Whatcom County
Water District No. 13

COMPREHENSIVE

SEWER PLAN

February 2012
Revised August 2012

CHS ENGINEERS, LLC

COMPREHENSIVE SEWER PLAN

Whatcom County Water District No. 13
Whatcom County, Washington

February 2012
Revised August 2012

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Date: August 14, 2012

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Water District No. 13

Whatcom County, Washington

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Whatcom County Water District #13

COMPREHENSIVE SEWER PLAN

Table of Contents

CHAPTER 1 – INTRODUCTION

CHAPTER 1

INTRODUCTION

1.1 GENERAL

This report presents the results of studies undertaken to develop and update the comprehensive sewer plan for Whatcom County Water District No. 13 in the Columbia Valley area northeast of Bellingham and just north of Kendall, in northwestern Washington. Locally, the area served by the District is referred to as Peaceful Valley—so named after a 1974 plat application and, subsequently, designated as a community in the 2000 census. The findings, conclusions, and recommendations contained herein address aspects of collection, treatment, and disposal of sanitary wastes for the District's present and future sewer service area. Figure 1.1 indicates the general location of Whatcom County Water District No. 13.

This plan was prepared in accordance with the requirements for general sewer plans as set forth in WAC 173-240. This plan is subject to approval by the State Department of Ecology as a general sewer plan for facilities. This plan is also subject to approval by Whatcom County with respect to consistency with local land use plans and policies.

1.2 AUTHORIZATION

The sanitary sewage collection, conveyance, treatment and disposal system is owned and operated by Whatcom County Water District No. 13, a special purpose district operating under Title 57 RCW.

The Commissioners of the Whatcom County Water District No. 13 authorized CHS Engineers, LLC, to prepare an updated Comprehensive Sewer Plan. The original plan was prepared by CH2M HILL in 1975.

The final draft of this plan, and a concurrently prepared engineering report for the wastewater treatment, was completed at a time when economic conditions were changing rapidly. The Commissioners elected to authorize Gray & Osborne, Inc. (G&O) to complete the engineering report for the wastewater treatment plant. Additional studies and coordination with the Department of Ecology (DOE) were implemented to support that work. Accordingly, completion of this plan was delayed from mid-2010 until 2011. G&O completed an engineering report for the wastewater treatment plant dated September, 2011. This Plan incorporates the findings of the report by G&O, with respect to capital improvement planning.

The plan was submitted to Whatcom County and DOE for review and approval. Following receipt of comments, the plan was updated in 2012. Minor revisions were made in August 2012 in response to final DOE review. SEPA review was completed in May 2012 (see DNS and checklist in Appendix C).

1.3 PURPOSE AND SCOPE

The purpose of this study is to develop comprehensive long-range plans for the construction of sanitary sewer facilities in the service area. The comprehensive plan includes recommendations for collection and treatment facilities, together with cost estimates and recommended construction programs. The plan for these facilities is in compliance with applicable requirements of the various regulatory agencies.

The objectives and scope of this plan are as follows:

A. Review and analyze available documents concerning the study area.

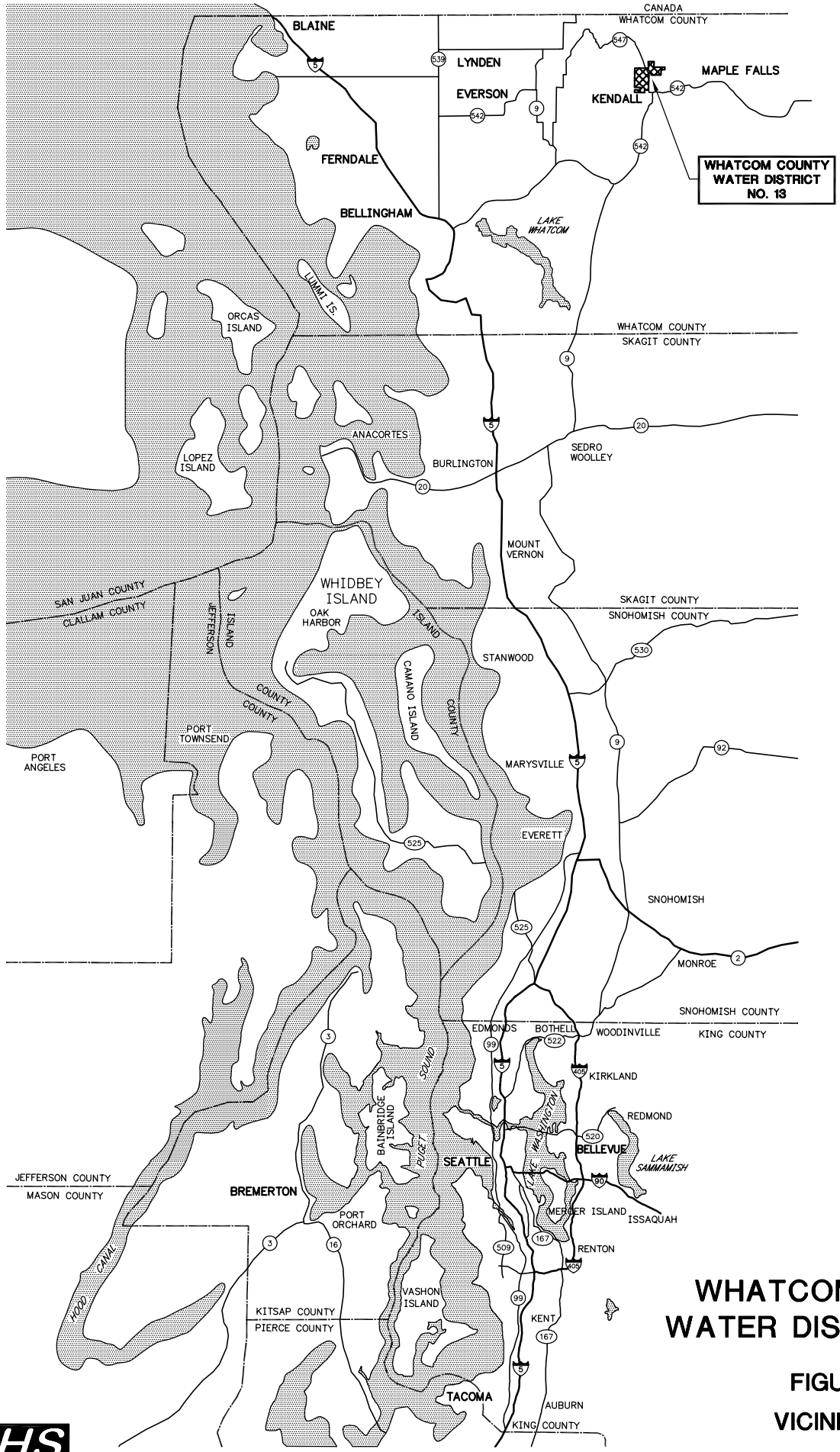
B. Prepare an engineering study of the present and future needs of the area and update the comprehensive sewer plan.

C. Summarize the evaluation of the wastewater treatment plant and recommend expansion and/or modification of the plant as presented in a separate engineering report.

D. Prepare cost estimates for the various components of the comprehensive plan along with recommended construction to meet immediate and foreseeable future requirements of the other properties adjacent to the study area.

E. Investigate the most feasible methods of implementing the comprehensive plan in order to provide for financing, maintenance, and operation of the system.

F. Plan sewer service to the portion of the Columbia Valley Urban Growth Area that is within the District's boundaries, in accordance with the Growth Management Act and the Whatcom County Comprehensive Plan.



WHATCOM COUNTY WATER DISTRICT NO. 13

FIGURE 1.1

VICINITY MAP

CHS ENGINEERS LLC

CHAPTER 2 – STUDY AREA

CHAPTER 2

STUDY AREA

2.1 GENERAL

The Columbia Valley lies between Sumas and Red Mountains, approximately 20 miles northeast of the City of Bellingham. Whatcom County Water District No. 13 straddles the Sumas-Kendall Road (State Route [SR] 547) north of Kendall and extends up the slopes of the two mountains. Populated areas to the north and south of the District on the Sumas-Kendall Road are served by the Columbia Valley Water District (formerly the Evergreen Water–Sewer District No. 19). Whatcom County Water District No. 13's treatment plant is located at the most southwestern point of existing development within the District and its effluent drainfield is approximately 2,000 feet to the north.

The valley is approximately one mile wide from which forested slopes rise to the respective mountaintops. The valley floor provides sites suitable for residential or commercial development. The portion of the District that is located on the valley floor is within the unincorporated Columbia Valley Urban Growth Area (UGA) boundaries as designated by Whatcom County. The UGA is considered a County urban growth area that is not associated with existing cities. The UGA itself is a part of the Foothills Subarea Plan which was adopted in May 2011. Easy access to the highway and the close proximity to Bellingham and Mount Baker make the UGA desirable for future development of residential properties as well as continued development of the area for recreational purposes. The existing plats and sewer system are centered within the District along, and primarily east of, SR 547. The treatment plant and drainfield are located on the west side of SR 547. Significant portions of the District to the east and west, both within and outside of the UGA boundaries, are undeveloped. In recent years, proposals to develop 272 acres to the west of SR 547 and 26 acres in the northeast part of the District have been submitted to the County and discussed with the District.

The Columbia Valley has a complex hydrogeologic regime with localized gradients and perched aquifers. The 1975 report assumed that the effluent percolated through the underlying gravels and eventually reached Kendall and Sprague Lakes. The outlet, Kendall Creek, flows south to merge with the North Fork of the Nooksack River.

2.2 DISTRICT SEWER HISTORY

On August 12, 1974, the Board of County Commissioners of Whatcom County granted preliminary approval of the plat of Peaceful Valley, a recreational home

subdivision. A condition of plat approval was that it be served by public sewers and Whatcom County Water District No. 13 authorized the engineering studies required to prepare the original comprehensive sewerage system plan in September 1974.

The original comprehensive plan was completed in August 1975 and additional information to satisfy the Washington State Department of Ecology (DOE) was provided in an addendum dated October 1975. The plan assumed that the homes were mostly for recreational purposes and, thus, would be occupied 50 days each year on average and that this would be primarily on summer weekends, followed by winter-weekend stays. In the plan, however, the conveyance system was sized to serve full build-out, while the treatment plant and pumping stations were sized for a 20-year design period. Three alternatives were considered for treatment: an aerated lagoon, an oxidation ditch, and a complete mix package plant. Because of the expected usage pattern—weekends, accommodating "shock" loadings was a primary consideration during evaluation. Aerated lagoons were the recommended alternative. At the time, the Peaceful Valley plat was considered a mountainous recreational area by the DOE and its policy dictated that only two discharge alternatives could be considered: land disposal or advanced water treatment with discharge to the Nooksack River. The latter was allowed to be considered only if land disposal proved to be inadequate. Test pits indicated that infiltration was a viable option and the drainfield was sited within the proposed fairway of expanded golf course area. The DOE also required the plan to account for development in plats to the north and south and sufficient land at the treatment plant was set aside for future expansion. Because the area in the vicinity of the treatment plant is projected to experience significant growth, alternatives to aeration lagoons in this residential setting should be explored.

Construction of the collection system, treatment plant, and drainfield began in 1976 and was completed in mid-1977. In the 1975 comprehensive plan, the ultimate population was projected to be 4,137 people based on 3 people per lot and 1,379 lots in the plat. The treatment plant was designed for the 20-year planning horizon that estimated 35 vacation homes would be built each year and occupied primarily during summer weekends.

The District's first discharge permit was issued on January 25, 2001, and allowed the discharge of up to 125,000 gallons per day. According to the permit fact sheet was issued on July 20, 2005, the collection system served 714 residents. This number is likely low because many of the homes in the area became year-round residences instead of use for periodic recreational stays. A new State Waste Discharge Permit (ST0007367) was issued effective September 1, 2011 (see Appendix B). The corresponding Fact Sheet does not reflect an updated count of residents.

2.3 TOPOGRAPHY

Topographic features are shown on Figure 2.1. Whatcom County Water District No. 13 lies within the Columbia Valley, at an approximate elevation of 440 feet, and climbs the slopes of the neighboring Sumas and Red Mountains, which peak out at 2,700 and 2,281 feet respectively. The study area lies wholly upon the valley floor, which—although sloping to the southeast—is relatively flat. At the southern District boundary, Sprague and Kendall Lakes together span the valley, trending southwest to northeast. Kendall Creek begins as the Sprague Lake outlet, where the valley narrows, and flows to the North Fork of the Nooksack River.

The County's geologically hazardous areas map indicates that the adjacent mountain slopes fall into the categories of "between 15% and 35% slopes" and "slopes greater than 35%." The map also indicates that alluvium identified in County studies and mass wasting identified in the State's *Landslide Inventory* are found on the valley floor at the base of the mountains. The County's wetlands map shows that wetlands appear to be associated with the alluvium and landslide debris deposits.

2.4 WATER SYSTEM

As described above, Whatcom County Water District No. 13 was established in 1975 to serve the Peaceful Valley development. The water supply is derived from an underlying aquifer and water rights were acquired in 1974 ("priority date"). Two wells and their associated pump stations were developed at that time. In 1976, two 150,000-gallon concrete reservoirs were constructed. The water system is comprised of a network of 4-, 6-, and 8-inch distribution mains and serves approximately the same Peaceful Valley area that is served by the District's sewer system. No treatment is provided. A February 2005 water system plan indicated that the District had water rights to serve approximately 1,346 dwelling units and the storage capacity in its reservoirs for 1,338 units.

The plan indicated that 345 residential units were connected to the water system in 2004 as were three non-residents—the Peaceful Valley Clubhouse, the Misty Mountain real estate office, and the Baker's Edge Golf Course (interruptible)—which amounted to an additional 9 equivalent residential units (ERUs). Figure 2.2 illustrates the existing water system infrastructure. The plan indicated that the District counted 321 ERUs in 2000, with a population of 800, and that the population increased to 863 in 2004. The plan assumed that conservation measures, such as taking shorter showers and using water-saving fixtures, would decrease the per capita water use in future years.

The plan predicted that additional source water would need to be identified to serve the District in 2019 and beyond. It also indicated that additional looped water mains were needed.

The ADD of approximately 300 gallons/ERU is more than double the 131 gallons of sewage that was estimated to be generated daily by each dwelling unit.

Whatcom County Water District No. 13 splits the Columbia Valley Water District (CVWD) into two separate areas located to the north and south. The CVWD, which formally took control of its water system from the Paradise Lakes Country Club in 2003, served 1,367 customers as of 2007 from its three groundwater wells. In their 2004 comprehensive water plan, the CVWD estimated that the demand per ERU was 274 gallons although significant leakage (up to 76%) was identified in reservoir drawdown tests. After improvements resolve the leakage, the CVWD expected that the water demand would increase within the range of 6 to 15 percent over the 20-year period to 2023.

The following is a table of wells as listed on the DOE website which are generally within or near the service area.

Permit #	Sec., Range, Township	
40-5-27P	SE1/4, SW1/4, Sec. 27, T40N, R5	
40/05-27L	NE1/4, SW1/4, Sec. 27, T40N, R5E	
40/5E/27F	SE1/4, NW1/4, Sec. 27, T40N, R5E	
40/5E/27B	NW1/4, NE1/4, Sec. 27, T40N, R5E	
40-5E-27B	NW1/4, NE1/4, Sec. 27, T40N, R5E	
40-5E-27B	NW1/4, NE1/4, Sec. 27, T40N, R5	
40-5-27B	NW1/4, NE1/4, Sec. 27, T40N, R5	
G1-22178P	NE1/4, SE1/4, Sec. 22, T40N, R5E	(no longer in service)
40/5/27D	NW1/4, NW1/4, Sec. 27, T40, R5E	
40-5E-27D	NW1/4, NW1/4, Sec. 27, T40, R5E	(District abandoned)
40-5E-22N	SW1/4, SW1/4, Sec. 22, T40, R5E	(District water)
G1-22158P	NW1/4, SW1/4, Sec. 22, T40, R5E	
G1-22178P	SW1/4, NW1/4, Sec. 22, T40N, R5E	(District water)
40/05-21(2)	N1/4, E1/4, Sec. 21, T40N, R5E	
40/5E-15N	SW1/4, SW1/4, Sec. 15, T40N, R5E	
40/5E-15N	SW1/4, SW1/4, Sec. 15, T40N, R5E	
40/5E-15R	SE1/4, SE1/4, Sec. 15, T40N, R5E	
40/5/15N	SE1/4, SE1/4, Sec. 15, T40N, R5	

The two District wells in service are indicated on Figure 2.2. There are four water quality monitoring wells in the vicinity of the District's wastewater treatment plant drainfield. Other wells in the area are south of Kendall and Sprague Lakes or north of the District.

2.5 SOILS AND HYDROGEOLOGY

Seven soil units can be found within the District boundaries according to the Natural Resources Conservation Service website. The Winston silt loam unit, with a minor deposit of Clipper silt loam, covers the central valley floor. As the slopes start to rise from the valley, the soil units transition to Blethen gravelly loams. The soil unit on the upper slopes is identified as Andic Xerochrepts, with the Kindy-Oso complex identified at the crest of Red Mountain. These latter units are comprised of bedrock, loam, and gravelly loam.

The hydrogeological investigations performed in 1974 and 1975 for the original comprehensive sewer plan indicated that the valley floor is underlain by a thick layer (150 feet maximum) of sand and gravel (the Blethen unit), which forms the principle groundwater reservoir tapped by water wells in the area. The water table varies from 10 to 40 feet. The sand/gravel layer overlies a poorly permeable clay and silt unit; the depth to bedrock in the valley is unknown.

The investigations found that landslide debris was deposited during the early recessional stages of the Vashon glacial period across the valley south of Sprague Lake. Extending approximately 75 feet below ground, this feature blocks groundwater movement through the upper portion of the Blethen unit and forces it to come to the surface in the form of springs and surface water features such as Kendall and Sprague Lakes.

The 1975 investigation verified previous studies and indicated that groundwater discharge through the area averaged 21,000 acre-feet annually. For a dry year (1952), the discharge was computed to be 14,150 acre-feet. An analysis was performed to determine the drainfield's impact on groundwater both from a water quantity and water quality perspective. The analysis modified some of the values used in the comprehensive plan, but found that the outcome was essentially the same. Specific values for hydrogeological characteristics for the drainfield included groundwater movement of approximately 5 feet per day to the southeast and a water level rise due to the discharge of 6 to 8 feet. The analysis results validated the plan's water quality calculations for an average year (a nitrogen increase of 0.02 parts per million [ppm]), but indicated that the dry-year nitrogen loading increase would need to be doubled (to 0.50 ppm). The 1975 comprehensive plan and addendum provide additional details regarding the derivation of these numerical quantities.

The County's Critical Aquifer Recharge Areas map indicates that the entire valley floor within the District's boundaries falls within wellhead protection zones for existing wells with travel times from 1 to 10 years. Because the wells are located at the base of Sumas Mountain, the zones extend up the mountain slopes.

2.6 HYDROLOGY AND SURFACE WATER

As described above, the Columbia Valley's groundwater movement is impeded by an ancient landslide that forces the water to the surface in the form of springs and surface water features such as Kendall and Sprague Lakes. Sprague Lake is located in the southeast portion of the District. The lakes, in turn, feed Kendall Creek, which flows south approximately two miles through land zoned rural and rural forestry to join the North Fork of the Nooksack River. The Nooksack River eventually discharges to Bellingham Bay to the west.

Average monthly precipitation totals range from a low of 1.62 inches in July to a high of 6.12 inches in December. Precipitation for the months of May through September range from 1.62 to 2.91 inches; October through January are the wettest months ranging from 4.90 to 6.12 inches; and the range from February through April is 3.41 to 4.27 inches. Temperatures have ranged from 0°F to 100°F. The coldest month, on average, is January, when the average minimum temperature is 30.8°F and the average maximum temperature is 41.7°F. Although the average annual snowfall is 14.1 inches, it melts away in a short time.

