APPENDIX C.
WASTEWATER TECHNICAL APPENDIX

Part C-1: Analysis of Sewer System Needs for Preferred Central Kitsap, Silverdale, and Kingston UGAs, BHC Consultants, LLC, July 25, 2012

Part C-2: Wastewater Planning and Finance, Statement of Local Circumstances and Strategies, Kitsap County, July 31, 2012

Part C-1: Analysis of Sewer System Needs for Preferred Central Kitsap, Silverdale, and Kingston UGAs
BHC Consultants, LLC, July 25, 2012

Technical Memorandum

Kitsap County GMA Remand

Analysis of Sewer System Needs for Preferred Central Kitsap, Silverdale and Kingston UGAs

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Prepared for Kitsap County Public Works

By:

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July 25, 2012

BHC CONSULTANTS

Kitsap County GMA Remand

Analysis of Sewer System Needs for Central Kitsap, Silverdale and Kingston Preferred Alternative UGAs

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Kitsap County GMA Remand

Analysis of Sewer System Needs for Central Kitsap, Silverdale and Kingston UGAs, Keyport Area and the Suquamish Area

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1.1 Introduction

Kitsap County has undertaken an analysis to evaluate sewer system and treatment facilities infrastructure requirements to provide sewer service within adopted boundaries of the Central Kitsap, Silverdale and Kingston Urban Growth Areas (UGAs) with associated population densities. After consideration of an analysis of a "No Action" UGA having the boundaries as defined by Kitsap County in 2006 and two alternative UGAs developed during the County GMA Remand process, final boundaries for these UGAs and related zoning have been selected by the Kitsap County Board of County Commissioners.

The main purpose of this technical memorandum is to document the analysis undertaken to identify sewer system infrastructure needs for the three UGAs. These needs are determined by modeling the existing sewer system using wastewater flows projected for year 2025 conditions. Detailed descriptions of the modeling methodology and cost estimating procedures are provided in the Central Kitsap County Wastewater Facility Plan (Brown & Caldwell, et.al. March 2011). Additional information used for the evaluation of the Kingston sewer system is provided in the Kingston Wastewater Facilities Plan Update Technical Addendum (Brown & Caldwell, August 2007). This technical memorandum summarizes the assumptions, methodology and results of this analysis.

In addition, the infrastructure needs for the Keyport LAMIRD, Suquamish area and Central Kitsap County Wastewater Treatment Plant are also presented based on information provided in other documents as described in subsequent sections.

1.2 Summary of Existing Sewer Systems

Kitsap County owns, operates and maintains wastewater collection and conveyance systems in the Central Kitsap UGA, Silverdale UGA and the Kingston UGA. The County also has wastewater collection and conveyance facilities in other areas outside of the UGAs that convey wastewater to the Central Kitsap Wastewater Treatment Plant (CKTP) for treatment. An inventory of these systems is summarized below.

- Central Kitsap UGA: 59.5 miles of pipeline and 19 pump stations (PS)
- Silverdale UGA: 64.2 miles of pipeline and 18 pump stations
- Area outside UGAs served by County at CKTP (Keyport, Navy): 20.9 miles of pipeline and 6 pump stations
- Kingston UGA: 14.1 miles of pipeline and 6 pump stations
- Suquamish area: 11.0 miles of pipeline and 2 pump stations.

The pipeline lengths exclude the outfalls for the CKTP, Kingston WWTP and Suquamish WWTP.

1.3 Assumptions for Analysis of Central Kitsap, Silverdale and Kingston UGA Sewer Systems

A number of assumptions that affect future wastewater flows were reviewed with Kitsap County staff including population forecasts for the UGAs, connection of currently-unsewered homes to the County sewer system and providing sewer service to County Health District "Areas of Concern". In addition, other assumptions were made for per capita wastewater flows, commercial connections to the sewer systems and flow peaking factors. Each of these assumptions is described in more detail below.

1.3.1 Population Forecasts and Allocations

The capital facilities models for the Silverdale, Central Kitsap, and Kingston UGAs were loaded with an analysis of current and future residential populations from Traffic Analysis Zoned (TAZ)-based datasets. Kitsap County provided BHC (via BERK Consultants) GIS files identifying parcels sewered in 2010 and parcels categorized as Vacant or Underutilized in their most recent Updated Land Capacity Analysis (ULCA). In addition, the County provided two TAZ-based datasets: 2010 Census data and 2025 residential capacity as calculated by the ULCA. Within TAZ geographies overlapping the UGA boundary, Kitsap provided a distribution of population both within and outside of the UGA.

A. 2010 Baseline Population

Within each TAZ, BHC distributed 2010 population between sewered and non-sewered land based on an assessment of parcel density, aerial photographs, underlying zoning, and parcels identified as vacant by the ULCA. The resulting population density was loaded into the capital facilities models according to composite sewered geographies within each TAZ, and the resulting aggregate density was then assigned to corresponding sub-basins. The proportion of sewered to non-sewered land was adjusted based on changes to the UGA. A multiplier was added to commercially zoned lands in the Central Kitsap and Silverdale UGAs to account for an equivalent commercial facilities use.

B. 2025 Forecast Population

Population forecasts were based on the assumption that all parcels within the UGA will be sewered by 2025. Population growth within each TAZ was evenly distributed to a composite geography of vacant and underutilized parcels as identified by the ULCA, and an aggregate density was then assigned to corresponding sub-basins.

1.3.2 Connection of On-site Systems

A significant assumption for all of the alternatives evaluated is that all existing on-site systems within the UGA boundaries could connect to the Kitsap County sewer system. For the purposes of modeling the existing infrastructure and determining future needs, it was assumed that all existing on-site systems would be connected by the end of the planning period. Thus, wastewater flows were estimated for the existing on-site systems and included in the total flows projected for 2025 conditions. In addition, the preliminary size and location of local pumps stations, associated force mains and collector sewers were determined to develop planning level project costs for these facilities.

1.3.3 County Health District "Areas of Concern"

During the 2009 Wastewater Infrastructure Taskforce process, four "Areas of Concern" were identified by Kitsap County Health District that may have potential on-site septic failures within Kitsap County's sewer service area. For the purpose of this analysis, the Illahee, Tracyton and Island Lake areas of concern have been analyzed within the service area. These areas of concerns use a series of qualitative assumptions (soil type, lot sizes, etc) for identification. These areas are not designated Health Hazards but rather regions that may need future scientific and site-specific review during the planning horizon.

Additionally, in 2012 the Health District only noted one area, located in the West Bremerton UGA, that may potentially have a significant problem where failing septic systems could be the primary source surface water contamination within an UGA. In the coming years, the Health District, through its Pollution Identification and Control (PIC) Program will continue to monitor this area and work with Kitsap County and appropriate service providers.

1.3.4 Commercial Connections

The connection of commercial establishments to the sewer systems were estimated based on Kitsap County wastewater utility accounts analyzed for the 2011 Central Kitsap Wastewater Facility Plan. The population equivalent for commercial accounts in the Central Kitsap UGA was assumed to be 11% of the residential population in the UGA. The population equivalent for commercial accounts in the Silverdale UGA was assumed to be 40% of the residential population in the UGA. The equivalent population for commercial connections was added to the residential population to estimate the total population served in each UGA alternative analyzed.

1.3.5 Per Capita Wastewater Flow Rates

The average per capita wastewater flow rate used in this analysis is 76 gallons per capita per day. This average flow rate was used in the Central Kitsap County Wastewater Facility Plan and was based on an analysis of influent flow measurements recorded during 2002-2006 at the Central Kitsap Wastewater Treatment Plant. The average per capita flow is used to calculate the total average wastewater flow generated in each UGA based on the total population served.

1.3.6 Flow Peaking Factors

The sizes of wastewater collection and conveyance facilities are determined based on the peak flow that will be conveyed by each facility. The peak flow used in this analysis is the peak hour flow which is determined using a "peaking factor". This peaking factor is a ratio of the peak hour flow to average annual flow. A peaking factor of 3.3 was used for the Central Kitsap and Silverdale UGA.

The peaking factor for the Kingston UGA was 4.4. This higher peaking factor was used because the flow calculation methodology included infiltration/inflow as a separate calculated flow component. The higher peaking factor is also due to the smaller service area relative to the Central Kitsap and Silverdale service areas.

1.4 Summary of Analysis Methodology

Two modeling approaches were used to evaluate the existing sewer system infrastructure and to determine future system infrastructure needs. The Central Kitsap and Silverdale UGAs systems were modeled using a dedicated computer model due to the complexity and size of the wastewater collection and conveyance systems. The Kingston UGA system is smaller and was analyzed using a spreadsheet model.

1.4.1 DHI Model Application for Central Kitsap and Silverdale UGA Systems

Sewer system modeling for Central Kitsap and Silverdale was based on the sewer system model used for the Central Kitsap County Wastewater Facility Plan. The UGA boundaries for the Central Kitsap and Silverdale UGAs used for the Facility Plan were modified based on the final boundaries selected by the Kitsap County Board of County Commissioners with changes in the population projections, land use and other assumptions as outlined above. Future flows were developed for each sewer service sub-basin within the Preferred UGA. These flows were routed through the existing sewer system infrastructure to identify deficiencies. Improvements to the existing system and future pump stations with related forcemains or gravity sewers to extend sewer service to new areas were identified. Project and construction costs were estimated for these improvements using the methodology described in Appendix 7 of the Central Kitsap County Wastewater Facility Plan.

1.4.2 Keyport LAMIRD

The analysis of Pump Station #16 (PS-16), PS-67 and the piping for conveying wastewater flows from the City of Poulsbo sewer system to the PS-16 is presented in Appendix 7G of the Central Kitsap County Wastewater Facility Plan. Project costs were revised in a memorandum to Barbara Zaroff from BHC Consultants dated March 5, 2012.

1.4.3 Central Kitsap Wastewater Treatment Plant Improvements

The improvements identified for the Central Kitsap Wastewater Treatment Plant were identified in the Central Kitsap County Wastewater Facility Plan and in Central Kitsap Treatment Plant, Reclamation and Reuse Project, Volume I: Basis of Design Summary (Brown & Caldwell, August 2011).

1.4.4 Spreadsheet Model for Kingston UGA System

Sewer system modeling for the Kingston UGA was similar to the sewer system modeling completed for the 2007 Kingston Facilities Plan Addendum. A spreadsheet model for the existing system was developed using sewer system data provided by Kitsap County. Population and land use for the Preferred UGA scenario was provided by the County as TAZ data and was converted to sewer system sub-basins for the model as described above. Future flows generated in each sub-basin were routed through the existing sewer system infrastructure to identify deficiencies. Improvements to the existing system were developed to correct the deficiencies with future pump stations with related forcemains or gravity sewers identified to extend sewer service to new areas within the UGA.

1.4.5 Suquamish Sewer System

The improvements identified for the Suquamish sewer system are identified in the draft Suquamish Wastewater Collection Facilities I&I Analysis (RH2, June 2012).

1.5 Results of the Analysis

The results of the GMA Remand analysis are presented in this section for each of the adopted UGAs. All of the improvements required for Central Kitsap, Silverdale and Kingston UGAs plus the Keyport LAMIRD are described including the 2013-2025 CIP. It should be noted that the highest priority projects were identified in consultation with Kitsap County Public Works staff.

Capital improvement programs (CIPs) are developed for each of the UGAs in the following sections. Specific projects are identified for improvements to existing sewer system infrastructure. The highest priority projects are identified in the 2013-2018 capital facilities plan with lower priority projects presented as being implemented during the 2019-2025. The CFP Project No. shown in parenthesis for each project is the project identification number used in the Capital Facilities Plan prepared by Kitsap County.

1.5.1 Central Kitsap UGA

Improvements identified for the existing Central Kitsap sewer system include 8 pump station upgrades and 6 pipe replacements projects. The capital improvement program (CIP) for the Central Kitsap UGA for the 2013-2025 planning period is summarized in Table 1. Four of these projects are included in the 2103-2018 CIP. The remaining existing infrastructure projects are scheduled for completion during 2019-2025. New infrastructure improvements to extend sewer service beyond the existing Central Kitsap system are also summarized and would be implemented as development occurs in those areas.

All of the Central Kitsap CIP projects are shown in Figure 1. The upgrade design capacities of existing pump stations and the future design capacities of new pump stations are shown in schematic diagrams presented in the Appendix Figures A-1 and A-1, respectively.

Table 1 - Central Kitsap Preferred UGA CIP

Project Name	2013	2014	2015	2016	2017	2018	Total 2013-2018	2019-2025	Total 2013-2025
Pump Stations									
LS-6	105,000	209,000	888,000	888,000			2,090,000		**2,090,000**
LS-8	85,000	178,000	759,000	758,000			1,780,000	200,000	**1,980,000**
LS-10								2,340,000	**2,340,000**
LS-32								2,340,000	**2,340,000**
LS-33								1,060,000	**1,060,000**
LS-34								3,760,000	**3,760,000**
LS-36								1,060,000	**1,060,000**
LS-62								1,060,000	**1,060,000**
LS-65								2,340,000	**2,340,000**
LS-69								2,340,000	**2,340,000**
New medium LS (3)								6,045,000	**6,045,000**
New small PS (13)								10,140,000	**10,140,000**
Total Pump Stations	**190,000**	**387,000**	**1,647,000**	**1,646,000**	**0**	**0**	**3,870,000**	**32,685,000**	**36,555,000**
Pipelines									
LS-6 Forcemain / So. Millitary Rd. Pipe Replacement	232,000	464,000	1,972,000	1,972,000			4,640,000		**4,640,000**
LS-8 Downstream Conveyance Improvements	285,000	571,000	2,427,000	2,427,000			5,710,000		**5,710,000**
No. Military Rd. Pipeline Replacement								7,710,000	**7,710,000**
LS-65 Force Main Replacemnt								3,500,000	**3,500,000**
LS-69 Force Main & GS Replacement (#7)								2,100,000	**2,100,000**
LS-18 Conveyance Improvements								1,310,000	**1,310,000**
LS-32 Force Main Replacement								600,000	**600,000**
LS-36 Force Main Replacement								400,000	**400,000**
New Force Main (35,000 LF)								6,300,000	**6,300,000**
New Gravity Pipe (75,600 LF)								27,000,000	**27,000,000**
Total Pipelines									
	517,000	**1,035,000**	**4,399,000**	**4,399,000**	**0**	**0**	**10,350,000**	**48,920,000**	**59,270,000**
Total for UGA	**707,000**	**1,422,000**	**6,046,000**	**6,045,000**	**0**	**0**	**14,220,000**	**81,605,000**	**95,825,000**

Pump Station-6 Upgrades (CFP Project No. CK-1)

Pump Station #6 is the major station serving the west Central Kitsap area. It is an older pump station that is currently exceeding design capacity of 1,400 gpm. It is regarded as a high priority project due to the age and poor condition of existing controls and pump motors. Replacement of the pumps with new pumps and motors, installation of new electrical components and a larger generator will increase pumping capacity to 3,200 gpm and increase the reliability of the station. A design report for these improvements is currently being completed and it is anticipated that final design work on this project will begin in the summer of 2012.

Pump Station-8 Upgrades (CFP Project No. CK-2)

Pump Station #8 serves the southeastern area of Central Kitsap area. Existing flows currently exceed design capacity of 400 gpm and the existing equipment has outlived its 30-year life. Replacement of the pumps and motors, installation of new electrical components and a larger generator will increase pumping capacity to 1,800 gpm and increase reliability of the station. A design report for these improvements is also currently being completed and it is anticipated that final design work on this project will begin in the summer of 2012.

Pump Station-10 Upgrades (CFP Project No. CK-5)

Pump Station #10 is a small pump station with a design capacity of 270 gpm serving the Meadowdale west area. An upgrade is required after 2018 due to flows projected to increase to 500 gpm during the planning period.

Pump Station-32 Upgrades (CFP Project No. CK-6)

Pump Station #32 is also a small pump station with a design capacity of 165 gpm serving the southern Central Kitsap area around SR303. Wastewater flows are projected to increase to 240 gpm during the planning period requiring an upgrade after 2018.

Pump Station-33 Upgrades (CFP Project No. CK-7)

Pump Station #33 is a small pump station with a design capacity of 90 gpm serving the south-central area of the UGA. Wastewater flows are projected to increase to about 95 gpm by the end of the planning period requiring an upgrade after 2018.

Pump Station -34 Upgrades (CFP Project No. CK-8)

This medium sized pump station with a design capacity of 900 gpm serves the southwest Central Kitsap area. It will become a major pump station with design pumping capacity of 1,700 gpm requiring an upgrade after 2018.

Pump Station -36 Upgrades (CFP Project No. CK-9)

Pump Station # 36 is a small pump station with a design capacity of 150 gpm serving the area immediately south of Pump Station 6. Wastewater flows are projected to increase to 155 gpm by the end of the planning period and would require an upgrade after 2018.

Pump Station -62 Upgrades (CFP Project No. CK-10)

Pump Station #62 is a small pump station with a design capacity of 50 gpm serving the northeast Central Kitsap area. An upgrade is required after 2018 due to projected flows increasing to 80 gpm during the planning period.

Pump Station -65 Upgrades (CFP Project No. CK-11)

Pump Station #65 is a medium-sized facility with a design capacity of 300 gpm serving the Illahee area and southeast Central Kitsap UGA. It will require an upgrade after 2018 due to projected flows increasing to 800 gpm during the planning period.

Pump Station -69 Upgrades (CFP Project No. CK-12)

Pump Station #69 is small facility with a design capacity of 160 gpm serving the south Central Kitsap area. Flows are projected to increase to 250 gpm during the planning period requiring an upgrade after 2018.

New Medium Sized Pump Stations (CFP Project No. CK-21)

Three new medium sized pump stations will be required to serve areas beyond the existing Central Kitsap sewer system as the areas develop. One facility will be located in the southeast Central Kitsap area having a design capacity of about 340 gpm and will discharge to the existing system upstream of Pump Station #65. The other two facilities will be located in the southwest Central Kitsap area and will discharge to the existing system upstream of Pump Station #34.

New Small Sized Pump Stations (CFP Project No. CK-21)

Thirteen new small pump stations will be required to serve the remainder of the Central Kitsap UGA as these areas develop. These facilities will have design pumping capacities less than 200 gpm and will generally be located either along the Port Orchard Bay shoreline or the Dyes Inlet shoreline.

PS-6 Force Main/South Old Military Road Pipe Replacement (CFP Project No. CK-3)

Replacement of the force main with about 1,150 feet of 16-inch pipe is required to avoid excessive flow velocities when the pumping capacity of Pump Station #6 is increased. This project also includes the construction of about 3,250 feet of 24-inch new force main located on South Old Military Road, parallel to the existing 30-inch force main, to convey the flows from Pump Station #6 force main to mitigate current surcharging problems in the sections of the existing pipe where manholes are accessed for cleaning the pipe. A design report for these improvements is also currently being completed and it is anticipated that final design work on this project will begin in the summer of 2012.

PS-8 Downstream Conveyance Improvements (CFP Project No. CK-4)

When Pump Station #8 is upgraded, the higher flows will increase existing surcharging problems experienced in the interceptor pipes immediately upstream of Pump Station #7. These problems will be alleviated by the construction of approximately 5,680 feet of

new 12-inch force main and about 3,000 feet of new 15-inch gravity sewer. The alignment for the new force main will run from PS-8 along NE McWilliams Road NE, north along Johnson Road NE through an existing easement to Clover Blossom Lane NE and then extend to NE John Carlson Road. The new gravity sewer will replace the existing 8-inch sewer from the intersection of Clover Blossom Lane NE and NE John Carlson Road west along NE John Carlson Road/NE Fairground Road to PS-7. A design report for these improvements is also currently being completed and it is anticipated that final design work on this project will begin in the summer of 2012.

North Old Military Road Pipe Replacement (CFP Project No. CK-13)

Increasing flows projected for the Central Kitsap during the planning period will require the replacement of the force main extending the South Old Military Road Pipe Replacement improvements (CFP Project #7) from Foster Road NE north along NE Old Military Road, west along NE Waaga Way, then north along County Road NE to Paulson Road. This project will consist of replacement of about 7,780 feet of existing 16-inch force main with 24-inch force main and will be required after 2018.

PS-18 Conveyance System Improvements (CFP Project No. CK-14)

As the flows from Pump Station #18 continue to increase during the planning period, the gravity sewer that receives flow from PS #18 force main must be replaced due to surcharging in the existing 8-inch pipe. The replacement gravity sewer will consist of about 1,825 feet of new 12-inch pipe along NE John Carlson Road from the discharge manhole for the force main to Clover Blossom Lane NE. This project will be required after 2018.

PS-65 Force Main Replacement (CFP Project No. CK-15)

The existing 6-inch force main from PS-65 will experience high flow velocities and cause significant head loss when PS-65 is upgraded and has a higher pumping capacity. Approximately 6,400 feet of existing force main will be replaced with 10-inch diameter pipe after 2018.

PS-69 Force Main Replacement (CFP Project No. CK-16)

The existing force main and gravity pipe downstream from PS-69 must be replaced when PS-69 is upgraded. Approximately 2730 feet of 4-inch force main will have high flow velocities and be replaced with 6-inch diameter pipe after 2018. The force main discharges to an 8-inch gravity sewer that will become surcharged when PS-69 is upgraded and the gravity sewer replacement project will consist of about 1,110 feet of 12-inch diameter pipe.

PS-32 Gravity Sewer Replacement (CFP Project No. CK-17)

The existing gravity sewer receiving the flows from PS-32 force main will experience excessive flow velocities after PS-32 is upgraded. Approximately 900 feet of 8-inch pipe will be replaced with 12-inch pipe when the PS-32 upgrade project is undertaken.

PS-36 Force Main Replacement (CFP Project No. CK-18)

The existing force main from PS-36 experiences excessive flow velocities that will worsen when PS-36 is upgraded. Approximately 700 feet of 4-incg pipe will be replaced with 8-inch diameter pipe when the PS-36 upgrade project is undertaken.

New Force Mains (CFP Project No. CK-19)

Approximately 35,000 feet of force main will be required to connect the new pump stations located in the UGA to the existing Central Kitsap UGA sewer system. The new force mains will consist of about 6,600 feet of 8-inch diameter pipe, 12,600 feet of 6-inch pipe with the remaining 16,000 feet consisting of 4-inch and 2-inch diameter pipe.

New Gravity Collectors (CFP Project No. CK-20)

Approximately 75,600 feet of gravity collector sewers will be required to convey wastewater generated in areas beyond the existing sewer system service area to the new pumps stations. It is assumed that these collectors will be 8-inch diameter pipe.

1.5.2 Silverdale UGA

Improvements identified for the existing Silverdale sewer system include 7 pump station upgrades and 11 pipe replacements projects. The capital improvement program (CIP) for the Silverdale UGA for the 2013-2025 planning period is summarized in Table 2. Six of these projects are included in the 2103-2018 CIP. The remaining existing infrastructure projects are scheduled for completion during 2019-2025. New infrastructure improvements to extend sewer service beyond the existing Silverdale system are also summarized and would be implemented as development occurs in those areas.

All of the Silverdale CIP projects are shown in Figure 2. The upgrade design capacities of existing pump stations and the future design capacities of new pump stations are shown in schematic diagrams presented in the Appendix, Figures B-1 and B-1, respectively.

Table 2 - Silverdale Preferred UGA CIP

Project Name	2013	2014	2015	2016	2017	2018	Total 2013-2018	2019-2025	Total 2013-2025
Pump Stations									
LS-1	99,000	198,000	842,000	841,000			1,980,000		**1,980,000**
LS-3					188,000	376,000	564,000	3,196,000	**3,760,000**
LS-4					485,000	970,000	1,455,000	8,245,000	**9,700,000**
LS-12								3,760,000	**3,760,000**
LS-21								2,340,000	**2,340,000**
LS-22								2,340,000	**2,340,000**
New medium LS (6)								12,090,000	**12,090,000**
New small LS (16)								12,480,000	**12,480,000**
Total Pump Stations	**99,000**	**198,000**	**842,000**	**841,000**	**673,000**	**1,346,000**	**3,999,000**	**44,451,000**	**48,450,000**
Pipelines									
Silverdale Way Pipeline Replacement	92,000	183,000	778,000	777,000			1,830,000		**1,830,000**
Bayshore Pipe Replacement	67,000	134,000	570,000	569,000			1,340,000		**1,340,000**
Lower Anderson Hill Rd. to LS-3 Pipe Replacement			125,000	250,000	1,063,000	1,062,000	2,500,000		**2,500,000**
Washington Ave. Pipe Replacement								1,000,000	**1,000,000**
Silverdale Way to LS-1 Pipe Replacement								3,750,000	**3,750,000**
Levin Rd. NW Pipe Replacement								1,700,000	**1,700,000**
Provost Rd. Pipe Replacement								3,100,000	**3,100,000**
LS-4 Force Main Replacement								6,700,000	**6,700,000**
Fredrickson Rd. NW Pipe Replacement								1,100,000	**1,100,000**
Upper Anderson Hill Rd. Replacement								1,500,000	**1,500,000**
LS-22 Forcemain Replacement								600,000	**600,000**
New Force Main (31,000 LF)								2,800,000	**2,800,000**
New Grav. Pipe (122,000 LF)								44,000,000	**44,000,000**
Total Pipelines	**159,000**	**317,000**	**1,473,000**	**1,596,000**	**1,063,000**	**1,062,000**	**5,670,000**	**66,250,000**	**71,920,000**
Total for UGA	**258,000**	**515,000**	**2,315,000**	**2,437,000**	**1,736,000**	**2,408,000**	**9,669,000**	**110,701,000**	**120,370,000**

Pump Station-1 Upgrades (CFP Project No. Silverdale-1)

Pump Station #1 is a major facility serving the northern Silverdale area. Wastewater flows are projected to exceed 85% of design capacity (2,100 gpm) by 2013. It also is a high priority project due to the age and poor condition of existing controls and pump motors. Replacement of the pumps and motors, installation of new electrical components and a larger generator will increase pumping capacity to 3,200 gpm and improve reliability of the station. A design report for these improvements is currently being completed and it is anticipated that final design work on this project will begin in the summer of 2012.

Pump Station-3 Upgrades (CFP Project No. Silverdale-2)

Pump Station #3 is a major conveyance facility serving the western Silverdale service area. Existing wastewater flows exceed design pumping capacity (1,800 gpm) and are projected to increase significantly due to population growth in the service area. The pump station improvements will include new pumps and motors to increase the design capacity to 3,600 gpm and related electrical upgrades. The project is scheduled to begin in 2017.

