

SECTION 400 SANITARY SEWER SYSTEM

The design of sanitary sewers shall be in conformance with the applicable sections of the State of Washington, Department of Ecology manual, Criteria for Sewage Works Design, revised August 2008, as there after; and the Standard Specifications for Road, Bridge, and Municipal Construction (hereinafter referred to as the “Standard Specifications”), Washington State Department of Transportation and American Public Works Association, Washington State Chapter, latest edition, unless superseded or amended by the City of Puyallup City Standards for Public Works Engineering and Construction (hereinafter referred to as the “City Standards”).

401 Sanitary Sewer System Design Criteria

The following additional design requirements shall also apply:

1. All public sanitary sewer lines shall be 8-inch-minimum diameter. All lines shall be to the minimum size as indicated in the City's Comprehensive Plan.
2. All sewer pipe shall be PVC, Polypropylene, or Ductile Iron. PVC sewer pipe shall conform to ASTM D-3034, SDR35 for pipe sizes 15-inch and smaller and ASTM F679 for pipe sizes 18- to 27-inch, ductile iron pipe shall be Class 51 or greater, lined with Protecto 401TM epoxy lining or equivalent, unless otherwise noted. 12-inch through 30-inch Polypropylene Pipe (PP) shall be dual walled, have a smooth interior and exterior corrugations and meet WSDOT 9-05.24(2). It shall meet or exceed ASTM F2736. 36-inch through 60-inch PP pipe shall be triple walled and meet WSDOT 9-05.24(2). It shall meet or exceed ASTM F2764. PP shall have a minimum pipe stiffness of 46 psi when tested in accordance with ASTM D2412. Testing shall be per ASTM F1417.
3. All sewer lines shall be designed and constructed to give mean velocities, when flowing full, of not less than 2.0 feet per second. The following minimum slopes should be provided:

<u>Sewer size</u> <u>(inches)</u>	<u>Minimum slope</u> <u>(percent)</u>
8	0.40
10	0.28
12	0.22
14	0.17
15	0.15
16	0.14
18	0.12
21	0.10
24	0.08
27	0.07
30	0.06
36	0.05

4. Commercial Developments:
The City may require specific monitoring facilities to be installed. This will allow inspection, sampling, and flow measurement of the building sewer and/or internal drainage system. This shall include but not limited to such devices as sampling tees, sampling manholes, industrial wastewater monitoring stations, flow meters and flume vaults. Contact Public Works Collection Division at (253) 841-5505 to determine specific requirements for the facilities to be constructed.

Puyallup Municipal Code 14.06.082

Monitoring - The City may require, to be provided and operated at the user's own expense, monitoring facilities to allow inspection, sampling and flow measurement of the building sewer and/or internal drainage system. There shall be ample room in or near such sampling manhole or facility to allow accurate sampling and preparation of samples for analysis. The facility, sampling and measuring equipment shall be maintained at all times in a safe and proper operating condition at the expense of the user. Whether constructed on public or private property, the sampling and monitoring facilities shall be provided in accordance with the City's requirements and all applicable local construction standards and specifications.