Kendall and Sprague Lakes are designated as Shoreline Management Program waterbodies in the County's Salmonid Fish Habitat Conservation Areas map. The map indicates that fish-bearing streams are found upgradient from Kendall Lake at the base of Red Mountain although the DOE's water quality mapping does not show a stream in that vicinity. The County's flood map also confirms the lack of streams and, therefore, the absence of a floodplain.

There are no existing or planned sewer outfalls to local creeks, streams or rivers.

2.7 WATER QUALITY

The DOE maintains records for surface water quality and the database identified Sprague Lake as having polluted waters that put it on the State's 303(d) list. Specifically, tissue from the lake's catfish collected in 2003 had total PCBs and dioxin (a pesticide) that exceeded the National Toxics Rule criteria. The tissues of rainbow trout and walleye also had quantities of dioxin that exceeded the criterion.

2.8 SERVICE AND STUDY AREAS

The service area considered in this comprehensive plan is formed by the intersection of the UGA and the District, over 500 acres in size, or about 35% of the District's 1,432 acres. Thus, the service area is comprised of most of that land that lies on the valley floor within the District boundaries. If the parcels

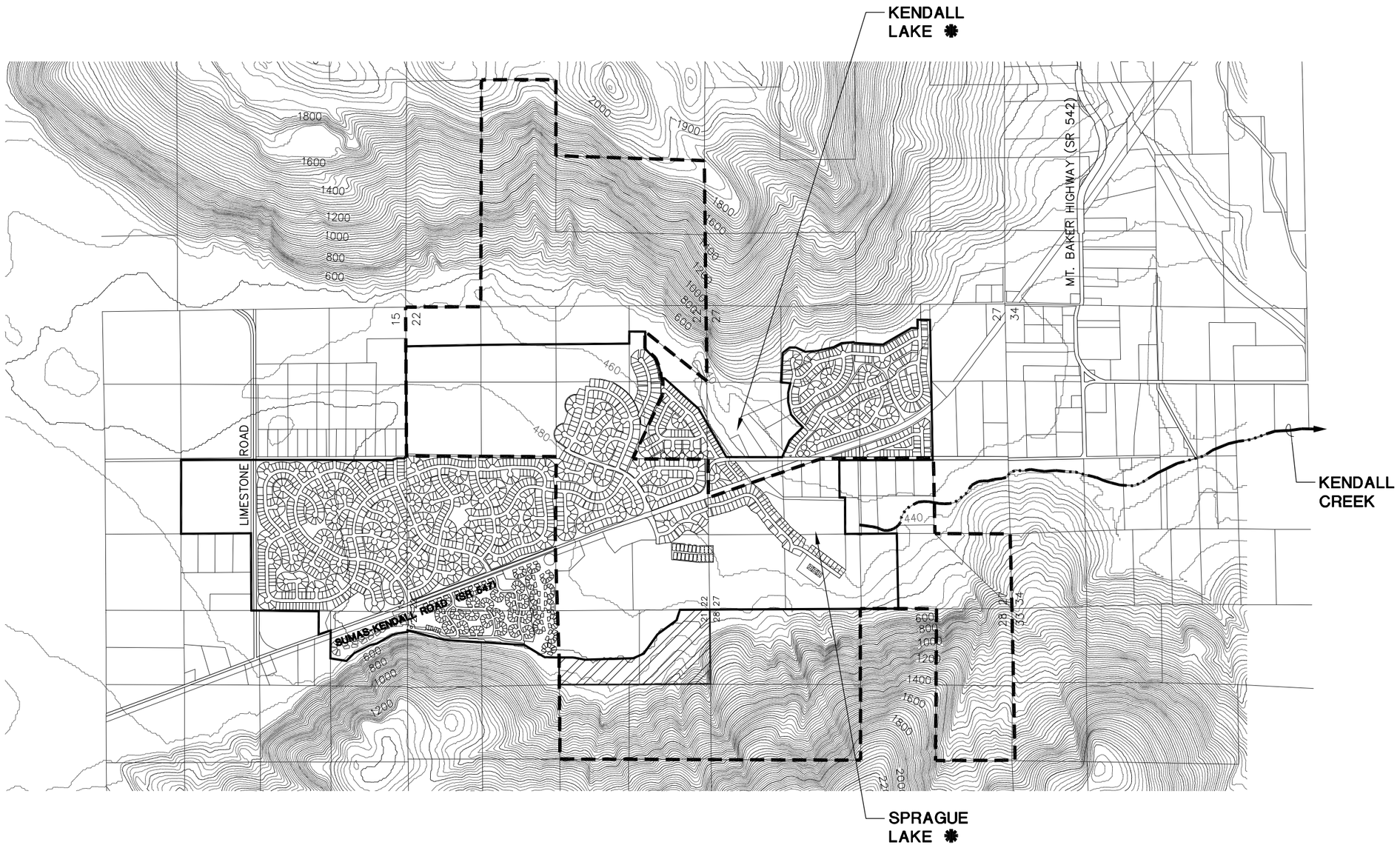
within the District and UGA boundaries were developed to their full potential, 1,908 connections would be generated.

Originally, the comprehensive plan considered only the Peaceful Valley plat, which contained 392 lots. However, the DOE required that the plan also consider the recreational developments of Campers Paradise and Paradise Lakes. Campers Paradise contained 344 lots on 83 acres. Paradise Lakes had north and south components split by the Peaceful Valley plat. The northern portion had 998 lots and encompassed approximately 300 acres; the southern division had 465 lots on 169 acres. To do so, the plan sized future facilities and showed future expansions of the treatment plant and drainfield. Consideration of capacity for service to the UGA areas to the north and south will continue to be considered in this plan although they are currently within the boundaries of the CVWD and are served by onsite sewage disposal systems. In its May 2010 draft subarea plan, the Foothills Subarea Plan Advisory Committee noted that the (then) Evergreen Water-Sewer District may need to contract with the District as future development intensifies and/or surface and ground water quality are threatened. There are 2,031 potential connections outside of the District boundaries but within the UGA, which would almost double the potential connections. Other than the informal consideration noted above, sewer service to areas within the CVWD is not addressed in this plan.

In 2009, Whatcom County completed a review of the County's ten UGAs including the Columbia Valley UGA and on November 24, 2009, the revised UGA boundaries were adopted per Ordinance 2009-071, bringing the County into compliance with the GMA. The revision was based on studies and recommendations of the Foothills Subarea Plan Advisory Committee as well as public comment. Specifically, where it impacts the service area, the UGA boundary expanded into approximately 40 acres of Rural Forest zoning to the east and converted previous Urban Residential zoning to rural zoning to the south (approximately 45 acres) and west (approximately 30 acres). The UGA is zoned primarily Urban Residential, which has a density of four dwelling units per acre. In addition, approximately 45 acres within the UGA boundaries were rezoned General Commercial to recognize the need for urban levels of public services and facilities within the UGA. Called a Town Center in the ongoing subarea planning, the center would allow for commercial development, a variety of housing types, and public/institutional uses at a central location. A developer proposal, which included such a Town Center concept, estimated the sanitary sewer requirements for the mixed-use concept and these have been used in this planning effort. The estimated need was nearly identical to that required for the Urban Residential density encompassed by the same area. In other words, whether the Town Center concept is realized or the area reverts to the existing residential density zoning, the impact on sewer planning is negligible.

In addition, the Advisory Committee has recommended that an area within the UGA, adjacent to Limestone Road to the north, be designated Light Industrial with an associated policy to consider Light Impact Industrial zoning to allow light industry and requested that this plan also consider those potential future impacts. The planned light industry zoning, however, is not contiguous with the District's boundary and will not be considered further in this plan. The County Plan also designates an area of "UGA Reserve" adjacent to the Columbia Valley UGA. The evaluations to prepare this Sewer Plan anticipate sewer service will someday be provided to the UGA Reserve Area. This Sewer Plan documents the capacity and plans to provide sewer service to the UGA Reserve within the 20-year planning period. The study area for this plan is the combined area of the service area as described above and the area designated UGA Reserve. However, since this area is not yet part of the UGA, sewer service cannot be provided within the UGA Reserve until it is re-designated as UGA.

In summary, the sewer service area consists of that portion of the UGA that falls within the District boundaries as shown on Figure 2.3. The GMA, case law, and Western Washington Growth Hearings Board decisions, consistently disallow sewer extensions into rural areas. The County's policies and comprehensive plan also discourage sewer planning for areas outside of the UGA except under very limited circumstances. Thus, this plan focuses on that part of the District that is within the UGA. The Subarea Plan encourages dialogue regarding the needs of neighboring developments and these will be discussed. Any future land use changes may require an amendment to this plan in order to consider providing sewer service at that time.



LEGEND

- DISTRICT BOUNDARY
- COLUMBIA VALLEY UGA BOUNDARY
- COLUMBIA VALLEY UGA RESERVE
- MAP INDICATES VICINITY OF EACH LAKE (SHORELINES NOT MAPPED)

2000 1000 0 2000

SCALE IN FEET

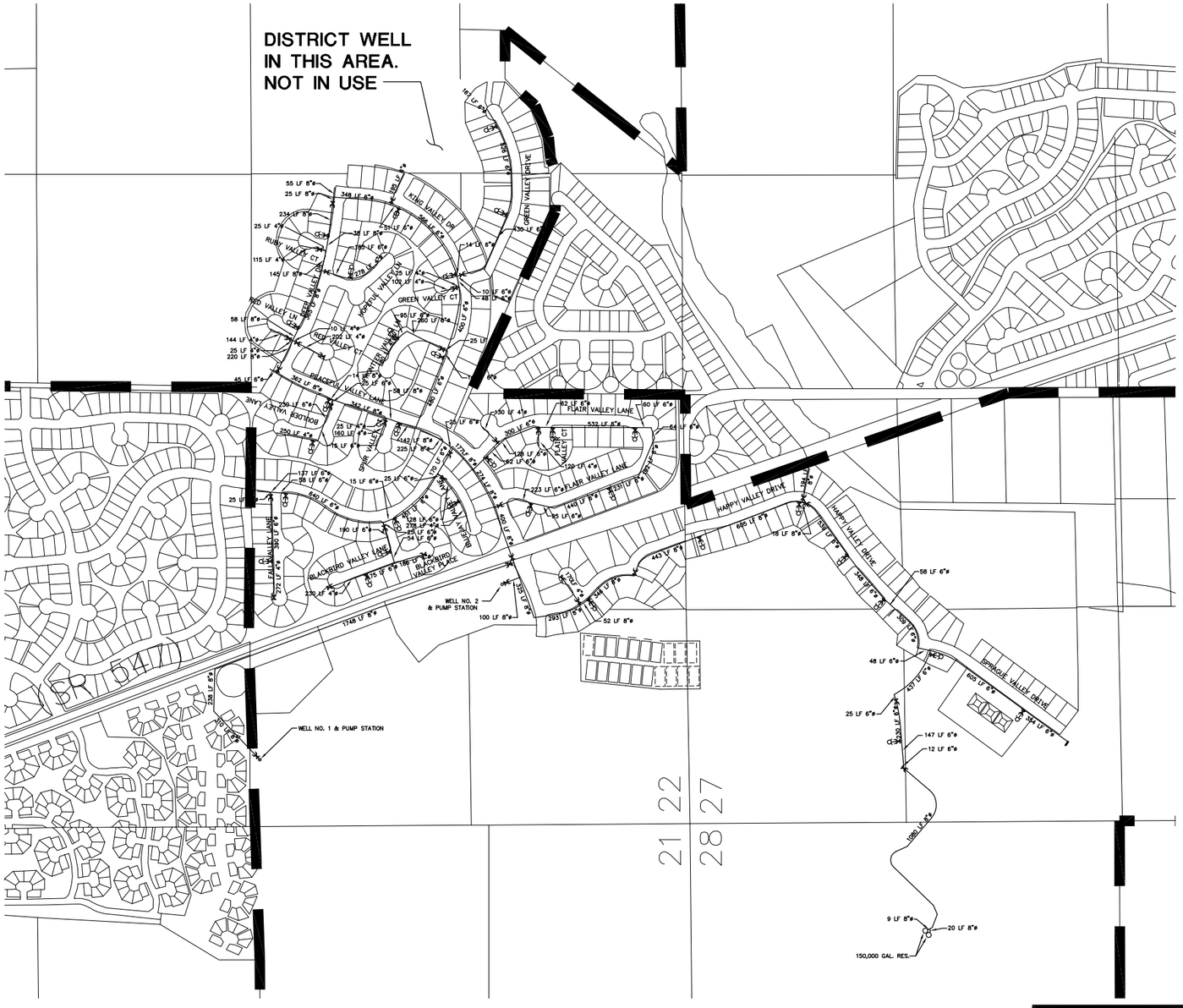
CONTOUR INTERVALS: 20 FT.

WHATCOM COUNTY WATER DISTRICT NO. 13
COMPREHENSIVE SEWER PLAN

FIGURE 2.1

TOPOGRAPHY

800704-WCWD13 Comprehensive Sewer Plan\Comp Plan\CAD 800704\800704-comp-plan-figs revised_2012.dwg 8/14/12



LEGEND

DISTRICT BOUNDARY

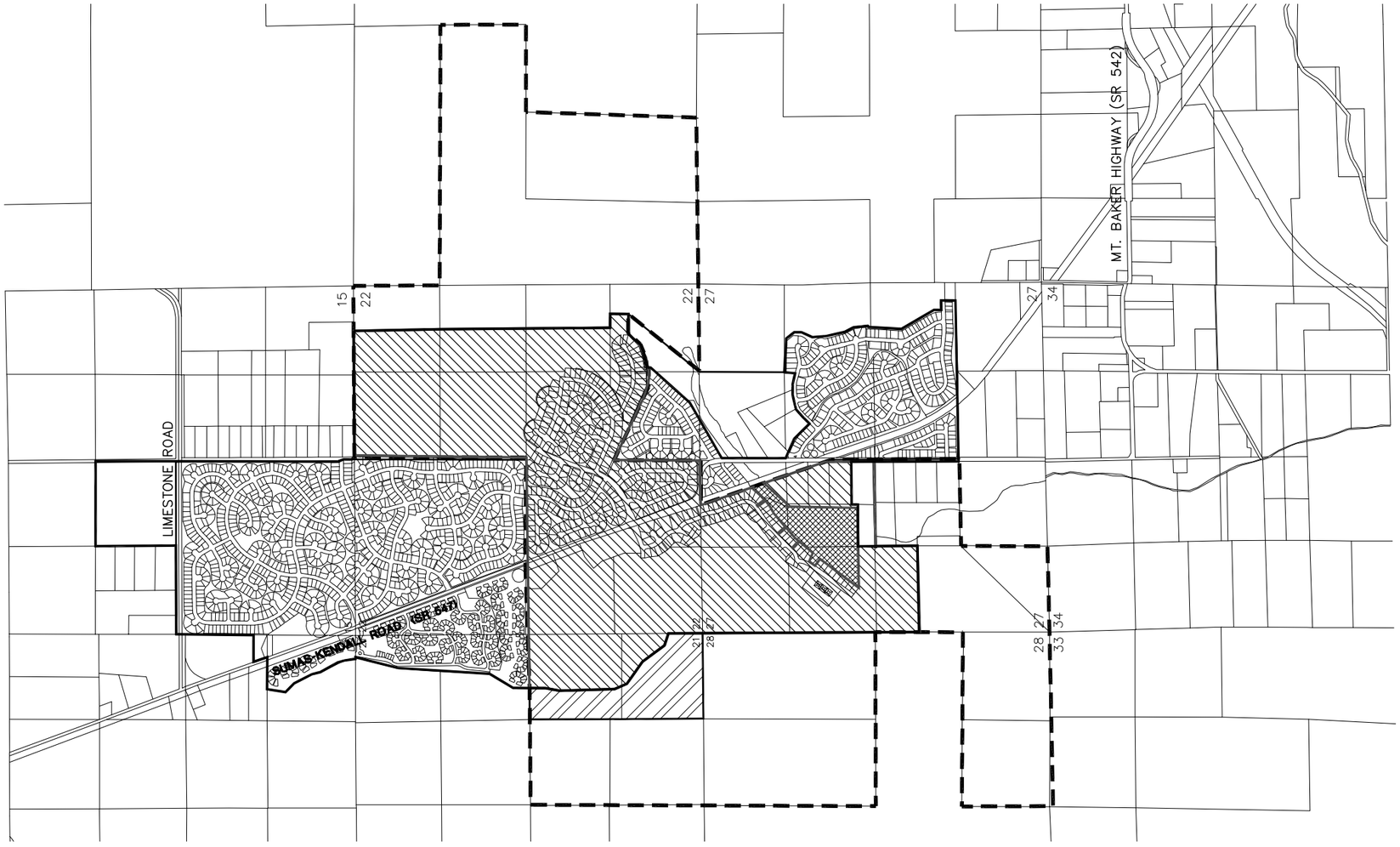
800 400 0 800 1600

SCALE IN FEET

WHATCOM COUNTY WATER DISTRICT NO. 13
COMPREHENSIVE SEWER PLAN

FIGURE 2.2

PEACEFUL VALLEY WATER SYSTEM



LEGEND

- DISTRICT BOUNDARY
- SEWER SERVICE AREA
- CRITICAL AREA
- COLUMBIA VALLEY UGA BOUNDARY
- UGA RESERVE (INCLUDED IN STUDY AREA)

2000 1000 0 2000

SCALE IN FEET

WHATCOM COUNTY WATER DISTRICT NO. 13
COMPREHENSIVE SEWER PLAN

FIGURE 2.3

SEWER SERVICE AREA

800704-WCWD13 Comprehensive Sewer Plan\Comp Plan\CAD 800704\800704-comp-plan-figs revised_2012.dwg 2/27/12

CHAPTER 3 – POPULATION AND LAND USE

CHAPTER 3

POPULATION AND LAND USE

3.1 INTRODUCTION

In order to project wastewater facility needs over a given period of time, it is necessary to establish reasonable estimates of the probable usage of these services. This can be accomplished in most service areas by a study of the population trends and land uses which impact sewage facility usage.

The infrastructure that was installed at the inception of Whatcom County Water District No. 13 extended to all of the Peaceful Valley Subdivision plats. Future expansion of the collection system is possible as subdivisions within its boundaries are proposed. Scheduling of future system expansions and extensions is dependent upon the particular property owners involved and cannot be accurately predicted. Because the District is hemmed in by a neighboring district (Columbia Valley Water District, formerly the Evergreen Water–Sewer District No. 19) and two mountains, the District's boundary is not expected to change, but growth is occurring within the existing boundaries. The service area discussed in this study is composed of that portion of the District that falls within the Columbia Valley UGA boundaries. Although, from a topographical standpoint, it may be possible to consider extending gravity collection services to Campers Paradise in the neighboring water district, we understand that Campers Paradise is strictly for recreational vehicles and has no permanent dwelling units.

3.2 GROWTH MANAGEMENT

Washington State's GMA—Title 36 Revised Code of Washington, 1990, and subsequent amendments—was created to avoid unplanned and uncoordinated growth, which posed a threat to the environment, sustainable economic development, and the quality of life in Washington. It mandated that Whatcom County develop a comprehensive plan on the basis of its growth rate. The County's comprehensive plan under GMA was adopted in 1997 and has been updated as ordinances are passed. Whatcom County completed the review of the Columbia Valley UGA in 2009. The next comprehensive review of UGS is due by 2016.

Within the original comprehensive plan, the Foothills area, which includes the District, had its own Subarea Plan and the County has made its revision a priority. The Foothills Subarea Plan was adopted by the Whatcom County Council on May 24, 2011. The Columbia Valley UGA, recognized by the County's comprehensive plan as a County UGA not associated with existing

cities, is one of the population centers included in the Foothills Subarea. The Columbia Valley was the fastest growing area in Whatcom County in the 1990s in terms of annual growth rate. Approximately one-half of the District's area is located within that UGA and the District appears to serve approximately one-fourth of the UGA's population. The Columbia Valley UGA zoning dictates a maximum density of four residential units per acre, but one area within the UGA is presently zoned for a lesser density—RF (rural forest, one unit per 20 acres) that is planned for light-impact industrial activities and is not contiguous to the District's boundary. A second area within the UGA and District boundaries is zoned General Commercial to support urban levels of public services and facilities.

