

CHAPTER 6 - WASTEWATER

6.00 General Approval Requirements

- A. See Chapter 1 for general construction requirements, including the requirements for extension of all sewer conveyance pipes to limits of property, surety bond, utility review, and other general requirements.
- B. In the sewer service area, sewer main extensions are required to assure orderly and adequate extension of the sewer utility system. These extensions are to be in accordance with requirements of development and service availability as established by the City and the Washington State Department of Ecology.
- C. Design and construction of sewer mains and facilities, including but not limited to: sewer lift stations, telemetering facilities and appurtenances shall be in compliance with the latest edition of the City's ordinances, latest revision to the City's General Sewer Plan, these Standards, the Standard Details and the latest issue or revision of "Criteria for Sewage Work Design" published by the Washington State Department of Ecology.
- D. No connections from storm drainage systems shall be made to the sanitary sewer system unless approved by the City Engineer and only under special circumstances (i.e. covered parking, wash down areas around garbage collection dumpsters with an area less than 200 sq. ft.).

6.01 Planning Criteria

- A. Sewer service shall be provided by a gravity system, unless approved otherwise by the City Engineer.
- B. Ensure sewer service can be provided to adjacent properties. Extend sewers to extreme of property and design for the ultimate development of the tributary areas.
- C. Demand Projections:
 - 1) Sewer systems shall be designed on the basis of per capita flows for the design period in conjunction with a peaking factor or approved alternative methods.
 - 2) Residential - Residential population is 2.66 people per household; 100 gallons per capita per day (GPCD)
 - 3) Commercial and Industrial - 15 GPCD
 - 4) Student Enrollment – 15 GPCD
- D. Peaking Factors:
 - 1) Where average day demands are 50 gallons or less, the design peaking factor shall be 4.
 - 2) Where average day demands are between 50 and 1,000 GPM, the design peaking factor will vary linearly between 4 and 2.5 respectively.
 - 3) Where average day demands are greater than 1,000 GPM the design peaking shall be 2.5.
- E. Infiltration/inflow (I/I) allowances:
 - 1) For new systems an I/I allowance of 1,100 gallons per acre per day (GPAD) shall be used.
 - 2) On existing sewer systems, I/I allowance shall be determined through a flow analysis.
- F. System Parameters:
 - 1) New sewer lines shall be designed so that under ultimate development peak flow, including I/I, shall not exceed 50% capacity of the line. Existing lines can have peak flows to 75% capacity of the line. Capacity analysis using an approved sewer model shall be conducted to verify sewer flows.

6.02 Main Line Extensions

- A. In residential and commercial areas, the minimum size sewer main to be installed shall be 8-inches. Larger sewer mains will be required where it is determined by the City that an 8-inch sewer is inadequate to handle the capacity of the users in the new or downstream facility, or for future service needs.
- B. Minimum depth: Sanitary sewers shall:
 - 1) have a minimum depth of cover of eight (8) feet unless approved in writing by the City Engineer and shall not have a depth of cover less than three (3) feet when subject to vehicular traffic
 - 2) Be deep enough to prevent freezing and physical damage
 - 3) Be designed at an elevation that is sufficient to serve the limits of the service basin; and
 - 4) Be of sufficient depth to serve existing and proposed basements
- C. Minimum slopes: All sewers shall be designed and constructed to give mean velocities, when flowing full, of not less than 2.0 fps. Table 6.1 lists the minimum slopes that should be provided; however, slopes greater than those listed in this table are desirable under low-flow conditions.