Pump Station-4 Upgrades (CFP Project No. Silverdale-3)

Pump Station #4 is a major conveyance facility serving the northern Silverdale service area as well as receiving flows from Pump Station #3. Existing wastewater flows exceed 85% of design pumping capacity (3,000 gpm) that may be exceeded when Pump Station #1 is upgraded. In addition, flows are projected to increase significantly due to population growth in the service area. The pump station improvements will include new pumps and motors to increase the design capacity to 7,500 gpm and related electrical upgrades. The project is scheduled to begin in 2017.

Pump Station-12 Upgrades (CFP Project No. Silverdale-7)

Pump Station #12 is a medium sized facility with an existing design capacity of 850 gpm serving the south Silverdale area, including receiving wastewater flows from Pump Station #13. Wastewater flows to the pump station are projected to increase to 1,800 gpm during the planning period which will require an upgrade after 2018.

Pump Station-21 Upgrades (CFP Project No. Silverdale-8)

Pump Station #21 serves the north Silverdale area and has an existing design capacity of 240 gpm. Wastewater flows are projected to increase to 450 gpm during the planning period and a facility upgrade will be required after 2018.

Pump Station-22 Upgrades (CFP Project No. Silverdale-9)

Pump Station #22 is a medium sized facility receives flows from PS-22 and also serves the north Silverdale area. Wastewater flows are projected to increase to 850 gpm which will require a facility upgrade after 2018.

New Medium Sized Pump Stations (CFP Project No. Silverdale- 21)

Six new medium sized pump stations will be required to provide sewer service beyond the existing system in the Silverdale UGA. Two new facilities with design capacities of 240 gpm and 275 gpm will be located in the northeast Silverdale area to convey flows around Island Lake to Pump Station #22. One new pump station with design capacity of about 500 gpm will be required in the north-central Silverdale area and discharge to the PS #1 collection system. Two pump stations each with design capacities of about 200 gpm will serve the southeast area and discharge to the PS#12 system. The sixth new pump station with design capacity of about 300 gpm will serve the area northeast of Dyes Inlet and will discharge to the PS #4 collection system.

New Small Sized Pump Stations (CFP Project No. Silverdale-21)

Sixteen new small pump stations will be required to serve the remainder of the Silverdale UGA as the area develops. These facilities will have design pumping capacities less than 200 gpm and will generally located along the boundary of the Silverdale UGA.

Silverdale Way Pipe Replacement (CFP Project No. Silverdale-4)

Existing flow surcharging conditions are experienced in the interceptor upstream of Pump Station #1 due to inadequate pipe size and backwater conditions from Pump Station #1. This project is the replacement of about 2,840 feet of existing 8 and 10-inch pipe with 12 and 15-inch pipe north of Waaga Way along Silverdale Way. A design report for these improvements is currently being completed and it is anticipated that final design work on this project will begin in the summer of 2012.

Bayshore Pipe Replacement (CFP Project No. Silverdale-5)

This project replaces about 1,865 feet of existing gravity sewer that serves the area immediately north of Pump Station #3. The project is high priority due to excessive cleaning required by Public Works staff and is scheduled to start in 2013.

Lower Anderson Hill Road to Pump Station 3 Pipe Replacement (CFP Project No. Silverdale-6)

This project is also a pipe replacement project designed to correct flow surcharging and cleaning problems experienced by Public Works staff. Approximately 3,700 feet of 8-inch gravity sewer will be replaced with 12 and 15-inch pipe from Pump Station #3, upstream through Old Town Silverdale, across Silverdale Way and continuing up Anderson Hill Road past the high school. The project is high priority and is scheduled to start in 2015.

Washington Avenue Pipe Replacement (CFP Project No. Silverdale-10)

Approximately 800 feet of existing gravity sewer located in Washington Avenue north of PS #3 needs to be replaced to eliminate surcharging conditions caused by projected wastewater flows. The project will consist of replacing about 680 feet of 8-inch pipe with 12-inch diameter pipe and about 120 feet of 15 and 16-inch gravity sewer with 18-inch pipe. This project will be required after 2018.

Silverdale Way to PS-1 Pipe Replacement (CFP Project No. Silverdale-11)

This project involves the replacement of about 4,800 feet of conveyance pipe downstream from the Silverdale Way Pipe Replacement Project (CFP Project #4) described above. Projected flows for the northwestern Silverdale service area will cause surcharging of the conveyance system between the CFP Project #4 improvements and PS #1. These improvements will consist of constructing about 1,640 feet of new 15-inch gravity sewer and upsizing an additional 3,200 feet of existing 15-inch and 18-inch gravity sewer to 18-inch and 21-inch diameter pipe, respectively. This project is required after 2018.

Levin Road NW Pipe Replacement (CFP Project No. Silverdale-12)

This project consists of replacing about 2,030 feet of 8-inch gravity sewer with 12-inch pipe along Levin Road in downtown Silverdale. The larger pipe is required after 2018 to eliminate surcharging conditions that would occur due to higher wastewater flows projected during the planning period.

Provost Road Pipe Replacement (CFP Project No. Silverdale -13)

This conveyance system project is required due to increased wastewater flows projected to occur during the planning period in the west-central Silverdale area upstream of PS #12. The project consists of replacing about 3,750 feet of 8-inch gravity sewer with 12-inch diameter pipe and is required after 2018.

PS-4 Force Main Replacement (CFP Project No. Silverdale-14)

Once PS #4 is upgraded, the higher pumping rates will cause excessive flow velocities and significant head loss in the force main. This project consists of replacing about 8,700 feet of 14-inch and 20-inch force main with 24-inch diameter pipe from PS #4 to the connection with the North Old Military Road force main along Waaga Way.

Fredrickson Road NW Pipe Replacement (CFP Project No. Silverdale-15)

This project consists of replacing the gravity conveyance pipe upstream of PS #4 to eliminate surcharging conditions that would be caused by increased flows from PS #1 and additional local flow projected during the planning period. Approximately 1,330 feet of 15-inch gravity sewer will be replaced with 21-inch diameter pipe. This project is required after 2018.

Upper Anderson Hill Road Pipe Replacement (CFP Project No. Silverdale-16)

This project is a continuation of the pipe replacement project along Anderson Hill Road from PS #3 to the high school to eliminate surcharging that would be caused by projected higher wastewater flows. It will consist of replacing about 2,000 feet of 8-inch pipe with 12-inch diameter pipe after 2018.

LS-22 Force Main & Gravity Sewer Replacement(CFP Project No. Silverdale-17)

After LS-22 is upgraded, the increased pumping rates will cause excessive flow velocities in the existing force main. This project consists of replacing about 1,050 feet

of 6-inch force main with 8-ich diameter pipe and about 450 feet of 8-inch gravity sewer with 12-inch diameter pipe after 2018.

New Force Mains (CFP Project No. Silverdale-18)

Approximately 31,000 feet of force main will be required to connect the new pump stations located in the UGA to the existing Silverdale UGA sewer system. About 1,600 feet of new force mains will be 6-inch diameter pipe with the remainder being 4-inch pipe or smaller.

New Gravity Collector Sewers (CFP Project No. Silverdale-19)

Approximately 122,000 feet of gravity collector sewers will be required to convey wastewater generated in areas beyond the existing sewer system service area to the new pumps stations. It is assumed that these collectors will be 8-inch diameter pipe.

1.5.3 Central Kitsap Wastewater Treatment Plant

The CIP for the Central Kitsap Wastewater Treatment Plant (CKTP) consists of three projects during the 6-Year CIP with 5 projects implemented in 2019-2025 (Table 3). Three of the projects are capacity related while the others are scheduled for implementation as funding becomes available in the planning period. Average annual wastewater flows at CKTP are projected to increase from about 4.2 mgd in 2012 to 7 mgd in 2025. Maximum month flows are projected to increase from 5.3 mgd to 8.8 mgd during the same period. Flows are assumed to increase linearly during the planning period to estimate when the improvements will be required for the CIP. However, the timing of improvements will be determined by actual increased flows and pollutants loadings to the facility.

The existing National Pollutant Discharge Elimination System (NPDES) discharge permit issued by Ecology to Kitsap County for CKTP has design criteria for maximum month influent flow (6.0 mgd) and maximum month loadings of biochemical oxygen demand and total suspended solids. Whenever any of the actual flows or loadings reaches 85% of the design criteria for three consecutive months or if projected increases in flows or loadings would reach design capacity within five years, the NPDES discharge permit states that the County must begin a plan to expand the capacity of CKTP or take other actions to avoid exceeding the design criteria. Thus, as wastewater flows and loadings increase, Kitsap County will be required to review the adopted CIP developed for CKTP and take appropriate actions to remain in compliance with the NPDES discharge permit.

The estimated maximum month influent flow of 4.2 mgd is about 88% of the 6.0 mgd design criterion. Final design of new primary sedimentation tanks is scheduled to begin in 2013 to provide additional treatment capacity until about 2030. However, the secondary clarifiers are projected to become the flow constraint in 2020. Therefore, final design of the secondary clarifiers is scheduled to begin in 2017 with completion of construction in 2020. This project would result in sufficient treatment capacity at CKTP through the planning period. The actual date for construction of the secondary clarifiers will depend on actual increases in flow as described above.

Table 3 - Central Kitsap Treatment Plant CIP

Project Name	2013	2014	2015	2016	2017	2018	Total 2013-2018	2019-2025	Total 2013-2025
1. Reclamation/Reuse	3,900,000	17,550,000	17,550,000				39,000,000		**39,000,000**
2. Primary Sed. Tanks	1,575,000	1,575,000	6,300,000	6,300,000			15,750,000		**15,750,000**
3. Secondary Clarifiers					978,000	978,000	1,956,000	7,826,000	**9,782,000**
4. Reclaimed Water Filters								21,439,000	**21,439,000**
5. Exist. Digester Improve.								23,311,000	**23,311,000**
6. New Admin Building								3,822,000	**3,822,000**
7. Laboratory Expansion								2,504,000	**2,504,000**
8. Storage and Main. Bldg.								2,960,000	**2,960,000**
Total CKTP Projects	**5,475,000**	**19,125,000**	**23,850,000**	**6,300,000**	**978,000**	**978,000**	**56,706,000**	**61,862,000**	**118,568,000**

Reclamation and Reuse (CFP Project No. CKTP-1)

The Reclamation and Reuse project consists of waste activated sludge thickening facilities, a plant process water system, reclaimed water production facilities, aeration basin modifications for nitrogen removal, high efficiency blowers, an aeration diffuser system upgrade and a digester gas cogeneration system. The project is a high priority project, currently in final design and expected to be advertised for bidding in 2013.

Primary Sedimentation Tanks (CFP Project No. CKTP-2)

The existing primary sedimentation tanks are projected to reach their maximum month flow design capacity of 6.3 mgd in 2016. New primary sedimentation tanks will be required by then to provide treatment for higher flows.

Secondary Clarifiers (CFP Project No. CKTP-3)

The existing secondary clarifiers are projected to reach their maximum month flow design capacity of 7.3 mgd in 2020. New secondary clarifiers are required to treat higher flows.

Reclaimed Water Filters (CFP Project No. CKTP-4)

The reclaimed water system constructed during the 6-Year CIP will have capacity to treat up to 3.5 million gallons per day (mgd). The timing for the construction of additional reclaimed water filters will depend on the actual demand for utilization of reclaimed water in the planning period and is not expected until after 2019.

Existing Digester Improvements (CFP Project No. CKTP-5)

The existing digester improvements project consists of facilities to upgrade sludge withdrawal, heating and mixing in the existing two digesters. The existing equipment will have reached its design life by 2025 and the upgrades are scheduled for implementation by then.

New Administration Building (CFP Project No. CKTP-6)

The existing administration building will be reaching the end of its useful life and have limited room for expanded operations by 2015. The new administration building is scheduled for construction by 2015 to accommodate anticipated future operations and maintenance needs.

Laboratory Expansion (CFP Project No. CKTP-7)

Expansion of the existing laboratory is also expected to be required by 2025 to provide space and equipment for future monitoring requirements.

Storage and Maintenance Building (CFP Project No. CKTP-8)

Additional storage and maintenance areas will be required in the future as the treatment processes increase in size with increasing wastewater flows. An additional storage and maintenance building is scheduled for construction by 2025.

1.5.4 Kingston UGA

Improvements identified for the existing Kingston sewer system include 4 pump station upgrades, 1 pipe replacement project and miscellaneous manhole and vault projects. The capital improvement program (CIP) for the Kingston UGA for the 2013-2025 planning period is summarized in Table 4. Five of these projects are included in the 2103-2018 CIP consisting of four sewer system projects and one project at the Kingston Wastewater Treatment Plant. The remaining existing infrastructure projects are scheduled for completion during 2019-2025. New infrastructure improvements to extend sewer service beyond the existing Kingston system are also summarized and would be implemented as development occurs in those areas.

All of the Kingston CIP projects are shown in Figure 3. The upgrade design capacities of existing pump stations and the future design capacities of new pump stations are shown in schematic diagrams presented in the Appendix, Figures C-1 and C-1, respectively.

Table 4 Kingston UGA - Preferred Alternative CIP

Project Name	2013	2014	2015	2016	2017	2018	Total 2013-2018	2019-2025	Total 2013-2025
Pump Stations									
LS-41	$30,000	$60,000	$342,500	$342,500			$775,000		**$775,000**
LS-71	$16,000	$32,000	$183,000	$183,000			$414,000		**$414,000**
Flow Meter Vaults			$7,000	$15,000	$84,000	$84,000	$190,000		**$190,000**
New Pump Stations									
SR-104 PS								$815,000	**$815,000**
West Kingston PS								$815,000	**$815,000**
Arness PS								$815,000	**$815,000**
Taree Grinder PS								$768,000	**$768,000**
Arborwood PS								$913,000	**$913,000**
Total Pump Stations	**$46,000**	**$92,000**	**$532,500**	**$540,500**	**$84,000**	**$84,000**	**$1,379,000**	**$4,126,000**	**$5,505,000**
Pipelines									
MH at NE California Street[(1)]	$15,000						$15,000		**$15,000**
Upsize Ohio Street Pipe[(1)]	X						$0		**$0**
MH at E 3rd Street[(1)]	$15,000						$15,000		**$15,000**
MH at LS-41[(1)]	$15,000						$15,000		**$15,000**
LS-71 Pipe	$2,000	$3,000	$19,000	$19,000			$43,000		**$43,000**
New Forcemains									
SR-104 FM								$1,369,000	**$1,369,000**
West Kingston FM								$27,000	**$27,000**
Arness FM								$886,000	**$886,000**
Taree Grinder FM								$373,000	**$373,000**
Arborwood FM								$1,002,000	**$1,002,000**
New Gravity Collectors									
Gravity to LS-43								$2,033,000	**$2,033,000**
Gravity to SR-104 PS								$522,000	**$522,000**
Gravity to West Kingston PS								$720,000	**$720,000**
Gravity to Arness PS								$4,671,000	**$4,671,000**
Gravity to Taree								$720,000	**$720,000**
Gravity to Arborwood								$5,450,000	**$5,450,000**
Total Pipelines	**$47,000**	**$3,000**	**$19,000**	**$19,000**	**$0**	**$0**	**$88,000**	**$17,773,000**	**$17,861,000**
Kingston WWTP	**$250,000**	**$250,000**					**$500,000**		**$500,000**
Total for UGA	**$343,000**	**$345,000**	**$551,500**	**$559,500**	**$84,000**	**$84,000**	**$1,967,000**	**$21,899,000**	**$23,866,000**

LS-41 Upgrades (CFP Project No. Kingston-1)

Peak hour flows into LS-41 were projected to exceed the current station capacity in 2011, although discussions with County staff indicated that the pump station has not failed due to being under capacity. LS-41 has also reached the end of its design life. Therefore, a full station upgrade including higher capacity pumps, a flow meter, new electrical equipment, new controls, new piping and appurtenances, and a new wet well is recommended. This project is a high priority and is scheduled to start in 2013.

LS-71 Upgrades (CFP Project No. Kingston-2)

Peak hour flows into LS-71 are projected to exceed the current station capacity in 2016. The station is relatively new, therefore it is assumed that the control and wet well are in adequate condition and do not need to be replaced. Recommended upgrades include higher capacity pumps, new electrical equipment, and new piping and appurtenances. This project is also a high priority and is scheduled to start in 2013.

Force Main Vaults (CFP Project No. Kingston-3)

This project includes installation of flow meters located in underground vaults at LS-42, LS-43, LS-52, and LS-72. This project is scheduled to begin in 2015.

Miscellaneous Maintenance Projects (CFP Project No. Kingston-4)

This project includes installation of manholes at NE California Street, E 3rd Street, and near LS-41 to facilitate cleaning and maintenance of the sewer system. This project is scheduled to begin in 2013.

LS-71 Inflow Pipe Replacement (CFP Project No. Kingston-5)

This project includes replacing approximately 50 feet of 10-inch PVC gravity pipe draining into the wet well with a 15-inch pipe to accommodate the increased future flows. It is recommended that this project be completed concurrent with the LS-71 replacement scheduled to start in 2013.

New Arborwood Pump Station (CFP Project No. Kingston-6))

A new Arborwood Pump Station will serve the southern Kingston UGA. It will have a design capacity of 510 gpm and will discharge directly to the Kingston WWTP. The pump station is proposed to be built as part of the Arborwood Plat which has preliminary approval from Kitsap County. This project is scheduled to start after 2018.

New Small Pump Stations (CFP Project No. Kingston-7)

Four new small pump stations will be required to serve the remainder of the Kingston UGA. Two of these facilities will be located in the southern portion of the Kingston UGA and two will be located in the western Kingston UGA. These projects are scheduled to start after 2018.

New Force Mains (CFP Project No. Kingston-8)

The new pump stations will require a total of approximately 1,400 LF of 2-inch force main, 3,600 LF of 4-inch force main, and 7,100 LF of 8-inch force main. The largest project will be 4,200 feet of 8-inch force main for the Arborwood Pump Station. Approximately 500 feet of 12-inch gravity sewer will also be required to convey flows from the new Arness Pump Station force main to the Arborwood Pump Station. These projects are scheduled to start after 2018.

New Gravity Sewers (CFP Project No. Kingston-9)

Approximately 36,100 feet of 8-inch gravity sewer will be required as collector/interceptor pipe to provide service beyond the existing Kingston sewer system. The largest project will be approximately 14,000 feet of 8-inch collectors for the Arborwood system. These projects are scheduled to start after 2018.

WWTP Reclaimed Water (CFP Project No. Kingston-10)

The Kingston WWTP Reclaimed Water project consists of the addition of facilities to produce reclaimed water for reclamation and reuse purposes in the Kingston UGA. Potential reclamation/reuse opportunities include wetlands enhancement, streamflow augmentation and golf course irrigation. The first phase of the improvement program will be a pre-design effort that will be completed during 2013-2014.

1.5.5 Keyport LAMIRD

The improvements identified for the Keyport LAMIRD consist of modifying one pump station with an upgrade to a second pump station, both located in the Keyport community. The majority of wastewater flows through these pump stations originate in the City of Poulsbo and the pipeline conveying these flows is called the Lemolo Peninsula pipeline, which must be replaced as the flows from Poulsbo increase. These projects are described in more detail in the 2011 Central Kitsap Wastewater Facility Plan, Appendix 7G.

Pump Station #16/#67 Upgrades (CFP Project No. Keyport-1)

This project is designed to increase the capacity of the wastewater conveyance system from the City of Poulsbo to the Central Kitsap Wastewater Treatment Plant. Pump Station #16 has a design capacity of 2,500 gpm and currently conveys the wastewater from Poulsbo while Pump Station #67 (design capacity of 1,300 gpm) serves the Keyport area, including the Navy facilities. This project consists of diverting the Poulsbo flows around Pump Station #67 and increasing the capacity at Pump Station # 67 (4,000 gpm) for the higher flows. Pump Station #16 would be a smaller facility to serve the local Keyport community. This project is considered a high priority project due to the age and poor condition of Pump Station #16. The project is scheduled to begin in 2014.

Lemolo Peninsula Pipe Replacement (CFP Project No. Keyport-2)

The existing Lemolo Peninsula pipeline consists of 4,450 feet of 14-inch low pressure/gravity pipe that currently has some manhole surcharging. As wastewater flow increases from the City of Poulsbo during the planning period, the surcharging will become significant and the pipe will be replaced with 18-inch pipe. This replacement pipe will function as a force main along its entire length to provide the head necessary to

convey flows around PS #16 to PS #67 in Keyport after those pump station upgrades have been completed. This project is scheduled to start after 2018.

1.5.6 Suquamish Area

The Suquamish area projects consist of four projects designed to reduce infiltration and inflow (I&I) to the Suquamish sewer system. Three of the projects are scheduled for implementation during the 6-Year CIP with the fourth project implemented before 2025

Prospect and Division Sewer Basin Improvements (CFP Project No. Suquamish-1)

This project consists of replacing approximately 3,350 feet of existing 8-ich sewer main, rehabilitating 86 laterals and replacing 16 manholes to eliminate about 255 gpm of I&I. The project is scheduled for construction in 2013.

Park and Center Sewer Basin Improvements (CFP Project No. Suquamish-2)

This project consists of replacing or rehabilitating approximately 6,300 feet of sewer main and 86 laterals and replacing 29 manholes to eliminate 56 gpm of I&I. The project is scheduled for implementation starting in 2013 with completion on 2014.

Harris and Angeline Sewer Basin Improvements (CFP Project No. Suquamish-3)

This project consists of cast in place pipe (CIPP) lining of approximately 1,050 feet of 8-inch sewer main to eliminate about 19 gpm of I&I. The project is scheduled for construction in 2015.

Beach Sewer Main Improvements (CFP Project No. Suquamish-4)

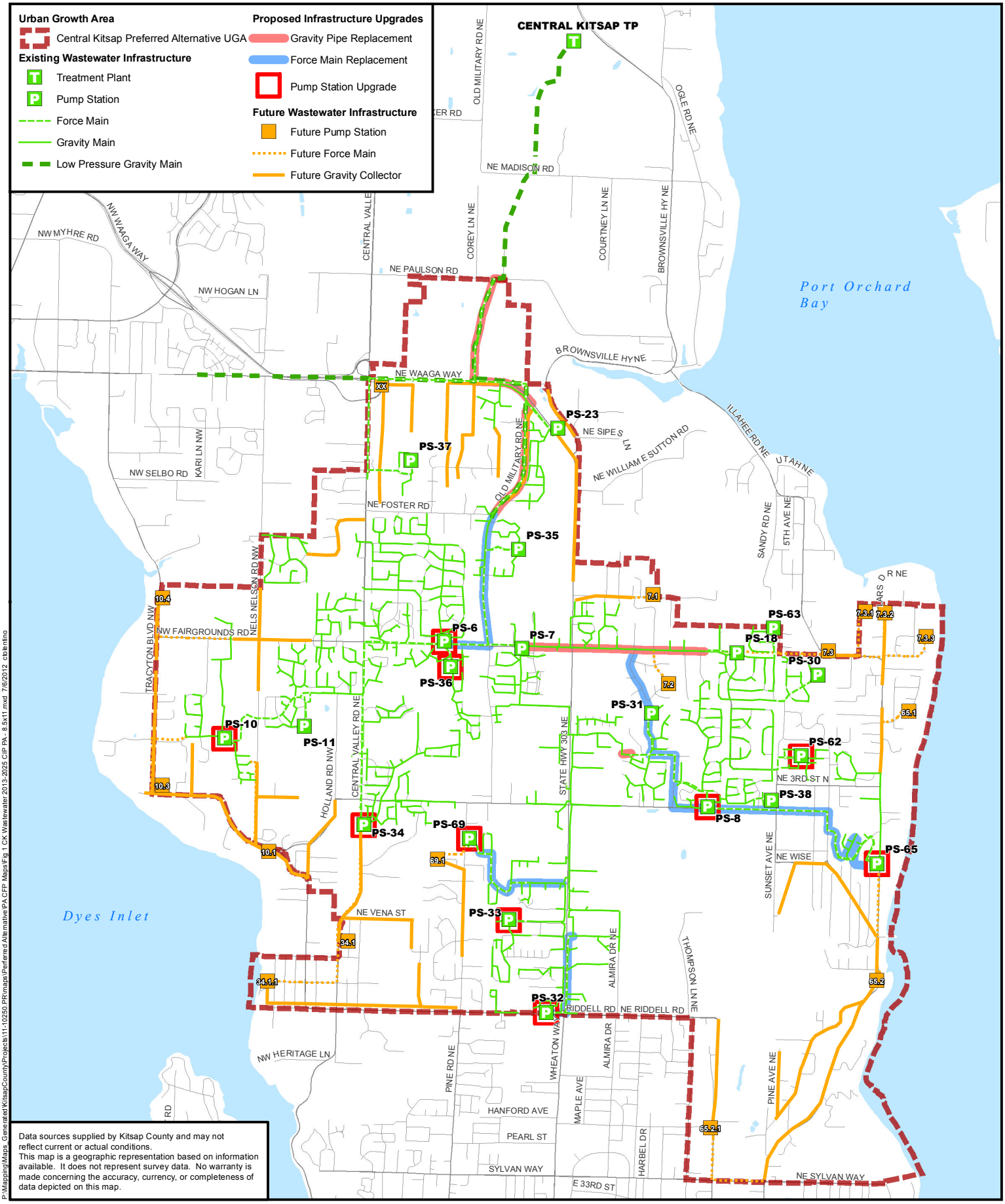
This project involves replacement of the beach sewer main by sliplining the existing sewer main. The project would be undertaken if video inspections show corrosion and structural failures in the sewer main. It is assumed that the project would be completed sometime after 2018.

1.5.7 Summary of CIP Costs for UGAs

The estimated project costs (2011 costs) of the Kitsap County CIP for the preferred UGA alternatives, the Keyport LAMIRD, the Suquamish area and the Central Kitsap Wastewater Treatment Plant are summarized in Table 5. Project implementation is assumed to be completed in a four-year phased program with planning, design and permitting during the first two years followed by project construction the last two years.