Under the UGA designation, the County recognizes the popularity of the area and the need to protect the surrounding area from sprawling, low-density development. Thus, the County's comprehensive plan includes a policy to limit sewer expansion to only those areas within city limits or UGAs. The land use designations for the area around the District are shown on Figure 3.1.

3.3 DISTRICT POPULATION

According to the U.S. Census, the County population increased 30.6 percent between 1990 and 2000, which corresponds to an annual average growth rate of 2.7 percent. The State's Office of Financial Management (OFM), as mandated by the GMA, developed low, medium, and high population forecasts for each county to use in their 20-year planning horizon. Choosing a growth rate within that range for comprehensive planning purposes is left to local governments. ECONorthwest has prepared forecasts for the Subarea plan that have been revised in the latest subarea plan to reflect a slowing of the growth rate. For the subarea plan, the Foothills Subarea Plan Advisory Committee has adopted a forecast that is below ECONorthwest's low-growth assumption, a forecast adopted by the County as a part of Ordinance 2009-071, which amended the County's comprehensive plan. The advisory committee forecasted that population in the Foothills Subarea would grow from a 2006 population of 6,722 to 8,476 by 2029, which translates into an annual growth rate of just over 1.01 percent.

Although the U.S. Census actually breaks out an area entitled Peaceful Valley Census Designated Place, that area encompasses a much larger area than that of the District. The U.S. Census block mapping (the smallest geographic unit used by the U.S. Census Bureau) and data set features were used to estimate the population in the area encompassed by this plan's sewer service area that, because of the very low density within the District but outside of the UGA, approximately equals the District's customer base. According to the 2000 census block data, approximately 485 people resided within the service area. To support the County's 2009-amended comprehensive plan, forecasting was

included in the final environmental impact statements (FEIS) Appendix C that broke out population on the basis of service providers. The forecasting table showed that nearly half of the growth in the Columbia Valley UGA would be concentrated within the District's boundary. To support the County's UGA review, the Foothills Subarea Plan Advisory Committee provided recommendations regarding zoning and UGA boundaries. Within the UGA, an area was zoned General Commercial to centrally locate future services, retail businesses, and higher-density housing.

Population forecasting for this sewer comprehensive plan is based on the interpretation of the projections and assumptions that supported the County's adoption of the Columbia Valley UGA boundary. The District study area is forecasted to have a growth rate that exceeds that within the surrounding UGA. As a result, the projected 2029 population for the sewer study area is 1,595 as shown in Table 3.1. The corresponding annual population growth rate for the 20-year planning horizon in the study area is approximately 2.79 percent. Review of County forecasts for total housing units reveals a growth rate of 3.09% per year. These projected growth rates are significantly higher than the just over 1.0 percent rate for the Foothills Subarea (which includes significant rural areas) and for County-wide projections (slightly greater than 1.1 percent). This aggressive growth forecast is supported by local information that predicts growth in the near future and which will be concentrated within the study area.

TABLE 3.1
POPULATION TRENDS

	Year			
Jurisdiction	**2000**	**2006**	**2008**	**2029**
Whatcom County[1, 5]	166,826		197,675	247,755
Columbia Valley UGA[1, 2]		3,853	3,924	5,000
Service Area[3, 4]	485		920	1,595

[1] Whatcom County Comprehensive Plan (January 2010, as adopted on 11/24/09, Ordinance 2009-071; and August 2010, amended by Ordinance 2010-037)
[2] Foothills Subarea Plan (May 2011)
[3] 2000 census data
[4] Whatcom County 20-year Capital Facilities Plan - Appendix 1 Growth Estimates by Special District and Whatcom County 20-Year Capital Facilities Plan, Table 47 – Population Comparison: Sewer Plans and 2029 Population Projection
[5] Intercensal and Postcensal Estimates of April 1 Population by Age and Sex: 1990-Present, Washington State Office of Financial Management, Forecasting Division (Revised 12/6/2011)

3.4 ZONING

The primary comprehensive plan and zoning designations within the District's boundary are UGA/UR(4) (Urban Residential density of four units per acre) and Rural Forestry (RF). Within the UGA, an area has been zoned General

Commercial (GC) to accommodate facilities that would serve urban levels of population. Rural density zones of one unit per five acres (R(5)) and one unit for 10 acres (R(10)) are minor zones within the District. One small area to the east on Red Mountain is zoned Commercial Forestry (CF). Beyond the District's boundary, the zoning is primarily CF to the east and west, and a mix of RF, R(5), and R(10) to the north and south. Where SR 547 and the Mount Baker Highway (SR 542) meet, approximately one mile to the south, the zoning designation–Small Town Commercial–acknowledges the presence of the community of Kendall. Those UGA areas not encompassed by Whatcom County Water District No. 13 are included in the adjacent Columbia Valley Water District. Figure 3.1 depicts zoning within and adjacent to the District's boundary.

Current land use is exclusively residential and, originally, much of the population was seasonal—spending weekends at vacation homes to participate in summer and winter recreational activities. Most of the seasonal dwellings have become year-round homes. As the area continues to develop, concepts for commercial services and public use facilities are being put forth and these facilities are expected to be sited within the District's boundaries and within the GC zone of the UGA.

Whatcom County Water District No. 13 is limited by the Whatcom County Comprehensive Plan and County Code, which restrict sewer service connections to the area within the UGA. Future sewer system connections are limited to within the UGA, whether for building on existing lots or for new development in the District's service area. Table 3.2 shows the permitted zoning densities for those areas within the District boundary that are not yet platted. The Rural, Rural Forestry and Commercial Forestry Districts are located outside the District's sewer service area.

TABLE 3.2
ZONING DENSITIES

Zoning District	Residential Densities
Urban Residential, UR(4)	4 units per acre
General Commercial, GC	18 multifamily units per acre, maximum
Rural, R(5)	1 unit per 5 acres
Rural, R(10)	1 per 10 acres
Rural Forest, RF	Generally 1 unit per 20 acres
Commercial Forestry, CF	N/A

Although the County has identified a planned light-impact industrial area at the north end of the UGA, this plan does not anticipate sewer service to that area by Whatcom County Water District No. 13.

3.5 POPULATION DENSITY AND CONNECTIONS

The 2000 census indicates that the average County household size is 2.51 persons. Using the 2000 data for Census Blocks and Tracts in the service area, the population per dwelling unit (p/du) ranges from 2.15 p/du to 3.38 p/du, resulting in an average of 2.96 p/du. Additionally, the census did show a significant number of unoccupied housing units—approximately 20 percent, although, reportedly, many seasonal dwellings are being converted to year-round residences. The Columbia Valley UGA is currently experiencing development at a rate that is not typical for rural areas of Whatcom County and growth is projected to be concentrated within the District boundaries according to the studies that supported the County's UGA review. For this plan, the household size was derived from a study that was included in Appendix C of the FEIS, which supported the County's review of its UGA boundaries. The same study was included in Appendix 1 of the *Whatcom County 20-Year Capital Facilities Plan,* which was incorporated into the County's comprehensive plan by adoption of Ordinance 2009-071. The study forecasted that the District's average household size in 2031 would be 2.87[1] persons.

If the entire study area were developed as allowed by the proposed zoning revisions and existing plats, the number of sewer residential customer equivalent connections (RCEs) would be approximately 1,908. The Foothills Subarea Advisory Committee recommends that services be located in a town center within the District. The final uses and density of development of the town center and the GC-zoned area is not known; however, for conservative planning purposes, it is expected that the RCEs generated within the town center would be equivalent to the UR(4) density of the UGA or approximately 160 RCEs.

Based on the analysis of available lots, full development of land in the study area is estimated to result in approximately 1,908 sewer system connections. This includes 160 commercial, public, multi-family housing, and school RCEs that are anticipated at full development (where none currently exist). Given the amount of developable land that is still available within the boundaries of the District and the UGA, the growth rate is anticipated to be moderate over the next twenty years, with full build-out not anticipated for several decades.

[1] For planning purposes, 2.87 persons per dwelling unit is a very conservative number, exceeding that found in earlier County planning documents or used in typical comprehensive sewer planning. For this CSP, the household density is utilized only in the collection system model found in Appendix D, which was used to predict capacity needs of the sewer system at ultimate development. As noted in Chapter 5, with each proposed development, the existing system should be analyzed to ensure that capacity has not been exceeded and the proposed improvements should be evaluated for their ability to accommodate future growth.

For purposes of this report, three growth scenarios were considered. The starting point for each scenario was the 379 connections actually served in accordance with District records. Each scenario is shown on Figure 3.2.

- County-projected District growth (of total housing units) at about 2.94% per year resulting in 697 RCEs at the end of the 20-year planning period (2029).
- District-projected growth at 1.78% per year, resulting in 549 RCEs by 2029[2].
- Foothills Subarea growth rate of just over 1.01% resulting in 480 RCEs by 2029.

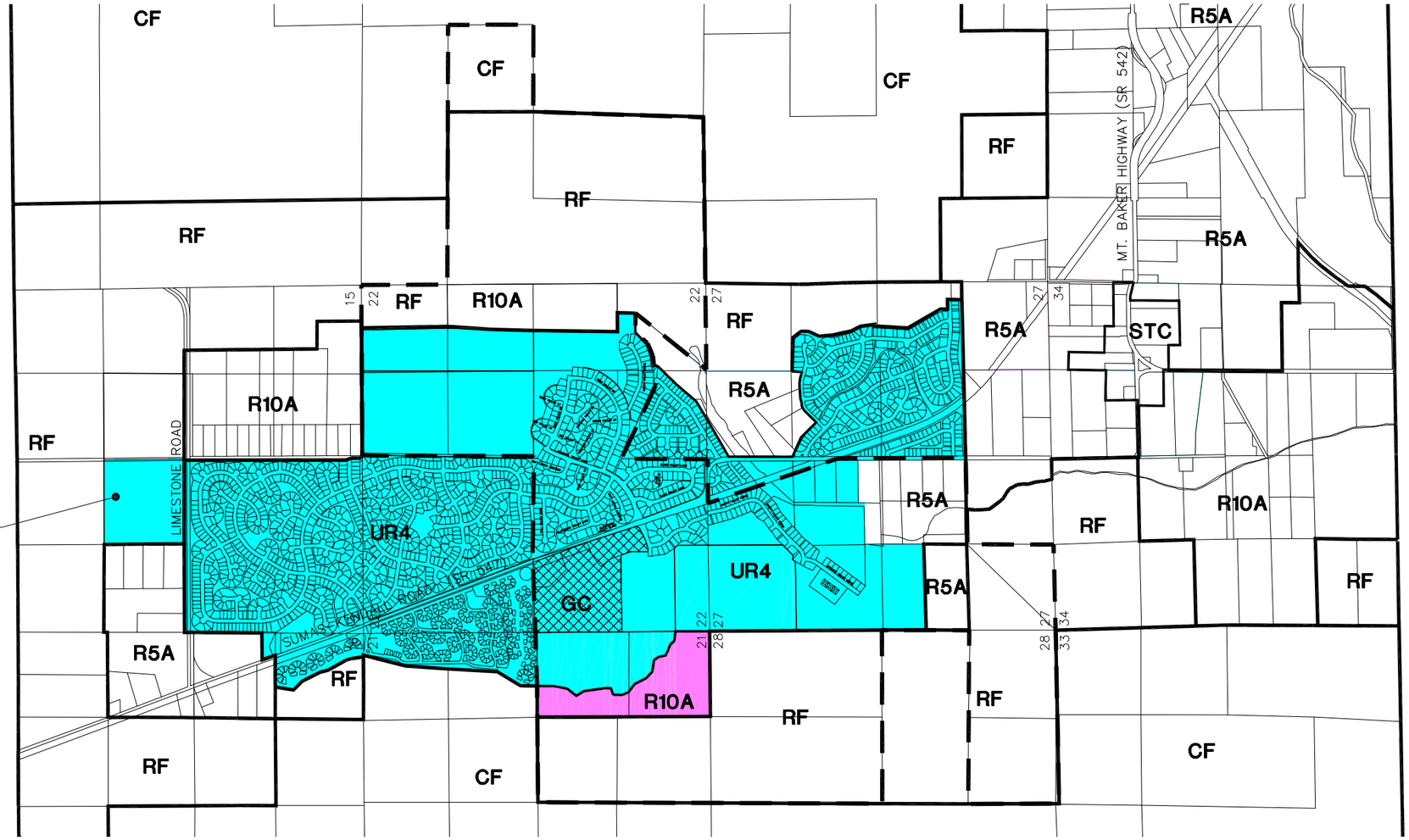
Table 3.3 summarizes the forecast growth in RCEs for each scenario. The District-projected growth rate was selected for use as the basis for facility planning in this Comprehensive Sewer Plan. This results in a 45% increase in the number of sewer connections and uses 29% of the development capacity of the District within the current UGA. The primary impact of the difference in the second and third growth forecast scenarios is the timing of the need for additional treatment capacity, as further discussed in Chapter 6.

[2] The basis for this forecast is to reflect a lower growth rate than that in the County Plan, based on the District's opinion of growth in the current economic conditions, particularly in the next five to ten years.

TABLE 3.3
FORECAST CONNECTIONS

PROJECTIONS			
Year	**Foothills Subarea Plan Growth[1]**	**District Growth[2]**	**County Growth for District[1]**
2008	379	379	379
2009	383	386	390
2010	392	393	402
2011	396	400	413
2012	405	407	426
2013	409	414	438
2014	413	421	451
2015	417	429	464
2016	421	436	478
2017	426	444	492
2018	430	452	507
2019	434	460	521
2020	439	468	537
2021	443	477	553
2022	448	485	569
2023	452	494	586
2024	457	503	603
2025	461	512	621
2026	466	521	639
2027	471	530	658
2028	476	539	677
2029	480	549	697

[1] Per Whatcom County Comprehensive Plan and supporting documents.
[2] As forecast by District based on local observations and current economic conditions.



PLANNED
LIGHT-IMPACT
INDUSTRIAL

LEGEND

	DISTRICT BOUNDARY
	URBAN GROWTH AREA
	UGA RESERVE
CF	COMMERCIAL FORESTRY
R5A	RURAL 1 UNIT/5 ACRES
R10A	RURAL 1 UNIT 10 ACRES
RF	RURAL FORESTRY
UR4	URBAN RESIDENTIAL 4 UNITS/ACRE
STC	SMALL TOWN COMMERCIAL
GC	GENERAL COMMERCIAL

NOTE:
PER WHATCOM COUNTY
COMPREHENSIVE PLAN 10/09

TOWNSHIP 40 NORTH
RANGE 5 EAST

2000 1000 0 2000 4000

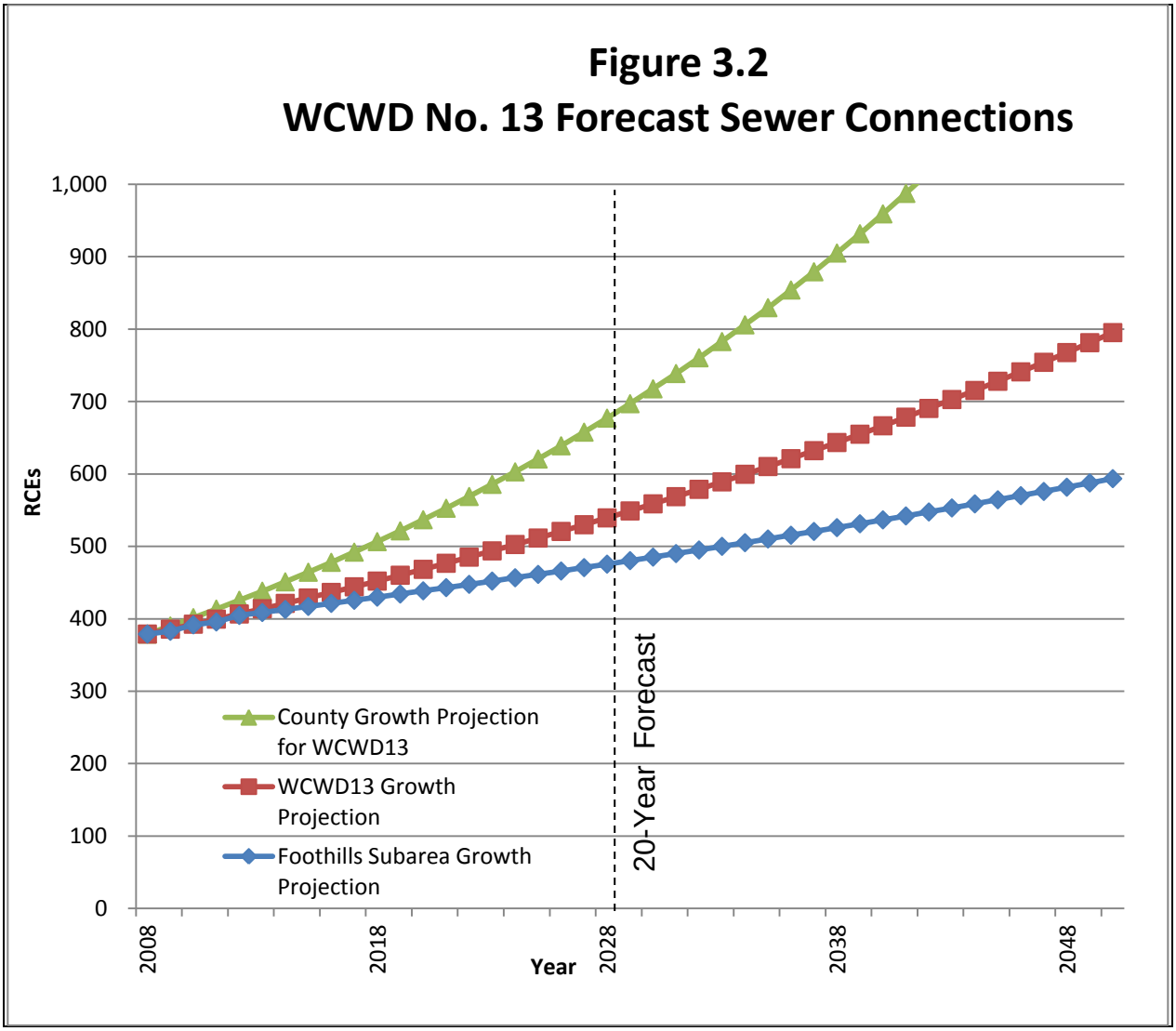
SCALE IN FEET

WHATCOM COUNTY WATER DISTRICT NO. 13
COMPREHENSIVE SEWER PLAN

FIGURE 3.1

ZONING AND COLUMBIA VALLEY URBAN GROWTH AREA

Figure 3.2
WCWD No. 13 Forecast Sewer Connections



CHAPTER 4 – PLANNING AND DESIGN CRITERIA

CHAPTER 4

PLANNING AND DESIGN CRITERIA

4.1 GENERAL

As previously stated, the purpose of this study is to update the comprehensive plan for the sewer system of the District. This chapter is concerned with the criteria to be used in planning the facilities necessary to achieve this purpose. Compatible with the scope of the study, these criteria include various aspects of sewage collection, treatment, and disposal. Where applicable, the criteria are based on the requirements imposed by the various regulatory agencies and on the accepted standards normally used in the design and construction of sewerage facilities. Consideration is given to both present and future needs.

4.2 ABBREVIATIONS

A number of terms have been abbreviated in this report.