TABLE 6.1 MINIMUM PIPE SLOPES	
Sewer Size (Inches)	Minimum Slope (Feet Per 100 Feet)
8	0.45
10	0.28
12	0.22
15	0.15
16	0.14
18	0.12
21	0.10
24	0.08

- D. Maximum main line slope shall not induce velocities greater than 15 feet per second under daily peak flows.
- E. Pipe anchors shall be provided at 20' on center where pipe slope exceeds 20%.
- F. Sewers shall be located within public right-of-way whenever possible.
- G. All sewer mains designed on public utility tracts shall have a minimum of one percent (1%) slope and shall be offset from the property line with manhole accesses located on offsets ten (10) feet from property lines and property corners.
- H. Sewer mains shall be extended through and to the extremes of the property being developed, to provide connection points for future development of unserved property as determined by the City. The depth of the main shall be determined by the applicants' Engineer and approved by the City. This shall be done by evaluating the feasible drainage basin that could contribute to that mainline and design the depth accordingly.
- I. All manholes and cleanouts shall be constructed to finished grade. Any re-adjustment of finish grade by the Developer or lot owner shall require that party to adjust the manhole and/or cleanout fixtures to the new finished grade.

J. Manhole and cleanouts covers shall be set flush with ground surface. Manholes in unimproved surfaces shall be one foot higher than surrounding grade.

K. A 3-foot concrete pad is required around all cleanouts on City-maintained lines.

6.03 Side Sewers

- A. Installation of side sewers shall conform to the requirements of the Uniform Plumbing Code, latest edition, the Standard Details, and the Standard Specifications.
- B. Side sewers shall be a minimum 4" for single family residential and minimum 6" for multi-family, industrial and commercial.
- C. Side sewer shall have minimum 6' of cover at property line. Greater depths may be required where elevation of lowest floor to be served is lower than surface elevation at property line.
- D. Pipe material for side sewers within the public right-of-way shall be the same as the pipe material used on the mainline.
- E. Minimum side sewer slope shall be 2 percent. Maximum slope shall be 100 percent.

6.04 Manholes

- A. Manholes shall be installed at the end of each line with 8-inch diameter or greater unless the 8-inch line is not expected to be extended in the foreseeable future, in which case a cleanout can be installed at the end of the line. Manholes shall also be installed at all changes in grade, size of pipe, or pipe alignment. Manholes shall be installed at all intersections and at distances not greater than 400 feet. Cleanouts may be used instead of manholes at the end of lines 6 inches or 8 inches in diameter and not more than 150 feet long.
- B. Drop in invert elevation across manhole shall be 0.2 ft.
- C. Manhole sizing: The minimum inner diameter of manholes shall be 48 inches. For incoming pipe larger than 24 inches in diameter, the manhole diameter should be 54 inches or greater. The configurations listed below is required to provide adequate shelves and space for performing maintenance and T.V. inspections.
 - 1) 48-inch Manhole
 - Two (2) connecting pipes, 8-inch to 12-inch diam.
 - Three (3) connecting pipes, 8-inch to 10-inch diam., perpendicular.
 - Four (4) connecting pipes, 8-inch diam.
 - 2) 54-inch Manhole
 - Two (2) connecting pipes, 8-inch to 12-inch with more than forty-five degree deflection, 15-inch to 18-inch diam. with forty-five degree or more deflection.
 - Three (3) connecting pipes, 10-inch to 12-inch diam., perpendicular.
 - Four (4) connecting pipes, 10-inch to 12-inch diam., perpendicular.
 - 3) 72-inch Manhole
 - Two (2) connecting pipes, 15-inch to 18-inch diam. with less than forty-five degree deflection.
 - Three (3) connecting pipes, 15-inch diam., perpendicular.
 - Four (4) connecting pipes, 15-inch diam., perpendicular.
 - 4) Terminal manholes (at end of main)
 - Side sewer stubs shall not connect to terminal manholes when there is a potential for future main line extension from manhole.
 - Terminal manholes without a side sewer connection shall not be channeled. The manhole base shall be sloped to provide positive drainage toward pipe.

- Where a side sewer connects to manhole, the crown of the side sewer shall be equal to or above main sewer crown, but not to exceed 18" above invert of main sewer.
- For other pipe configurations, the size of the manhole shall be approved by the City Engineer.

In the above criteria "deflection" refers to the angle between any two (2) pipe channels in the manhole.

