3.19 Sanitary Sewer

3.19.1 Affected Environment

Current Plan Area

The information in this section is based on the *City of Sumner Sanitary Sewer Comprehensive Plan* (City Sanitary Sewer Plan), adopted in May 2000 (Parametrix 2000), and the *Wastewater Treatment Plant Capacity Increase Analysis* completed in October 2009 (Gray & Osborne, Inc. 2009).

The City of Sumner (City) has operated a sanitary sewer system since 1927 and a wastewater treatment plant (WWTP) since 1957. The last major upgrade to the WWTP occurred in 2004, increasing its permitted capacity to 4.59 million gallons per day (mgd). The City's sanitary sewer service area includes the Sumner city limits, as well as portions of the Sumner UGA. The 7.2-square-mile (4,672-acre) service area contains 179,000 lineal feet (33.90 miles) of sewer mains. The system also includes 15 pump stations for different drainage basins throughout the area. Table 3.19-1 contains an inventory of pump stations, capacities, and years built or rebuilt.

Table 3.19-1. Pump Station Characteristics

Pump Station Number	Station Name	Year Constructed	Last Year Rebuilt	Type	Station Design Capacity (Gallons per Minute)
1	Tacoma Avenue	1982	2009	Dry/wet well	175
2	North	1957	1987	Dry/wet well	500
3	Van tassel	1977	2007	Submersible	250
4	Jansen	1979	2006	Submersible	130
5	Parker	1963		Dry/wet well	285
6	16th Street	1967	2009	Dry/wet well	700
7	Cherry	1966		Dry/wet well	535
8	South	1966		Dry/wet well	1,500
9	160th Street	1996		Submersible	130
10	142nd Street	1998		Submersible	2,280
11	16th PS No. 1	1998		Submersible	100
12	16th PS No.2	1998		Submersible	100
13	Cannery	2006		Submersible	213
14	Forest Canyon	2007		Submersible	600
15	North	2010		Submersible	500

Source: Kongslie pers. comm.

The service area is divided into basins to analyze capacity needs. The boundaries of the service area and its constituent basins are shown in Figure 3.19-1. Figure 3.19-1 also shows the existing collection system for sanitary sewer.

The WWTP is located at 13114 63rd Street East at the confluence of the Puyallup and White (Stuck) rivers and provides sanitary sewer treatment to all of the current plan area as well as the City of Bonney Lake. The WWTP is a secondary treatment facility that treats an average wet weather flow of 2.44 mgd. The treated effluent is discharged to the White (Stuck) River. The WWTP has a peak-hour flow design capacity of 14.43 mgd, and is capable of handling the wastewater flows of a population of 21,033. Currently planned upgrades to the WWTP would increase the peak-hour flow design capacity to 19.18 mgd, with a population design capacity of 42,500 (Kongslie pers. comm.).

The City Sanitary Sewer Plan was completed in 1989 and last updated in 2000. The plan analyzes the City's collection system, identifies any system deficiencies for existing and future flow conditions, and provides recommended improvements and cost estimates. Development applications, such as the Forest Canyon Highlands application for sanitary sewer connection in 2005, have proposed amendments to the system.

In preparing the plan, the City's wastewater collection system was analyzed for existing and future capacity. The existing system's condition was also assessed. The collection system capacity determines the ability to hydraulically convey the wastewater flows to the WWTP. The system's condition and reliability is determined by examining the age of the system and deficiencies identified by City personnel. Using this information and the following analysis components, system deficiencies were determined:

- comparison of collection system capacity to a simulated current peak-day flow;
- review of the system's condition and identification of potential impacts on the overall system's reliability;
- comparison of system capacity to a simulated future peak-day flow for the current service area; and
- expansion of the collection system into unserved areas within the Sumner urban growth area (UGA) (future service area).

Existing Peak-Day Flow Simulation (Current Service Area)

The capacity of the existing collection system was compared to a simulated peak-day wastewater flow generated for the City's current service area. Both the existing pipeline capacity and the simulated peak-day flow were calculated using a computer program called HYDRA. HYDRA calculates the capacity of City's existing pipelines and pump stations using conventional engineering formulas and assumptions. A detailed description of HYDRA is in the City Sanitary Sewer Plan.