Acre(s)	AC
Cubic feet per second	cfs
Gallon(s)	gal
Gallons per day	gpd
Gallons per acre per day	gpad
Gallons per capita per day	gpcd
Gallons per minute	gpm
Million gallons per day	mgd

4.3 DATUM

The datum on which the as-built drawings for the existing system are based is not known. Because hydraulic capacities of sewer system facilities are based on pipeline slopes, it is important that a common datum be used for design purposes. Future projects will need to tie into the existing system by using a common datum.

4.4 DESIGN PERIOD

Economy in design and construction cost is, in general, achieved by the construction of trunk and interceptor sewers with sufficient capacity to meet the long-range needs of the tributary area. This is especially true in congested areas where duplication and paralleling of wastewater facilities at some future date would be an extremely difficult and costly project. Pumping stations and

treatment plants, on the other hand, are suited for staged construction under which basic structures only are built initially for ultimate flow requirements.

The term “ultimate” refers to conditions that will approximate saturation of the area as related to development and the need for major sewer improvements.

4.5 SEWAGE FLOW DESIGN CRITERIA

In terms of volume, sewage normally consists of sanitary wastes, ground water infiltration, and storm water inflow. Pipelines and pumping facilities must have capacities sufficient to handle the sum of maximum quantities of each of these components. In order to properly design such facilities, estimates must be made of quantities to be anticipated for each component of flow.

Sanitary Sewage

Actual measured sewage flows represent the total of all components, thus giving no indication of the volume attributable just to sanitary wastes. However during the winter months when lawn and garden irrigation is at a minimum, the volume of sanitary waste is approximately equal to the amount of water consumed. Accordingly, water consumption data may be used to obtain reasonable estimates of this component of sewage flow. Water consumption in the Peaceful Valley area, per District records, averaged about 300 gpd per connection or about 108 gpcd. Future water conservation measures are expected to reduce per capita consumption to approximately 100 gpcd.

An analysis of measured historical sewage flows from 2002 to 2006 that are tributary to the wastewater treatment plant shows that dry season average flows are, on average, 5% below the annual average and wet season average flows are, on average, 5% above the annual average. Maximum day flows will normally range from 120% to 140% of the annual average flow. A review of the data indicates that October, which is considered a “dry” season month, typically exceeds the average annual flow, while the “wet” season months of February, March, and April have typically less-than-average annual flows. As discussed in the WWTP Engineering Report, the average annual daily flow for 2006 was 52,000 gpd, which is approximately 49 gpcd.

Records from treatment plants in the Puget Sound area that treat only sanitary wastes have indicated that the average daily dry weather flows vary from 60 to 100 gpcd. For this study, an average unit sewage flow of 65 gpcd will be used for design purposes. The sanitary sewage system, however, must be capable of carrying peak sewage flows that occur daily. For this study, a variable peaking factor will be used to analyze pipe and pump capacities. A peak of 4.0 will be used for initial flows from small basins. As the drainage basin becomes larger, the peaking factor will be reduced and will vary between 4.0 and 2.2 depending

on the size of the drainage basin. See Table 4.1 for a summary of the design criteria.

TABLE 4.1
DESIGN CRITERIA FOR SEWAGE FLOWS

Quantity of sanitary sewage (average):		65 gpcd	
Quantity of sanitary and industrial waste (average):			
Light industrial[1]		1,000 gpad	
Infiltration and inflow:			
Infiltration		600 gpad	
Inflow		500 gpad	
Total:		1,100 gpad	
Peaking factors for sanitary waste:			
Tributary acreage:	0-100	100-1,000	1,000-5,000
Peaking factor:	4.0	3.0	2.2

[1] Located outside of the District's sewer service area

The service area is designated as that portion of the District that lies within the proposed UGA. Whatcom County has established the development density in the Columbia Valley UGA as four units per acre. Thus, the estimated population density for the service area, with a projected household size of 2.87 persons, is approximately 11.5 persons per acre, subject to the size of existing parcels in a particular area.

Ground Water Infiltration

The quantity of water that might infiltrate into a sewer is difficult to determine and generally varies with the age of the sewer, ground water table elevation, and type of pipe materials. However, the design of the sewer system and quality control during construction has much to do with the amount of infiltration that will enter the system. For construction planned under this program, the use of pipe having joints assembled with flexible rubber gaskets has been assumed. The design allowance for infiltration is an estimated value of 600 gpad.

Surface Water Inflow

Surface water inflows consist of water that may enter the sewer system through illegal connections from roof, footing, and area drains. This type of connection is of concern in the design of a sanitary sewer system because the amount of flow from this source may exceed the design capacity of the sewer, thereby causing the sewer to become surcharged or overloaded. Even though this type of connection is strictly prohibited, it periodically occurs and, therefore, an allowance is made during design of facilities for surface water inflow. Inflow values of 1,200 gpad are used in new systems in areas of high ground water

whereas 500 gpad is used for new systems in areas with average ground water conditions.

4.6 CONVEYANCE SYSTEMS

Lateral and Trunk Sewers

Sewers must be designed with sufficient capacity to carry the peak flows from the ultimate development of the tributary area. This flow represents the sum of the several loadings calculated separately for each section of sewer or tributary area. The loadings consist of the peak flow of sanitary sewage, groundwater infiltration, surface water inflow, and any special quantities that must be considered.

The ability of a sewer to transport suspended solids contained in sewage is related to the velocity of flow in the sewer. A velocity of two feet per second is generally considered to be the minimum that will keep pipe surfaces clean and free of deposited material. Table 4.2 gives the minimum allowable slope for various sizes of sewers to obtain a cleaning velocity under average flow conditions. The Department of Ecology minimum slopes are not as conservative; however, the District has determined that the Table 4.2 slopes are the minimum for use in the District. The minimum slope for short eight-inch extensions with no possibility of future extensions is 0.0075.

TABLE 4.2
MINIMUM SLOPES FOR SEWER PIPE

Pipe Size, Inches	Slope, Foot/Foot
8	0.005
10	0.004
12	0.003

Sizes required for gravity sewers are determined by application of Manning's pipe friction formula, assuming the pipes are flowing full and have a roughness coefficient "n" of 0.013.

Where other provisions are made to provide flushing provisions by means other than normal gravity flow, variations from the minimum slopes shown in Table 4.2 can be made. These variations are often required for systems around lakes where pumping of the sewage becomes necessary and flushing velocities can be obtained by the pump discharge flow.

Force Mains and Inverted Siphons

The design of sewer force mains and inverted siphons is predicated on the fact that they flow full and under pressure. Again, as in the case of gravity sewers, the mains must be capable of carrying the peak flow from a given area. Proper

cleaning velocities are obtained in a force main by selecting a size that will ensure a suitable velocity with a specified pumping capacity.

Inverted siphons may consist of two or three parallel lines of different sizes to obtain the desired velocities. Inlet and outlet structures provide for use of one line until the flow increases to the point where the capacity of the second line is needed.

Since the design flow is either pumped or divided between parallel lines, force mains and siphons are commonly of smaller size than adjacent gravity sewers. Diameters of force mains and inverted siphons are determined by means of the Hazen and Williams formula, using a roughness coefficient "C" of 130 or as otherwise appropriate for the pipe material.

Pumping Stations

Capacities of permanent pumping stations in the trunk sewer system are based on the peak flow of all tributary sewers. Structures are normally constructed to be adequate for future requirements, with pumping units installed as required by growth and consequent flow increases. Pumps are electric motor-driven, are of a non-clog design, and the number of units is sufficient to pump design flow with any one unit out of service.

The District minimum standard for pump stations is a duplex, wetwell-mounted package station with self-priming non-clog wastewater pumps and integral control panel. Onsite standby power shall be provided. The station shall include an autodialer for remote monitoring of critical status and alarms, with radio or telephone communication. The station shall be accessible by vehicle.

Sewer Materials

Although below ground and not visible, sewers present structural and maintenance problems just as any visible structure does. The materials acceptable for gravity sewer construction consist of polyvinyl chloride (PVC) and, for certain applications, ductile iron. Force mains shall be PVC, ductile iron, or high-density polyethylene (HDPE). The pipes shall be connected by flexible, rubber-gasket type joints. In addition, the rigid pipes must pass standard crushing, flexural, and fill tests to ensure that the installation will be watertight and able to withstand the earth and traffic loads after placement in the trench.

Precast, reinforced concrete manholes have been the proven standard for manholes for many years. Properly installed rubber gasket seals and gasketed pipe entry collars have significantly reduced infiltration.

Sewer Locations

In general, the lateral and trunk sewers will be located in existing street rights-of-way or in proposed street areas where possible. Gravity sewer systems are

preferred over those that require installation of pump stations in order to minimize maintenance concerns.

CHAPTER 5 – EXISTING SEWER SYSTEM

CHAPTER 5

EXISTING SEWER SYSTEM

5.1 EXISTING FACILITIES

Whatcom County Water District No. 13 presently owns, operates, and maintains a domestic wastewater collection and interceptor system consisting of two pump stations, approximately 20,200 feet of pressure and gravity sewer pipe, a wastewater treatment plant, and a 6-inch diameter force main (approximately 3,400 feet) that transfers flows from the treatment plant to the approximately 1.71-acre drainfield. Approximately 650 acres of the District have sewer service available by this system or through extensions within the UGA ("existing service area").

The collection system was constructed in 1976/77 under three contracts. Initially, discharge from the system was negligible and no NPDES permit was required. Increasing development, however, led to issuance of a State Waste Discharge permit on January 25, 2001.

The system is centered within the District boundary primarily to the east of Kendall Road (SR 547). The treatment plant and drainage field, however, are located west of Kendall Road. Approximately one-third of the system (to the east) is intercepted and pumped to the gravity system that flows south and west to the treatment plant vicinity where all flows are pumped to the plant. The existing collection system force main is 4 inches in diameter. The gravity collection pipes are 8 and 12 inches in diameter. A more detailed discussion of the treatment plant is presented in Chapter 6.

Presently, the District has a pump station in the collection system and one at the treatment plant. Approximate pumping capacity of each station is shown in Table 5.1.

TABLE 5.1
EXISTING PUMPING FACILITIES

Pump Station	Pump Capacity*	Station Type	Power Outage Operation
@ MH D-1	300 gpm/29' TDH	Submersible	Standby Generator
@ MH A-1	200 gpm/27' TDH	Wet Well Mounted	Standby Generator

*Capacity is for one pump. Each station has two pumps.

Currently, individual residences are connected to the sewer mains by gravity side sewers. Most service connections are 6 inches in diameter and serve two lots but where topography or layout dictates, 4-inch diameter connections to individual lots are used.

The existing collection system has been analyzed to determine its present hydraulic capacity and this capacity was compared to the estimated wastewater flows that would be generated throughout the service area at full build-out. See Appendix D, Collection System Hydraulic Analysis, for the analysis. The capacities of selected portions of the existing collection system are indicated on Figure 5.1. With the sewage design criteria discussed in Chapter 4, most elements of the system would be potentially near or "under" capacity with full development of the existing service area.

The present capacity of the pump station downstream of Manhole D-1 on Green Valley Drive is 300 gpm whereas a peak flow of 550 gpm is estimated by the hydraulic analysis for full development of the existing service area. The pump station upstream of Manhole A-1, which conveys all of the District's flow from the interceptor/collection system to the treatment plant, has a capacity of 200 gpm, whereas the analysis estimates a future (buildout) peak flow of 1,320 gpm[1]. An analysis of the existing system in the vicinity of the Green Valley force main indicates that the force main to Manhole B-9 can accommodate an additional 30 acres of development before an upgrade will be required.

The system appears to be adequate for the planning period if the growth is distributed relatively evenly over the service area. The analysis indicates that the capacity of some pipes will be exceeded if full build-out occurs or, in other terms, if the worst-case scenario is realized. However, the analysis uses conservative factors including values for inflow and infiltration and the assumption that all areas will be developed and occupied at maximum density. For this planning period, the existing collection system is deemed acceptable for future service and no improvements are recommended at this time. However, development patterns, per-capita or per-RCE flows, and inflow and infiltration should be periodically evaluated to confirm that the collection system continues to have adequate capacity. At full build-out and maximum density, three-quarters of the sewer trunk between the two existing pump stations will need to be upsized. The exceptions are the reaches between Manholes B-10A to B-10 and Manholes A-10 to A-3. For each proposed development, a review of the system's capacity should be conducted to determine if an upgrade to the existing system will be required. In the vicinity of the Green Valley pump station and force main—that is, the eastern part of the District, development should be monitored more closely to ensure that the existing pump station and force main can adequately serve new connections.

5.2 OPERATION AND MAINTENANCE

Whatcom County Water District No. 13 has contracted with Water and Wastewater Services, LLC, of Mount Vernon for operation and maintenance of

[1] Refer to the WWTP Engineering Report, September 2011, for additional discussion of future peak influent flows.

the wastewater collection system and the treatment plant. Water and Wastewater Services has a staff of one certified operator for normal daily operations, for emergency conditions or repairs, and for on-going preventive maintenance of District facilities. The operator is certified by the State of Washington as a Wastewater Treatment Plant Operator, Group II.

Regular maintenance procedures include annual inspection of manholes and twice-weekly inspection of the sewer pump stations. An operator is present daily at the wastewater treatment plant. This operator's daily work routine includes the following tasks:

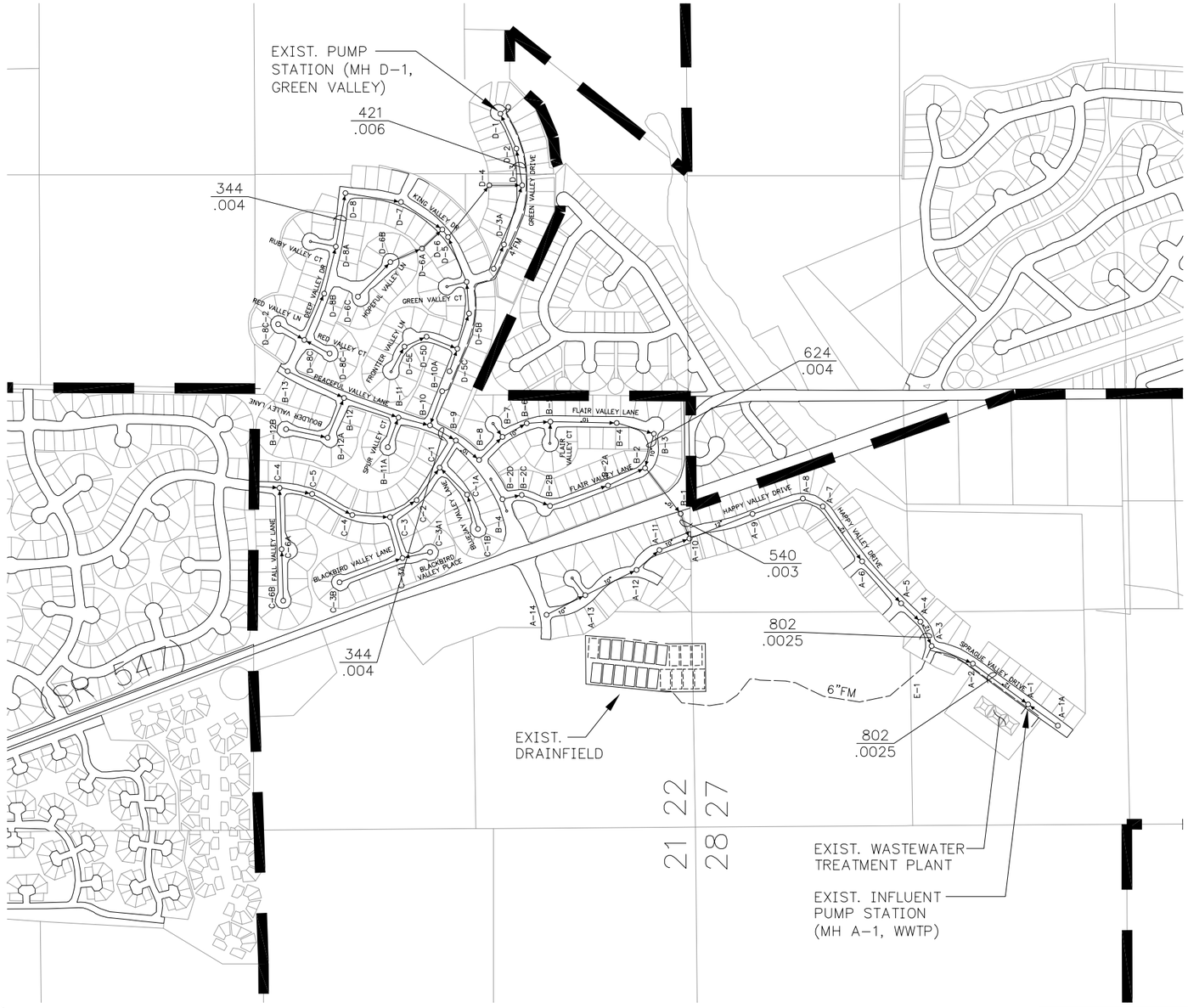
1. Sample collection, lab work, and process control.
2. Data recording/report preparation.
3. Equipment checks.
4. Customer relations/utility locates.
5. Answering phone calls.
6. Side sewer installation observation.
7. Pump station checks (twice weekly).

Existing pipes are monitored by television inspection on an as-needed basis.

Normal operation and alarm conditions at the Green Valley pump station (just downstream of MH D-1) are relayed via an auto-dialer system to the treatment plant and monitored by the operator. The treatment plant's autodialer will page an operator if an alarm condition is detected outside of normal business hours.

5.3 INFLOW AND INFILTRATION

A detailed evaluation of inflow and infiltration (I/I) has not been completed. The operator reports no apparent I/I problems. The WWTP permit conditions require completion of an I/I evaluation by May, 2013 (see Section 6.2).



LEGEND

- **DISTRICT BOUNDARY**
- **MANHOLE/SEWER** (ALL 8" UNLESS NOTED OTHERWISE)
- 6"FM — **FORCEMAIN**
- 450 / .004 — **EX. CAPACITY (GPM)** **EX. SLOPE (%)** THE PIPES CALLED OUT REPRESENT LOWEST CAPACITY EXISTING PIPES IN THAT SEGMENT OF SYSTEM.

800 400 0 800 1600

SCALE IN FEET

WHATCOM COUNTY WATER DISTRICT NO. 13
COMPREHENSIVE SEWER PLAN

FIGURE 5.1

EXISTING SEWER SYSTEM

800704-WCW013 Comprehensive Sewer Plan\Comp Plan\CAD 800704\WCW013-CSP-Fig-5.1_2012.dwg 8/14/12

CHAPTER 6 – WASTEWATER TREATMENT PLANT

CHAPTER 6

WASTEWATER TREATMENT PLANT

6.1 EXISTING FACILITIES

The District owns and operates a wastewater treatment plant (WWTP) west of Kendall Road (SR 547). The plant was constructed in 1976/77. Operation of the plant is in accordance with State Waste Discharge Permit No. ST-7367 issued by the Washington State Department of Ecology on August 4, 2011. See Appendix B for a copy of the updated Permit. The constructed infiltration area is approximately 1.71 acres and the infiltration area of the previously planned 20 cells would be approximately 2.05 acres,

The treated effluent is conveyed by a 6-inch diameter main that transfers flows from the treatment plant to the drainfield. The plant has a standby generator for use in the event of a power outage.

As of July 2007, the District served approximately 379 connections (RCEs). The average daily flow for 2006 was about 52,000 gpd. The average daily flow for the maximum month in 2006 was 63,000 gpd. Wet season average daily flow was 55,000 gpd and dry season average daily flow was 49,000 gpd. For 2006, the unit flow per RCE was about 137 gallons per connection per day or 49 gpcd assuming 2.79 persons per connection. For the same period, the wet season (November thru April) flow was 145 gpd/RCE or about 52 gpcd. This indicates that the 70 gpcd and the 1,100 gpad inflow/infiltration discussed in Chapter 4 are conservative, as they should be for planning purposes.

The maximum month average daily flow for 2008 was 61,900 gpd.