- D. Manholes in easements and in areas outside of public right-of-way shall have locking lids.
- E. "WrapidSeal" manhole encapsulation shall be provided at all manhole connections where the groundwater level is above the invert of the connecting sewer.
- F. Minimum Manhole Depths:

Manhole Size	Pipe Size	Minimum Depth	Comments
48"	6"	3.0'	Flat top manhole per standard detail
	8"	3.2'	
	10"-12"	3.5'	
54"	8"	3.7'	Flat top manhole per standard detail
	10"-12"	4.0'	
	15"-18"	4.5'	
72"	15"	8.0'	Flat top manhole w/ 2 access lids
	18"-24"	8.5'	
	27"	9.0'	

6.05 Pipe Class, Protection and Cover

- A. All sewer pipe shall be SDR 35 PVC conforming to ASTM D3034, unless otherwise determined by the City.
- B. Depth of cover over SDR 35 PVC pipe shall be 3' minimum and 20' maximum. Pipe depths outside this range will require use of pressure class PVC conforming to AWWA C900 (dimension ratio 18 or less).
- C. PVC pipe shall be encased in steel casing when crossing under rockeries or retaining walls over 3' high. Casing to extend beyond footings or rockery face a minimum of 5' or the height of the wall or rockery, whichever is greater.
- D. Ductile iron pipe, class 52, shall be used only where required by the City. All buried metal pipe shall be encased in 8-mil polyethylene per AWWA C-105.

6.06 Horizontal Setback Requirements

- 5 feet minimum from covered parking.
- 10 feet minimum from buildings and retaining walls, or equal to depth of pipe, whichever is greater.
- 20 feet minimum easement shall be provided between buildings.
- When passing between any two buildings (residential or commercial, etc.) which are 25 feet apart or less: the sewer line shall be oversized two (2) nominal pipe sizes above the capacity requirements between nearest manholes beyond limits of buildings.

6.07 Horizontal Clearances from Other Utilities

- Water 10'
- Other utilities 5'

6.08 Vertical Clearances from Other Utilities

- Water 18" (sanitary sewer below the waterline)
- Other utilities 1'

6.09 Connections

- A. Connection of a pipeline to a system where a manhole is not available shall be accomplished by pouring a concrete base and setting manhole sections. The existing pipe shall not be cut into until approval is received from the City.
- B. Connections to manholes using inside drop structures shall be approved by the City Engineer. Outside drops are prohibited unless specifically approved by the Director.
- C. Connection of new service laterals to existing mains shall be accomplished by tapping the main where the lateral is to be installed using "Insert-A-Tee" or approved equal. The new service lateral shall be constructed of the same material as the main.
- D. Connections where the new service lateral is the same size as the existing main shall be accomplished by cut-in of a wye using a mechanical coupling as approved by the City. Wye cut-ins on cast iron or ductile iron will require installation of a wye made of the same material as the main.

6.10 Fats, Oils, Grease Separation

- A. Oil/water separator. Whenever an industrial or commercial business generates mineral/petroleum oils exceeding 100 milligrams per liter to be discharged to the sanitary sewer, pre-treatment is required. An oil/water separation device shall be installed by the property owner as specified on various standard details. Selection and sizing of an oil/water separator shall be subject to approval of the City Engineer. Water discharged from any oil/water separator to the sanitary sewer system shall not contain in excess of 100 milligrams per liter of petroleum oil, non- biodegradable cutting oil or mineral products and shall be in compliance with the City of Stevenson Regulations for Discharge to the Sanitary Sewer.
 - 1) Sizing of a separator facility shall meet or exceed the requirements of the Uniform Plumbing Code Section 211.0, 1009.0 through 1009.7, and 1017.0 through 1017.2, with a minimum capacity of 450 gallons.
 - 2) The oil/water separator shall be covered with removable sections. Access and inspection covers, weighing not more than 30 lbs. with suitable hand holds, are to be provided directly above inspection "tee" and oil/grit collection compartments.
 - 3) Only wastewater from floor drains and covered parking garages shall drain to the separator. The location and design shall minimize or eliminate the possibility of storm water reaching the separator. Areas over two hundred square feet open to rainfall and/or sewage from restrooms and shower facilities shall not drain to the separator.
 - 4) Allowable materials:
 - Tank - concrete
 - Baffles - concrete, steel plate
 - 5) The separator shall be located within 20 feet of an access drive for access by maintenance vehicles. Access to the separator shall be maintained free for inspection and compliance determination sampling at all times.
 - 6) A sampling tee shall be located on the outlet with a minimum 18 inch drop below the invert.
 - 7) When pre-treatment is no longer required, the inlet and outlet pipes shall be permanently plugged, the separation chambers pumped out, and the vault removed.

