

VISION 2020 + 20 Update  
Issue Paper on Sewer Utility Status

Puget Sound Regional Council

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# Issue Paper Purpose

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This issue paper broadly outlines sewer conditions in the Puget Sound region and identifies where sewer capacity could affect growth.

## Introduction

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The Washington State Growth Management Act requires comprehensive planning for cities and counties in the central Puget Sound region and other highly populated or fast-growing areas of the state. As part of the comprehensive plan there are mandatory elements that must be addressed. One of these is the capital facilities element, as outlined in RCW 36.70A.070:

*(3) A capital facilities plan element consisting of: (a) An inventory of existing capital facilities owned by public entities, showing the locations and capacities of the capital facilities; (b) a forecast of the future needs for such capital facilities; (c) the proposed locations and capacities of expanded or new capital facilities; (d) at least a six-year plan that will finance such capital facilities within projected funding capacities and clearly identifies sources of public money for such purposes; and (e) a requirement to reassess the land use element if probable funding falls short of meeting existing needs and to ensure that the land use element, capital facilities plan element, and financing plan within the capital facilities plan element are coordinated and consistent.*

This element provides the foundation for how urban services are addressed that are so critical to citizens in our region. These services are defined under 36.70A.030.19 in part as (1) storm and sanitary sewer systems, (2) domestic water systems, (3) street cleaning services, (4) fire and police protection services, (5) public transit services, and (6) other public utilities associated with urban areas which are not normally associated with rural areas. Our focus in this paper is on sanitary sewer systems.

The Growth Management Act distinguishes between rural and urban levels-of-service. Several of the defined “urban services” are allowed in the urban and rural area. For example, domestic water systems are allowed in both rural and urban areas. However, sanitary sewer service, with very few exceptions, is only allowed in the urban area. These sewer service exceptions generally are provided only for schools or for specific health, safety or environmental concerns. There are rural locations in Pierce County that receive sewer service due to a binding sewer agreement that predates the Growth Management Act.

As outlined by the Growth Management Act, sanitary sewer service is an urban service that provides for growth and treatment to levels that comply with water quality standards. There are a few barriers for sanitary sewer service delivery; however most of these are localized and not global to the area. These challenges are discussed herein.

In the Puget Sound region, sewer service is provided by cities, counties, special purpose districts and tribal nations. The utility provider for each of these jurisdictions is required to prepare a sewer comprehensive plan (Plan), which documents the current status and analyzes the future needs of the sanitary sewer system. The utilities use the Plan as a tool to anticipate and plan for maintaining and improving the sanitary sewer system for the next 20 years. Many utilities also analyze the needs of their system at ultimate capacity or build-out. Each of these plans must meet state, county and local requirements. The Plan must comply with requirements of the Department of Ecology, as set forth in the Washington Administrative Code (WAC) 173-240 and the Revised Code of Washington (RCW) 90.48.110.

The Plan is “required of any governmental agency before providing sewer service” WAC 173-240-050. Any governmental agency includes but is not limited to cities, towns, counties and special purpose districts. All Plans must be submitted to and approved by the Department of Ecology as outlined in WAC 173-240-050. Further local government jurisdictions, such as counties, generally have additional planning requirements. Sewer Districts have additional requirements. Districts must also submit to and have approval from the legislative authority of every county and city within whose boundaries all or a portion of the utility lies. Further the Plan “shall not provide for the extension or location of facilities that are inconsistent with the requirements of RCW 36.70A.110.” In essence, districts are not allowed to plan for or provide sewer services outside the urban growth area with extraordinarily limited exceptions. It is the responsibility of the approval agencies to review the Plan and ensure compliance of these planning requirements and limitations.