5. For commercial developments in which sources of grease and/or oils may be introduced to the City's sanitary sewer system, a City approved external grease interceptor shall be installed downstream from the source. The grease interceptor shall meet requirements of PMC 14.06.031 and the Uniform Plumbing Code as adopted by the City of Puyallup.
6. Side sewers shall be installed from the City sewer main to 15 feet beyond the property line at all building sites and shall be a minimum of 6 inches in diameter with a 0.02 foot per foot minimum slope. The depth at the property line shall be a minimum of 5 feet.
7. A separate and independent side sewer from the public main to all building sites shall be provided for each building. A cleanout shall be installed on side sewer lines at the property line or easement line. When a development proposes a side sewer connection to a public sewer main located on private property, the property utilizing/connected to the side sewer will be responsible for maintenance of the side sewer from the building to point of connection to the public sewer main.
8. Manholes shall be installed at a maximum spacing of 400 feet.
9. All public sanitary sewer lines shall end with a manhole; cleanouts will not be allowed.
10. The minimum design velocity shall be 2 feet per second flowing full unless directed otherwise.
11. Sewer lines shall have a 0.1 foot drop through manholes from inlet invert to outlet invert.
12. Manholes shall be installed at all junctions of two (2) or more connecting sanitary sewer pipes and at changes of direction, slope, and/or pipe size.
13. Connection of side sewer to main line shall be with a 'tee'.
14. Easements shall be a minimum of 40-feet wide. No building structures shall be allowed within easements.
15. The City requires that all new construction provide a new sanitary sewer service all the way to the main. Redevelopment projects shall utilize the existing trench where possible.
16. The City Sewer Department must conduct a visual inspection of a previously used side sewer to determine if that side sewer can be used again. Existing laterals must meet current standard to be used again. It is the responsibility of the property owner to expose the line as necessary for that inspection. The City reserves the right to request video inspection of the side sewer to assist in its determination.
17. Residential Sanitary Sewer Pump and Pressure line systems:

- a. Only “Environment One” Packaged Grinder Lift Station Model WH231/WR231 “SQUAT” (<http://www.eone.com>) or approved equal shall be used.
 - b. A gravity sewer line with clean out shall be installed to each building site, with the pressure line installed in accordance with City of Puyallup Standard Detail 04.05.01.
 - c. Each building site shall have its own Grinder Pump Station and discharge to its own gravity side sewer connection.
 - d. Grinder Pump Stations shall be installed within 15 feet of the building. The pump station shall be accessible for maintenance and repair. Finished grade shall slope away from the pump station. The pump station is not to be located within low areas that may pond. Fences, plants, or any other object shall not hinder the maintenance or repair of the pump station.
 - e. The property owner shall retain ownership and maintenance of the Grinder Pump Station and associated lines to the property line, gravity side sewer clean-out, or where the pressure line discharges to a City of Puyallup owned gravity sewer clean-out or structure.
 - f. The property owner shall be responsible for any sewer backups or spills due to power or pump failure.
 - g. See Grinder Pump Installation Details and Pressure Line to Gravity Line Side Sewer Connection and Clean-out Details.
18. Maintenance Access Roads shall comply with the construction requirements specified in City Standards Section 205.2.

402 Wastewater Quality Requirements

Discharge of objectionable materials of any sort is prohibited by the Puyallup Municipal Code 14.06.021, 14.06.022, 14.06.023, and 14.06.024. “Objectionable material” includes rubbish, dead animals, brush, concentrations of grease and oils, anything over 100°F in temperature, stormwater, septic tank pumping, and other matter not normally and customarily discharged into the sanitary sewer system. Normal material entering a toilet, kitchen sink, and wash trays is the only type of material permitted to enter a sewer or sewer treatment plant without pretreatment.

Commercial and industrial operations which discharge into the City’s sanitary sewer system shall be responsible for compliance with the requirements of the Washington State Water Pollution Control Act (RCW 90.48) including application for State Waste Discharge Permit (WAC 173-216) and Submission of Plans and Reports for Construction of Wastewater Facilities (WAC-240). City of Puyallup building permits may be issued only upon proof of submittals to the Washington State Department of Ecology. Examples are car washes, automobile service stations, paint shops, and chemical processing of hazardous materials. Industries which discharge domestic wastewater or wastewater similar in character and strength to domestic wastewater which does not have the potential to adversely affect performance of the treatment system only require a permit from the City. Examples are hotels, restaurants, non-industrial laundries, and food preparation. In both cases the City regulates the effluent into the system.

402.1 Effluent Requirements

Effluent discharged into the City's sanitary sewer system shall not exceed 100 mg/l oil and grease if discharged to the sanitary sewer. The use of grease interceptors and/or oil/water separators shall be required when the effluent is expected to be greater than the 100 mg/l maximum.