Table 5 – Summary of CIP Costs ($1,000)

Area	2013	2014	2015	2016	2017	2018	Total 2013-2018	2019-2025	Total 2013-2025
Central Kitsap UGA	707	1,422	6,046	6,045			14,220	81,605	**95,825**
Silverdale UGA	258	515	2,315	2,437	1,736	2,408	9,669	110,701	**120,370**
CKTP	5,475	19,125	23,850	6,300	978	978	56,706	61,862	**118,568**
Kingston UGA	343	345	551	560	84	84	1,967	21,899	**23,866**
Keyport LAMIRD		241	481	2,044	2,044	0	4,810	7,920	**12,730**
Suquamish Area	2,150	1,347	305				3,802	1,729	**5,531**
Total	**8,683**	**22,995**	**33,548**	**17,386**	**4,842**	**3,470**	**91,174**	**285,716**	**376,890**



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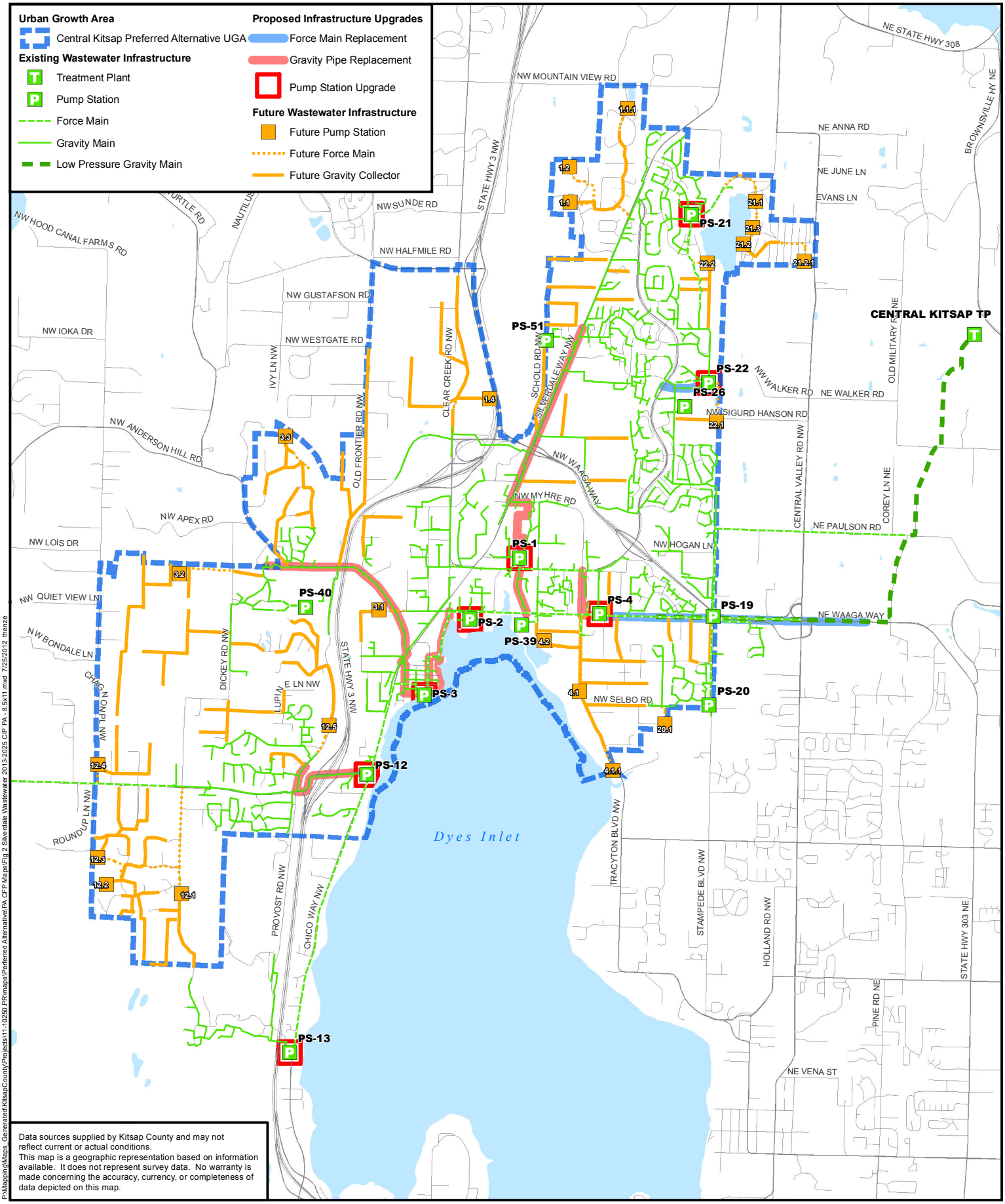
Central Kitsap UGA Wastewater 2013-2025 CIP Preferred Alternative

Kitsap County Public Works
July 2012

Figure

1



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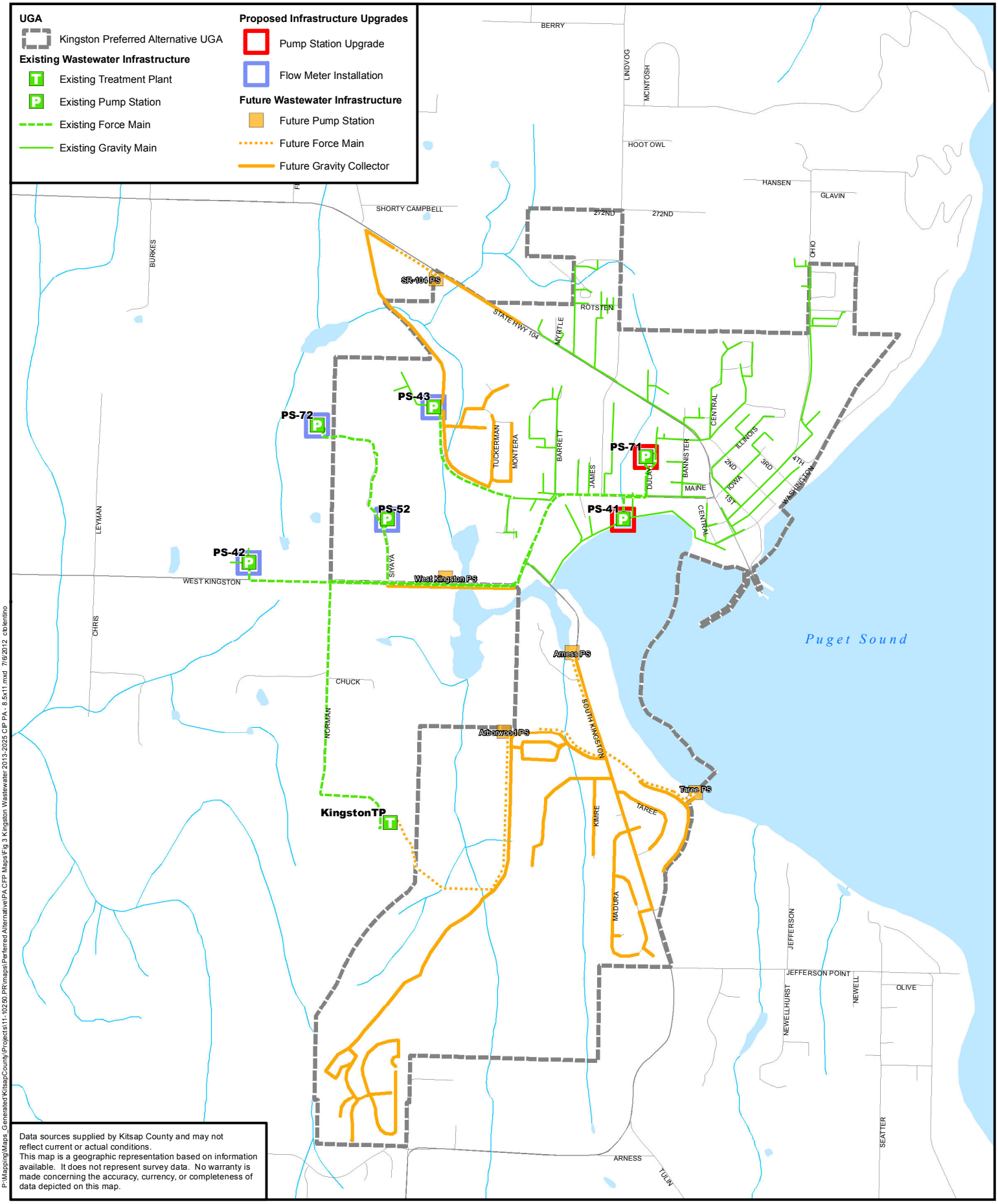
KITSAP COUNTY 18 57 WASHINGTON

Silverdale UGA Wastewater 2013-2025 CIP Preferred Alternative

Kitsap County Public Works
July 2012

Figure **2**



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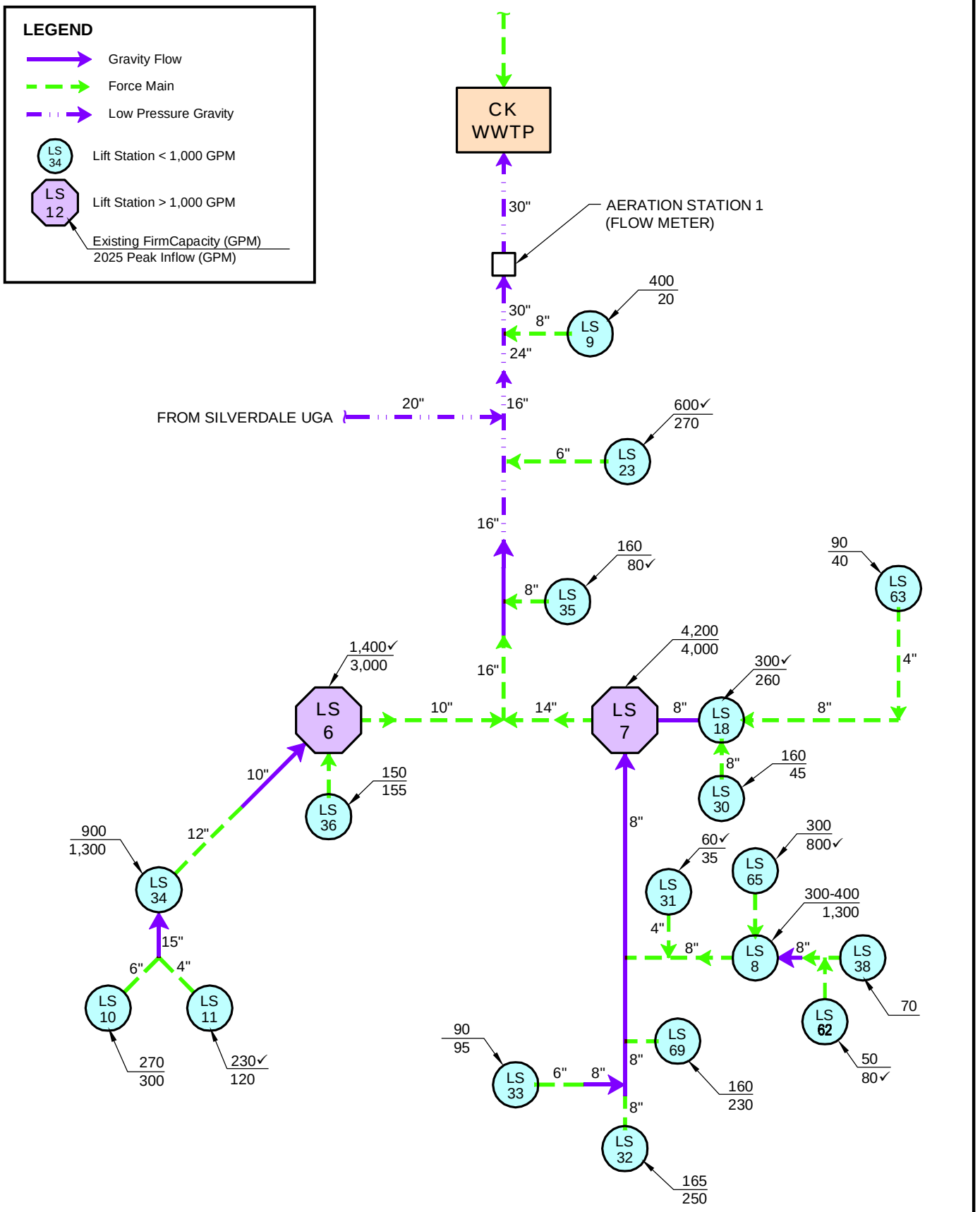
Kingston Wastewater 2013-2025 CIP Preferred Alternative

Kitsap County Public Works
July 2012

Figure **3**

APPENDICES



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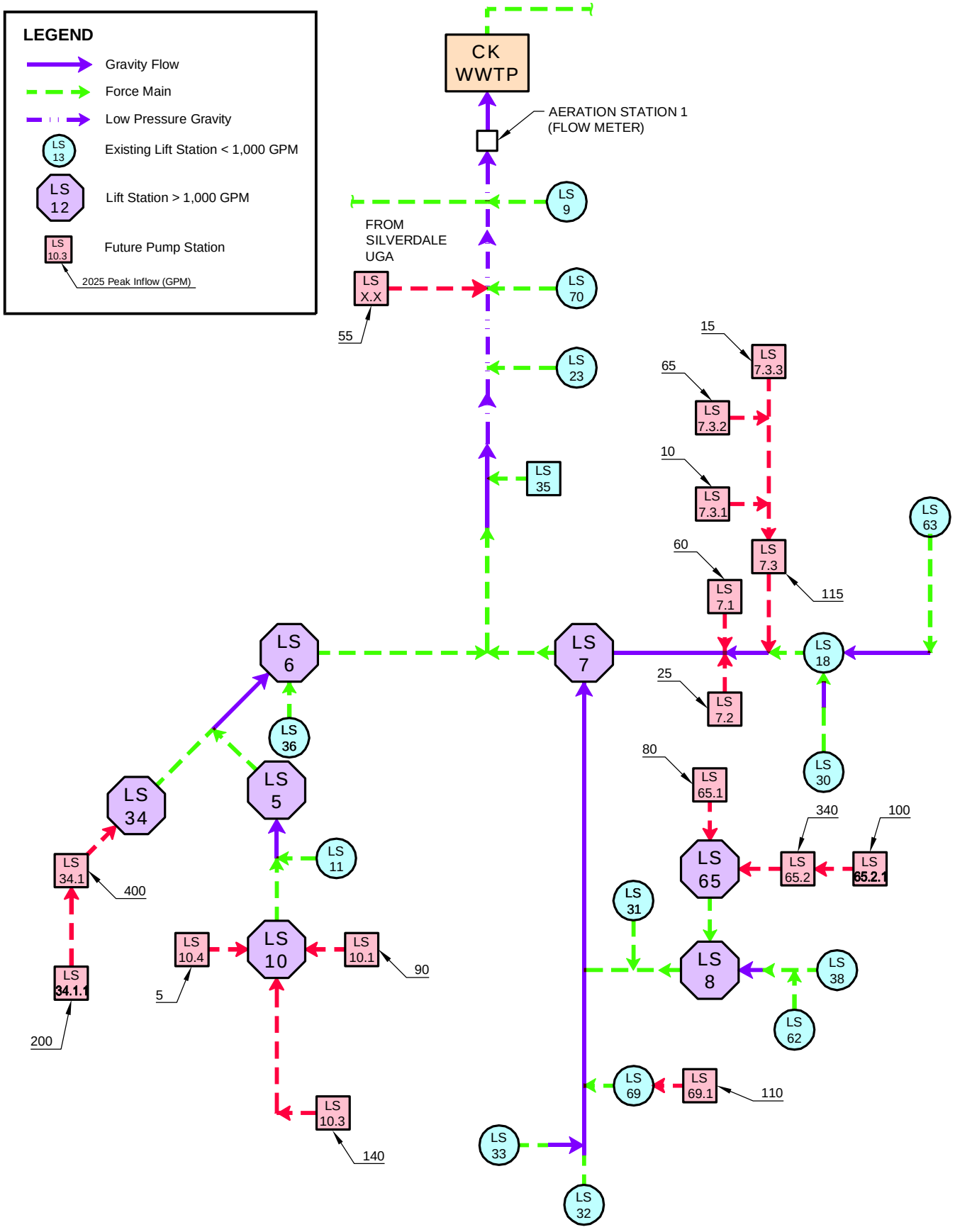
Existing Lift Station Capacity and
Future 2025 Peak Flows
Central Kitsap UGA - Preferred Alternative
Kitsap County Public Works
July 2012

Figure
A-1



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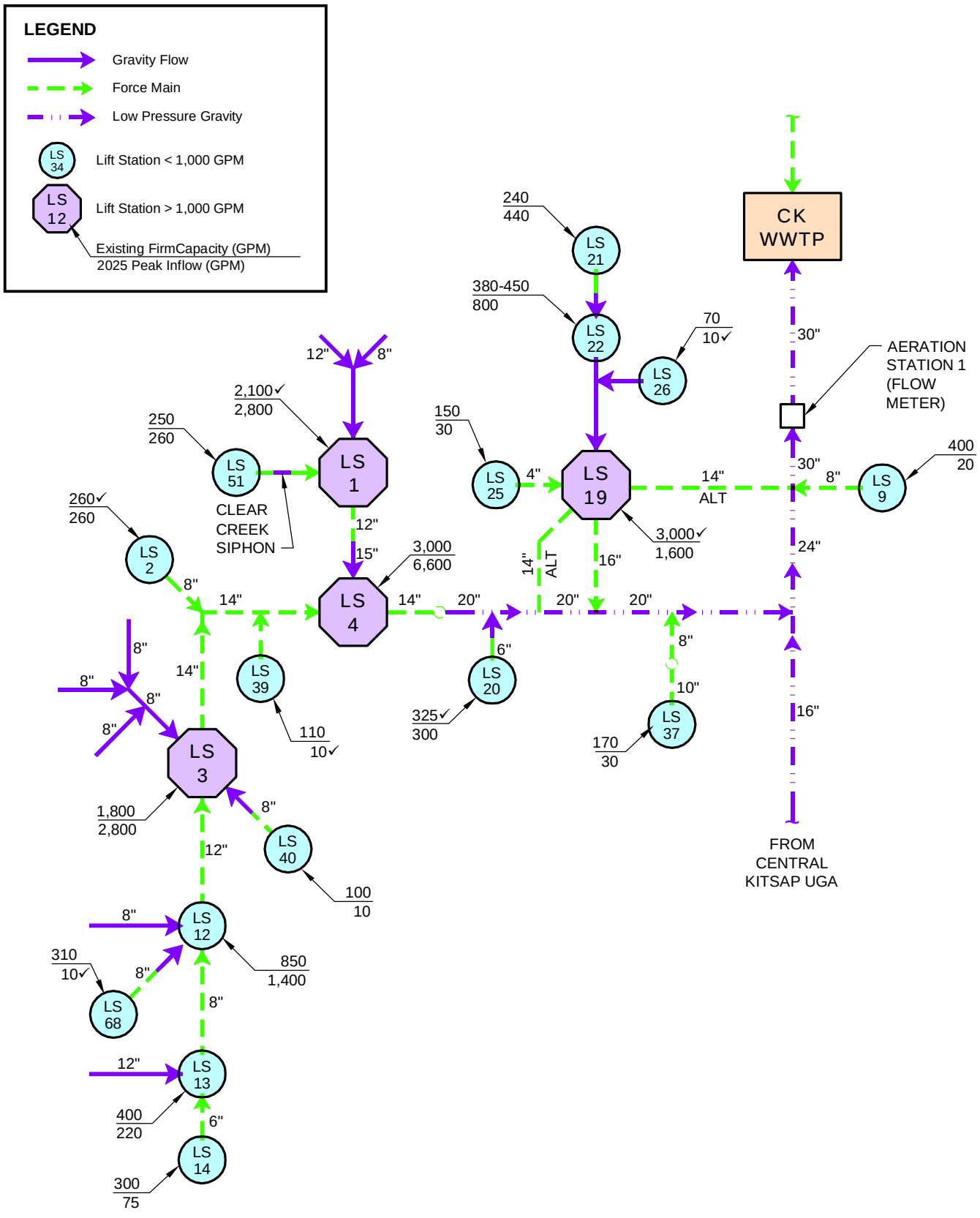
New Future Lift Station Capacity and Requirements for 2025 Flows
Central Kitsap UGA - Preferred Alternative
Kitsap County Public Works
July 2012

Figure
A-2



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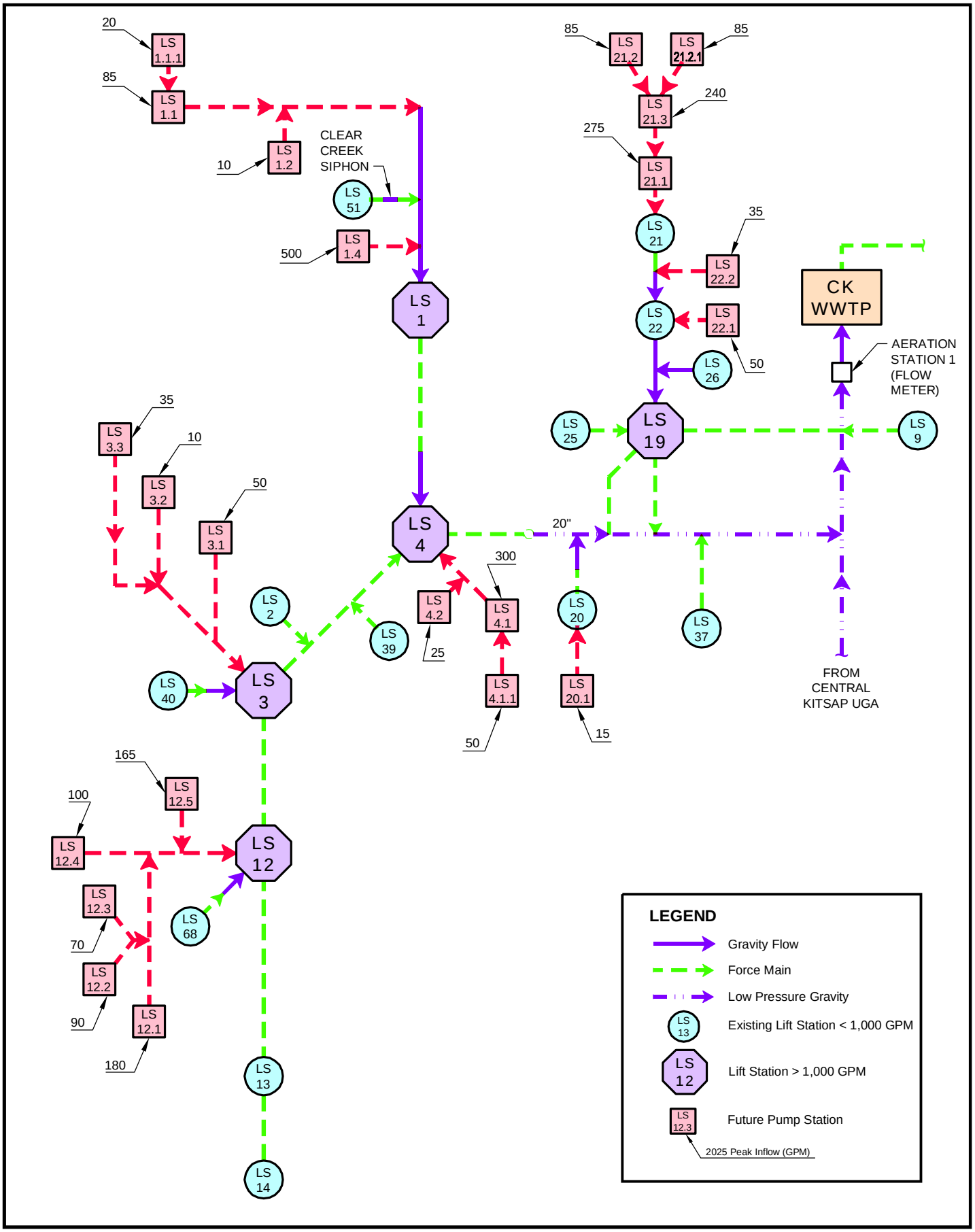
Existing Lift Station Capacity and Future 2025 Peak Flows
Silverdale UGA - Preferred Alternative
Kitsap County Public Works
July 2012

Figure
B-1



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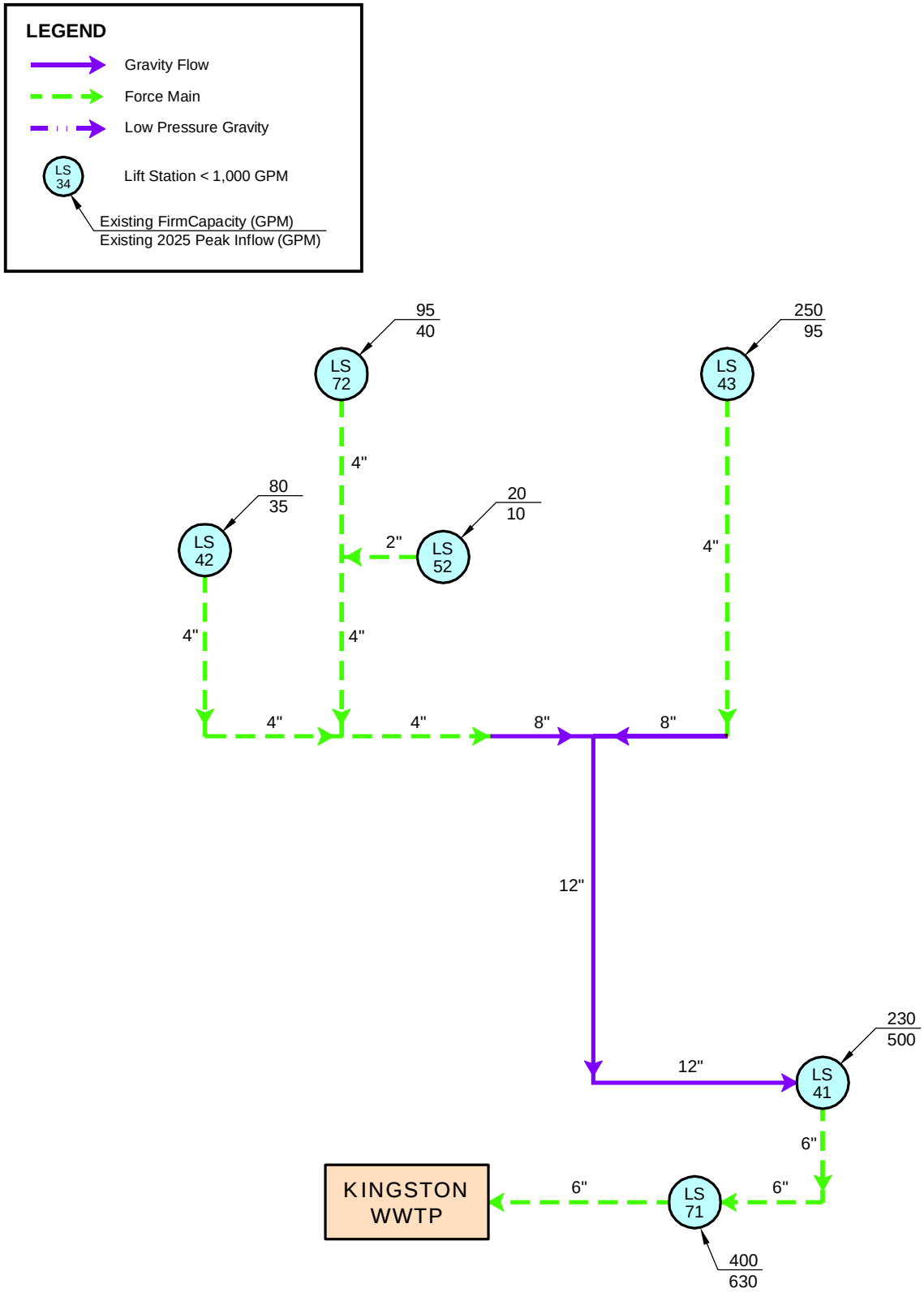
KITSAP COUNTY 18 57 WASHINGTON