The Plan as outlined in WAC 17-240-050 and RCW 57.16.010 shall include the following information:

- The purpose and need for the proposed plan.
- A discussion of who will own, operate, and maintain the systems.
- The existing and proposed services boundaries.
- Layout map with boundaries; existing and proposed sewers, pump stations, force mains; topography and elevations; streams, lakes and other bodies of water; and water systems.
- The population trend as indicated by available records, and estimated future populations for the stated design period.
- Any existing domestic or industrial wastewater facilities within twenty miles of the general plan area and within the same topographical drainage basin containing the general plan area.
- A discussion of any infiltration and inflow problems and a discussion of actions that will alleviate these problems in the future.

- A statement regarding provision for treatment and discussion of the adequacy of the treatment.
- List of all establishments producing industrial wastewater, the quantity of wastewater and periods of production, and the character of the industrial wastewater insofar as it may affect the sewer system or treatment plant. Consideration must be given to future industrial expansion.
- Discussion of the location of all existing and public wells or other sources of water supply, and destruction structures as they are related to both existing and proposed domestic wastewater treatment facilities.
- Discussion of the various alternatives evaluated, and a determination of alternative chosen, if applicable.
- A discussion, including a table, that shows the cost per service in terms of both debt service and operation and maintenance costs, of all facilities (existing and proposed) during the planning period.
- A statement regarding compliance with any adopted water quality management plan under the Federal Water Pollution Control Act as amended.
- A statement regarding compliance with the State Environmental Policy Act and the National Environmental Policy Act, if applicable.

The local government may require additional information. In King County, Title 13.24.010 of the King County Code, requires additional discussion regarding:

- Existing and planned flows, both average and peak;
- Existing and planned flows of any basin discharging into King County's sewage conveyance and treatment system;
- Amounts of inflow and infiltration to the system, comparison of those amounts with King County's one-thousand-one-hundred-gallons-per-acre-per-day-standard, and steps being taken to reduce the inflow and infiltration; and
- Areas of concern with respect to corrosion and odor control and steps being taken to reduce their occurrence.

Each of these requirements generally allows the jurisdiction to document the condition of the existing systems, determine how much growth is coming, and outline methods to meet existing and future needs. The alternatives may include a new treatment plant, rehabilitation or upsizing of old pipes, or expansion to new developments. Most of these alternatives cause the need to look at existing sewer rates and connection charges. Each of these elements is outlined in varying detail within each sewer Plan.

## Background – Sanitary Sewer System 101

The purpose of a sanitary sewer system is to convey wastewater from its source to a point of treatment. The preferred method for conveying wastewater is a gravity sewer system. A gravity sewer system is made up of collector sewers, which as their name implies, collects the wastewater from individual basins, carries the wastewater to interceptor sewers, and onto the point of treatment.

Another major sanitary sewer system component is a sewage pump station. A pump or lift station is needed when the sanitary sewer system must overcome topographic restrictions within a basin that make it impossible, or financially unfeasible, to construct gravity sewers. Pump or lift stations can be temporary, used until a gravity sewer system can intercept it, and then be abandoned once gravity service is extended.

The final stage of the sewer system includes treatment and discharge. There are various types of treatment within the four county region. Generally the sewer treatment plants are secondary treatment plants. However, treatment plants in a number of communities are being upgraded and tertiary treatment is being considered. Tertiary treatment provides a higher quality of effluent discharge as compared to secondary treatment.

It is important to note that many urbanized areas still have properties served by on-site septic systems. There are many factors for the continued use of septic systems including; soil properties and characteristics, age and type of system, the size of the property and structure being served, and cost of conversion from septic to sewer. These all contribute to the on-going use of septic systems. The use of septic systems typically do not allow for urban levels of density.

## Planning Considerations

Each jurisdiction, whether a city, town, county or special purpose district, must define a sewer service area. Generally, this is an area where the jurisdiction is already providing service and seeks to extend sanitary sewer infrastructure to serve homes, business, local governments, and schools. The sewer service area determination also takes into consideration; adjacent sewer service providers, topographical limitations, and proximity of sewer lines that make it practical for the jurisdiction to serve. Jurisdictions also consider cost-effective ways to provide service to these areas.