402.2 Oil/Water Separators

Oil/water separators are required when petroleum-derived waste is to be discharged into the sanitary sewer in which the effluent is expected to be greater than the 100 mg/l maximum.

1. The business owner shall provide three (3) sets of specifications and plans for the project. The plans shall bear the stamp of a Washington State licensed professional engineer.
2. The plans and specifications shall illustrate property boundaries, piping, and drainage details, and connections to the sanitary or storm sewer. Detail and elevation drawings of the oil/water separator shall be supplemented with design calculations to show capacity, detention time, and removal efficiencies.
3. Effluent from oil/water separators shall not exceed 100 mg/l oil and grease if discharged to the sanitary sewer. When effluent discharge is to the storm sewer, there shall be no visible oil sheen allowed. The oil and grease discharge shall average less than 10 mg/l daily and at no time shall exceed 15 mg/l.
4. The applicant shall be responsible for compliance with the requirements of the Washington State Water Pollution Control Act (RCW 90.48) including application for State Waste Discharge Permit (WAC 173-216) and Submission of Plans and Reports for Construction of Wastewater Facilities (WAC-240). A City of Puyallup building permit may be issued upon proof of submittals to the Washington State Department of Ecology.
5. Separators installed in paved areas shall comply with HS-20 loading standards.
6. The separator shall be installed and connected as such that it is easily accessible for inspection, cleaning, and removal at all times. No sanitary wastewater shall be conveyed to the separator. It shall be placed as close as practical to the service area. Manhole covers shall be gas tight and have a minimum opening of 24 inches in diameter.
7. Plumbing/piping shall be constructed to establish "parallel flow" (90° to the tank baffle) through the separator. No radius, bend, or elbow shall be allowed in the inlet pipe for a minimum of 10 feet or 20 pipe diameters upstream of the separator, whichever is greater (e.g., where the inlet pipe = 6 inches, then 6 inches x 20 = 120 inches = 10 feet).
8. A valve shall be located in the discharge piping, a maximum of 10 feet from the separator. This valve shall be closed when cleaning or servicing the device. Any pump mechanism shall be installed downstream of the separator to prevent oil emulsification. A 'tee' connection shall be installed in the discharge piping to provide for sample collection.
9. All separators shall be filled with clean water before use.
10. The design engineer shall provide the Engineering Services Staff with a letter of inspection certifying that the installation was performed in accordance with all regulations and the approved plan.

11. Final inspection is required by the Engineering Services Staff prior to connection to the sanitary or storm sewer.
12. The property owner shall retain ownership of the separator and side sewer lines and shall be responsible for their operation and maintenance. A service/maintenance record shall be kept on the premises at all times and shall be immediately available to the Engineering Services Staff upon request.
13. The property owner shall report immediately to the City's Public Works Division any spill, surcharge, bypass, or mechanical fault or failure which interrupts or otherwise reduces the capacity or removal efficiency of the separator. Please call 253-841-5505 during regular business hours or 253-770-3336 after hours.

402.3 Grease Interceptors

Grease interceptors are required for all commercial facilities involved in food preparation. The design of grease interceptors shall be in accordance with the Uniform Plumbing Code currently adopted by the City of Puyallup, City Standard Details and the following design criteria:

1. The business owner shall provide three (3) sets of specifications and plans for the project. They shall bear the stamp of a Washington State licensed professional engineer.
2. The plans and specifications shall illustrate property boundaries, piping/drainage details, and connections to the sanitary sewer. Detail and elevation drawings of the grease interceptor shall include sizing calculations in accordance with the Uniform Plumbing Code currently adopted by the City of Puyallup (Reference PMC 17.04.030 and PMC 14.06.031(3)).
3. Venting of the interceptor shall be in accordance with the uniform plumbing code currently adopted by the City of Puyallup.
4. Effluent from grease interceptor shall not exceed 100 mg/l fat, oil, and/or grease discharged to the sanitary sewer.
5. Grease interceptors installed in paved areas shall comply with HS-20 loading standards.
6. The grease interceptor shall be installed and connected as such that it is easily accessible for inspection, cleaning, and removal at all times. Manhole covers shall be gas tight and have a minimum opening of 24 inches in diameter.
7. No sanitary wastewater shall be conveyed to the grease interceptor. A separate side sewer shall be required to carry sanitary waste to the main. It shall be placed as close as practical to the service area.
8. Plumbing/piping shall be constructed to establish "parallel flow" (90° to the tank baffle) through the grease interceptor. No radius, bend, or elbow shall be allowed in the inlet pipe upstream of the interceptor for a minimum of 10-feet, or 20-pipe diameters, whichever is greater. (e.g., where the inlet pipe = 6-inches, then 6-inches x 20 = 120-inches = 10-feet).