New Future Lift Station Capacity Requirements for 2025 Peak Flows
Silverdale UGA - Preferred Alternative
Kitsap County Public Works
July 2012

Figure
B-2



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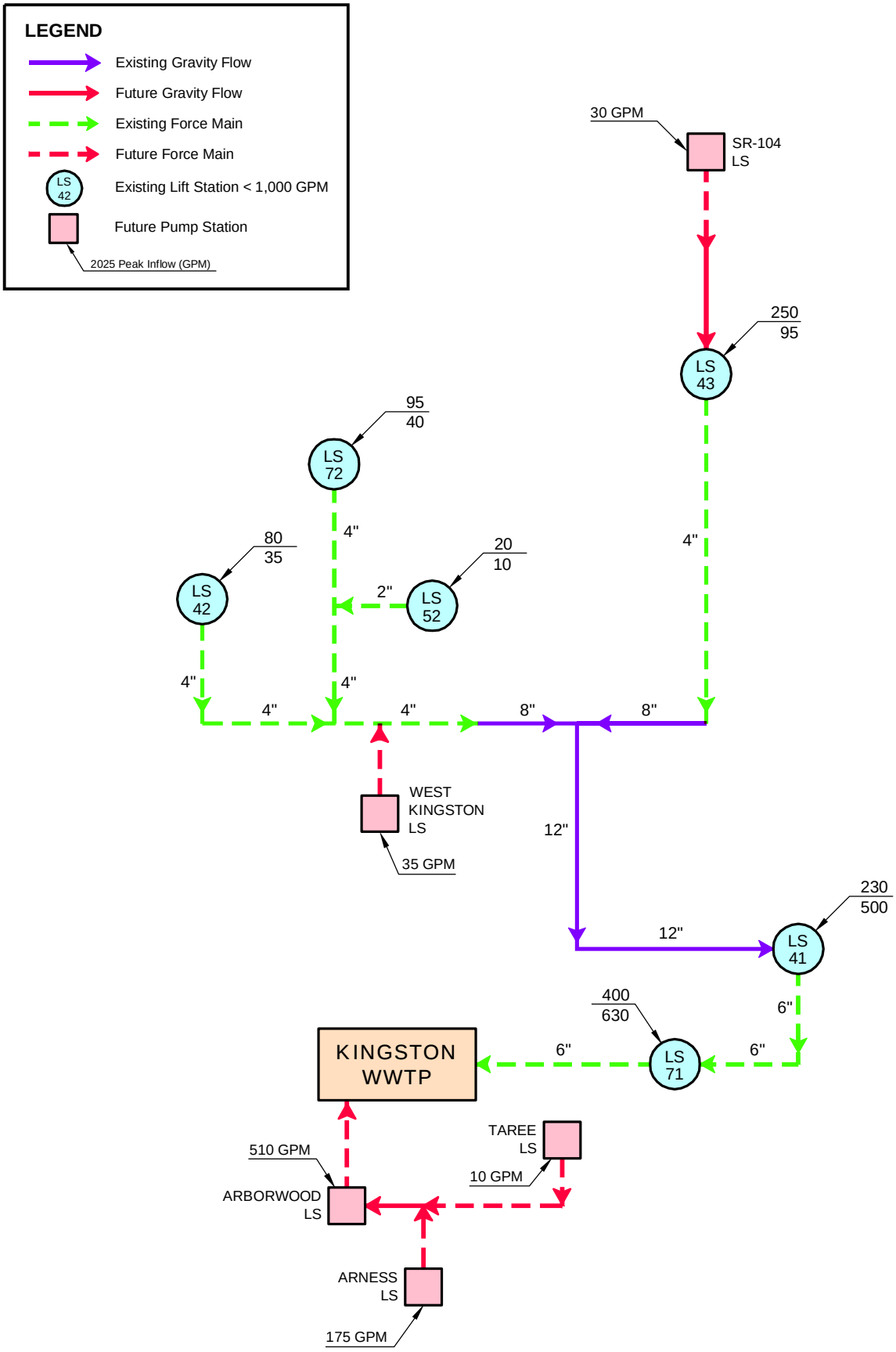
Existing Lift Station Capacity and Future 2025 Peak Flows
Kingston UGA - Preferred Alternative
Kitsap County Public Works
July 2012

Figure
C-1



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New Future Lift Station Capacity and Requirements for 2025 Flows
Kingston UGA - Preferred Alternative
Kitsap County Public Works
July 2012

Figure
C-2

Part C-2: Wastewater Planning and Finance, Statement of Local Circumstances and Strategies, Kitsap County, July 31, 2012

KITSAP COUNTY
UGA SIZING AND COMPOSITION REMAND
Wastewater Planning and Finance
Statement of Local Circumstances and Strategies

PURPOSE

The purpose of this document is to evaluate the provision of adequate and available urban-level wastewater service in UGAs in Kitsap County. This policy evaluation will include review of the Kitsap County UGAs characteristics; applicable Washington State law regarding capital facility provision; forms of appropriate wastewater methods; as well as existing and future strategies for financing needed infrastructure. As discussed below, this policy evaluation will show that Kitsap County has met the GMA requirements for adequate and available wastewater services within the UGA at the time of development.

INTRODUCTION

Recent Central Puget Sound Growth Management Hearings Board (CPSGMHB) decisions[1] have directed Kitsap County to document the provision of urban-levels of wastewater service to its entire urban growth areas (UGAs) within the 20-year planning horizon. This issue is not isolated to Kitsap County, its cities and service providers; nor does it affect only the current planning horizon (2005-2025). These Growth Hearings Board opinions suggest that jurisdictions must show full wastewater financing and construction for each UGA twenty years after initial designation. For Kitsap County, this exercise requires an assessment of the current planning horizon and proposed new UGA boundaries, and also includes the UGA boundaries established in 1998. There is no clear GMA definition as to what precisely constitutes an "adequate urban wastewater system."[2] Recent Growth Hearings Board opinions on wastewater adequacy require Kitsap County to present a clear definition as to what is an acceptable urban-level wastewater treatment method; whether wastewater is subject to the concurrency requirement in state law; and the level to which jurisdictions must show public financing for these facilities. This is a definition with

[1] *Suquamish Tribe et al. v. Kitsap County,* CPSGMHB 07-3-0019c, Final Decision & Order (8/15/2007); *KCRP et al. v. Kitsap County ("KCRP IV"),* CPSGMHB 06-3-0007, Final Decision & Order (7/26/06).

[2] Compare, e.g., *Harless v. Kitsap County,* CPSGMHB No. 07-3-0032, Order on Dispositive Motion (11/15/07) ("[P]rivately-owned services and facilities providing a public service fall within the rubric of governmental urban services."; the Board implies that Large On-Site Septic Systems may be considered urban in nature depending upon the community served) with *Advocates for Responsible Development et al. v. Mason County,* WWGMHB No. 06-2-0005, Compliance Order on Plan and Development Regulations – Sewer in Belfair UGA (11/14/2007)(Holding community septic systems are a rural service, not allowed in urban areas under any circumstances.) *See also,* Letter from Juli Wilkerson, Director State Dept. of Community Trade and Economic Development to Cris Gears, Kitsap County Administrator (11/3/2006)("Although the proposed [LOSS] system is not a traditional extension of wastewater service through hook-up to a central plant, if the proposed on-site system serves urban levels of development, we believe it is consequently an urban level of service.")

statewide implications as most jurisdictions are now reaching the end of their first Comprehensive Plan's 20-year planning horizons.

KITSAP COUNTY'S DEVELOPMENT HISTORY

Founded in 1857, Kitsap County is located on the Kitsap Peninsula in Washington State and comprises a total land mass of 393 square miles. Kitsap County ranks 36th in size among the 39 Washington Counties, and is the third most densely populated county in the state. Since the 1800s, growth has been largely attributable to the expansion of lumber mill operations and Department of Defense naval work at the Puget Sound Naval Shipyard with development primarily centered around employment centers in Bremerton, Port Orchard, and Bainbridge Island. Development in these core areas utilized public sewer systems while construction of developments located on the outer edges predominantly were served by on-site septic systems (e.g. Illahee, West Hills). While growth had continued with the expansions of the Naval Shipyard during and after World War II, it was the development of the Trident Naval Subbase in the1970s that spurred the most recent employment boom. With this new naval facility came federal investment in infrastructure including highway improvements and the Brownsville Wastewater Treatment Plant (known today as the Central Kitsap Wastewater Treatment Plant). In close proximity to the new facility and infrastructure improvements, the areas north of East Bremerton and the emerging community of Silverdale saw a significant amount of growth pressure. These areas, and, to a lesser degree, South Kitsap, Poulsbo and Kingston, saw rapid development of new residential neighborhoods and commercial centers to serve this new facility.

These areas developed in various ways. Many large-scale developments on substantial areas of vacant land used local improvement districts (LIDs) or developer extensions to connect to the new public sewer plant (e.g. downtown Silverdale and Ridgetop), creating a more dense development pattern. Other developments developed in "suburban" subdivision design with some having larger suburban lots with on-site septic systems. These "suburban" designs commonly included a single access point onto a main roadway, a meandering street system with cul-de-sac end points, and lot sizes greater than 1/3-acre to accommodate the use of traditional on-site septic systems (Figure 1).

Figure 1.
Pre-GMA Subdivision, Southwest Silverdale UGA

By the time Washington State legislature adopted the Growth Management Act (GMA) in 1990, much of Kitsap County's developed areas had already been dotted with this "suburban" residential subdivision pattern

served by on-site septic development. Kitsap County wrestled with the ability to provide land for new growth while accommodating existing development patterns. In 1998, Kitsap County adopted a Comprehensive Plan under the GMA and designated ten UGAs that included many of these "suburban developments".[3] While the densities of these "suburban developments" were generally lower than the core urban areas, and are neither completely urban nor rural in nature, their public service demand (transportation, law and justice, parks, fire) was and continue to be largely urban. On balance, these areas have been considered to be more urban than rural and hence were included within the UGAs as "Tier 2" lands (see below). Importantly, these lands meet the GMA definition of "urban growth": "*growth that makes intensive use of land for the location of buildings, structures, and impermeable surfaces to such a degree as to be incompatible with the primary use of land for the production of food, other agricultural products, or fiber, or the extraction of mineral resources, rural uses, rural development, and natural resource lands designated pursuant to RCW 36.70A.170*."[4] Additionally, these pre-GMA Tier 2 developments are fully developed and have little to no redevelopment potential due to their original design, plat conditions and covenants.

GROWTH MANAGEMENT ACT PROVISIONS

Goals of the Act

The GMA provides legislative policy guidance on the creation of local comprehensive and capital facility plans which guide growth and development. The GMA is based upon 14 guiding, non-prioritized goals.[5] These goals are not mutually exclusive and must be balanced in the creation of local planning documents and facility plans. Of the fourteen goals, three goals in particular are related to ensuring wastewater service provision in UGAs, which include:

(1) Urban growth. Encourage development in urban areas where adequate public facilities and services exist or can be provided in an efficient manner.

(2) Reduce sprawl. Reduce the inappropriate conversion of undeveloped land into sprawling, low-density development.

(12) Public facilities and services. Ensure that those public facilities and services necessary to support development shall be adequate to serve the development at the time the

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[3] Kitsap County's established its compliant UGAs pursuant to CPSGMHB direction in *Association of Rural Residents (ARR) v. Kitsap County*, CPSGMHB 93-2-0010, FDO (6/3/1994), where the Growth Hearings Board extensively discussed the "tiering systems" to be used in establishing a UGA and phasing growth within, pursuant to RCW 36.70A.110(1) and (3). In that decision, the CPSGMHB made it clear that there shall only be "nonurban growth" outside of a UGA. Further, the establishment of a UGA shall first be limited to city limits, and if they cannot accommodate growth, then the UGAs may include areas that already have urban growth located on it. (Referred to as "Tier 2 lands" herein).

[4] RCW 36.70A. 030(19). Moreover, because of their proximity to cities and other urban areas, these types of development could not be considered as Limited Areas of More Intensive Rural Development (LAMIRDs) under RCW 36.70A.070(5)(d).

[5] RCW 36.70A.020 ; RCW 36.70A.480(1).

development is available for occupancy and use without decreasing current service levels below locally established minimum standards.

Goal 1 suggests that urban areas should have adequate public facilities and services, or be able to be provided with them at some point in an efficient manner. Goal 2 indicates that there should be no more post-GMA development of sprawling low-density development. Goal 12 generally deals with prospective development and concurrency, i.e., all future growth should occur with the development of concurrent facilities and services necessary to support that growth. These goals lay down the framework for the definition of urban services, such as wastewater, as "those public services and public facilities at an intensity historically and typically provided in cities, specifically including storm and sanitary sewer systems, domestic water systems, street cleaning services, fire and police protection services, public transit services, and other public utilities associated with urban areas and normally not associated with rural areas."[6] This is the most detail that the GMA provides in defining urban wastewater systems; although it specifically includes sewer systems as an urban service, it does not exclude other wastewater systems that may provide treatment for urban-level development. As described later in this paper, alternative wastewater technologies may better match local topographic constraints and soils, while supporting urban densities.

Applying this definition, the historical and typical provision of the wastewater facilities provided in Kitsap County cities (Bainbridge Island, Poulsbo, Bremerton and Port Orchard) includes a wide range of technologies. While each of Kitsap County's cities include a traditional public sewer conveyance system with Bainbridge Island, Port Orchard and Bremerton maintaining their own sewer treatment facilities, each allow multiple systems including grinder pumps and properly-functioning septic systems. None of the three jurisdictions require the decommissioning of these existing septic systems and the transition to traditional sewer facilities. These systems are components of the sewer systems and generally serve existing suburban development without an expectation of future redevelopment during the 20-year planning horizon.

Designation of UGAs

In the early days of GMA, the CPSGMHB gave Kitsap County direction in establishing compliant UGAs.[7] In that decision, the Hearings Board provided a lengthy discussion of the GMA provisions concerning UGAs, and the legislature's priority to classify urban lands.[8] The CPSGMHB made it clear that "only 'nonurban' growth can occur outside a UGA,"[9] which means that existing urban growth should be included within a

[6] RCW 36.70A.030 (18).

[7] *Association of Rural Residents (ARR) v. Kitsap County,* CPSGMHB 93-3-0010, FDO (6/3/1994).

[8] RCW 36.70A.110(1) and (3). While RCW 36.70A.110(1) deals with the initial designation, subsection .110(3) deals with phasing of growth within a UGA.

[9] *ARR, supra* at *32.

UGA. The 1994 *Association of Rural Residents (ARR) v. Kitsap County* decision also set forth a type of "tiering system" for designating UGA boundaries as follows:[10]

1) A county must first look to established cities as the UGAs.
2) If the existing cities cannot accommodate all projected growth, the county may include "only if that additional territory is already 'land having urban growth located on it.'"[11]
3) If the existing cities and land with urban growth do not accommodate growth, additional territory may be added that is "land located in relationship to an area with urban growth on it as to be appropriate for urban on it as to be appropriate for urban growth."
4) If there is still need for territory after the first three steps above are added, additional territory adjacent to territory already having urban growth may be allowed.
5) After all territory set forth above is included, additional territory may be added if it is adjacent to territory that is already located in relationship to an area with urban growth on it as to be appropriate for urban growth.[12]

After a UGA is established, *new growth* should be directed into the UGA utilizing a three tier priority system in the following order.

1) Areas already characterized by urban growth that have adequate existing public facility and service capacities to serve such development. (These areas include existing development at urban densities connected to a public sewer plant.)
2) Areas already characterized by urban growth that will be served adequately by a combination of both existing public facilities and services and any additional needed public facilities and services that are provided by either public or private sources. (These are areas of urban or suburban development in proximity to urban services but may be using other means of wastewater treatment, such as on-site septic systems.)
3) The remaining portions of the UGAs. (All other areas with no urban character or urban services.)[13]

[10] This paper does not address the other "exceptions" discussed by the Board for locating urban growth outside of established cities, i.e., fully contained communities or master planned resorts.

[11] Quoting RCW 36.70A.110(1). Note, in 1995 the legislature amended this provision adding language that clarifies "whether or not the urban growth area includes a city." These lands are referred to as "Tier 2 lands" in this paper.

[12] *ARR, supra,* at *38.

[13] However, the Board noted that there is no "temporal phasing" requirement o this requirement: "The Board holds that the Act neither mandates nor prohibits temporal phasing of development within a UGA[.] Subsection (3) [RCW 36.70A.110(3)] also does not prohibit development within UGAs of the limited areas that have no existing public facilities and service capacities. Instead, if a private developer is willing and able to provide adequate facilities and services in lieu of the government doing so, nothing in the Act prevents this from happening, subject to the local government's exercise of discretion."

Pursuant to *ARR,* Kitsap County employed the Hearings Board's priority system in designating its UGAs. Following this system, Kitsap County chose to include many existing "Tier 2 'suburban' developments" before expanding UGAs to large vacant tracts of land. It is worth noting that these lands were not included to accommodate projected growth, but rather, because they meet the GMA definition of "urban growth." Such lands should not be considered "rural" and should be considered urban, and included in the UGA. From a planning perspective, to exclude these lands from the UGA would result in extremely irregular boundaries and would create islands of "suburban" development scattered throughout the UGAs. From both a planning and a service perspective, excluding such lands from the UGA would not have made common planning principles. Also, as stated earlier, these Tier 2 lands demand other urban services such as public utilities, public safety, and others.

Kitsap County has also developed its capital facilities plan to show the availability of public services, such as public sewer, through the 2005-2025 planning horizon. These lands will be able to connect to a public sewer system if the need exists, but that need may not occur within the 20-year planning horizon. These Tier 2 lands meet the GMA requirement and are lands having urban growth located on them; are currently adequately served with services; and that they "will be served" when needed by either public or private sources. Thus, utilizing this system, GMA indicates that on-site septic systems have a place in the designation of existing UGAs. In other words, the mere fact that these lands are served by on-site septic systems does not make them ineligible as urban designations; nor does GMA require such lands to convert to public sewer within the 20-year planning horizon.

Capital Facilities Planning

The GMA also includes provisions for jurisdictions to show how public facility needs are to be met over the twenty year-planning period. The requirements for this planning are outlined in RCW 36.70A.070(3), which requires Kitsap County to develop a capital facilities plan element consisting of:

- An inventory of existing capital facilities owned by public entities, showing the locations and capacities of the capital facilities;
- A forecast of the future needs for such capital facilities;
- The proposed locations and capacities of expanded or new capital facilities;
- 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
- 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. Park and recreation facilities shall be included in the capital facilities plan element.

GMA states that the CFP 6-year finance plan requires jurisdictions to show only public funding, not private funding for development. One of the founding principles of the GMA is to have growth pay for growth. In new development of vacant or infill/redevelopment lands, the developer, private property owner or local improvement district are the sources of funding for most wastewater conveyance infrastructure. For Tier 2 lands, GMA clearly describes the provision of their future urban services as "provided by either public or

private sources." While projected to be available within the six-year horizon, these private sources cannot be clearly predicted to the detail required for public funds in a six-year finance strategy. Nevertheless, through conditions on development, impact fees, and other sources, Goal 12 can be met to require the provision of adequate public facilities and services at the time the development is available for occupancy and use.

WAC 365-196-840 defines the term concurrency as an assurance that public facilities and services necessary to support development are adequate to serve that development at the time it is available for occupancy and use, without decreasing service levels below locally established minimum standards. Concurrency describes the situation in which adequate facilities are available when the impacts of development occur, or within a specified time thereafter. Concurrency ensures consistency in land use approval and the development of adequate public facilities as plans are implemented. Concurrency is required for locally owned transportation facilities and for transportation facilities of statewide significance. Counties and cities may adopt a concurrency mechanism for other facilities that are deemed necessary for development. In Kitsap County, the concurrency mechanism adopted is only for transportation. Concurrency means that necessary improvements or strategies are in place at the time of development, or that financial commitments are in place to complete the improvements or strategies within six years.

GMA and the Hearings Boards use a similar concept of "adequacy" when applied to urban wastewater infrastructure. Jurisdictions must provide adequate and available urban services as growth requires. This leads to the expectation that local planning and strategies for provision of sanitary sewer provision are in place to ensure that this concept is addressed during the planning horizon.

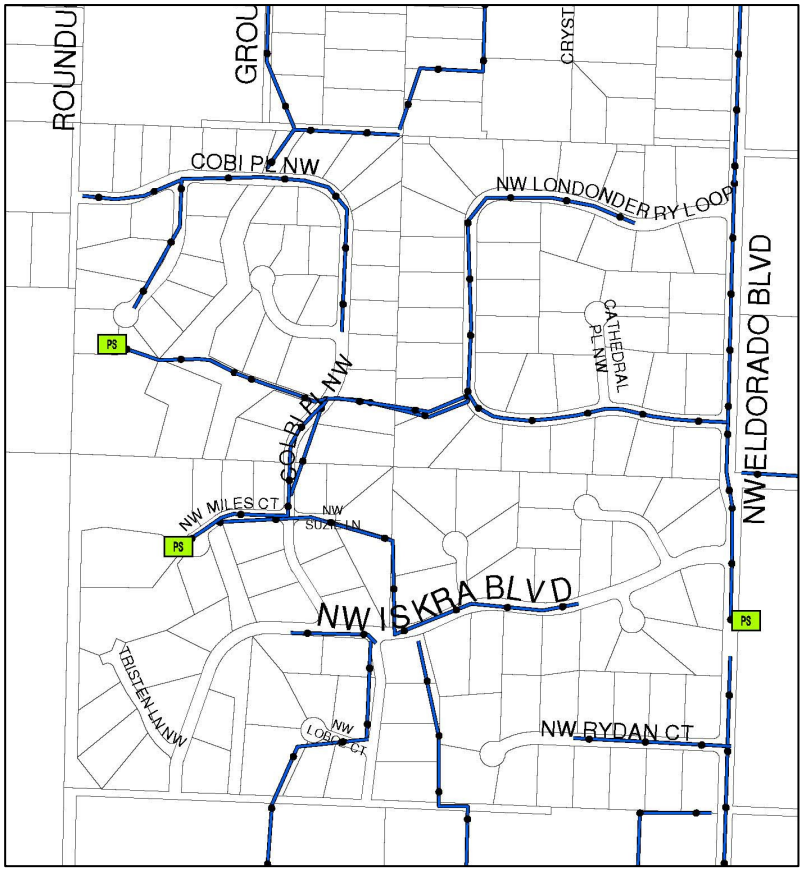


Figure 2.
Wastewater Planning in Pre-GMA Subdivision, Southwest Silverdale UGA

With the adoption of the 1998 Comprehensive plan, recent sewer plans and development regulations (based upon RCW 36.70A.020(12) and .110), new urban development in Kitsap County UGAs has typically connected urban sanitary sewer services.

Through its planning process, Kitsap County has demonstrated planning to provide traditional sewer infrastructure to the entire UGA if projected new and existing growth requires it (illustrated in Figure 2). While the County has demonstrated how traditional sewer conveyance systems could be extended, it is important to note that the ability to achieve urban densities and intensities does not exclude the use of alternative wastewater technologies, such as functioning existing on-site septic systems, community drainfields and other wastewater systems (discussed below). Although alternative wastewater techniques can support urban densities, there are some instances where traditional public sewer is necessary to address public health and environmental concerns. Accordingly, Kitsap County has worked closely with the Kitsap Public Health District (KPHD) to identify urban areas served by septic systems that may be areas of concern, and to prioritize the provision of public sewer to those areas. However, as discussed below, there is currently no health hazard areas within Kitsap's UGA and minimal expectation from KPHD that any transition of sewer service will be necessary for these on-site systems in 2025 planning horizon.

Essentially, GMA indicates is that the use of sanitary sewer systems in urban areas will be dependent on the environmental characteristics of the site and ability to achieve the urban densities and intensities. Having "traditional" wastewater service in place at the time of development is not a strict requirement, rather, the need to achieve urban densities, lot requirements and other environmental restrictions will be the determining factor. While Kitsap County has completed the requisite twenty-year and six-year planning for its sewer service in the UGAs, it does not mean that each and every existing development shall connect to traditional public sewer service within that 20-year horizon. Rather, when such connections become necessary to support the pre-GMA development, there will need to be site-specific determinations and considerations at that time. The use of alternative forms of sewer service is based on site-specific land and development proposal characteristics such as topography, soil types and proposed densities. Such site-specific considerations are not practically or economically feasible to evaluate a comprehensive planning level.

WASTEWATER TREATMENT TECHNOLOGIES - EXISTING AND FUTURE

As is documented in the Capital Facilities Plan for wastewater infrastructure and illustrated in Figure 2, Kitsap County has shown planning for traditional sewer facilities including mains and pump stations to the entirety of its UGAs and documented the costs. In summary, this form of service has an estimated cost of over $400M for traditional sewer infrastructure. However, these costs are substantially affected by the issues of topography, critical areas and the true need for service within the 20-year horizon as well as the use of other existing and emerging wastewater technologies. Many of these technologies do not require the substantial conveyance infrastructure and can treat the effluent in a facility closer to the proposed development and at a drastically reduced cost. These systems are site-specific and, unlike traditional sewer facilities, cannot be engineered everywhere. Nevertheless, they may have substantial utility to new development and existing developments in the future.

Geography, Topography and Environmental Constraints

Kitsap County is very different from the other three urban counties in the Central Puget Sound region: King, Snohomish and Pierce. Kitsap is second only to King in density, but its existing land use pattern and

ability to serve that pattern with urban services has been uniquely shaped by the constraints of its unique geography. Unlike the landscape in the three urban counties east of Puget Sound, Kitsap's landscape has a minimal resource land component[14]. Kitsap is not graced by mountain ranges flanked by extensive designated forest resource lands, nor does it have river valleys with the rich bottom lands that would support an agricultural resource industry. The network of agricultural river valleys and forested mountain ranges in the three eastern Central Puget Sound counties create natural separators between urban and urban, between urban and rural, and between rural and rural. There are no designated Resource Lands in Kitsap to perform this region-forming function and is one factor that contributes to the historical lack of differentiation between urban and rural in Kitsap.