An existing peak-day flow simulation was calculated based on land use and the percentage buildout of properties within the City's service area, plus anticipated contribution of infiltration and inflow (I/I) of stormwater entering the City's sanitary sewer pipelines during winter months. I/I was calculated between 500 and 2,000 gallons per acre per day (gpad).

The percentage buildout of properties within the City's service area was established using visual observation of aerial photos of the Sumner valley. Once the flow simulation was completed it was compared to existing WWTP records to validate results of the computer model.

Based on the results of the computer modeling, the simulated peak-day flow for the City's service area was calculated at 3.1 mgd, which compared reasonably well to actual peak-day flows of 2.7 mgd recorded at the City WWTP.

Future Peak-Day Flow Simulation (Current Service Area)

HYDRA was also used to simulate and model the future peak-day flow. This flow simulation used the same methodology as the existing peak-day flow simulation, with two exceptions. It was assumed that:

- the City's current service area would be at 100% buildout in between 20 and 25 years; and
- the City would reduce I/I in the pump station basins with older pipeline not to exceed 500 gpad.

The future peak-day flow simulation was compared to the capacity of the existing City pipelines and pump stations to determine if capacity deficiencies could occur as the current service area builds out. Table 3.19-2 below summarizes the wastewater flow projections for peak-day flow and future peak-day flow after buildout and a population increase of 3.5% per year.

Table 3.19-2. Wastewater Flow Projections (Peak Day)

Source	Average Annual Growth Rate (%)	Current Peak Service Flow (mgd)	Projected Peak Flow (mgd)
HYDRA flow simulations	Land use	3.1	5.5 (build out)[1]
WWTP base flow[2]	3.5	4.59	6.4 (year 2025)
WWTP base flow[2]	3.0	4.59	5.7 (year 2025)
Population[3]	3.5	4.59	5.3 (year 2025)

Source: City of Sumner 2000; Pugh pers. comm.

1 Using existing peak-day flow and projecting flow increases to match the projected population increase of 3.5% per year, the collection system will reach buildout peak-day flow in 23 years. Assumes correction of excessive I/I to approximately 500 gpad.

2 Assumes existing WWTP peak-day flow projected forward by growth rate listed. Assumes that the current rate if I/I is not reduced.

3 Population projected flow was determined using a projected population of 29,625 (year 2028), a total service area of 4,336 acres, and an industrial flow of 0.964 mgd. The industrial flow volume for this calculation was taken from the hydraulic model.

Expansion of the Service Area to Accommodate the Entire Sumner UGA

The following portions of the Sumner UGA are not yet fully served by the City's existing wastewater collection system.

- The area bounded by Salmon Creek on the west and south, Lake Tapps on the east, and Forest Canyon Road on the north.
- The area located along Valley Avenue East west of SR 167 near the existing City Cemetery.

Adding service area to the City's sewer system will increase flow to the downstream of the connection point. Future impacts on the system resulting from expanded service area were simulated using the same assumptions as the future peak-day flow simulation with the following exceptions:

- The increased service area would accommodate the additional UGA acreage.
- The area east of the East Valley Highway was assumed at 40% of total land utilization due to steep topography.

System Reliability

The condition of the existing system was examined to determine if service area expansion would have potential impacts on the system reliability. The system's condition was established by interviewing City maintenance staff, reviewing the results of the modeling exercise, and researching the age of the collection system pipelines and pump stations throughout the City's system. Those portions of the City's collection system that need to be upgraded over the next 20- to 25-year planning period were noted and improvements were recommended.