9. Any pump mechanism shall be installed downstream of the interceptor to prevent fat, oil, and grease emulsification. A 'Tee' connection shall be installed in the discharge piping to provide for sample collection.
10. All grease interceptors shall be filled with clean water before use.
11. The design engineer shall provide the Engineering Services Staff with a letter of inspection certifying that the installation was performed in accordance with all regulations and the approved plan.
12. Final inspection is required by the Engineering Services Staff prior to connection to the sanitary sewer.
13. The property owner shall retain ownership of grease interceptor and side sewer lines and shall be responsible for their operation and maintenance. A service/maintenance record shall be kept on the premises at all times and shall be immediately available to City of Puyallup Staff upon request.
14. The property owner shall report immediately to the City's Industrial Pretreatment Specialist, any spill, surcharge, bypass, or mechanical fault and/or failure which interrupts or otherwise reduces the capacity or removal efficiency of the grease interceptor by calling (253) 841-5523.

403 Design Criteria Specific to Short Plats

Sewers or septic tanks: The proposed short plat shall be reviewed for potential sewer or septic tank adequacy. If known local conditions exist which may affect future building sites, these conditions shall be stated on the face of the short plat.

404 Sanitary Sewer Plan Requirements

The following requirements shall be shown on the plans:

- Plan and profile in accordance with Section 2.0 herein
- Sanitary sewer pipe including locations, length, material, slope, depth, and size
- Manholes including location, type, and rim and invert elevations. All new manholes shall be numbered consecutively and all existing manholes shall be referenced to the City's current numbering system.
- Detail any inside drop manhole connections per City Standard Details. 04.01.02 and 04.01.03.
- Identify any possible utility conflicts.
- Provide stationing and reference points.
- All public sewer main lines shall be located within roadway rights-of-way or easements.
- Location and stationing from downstream manholes shown
- Perpendicular connection of side sewers to the main lines
- Proper reference and layout for saw cutting and patching existing streets
- An all-weather maintenance access, including typical cross section of said access roads
- Existing septic tanks and drainfields

405 Sanitary Sewer Plan Notes

The following applicable notes shall also be shown on the plans.

SANITARY SEWER NOTES:

1. All work in City right-of-way requires a permit from the City of Puyallup. Prior to any work commencing, the general contractor shall arrange for a preconstruction meeting at the Development Services Center to be attended by all contractors that will perform work shown on the engineering plans, representatives from all applicable Utility Companies, the project owner and appropriate City staff. Contact Engineering Services to schedule the meeting (253) 841-5568. The contractor is responsible to have their own approved set of plans at the meeting.
2. After completion of all items shown on these plans and before acceptance of the project, the contractor shall obtain a “punch list” prepared by the City’s inspector detailing remaining items of work to be completed. All items of work shown on these plans shall be completed to the satisfaction of the City prior to acceptance of the sewer system and provision of sanitary sewer service.
3. All materials and workmanship shall conform to the Standard Specifications for Road, Bridge, and Municipal Construction (hereinafter referred to as the “Standard Specifications”), Washington State Department of Transportation and American Public Works Association, Washington State Chapter, latest edition, unless superseded or amended by the City of Puyallup City Standards for Public Works Engineering and Construction (hereinafter referred to as the “City Standards”).
4. A copy of these approved plans and applicable city developer specifications and details shall be on site during construction.
5. Any revisions made to these plans must be reviewed and approved by the developer's engineer and the Engineering Services Staff prior to any implementation in the field. The City shall not be responsible for any errors and/or omissions on these plans.
6. The contractor shall have all utilities verified on the ground prior to any construction. Call (811) at least two working days in advance. The owner and his/her engineer shall be contacted immediately if a conflict exists.
7. Any structure and/or obstruction which require removal or relocation relating to this project shall be done so at the developer’s expense.
8. Minimum grade on all 4 inch residential side sewers shall be 2 percent and 6 inch commercial side sewers shall be 1 percent; maximum shall be 8 percent. All side sewers shall be 6 inches within City right-of-way.
9. Side sewers shall be installed in accordance with City Standard Nos. 04.03.01, 04.03.02, 04.03.03 and 04.03.04. Side sewer installation work shall be done in accordance with the Washington Industrial Safety and Health Act (WISHA).
10. All sewer pipe shall be PVC, Polypropylene, or Ductile Iron. PVC sewer pipe shall conform to ASTM D-3034, SDR35 for pipe sizes 15-inch and smaller and ASTM F679 for pipe sizes 18- to 27-inch, ductile iron pipe shall be Class 51 or greater, lined with Protecto 401TM

epoxy lining or equivalent, unless otherwise noted. 12-inch through 30-inch Polypropylene Pipe (PP) shall be dual walled, have a smooth interior and exterior corrugations and meet WSDOT 9-05.24(2). It shall meet or exceed ASTM F2764. 36-inch through 60-inch PP pipe shall be triple walled and meet WSDOT 9-05.24(2). It shall meet or exceed ASTM F2764. PP shall have a minimum pipe stiffness of 46 pii when tested in accordance with ASTM D2412. Testing shall be per ASTM F1417. Trenching, bedding, and backfill shall be in accordance with City Standard No. 06.01.01. Minimum cover on PVC and PP pipe shall be 3.0 feet. Minimum cover on ductile iron pipe shall be 1.0 foot.

11. Sanitary sewer manhole frames and covers shall conform to City Standard No. 06.01.02.
12. Sanitary sewer manholes shall conform to City Standard Nos. 04.01.01, 04.01.02, 04.01.03 and 04.01.04. All manholes shall be channeled for future lines as specified on these plans. Manhole steps and ladder shall conform to Standard No. 06.01.03.
13. Sanitary sewer pipe and side sewers shall be 10 feet away from building foundations and/or roof lines.
14. No side sewers shall be connected to any house or building until all manholes are adjusted to the finished grade of the completed asphalt roadway and the asphalt patch and seal around the ring are accepted.
15. For commercial developments in which sources of grease and/or oils may be introduced to the City sanitary sewer system, a City approved grease interceptor shall be installed downstream from the source.
16. Once sewer and all other utility construction is completed, all sanitary sewer mains and side sewers shall be tested per Section 406 of the City Standards.

406 Testing Requirements

Gravity sanitary sewer cleaning and testing requirements shall be as outlined in WSDOT Section 7-17.3(2). Sanitary sewer cleaning and testing shall be completed to the satisfaction of the Office of the City Engineer and/or Public Works Department prior to final acceptance. After completion of **all** project utility work (sewer, water, storm, etc.) and associated utility trench backfill and compaction, sewer lines shall be cleaned and tested by the Contractor prior to final project acceptance, as outlined in Section 406.1 through 406.4. At the end of the Maintenance and Warranty Period, the City will perform a final CCTV inspection per 406.4 to verify that the work performed conforms to City Standards prior to bond release.

406.1 Cleaning

Physical connection to the existing City sewer system shall not be allowed until all pipes have been thoroughly cleaned by jetting and/or pigging to remove any solids or construction debris that may have entered the pipe.