Overall, Kitsap County includes challenging topography and critical areas throughout the county, whether urban and rural. While Kitsap County has taken efforts to exclude these lands in the UGAs for intense development, it is nearly impossible to designate a UGA without including significant critical area systems and hilly topography. (Illustrated in Figure 3).

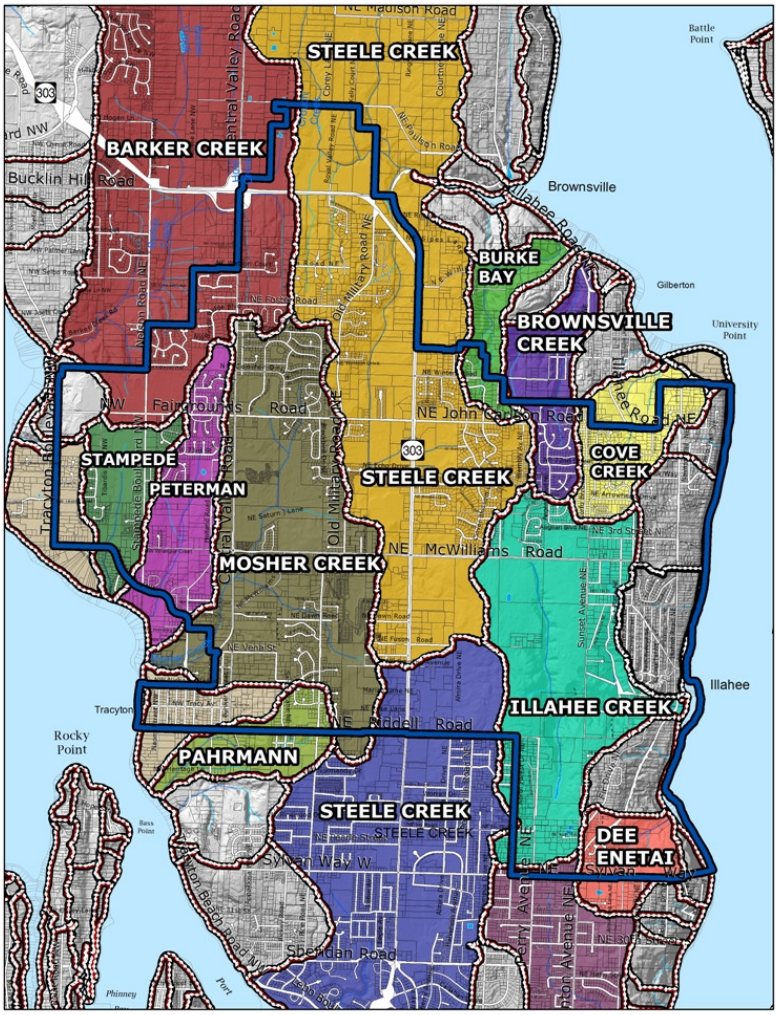


Figure 3.
Watersheds Basins, Central Kitsap UGA

The efficiency and cost of traditional sanitary sewer systems are influenced by economies of scale and the engineering necessary to overcome and/or work with gravity. Kitsap's rolling topography has created a relatively large number of relatively small catchment areas, making the collection and transmission of wastewater a bigger engineering and budgeting task than in counties with

[14] Kitsap County has only limited commercial forest (1.6% of Kitsap), mineral resource lands (1.4% of Kitsap) and no agricultural resource lands. While an active gravel pit, for example, is a tangible physical reality quite different from rural or urban uses, the geographic extent of such lands are far less extensive than either rural or urban lands and scattered throughout the County. Accordingly, mineral resource lands do not play the same landscape-shaping role that agricultural or forestry resource lands do.

more pronounced topographies and larger catchment areas.[15] Particularly, east-west, Kitsap's terrain requires multiple pump stations to move effluent from development to plant. Some areas require multiple pump stations (an average estimated cost between $600K and $1M each). This is a local circumstance that is somewhat unique to Kitsap County, in sharp contrast to the three east Central Puget Sound counties.

These local circumstances will require sewer provision techniques beyond traditional public sewer. Table 2 outlines the variety of wastewater methods and their ability to serve urban developments. All systems have the ability to service some form of urban development. The appropriate use of any specific technology would be determined at the time of project submittal because the use of such systems is very context-sensitive and site-specific. The use of various technologies may be based upon soil types, lot sizes and other factors. In any event, Kitsap County has planned where the necessary location of traditional public sewer systems should be located in the event other wastewater methods are not achievable.

Table 2. Available Wastewater Technologies

System	Definition	General Description	Typical Use	Constraints	Urban Suitability
Community Drainfields	A system of piping, treatment devices and/or other facilities which provide subsurface treatment and disposal on-site or on nearby property and serve more than one single family dwelling or multifamily dwellings.	Generally similar to an on-site septic, but larger with more components to serve multiple residences.	In Kitsap County, such systems have been used as an interim system until connected to public sewer system (McCormick Woods)	Various components may have mandatory set back requirements similar to on-site systems, need larger drainfield area to serve multiple residences. Generally will require higher standard of operation and maintenance than individual systems.	May allow for smaller individual lot sizes and higher urban densities than individual systems. Can be designed to facilitate future connection to other forms of public sewer. Should be limited to areas where aquifer recharge and stream flows are of issue or as interim measures that promote the future extension of advanced forms of wastewater service (see below). Kitsap County code restricts the use of these systems in rural areas.

[15] One measure of the number of distinct gravity catchment areas in Kitsap is the sheer number of distinct watersheds. Figure 3.1-2 in the DSEIS shows over seventy such areas. The watercourses in Kitsap are much smaller in scope, length and volume than those in the eastern Central Puget Sound counties. Kitsap has no large rivers and thus no agricultural floodplains comparable to the Stillaguamish, Snohomish, Snoqualmie, Sammamish, Cedar, or Green

Table 2. Available Wastewater Technologies					
System	**Definition**	**General Description**	**Typical Use**	**Constraints**	**Urban Suitability**
Large On-Site Sewer (LOSS)	An integrated system of components, located on or nearby the property it serves, that conveys, stores, treats, and provides subsurface soil treatment and disposal of domestic sewage, with peak design flows of between 3,500 (gpd) and 100,000 gpd.	A LOSS consists of a collection system, a treatment component such as a septic tank, or treatment sequence, and a drainfield. It may include a mechanical treatment system depending on size and site constraints. LOSS are permitted and regulated by the State Department of Health.	LOSS systems convey, store, treat, and provide subsurface soil treatment and disposal of domestic sewage from 10 to 370 homes, or the equivalent mix that includes commercial development with residential strength sewage.	Requires a drainfield with the appropriate soil and groundwater characteristics. Other treatment methods may be required in combination with the drainfield. Industrial wastewater and stormwater are not allowed to be treated with a LOSS.	LOSS systems can support urban densities may be suitable in urban settings if sufficient land is available to meet design and regulatory criteria, and site constraints. State regulations require some form of public operation and maintenance unless that the system serves development under single ownership. Municipal codes may also dictate if a LOSS is allowable. Kitsap County code currently restricts the use of such systems in rural areas.
Conventional Wastewater Treatment Plants	Treatment typically consists of primary processes (pumping, screening, and grit removal), to remove heavy solids and floatable materials; and secondary treatment such as biological aeration to metabolize and flocculate colloidal and dissolved organics. Waste sludge drawn from these unit operations is thickened and processed for ultimate disposal. These facilities treat wastewater flows greater than 100,000 gpd are regulated by the Department of Ecology.		Treatment plants urban areas, or rural areas designated Limited Areas of More Intensive Rural Development (LAMIRD).	High cost of plant development and requirements for lengthy conveyance infrastructure to bring effluent from development to plant (often exacerbated by rolling topography).	Suitable for municipalities, other urban areas, larger rural communities, and industrial facilities. At a cost, can be provided everywhere with the UGAs with proper design (shown for County UGAs in Section 5.5 of the CFP). Kitsap County prohibits the extension of such systems outside of UGAs.

Table 2. Available Wastewater Technologies					
System	**Definition**	**General Description**	**Typical Use**	**Constraints**	**Urban Suitability**
Advanced Wastewater Treatment Plants	These facilities are similar to conventional treatment plants, but are designed to provide a higher level of treatment to remove specific wastewater components prior to discharge. Advanced treatment facilities are also used in situations where high quality effluent is required, such as water reclamation projects. Such plants include membrane bio-filtration reactors.		Used in urban areas or to address documented environmental hazards. Can provide service to high densities and commercial and industrial land use intensities.	Plants are expensive and treated water must be discharged either to surface waters or direct injection to aquifers.	Suitable for municipalities, other urban growth areas, large decentralized communities, and industrial facilities.
Existing On-Site Septic	Individual or clustered systems that discharge effluent below the surface of the ground for final treatment and dispersal, with peak design flows of less than 3,500 gallons/day (gpd).		Wastewater flows into a buried septic tank; sludge settles in the tank, and the wastewater effluent is discharged into the ground via a gravity or pressurized distribution system. These facilities are typically regulated by the local health jurisdiction.	Septic systems are typically used in all types of areas (urban, suburban and rural) where lot conditions meet applicable regulations, and the distance to a municipal system made it cost prohibitive to connect to a centralized collection/treatment facility.	Lot size and site conditions dictate use. Slopes, soil types and depth, minimum depth-to-groundwater, and mandatory setback distance from property lines, wells, structures, and water bodies must be maintained. Properly functioning systems may be suitable for existing development and areas zoned Urban Restricted in close proximity to critical areas.

Source: Parametrix 2012; Kitsap County 2012

While conceptual planning can be conducted about the merits of these various technologies, the determination of what is an appropriate system to achieve the urban densities is a site-specific determination that requires expense in engineering and scientific analysis at a micro-level. In contrast, comprehensive planning, by nature, is a macro-level planning document that guides development regulations, capital facility plans and other governmental policies.

Over the course of 2008-2009, Kitsap County, along with service providers, developers, environmental groups and other interested parties participated in the Wastewater Infrastructure Taskforce. This Taskforce was charged with developing recommendations on how to resolve these issues. A final report was issued and made recommendations on digital inventory of wastewater systems, finance opportunities, location of potential septic failure areas and public funding sequencing and prioritization. It classified many issues into suites including environmental, market- based and infill focused. With the issues of topography, engineering, competing priorities for investment and public versus private sources

funding various improvements, this taskforce was unable to come to one conclusion regarding wastewater provision. It was concluded that at a macro, comprehensive plan level a host of wastewater service systems and funding sources is necessary.

ENVIRONMENTAL PROTECTION AND PUBLIC SAFETY IN URBAN AREAS

Environmental Sensitivity

As discussed above, Kitsap County's UGAs have rolling topography and critical areas, resulting in environmental constraints. Bordering these areas, these same UGAs have land appropriate for urban development. To reduce illogical boundaries and yet protect the environmentally-constrained areas, Kitsap County has employed environmentally-sensitive residential zones, such as Urban Restricted (1-5 DU/acre) and Illahee Greenbelt Overlay (1-4 DU/acre). These zones, in combination with the Critical Areas Ordinance (CAO), help protect endangered salmon streams and associated wetlands from impacts of urban development. These areas are not necessarily required to connect to public sewer but may connect as development dictates. As these lands cannot be logically removed from the UGAs and the areas meet the requirements of the Litowitz test[16] the designations are compliant with GMA. The Central Kitsap UGA provides an example of this issue (Figure 4), showing steep slopes in pink and wetlands in green.

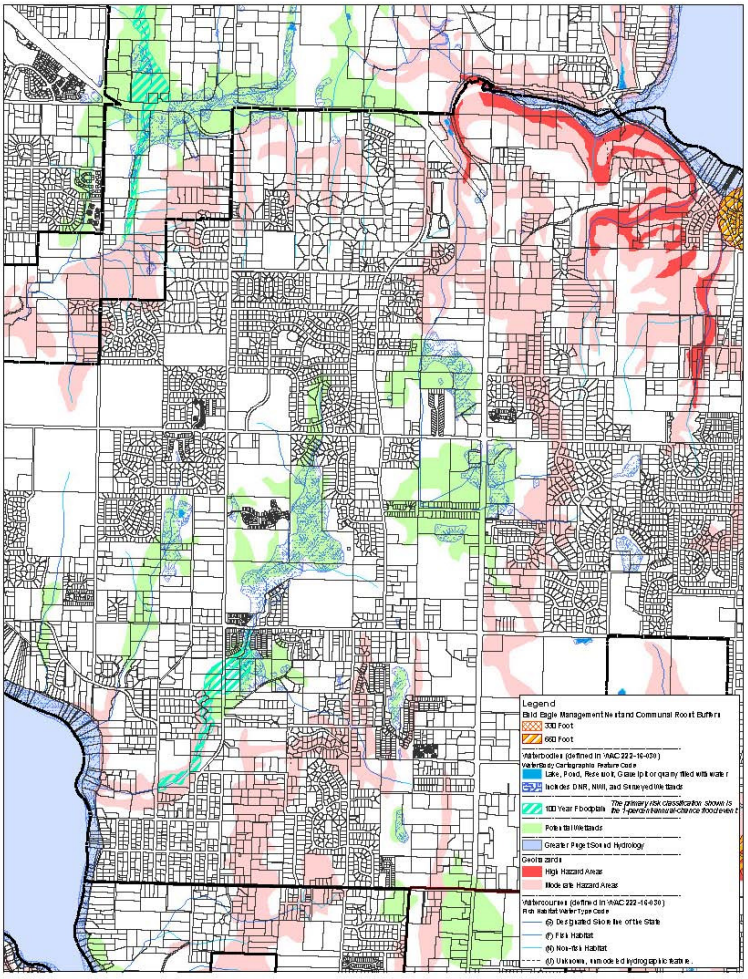


Figure 4.
Critical Areas, Central Kitsap UGA

Additionally, these areas are closely associated with Kitsap's surface and ground water sources. Virtually all of Kitsap County, other than Bremerton, relies on groundwater as a drinking source. The County regulates, through the CAO,

[16] The Growth Hearings Board has allowed lower density development in certain urban areas under *Litowitz v. City of Federal Way*, CPSGMHB 96-3-0005, FDO (7/22/ 1996). Such lower densities are allowed if they are is used to protect critical area functions when the critical area in question is: 1) Large in scope; 2) structure & functions are complex, and 3) the rank order value is high.

categories of aquifers and whether they pose a potential risk of groundwater contamination with development. As shown in Attachment A, Aquifer Recharge Areas are located throughout the County's urban and rural areas where development has occurred since the 1800s. Many of these existing, pre-GMA developments use on-site septic systems as their primary wastewater service. The Kitsap County Groundwater Management Plan (May 20, 1997) noted the importance of septic systems for aquifer recharge and recommended that the comprehensive plan should encourage the use of septic systems over the development of sewer systems whenever possible. Thus, the use of on-site septic systems, community drainfields and alternative wastewater methods requires a site-specific analysis, and should not be summarily excluded from use in a UGA without measuring the potential benefits of such use.[17]

Public Health and Safety

One of the risks of on-site septic systems is the potential for failure and environmental contamination. The Kitsap Public Health District has provided a letter regarding their efforts in UGAs and their evaluations of existing or future health hazards (Attachment B), summarized below.

Over the past 23 years, the Kitsap Public Health District has conducted many countywide investigations regarding both point and non-point source pollution issues. Through this work, the Health District has identified and enforced the correction of thousands of septic system failures and other forms of surface water contamination. Through the Health District's Pollution Identification and Control (PIC) Program, the Health District has studied and addressed numerous non-point source fecal coliform issues stemming from stormwater drainage, wildlife, waterfowl, domestic animals, agriculture and various septic system and sewer failures. Because PIC uses a science-based approach to identify and correct pollution sources, the Health District's work focused on both rural areas (Burley Creek and Gamble Bay) and urban areas (Dyes Inlet, Sinclair Inlet, Liberty Bay) with a particular emphasis along Kitsap County's marine shoreline areas. Additionally, the Health District has taken an active role in addressing a historic environmental hazard within the Gorst UGA. Caused by failing septic systems, Gorst Creek and portions of Sinclair Inlet were significantly impacted by fecal coliform contamination. Through the assistance of the City of Bremerton and state and federal agencies, this contamination was rectified in 2011 with the installation of a sewer main to connect this area to Bremerton's Wastewater Treatment Plant. The sewering of this area is expected to end the contamination problems from failing septic systems and aid the creek and shoreline to return to its properly functioning levels.

With the Gorst contamination addressed, the Health District is aware of only one remaining area where failing septic systems could potentially create source surface water contamination within an urban growth area. This area is commonly referred to the Broad and Ida Street/Sunnyhill Road area to the west of Bremerton. This area was investigated in 2009, has been prioritized for further investigation beginning in

[17] In the *Suquamish II* FDO, *supra,* the CPSGMHB noted (at p. 26): "This is not to say that the Board is requiring each existing residence to be connected, but that the service provider should have the capacity (i.e., treatment facilities, trunk lines) to make adequate service available to the area." In its subsequent Order finding Compliance, the CPSGMHB stated (at pp. 8-9) that it "recognizes that, in some instances, properly functioning septic systems may be continued so as to allow limited groundwater supplies to be recharged."

late 2012. The Health District will keep the County informed of its findings during this upcoming investigation.

In 2009, the Health District also participated with the County on the Wastewater Infrastructure Taskforce. Through this effort, the Health District identified "areas of concern" with respect to long-term (>20 years) reliance on septic systems as the primary means for wastewater treatment. Many of these areas of concern are within or nearby to UGA. While the Health District has long-term concerns about some areas served by septic systems where conditions are not necessarily ideal for such systems (e.g., such as small lot sizes and/or poor soils), an "area of concern" is not the same as a documented health hazard. The Health District must thoroughly investigate the conditions of the area prior to designating it as a health hazard. Currently there is no evidence of UGA-wide septic failures, and the Health District has no existing documentation to predict that widespread failures will occur in any of these areas through the 2025 time horizon.

The Health District will continue to assess areas of concern throughout Kitsap County, including portions of the UGAs, through the PIC program in the near future. In addition to the Broad and Ida Streets/Sunnyhill Road area, other areas within or near UGA that will be investigated include Ridgetop Creek, Enetai Creek and South Dye's Inlet. Through these assessments, the Health District expects that further information will be gathered about potential contamination sources and their impact. However, the Health District has stated it currently has no information that such an assessment will result in documented health hazards caused by failing septic systems or other sewer issues through the 2025 time period.

WASTEWATER PROVISION STRATEGIES

Public and Private Funding

Some Hearings Board decisions raise questions as to a jurisdiction's role in the funding of wastewater facilities for all conveyance infrastructure including "last-mile" pump stations and main lines to both new and existing development.[18] Historically, public sources of funds have focused on capacity improvements to sewer plants and regional pump stations that serve the system as a whole. This focus has been directed largely by the source of funds used to pay for them, including sewer rates, connection fees and state and federal funding. Kitsap County has expended $63.6M of these funds towards wastewater improvements since 1998 in its urban service areas. Extensions of minor "last mile" sewer lines and pump stations have historically been the responsibility of development (growth paying for growth) or private property owners converting their existing on-septic systems to sewers. As described above, the need or timing of such extensions is site- and market-specific, which make secured financial predictions difficult. Kitsap County will continue to require developer-funded financing for new development and property owner funding for

[18] *See KCRP IV, supra,* FDO at p. 26 ("The County is required to demonstrate that public services, including sewer, will be available for the allocated population within the twenty-year planning period."); *Irondale Community Action Neighbors v. Jefferson Cy,* WWGMHB No. 03-2-0010, FDO (5/31/05) ("A defined funding mechanism needs to be included in the capital facilities plan before urban development is allowed.").

conversions (e.g., private payment, grant funding for connections, or utility local improvement districts). These improvements will be based upon the cost-effective sizing of UGAs with the ability to serve with urban-level sanitary sewer service as high priority.

Strategies – Cost Reductions or Funding Sources

Kitsap has completed a comprehensive analysis of existing and future funding sources and other strategies to fund planning, engineering and construction of urban sewer infrastructure. These strategies are shown in Attachment C and include public and private funding, public/private partnerships, regulatory measures and other mechanisms. These methods may be used to fund a range of wastewater methods beyond just traditional public sewer facilities. Kitsap County and its service providers has and/or currently employs many of the Washington State authorized mechanisms as sources of funds. Additionally, in 2009, both the Washington State Office of Financial Management and the Puget Sound Regional Council completed two separate studies on financing public infrastructure *(Restructuring State Public Infrastructure Programs* and Funding *for Local Government Infrastructure)*, which evaluated existing revenue sources for a variety of public services. Of particular note, the studies concluded that state and federal governments' historical role in funding infrastructure is on a decrease, and those remaining funding programs are too complex and costly for local governments to participate in. In short, the burden of providing infrastructure in UGAs has and will continue to be shouldered by local governments, developers and private property owners. This provides a significant challenge for local governments, including Kitsap County, where an exploration of many or these strategies may be necessary to address our wastewater infrastructure needs into the future.

Kitsap has paired these various funding strategies with specific areas of its unincorporated UGAs (Attachment D and E). Kitsap has analyzed the characteristics of each development sector including its topography, critical areas, zoning and existing development patterns. This analysis also included an assessment of all existing sewer facilities and future needs based upon traditional sewer service. It also addressed soil types as they apply to the potential for alternative systems.

THE END OF THE 20-YEAR PLANNING HORIZON

"Adequate and Available"

As Kitsap County approaches the 20-year "anniversary" of its 1998 Comprehensive Plan and its UGAs, issues have been raised concerning the ability to fully-serve the UGAs with adequate and available urban wastewater service. As documented above, such an assessment must consider multiple factors beyond just whether public sewer infrastructure is available to the entire geography of the UGAs.

First, of course, is the proximity to existing public sewer lines. Since the adoption of Kitsap's first Comprehensive Plan in 1998, development has brought sewer infrastructure to substantial portions of the UGAs to a level where much of the existing UGA is within close proximity to existing lines. This has been due to extensive public and private investment in the sewer systems as well as regulatory requirements for connection. The requirements have included the condition for all new subdivision and other development increasing density within unincorporated UGAs to connect to urban levels of public sewer.

Additionally, Kitsap County Code requires all new development, substantial remodels and properties with failing septic systems within 200 feet of a sewer main to connect to public sewer. The expansion of the system has provided additional connection capability and sewer capacity within a vast majority of the UGA boundaries (Attachment D).

Second, all development types included within the UGAs as prescribed by the GMA priority system must be considered. The Tier 2 developments on existing, functioning on-site septic systems were included in UGAs as their development pattern would dictate. However, they have had no need for expensive public sewer infrastructure and there is no documentation that they will need to connect during the 2005-2025 horizon. Tier 2 lands with properly maintained septic systems have life-spans that extend beyond the life of the Comprehensive Plan which designated them urban. Additionally, Kitsap has no documentation of health hazards nor an expectation that the transition of existing on-site septic systems will be necessary in the near or long-term. Nevertheless, Kitsap has provided full planning for public sewer and strategies for construction if such a service is required in the future.

Third, the critical area constraints of the unserved lands must be considered. Many of the unsewered areas are unavailable for future development due to the sensitivity of wetlands, streams and steep slopes (or a combination of all) located in and around them. These include endangered salmon streams and headwaters to high category wetlands with substantial wildlife habitat. These areas have not been previously developed and are unlikely to develop in the future. Additionally, Kitsap has designated many of these areas Urban Restricted to reflect these characteristics; allowing lower density development to reduce stormwater runoff and tree canopy disturbance.

Finally, strategies must be in place to ensure adequacy of urban wastewater service during the planning period. These strategies may include the furthering of multiple sewer techniques and funding mechanisms. Kitsap has analyzed the sewer needs of its UGAs and has assessed the characteristics, topographic challenges, and future sewer facility opportunities for various sectors of the UGA boundaries (Attachments D and E). These sectors have been paired with potential funding mechanisms when, and if, they require construction of urban levels of sewer service during the 2025 planning horizon. Further discussion of these strategies can be found below.

Based upon these factors, Kitsap has planned, developed strategies and/or provided its UGAs with adequate and available wastewater service as required by GMA.

CONCLUSIONS

GMA requires the provision of adequate and available urban services, such as wastewater, to urban growth areas (UGAs), but the Act does not define what precisely might constitute an urban wastewater service. It is not clear that all development within a UGA is expected to connect to traditional public sewer within the 20-year horizon, or whether it is the government's responsibility to provide public funding to install such infrastructure within this time frame. Thus, these issues should be addressed through local discretion and local circumstances.

As outlined in the GMA, UGAs must be sized for future urban growth but should also include areas of historic pre-GMA development that were developed at less than full urban standards (i.e., Tier 2 lands). This historic development pattern usually has no redevelopment potential, nor does it need immediate connection to public sewer systems if served by properly functioning on-site septic systems. These developments likely will not need to connect to public sewer within the 20-year planning horizon, yet they often require other urban services and meet the GMA definition of "urban growth."

While jurisdictions must plan for connection to public sewer service as a contingency and provide clear strategies to that end, the expectation that public entities will solely fund such improvements to either fuel future growth or pay for unnecessary conversions of historic development with property functioning septic systems does not comport with the GMA principle to require "growth pay for growth." Such a requirement would force jurisdictions to install unnecessary infrastructure using capital funds that have been extremely limited in the past years. Alternatively, it would force jurisdictions to reconfigure UGAs into illogical boundaries leaving islands of existing denser development outside the UGAs simply because they are served by on-site septic systems, but meet all other definition of "urban growth."

Additionally, the concept that an expensive public sewer system is the only method of urban wastewater provision is contradicted by recent technology and limits the use of additional technological advancements. Multiple options to public sewer systems exist that are available for construction throughout Kitsap's UGAs that would maintain urban densities and intensities. While these systems are site-specific in their application, they can be more cost-effective to new development and retrofit of existing neighborhoods.

Finally, the concept that a Comprehensive Plan must guarantee funding for conveyance infrastructure that has historically been funded by private development, local improvement districts or private property owners is a drastic shift that has significant fiscal implications statewide. These costs historically have not been the responsibility of local jurisdictions and GMA does not direct such a responsibility shift. Kitsap County should be able to continue to rely on such private funding to ensure that growth pays for growth.

In sum, Kitsap County has adequately planned for providing wastewater throughout it UGAs per the GMA requirements. Kitsap County will continue to explore the use of on-site and that of site-specific alternative wastewater technologies, in addition to traditional methods of providing sewer service, with consideration of the development continuum and required GMA assessments of county comprehensive plans.