System Capacity Improvements

The City Sanitary Sewer Plan listed recommended improvements to correct the capacity deficiencies in the collection system resulting from existing peak-day flow volumes. These projects, along with updated notes on current status, are listed below and summarized in Table 3.19-3:

- Increase the existing capacity of the Parker Pump Station from 285 gallons per minute (gpm) to 950 gpm. Ultimately, the Parker Pump Station will need to be upgraded to 1,800 gpm to accommodate future peak-day flows. Replace the existing 6-inch-diameter force main with 4,000 feet of 10-inch-diameter force main from the Parker Pump Station to a new discharge at Wood Avenue. This project is pending.
- Increase the existing capacity of the Van Tassel Pump Station from 135 gpm to 365 gpm. Extend the 4-inch-diameter force main from the current discharge approximately 1,800 feet further west along Elm Street to a new discharge at Wright Avenue. This project was completed in 2007.
- Increase the existing capacity of the 16th Street Pump Station from 700 gpm to 1,400 gpm. Capacity increases were completed in 2009. An electrical system upgrade at this location is still pending.
- Replace approximately 1,400 lineal feet of existing 10-inch-diameter gravity pipe main with 12-inch-diameter pipe from the 16th Street Pump Station east along 16th Street, then south along Wright Avenue to between Langdon and Washington Streets. This project is pending.
- Increase the existing capacity of the Tacoma Street Pump Station from 175 gpm to 372 gpm. This project was completed in 2009.

The following are improvements recommended in the 2000 plan to correct capacity deficiencies in the existing collection system resulting from future peak-day flow volumes:

- Increase the capacity of the Cherry Street Pump Station from 534 gpm to 1,180 gpm. This project is pending.
- Increase the capacity of the South Street Pump Station from 1,115 gpm to 1,750. This project is pending.

The following are improvements recommended in the 2000 plan to provide capacity to the collection system to allow for expansion into unserved portions within the UGA:

- Increase the capacity of the 142nd Street Pump Station from 2,300 gpm to 5,200 gpm. Install a new 14-inch-diameter force main parallel to the existing line from the existing station to a new discharge at the intersection of W. Main Avenue and Fryar Avenue. This improvement is contingent on the actual industrial wastewater flow meeting or exceeding per-acre flow estimates. These improvements have since been cancelled.

- Expand the capacity of the 16th Street Pump Station No. 2 from 100 gpm to 160 gpm. This project was completed in 2009.

Collection System Upgrades

The following improvements were recommended in the 2000 plan to upgrade the collection system, reduce I/I, extend the lifecycle of the collection system, and extend the life and capacity of the treatment plant:

- Eliminate the hydraulic intertie between Parker, Van Tassel, and 160th Street Pump Stations. This project has been cancelled.
- Identify and eliminate excessive I/I within the collection system. This project is pending.
- Institute a sewer main replacement and/or rehabilitation program to reduce I/I and extend the lifecycle of the collection system. This project is pending.
- Install flow meters at all existing pump stations. Flow meters have been installed at Parker, Cherry, and South pump stations.
- Install standby generators at the South, North, Tacoma, and Cherry Street pump stations. Generators have been installed at North and Forest Canyon pump stations.
- Rewire the Cherry Street and 16th Street pump stations to meet current electrical code requirements. This project has been completed at the Cherry Street station; improvements are pending at 16th Street.

Table 3.19-3. Recommended System Improvements

Improvement Category	Estimated Project Cost (1999 Dollars)	Project Status (2010)
System capacity improvements		
Parker Pump Station	$1,176,000	
Extend Van Tassel Pump Station force main	$184,400	Completed 2007
Van Tassel Pump Station	$284,000	Completed 2007
16th Street Pump Station	$637,500	Electrical system upgrade pending; other work completed 2009
Increase gravity pipe mains from 10-inch diameter to 12-inch diameter in 16th Street Basin	$271,700	
Tacoma Street Pump Station	$284,000	Completed 2009
Cherry Street Pump Station	$673,000	
South Street Pump Station	$692,000	
142nd Street Pump Station	$810,000	Project cancelled
Parallel 14-inch-diameter force main	$715,000	Project cancelled
16th Street Pump Station No. 2	$27,000	Completed 2009
Subtotal	$5,754,600	
Collection system upgrades		
Pipe Main Rehabilitation/Replacement program	$8,100,000	
Hydraulic intertie removal	$54,800	Project cancelled
I/I program	$150,000	
Flow-meter installation at each station	$190,500	Completed at stations 5, 7, and 8
Onsite generator installation	$307,200	Completed at stations 2, 5 and 14
Electrical system upgrades	$23,800	Completed at station 7
Subtotal	$8,826,300	
Total projected cost in 1999 dollars	$14,680,900	

Source: Parametrix 2000; Kongslie pers. comm.