There are many unincorporated urban areas in the four-county region. Some of these areas are served by on-site septic systems however there is also sewer service in the more dense urban unincorporated areas. The sewer service is provided by special purpose districts, cities, towns or counties. When a city annexes unincorporated area or is newly incorporated, the city coordinates with the local sewer service provider if it someone other than itself. In some instances, the local sewer service provision is assumed by the city. However, since the sewer service is optimized when following topographic boundaries and many local sewer service providers extend beyond the annexation or incorporation areas, the provision of sewer service has not changed following annexation or incorporation.

Sizing of the sanitary sewer mains and timing for sewer capital improvement are generally based upon zoning data, future growth projections from the Puget Sound Regional Council, and historic sewer use patterns for established sewer service areas. The zoning information comes from the local planning jurisdiction.

Soil properties may impact the design and location of sewer facilities. A detailed soil testing is often performed early in the design of proposed facilities to identify design parameters and to minimize construction costs.

Topography of an area is one of the principal factors in the design of sewage facilities. Every effort should be made to utilize the natural drainage basins in the design to take maximum advantage of gravity flow and minimize the need for constructing sewer lift stations. Typically, when the urban growth area does not conform to natural drainage basins, it may be necessary for a facility to pass partially through the rural area. Facilities passing through the rural area are not allowed to provide direct service to rural property owners unless permitted by local regulations.

It is noted by many sewer utilities that not all development within a sewer service area are connected to a sewer system. Septic systems exist in many areas. Some utilities anticipate that all septic systems will be converted to a sewer system within the planning horizon, while others consider a significant portion but not 100 percent.

Many considerations are taken into account when planning for ultimate sewer service capacity. Each jurisdiction considers;

- Adjacent sewer service providers,
- Cost-effectiveness,
- Zoning,
- Existing soil conditions,
- Topographical limitations, and
- Septic conversions.

# Sewerage System Analysis

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The purpose of a sanitary sewer system is to convey wastewater from its source to a point of treatment. The preferred method for conveying wastewater is a gravity sewer system. A gravity sewer system is made up of collector sewers, which as their name implies, collect the wastewater from individual basins. The basin collector sewer carries the wastewater to interceptor sewers and onto the point of treatment.

Another major sanitary sewer system component is a sewage pump or lift station. A pump or lift station is needed when the sanitary sewer system must overcome topographic restrictions within a basin that make it impossible, or financially unfeasible, to construct gravity sewers. Pump or lift stations can be temporary, used until a gravity sewer system can intercept it, and then be abandoned once gravity service is extended.

The technical criteria utilized by sewer utilities for the design and construction of sanitary sewer infrastructure are based on the Department of Ecology publication, "Criteria for Sewage Works Design" and WSDOT/APWA Standard Specifications. These standards are, in general, used throughout the state and have been modified and supplemented by most jurisdictions with standards to suit the specific requirements and preferences of each utility.

Many of the sewers extensions are built by developers for the sewer utilities. Therefore, allowing growth to pay for growth.

## Capital Facility Planning

Sewer utilities outline improvements necessary to meet future sewer system needs during their comprehensive sewer planning. The improvements are based on the evaluation of existing system facilities, reports from operations staff, and the analysis done in preparing the Plan. Recommended improvements generally are identified through a six-year period for a capital facility plan and to the end of the planning horizon. This planning horizon looks out 20 years and in many cases 50 years. Although recommended improvements are identified through the end of the planning period, it should be noted that the specific needs of the utility are evaluated on an ongoing basis. Growth rates and land use patterns likely vary from neighborhood to neighborhood.

Significant thought is given to the analysis of improvements in order to select the most cost-effective plan of actions to meet future sewer needs. However, in most instances, the proposed sewer lines are development driven.

The sizes of the new sewer facilities are generally derived from the estimated ultimate peak flow of the tributary area within each basin served. The Plans also predict the location of the facilities based on possible future sewage flow paths. Actual development may cause both the size and location of recommended facilities to be modified. It is also difficult to predict the timing of development for specific areas over the planning period.