WWTP biological oxygen demand (BOD_5) and total suspended solids (TSS) loading data were evaluated for the 2006. BOD_5 averaged 204 milligrams per liter (mg/l) with a maximum month of 296 mg/l, corresponding to 0.227 pounds per day (ppd)/RCE (annual average) and 0.385 ppd/RCE (maximum month). TSS averaged 113 mg/l with a maximum month of 230 mg/l, corresponding to 0.127 ppd/RCE (annual average) and 0.301 ppd/RCE (maximum month).

The effluent limitations in the current discharge permit address BOD, TSS, pH, and hydraulic capacity, and are monitored at the lagoon discharge. Groundwater enforcement limits are applicable to nitrate (as NO_3-NO_2), total dissolved solids, chloride, pH, sulfate, and total coliforms, which are measured in monitoring wells down-gradient of the infiltration basin.

The District's plant is the only treatment facility in the immediate topographical drainage basin. Other domestic treatment facilities, within approximately twenty

miles (in the United States) include those operated by Bellingham, Ferndale, Lynden and Everson. Industrial facilities within approximately twenty miles include Brooks Manufacturing, Bellingham Airport Woodwaste Landfill, Georgia Pacific, Hannegan Properties, Lehigh Northwest Cement Co., Oeser Co., PSE Encogen Generating Station, Puglia Engineering, Inc. and the Department of Fish and Wildlife Hatchery all in Bellingham; Darigold in Lynden; and Hilltop Woodwaste Landfill in Everson.

This facility does not discharge to surface waters. The facility is not subject to an adopted water quality management plan, pursuant to the Federal Water Pollution Control Act, as amended.

6.2 EVALUATION AND RECOMMENDATIONS

It is recommended that the District update the comprehensive sewer plan within six years, or sooner, if land use changes impact the sewer service area or development density therein or if effluent limits are changed. Whatcom County is required to review and update its UGAs by June 30, 2016. This plan should be updated in conjunction with the next UGA update.

The discharge permit includes requirements for several report submittals during the permit period including the following special scheduled assessments:

- Operations and maintenance manual update or review confirmation letter November 1, 2011, and annually thereafter.
- Ground water monitoring plan by February 1, 2012.
- Operations and maintenance manual best management practices by December 23, 2011.
- Infiltration and inflow study by May 30, 2013.
- Draft security plan for drainfield by December 23, 2011.
- Drainfield evaluation reports, one by July 30, 2012, and a second by July 30, 2015.
- Application for permit renewal by March 1, 2016.

The existing facility includes an influent pump station, headworks with bar screen and channel grinder, three lined lagoons (two used for aeration and one for settling), chlorine contact chamber, discharge pump station, drainfield and operations building with laboratory and office. Sludge handling is accomplished by settling and removal from the lagoons, with hauling in liquid form for land application on permitted fields.

Gray & Osborne, Inc. (G&O) has concurrently prepared a WWTP Engineering Report to evaluate the existing plant, consider alternatives for upgrades and recommend a treatment facility capital improvement plan. The analysis by G&O and preparation of the new discharge permit was supported by a Ground Water Quality Evaluation Report prepared by Associated Earth Sciences, Inc. (December, 2010). This Report included field investigations and analysis of

water quality, quantity and loading effects to determine nitrate loading limitations at the WWTP drainfield.

The existing WWTP provides adequate capacity and treatment capability to treat the influent wastewater to meet or exceed the discharge permit criteria. For example, the facility met all parameters throughout 2011. Additionally, G&O evaluated the adequacy of treatment capacity in its report and concludes the current treatment plant is sufficient, for the permitted flows and loadings.

Future flow and loading is anticipated to be entirely domestic. Service by the District to the planned light-impact industrial area at the northend of the UGA is not anticipated.

The Engineering Report concludes that growth within the District through the planning year of 2029 will not produce flows that will exceed the current permit levels[1]. The report recognizes that much of the existing WWTP equipment has exceeded its design life and will need to be replaced during the planning period. The proposed activities within the 20-year planning period include the following:

- Replace influent pump station equipment.
- Upsize approximately 350 feet of 4-inch force main to 6 inches.
- Replace the headworks' comminutor.
- Install a second floating surface aerator in Lagoon No. 2.
- Replace the liners in Lagoons No. 2 and No. 3.
- Install a new liquid sodium hypochlorite disinfection system, as required, to meet potential future fecal coliform limits.
- Purchase additional land for drainfield expansion.
- Complete an infiltration and inflow study as required by the permit.
- Set aside $5,000 each year for maintenance and/or replacement of equipment, including floating surface aerators, valves, and gates.

The WWTP Engineering report also considers the needs of the District to serve anticipated connections beyond year 2029. The existing lagoon system will not be adequate for higher flows and anticipated nitrate concentration limits. Two alternatives for a future upgrade are considered: sequencing batch reactor (SBR) or membrane bioreactor (MBR).

[1] The Engineering Report is based on the District growth rate projection as presented in Chapter 3, resulting in 549 RCEs by 2029. The County Comprehensive Plan anticipates faster growth, resulting in 697 RCEs by 2029. If actual growth is as anticipated by the County Plan, the WWTP upgrade discussed herein would need to be adjusted to be complete in year 2020.

The MBR process is the recommended future process, in the context of anticipated effluent limitations and the use of a drainfield for disposal. That upgrade would include a new influent pump station, replacement headworks with fine screening, anoxic basin, aeration basins and membrane basins. One existing lagoon basin would be configured to serve as influent equalization. A UV disinfection system would be added for disinfection. The remaining lagoons would be reconfigured for improved sludge stabilization and storage. Expansion of the drainfield would be required as well at that time.

The WWTP Engineering Report does not include costs estimates for additional land or easements for the expanded drainfield, associated with the future plant upgrade.

6.3 WATER RECLAMATION

The use of secondary effluent, treated to meet the requirements for reclaimed water, is being considered and implemented in a number of areas in Washington as potable water resources are unable to keep pace with growth.

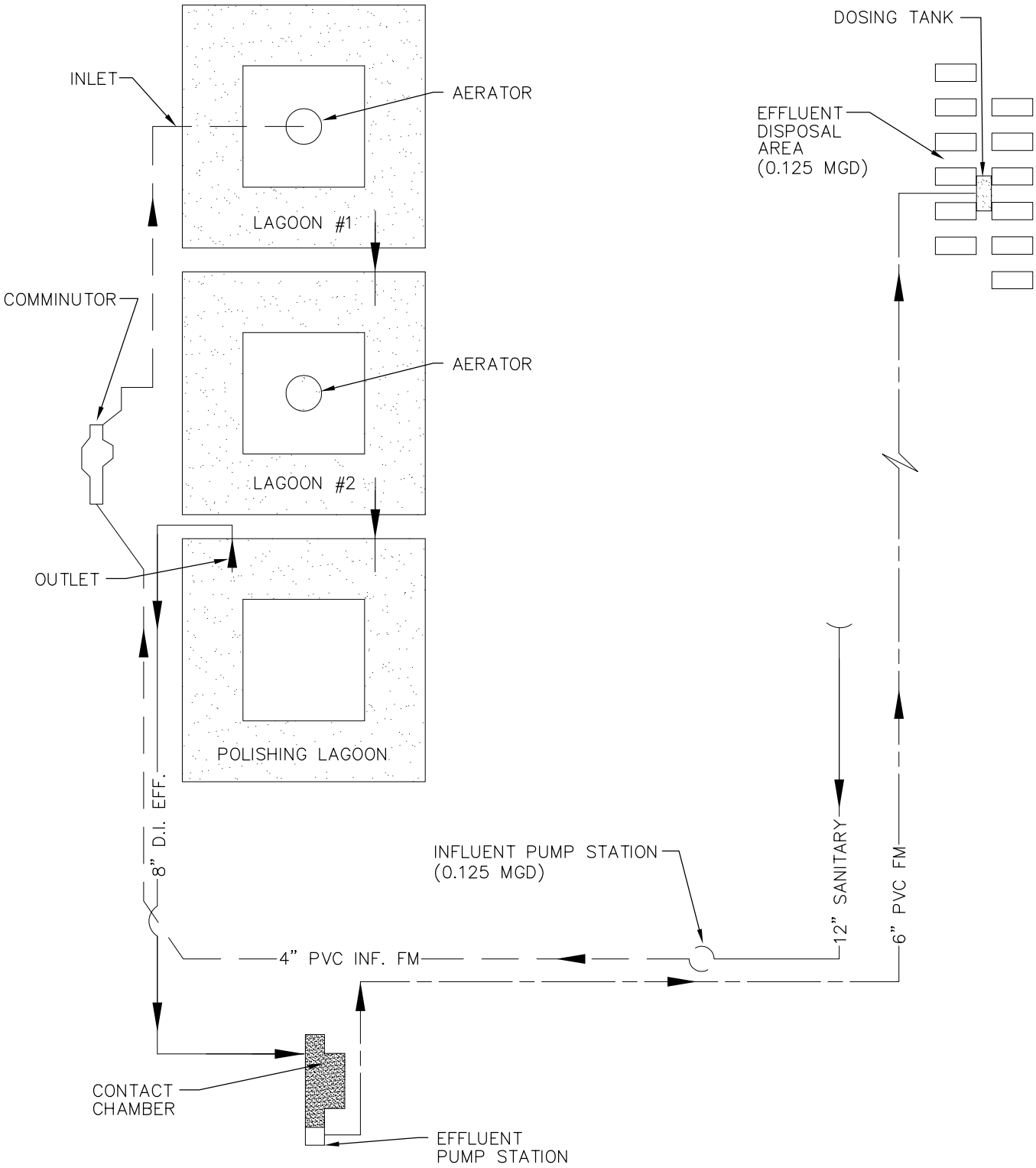
There are four classes of reclaimed water, as defined by the State: Class A, B, C and D. Class A is the highest class and has the widest range of potential uses and least restrictions on its use. Class A reclaimed water is oxidized, coagulated, filtered and disinfected wastewater. Classes B, C and D are each oxidized and disinfected wastewater, with lesser degrees of disinfection.

The level of treatment provided by the existing plant partially meets the basic requirements for oxidation of all four classes of reclaimed water (BOD_5 and TSS of 30 mg/l). Additional or enhanced treatment process units would be necessary for coagulation and flocculation in order to meet the requirements for Class A reclaimed water. These units could include chemical addition and mixing equipment, flocculation basins, and filters with backwash and solids handling equipment or low-solids membrane filters. Enhancements of the disinfection system may be necessary to achieve the appropriate level of disinfection for each class of reclaimed water. Depending on the proposed use of the reclaimed water, a chlorine residual may be required.

Typical beneficial uses of reclaimed water include golf course and landscape irrigation, construction (dust control and compaction), industrial process water, sewer flushing water and groundwater recharge. Additional lower volume uses may be identified once the primary infrastructure is in place (e.g. fire sprinkler systems and residential landscaping).

To produce Class A water for reuse, the WWTP would need to be converted and upgraded to a water reclamation facility (WRF). In addition to the treatment process improvements, a variety of reliability improvements would be required to assure delivery of the highest quality water at all times.

The community served by the District is nearly all residential housing. There was a golf course in the District but it is been closed and the grounds are anticipated to be developed with residential, commercial and local government facilities. There is no industrial land in the District and the nearest such land use designation is on the north side of Columbia Valley Water District, about two miles from the District WWTP. The cost of a reclaimed water transmission main would likely exceed the benefit of industrial beneficial use of reclaimed water. Future development may desire reclaimed water for landscaping uses. However, it is presumed that the expense for conversion of the WWTP to a WRF, along with the cost of the irrigation distribution system, for a relatively short growing season in the foothills would far exceed the benefits. There are no known uses of potable water in the immediate area that could be replaced by reclaimed water, to extend the potable water resource for planned growth and water conservation. It is therefore presently presumed that there are no immediately obvious potential users of reclaimed water in the District or immediately adjacent areas. A more detailed feasibility analysis should be completed if a specific need or potential use for reclaimed water is identified.



WHATCOM COUNTY WATER DISTRICT NO. 13
COMPREHENSIVE SEWER PLAN

FIGURE 6.1

EXISITNG WASTEWATER TREATMENT PLANT SCHEMATIC

800704-WCWD13 Comprehensive Sewer Plan\Comp Plan\CAD 800704 WCWD13-CSP-Fig-6.1_2012.dwg 2/27/12

CHAPTER 7 – CAPITAL IMPROVEMENT PROGRAM

CHAPTER 7

CAPITAL IMPROVEMENT PLAN

7.1 GENERAL

The development of a comprehensive plan for the maintenance and expansion of the Whatcom County Water District No. 13 sewer system is set forth in this plan. The land use, design criteria, and existing system review presented in preceding chapters were used to formulate the plan.

The existing system was reviewed to determine the necessity of replacing or repairing any components of the system. Once deficiencies were noted, each project was evaluated and a recommended sequence for construction was established. The timing of construction or of upgrading such facilities is contingent upon that point in time for which system demand is expected to exceed the capacity of the existing facilities.

Following is a discussion of the service area of Whatcom County Water District No. 13 and a capital improvement plan which includes cost estimates and a recommended schedule for upgrading and/or improving the District's facilities.

7.2 SERVICE AREA

It is expected that future sewer line construction within the District will occur primarily by means of developer extensions in accordance with District standards and policies. All such extensions are designed and constructed in accordance with District standards and policies, Department of Ecology design criteria, and good engineering practice. Development of this type will progress outward from the existing system. Scheduling of these projects is dependent on the plans of the property owners wanting or needing sewer service.

Because future improvements depend on how and when a particular property is developed, the scope of all future system improvements cannot be detailed. However, the general framework for connecting unserved property with the existing system has been outlined and is shown on Figure 7.1. Particular properties may be served by connection to the existing system at a point different than anticipated in development of this plan, depending on the size and location of the property to be served, site/profile constraints and sewer extensions occurring after completion of this plan. The service pattern shown on Figure 7.1 generally follows the natural topography and connects to the existing system as far upstream as reasonably possible to conservatively assess the potential impact on existing system capacity.

In order to provide local independent review and avoid haphazard and disjointed provision of municipal services, the Washington State Boundary Review Board (BRB) for Whatcom County has been established in accordance with state statutes. The BRB reviews actions proposed by cities, towns and special purpose districts. Actions requiring review include boundary changes and permanent extension of water and sewer lines and service beyond city limits or district boundaries. To initiate the Board's review, the action initiator must prepare a Notice of Intention with the details of the proposed action. A public hearing is held, and the Board reviews the proposed action against criteria cited in the state statute.

The BRB may waive a formal review and approve the request as submitted, or review for up to 45 days, invoke the BRB jurisdiction, collect public comment during a 120-day hearing period, and then act on the request.

The District has maintained a general practice that it would serve areas upon petition of owners within the area subject to land use regulations and reasonable cost. Owners of property representing 60% or more of an area are required to petition for sewer service and annexation when District services were desired.

The District recognizes that it cannot extend public sewer service to areas designated as rural, forestry, agricultural, etc., unless such is allowed under state law, case law, county code, and/or policy. Presently these areas are considered “rural” and, as such, in the absence of an existing environmental problem cannot be served by public sewer.

It is anticipated that most future sewer collection and conveyance system improvements will be located in existing or future Whatcom County right-of-ways. WCC 12.27 and Whatcom County Development Standards (WCDS) Section 512 address utility installation requirements in County public road right-of-ways.

A County/District Franchise Agreement per RCW 36.55 and WCC 12.24 is required as a prerequisite to anyone installing, operating and maintaining sanitary sewer infrastructure and facilities in County public road right-of-ways.

7.3 FINANCES

The revenue to operate the District is obtained through a monthly service charge. Essentially the entire charge is for repair, replacement, administration, operation, and maintenance of the District's facilities. The monthly service charge is $52.00 per RCE.

The current general facilities charge (GFC) is $3,125 per RCE. (Following adoption of this Comprehensive Sewer Plan, it is anticipated that the District will review and revise the general facilities charge to reflect the new Capital Improvement Plan.) The cost of a side sewer inspection is $25.00.

The WWTP Engineering report includes a chapter addressing financial analysis. That analysis focuses only on the improvements considered in that plan, and does not include the inflow and infiltration analysis required by the discharge permit. The analysis should be updated, with respect to impact on rates and GFCs for all work outlined in this Plan.

7.4 CAPITAL IMPROVEMENT PLAN

The following sections outline the Capital Improvement Plan for the entire 20-year planning period through 2029 for the Whatcom County Water District No. 13. This plan is intended to be a guide for improving the existing District facilities and expanding the system. Each section discusses proposed projects and estimated project cost. Locations of the capital improvement projects are shown on Figure 7.1.

Cost estimates involve an engineering judgment based on experience, but construction costs can vary over a wide range because of the many factors that cannot be predicted such as labor availability, competitive conditions, management, environmental considerations, and other intangibles affecting construction costs at the time the work is actually performed. Generally, actual costs cannot be known until bids are received, and even these may be subject to adjustment because of changed conditions. The District, in its decision-making, must always keep in mind that the costs presented in this plan are estimates.

Construction costs are estimated from prices obtained from various sources, including manufacturers and suppliers of materials and equipment and bid prices for projects in other communities in the area. In considering these estimates, it is important to realize that changes during final design quite possibly will alter the total cost to some degree, and future changes in the cost of material, labor, and equipment will also have a direct impact. Prior to the initiation of the projects shown in this Capital Improvement Plan, the project costs should be reviewed and updated to reflect current conditions.

The cost estimates presented are based on 2011 prices (ENR Index 8758) and represent estimated total project costs. Project costs include construction cost plus a contingency of 25 percent as well as allied costs. Allied costs include consultant services, interest, taxes, District administration costs, etc. These allied costs have been estimated at 35 percent of the construction cost based on the following breakdown:

State sales tax	8.4%±
Permitting, environmental, engineering design, surveying, inspection, administrative, etc.	24.6%
Legal	1.0%

Administration, interest during construction, financial fees, etc.	1.0%
TOTAL	35.0%

Cost estimates for work at the WWTP are as prepared in the WWTP Engineering Report.

Operation and maintenance costs are not reflected in the project cost estimates. However, these costs are important and require thorough consideration during the design phase of a proposed facility or project. As new facilities are constructed, the sewer service rates should be reviewed and increased appropriately to provide continued funding for an expanding and aging system. In addition, as the District grows, additional funding will be necessary for administration, automation of customer accounts, etc. Rates must keep pace with these funding requirements.

Wastewater Treatment Plant

As discussed in Chapter 6, improvements at the treatment plant will be necessary in the 20-year planning period. The recommended WWTP improvements, per Engineering Report Table 6-8, include:

- Replace influent pump station equipment
- Replace influent pump station force main
- Replace comminutor
- Install new floating surface aerator
- Reline Lagoons No. 2 and No. 3
- Refurbish chlorination equipment
- Purchase additional drain field property

The Engineering report also recommends an annual maintenance allowance for keeping existing equipment in working order. The recently issued discharge permit requires an inflow and infiltration study by May 2013.

The WWTP Engineering Report evaluated alternatives for the WWTP replacement when the number of connections approaches 549 RCEs. Chapter 3 discusses potential growth forecasts, including recognition that the County anticipates this occurring by about 2020. The District anticipates slower growth in the near term. For purposes of the Capital Improvement Plan, the WWTP upgrade will be scheduled for completion by 2020, consistent with the County Plan. However, the District will continue to monitor growth, flow and loadings and prepare to upgrade the WWTP consistent with the requirements of the discharge permit. The report recommends that a membrane bioreactor process be implemented, with an expanded drainfield.

Interceptor/Collection System Improvements

As discussed in Section 7.2, future sewer system extensions are expected to be by developer extensions or small utility local improvement districts (ULIDs). All gravity sewer extensions anticipated in this plan are eight- or ten-inch diameter pipes. These are considered local facilities and extension of such local facilities is not specifically listed herein. Similarly, proposed Pump Station A serves land owned in whole by one property owner. If developed, the station and force main should be considered a local facility, with the property owner responsible for its construction to District standards, for ownership and operation by the District.

