

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3.29.10 Grinder System Force Main:

- A. Mainline/common pressure main. The minimum pipe size used is 2 inches nominal diameter. This is based on maintenance requirements rather than flow. Pipe will be PVC, or SDR 21 (200) with rubber gasket joints. Gaskets will comply with ASTM D 1869. Mains will have a minimum 36 inches of cover to top of pipe. See Ecology's criteria for sewage works design for sanitary sewer/water main crossing requirements.
- B. Service Line. Service connection pipe will be minimum 1-1/4 inch diameter, Schedule 80 PVC water pipe, solvent weld joint located at 90 degrees to the mainline when possible. Solvent cements and primer for joining PVC pipe and fittings will comply with ASTM D2564 and will be used as recommended by the pipe and fitting manufacturers. Service will have a minimum 24 inches of cover to top of pipe. The service line shall have two boxes, one within two feet of the station which will house a clean-out and an approved lateral connection (clean-out box). The second box will house an approved lateral connection at the property line (collector box). See Standard Plan 3-10GP.
- C. Building Sewer. The gravity building sewer between the building and the tank will be designed and installed in accordance with the UPC as adopted by the City. The owner will be responsible for maintenance of the building sewer.
- D. All pipes will be installed with continuous tracer tape installed 12 to 18 inches under the proposed finished grade. The marker tape will be marked "sewer" and be plastic, non-biodegradable metal core or backing that can be detected by a standard metal detector. Tape will be Terra Tape "D" or approved equal. In addition to tracer tape, install 12-gauge-coated copper wire wrapped around the pipe, brought up and tied off at the valve boxes. A 1-pound magnesium anode will be buried with the sewer line wire splices and connections to anodes will join wires both mechanically and electrically and will employ epoxy resin or heat shrink tape insulation. Furnishing and installing the tracer wire and anodes will be incidental to pipe installation.
- E. All pipes shall be bedded with sand or suitable material to protect them from backfilling and settling after construction.
- F. Pressure main will be required to have air release valves installed at the high points and or at every 2,000 to 2,500 feet along a horizontal run that lacks a clearly defined high point.

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GRINDER PUMP INSTALLATION

Contact the City for a pre-construction meeting for pump tank and control panel locations before any installation. Contractor shall determine the depth of the existing or future building sewer discharge before any installation, to determine which system will be suitable. At the time of submittal, a service agreement between the property owner and the City must be signed and filed with the City of Centralia Public Works Department and recorded in the Lewis County Auditor's office.

The grinder pump lift station package shall include the following items:

- a) Corrugated HDPE tank with single complete pump unit, ready for installation. The tank will have a 1-1/4 NPT discharge connection and a 4-or 6-inch inlet grommet.
- b) The tank shall include an internal check valve assembly.
- c) The package system shall meet the requirements of the L & I, Division for Residential, grinder pump systems.
- d) The tank location shall be accessible for maintenance and repair. The tank cover shall be approximately 3 inches above finished grade. Finish grade shall slope away from the station and the station shall not be installed within a "pot hole". No plants, fences, or other obstructions are to be located within 5 feet of the tank and the valve boxes, and the property owner shall maintain a 5-foot clear zone around the tank.
- e) The location of the breaker panel shall be:
 - Accessible for maintenance and repair;
 - In sight of the tank;
 - The bottom of the Panel must be 5 feet above finished grade; and
 - The alarm light shall be visible from 50 feet and must be visible in a 180 degree radius.
- f) The maximum distance between the breaker panel and the grinder tank shall be 25 feet, and with sight and easy access.
- g) Fences, bushes, or any other object shall not hide the alarm light or hinder in the maintenance and/or repair of the system.
- h) There shall be no additional junction boxes or splices made once the system has been installed and inspected by City personnel. Anyone tampering with the approved system shall be liable to the City for any expense, loss, damage, cost of

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inspection or cost of correction incurred by the City, plus a penalty not to exceed \$1000.00.

CALL FOR INSPECTION

Arrangements for inspection of a side sewer installation shall be made with the City 24-hours in advance. The City reserves the right to set the time for inspection. All inspections will be performed during normal working hours. Cancellations must be made a minimum of one hour before the scheduled appointment. Additional inspection may result in additional fees.

(For inspections call 360-330-7512)

TESTING OR FINAL INSTALLATION – GRINDER PUMP

Sewers using pump systems shall be tested at 50 psi, or as directed by the City for actual conditions. The following is the procedure used for testing the discharge line:

- a) Close the in-line ball valve in the grinder valve box.
- b) Open the riser ball valve in the grinder valve box.
- c) Close the ball valve at the collector valve box for the street connection.
- d) Using hand pump, pressurize with water or air, introduced at the low end, to test for leakage.
- e) Hold the required pressure for ten minutes. Allowable leakage = 0.

AS-BUILT DRAWING

As-built drawings shall be prepared by the contractor on a CAD format and checked by the Wastewater Department Inspector (Centralia Public Works) in conjunction with the permit, and shall show the as-built location of all the components of the installations. Also a copy of all maintenance manuals for the system will need to be supplied to the City for record keeping.

3.30 Vehicle and Equipment Washwater Discharge

All businesses that regularly wash vehicles and/or equipment surfaces shall conform to the requirements of the Best Management Practices Manual for Vehicle and Equipment Washwater Discharges and the City-adopted version of the Stormwater Management Manual

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for Western Washington prepared by Ecology. These requirements will also apply to farm/construction vehicles, equipment rinsing, mobile washers, new/used car dealerships, and charity car washes.

3.30.1 Businesses that are specifically a "Car Wash", shall be designed for zero (0) discharge to the public sanitary sewer system. These businesses shall be required to install a flow meter on the discharge line connecting to the City's sanitary sewer system.

3.31 Grease Recovery Devices (GRD)

3.31.1 All Food Service Establishment (FSE) shall have a (GRD) to serve their property, the size will be determined when plans are reviewed by the Wastewater Department Administrative Authority or there representative.

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LIST OF DRAWINGS

CHAPTER 3: SANITARY SEWER

<u>Drawing Title</u>	<u>Number</u>
Sanitary Sewer Main Installation General Notes	
Sanitary Sewer Lateral Service Connection	3-01
Sanitary Sewer Manhole.....	3-02
Manhole Collar	3-03
Cleanout.....	3-04
Drop Connection (outside manhole).....	3-05
Drop Connection (inside manhole).....	3-06
Typical Grinder Pump Lateral Installation	3-07GP
Clean-out Box Connection.....	3-08GP
Collector Box Connection	3-09GP
Residential Grinder Pump Lateral (Collector & Clean-out) Box Requirements	3-10GP
Compression Fitting (instructions)	3-11GP
Force Main Sewer Lateral Service Connection	3-12GP
Type 1 Low Pressure Clean-out (for non-traffic areas only)	3-13GP
Type 2 Low Pressure Clean-out (with manhole – for traffic areas only)	3-14GP
Force Main Drop connection system (inside manhole)	3-15GP