Path: U:\Brem\Projects\Clients\6940-Berk Associates\233-6940-001 KC CompPlnUpdate\99Svcs\GIS\PH3_SEIS_Figures\Fig3 1-4 Critical Acquifer Recharge Areas 11x17.mxd

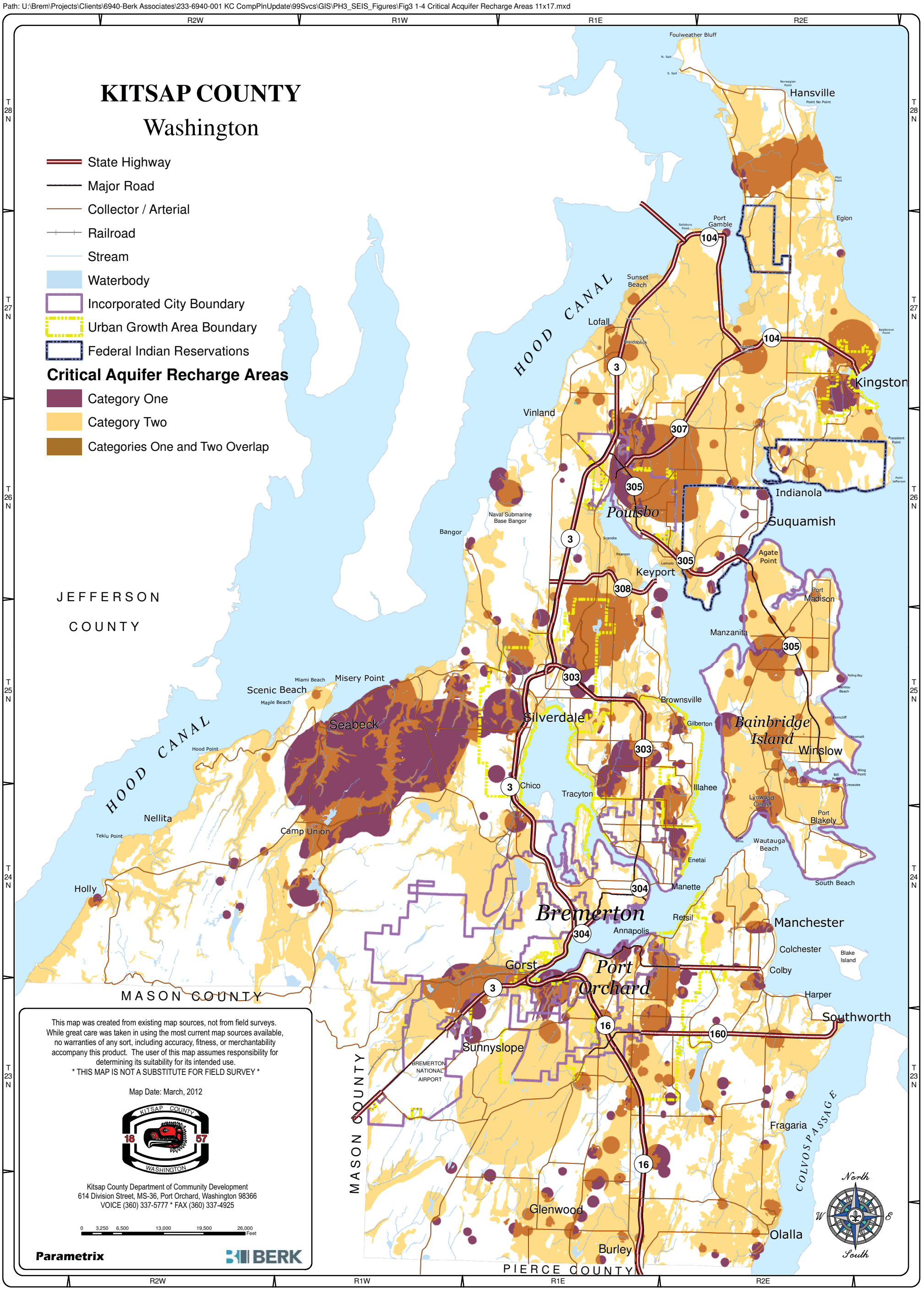


Figure 3.1-4. Critical Acquifer Recharge Areas

Attachment B

KITSAP PUBLIC
HEALTH DISTRICT

345 6th Street, Suite 300
Bremerton, WA 98337
360-337-5235

April 18, 2012

Kitsap County Board of County Commissioners
614 Division Street, MS-4
Port Orchard, WA 98366

RE: Kitsap Urban Growth Areas and Wastewater Infrastructure

Dear Board of Commissioners:

Thank you for your coordination with the Kitsap Public Health District in the 2012 update of the Kitsap County Comprehensive Plan. For over six decades the Health District has been involved with the protection of public health in Kitsap's urban and rural areas, and welcomes the opportunity to participate in discussions of issues that include existing and future wastewater service / wastewater infrastructure.

Over the last 23 years, the Health District has conducted many investigations of both point and non-point source pollution issues countywide. Through this work, the Health District has identified and enforced the correction of thousands of septic system failures and other sources of surface water contamination. Through the Health District's Pollution Identification and Control (PIC) Program, we have studied and addressed numerous non-point source fecal coliform issues stemming from storm water drainage, wildlife, waterfowl, domestic animals, agriculture and various septic system and public sewer failures. Because PIC uses a science-based approach to identify and correct pollution sources, our work has focused on both rural watershed areas (e.g., Burley Creek and Gamble Bay) and urban watershed areas (e.g., Dyes Inlet, Sinclair Inlet, Liberty Bay) with a particular emphasis along our marine shoreline areas.

Additionally, as you are aware the Health District took an active role in addressing a historic public health and environmental hazard within the Gorst urban growth area. Caused primarily by failing septic systems, Gorst Creek and portions of Sinclair Inlet were significantly impacted by fecal coliform bacteria contamination, and had been for over 40 years. Through the assistance of the City of Bremerton and other state and federal agencies, this contamination was rectified in 2011 with the installation of a sewer main to connect this area to Bremerton's Wastewater Treatment Plant. The sewering of this area is expected to end the contamination problems from failing septic systems and aid the creek and shoreline to return to its properly functioning levels. Recent water quality data indicates that improving trends are already evident in Gorst Creek, and both Gorst Creek and Sinclair Inlet current meet state water quality standards.

With the Gorst contamination addressed, the Health District is aware of only one other potentially significant problem area --- in an urban growth area --- where failing septic systems are the primary source surface water contamination and where the repair of these failing septic systems are problematic due to poor site conditions (i.e., poor soils, small lots). This area is commonly referred to as the Broad and Ida Street / Sunnyhill Road area to the west of Bremerton. This area was recently investigated in 2009, and has been prioritized for further investigation beginning in late 2012. The Health District is very concerned about this area and will keep the County informed of our findings during this upcoming investigation.

In 2009, the Health District also participated with your staff on the Wastewater Infrastructure Taskforce. Through this effort, the Health District identified "areas of concern" with respect to long-term (>20 years) reliance on septic systems as the primary means for wastewater treatment. Many of these areas of concern are within or nearby to UGA. While the Health District has long-term concerns with these areas served by septic systems, where conditions are not necessarily ideal for such systems (e.g., age of development, small lot sizes, and/or poor soils), an "area of concern" is not the same as a documented health hazard. An area of concern means that the Health District will keep these areas prioritized for future work efforts. The Health District must thoroughly investigate the conditions of these areas prior to designating it as a health hazard. Currently there is no evidence of widespread septic failures UGA-wide, and the Health District has no existing documentation to predict that widespread failures will occur in any of these areas through the 2025 time horizon.

The Health District will continue to assess areas of concern throughout Kitsap County, including portions of the urban growth areas, through the PIC program in the near future. In addition to the Broad and Ida Streets/Sunnyhill Road area, other areas within or near UGA that will be investigated include Ridgetop Creek, Enetai Creek and South Dyes Inlet. Through these assessments, we expect that further information will be gathered about potential contamination sources and their impact. Again, however the Health District currently has no information that such an assessment will result in the declaration of a health hazard caused by failing septic systems or other sewer issues through the 2025 time period.

Thank you for the opportunity to participate in the Comprehensive Plan update. If you need additional information, please don't hesitate to engage us.

Sincerely,

Keith Grellner
Director of Environmental Health
Kitsap Public Health District

ATTACHMENT C

WASTEWATER PROVISION STRATEGIES

FUNDING AND REGULATORY

Option	Description	Require Public Vote?	Authorized in WA State	Limitations and Opportunities	Areas of Applicability
PUBLIC SOURCES (FUNDING OR REGULATION)					
General Fund	Move funding from other Kitsap County departments to fund wastewater projects.	No	Yes	Provides funding mechanism to dedicate to infrastructure development. Currently, supports other regional services in the County which have no other sources of revenue. Generation of revenues are dependent on the health of the economy (sales tax, property tax, etc).	All UGAs within Kitsap County's Sewer Service Area (Kingston, Silverdale, Central Kitsap, Poulsbo)

Wastewater Improvement Fund	Move funding within the Wastewater CIP to fund specific projects.	No	Yes	Provides funding mechanism to maintain and construct infrastructure. Limited funding, roughly, $5M annually is dedicated to maintaining the existing system and improvements to the treatment plants.	Areas of the UGA in close proximity to existing sewer mains or capacity improvements in existing pump stations and mains.
Option	**Description**	**Require Public Vote?**	**Authorized in WA State**	**Limitations and Opportunities**	**Areas of Applicability**
Wastewater Construction Fund	Move funding within the Wastewater CIP to fund specific projects.	No	Yes	Provides funding mechanism to maintain and construct infrastructure. Limited funding, roughly, $15M annually and is dedicated to maintaining the existing system and improvements to the treatment plants.	Areas of the UGA in close proximity to existing sewer mains or capacity improvements in existing pump stations and mains.

Real Estate Excise Tax (REET)	Dedicate some portion of future funding from this revenue stream to wastewater projects.	No	Yes	Provides funding mechanism to maintain and construct infrastructure. Limited funding, currently supports many other capital programs (parks, public buildings, etc). Revenue generation is dependent on economic conditions (currently drastically reduced).	Infill Development Areas of the UGA in close proximity to existing sewer mains or capacity improvements in existing pump stations and mains.
Option	**Description**	**Require Public Vote?**	**Authorized in WA State**	**Limitations and Opportunities**	**Areas of Applicability**
Sewer Rate/Connection Fee Adjustments	Adjust sewer rates to accommodate up front expenses of installing wastewater infrastructure. Payback through late-comers agreements and additional connection fees.	No	Yes	Rate increases are already needed for sewer plan improvements. Economy in flux making the investments questionable. Must show a clear nexus between the rates and the needed improvements.	Existing development without infrastructure Infill/Redevelopment Environmental hazard areas

Federal Grants	Grant funding from the federal government. Programs include, but not limited to: USDA Water & Waste Disposal Grant HUD Brownfields Economic Development Initiative (BEDI) Centennial Clean Water Fund	No	Yes	Provides funding mechanism to maintain and construct infrastructure. Highly competitive, costly reporting requirements. Projects awarded typically have to be an environmental hazard. Historical funding amounts have been reduced	Existing development without infrastructure Infill/Redevelopment Vacant lands Environmental hazard areas
Option	**Description**	**Require Public Vote?**	**Authorized in WA State**	**Limitations and Opportunities**	**Areas of Applicability**
State Grants and Loans	Grant funding from Washington State. Programs include: Public Works Trust Fund Clean Water Revolving Fund Community Development Block Grant Community Economic Revitalization Board Salmon Recovery Funding Board	No	Yes	Provides funding mechanism to maintain and construct infrastructure. Highly competitive, costly reporting requirements. Projects awarded typically involve a severe public or environmental hazard. Historical funding amounts have been reduced.	Existing development without infrastructure Infill/Redevelopment Vacant lands Environmental hazard areas

Explore Specific Use of Alternative Septic Systems	Begin analyzing specific geographical areas for the potential of more cost-effective sewer technologies throughout the UGA boundaries.	No	Yes	May provide additional wastewater planning options beyond costly public sewer. Costly analysis includes soil surveys and property owner participation (unlikely as failures are not imminent).	Existing development without infrastructure Environmental hazard areas
Option	**Description**	**Require Public Vote?**	**Authorized in WA State**	**Limitations and Opportunities**	**Areas of Applicability**
Allow Use of Grinder Pumps	Allow the use of grinder pumps in areas where pump stations are cost prohibitive for new or existing development.	No	Yes	Removes need for multiple pump/lift stations in portions of the UGA boundaries. Their removal reduces the related costs of sewering an area ($500K - $1M each). Complicated ownership/operation structure can lead to higher maintenance costs and other issues.	Existing development without infrastructure Infill/Redevelopment Vacant lands Environmental hazard areas
Option	**Description**	**Require Public Vote?**	**Authorized in WA State**	**Limitations and Opportunities**	**Areas of Applicability**

Land Use Measures – Reduce UGA Size	UGAs could be contracted to reduced to remove the need for capacity and conveyance improvements.	No	Yes	Eliminates need for sewer infrastructure to certain areas over the 20-year planning horizon. Does not address funding issues to expand treatment capacity nor service provision to existing development on septic systems. Re –designation of existing suburban development as rural areas could negatively affect the County's rural character.	Areas on the fringe of the UGAs with existing suburban development with high infrastructure costs or vacant/underutilized lands with no existing urban infrastructure.
Code Requirements – Sewer Connection	Require all subdivision or projects increasing density to connect to urban levels of sewer. Require new development within 200 feet of sewer mains to connect to public sewer. Require failing septic systems within 200 feet of an existing sewer main to connect to public sewer	No	Yes	Included in the 2006 and 2012 Comprehensive Plan update as requirements for development. Must be clearly defined for the public in regards to distance calculations and construction standards.	All unincorporated UGAs
Option	**Description**	**Require Public Vote?**	**Authorized in WA State**	**Limitations and Opportunities**	**Areas of Applicability**

Transfer of Development Rights	Allow property owners to sell development rights from their properties with the proceeds intended to fund infrastructure within an Urban Growth Areas. In Kitsap County, the TDR program is a market-based land use incentive program for higher densities or intensity of uses. Currently, Kitsap County's program allows the sale of county property for TDR credits, but does not direct the use of this revenue.	No	Yes RCW 36.70A.	Provides funding from public lands to dedicate to infrastructure development. Transfer of development rights programs have a varying success rate due to market conditions and cost of operation. Limited existing market for TDRs in Kitsap County.	Infill/Redevelopment Areas of Environmental Concern
Option	**Description**	**Require Public Vote?**	**Authorized in WA State**	**Limitations and Opportunities**	**Areas of Applicability**

Revolving Loan Fund	A non-profit organization could provide low interest loans to development proposed within UGAs. As the loans are repaid additional loans can be issued. Project feasibility is based upon acquiring stake or seed money to begin program (grants or other funding).	No	Yes	Low interest loans. Provides financial bridge for projects that are close to being viable. Difficulty finding sources for initial start-up. Risk associated with loans for projects in a depressed housing market.	Infill Redevelopment Expanded UGAs
City Annexations/ Incorporation	Much of the areas within UGA boundaries are expected to be annexed or incorporated during the 20-year planning period. The responsibility for their funding moves to the respective city and their enhanced funding mechanisms (B&O tax, utility tax, etc.)	Yes However, most annexation mechanisms require property owner approval	Yes	Shifts local service provision to cities, as encouraged by GMA. Allows additional revenues to be generated to address service provision.	All associated UGAs (East Bremerton, West Bremerton, Gorst, SKIA, McCormick/ULID #^ and Port Orchard/South Kitsap
Option	**Description**	**Require Public Vote?**	**Authorized in WA State**	**Limitations and Opportunities**	**Areas of Applicability**

Utility Tax	Similar to municipal utility taxes, the proposal would also authorize counties to impose a tax for many urban services (sewer, etc.) onto taxable properties in unincorporated UGAs. The revenue from this tax would be used to fund wastewater infrastructure.	No	No. Limited to cities only	Large source of revenue. Adjustable. Highly reliable, broad based, new revenue. Can be imposed through councilmatic action. Requires legislative change. County does not currently have authority.	Infill/Redevelopment Capacity improvement to existing infrastructure. Areas of Environmental Concern
Option	**Description**	**Require Public Vote?**	**Authorized in WA State**	**Limitations and Opportunities**	**Areas of Applicability**

Planned Action Environmental Impact Statement (EIS)	A planned action EIS includes detailed environmental analysis and reflects a decision that adequate environmental review has been completed. To that end, further review under SEPA, for each specific development proposal or phase, would not be required if the proposal meets certain development thresholds specified in the EIS. Although future proposals that qualify as planned actions would not be subject to additional SEPA review, they would be subject to application notification and permit process requirements.	No	Yes. WAC 197-11	Removes some questions about cost of development and provides incentive for urban development. Facilitates timeline for infrastructure addition. Not directly revenue generating. Politically intensive. Costly for up-front planning. Jurisdictions have different determination thresholds.	Infill /Redevelopment Typically used for small areas with minimal environmental constraints, similar zoning and large redevelopment potential.
Option	**Description**	**Require Public Vote?**	**Authorized in WA State**	**Limitations and Opportunities**	**Areas of Applicability**

Multi-Family Housing Tax Exemptions	These exemptions are used by cities planning under GMA that have designated urban centers to encourage multi-family construction with a portion dedicated specifically to low-income housing. Designation of urban centers is up to the local jurisdiction, but they must contain 1) several existing office and commercial uses, 2) adequate public facilities, and 3) mixture of housing, recreation and cultural activities.	No	Yes. RCW 84.14 but only applies to cities and certain counties.	Cost-offset of multi-family development. Higher density incentive. Not directly revenue generating.	Infill/Redevelopment Expanded UGAs
Option	**Description**	**Require Public Vote?**	**Authorized in WA State**	**Limitations and Opportunities**	**Areas of Applicability**

Sewer Capacity Charge	A charge in addition to sewer service billed to those customers who connected to the sanitary sewage system on or after a certain date established by the local legislative authority. For example, King County Metro has established this rate program in which the funding goes directly to expanding treatment facilities or expanding existing facilities.	No	Yes. RCW 35.58, but must include two cities. one which is 10,000 or more in population.	Addresses increasing cost of new capacity (through connection fee) with different connection charges for properties connecting after a particular date. Addresses "growth pays for growth." Complex administration Politically-charged Limited utility for Kitsap A clear nexus for increased rates must be determined.	Areas served by Central Kitsap or Kingston Wastewater Facilities Areas served by the Port Orchard/West Sound Utility District sewer plant
Revenue Sharing	Revenue sharing is the gradual shift of revenue from one jurisdiction to another (i.e. sales or property tax) based upon annexation or other factor. The Cities of Bremerton and Port Orchard and recently withdrawn from the current revenue sharing agreement between the County and its cities, which provided such a transfer.	No	Yes	Maximizes existing revenue sources by sharing costs. Incentivize county to continue infrastructure improvement in likely annexation areas. Not directly revenue generating. Politically-charged.	Any UGA associated with an existing city. Infill/Redevelopment
PRIVATE STRATEGIES					

Option	Description	Require Public Vote?	Authorized in WA State	Limitations and Opportunities	Areas of Applicability
Developer Extensions	Extension and improvements to the wastewater conveyance system would be borne by developments.	No	Yes	Historically, the funding mechanism for conveyance infrastructure (growth pays for growth). Requires high-density projects and large tracts of land, limited critical areas to balance out costs. Costly and pump stations may not be located in the most logical and regional location.	Vacant lands Infill/Redevelopment
Utility Local Improvement District (ULID)	Property owners assess themselves a fee to pay for sewer improvements. The maximum amount of an ULID is unlimited with funding coming from voter-approved assessments on properties within specified district.	Yes	Yes	Provides funding mechanism to maintain and construct infrastructure. Requires 51% approval of properties located within the district.	Existing development without adequate sewer infrastructure Infill/Redevelopment Vacant lands
Option	**Description**	**Require Public Vote?**	**Authorized in WA State**	**Limitations and Opportunities**	**Areas of Applicability**

Latecomers Agreements	Allowing latecomers agreements (the requirement for future development to pay back infrastructure costs) to accrue interest and lengthening the period of time in which these payments may be received.	No	Yes	Delayed benefits with money coming in after development is constructed. 20 years too little time to recoup costs. Interest percentage is not worth risk. Only benefits city or county, not the developer.	Infill/Redevelopment Expanded UGAs Areas of Environmental Concern Vacant lands
PUBLIC/PRIVATE STRATEGIES					
Option	**Description**	**Require Public Vote?**	**Authorized in WA State**	**Limitations and Opportunities**	**Areas of Applicability**

Community Development Districts (CDDs)	CDD's are quasi-government agencies focusing on a specified district boundary. A CDD infrastructure implementation by providing maintenance/operation and construction of capital improvements for a number of public services (i.e. sewer, water, utilities, transportation and/or parks). The district would also have taxing authority to pay for proposed capital improvements, which may or may not require a public vote. CDDs are similar in function to that of Transportation Benefit Districts (TBD). TBDs are currently authorized in Washington state, but limited only to transportation improvements.	Yes	No	Focuses on revenue and costs for a specific area Binding on future incorporations More flexible taxing authority Large area needed Complicated to administer Politically-charged	Silverdale UGA Kingston UGA
Option	**Description**	**Require Public Vote?**	**Authorized in WA State**	**Limitations and Opportunities**	**Areas of Applicability**

Tax Increment Financing	Tax Increment Financing is a tool to use future gains in taxes (i.e. real estate excise tax, sales tax, property tax, etc.) to finance capital improvements. Tax Increment Financing dedicates that increased revenue to finance debt issued to pay for the project. For example, when a public project such as a road, sewer or water is constructed, there is an increase in the value of surrounding area and often new private investment. This increased value and investment creates more taxable property, which increases tax revenues. Currently, Washington state only allows Tax Increment Financing through the use of CERB, LIFT or a state identified increment area (only one currently designated in the entire state). The Washington state legislature approved the LIFT program in 2006 as a form of tax-increment financing. This mechanism allows jurisdictions to receive a rebate up to $1M of their sales tax revenue previously obligated to the state for future infrastructure projects.	No	Depends, Limited to CERB LIFT and Hospital Benefit Programs.	Focuses on revenue and costs for a specific area Large area needed Not binding on future incorporations or annexations Complicated to administer Highly competitive Revenue generation is dependent on economy	Infill/Redevelopment Areas Capacity improvement to existing infrastructure. Vacant Lands

Option	Description	Require Public Vote?	Authorized in WA State	Limitations and Opportunities	Areas of Applicability
Tax Municipal-Lease Financing	This infrastructure funding opportunity allows a jurisdiction to rent, with the option of purchase on a specific capital project. Under a lease-purchase arrangement, the government agency leases the asset (and reserves the right to walk away from the transaction without penalty if it does not have sufficient funds to appropriate for the lease in subsequent years). The agency receives a credit for each lease payment so that, at the end of the lease term, the municipality acquires full ownership of the asset. If the municipality terminates the lease prior to the end of the term, the municipality does not get any credit for those lease payments.	No	No	Removes costs of administration and overhead. Liability issues Higher costs borne by newcomers and rate payers. Not currently been done for wastewater facilities. Does not address infrastructure needs in existing pre-GMA developments (Tier 2 lands).	All UGAs

ACRONYM LIST:

B&O = Business and Occupation tax

CDD = Community Development District

CIP = Capital Improvement Plan

CK = Central Kitsap

GMA = Growth Management Act

HBD = Hospital Benefit District

HUD = United State Department of Housing and Urban Development

LIFT = Local Infrastructure Financing Tool

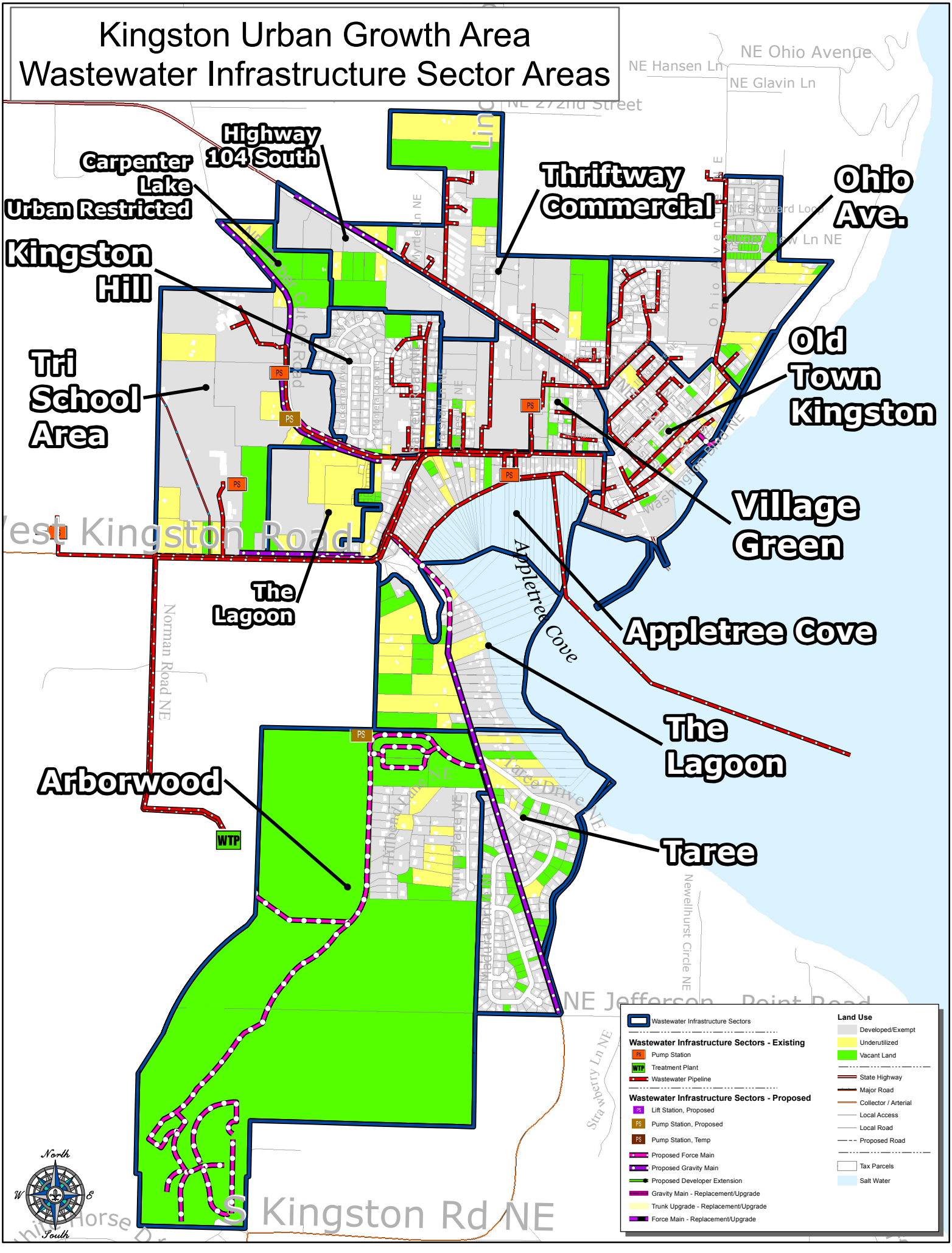
SK = South Kitsap

UGA = Urban Growth Area

ULID = Local Improvement District

USDA = United States Department of Agriculture

Attachment D



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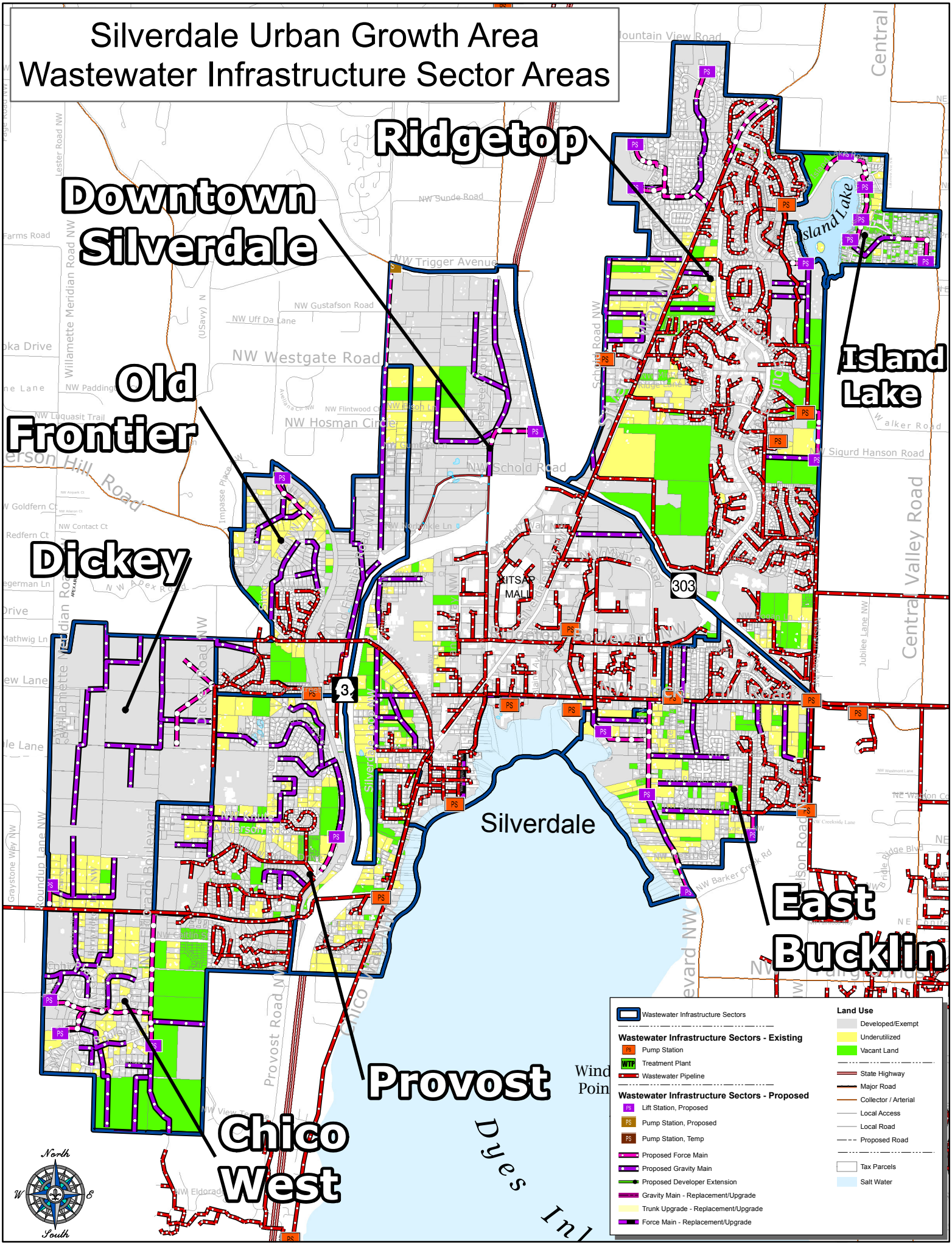
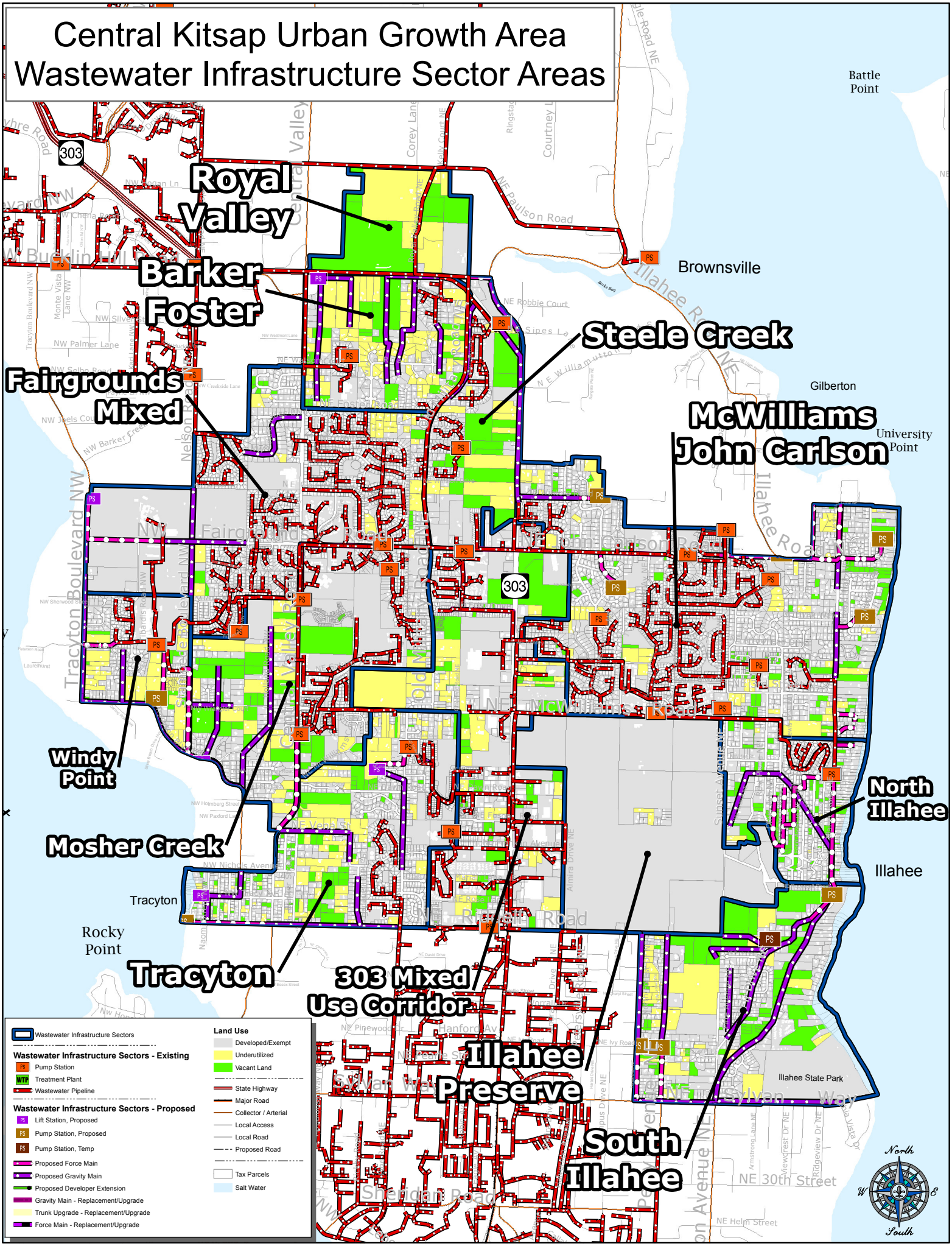


Attachment D

Central Kitsap Urban Growth Area
Wastewater Infrastructure Sector Areas



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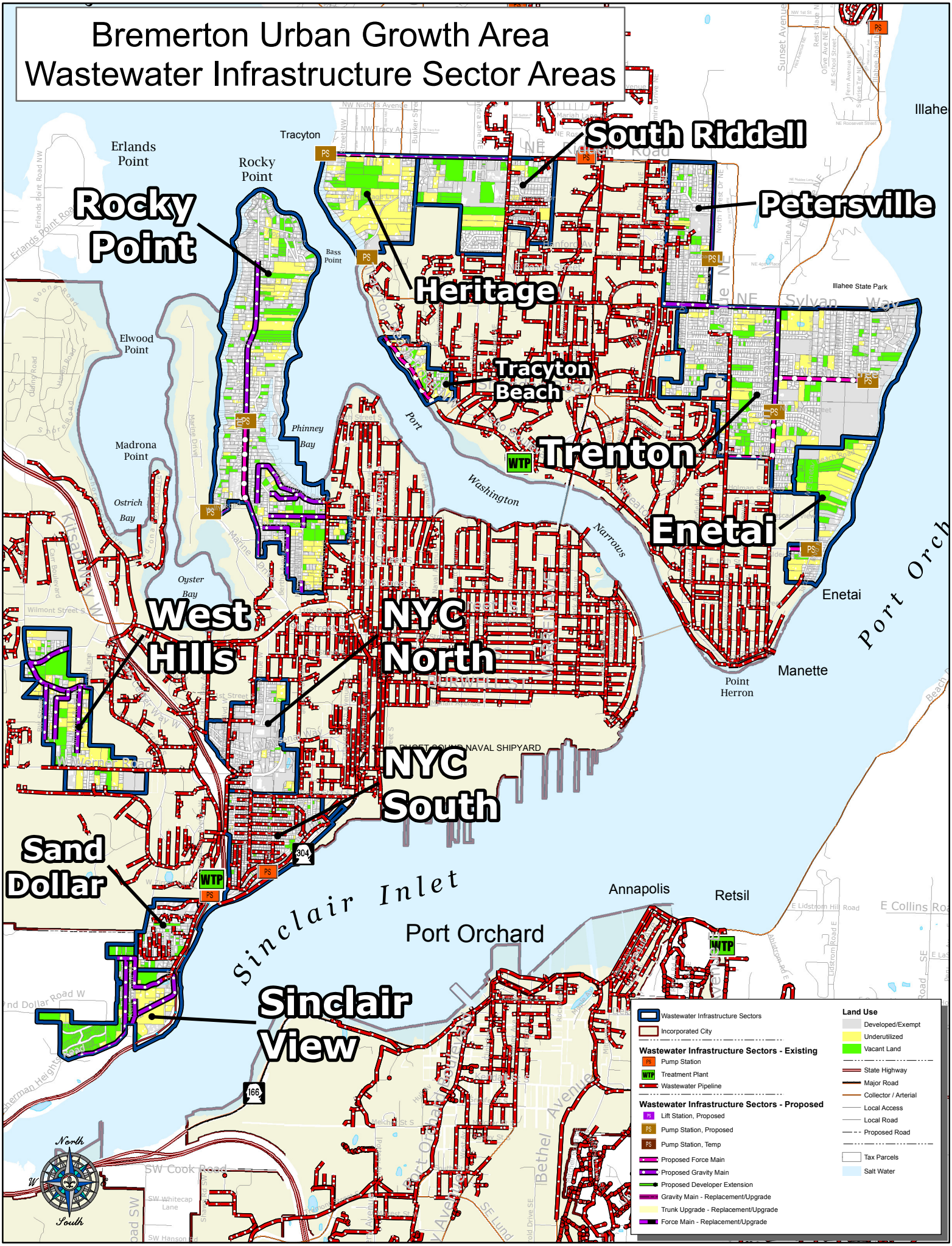
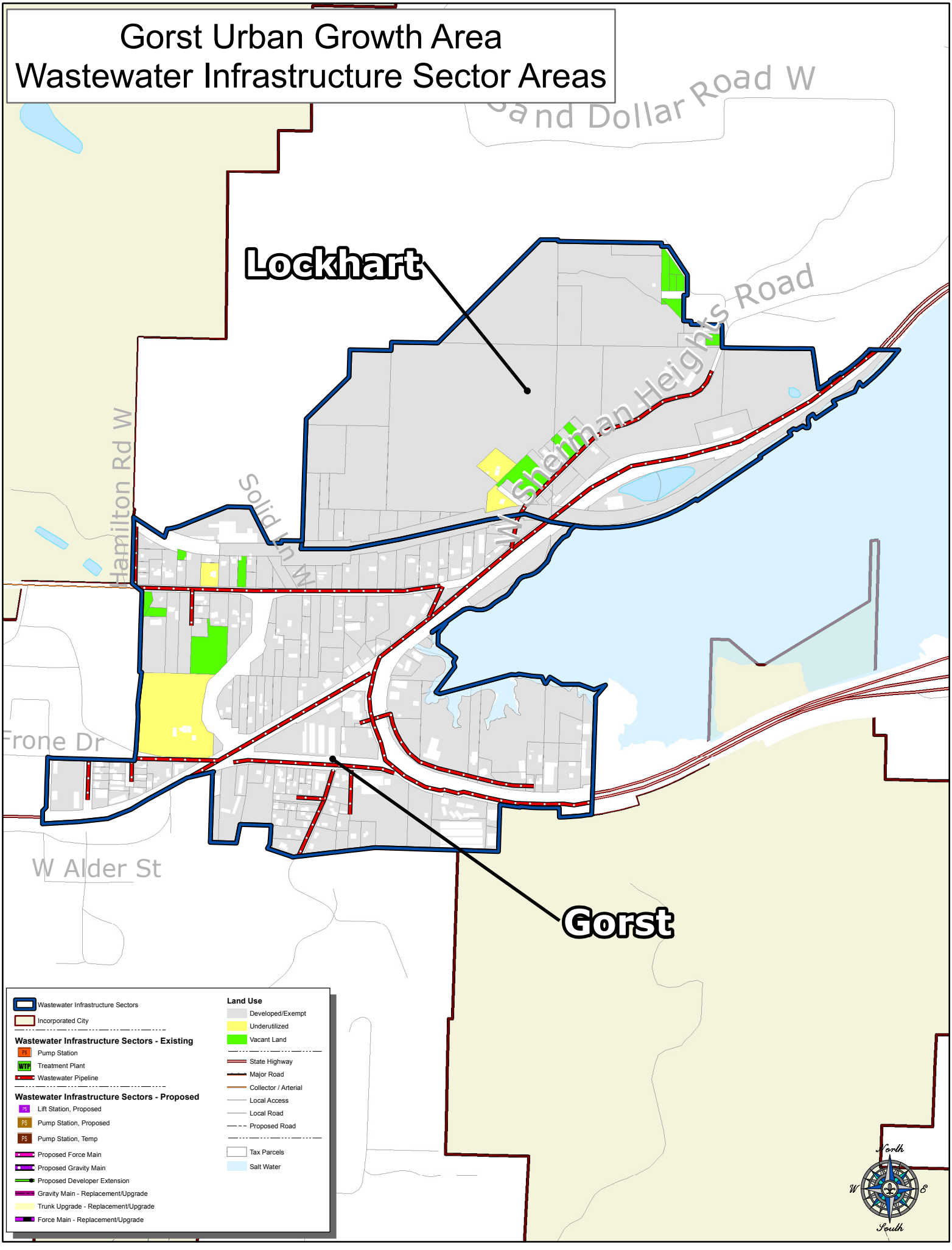


Attachment D

Gorst Urban Growth Area
Wastewater Infrastructure Sector Areas



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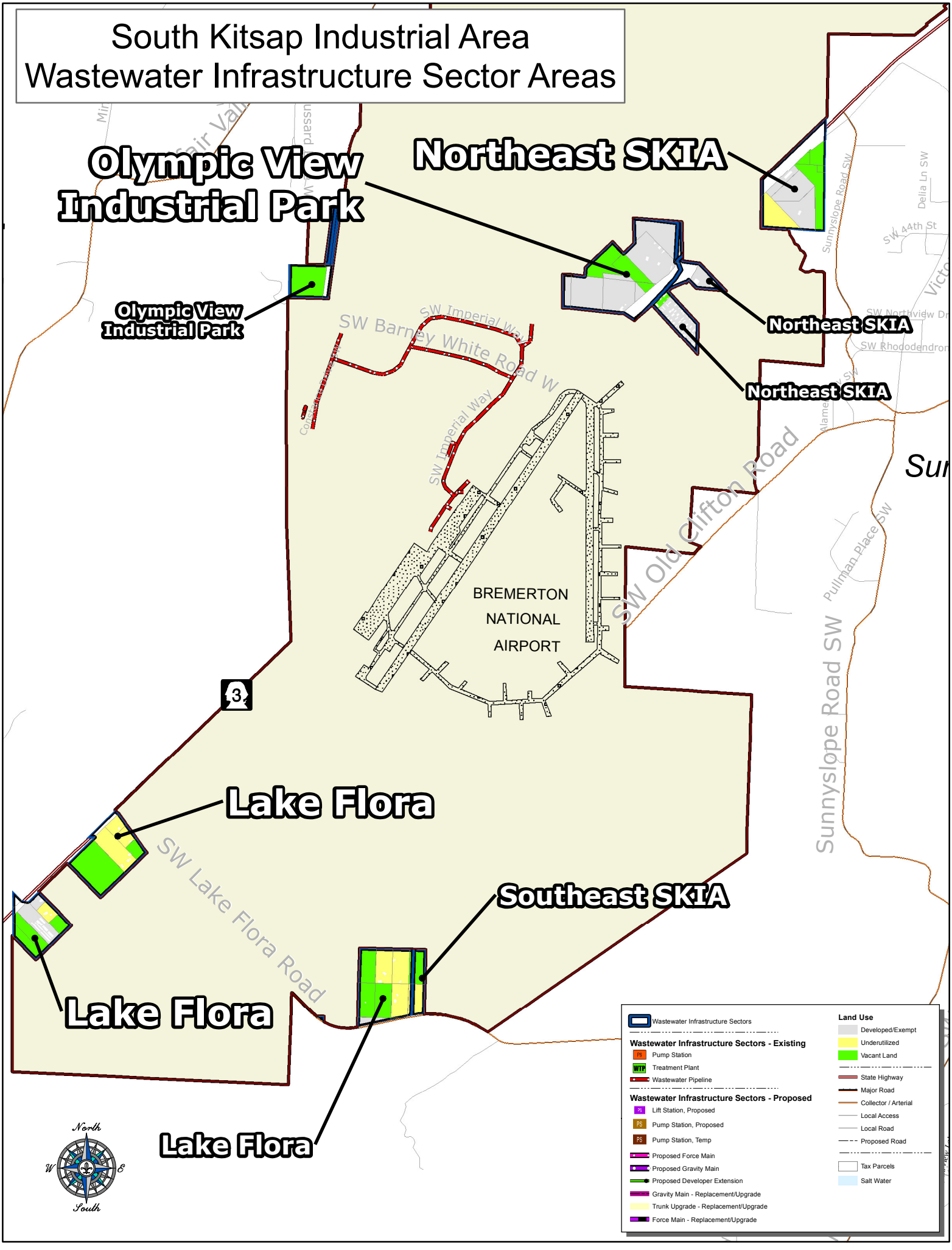
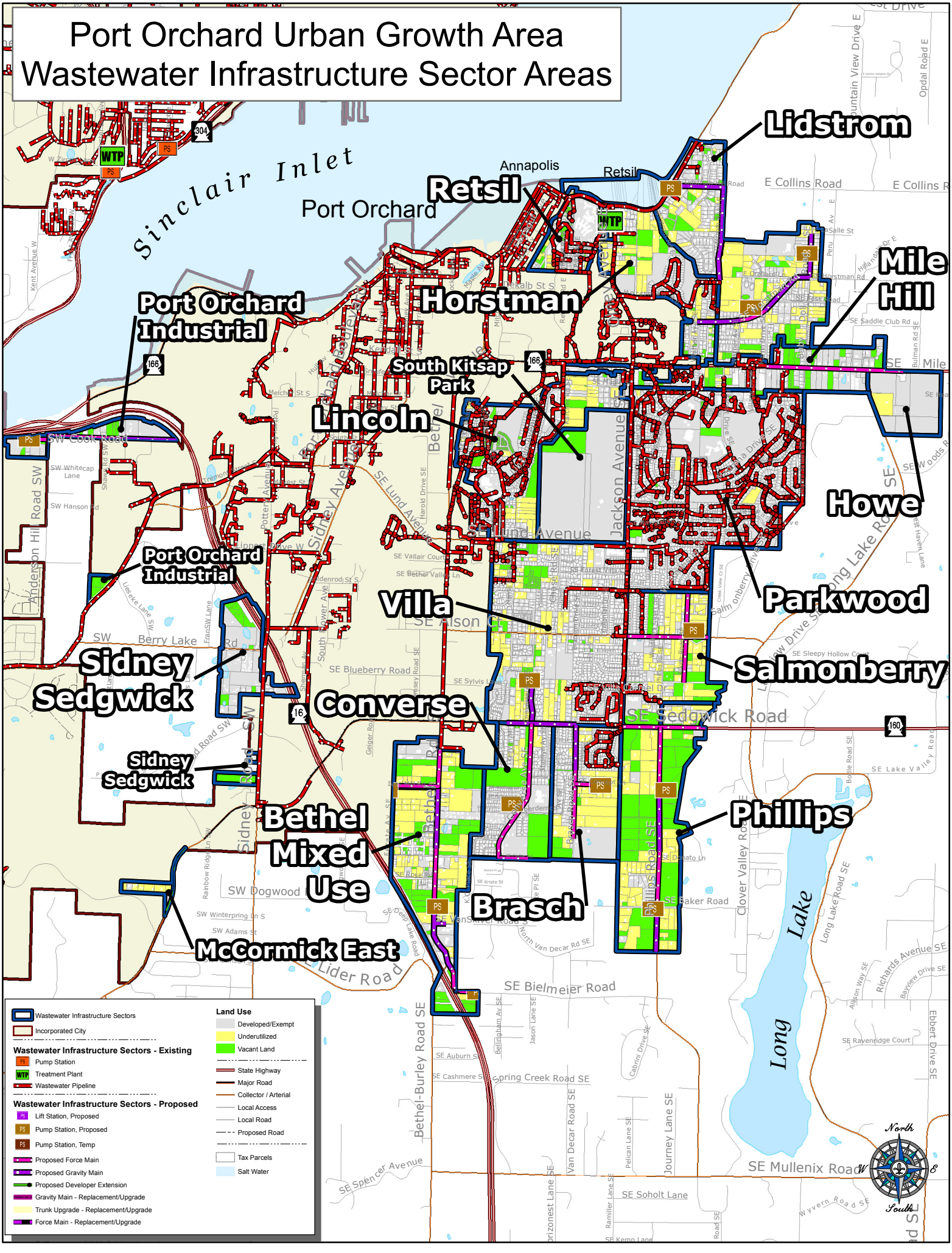


Attachment D

Port Orchard Urban Growth Area
Wastewater Infrastructure Sector Areas



ATTACHMENT E

WASTEWATER PROVISION STRATEGIES
SECTOR ANALYSIS AND SEQUENCING MATRIX

The matrix below provides an analysis regarding various areas of the unincorporated Kitsap urban growth areas. This information is organized into sectors and includes an assessment of the characteristics of the specific area and provides strategies for future sewer provision. The matrix includes descriptions of the areas topography and zoning, existing facilities and based upon these characteristics, applies potential funding sources and wastewater service methods to each.

After the analysis was completed, each sector was assessed based upon the following criteria for potential sequencing of future sewer infrastructure. Kitsap has planned for urban levels of sanitary sewer service within the entirety of its urban boundaries within the 2025 planning horizon. The sequencing range is from 1 to 3 as described below:

Sequence 1: Properties that will develop in the near-term due to their close proximity to existing sewer infrastructure and/or substantial development potential. These areas often have limited critical areas or other constraints on development. These areas will likely develop on traditional public sewer technologies through the existing code requirements for sewer connection. Alternative systems may be options but are unlikely.

Sequence 2: Properties further away from existing sewer infrastructure where substantial development opportunities exist for infill or other construction. These areas may be moderately constrained by critical areas and topographical challenges. These areas may use traditional public sewer if economically-viable but may also explore alternative systems to reduce the costs of conveyance infrastructure.

Sequence 3: Properties furthest away from existing infrastructure, predominantly developed at pre-GMA densities on existing functioning septic systems or properties substantially-constrained by critical areas or other features. Most of these properties have no expected future development potential and likely (based upon current Health District documentation) no need to transition to traditional public sewer infrastructure within the 2025 planning horizon. However, alternative systems or traditional sewer will be extended based upon a documented need within this time period.

For maximum utility, the matrix should be used in concert with associated maps of each Urban Growth Area (UGA). Acronym List follows.