Wastewater Treatment Plant Capacity

Since the latest upgrades to the WWTP in 2004, City staff have observed that influent loading rates are increasing more rapidly than predicted during the design of the 2004 improvements. Based on the current loading data, the WWTP may reach its maximum permitted load for solids by 2014, 3 years earlier than its design year of 2017. The WWTP has already reached 85% of its solid load capacity, and per the requirements of its National Pollutant Discharge Elimination System permit, the City has begun planning for additional upgrades to the WWTP to increase capacity. By contrast,

influent flows at the WWTP have grown more slowly than originally predicted, and the plant is not anticipated to reach its maximum permitted flow capacity until 2028. Estimated 2028 solids loading for the WWTP is summarized in Table 3.19-4.

Table 3.19-4. Estimated Design Year 2028 WWTP Loads

	Influent Parameter	Design Year 2028
BOD_5 Load (lbs/day)	Annual Average	7,400
	Maximum 30-day Average	7,800
	Peak 7-day Average	8,600
TSS Load (lbs/day)	Annual Average	7,800
	Maximum 30-day Average[1]	8,400/9,800
	Peak 7-day Average	9,000

Source: Gray & Osborne 2009.
[1] Spikes included/spikes not included

While a number of alternatives are under consideration for increasing treatment capacity at the WWTP, the most likely solution would involve the construction of a third aeration basin to allow for increased treatment of solids. The resulting capacity for treatment of BOD_5 and TSS loads would be 8,500 and 9,100 pounds per day, respectively. This represents a 9% increase over the estimated maximum 30-day-average loads for 2028. (Gray & Osborne 2009). These upgrades would also increase the plant's peak-hour flow capacity to 19.18 mgd and allow it to serve a design population of approximately 42,500 (Kongslie pers. comm.). The City maintains an agreement with the City of Bonney Lake for the treatment of wastewater generated in the Bonney Lake service area. Under the terms of the agreement, Bonney Lake is allowed to use up to 55% of the plant's capacity, equivalent to a population of 23,375 (City of Bonney Lake 2009). The remaining 45% of the plant's capacity, equivalent to a population of 19,125, is reserved for flows from the Sumner service area.

Orton Junction Expansion Area

The Orton Junction expansion area lies outside the City's existing service area. As such, no City wastewater facilities exist in the vicinity.

East Hill Reduction Area

The East Hill reduction area, while nominally within the City's service area, is not currently served by City facilities. As of the City's last Comprehensive Plan Update in 2009, a small diameter line is proposed to connect development between the city limits and 166th Avenue East to the system. The proposed line would feed into the existing 16th Street Pump Station.

3.19.2 Impacts

Impacts Common to All Alternatives

All alternatives would increase demand for wastewater treatment and collection. With the construction of planned improvements, the WWTP will be capable of handling flows and loads anticipated by 2028 for all alternatives studied. Collection and conveyance infrastructure would require upgrades per adopted plans.

Impacts Specific to the UGA Expansion (Orton Junction) Alternative

With the construction of planned improvements, the WWTP will be capable of handling flows and loads from a total population of 42,500. After subtracting the City of Bonney Lake's capacity allowance, the plant's remaining design population for the Sumner service area would be 19,125. Under the UGA Expansion Alternative, the service area population would increase to 16,459, resulting in an excess WWTP population capacity of 2,666 residents. Based on the standard population equivalent for suspended solids of 0.2 pound per capita per day, the projected population of 16,459 would produce loads of approximately 3,292 pounds per day (Sacramento State University 2010). After subtracting the City of Bonney Lake's capacity allowance, the loading capacity remaining for the Sumner service area would be 4,095 pounds per day. The UGA Expansion Alternative would therefore result in an excess loading capacity of 803 pounds per day. Therefore, no further expansion of the WWTP would be necessary, only improvements to collection and conveyance infrastructure.