Land that is in use at substantially less than allowable density, in other words, parcels with enough vacant space to subdivide into additional lots, are more likely to develop. Easy access to existing facilities will tend to promote this activity in the more near term future. A major consideration regarding the subject of development rate is the current state policy of limiting the growth of the sewer systems to the urban growth area.

An integral part of the comprehensive planning process is a thorough hydraulic analysis of the sewage system facilities. The purpose of the hydraulic is to evaluate the ability of the existing system to effectively transportation wastewater through the local sewer utility to adjacent jurisdictions' sewer systems. The results of this analysis are then used to identify deficiencies. The analysis generally includes current conditions as well as conditions anticipated in the planning period and for ultimate development. The hydraulic analysis is used to identify the projects included in a Capital Facility Plan.

The Capital Facilities Plan includes components that respond to predicted growth within the sewer service area; as well as components that focus on improving service to existing customers in the system. The improvements for existing system customers may include replacement of existing infrastructure that has service its useful life or has become problematic for the system. Projects may also include enhancements to the existing sewer system to increase efficiency and/or useful life of the facility. Many expansion projects are viewed as necessary to serve future growth. Some of these projects are designated to be funded largely or entirely by developers. Capacity problems within the existing system created by future development may be funded by future developers. The developer in this scenario would be required to create the downstream capacity for the proposed future growth.

It should be noted that the timing of the projects may change during the planning period. There is a need for flexibility in order to coordinate a joint roadway or other utility project. Although specific projects may be implemented sooner or be delayed, based on current priorities, each jurisdiction invests in capital improvements at the recommended level throughout the planning period in order to maintain the utilities ability to meet customer needs.

## Barriers to Sewer Service Delivery

Sewer utility engineers, planners and administrators take into consideration many factors that may influence the ability to provide sewer service. Each keeps in mind the need to plan for maximum build-out within the sewer service area for which they are planning. This philosophy is reinforced by the Washington State Department of Ecology

policies that allow for a ban on sewer connections if a local or regional sewer utility is nearing the capacity of its system.

There are a few recognized barriers to service delivery:

- Capacity,
- Water quality, and
- Cost.

In the four-county area there is evidence of each of these barriers.

## Capacity

As utilities prepare comprehensive sewer and capital facilities plans, each are required to assess deficiencies of the system. However, there can be short term, temporary localized capacity issues when new demand is placed on the system that was not previously anticipated.

There have been a few occasions when the urban growth area has been modified to increase the amount of urban area. This “new” urban area is then eligible to receive sewer service when it previously was not likely included in a sewer comprehensive plan.

School Districts provide service to both the urban and rural areas. There are many instances in which schools have been located within the rural area. Sewer service can be allowed to schools when they are on the rural side of the urban growth area. Each of these circumstances can have a direct impact on sewer system capacity.

There are also circumstances when sewers must be extended to address health, safety or environmental relief. This has been, in some cases, the failure of an onsite septic system without the ability of repair and abandonment of the structure being served.

There are also situations when large areas within the urban area are rezoned or a significant employer leaves the area and property changes use. This can have a localized impact on capacity in the sewer system capacity.

In any of these cases, the flow may increase, which may cause facilities to increase slightly in size to accommodate the new flow or push forward a capital project sooner than planned. Most sewer comprehensive plans have enough flexibility built into the capital facilities plan and the system to accommodate these short term capacity needs.

One significant project to accommodate capacity in the four-county region is the King County Brightwater Treatment Plant. According to the King County Regional Wastewater Services Plan, the Brightwater Project will be constructed in south Snohomish County to accommodate future wastewater needs in King County’s northern sewer service area. The Plant will have an initial capacity of 36 mgd by approximately 2010, with an additional 18 mgd increase by 2040. The Brightwater Plant will have a marine outfall off Point Wells into the Puget Sound. This Plant will increase the treatment capacity in the King County system with consists of two secondary treatment

plants, South and West Point. King County's wastewater service area includes portions of King, Pierce, and Snohomish Counties. The County's wastewater service area is limited to the urban growth areas as defined by the Growth Management Act and agreements with local sewer agencies.