Other Recommendations

The discharge permit includes requirements for several report submittals during the permit period including the following special scheduled assessments:

- Operations and maintenance manual update or review confirmation letter November 1, 2011, and annually thereafter.
- Ground water monitoring plan by February 1, 2012.
- Operations and maintenance manual best management practices by December 23, 2011.
- Infiltration and inflow study by May 30, 2013.
- Draft security plan for drainfield by December 23, 2011.
- Drainfield evaluation report one July 30, 2012, and July 30, 2015.
- Application for permit renewal by March 1, 2016.

The cost of these studies has not been determined but we recommend that the District budget an allowance of $50,000 for these studies (not including the inflow and infiltration study) until such time as better information is available.

The Comprehensive Sewer Plan will need to be updated if the County changes the land use or zoning in the service area, or if there is need and support for significant extension of sewer service beyond the service area. A budget of $65,000 is recommended for a Comprehensive Sewer Plan update.

Prior to entering into a developer extension agreement, the District should develop a comprehensive developer extension manual that defines the process and includes a sample agreement, a checklist, and standard details, plans, and technical specifications. An allowance of $5,000 is recommended for developer project manual preparation.

Drainfield Easement

In the 1975 comprehensive plan, it was recommended that a permanent easement be secured over the entire golf course and all open space for the purpose of constructing, operating, and maintaining sewerage facilities. Although the District's files include a legal description and survey delineating an easement associated with the existing drainfield and force main, no dedication or recorded

easement is found in either the District's records or during a preliminary search of public records[1].

TABLE 7.1
SEWER SYSTEM PROJECTS

	Project Description[2]	***Preliminary Estimated Project Cost*** *(2011 dollars)*
1	Replace influent pump station equipment (WW1)	$169,000
2	Replace influent pump station force main (WW2)	$121,000
3	Replace comminutor (WW3)	$81,000
4	Install new floating surface aerator (WW4)	$18,000
5	Reline Lagoon No. 2 (WW5)	$98,000
6	Reline Lagoon No. 3 (WW6)	$98,000
7	Refurbish chlorination equipment (WW7)	$20,000
8	Purchase additional drain field property (WW8)	$40,000
9	Reserves for annual maintenance fund (WW9), through 2020 only	$45,000
10	Infiltration and inflow study	$10,000
11	Upgrade 717 LF sewer trunk line between MH A-3 and influent pump station to 15-inch pipe.	$273,000
12	For development to the northwestern portion of the service area, install 1,280 LF 8-inch pipe and 2,785 LF 10-inch pipe (trunk line; assumed to be constructed in two phases).	$347,000 $809,000
13	For development to the southwestern portion of the service area, install 140-gpm pump station (A) and 1,050 LF 4-inch force main to MH A-1A.	$629,000
14	Upgrade 1,242 LF sewer trunk between approximately MH A-8 and MH A-3 to 15-inch pipe.	$472,000
15	For development to the southern portion of the service area, install 1,350 LF 8-inch pipe (trunk line).	$338,000

[1] The WWTP discharge permit indicates the drainfield is on an easement, but CHS Engineers has not been able to independently verify such an easement has been executed. If, in fact, the easement has been granted and it is adequate for the District's future needs, the subsequent recommendation is not applicable.
[2] WW# indicates project from WWTP Engineering Report.

16	For development to the southern portion of the service area, install 1,840 LF 4-inch force main and 140-gpm pump station (B) to MH A-8.	$763,000
17	Between MH B-10A and MH B-9, upgrade 425 LF of pipe to 10-inch and between MH B-8 and MH A-10, upgrade 1,883 LF to 12-inch pipe.	$750,000
18	Increase Green Valley pump station capacity to 550 gpm and upgrade 1,820 LF force main to 6 inches.	$746,000
19	For development to the northeastern portion of the service area, install two 8-inch sewer trunk lines having lengths of 3,245 LF and 4,220 LF.	$1,867,000
20	WWTP MBR Upgrade (WW PH II)	$7,822,000
	TOTAL	**$15,516,000**

It is recommended that easements for the existing facilities be secured as soon as possible. And, as new development occurs, easements for facilities expansion, as discussed in the Engineering Report, should be secured.

An allowance of $20,000 for legal, engineering, and administrative costs is recommended to secure easements.

Construction Schedule

Table 7.2 is a proposed construction schedule for implementing the projects identified in the Capital Improvement Plan, for those projects anticipated to be necessary within the twenty year planning period. (With full development of the service area anticipated far in the future, most collection system upsizing projects are not anticipated in the planning period. Also, the cost of new sewer facilities associated with development of the two small unsewered areas at the south end of the District is anticipated to delay such development at urban densities). The probable funding source key letter(s) (A, B, C, or D) listed with the project costs references the potential sources discussed in Section 7.5.

7.5 PROJECT FUNDING SOURCES

There are three principal ways that the improvements outlined in this report can be financed. Rates and charges must be maintained at an adequate level to ensure a sufficiency of funds to properly maintain and operate the system and provide funds for construction of the comprehensive sewer plan through a combination of cash contributions and debt financing. See Figure 7.2 for a general schematic of special purpose district finances.

A. Developer Financing

Most of the new facilities constructed in the District will be financed by developers of presently unimproved property. All of the improvements

required for service to property within new plats or presently unserved parcels will be designed and constructed in accordance with the District's *Developer Project Manual*. In some cases, latecomer agreements may be executed for sewer mains serving property other than the property owned by the developer that is financing the project.

B. General Facilities Charges/Revenue Bonds

WWTP improvements, pump stations, oversizing of gravity sewers and force mains are of a general benefit to the District and may be financed by revenue bonds or through accumulation of general facilities charges. The District may use whatever funds are available for the payment of the debt service on the revenue bonds. A major source of these funds is from sewer service payments from District customers. However, all funds, such as general facilities charges, local facilities charges, or latecomer charges, may be used for debt service.

Sewer system improvements that will service many different property owners in areas that are already developed may be financed through the establishment of a ULID. The financing is accomplished through the sale of revenue bonds. These bonds are retired with income from the assessments and/or other funds of the District.

C. Grant/Loan Funds

The state and federal authorities have previously provided funds under the various grant and loan programs for the construction of major improvements to or rehabilitation of sewer systems. The only known programs available at this time are the Centennial Clean Water Grant Fund, State Revolving Loan Fund, Farmers Home Administration (RDA), and Public Works Trust Fund Loan Program. The District should continuously monitor the activities of the state or federal agencies to determine the requirements of these programs or of any new grant programs that may be developed in the future.

D. Monthly Service Charges

In limited instances, existing customers should contribute to certain projects, if that project provides replacement material, equipment, and/or capacity or similar benefit for both existing and future customers. A portion of the funds collected from monthly service charges should be directed to the replacement element of the capital improvement program. The District develops annual capital and operation/maintenance budgets following review of prior year’s expenses and growth and anticipated new customers and projects. These budgets are developed separately for the sewer and water systems, with general District administration expenses split between each utility. The utility charges (revenue projections) are also reviewed annually to determine if changes in the rates are necessary.

Table 7.3 indicates recent and projected debt service and operation/maintenance expenses. The projections in this table are very general. As capital projects are scheduled, the District evaluates available options for financing and then determines if debt financing is necessary. The projected increase in operation and maintenance expenses assumes such costs will increase at a rate of 2.5% per year. Sewer RCEs are forecast to increase as discussed in Chapter 3. The cost per service is presented per the schedule of projects in Table 7.2, and also with the WWTP deferred to the end of the planning period, for comparison purposes.

Table 7.4 presents a very general financing plan based on the annual operating and debt service costs presented in Table 7.3, with the WWTP complete by 2020 and also by 2029. The monthly service charges and general facilities charges presented in Table 7.4 are for order-of-magnitude discussion purposes only. Several factors impact determination of such charges. Table 7.4 was developed to maintain positive cash balances over the twenty-year planning period in generic capital and operating funds. More detailed analysis by the District is necessary before such charges are adopted. The analysis for the WWTP completion at the end of the planning purposes is less certain. The District could set higher charges for the next twenty years and accumulate cash to reduce the level of debt financing in 2027 or could defer higher charges until the debt is incurred. Table 7.4 presents a scenario somewhere between these extremes.

TABLE 7.2
TWENTY-YEAR CAPITAL IMPROVEMENT PROGRAM

YEARS 2012-2016

	CAPITAL IMPROVEMENT	Funding	2012	2013	2014	2015	2016
1	Replace influent pump station equipment (WW1)	B, C, D	$169,000				
3	Replace comminutor (WW3)	B, C, D				$81,000	
4	Install new floating surface aerator (WW4)	B, C, D				$18,000	
8	Purchase additional drainfield property (WW8)	B, D				$40,000	
9	Reserves for annual maintenance fund (WW9)	A, B, D	$5,000	$5,000	$5,000	$5,000	$5,000
12	Northwestern service area development (new pipe)	A			$347,000		
19	1,000 LF of trunk for development to northeast	A			$250,000		
	Easements for existing facilities	B, D	$10,000				
	Developer Extension Manual	B		$5,000			
	Easements for future facilities	B			$10,000		
10	Infiltration and inflow study	B		$10,000			
	Discharge permit: required studies	B, D	$20,000	$20,000		$10,000	
	TOTAL		**$204,000**	**$40,000**	**$612,000**	**$154,000**	**$5,000**

TABLE 7.2 - continued
TWENTY-YEAR CAPITAL IMPROVEMENT PROGRAM
YEARS 2017-2021[3]

	CAPITAL IMPROVEMENT	Funding	2017	2018	2019	2020	2021
	Comprehensive Sewer Plan Update	B, D	$65,000				
5	Reline Lagoon No. 2 (WW5)	B, C, D	$98,000				
2	Replace influent pump station force main (WW2)	B, C, D			$121,000		
20	WWTP MBR Upgrade (WW PH II)[4]	B, D		$322,000	$1,500,000	$6,000,000	
6	Reline Lagoon No. 3 (WW6)	B, C, D			$98,000		
7	Refurbish chlorination equipment (WW7)	B, C, D	$20,000				
9	Reserves for annual maintenance fund (WW9)	A, B, D	$5,000	$5,000	$5,000	$5,000	
12	Second phase-Northwestern service area development (new pipe)	A			$809,000		
19	Second phase-Northeastern service area development (2,000 new pipe)	A	$500,000				$1,117,000
	TOTAL		**$688,000**	**$327,000**	**$2,533,000**	**$6,005,000**	**$1,117,000**

Funding:
- A – Developer financing
- B – General facilities charges/revenue bonds
- C – Grant/loan funds
- D – Monthly service charges

TOTAL, 20-YR CIP	**$11,685,000**

[3] No capital projects from Table 7.1 are anticipated for completion between years 2022 through 2029.
[4] If growth in connections per District's forecast, project may be deferred to years 2027, 2028 and 2029. Growth related projects other than WWTP may also be deferred but not tracked here because they are largely developer-funded, donated facilities.

TABLE 7.3
SEWER SYSTEM COST PER SERVICE
(WWTP complete by year 2020)

Description	Projected				
	2012	**2017**	**2022**	**2027**	**2029**
Approx. Debt Service*	$18,000	$0	$695,769	$695,769	$695,769
Operating Expense**					
O & M***	$135,769	$153,610	$305,124	$345,220	$362,696
Gen. & Admin.	$70,092	$79,303	$89,724	$101,514	$106,653
Repair/Replacement	$29,803	$33,719	$38,150	$43,164	$45,349
Total O & M Expenses	$235,664	$266,632	$432,998	$489,898	$514,699

No. of Sewer Connections****	**426**	**492**	**569**	**658**	**697**

Cost Per Connection Per Year

O & M Only	$554	$542	$761	$745	$738
O & M w/ Debt Service	$496	$542	$1,984	$1,803	$1,737

* Future debt service estimated at 3.5%, 20 year notes, and no debt issued for projects less than $300,000 or developer projects, with project cost escalation from 2011 to time of construction of 3% per year

** Operating Expenses increasing 2.5% per year

*** Includes $125,000 higher costs for MBR O&M starting 2020

**** Sewer connection projection based on Table 3.3

TABLE 7.3 - continued
SEWER SYSTEM COST PER SERVICE
(WWTP complete by year 2029)

Description	Projected				
	2012	**2017**	**2022**	**2027**	**2029**
Approx. Debt Service*	$18,000	$0	$0	$34,558	$907,862
Operating Expense**					
O & M***	$135,769	$153,610	$173,796	$196,634	$356,589
Gen. & Admin.	$70,092	$79,303	$89,724	$101,514	$106,653
Repair/Replacement	$29,803	$33,719	$38,150	$43,164	$45,349
Total O & M Expenses	$235,664	$266,632	$301,670	$341,312	$508,591

No. of Sewer Connections****	**407**	**444**	**485**	**530**	**549**

Cost Per Connection Per Year

O & M Only	$579	$600	$622	$644	$926
O & M w/ Debt Service	$624	$600	$622	$709	$2,580

* Future debt service estimated at 3.5%, 20 year notes, and no debt issued for projects less than $300,000 or developer projects, with project cost escalation from 2011 to time of construction of 3% per year

** Operating Expenses increasing 2.5% per year

*** Includes $150,000 higher costs for MBR O& M starting 2029

**** Sewer connection projection based on Table 3.3

TABLE 7.4
SEWER SYSTEM GENERAL FINANCING PLAN
(WWTP complete by year 2020)

Year	2012	2017	2022	2027	2029
RCE	426	492	569	658	697
Monthly Service Month	$63.00	$73.00	$83.00	$91.00	$91.00
GFC per RCE	$13,000	$15,000	$17,500	$18,500	$18,500

OPERATING FUND

Starting **Balance**	$25,000	$122,904	$189,483	$65,230	$84,259
Service Charge Revenue	$321,785	$431,075	$566,648	$718,260	$761,174
O&M and R/R Expense	$(326,861)	$(369,913)	$(627,848)	$(710,734)	$(746,350)
Operating Fund End Balance	**$19,923**	**$184,065**	**$128,283**	**$72,756**	**$99,082**

CAPITAL FUND

Starting Balance	$200,000	$1,264,332	$995,140	$312,896	$161,584
GFC Revenue	$158,243	$211,094	$284,727	$347,991	$368,782
R/R Transfer In	$121,000	$137,000	$233,000	$264,000	$277,000
Developer Donation		$597,000			
Capital Expenses	$(210,000)	$(822,000)			
Debt Service	$(18,000)		$(695,769)	$(695,769)	$(695,769)
Capital Fund End Balance	**$251,243**	**$1,387,426**	**$817,098**	**$229,118**	**$111,597**

Financial Planning Assumptions

Minimum Capital Fund Balance		$50,000
Minimum Operating fund Balance Number of days of operating revenue		30
Share of Service Charge Transfer to Repair and Replacement (R/R)		59%
Minimum Amount Financed		$300,000
GFC Annual Escalation and Maximum	3.0%	$18,500
Service Charge Annual Escalation and Maximum	3.0%	$91.00
Project Cost Escalation from 2011		3.0%
Debt Service Assumes 3.5% Annual Interest, 20 Year term (mix of SRF and PWTF)		
Loan Value to Total Project Cost for Financed Projects		95%

Scenario meets all minimum fund balances except in Years 2012 and 2013
(Operating Fund too low, but positive)

TABLE 7.4-continued
SEWER SYSTEM GENERAL FINANCING PLAN
(WWTP complete by year 2029)

Year	2012	2017	2022	2027	2029
RCE	407	444	485	530	549
Monthly Service Month	$65.00	$75.00	$85.00	$87.00	$87.00
GFC per RCE	$5,000	$6,000	$7,000	$8,000	$8,400

OPERATING FUND

Starting **Balance**	$25,000	$73,526	$335,132	$772,826	$941,436
Service Charge Revenue	$317,237	$399,801	$494,896	$553,256	$573,127
O&M and R/R Expense	$(322,861)	$(365,913)	$(413,520)	$(468,148)	$(727,242)
Operating Fund End Balance	**$19,376**	**$107,414**	**$416,508**	**$857,934**	**$787,322**

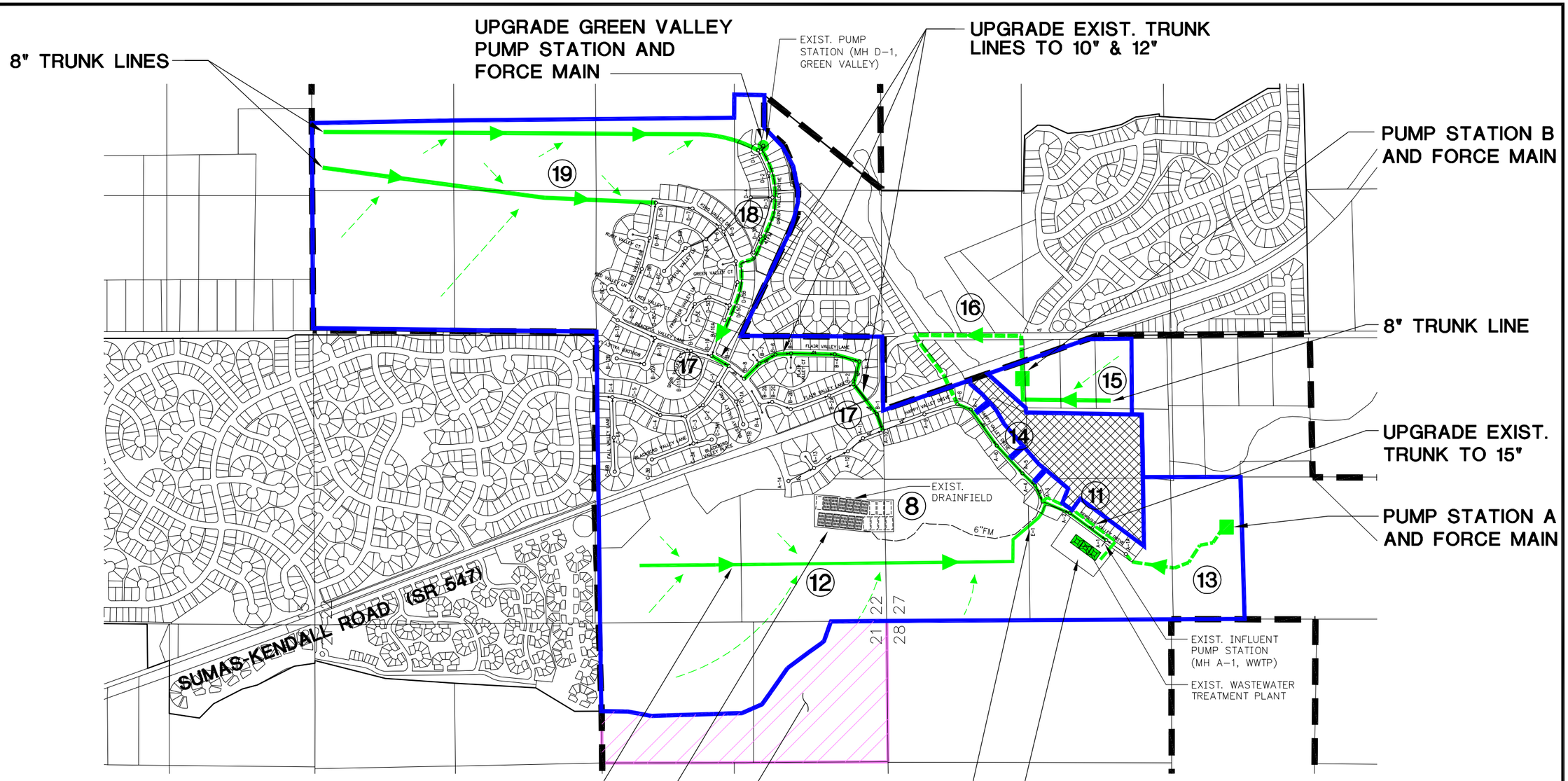
CAPITAL FUND

Starting Balance	$200,000	$549,268	$983,166	$2,098,812	$2,184,687
GFC Revenue	$35,564	$46,613	$59,398	$74,144	$80,647
R/R Transfer In	$117,000	$133,000	$150,000	$170,000	$264,000
Developer Donation		$597,000			
Capital Expenses	$(210,000)	$(822,000)		$(26,000)	$(511,000)
Debt Service	$(18,000)			$(34,558)	$(907,862)
Capital Fund End Balance	**$124,564**	**$503,881**	**$1,192,563**	**$2,282,398**	**$1,110,472**