In addition to extending the collection system to portions of the current planning area as proposed in the City's sanitary sewer plans, under the UGA Expansion Alternative, sewer collection and treatment services would be extended to the Orton Junction expansion area, which would result in additional wastewater flows to the City's WWTP. According to an analysis by Parametrix (2010), the additional residential and employment population generated by the conversion of the Orton Junction expansion area to commercial and low-density residential development would result in additional peak flows of between 500 and 600 gpm. These additional flows would require new wastewater facilities to be installed, as well as upgrades to existing infrastructure. New facilities required to convey flows from the Orton Junction expansion area to the WWTP would include a pump station and either a new force main or a combination of force main and gravity lines (Appendix I).

The aforementioned analysis by Parametrix concluded that the necessary improvements would cost between $1.76 and $2.47 million to construct, depending on the route and length of force main. The technical memo containing this analysis is attached as Appendix I.

Impacts Specific to the UGA Modification Alternative

As discussed under the UGA Expansion Alternative, construction of the planned improvements to the WWTP would provide capacity to serve 19,125 residents in the Sumner service area. Under the UGA Modification Alternative, the service area's population would increase to 14,706, resulting in an excess WWTP population capacity of 4,419. Based on a standard suspended solids loading rate of 0.2 pound per capita per day, the projected population would produce loads of approximately 2,941 pounds per day. After subtracting the City of Bonney Lake's capacity allowance, the loading capacity remaining for the Sumner service area would be 4,095 pounds per day, resulting in an excess loading capacity of 1,154 pounds per day. Therefore, no further expansions to the WWTP would be necessary, only improvements to collection and conveyance infrastructure.

In addition to extending the collection system to portions of the current planning area as proposed in the City's sanitary sewer plans, under the UGA Modification Alternative, service to the Orton Junction expansion area would be extended to accommodate future commercial development, which would result in additional wastewater flows to the City's WWTP. As described under the UGA Expansion Alternative, these additional flows would require the installation of new conveyance facilities. Because the expansion area would be limited to the commercial areas under this

alternative, projected additional peak flows would be approximately 110 gallons per minute lower than under the UGA Expansion Alternative. However, as no City sewer facilities currently exist in the Orton Junction expansion area, new infrastructure construction would be the same under both alternatives.

The East Hill reduction area is not currently served by City sewer facilities. Removal of this area from the UGA would have no effect on City facilities.

Impacts Specific to the No Action Alternative

Under the No Action Alternative, no changes would be made to the City's wastewater service area, and the City would incur no expenses for wastewater conveyance and treatment facilities beyond those already planned. No further expansions to the WWTP would be necessary beyond the currently planned upgrades, only improvements to collection and conveyance infrastructure per adopted functional plans.

3.19.3 Mitigation Measures

Incorporated Plan Features

- The City's Capital Facilities Element contains goals and policies regarding wastewater systems. All alternatives would continue to include wastewater policies.