- B. Grease interceptor. Whenever a commercial and/or retail food preparation operation, regardless of size, generates animal/vegetable fats, oils or grease (f.o.g.) waste in excess of 100 milligrams per liter to be discharged to the sanitary sewer, pre-treatment is required. A grease interception device shall be installed by the owner. Effluent discharged from any grease interceptor shall contain no more than 100 milligrams per liter animal/vegetable f.o.g. and be in compliance with the City of Stevenson regulations for discharge to the sanitary sewer.
- 1) Size and design of the grease interceptor shall meet or exceed the requirements of the Uniform Plumbing Code Sections 209.0, 210.0 and 1009.0 through 1015.5.
 - 2) All fixtures in the kitchen area which discharge waste-water containing grease are to be connected to the grease interceptor. Such fixtures include dishwashers, pot sinks, range woks, janitor's sink, floor sinks and rotoclones. Sanitary facilities and garbage disposals shall not flow through the interceptor.
 - 3) The interceptor shall be located exterior to the building within twenty feet of an access drive for access by maintenance vehicles.
 - 4) The interceptor shall be filled with clean water prior to start-up of system. Allowable materials for construction are as follows:
 - tank - concrete
 - baffles - concrete, plastic
 - 5) Access to the interceptor shall be maintained free for inspection and compliance determination sampling at all times.
 - 6) When pre-treatment is no longer required, the inlet and outlet pipes shall be permanently plugged, the separation chambers pumped out, and the vault removed.

6.11 Pump Stations

- A. Pump stations shall only serve those properties which cannot otherwise be served by conventional gravity sewers, as determined by the City Engineer. Pump stations shall be approved on an individual basis by the City Engineer.
- B. Pump stations shall be designed in accordance with the requirements and details of the latest edition of the City of Vancouver "Public Sanitary Sewer Pump Station Design and Construction Standards", with the following amendments:
- 1) Prefabricated lift stations shall be manufactured by Romtech, or approved equal as determined by the City Engineer.
 - 2) All pump stations shall have a minimum of two (2) pumps.
 - 3) Pumps shall be 460 volt, 3-phase Flygt pumps, or approved equal.
 - 4) Check valves shall be Flygt ball check, or approved equal.
 - 5) A potable water service with backflow prevention and a yard hydrant at the end shall be provided.
 - 6) Multi-trode transducers shall be used in place of floats.
 - 7) Electrical panels shall be located under a shed roof extending a minimum three (3) feet in all directions from the edges of the panel. Electrical panels mounted in unprotected areas will not be allowed.
 - 8) Pump stations shall be equipped with City approved telemetry.
 - 9) Exterior lighting shall be provided.

- 10) Pump station sites shall have a paved 18' wide service road and shall be fenced with a lockable gate.
- 11) An approved lift station sign shall be provided.
- 12) Pump stations shall be furnished with provisions for emergency back-up power with 48 hours fuel capacity.
- 13) City Standard Details shall be used on the installation of water service and backflow preventer.
- 14) An air discharge permit, naming the City of Stevenson as the owner, shall be obtained from the Southwest Washington Clean Air Agency prior to the start of construction.