Financial Planning Assumptions

Minimum Capital Fund Balance		$50,000
Minimum Operating fund Balance Number of days of operating revenue		30
Share of Service Charge Transfer to Repair and Replacement (R/R)		57%
Minimum Amount Financed		$300,000
GFC Annual Escalation and Maximum	3.0%	$8,400
Service Charge Annual Escalation and Maximum	2.5%	$87.00
Project Cost Escalation from 2011		3.0%
Debt Service Assumes 3.5% Annual Interest, 20 Year term (mix of SRF and PWTF)		
Loan Value to Total Project Cost for Financed Projects		95%

Scenario meets all minimum fund balances except in Years 2012 and 2013
(Operating Fund too low, but positive)
Scenario does not extend past 2029 to test viability of debt service thereafter



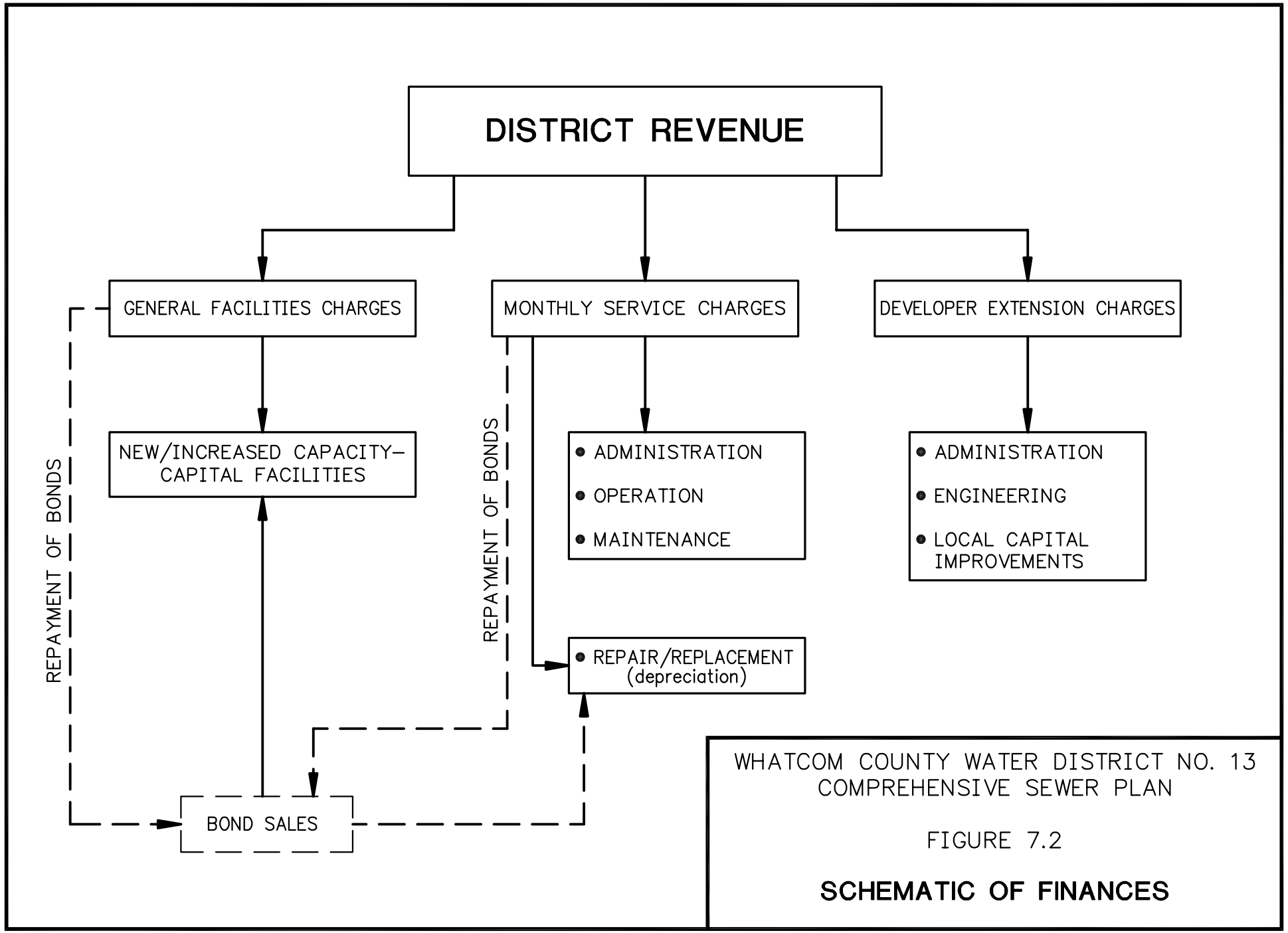
LEGEND

- DISTRICT BOUNDARY
- SEWER SERVICE AREA
- CRITICAL AREA
- PROPOSED TRUNK LINES
- PROPOSED FORCE MAIN
- SCHEMATIC LATERALS
- (1) PROJECT IDENTIFICATION (SEE TABLE 7.1)

WHATCOM COUNTY WATER DISTRICT NO. 13
COMPREHENSIVE SEWER PLAN

FIGURE 7.1

CAPITAL IMPROVEMENT PLAN



WHATCOM COUNTY WATER DISTRICT NO. 13
COMPREHENSIVE SEWER PLAN

FIGURE 7.2

SCHEMATIC OF FINANCES

CHAPTER 8 – DEVELOPER PROJECT STANDARDS

CHAPTER 8

DEVELOPER PROJECT STANDARDS

Whatcom County Water District No. 13 will have developer extensions for sewer service to residential and commercial development.

The Board of Commissioners has established certain standards for the extension of existing mainline sewers within the District.

The following standards, as may be modificed or supplemented by the Board for specific projects and/or by adoption of a developer extension manual, shall apply to developer projects.

DESIGN STANDARDS

1. GENERAL

All extensions to the sewer system must conform to the design standards of the District. In general, the Developer is required to construct the sewer lines through his property in order to allow for future extension, expansion, and continuation of the District's collection system or for conformance with the Comprehensive Sewer Plan. The following items are necessary to meet the conditions.

The District and its consultants do not ensure the correctness of the information supplied to the Developer from the District's records. The developer shall verify by survey any information provided by the District prior to using the information in design or construction.

A. Plans and Specifications

The installation of sewer extensions shall be made in accordance with these Conditions and Standards. The scale shall be: horizontal 1" = 50' or other scale as appropriate for the specific project, subject to the approval of the District Engineer; vertical 1" = 5' on 22" x 34" mylar. Scales used in plan views and/or profiles on multiple sheets shall correspond to one another. The minimum text height shall be 0.12 inch. The plans shall be sealed by a Professional Engineer licensed in Washington. The sewer extension shall be shown on a sheet separate from the water, storm drainage, and roadway plans. If the project is part of a phased development, a plan of the entire development shall be included, with the current phase clearly indicated.

The construction plans shall be reviewed or prepared by the District's Engineer. The developer shall submit two (2) sets of plans for review by the District. When the plans have been determined to meet the District standards, then a final set of reproducible plans shall be submitted to the District. These reproducible plans shall receive the District's "Plan Review" approval stamp. The District shall submit the plans to the regulatory agencies for approval. After approvals have been received, a set of plans stamped "Issued for Construction" shall be made available to the developer.

When the contractor completes the mainline sewer work and the manholes have been adjusted to the finish grade, the mylars of the sewer plans shall be revised to conform with construction records and then sent to the District. Prior to submitting revised plans, manhole inverts and horizontal alignment shall be verified by a professional land surveyor. Photomylars are required for the District record drawings.

B. Right-of-Way and Monuments

All rights-of-way in which the sewer extension is to be made shall be improved prior to preparation of construction plans and installation of the sewers. Permanent private easements shall be not less than ten (10) feet in width. Public rights-of-way shall be cleared, grubbed and graded in accordance with the requirements of Whatcom County.

All work, as defined in Whatcom County Code (WCC) 12.16, that the District performs in a County public road right-of-way requires, per WCC 12.16, a County-issued Revocable Encroachment Permit as a prerequisite to commencing said work.

Monuments disturbed or destroyed shall be replaced at the developer's expense. WAC 332-120 addresses the removal or destriction of survey monuments.

2. DESIGN STANDARDS

A. Unless otherwise called for by the District's Engineer in the specifications and plans, gravity sewers shall be PVC pipe. Ductile iron or concrete may be required in certain applications.

Plastic-PVC	ASTM D3034-SDR 35 or F789
Ductile Iron (polyethylene-encased)	AWWA C151
Concrete	ASTM C-14 Class 2

B. Manholes shall be precast, shall be 48" I.D. and shall conform to ASTM C478. Manhole frames and covers shall be locking type to match existing District covers and shall be supplied with stainless steel allen head cap screws.

C. Pressure mains shall be ductile iron or PVC.

D. All joints for sewers or pressure mains shall be of the rubber gasket type.

E. The pipe sizes and routing (including build-through) shall be selected as is indicated by good practice and shall conform to the Comprehensive Plan, as approved by the District.

F. Minimum grade for 8-inch mains shall be 0.5% and the minimum grade for end sewer mains that will not be extended shall be 0.75% unless otherwise approved by the District's Engineer. Minimum grade and design criteria, unless District criteria is more stringent, shall be in accordance with *Criteria for Sewage Works Design*, State of Washington, DOE; however, minimum grades shall not be used without prior approval from the District's Engineer.

G. Manholes shall be placed at each grade and direction change. Distances between manholes shall not exceed 400 feet. Manholes shall be a minimum of six (6) feet deep and shall be seven (7) feet deep where possible and shall be used at the termination of each sewer unless otherwise approved by District's Engineer. Joints on manhole sections shall be rubber gasket type. The exterior joint line of the manhole shall be grouted after the manhole is assembled.

H. The sewer grade for 6-inch side sewer stubs shall be a minimum of 2 percent (2%).

I. A tight line bypass shall be required to separate existing flows from the new connection until final acceptance of the sewer extension. A grouted in-place plug shall be required at the connection of a new system to a dead end existing manhole until final acceptance of the sewer extension.

REFERENCES

REFERENCES

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APPENDICES

APPENDIX A –
RESOLUTION TO ADOPT COMPREHENSIVE SEWER PLAN

APPENDIX B – STATE WASTE DISCHARGE PERMIT

STATE WASTE DISCHARGE PERMIT NUMBER ST0007367

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Bellingham Field Office
1440 – 10th Street, Suite 102
Bellingham, WA 98225-7028

In compliance with the provisions of the
State of Washington Water Pollution Control Law
Chapter 90.48 Revised Code of Washington, as amended,

Whatcom County Water District No. 13
532 Sprague Valley Drive
Maple Falls, Washington 98266

is authorized to discharge wastewater in accordance
with the special and general conditions which follow.

Plant Location: 532 Sprague Valley Drive Treatment Type: Aerated/Facultative Lagoons with discharge to ground drainfield	Discharge Location: Legal Description: A portion of the Southwest ¼ of Section 22, Township of 40 North, Range 5 East of W.M. Latitude: 48.9363 N Longitude: 122.15024 W

Richard Grout
Office Manager
Bellingham Field Office
Washington State Department of Ecology

TABLE OF CONTENTS

GENERAL CONDITIONS

SUMMARY OF PERMIT REPORT SUBMITTALS

Refer to the Special and General Conditions of this permit for additional submittal requirements.

Permit Section	Submittal	Frequency	First Submittal Date
S3.A	Discharge Monitoring Report	Monthly	September 15, 2011
S3.E	Reporting Permit Violations	As necessary	
S3.F	Other Reporting	As necessary	
S4.E	Infiltration and Inflow Study	1/permit cycle	May 30, 2013
S5.F	Reporting Bypasses	As necessary	
S5.G	Operations and Maintenance Manual Update or Review Confirmation Letter	Annually	November 1, 2011, & annually thereafter
S5.G	Draft Security Plan for Drainfield	1/permit cycle	December 23, 2011
S5.G	Drainfield Evaluation Report	2/permit cycle	July 30, 2012 & July 30, 2015
S5.H	Operations and Maintenance Manual Best Management Practices	1/permit cycle	December 23, 2011
S8	Application for Permit Renewal	1/permit cycle	March 1, 2016
S9	Ground Water Monitoring Plan	1/permit cycle	February 1, 2012
G1.C	Notice of Change in Authorization	As necessary	
G4	Permit Application for Substantive Changes to the Discharge	As necessary	
G5	Notification of New or Altered Sources	As necessary	
G7	Notice of Permit Transfer	As necessary	

SPECIAL CONDITIONS

S1. DISCHARGE LIMITS

A. Effluent Limits

All discharges and activities authorized by this permit must comply with the terms and conditions of this permit. The discharge of any of the following pollutants more frequently than, or at a concentration in excess of, that authorized by this permit violates the terms and conditions of this permit. Wastewater flows and loadings must not exceed the Design Criteria specified in Section S4.

Beginning on the effective date of this permit and lasting through this permits expiration date, the Permittee is authorized to discharge domestic wastewater to drainfields at the permitted location subject to the following limits:

EFFLUENT LIMITS FROM LAGOONS BEFORE DRAINFIELD		
Parameter	**Average Monthly [a]**	**Average Weekly[b]**
Flow [c]	0.125 MGD	
BOD_5	45 mg/L, 47 lbs/day, and 65% removal	65 mg/L, 68 lbs/day
TSS	45 mg/L, 47 lbs/day, and 65% removal	65 mg/L, 68 lbs/day
pH [e]	Daily minimum is equal to or greater than 6.5 and the daily maximum is less than or equal to 8.5	

a	Average monthly effluent limit means the highest allowable average of daily discharges over a calendar month. To calculate the discharge value to compare to the limit, you add the value of each daily discharge measured during a calendar month and divide this sum by the total number of daily discharges measured.
b	Average weekly discharge limitation means the highest allowable average of "daily discharges" over a calendar week, calculated as the sum of all "daily discharges" measured during a calendar week divided by the number of "daily discharges" measured during that week. See footnote [d] for fecal coliform calculations.
c	Ecology uses the flow data submitted in the approved engineering report and as included in the Facility Loading Condition (S4) to set permit fees.
d	To calculate the average monthly and average weekly values for fecal coliforms you must use the geometric mean. Ecology gives directions to calculate this value in publication No. 04-10-020, *Information Manual for Treatment Plant Operators* available at: http://www.ecy.wa.gov/pubs/0410020.pdf
e	Indicates the range of permitted values. The Permittee must report the instantaneous maximum and minimum pH monthly. Do not average pH values.

B. Best Management Practices/Pollution Prevention

The Permittee must comply with the following Best Management Practices to prevent pollution to waters of the State:

1. Do not discharge in excess of the hydraulic capacity of the drainfields.

2. Do not discharge priority pollutants, dangerous wastes, or toxics in toxic amounts.

3. Operate the system to protect the existing and future beneficial uses of the ground water and not cause a violation of the ground water standards.

4. Have the drainfield evaluated by a professional certified OSS inspector by June 30, 2012, and June 30, 2015, and submit the evaluation reports to Ecology within thirty (30) days of the inspection.

All discharges and activities authorized by this permit must comply with the terms and conditions of this permit. The discharge of any of the following pollutants more frequently than, or at a concentration in excess of, that authorized by this permit violates the terms and conditions of this permit.

GROUND WATER ENFORCEMENT LIMITS	
Discharges are subject to the following limits. The point of compliance is at monitoring wells A, B, C. Two consecutive exceedences of an enforcement limit for the same parameter at the same well is a violation.	
Nitrate[1]	9.5
Total Dissolved Solids[1]	500 mg/L
Chloride[1]	250 mg/L
pH[1]	6.5 – 8.5
Sulfate[1]	250 mg/L
Total Coliforms[1]	1 cfu/100 mL
[1] Sample monitoring wells A, B, C.	

Parameter	**Minimum/Maximum**
Total Coliform	1/100 mL
pH [a]	6.5/8.5
Sulfate	250
Total Dissolved Solids	500
NO_3-NO_2	9.5
Chloride	250

a	Indicates the range of permitted values. The Permittee must report the instantaneous maximum and minimum pH monthly. Do not average pH values.

S2. MONITORING REQUIREMENTS

A. Wastewater Monitoring

The Permittee must monitor the wastewater from the lagoons at the end of pipe prior to discharging into the drainfield. Effluent samples may be taken at the chlorine contact tank.

The Permittee must also monitor the final effluent by sampling down gradient monitoring wells according to their Ecology-approved ground water monitoring plan.

The Permittee must monitor the wastewater according to the following schedule (see Appendix 1 for analytical methods and levels):

Category	Parameter	Units	Laboratory Method	Sampling Frequency	Sample Type
Wastewater Influent	Flow	MGD	Measurement	Daily	Continuous
"	BOD	mg/L	SM5210-B	1/week	24-hour Composite
"	TSS	mg/L	SM2540-D	1/week	24-hour Composite
Wastewater Effluent	Flow	MGD	Measurement	Daily	Continuous
"	BOD[2]	mg/l	SM5210-B	1/week	24-hour Composite
"	BOD[2]	lbs/day	Calculate	1/week	Calculate
"	BOD[2]	% removal	Calculate	1/month	Calculate
"	TSS[2]	mg/l	SM2540-D	1/week	24-hour Composite
"	TSS[2]	lbs/day	Calculate	1/week	Calculate
"	TSS[2]	% removal	Calculate	1/month	Calculate
"	pH	Standard Units	Measurement	5/week	Grab

B. Ground Water Monitoring

The Permittee must monitor the ground water at monitoring wells Well A, Well B, Well C, and Well D according to the following schedule:

Parameter	Units	Laboratory Method	Sampling Frequency	Sample Type
Iron (Total)	mg/l	200.8	Quarterly	Grab
Total Organic Carbon	mg/l	SM5310-B/C/D	Quarterly	"
Conductivity	Micromho/cm	SM2510B	Quarterly	"
Total Coliform	CPU/100 ml	SM9221E	1/month	"
Static Water Level	Feet (nearest 0.01 ft relative to mean sea level)	Electric water level probe or similar	1/month	Field Measurement

[2] Sample the contact chamber at the wastewater plant prior to discharge to the drainfield.

Parameter	Units	Laboratory Method	Sampling Frequency	Sample Type
Temperature	Degrees C	Analog Recorder	Quarterly	"
Total Alkalinity	mg/l	SM2320-B	Quarterly	Grab
Chloride	mg/L	SM300.0	Quarterly	Grab
pH	Standard units	SM4500-H^+ B	Quarterly	Grab
Sulfate	mg/L	SM4110-B	Quarterly	Grab
Total Dissolved Solids	mg/L	SM2540 C	Quarterly	Grab
$NO_3 + NO_2$	mg/L	4500-NO3 E/F/H	Quarterly	Grab
TKN (as N)	mg/L	4500-NO3 C/E/FG	Quarterly	Grab
Calcium	mg/L	SM3500-Ca	Quarterly	Grab
Magnesium	mg/L	200.8	Quarterly	Grab
Potassium	mg/L	SM3500-K	Quarterly	Grab
Redox. Potential	mV	Measurement	Quarterly	Grab
Sodium	mg/L	SM3500-Na	Quarterly	Grab
Manganese	mg/L	200.8	Quarterly	Grab

C. Sampling and Analytical Procedures

Samples and measurements taken to meet the requirements of this permit must represent the volume and nature of the monitored parameters, including representative sampling of any unusual discharge or discharge condition, including bypasses, upsets, and maintenance-related conditions affecting effluent quality.