Applicable Regulations and Commitments

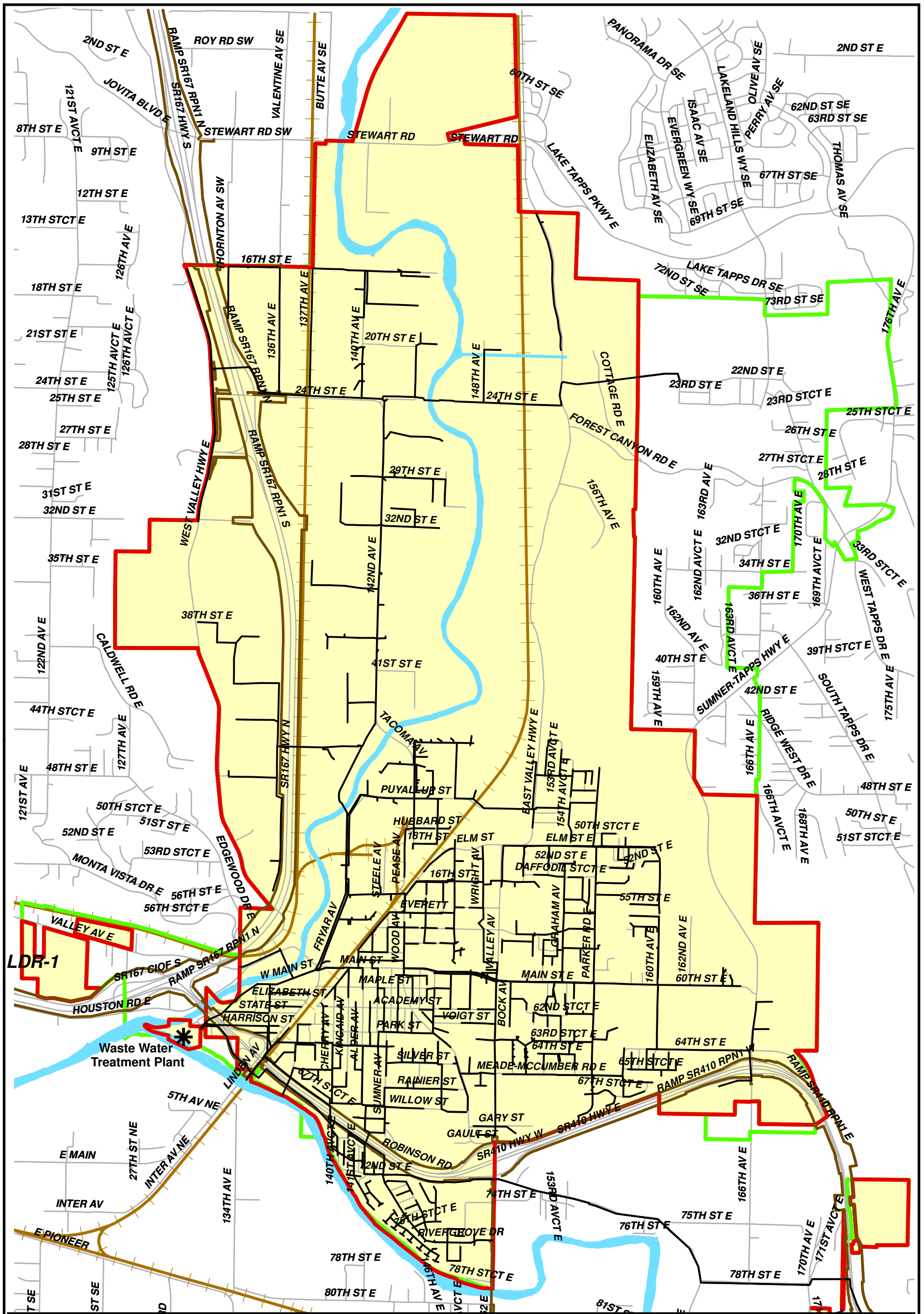
- The U.S. Environmental Protection Agency (EPA) regulates wastewater discharge under the Federal Water Pollution Control Act and the Clean Water Act. EPA administers the National Pollutant Discharge Elimination System, which requires permits for various types of discharge to streams and rivers, including treated wastewater effluent. In Washington State, EPA delegates its permitting authority to the Washington State Department of Ecology.
- Public sanitary sewer system operations in Washington State are regulated under Chapters 35.67 and 36.94 of the Revised Code of Washington (RCW), as well as RCW Title 57.

Other Potential Mitigation Measures

- The City could implement recommendations of the City Sanitary Sewer Plan to correct existing deficiencies in the 6-year planning period.
- The City could update the City Sewer Comprehensive Plan subsequent to adoption of the Comprehensive Plan Update to ensure consistency.
- The City could require and implement sewer improvements for the Orton Junction expansion area as identified in Appendix I.

3.19.4 Significant Unavoidable Adverse Impacts

Additional population, employment, and industrial/commercial growth throughout the city's service area would result in increased demands on sanitary sewer facilities. Advanced sewer system planning and capital facility planning should minimize the possibility of unavoidable impacts.



Comprehensive Plan Update and Amendments
Environmental Impact Statement

Legend

- Sumner City Limits
- Sumner UGA Boundary (Sewer and Storm Service Areas)
- Sumner Sewer Lines
- Streets

DISCLAIMER:
This Map is Intended for Planning Purposes Only.

Source: City of Sumner Community Development Department

Figure 3.19-1 *Sanitary Sewer Collection System*