## Water Quality

The Washington State Department of Ecology is the regulatory agency charged to prevent water pollution and protect water quality. In the case of wastewater treatment and discharge, making sure that the wastewater is adequately treated is key to not polluting water bodies or ground water. In the past ten years, approximately 30 communities statewide have been required to ban sewer connections for a period of time.

The increasing density within the urban area has placed a strain on the onsite septic systems. There has been a number of reported failures that contributed to the water quality problems within local water bodies and ground water. The City of Carnation is an urban area entirely served by onsite septic systems. The Seattle King County Health Department declared the City a health hazard. A description of the City is provided later in this document.

The sewer industry has undergone revisions to water quality and environmental standards. In many cases, communities served by sewer have been able to comply with these standards. In addition, sewer treatment technology is improving and able to produce a higher quality effluent. It is unclear the direction of future regulations or treatment technology, therefore it is up to each utility to respond to the changing industry standards.

## Cost

There are two costs to take into consideration, costs for facility extension for the utility, citizens, businesses or schools and costs associated with operating and maintaining the sewer system.

An area may be designated within a utility service area; but may not currently have any sewer pipe in the vicinity to provide direct sewer service. If a property owner is interested in obtaining sewer service, they most likely will pay the cost to bring the sewer facilities to the location of such property. This could be a significant expense depending on the amount of facilities needed to provide sewer service. The other option for the property owner is to wait until sewer service is extended to the other unsewered properties between this property and the one that has existing sewer service.

There are many areas in the four-county region still served by onsite septic systems. The conversion to sewers is very expensive. In some areas, conversion will cost around \$15,000 to \$20,000 in addition to a monthly sewer rate. Some of these property owners have single-family homes on less than a quarter acre lot and are in an area zoned for single family. This makes it difficult for a single family residence to offset the

cost of hooking up to the sewer system without additional revenue from the sale of the excess property or additional units that might be served.

As mentioned previously, each utility considers topography in the planning process. If the basin boundary or urban growth boundary is adjusted, it is important consider the long term impacts of how those properties will be served with sewer. If the new urban area is not able to take advantage of gravity flow or able to connect to existing facilities close by, then it is likely there will be higher utility operation and maintenance costs associated with serving those properties.

The following are two examples of barriers for sewer service within the four-county region:

■ **City of Tacoma, Pierce (Capacity – Cost Barrier)**

In northern downtown, development is occurring according to plans prepared for zoning and land use. However, there is a short term barrier with the capacity of some of the sewer pipes. In order for the growth to proceed these pipes must have increased capacity to collect and convey the sewer for the new development. These costs will be born by the new development.

■ **City of Carnation, King County (Septic Failure – Cost barrier)**

Currently there is no public wastewater collection and treatment system for the City of Carnation. It is one of the last two cities in King County to be sewerred. At present, individual onsite septic systems are the only option for wastewater management and treatment. Many of these systems, especially within the downtown commercial core and older sections of town are not up to current Seattle-King County Department of Health Standards. In 1999, the City Council created a Sewer Advisory Committee to focus efforts on addressing the future wastewater management needs for 2,000 or so people and businesses in the City of Carnation and its urban growth area.

The City of Carnation partnered with King County to provide collection and treatment. The City will design, construct and maintain the sewer collection system. King County will design, construct, operate and maintain the wastewater treatment facility, which includes a treatment plant and discharge point. The cost to each citizen will be approximately \$155 per month. This is a very significant burden to the citizens of Carnation. This system will be operational in 2007.

■ **Town of Wilkeson, Pierce County (Water Quality – Compliance order)**

In rural Pierce County in the shadow of Mount Rainier, in 1996 the Town of Wilkeson was ordered by the Washington State Department of Ecology to protect water quality. It was banned from allowing new hook-ups to its existing wastewater treatment systems. In June 2003, the Department of Ecology issued a report on the bacteria and temperature impacts on the South Prairie Creek and its tributaries. The small town of nearly 400 people were contributing both fecal coliform and heat loads to Wilkeson Creek.