Sector	Characteristics	Existing Facilities	Strategies	Sequence
Kingston UGA				
Arborwood	• Sector bound by South Kingston Road to the east, and includes the neighborhoods of Arborwood, Hillabend and Kimbre Place. • Large single-developer ownership in west half which includes vested plat and developers agreement with specific sewer infrastructure design. • Low density residential (Urban Cluster and Urban Low) • Areas of existing development on functioning septic systems in eastern portion. • Moderate slopes and wetlands. • Minor infill development potential in Urban Low area.	• Close proximity to the Kingston Wastewater Treatment Facility. • No existing conveyance systems.	• Developer Extensions • Developer Agreement with vested Arborwood project • Utility Local Improvement District (ULID)	1
Taree	• Sector includes areas east and west of South Kingston Road. • Zoned Urban Low (5-9 DU an acre) • Predominantly areas of existing development on functioning septic systems. • Moderate slopes • Limited redevelopment potential.	• No existing conveyance systems	• Developer extensions • ULID • Alternative wastewater technologies	3
The Lagoon	• Sector includes lands adjacent near to Appletree Cove. • Low density residential (Urban Low and Urban Restricted). • Wetlands and bald eagle habitat. • Very little infill development potential.	• Minimal existing sewer facilities.	• ULID • Environmental loans/grants • Alternative wastewater technologies	3

Sector	Characteristics	Existing Facilities	Strategies	Sequence
Kingston Hill	• Sector bound by Barber Cut-Off to the south and industrial and multi-family zoning to the north. • Significant areas of existing development on functioning septic systems. • Limited infill/redevelopment potential.	• Moderate sewer facility system to east	• Facility Upgrades (rate payers, developer) • ULID	3
Carpenter Lake Urban Restricted	• Sector bound along the northern area of Barber Cut-Off Road and bounded by the UGA boundary to the north and west. • Low density residential Urban Restricted zoning. • Some wetland constraints • Close proximity to sewer infrastructure • Low development potential.	None	• Develop extensions • ULID • Alternative Sewer Technologies	2
Tri-School Area	• Sector is characterized as lands located north of West Kingston Road. • Three schools comprise a majority of the developable area. • Few wetlands. • Limited development potential.	• Sewer facilities to serve public schools	• Facility Upgrades (rate payers, developer)	1
Highway 104 South	• Sector is located south of Hwy. 104. • Industrial and multi-family zoning • Stream and moderate slopes. • Significant development potential.	• Limited sewer facilities along State Hwy. 104 at the southeast corner	• Developer Extension	1
Thriftway Commercial	• Sector is located north of Hwy. 104. • Existing commercial (Thriftway, etc.) and some multi-family development. • Moderate slopes in the north. • Redevelopment potential.	• Expansive sewer facility system. • Some upgrades may be necessary based upon the proposed uses.	• Facility improvements (rate payers, developer) • Possible new funding sources (CDDs, LIFT, etc.)	1

Sector	Characteristics	Existing Facilities	Strategies	Sequence
Village Green	• Sector is located west of Old Town and north of West Kingston Road • Existing and planned parks facilities in the area. • Primarily Commercial and Urban Village Center zoning. • Commercial development potential. • Few critical areas.	• Expansive sewer facilities • Some upgrades may be necessary based upon the proposed uses	• Developer extensions • Parks and other grants	1
Ohio Avenue	• Sector is east of Washington Ave and north of Old Town. • Some suburban sized residential development. • Existing public facility in the north portion of the area. • Moderate slopes. • Urban Low and Urban Medium zoning.	• Moderate sewer facilities	• Developer extensions • ULID	1
Old Town Kingston	• Sector described as predominately Puget sound to the east, portion of Ohio Avenue to the northeast, Pennsylvania Avenue to the northwest and Appletree Cove to the southwest. • Ferry terminal and accessory uses. • Mixed-use and medium density residential lands. • Infill and significant redevelopment potential.	• Expansive sewer facility system.	• Developer Extension • ULID • Possible new funding sources (CDDs, LIFT, etc.)	1
Appletree Cove	• Sector represents urban low and waterfront lands northwest of Appletree Cove. • Largely shoreline properties. • Low density suburban residential. • Some redevelopment potential.	• Minimal existing sewer facilities. • Pump stations on shoreline properties likely	• ULID • Individual hook-ups • Developer extensions • Facility Upgrades (rate payers, developer)	1

Sector	Characteristics	Existing Facilities	Strategies	Sequence
Silverdale UGA				
Chico West	• Sector bounded by Newberry Hill Road to the north, Willamette-Meridian Road to the west, and generally the top of slope to the east. • Low density residential and a small area of industrial activity to the north. • Low to moderate slopes. • Few wetlands. • Several large vacant lands in single ownerships with substantial development potential.	• No existing facilities • Alternative technologies possible • Possible Silverdale Water District Reclamation / Aquifer Recharge	• Developer Extension • Alternative Sewer Technologies	2
Provost	• Sector is located south of Whisper St. with Old Frontier Road to the east, Newberry Hill Road to the south and Dickey Road to the west. • Low density Urban Low residential • Mixture of pre-GMA development patterns on septic systems and urban lots on sewer. • Moderate slopes. • Minimal infill potential.	• Some existing sewer facilities.	• Developer Extension • ULID • Facility Upgrades (rate payers, developer)	1
Old Frontier	• Sector contains Urban Low and some Industrial and Commercial zoning along Old Frontier Road. • Low density development pattern. • Significant development potential for residential and industrial lands and moderate for commercial. • Significant areas of existing development on functioning septic systems.	• Limited existing sewer facilities	• Developer Extensions • ULID • Alternative Sewer Technologies	2

Sector	Characteristics	Existing Facilities	Strategies	Sequence
Dickey	• Sector bound by Westgate Road to the north, Old Frontier Road to the east, Newberry Hill Road to the south and Dickey Road to the west. • Industrially-zoned with minimal low density residential uses. • Large parcels owned by few property owners • Existing mineral resource activities within the area. Future reclamation possible.	• Minimal existing sewer facilities.	• Developer Extension • Alternative Sewer Technologies • Facility Upgrades (rate payers, developer)	2
Downtown Silverdale	• Sector bound by Hwy 3/303 to the north and Dyes Inlet to the south • Predominantly Regional Commercial with some mixed-use and high-density residential uses. • Number of stream corridors and associated wetlands (Clear Creek). • Largely developed. • Redevelopment potential, particularly south of Bucklin Hill Road and in the Silverdale Loop area.	• Expansive sewer facility system. • Future upgrades may be necessary as infill occurs.	• Developer Extension • Facility Upgrades (rate payers, developer) • Possible new funding sources (CDDs, LIFT, HBD, etc.)	1
East Bucklin	• Sector bound by Dyes Inlet and Barker Creek urban separator to the south-east, Hwy 303 and Ridgetop Blvd to the northeast and Mickleberry Road to the west. • Existing low density residential with some potential for high density redevelopment. • Moderate infill potential. • Wetland systems along shoreline.	• Moderate existing sewer facilities.	• Individual hook-ups • ULID • Facility Upgrades (rate payers, developer) • Alternative Sewer Technologies	2

Sector	Characteristics	Existing Facilities	Strategies	Sequence
Ridgetop	• Sector bound by Hwy 303 to the south east, UGA boundary to the east and commonly referred to as the llama neck of the UGA (excludes Island Lake). • Master planned development approved in the 1980's. • Largely built-out. • Low and high density residential. • Infill development potential. • Large single-ownership properties (DNR, etc.) in the southwest portion. • Moderate slopes.	• Expansive sewer facility system.	• Individual hook-ups • Developer Extensions • Facility Upgrades (rate payers, developer)	1
Island Lake	• Sector includes lots within the immediate vicinity east of the Island Lake County Park and Island Lake Road to the north. • Historic lots subdivided in the early 1900's • Low density residential development pattern. • Some infill/redevelopment opportunity. • Some wetlands and moderate slopes.	• No existing sewer facilities.	• ULID • Alternative Sewer Technologies • Environmental grants/loans	2
Central Kitsap UGA				
Windy Point	• Sector bound by Tracyton Blvd. to the west, Stampede Blvd to the east and Fairgrounds complex to the north. • Low-density Urban Low residential zoning. • Some areas of existing development on functioning septic systems. • Moderate infill/redevelopment potential.	• Some exiting infrastructure	• Developer Extension • Facility Upgrades (rate payers, developer) • ULID	1

Sector	Characteristics	Existing Facilities	Strategies	Sequence
Tracyton	• Sector bound by Dyes Inlet to the west, Riddell Road to the south and McWilliams and Central Valley Roads to the north and northwest. • Low density Urban Low zoning • Mix of early-1900's platting and more recent areas of existing development on functioning septic systems. • Moderate infill/redevelopment potential.	• Existing sewer facilities in the eastern half. • Minimal facilities in the historic town of Tracyton.	• Developer Extension • Facility Upgrades (rate payers, developer) • ULID • Environmental grants/loans	2
Mosher Creek	• This sector is located east of Hwy 303 and follows generally the Mosher Creek basin. • Primarily low density Urban Restricted zoning with minor medium density residential in the northern portion. • Significant areas of existing development on functioning septic systems. • Significant creek and associated wetland features. • Some infill/redevelopment potential.	• Minimal existing sewer facilities.	• Developer Extension • ULID Environmental grants/loans • Alternative wastewater technologies	3
303 Mixed Use Corridor	• This sector is predominately commercial, mixed-use and high density residential zoning within the CK UGA along Hwy 303 corridor. • High-intensity commercial and high-density residential zoning. • Largely developed. • Some redevelopment potential.	• Expansive sewer facility system.	• Developer Extension • Facility Upgrades (rates payers, developer) • Possible new funding sources (CDDs, LIFT, etc)	1

Sector	Characteristics	Existing Facilities	Strategies	Sequence
McWilliams/John Carlson	• Sector represents majority of Urban Low zoning the east side of Hwy 303 and north of McWilliams Road. • Low density Urban Low residential, with minor medium to high density developments to the south and Urban restricted along the shoreline. • Largely developed. • Significant areas of existing development on functioning septic systems in the eastern portion. • Minor infill potential.	• Substantial existing sewer facilities.	• Developer Extension • ULID • Facility Upgrades (rates payers, developer) • Environmental grants/loans	1
Steele Creek	• Sector bound by Old Military Road to the west, Hwy 303 to the east and Fairgrounds Road to the south. • Low density Urban Restricted residential. • Moderate slopes • Significant creek and associated wetland systems. • Limited infill or redevelopment potential.	• Moderate existing sewer facilities	• Developer Extension • ULID • Facility Upgrades (rates payers, developer)	2
Barker-Foster	• Sector bound by Foster Road to the south, Barker Creek to the northwest and Waaga Way to the north and Old Military Road to the east. • Predominantly Urban Low zoning with areas of existing development on functioning septic systems. • Moderate critical area constraints along Waaga Way • Moderate infill potential.	• Minimal existing sewer facilities.	• Developer Extension • ULID • Facility Upgrades (rates payers, developer)	2

Sector	Characteristics	Existing Facilities	Strategies	Sequence
Royal Valley	• Sector bound by Waaga Way to the south, Paulson Road to the north and private properties to the east and west. • Zoned Senior Living Homestead (5-9 DU per acre). • Existing infrastructure including water and highway access. • Some critical areas • Low to moderate slopes	• Existing sewer infrastructure (newly upgraded transmission line)	• Developer Extensions	1
Fairgrounds-Mixed	• Sector described as the Kitsap County Fairgrounds and surrounding residential uses that includes majority of lands located within the northwestern portion of the UGA. • Low density Urban Low residential and public facilities. • Largely developed. • Few areas of existing development on functioning septic systems. • Little to no infill/redevelopment potential.	• Substantial existing sewer facilities	• Facility Upgrades (rates payers, developer) • ULID	1
Illahee Preserve	• Sector described as the Rolling Hills Golf course, Illahee Preserve and open space lands between McWilliams Road to the north, Riddell Road to the South and generally Sunset Avenue to the east. • Primarily zoned Parks with a small island on Urban Low. • Little to no infill or redevelopment potential.	• Minimal existing sewer facilities.	• ULID • Environmental grants/loans	3

Sector	Characteristics	Existing Facilities	Strategies	Sequence
North Illahee	• Sector includes lands north of Illahee Creek, slightly south of McWilliams Road, and east of the Illahee Preserve. • Low density Urban Low, Urban Restricted and Illahee Greenbelt residential. • Many existing lots based upon early-1900's platting. • Substantial areas of existing development on functioning septic systems. • Moderate to steep slopes. • Low redevelopment or infill potential. • May be community opposition to sewer, its associated density and its watershed effects.	• Few existing sewer facilities.	• Developer Extension • ULID • Facility Upgrades (rates payers, developer) • Alternative Sewer Technologies • Environmental grants/loans	3
South Illahee	• Sector generally described as low density residential lands to the south of Illahee Creek and north of Sylvan Way and west of Forest Drive. • Primarily Illahee Greenbelt zoning. • Wetlands, moderate to steep slopes and bald eagle habitat. • Moderate infill or redevelopment potential. • May be community opposition to sewer, its associated density and its watershed effects. • Some redevelopment opportunities.	• Few existing sewer facilities.	• Developer Extension • ULID • Facility Upgrades (rates payers, developer) • Alternative Sewer Technologies • Environmental grants/loans	2

Sector	Characteristics	Existing Facilities	Strategies	Sequence
East Bremerton UGA				
Tracyton Beach	• Sector is bounded by the Port of Washington Narrows to the southeast and surrounded by the City of Bremerton on all other sides. • Zoned Urban Low. • Some redevelopment potential with gravity opportunities to existing sewer lines • Few environmental limitations.	• Substantial sewer facilities	• Developer Extensions • ULID	1
Heritage	• Sector is bounded by Riddell Road to the north, The Port of Washington Narrows to the west, the City of Bremerton to the south and private property to the east. • Zoned Urban Low with a pocket of Urban Restricted. • Some critical area constraints. • Some redevelopment potential. • Close proximity to the City of Bremerton.	• No existing sewer facilities	• Developer Extensions • ULID	2
South Riddell	• Sector is bounded by Riddell Road to the North, the City of Bremerton to the east and south and private properties to the west. • Zoned Urban Low. • Some areas of existing development on functioning septic systems. • Substantial redevelopment potential. • Few critical area constraints. • Few slopes. • Close proximity to the City of Bremerton.	• Some existing sewer facilities	• Developer Extensions	1

Sector	Characteristics	Existing Facilities	Strategies	Sequence
Petersville	• Sector is bounded by Riddell Road to the north, the City of Bremerton to the west and south and Forest Drive and Perry Avenue to the east. • Zoned Urban Low. • Substantial areas of existing development on functioning septic systems. • Few critical area constraints. • Few slopes. • Close proximity to the City of Bremerton. • Little redevelopment potential.	• Some existing sewer facilities	• ULID	2
Trenton	• Sector is bounded by Sylvan Way to the north, Port Orchard Bay to the east, private property to the south and Perry Avenue to the west. • Zoned Urban Low, Urban Restricted and Illahee Greenbelt. • Substantial areas of existing development on functioning septic systems. • Moderate slopes. • Some critical area constraints. • Some redevelopment potential.	• Some existing sewer facilities in the eastern portion.	• Developer extensions • ULID	2
Enetai	• Sector is bounded by Port Orchard Bay to the east, the city of Bremerton to the south and west and private properties to the north. • Zoned Urban Low • Substantial areas of existing development on functioning septic systems. • Moderate to severe slopes. • Substantial critical areas. • Little redevelopment potential. • Close proximity to the City of Bremerton.	• Few existing sewer facilities	• Developer extensions • ULID • Environmental grants/loans	3

Sector	Characteristics	Existing Facilities	Strategies	Sequence
West Bremerton UGA				
Rocky Point	• Sector comprises of the Rocky Point and bounded by Phinney Bay and Port Washington Narrows. • Moderate infill potential. • Primarily Urban Low residential with Urban Medium density uses. • Substantial areas of existing development on functioning septic systems. • Moderate slopes and bald eagle habitat.	• Few existing sewer facilities beyond southern portion • Pump/lift stations necessary on most shoreline lots	• Developer Extension • ULID • Environmental grants/loans	2
West Hills	• Sector is bound by the City of Bremerton on all sides with Werner Road to the south and Harlow drive to the north. • Zoned Urban Low and Urban Medium residential with Industrial along Werner Road. • Some critical area constraints. • Moderate slopes. • Moderate infill/redevelopment potential.	• Few existing sewer facilities in southern portion.	• Developer Extension • ULID • Environmental grants/loans	1
NYC North	• Sector described as lands located within Navy Yard City, north of Preble Street. • Largely developed with some redevelopment potential. • Primarily zoned Highway-Tourist Commercial and Industrial with existing low density residential uses. • Some low and medium density residential zoning. • Moderate slopes. • No other critical areas limitations. • Close proximity to the City of Bremerton.	• Substantial existing sewer facilities	• Facility Upgrades (rates payers, developer) • Developer Extension	1

Sector	Characteristics	Existing Facilities	Strategies	Sequence
NYC South	• Sector describes as lands located within Navy Yard City, south of Preble Street. • Generally zoned Urban Low with mixed-use, commercial and industrial zoned properties located in nodes or along State Hwy. 304. • Predominantly developed. • Moderate slopes. • Minimal redevelopment or infill opportunity. • Primarily low-density Urban Low zoned land. • Close proximity to the City of Bremerton.	• Expansive existing sewer facilities.	• Facility Upgrades (rates payers, developer)	1
Sinclair View	• Sector generally along Sherman Heights Road in on the hillside above State Hwy. 3. • Zoned Urban Low and Urban Medium. • Largely developed. • Multiple property owners. • Moderate to steep slopes. • Limited redevelopment potential. • Close proximity to the City of Bremerton.	• Substantial existing sewer facilities.	• Facility Upgrades (rates payers, developer) • Developer Extension	1
Sand Dollar	• Sector generally follows portion of Hwy 304 and remainder of UGA boundary to the southwest. • Several historic plats that are largely vacant. • Zoned Urban Low residential. • Moderate slopes. • Significant development potential.	• Some existing sewer facilities along Sherman Heights Road.	• Facility Upgrades (rates payers, developer) • Developer Extension	1
Gorst UGA				

Sector	Characteristics	Existing Facilities	Strategies	Sequence
Lockhart	• Sector includes large portion of Mineral Resource and Industrial lands and located on the northeast portion of the UGA. • One property owner. • Nearing end of mining operation. Reclamation likely. • Moderate slopes.	• Some sewer facilities along Sherman Heights Road. • Gravity feed opportunities to these existing mains.	• Developer Extension •	1
Gorst	• Sector contains remaining lands of UGA situated along Sinclair Inlet. • Zoned Highway-Tourist Commercial and Urban Low residential zoning. • Modest commercial uses currently in the area • New sewer system creates substantial redevelopment and infill potential.	• Expansive sewer facilities throughout.	• Developer Extension •	1
SKIA UGA				
Northeast SKIA	• Sector described as northeast portion of UGA boundary. Largely annexed by the City of Bremerton in 2009-2010. • Zoned Industrial and Business Center • Moderate slopes and minimal wetlands. • Existing low-intensity industrial uses. • Infill/redevelopment potential.	• Sewer facilities available within the city limits through Port of Bremerton's community system.	• Developer Extension • Possible multi-jurisdictional or public/private partnering.	1

Sector	Characteristics	Existing Facilities	Strategies	Sequence
Lake Flora	• Sector represents southwest portion of UGA boundary. Largely annexed by the City of Bremerton in 2009-2010. • Zoned Business Center. • Area owned by a few large property owners. • Moderate slopes and several wetland complexes. • With infrastructure, significant development potential.	No sewer facilities.	• Developer Extension • Alternative Sewer Technologies • Possible multi-jurisdictional or public/private partnering.	2
Southeast SKIA	• Sector represents southeast portion of UGA boundary. Largely annexed by the City of Bremerton in 2009-2010. • Zoned Industrial and Business Center. • Moderate slopes and wetlands. • Area owned by a few large property owners. • With infrastructure, significant development potential.	• No existing sewer facilities. • Substantial alternative sewer technology opportunities	• Developer Extension • Alternative Sewer Technologies • Possible multi-jurisdictional or public/private partnering.	2
Port Orchard/South Kitsap UGA				
Port Orchard Industrial Park	• Sector is situated northwest portion of the City of Port Orchard with Cook and Old Clifton Roads providing access. • Zoned Industrial • Industrial park largely developed and within the City of Port Orchard. • Moderate slopes • Moderate development potential.	• Expansive existing sewer facilities in southern portion.	• Developer Extension • Facility Upgrades (rates payers, developer)	1

Sector	Characteristics	Existing Facilities	Strategies	Sequence
Sidney Sedgwick	• Sector follows the Hwy 16 corridor to the west. • Zoned Highway-Tourist Commercial. • Largely vacant land in multiple ownerships. • Some existing residential uses in the southern portion. • Moderate slopes and creeks and wetland complexes. • Moderate development potential.	• Few existing sewer facilities located to the south within the Port Orchard city limits.	• Developer Extension • Facility Upgrades (rates payers, developer)	1
McCormick East	• Sector is located on the southwest portion of the UGA, west of Hwy 16. Predominantly annexed by the City of Port Orchard in 2011. • Zoned Urban Low residential. • Developed on existing functional septic systems. • Multiple ownerships. • Surrounded by the City of Port Orchard and a single large landowner. • Few wetlands.	• No existing sewer facilities.	• Developer Extension • Facility Upgrades (rates payers, developer) • Developer's Agreement with the adjacent land owner.	2
Bethel Mixed-Use	• Sector is located south of Sedgwick Road, east of Ferate Avenue and west of Converse Avenue. • Mixed-use zoning allowing for a variety of commercial and high density residential uses. • Primarily pre-GMA suburban residential development with pockets of commercial. • Numerous underutilized and vacant lands. • Substantial development potential. • Some wetlands.	• No sewer facilities within the sector. • Facilities located immediately to the north within the city limits of Port Orchard	• Developer Extension • ULID • Possible new funding sources (CDDs, LIFT, etc)	2

Sector	Characteristics	Existing Facilities	Strategies	Sequence
Lincoln	• Sector is bound by Lund Avenue to the south, City of Port Orchard to the west and north and SK Park to the east. • Zoned Urban Low residential. • Several school and church sites in the area. • Limited redevelopment or infill potential. • Moderate slopes with minimal wetlands.	• Expansive existing sewer facilities.	• Individual hook-ups • Facility Upgrades (rate payers, developer)	1
South Kitsap Park	• Sector contains South Kitsap Park located west of Jackson Avenue, Lund Avenue to the south, Mile Hill Drive to the north and Lincoln Urban Low sector to the west. • Park zoning. • County-owned. • Moderate and steep slopes. • No residential development potential.	• Sewer facilities adjacent to park property.	• Parks funding • State and federal grants.	1
Parkwood	• Sector is located just south of Mile Hill Drive, Jackson Avenue to the west, UGA boundary to the east and Westminster Drive to the south. • Public facilities, Urban Low and Urban Medium residential zoning. • Primarily built-out. • Wetlands and moderate slopes. • Little to no redevelopment or infill potential.	• Expansive existing sewer facilities.	• Facility Upgrades (rate payers, developer)	1

Sector	Characteristics	Existing Facilities	Strategies	Sequence
Villa	• Sector is bounded by Lund Avenue on the north, Jackson Avenue to the east, Sedgwick Road to the South and the City of Port Orchard to the west. • Zoned Urban Low • Predominantly developed on existing functional septic systems. • Moderate critical area constraints in the southern portion. • Some redevelopment potential.	• Substantial sewer infrastructure along Jackson Avenue and Bethel Road to the east and west of the sector.	• Developer extensions • Alternative Sewer Technologies • ULID	2
Salmonberry	• Sector is described as Sedgwick Road to the south, Lund Avenue to the north, UGA boundary to the east and Bethel Road to the west. • Zoned Urban Low residential. • Pre-GMA development patterns on existing septic systems. • Pockets of vacant and underutilized lands. • Some redevelopment potential.	• Minimal existing sewer facilities.	• Developer Extension • Alternative Sewer Technologies • ULID	2
Phillips Road	• Sector is situated south of Sedgwick Road, west of Long Lake and east of Brash and Van Skiver Roads. • Zoned Urban Low residential with pockets of Urban Restricted. • Largely semi-rural development pattern. • Multiple approved plats and vested projects. • Significant development potential.	• No existing sewer facilities. • Several vested projects with sewer contracts in place.	• Developer Extension • ULID	1

Sector	Characteristics	Existing Facilities	Strategies	Sequence
Converse	• Sector is located south of Sedgwick Road, north Cedar Avenue, west of Brasch Road and east of private property. • Low density Urban Low residential. • Predominantly developed on existing functional septic systems. • School and Kitsap road shed located in the area. • Limited redevelopment and infill potential. • Some critical areas.	• No existing sewer facilities.	• Developer Extension • Alternative Sewer Technologies • ULID	3
Brasch	• Sector is located south of Sedgwick Road, north Cedar Avenue, west of Phillips Road and east of Converse Road. • Zoned Urban Low residential. • Mix of suburban and semi-rural development patterns. • Moderate slopes and wetlands. • Moderate redevelopment and infill potential.	• Full sewer facilities in the northeastern portion of the sector.	• Developer Extension • ULID • Sedgwick main – latecomer funded (money will be advanced, but recovered) • Alternative Sewer Technologies	2
Mile Hill Drive Commercial	• Sector is located off of Mile Hill Drive. • High intensity commercial zoning. • Mix of commercial and suburban/semi-rural residential development • A number of underutilized and vacant lands. • Significant redevelopment potential.	• Minimal existing sewer facilities.	• Developer Extension • Facility Upgrades (rates payers, developer)	1
Howe Farm	• Sector is located south of Mile Hill Drive. • Zoned Parks • Owned by Kitsap County • No residential development potential • Currently no facilities on site and no need for sewer	• No existing sewer facilities	• Parks funding • Alternative Sewer Technologies • State and federal grants	3

Sector	Characteristics	Existing Facilities	Strategies	Sequence
Baby Doll	• Sector is located north of Mile Hill Drive and south of LaSalle Street along Horstman Road. • Low density Urban Low and Urban Restricted residential zoning. • Substantial areas of development on existing functioning septic systems. • Significant development potential. • Some critical areas in northern portion.	• No existing sewer facilities	• Developer Extension • ULID • Alternative Sewer Technologies	2
Beach Drive	• Sector is situated south of the Beach Drive Residential sector, with Ahlstrom Road to the southwest. • Low density Urban Low and Urban Restricted residential zoning. • Substantial development on existing functioning septic systems. • Moderate to severe slopes. • Limited infill potential.	• Sewer main with limited capacity along Beach Drive.	• Developer Extension • ULID • Facility Upgrades (rates payers, developer)	2
Horstman	• Sector is situated south of the Ahlstrom Road and north and east of the City of Port Orchard. • Low density Urban Low residential. • Pre-GMA suburban/semi-rural development pattern. • Moderate redevelopment and infill potential. • Moderate to severe slopes.	• Sewer main with limited capacity along Beach Drive. • Moderate sewer facilities in the southern portion.	• Developer Extension • Facility Upgrades (rates payers, developer)	1

Sector	Characteristics	Existing Facilities	Strategies	Sequence
Retsil	• Sector is adjacent to City of Port Orchard to the west and south, with Port Orchard Bay to the north. • Zoned Urban Low • Area includes the joint West Sound/Port Orchard sewer treatment facility. • Mix of early 1900's and pre-GMA subdivision. • Moderate infill and redevelopment potential. • Moderate slopes and streams.	• Substantial sewer facilities.	• Developer Extension • Facility Upgrades (rates payers, developer)	1

ACRONYM LIST

CDD = Community Development District
CK = Central Kitsap
GMA = Growth Management Act
HBD = Hospital Benefit District
LIFT = Local Infrastructure Financing Tool
SK = South Kitsap
UGA = Urban Growth Area
ULID = Local Improvement District