The Contractor shall arrange to have the water accumulated during construction and sanitary system cleaning operations removed from the sewer system by a Vactor truck. Water from the new sewer extension shall not be permitted to enter the existing City system until final project approval. Sediment or debris introduced to existing City sewers

as a result of any construction activity shall be removed immediately by the Contractor in conformance with WSDOT Section 7-17.

406.2 Deflection Testing

Gravity sanitary sewers shall be tested for deflection prior to visual inspection. Thermoplastic pipe shall be tested for deflection not less than 30 days after the trench backfill and compaction has been completed. Deflection testing shall be conducted by pulling a mandrel (rigid or adjustable) with a diameter not less than 95 percent of the normal diameter of the pipe being tested. Mandrel testing shall be conducted in conformance with WSDOT Section 7-17.3(2)G.

406.3 Leakage Testing

All new gravity sanitary sewer mains and the right-of-way laterals shall be subject to a low-pressure air test per WSDOT Section 7-17.3(2)F. Low pressure air testing shall be conducted after backfilling is completed and the backfill material has been compacted in conformance with the approved plans. Conforming compaction shall be verified by nuclear gauge testing and/or proof rolling at the discretion of Engineering staff. The City Engineer or designee shall observe all testing to verify satisfactory completion. The City Engineer or designee may require that air test pressure be maintained at 4.0 psig with no drop for 15 minutes for a passing leakage test where groundwater pressure is deemed negligible, or at the City Engineer's or designee's discretion.

The Contractor shall furnish all necessary equipment and personnel for conducting the pressure test. The Contractor shall provide certification from a certified/accredited laboratory that testing equipment is accurate. All equipment and personnel shall be subject to approval by the City Engineer or designee.

If any portion of the sanitary system fails to meet the testing requirements, the Contractor shall determine, at their own expense, the source of leakage and shall repair or replace all defective materials or workmanship. The completed pipe installation shall meet the minimum testing requirements before being considered acceptable.

406.4 Television Inspection

All new gravity sanitary sewer extensions shall be visually inspected in conformance with WSDOT Section 7-17.3(2)H, following satisfactory trench compaction testing, flushing, low pressure air testing, and deflection testing. All manholes shall be channeled and grade rings set in place prior to sewer video inspection.

The remote camera used in sewer visual inspection shall be one specifically designed for such an application, with the ability to rotate the camera 180 degrees and lighting suitable to allow a clear picture of the entire periphery of the pipe. The camera shall proceed through the pipe at a sufficiently slow velocity to allow adequate inspection of all pipe joints. All sewer lateral fittings and joints and suspect pipe joints shall be closely inspected by rotating the camera as needed to provide a clear view.

The Contractor shall introduce water to the new sewer system immediately prior to the visual inspection by adding water to the upstream manhole until water is seen flowing in the lowest manhole. Video inspection of the line shall begin when flow in the lowest manhole has stopped. A 1-Inch sewer ball shall be attached to the front of the camera to provide a basis for estimating the depth of the ponding within the sewer pipe.

Television Inspection Acceptance Criteria:

1. Any ponding within a pipe shall be less than one-half inch (1/2") in depth.
2. The total accumulated ponding length, regardless of depth, from manhole to manhole shall be less than ten (10) percent of the total length from manhole to manhole.

Any sewer pipe that exceeds either of the above acceptance criteria will be rejected and require repair and/or replacement by the Contractor.

The Contractor shall bear all costs for the correction of any deficiencies found during TV inspection, including the costs for additional TV inspection and leakage testing needed to verify the deficiencies were corrected. All components of the video and recording equipment shall be sufficient to provide picture quality to the satisfaction of the City Engineer or designee.

Upon completion of the video inspection, the digital video, of common format, and written inspection report shall be submitted to the City for review. At a minimum, the inspection report shall contain the following information:

- Size, length, and material type of the sewer main.
- Location of all lateral connections.
- Estimated depth and location of all ponding over 1/4 inch in depth
- Manhole numbers that correspond to the approved plans
- Street name and/or location of sewer main