The sewer systems and aging treatment plant were brought into compliance. In March of 2003, the state lifted the ban on sewer connections.

## Summary

The Growth Management Act has outlined the need for urban services. Sanitary sewer service is an urban service that provides for growth and treatment to levels that comply with water quality standards. There are a few barriers for sanitary sewer service delivery; however most of these are localized issues.

# List of Sewer Service Providers

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In the four county region, there are a number of sewer service providers. In reviewing many utility plans, comprehensive land use plans, and countywide planning policies, there is a distinct effort by the utilities to coordinate local and regional sewer service. The policies, plans and capital project demonstrate the objective to minimize conflict, increase reliability, and provide stability.

Sewer utilities have varying levels service capacity. Some utilities are full service in that they collect, convey, treat and discharge the wastewater. However, some utilities only provide collection or conveyance services and contract with other agencies for treatment and discharge services. There are some utilities that provide treatment and discharge for some of there wastewater and send other portions of there wastewater to another agency for treatment and discharge.

The following is a listing of jurisdictions by county providing sewer service:

## King County

- City of Algona
- City of Auburn
- Town of Beaux Arts
- City of Bellevue
- City of Black Diamond
- City of Bothell
- City of Burien
- Cedar River Water and Sewer District
- Coal Creek Utility District
- City of Duvall
- City of Enumclaw
- Highlands Sewer District
- City of Issaquah
- City of Kent
- City of Kirkland
- King County
- City of Lake Forest Park
- Lakehaven Utility District
- City of Mercer Island
- Midway Sewer District
- City of Milton
- Muckleshoot Indian Tribe
- City of North Bend
- Northeast Sammamish Sewer and Water District
- Northshore Utility District
- City of Pacific
- City of Redmond
- City of Renton
- Ronald Wastewater District
- Sammamish Plateau Water and Sewer District
- City of Seattle
- Skyway Water and Sewer District
- City of Snoqualmie
- Snoqualmie Pass Utility District
- Soos Creek Water and Sewer District
- Southwest Suburban Sewer District
- City of Tukwila
- Val Vue Sewer District
- Vashon Sewer District
- Woodinville Water District

### Kitsap County

- City of Bainbridge Island
- City of Bremerton
- Karcher Creek Sewer District #5
- Kitsap Sewer District #7
- Kitsap County
- City of Poulsbo
- City of Port Orchard

### Pierce County

- City of Auburn
- City of Bonney Lake
- City of Buckley
- Town of Carbonado
- Crystal Mountain Sewer District
- City of DuPont
- Town of Eatonville
- Elbe Water and Sewer District
- City of Fife
- Town of Fircrest
- Fort Lewis
- City of Gig Harbor
- Lakehaven Utility District
- McChord Air Force Base
- City of Milton
- Muckleshoot Indian Tribe
- City of Orting
- City of Pacific
- Pierce County
- City of Puyallup
- Town of Ruston
- State of Washington
- Town of South Prairie
- Town of Steilacoom
- City of Sumner
- City of Tacoma
- Taylor Beach Bay club
- Town of Wilkeson
- Wollochet Harbor Club

### Snohomish County

- Alderwood Water and Wastewater District
- City of Arlington
- City of Bothell
- City of Brier
- Cross Valley Water District
- City of Edmonds
- City of Everett
- City of Granite Falls
- Jordan Village Sewer District
- King County
- Lake Stevens Sewer District
- City of Lake Stevens
- City of Lynnwood
- City of Marysville
- City of Monroe
- City of Mountlake Terrace
- City of Mukilteo
- Olympic View Water and Sewer District
- Olympus Terrace Sewer District
- Silver Lake Water District
- City of Snohomish
- City of Stanwood
- City of Sultan
- Tulalip Tribe

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