Ground water sampling must conform to the latest protocols in the *Implementation Guidance for the Ground Water Quality Standards* (Ecology, 2005).

Sampling and analytical methods used to meet the water and wastewater monitoring requirements specified in this permit must conform to the latest revision of the *Guidelines Establishing Test Procedures for the Analysis of Pollutants* contained in 40 CFR Part 136 or to the latest revision of *Standard Methods for the Examination of Water and Wastewater* (APHA), unless otherwise specified in this permit or approved in writing by the Department of Ecology (Ecology).

D. Flow Measurement

The Permittee must:

1. Select and use appropriate flow measurement continuous monitoring devices and methods consistent with accepted scientific practices.

2. Install, calibrate, and maintain these devices to ensure the accuracy of the measurements is consistent with the accepted industry standard and the manufacturer's recommendation for that type of device.
3. Use field measurement devices as directed by the manufacturer and do not use reagents beyond their expiration dates.
4. Calibrate these devices at the frequency recommended by the manufacturer.
5. Calibrate flow monitoring devices at a minimum frequency of at least one calibration per year.
6. Maintain calibration records for at least three years.

E. Laboratory Accreditation

The Permittee must ensure that all monitoring data required by Ecology is prepared by a laboratory registered or accredited under the provisions of chapter 173-50 WAC, *Accreditation of Environmental Laboratories.* Flow, temperature, settleable solids, conductivity, pH, and internal process control parameters are exempt from this requirement. The Permittee must obtain accreditation for conductivity and pH if it must receive accreditation or registration for other parameters.

F. Request for Reduction in Monitoring

The Permittee may request a reduction of the sampling frequency after twelve (12) months of monitoring. Ecology will review each request and at its discretion grant the request through a permit modification or when it reissues the permit.

The Permittee must:

1. Provide a written request.
2. Clearly state the parameters for which it is requesting reduced monitoring.
3. Clearly state the justification for the reduction.

S3. REPORTING AND RECORD KEEPING REQUIREMENTS

The Permittee must monitor and report in accordance with the following conditions. The falsification of information submitted to Ecology constitutes a violation of the terms and conditions of this permit.

A. Reporting

The first monitoring period begins on the effective date of the permit. The Permittee must:

1. Submit monitoring results for BOD_5, TSS, flow, static water level, total coliform bacteria, and pH **monthly**.

Submit monitoring results for nitrate-nitrite, total Kjehldahl nitrogen, iron, manganese, chloride, sulfate, sodium, conductivity, total dissolved solids, total coliform, total alkalinity, magnesium, calcium, potassium, reduction/oxidation (redox) potential, and total organic carbon **quarterly**.

2. Summarize, report, and submit monitoring data obtained during each monitoring period on a Discharge Monitoring Report (DMR) form provided, or otherwise approved, by Ecology.

3. Submit DMR forms monthly whether or not the facility was discharging. If the facility did not discharge during a given monitoring period, submit the form as required with the words "NO DISCHARGE" entered in place of the monitoring results. If submitting DMRs electronically, you must enter "NO DISCHARGE" for an entire DMR, for a specific monitoring point, or for a specific parameter as appropriate.

4. Ensure that DMR forms are postmarked or received by Ecology no later than the 15th day of the month following the completed monitoring period, unless otherwise specified in this permit.

5. Submit DMRs for parameters with the monitoring frequencies specified in S2 (monthly, quarterly, annual, etc.) at the reporting schedule identified below. The Permittee must:

   a) Submit **monthly** DMRs by the 15th day of the following month.

6. Submit reports to Ecology online using Ecology's electronic DMR submittal forms or send reports to Ecology at:

Department of Ecology Water Quality Program Northwest Regional Office 3190 - 160th Avenue SE Bellevue, WA 98008-5452	**and**	Department of Ecology Water Quality Program Bellingham Field Office 1440 10th Street, Suite 102 Bellingham, WA 98225-7028

respectively

All laboratory reports providing data for organic and metal parameters must include the following information: sampling date, sample location, date of analysis, parameter name, CAS number, analytical method/number, method detection limit (MDL), laboratory practical quantitation limit (PQL), reporting units, and concentration detected. Analytical results from samples sent to a contract laboratory must include information on the chain of custody, the analytical method, QA/QC results, and documentation of accreditation for the parameter.

B. Records Retention

The Permittee must retain records of all monitoring information for a minimum of three (3) years. Such information must include all calibration and maintenance records and all original recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit. The Permittee must extend this period of retention during the course of any unresolved litigation regarding the discharge of pollutants by the Permittee or when requested by Ecology.

The Permittee must retain all records pertaining to the monitoring of sludge for a minimum of five years.

C. Recording of Results

For each measurement or sample taken, the Permittee must record the following information:

1. The date, exact place and time of sampling.
2. The individual who performed the sampling or measurement.
3. The dates the analyses were performed.
4. The individual who performed the analyses.
5. The analytical techniques or methods used.
6. The results of all analyses.

D. Additional Monitoring by the Permittee

If the Permittee monitors any pollutant more frequently than required by Condition S2 of this permit, then the Permittee must include the results of such monitoring in the calculation and reporting of the data submitted in the Permittee's DMR.

E. Reporting Permit Violations

The Permittee must take the following actions when it violates or is unable to comply with any permit condition:

- Immediately take action to stop, contain, and cleanup unauthorized discharges or otherwise stop the noncompliance and correct the problem.
- If applicable, immediately repeat sampling and analysis. Submit the results of any repeat sampling to Ecology within thirty (30) days of sampling.

1. Immediate Reporting

Any failure of the disinfection system, any collection system overflows, or any plant bypass discharging to a waterbody used as a source of drinking water must be reported **immediately** to the Department of Ecology and the Department of Health, Drinking Water Program at the numbers listed below:

Northwest Regional Office	425-649-7000 (24-hours)
Bellingham Field Office	360-715-5208
Whatcom County Health Department	360- 715-2588 (24-hours)
Department of Health, **Drinking Water Program**	360-521-0323 (business hours) 360-481-4901 (after business hours)

2. Twenty-four-hour Reporting

The Permittee must report the following occurrences of noncompliance by telephone, to Ecology at the telephone numbers listed above, within 24 hours from the time the Permittee becomes aware of any of the following circumstances:

a. Any noncompliance that may endanger health or the environment, unless previously reported under subpart 1, above.

b. Any unanticipated **bypass** that exceeds any effluent limit in the permit (See Part S5.F, "Bypass Procedures").

c. Any **upset** that exceeds any effluent limit in the permit. Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

d. Any violation of a maximum daily or instantaneous maximum discharge limit for any of the pollutants in Section S1.A of this permit.

e. Any overflow prior to the treatment works, whether or not such overflow endangers health or the environment or exceeds any effluent limit in the permit.

3. Report Within Five Days

The Permittee must also provide a written submission within five days of the time that the Permittee becomes aware of any event required to be reported under subparts 1 or 2, above. The written submission must contain:

a. A description of the noncompliance and its cause.

b. The period of noncompliance, including exact dates and times.

c. The estimated time noncompliance is expected to continue if it has not been corrected.

d. Steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

e. If the noncompliance involves an overflow prior to the treatment works, an estimate of the quantity (in gallons) of untreated overflow.

4. Waiver of Written Reports

Ecology may waive the written report required in subpart 3, above, on a case-by-case basis upon request if a timely oral report has been received.

5. Report Submittal

The Permittee must submit reports to the address listed in S3.

F. Other Reporting

The Permittee must report all instances of noncompliance, not required to be reported immediately or within 24 hours, at the time that monitoring reports for S3.A ("Reporting") are submitted. The reports must contain the information listed in paragraph E.3, above. Compliance with these requirements does not relieve the Permittee from responsibility to maintain continuous compliance with the terms and conditions of this permit or the resulting liability for failure to comply.

The Permittee **must** report a spill of oil or hazardous materials in accordance with the requirements of RCW 90.56.280. You can obtain further instructions at the following website: http://www.ecy.wa.gov/programs/spills/other/reportaspill.htm .

G. Maintaining a Copy of This Permit

The Permittee must keep a copy of this permit at the facility and make it available upon request to Ecology inspectors.

S4. FACILITY LOADING

A. Design Criteria

The flows or waste loads for the permitted facility must not exceed the following design criteria:

Maximum Month Design Flow (MMDF)	0.125 MGD
Maximum Peak total flow	0.35 MGD

B. Plans for Maintaining Adequate Capacity

The Permittee must submit a plan and a schedule for continuing to maintain capacity to Ecology when:

1. The actual flow or waste load reaches 85 percent of any one of the design criteria in S4.A for three consecutive months.

2. The projected increase would reach design capacity within five years.

   The plan and schedule for continuing to maintain capacity must be sufficient to achieve the effluent limits and other conditions of this permit. This plan must identify any of the following actions or any other actions necessary to meet the objective of maintaining capacity.

   a. Analysis of the present design, including the introduction of any process modifications that would establish the ability of the existing facility to achieve the effluent limits and other requirements of this permit at specific levels in excess of the existing design criteria specified in paragraph A, above.

   b. Reduction or elimination of excessive infiltration and inflow of uncontaminated ground and surface water into the sewer system.

   c. Limit on future sewer extensions or connections or additional waste loads.

   d. Modification or expansion of facilities necessary to accommodate increased flow or waste load.

   e. Reduction of industrial or commercial flows or waste loads to allow for increasing sanitary flow or waste load.

   Engineering documents associated with the plan must meet the requirements of WAC 173-240-060, "Engineering Report," and be approved by Ecology prior to any construction.

   If the Permittee intends to apply for state or federal funding for the design or construction of a facility project, the plan may also need to meet the environmental review requirements as described in 40 CFR 35.3040 and 40 CFR 35.3045 and it may also need to demonstrate cost effectiveness as required by WAC 173-95-730. The plan must specify any contracts, ordinances, methods for financing, or other arrangements necessary to achieve this objective.

C. Duty to Mitigate

   The Permittee must take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

D. Notification of New or Altered Sources

1. The Permittee must submit written notice to Ecology whenever any new discharge or a substantial change in volume or character of an existing discharge into the District’s POTW is proposed which:

   a. Would interfere with the operation of, or exceed the design capacity of, any portion of the POTW;

b. Is not part of an approved general sewer plan or approved plans and specifications; or

c. Would be subject to pretreatment standards under 40 CFR Part 403 and Section 307(b) of the Clean Water Act.

2. This notice must include an evaluation of the District POTW's ability to adequately transport and treat the added flow and/or waste load, the quality and volume of effluent to be discharged to the POTW, and the anticipated impact on the Permittee's effluent [40 CFR 122.42(b)].

E. Infiltration and Inflow Evaluation

1. The Permittee must conduct an infiltration and inflow evaluation. Refer to the U.S. EPA publication, *I/I Analysis and Project Certification*, available as Publication No. 97-03 at:

Publications Office
Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

or at

http://www.ecy.wa.gov/programs/wq/permits/guidance.html .

The Permittee may use plant monitoring records to assess measurable infiltration and inflow.

2. The Permittee must prepare a report which summarizes any measurable infiltration and inflow. If infiltration and inflow have increased by more than 15 percent from that found in the previous report based on equivalent rainfall, the report must contain a plan and a schedule for:

a. Locating the sources of infiltration and inflow; and

b. Correcting the problem.

3. The Permittee must submit a report summarizing the results of the evaluation and any recommendations for corrective actions by May 30, 2013.

S5. OPERATIONS AND MAINTENANCE

The Permittee must, at all times, properly operate and maintain all facilities or systems of treatment and control (and related appurtenances) which are installed to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems, which are installed by a Permittee only when the operation is necessary to achieve compliance with the conditions of this permit.

A. Certified Operator

An operator certified for at least a Class I plant by the state of Washington must be in responsible charge of the day-to-day operation of the wastewater treatment plant. An operator certified for at least a Class I plant must be in charge during all regularly scheduled shifts.

B. O & M Program

The Permittee must:

1. Institute an adequate operation and maintenance program for the entire sewage system.

2. Keep maintenance records on all major electrical and mechanical components of the treatment plant, as well as the sewage system and pumping stations. Such records must clearly specify the frequency and type of maintenance recommended by the manufacturer and must show the frequency and type of maintenance performed.

3. Make maintenance records available for inspection at all times.

C. Short-term Reduction

If a Permittee contemplates a reduction in the level of treatment that would cause a violation of permit discharge limits on a short-term basis for any reason, and such reduction cannot be avoided, the Permittee must:

1. Give written notification to Ecology, if possible, thirty (30) days prior to such activities.

2. Detail the reasons for, length of time of, and the potential effects of the reduced level of treatment.

This notification does not relieve the Permittee of its obligations under this permit.

D. Electrical Power Failure

The Permittee must ensure that adequate safeguards prevent the discharge of untreated wastes or wastes not treated in accordance with the requirements of this permit during electrical power failure at the treatment plant and/or sewage lift stations. Adequate safeguards include, but are not limited to, alternate power sources, standby generator(s), or retention of inadequately treated wastes. The Permittee must maintain Reliability Class II (EPA 430-99-74-001) at the wastewater treatment plant, which requires primary sedimentation. Disinfection does not apply in this case due to the system's use of a drainfield.

E. Prevent Connection of Inflow

The Permittee must strictly enforce its sewer ordinances and not allow the connection of inflow (roof drains, foundation drains, etc.) to the sanitary sewer system.

F. Bypass Procedures

This permit prohibits a bypass which is the intentional diversion of waste streams from any portion of a treatment facility. Ecology may take enforcement action against a Permittee for a bypass unless one of the following circumstances (1, 2, or 3) applies.

1. Bypass is for essential maintenance without the potential to cause violation of permit limits or conditions.

   This permit authorizes a bypass if it allows for essential maintenance and does not have the potential to cause violations of limits or other conditions of this permit, or adversely impact public health as determined by Ecology prior to the bypass. The Permittee must submit prior notice, if possible, at least ten (10) days before the date of the bypass.

2. Bypass is unavoidable, unanticipated, and results in noncompliance with the conditions of this permit.

   This permit authorizes such a bypass only if:

   a. Bypass is unavoidable to prevent loss of life, personal injury, or severe property damage. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which would cause them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass.

   b. No feasible alternatives to the bypass exist, such as:

      - The use of auxiliary treatment facilities.
      - Retention of untreated wastes.
      - Stopping production.
      - Maintenance during normal periods of equipment downtime, but not if the Permittee should have installed adequate backup equipment in the exercise of reasonable engineering judgment to prevent a bypass.
      - Transport of untreated wastes to another treatment facility.

   c. The Permittee has properly notified Ecology of the bypass as required in Condition S3.E of this permit.

3. If bypass is anticipated and has the potential to result in noncompliance of this permit.

   a. The Permittee must notify Ecology at least thirty (30) days before the planned date of bypass. The notice must contain:

      - A description of the bypass and its cause.
      - An analysis of all known alternatives which would eliminate, reduce, or mitigate the need for bypassing.
      - A cost-effectiveness analysis of alternatives including comparative resource damage assessment.
      - The minimum and maximum duration of bypass under each alternative.
      - A recommendation as to the preferred alternative for conducting the bypass.
      - The projected date of bypass initiation.
      - A statement of compliance with SEPA.
      - A request for modification of water quality standards as provided for in WAC 173-201A-410, if an exceedence of any water quality standard is anticipated.
      - Details of the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the bypass.

   b. For probable construction bypasses, the Permittee must notify Ecology of the need to bypass as early in the planning process as possible. The Permittee must consider the analysis required above during preparation of the engineering report or facilities plan and plans and specifications and must include these to the extent practical. In cases where the Permittee determines the probable need to bypass early, the Permittee must continue to analyze conditions up to and including the construction period in an effort to minimize or eliminate the bypass.

   c. Ecology will consider the following prior to issuing an administrative order for this type of bypass:

      - If the bypass is necessary to perform construction or maintenance-related activities essential to meet the requirements of this permit.
      - If feasible alternatives to bypass exist, such as the use of auxiliary treatment facilities, retention of untreated wastes, stopping production, maintenance during normal periods of equipment down time, or transport of untreated wastes to another treatment facility.

- If the Permittee planned and scheduled the bypass to minimize adverse effects on the public and the environment.

After consideration of the above and the adverse effects of the proposed bypass and any other relevant factors, Ecology will approve or deny the request. Ecology will give the public an opportunity to comment on bypass incidents of significant duration, to the extent feasible. Ecology will approve a request to bypass by issuing an administrative order under RCW 90.48.120.

G. Operations and Maintenance Manual

The Permittee must:

1. Review the operations and maintenance (O&M) manual and confirm this review by letter to Ecology by November 1, 2011, and annually thereafter.

2. Submit to Ecology for review and approval substantial changes or updates to the O&M manual whenever it incorporates them into the manual.

3. Keep the approved O&M manual at the permitted facility.

4. Follow the instructions and procedures of this manual.

In addition to the requirements of WAC 173-240-104, the O&M manual must include:

1. Emergency procedures for plant shutdown and cleanup in event of wastewater system upset or failure.

2. Wastewater system maintenance procedures that contribute to the generation of wastewater.

3. Any directions to maintenance staff when cleaning, or maintaining other equipment or performing other tasks which are necessary to protect the operation of the wastewater system (for example, defining maximum allowable discharge rate for draining a tank, blocking all floor drains before beginning the overhaul of a stationary engine.)

4. Treatment plant process control monitoring schedule.

5. Wastewater sampling protocols and procedures for compliance with the sampling and reporting requirements in the wastewater discharge permit.

6. Minimum staffing adequate to operate and maintain the treatment processes and carry out compliance monitoring required by the permit.

7. Protocols and procedures for ground water monitoring network.

8. Operate the system to protect the existing and future beneficial uses of the ground water and not cause a violation of the ground water standards.

9. Ensure that the flow diverting device at the drainfield is operating properly and can divert flow to each of the drainfield cells. Operate the flow diverting device according to the District's O&M manual.

10. Since the drainfield is considered part of the treatment system, a means of securing the drainfield from vehicular traffic and from vandalism must be secured. A draft plan for securing the drainfield will be written and submitted by December 23, 2011. The plan will be reviewed by Ecology within 90 days. Immediately after receiving a finalized version from Ecology, the district shall institute the plan.

11. Check cleanouts and monitoring ports quarterly to ensure no standing water is present, and ensure that they are capped or covered to keep rain and foreign materials from entering. Standing water may indicate clogging or a constriction due to solids.

12. Have the drainfield evaluated by a professional certified OSS inspector by August 30, 2012, and June 30, 2014, and submit the evaluation reports to Ecology within 30 days of the inspection.

H. Best Management Practices

The District will incorporate the following best management practices into its O&M manual and keep a log of the following activities:

1. Ensure that the flow diverting device at the drainfield is operating properly and can divert flow to each of the drainfield cells. Operate the flow diverting device according to the District's O&M manual.

2. Since the drainfield is considered part of the treatment system, a means of securing the drainfield from vehicular traffic and from vandalism must be secured. A draft plan for securing the drainfield will be written and submitted by December 23, 2011. The plan will be reviewed by Ecology within 90 days. Immediately after receiving a finalized version from Ecology, the District shall institute the plan.

3. Check cleanouts and monitoring ports quarterly to ensure no standing water is present, and ensure that they are capped or covered to keep rain and foreign materials from entering. Standing water may indicate clogging or a constriction due to solids.

S6. SOLID WASTES

A. Solid Waste Handling

The Permittee must handle and dispose of all solid waste material in such a manner as to prevent its entry into state ground or surface water.

B. Leachate

The Permittee must not allow leachate from its solid waste material to enter state waters without providing all known, available, and reasonable methods of treatment, nor allow such leachate to cause violations of the state surface water quality standards, chapter 173-201A WAC, or the state ground water quality standards, chapter 173-200 WAC. The Permittee must apply for a permit or permit modification as may be required for such discharges to state ground or surface waters.

S7. PRETREATMENT

The Permittee must work with Ecology to ensure that all commercial and industrial users of the District's publicly owned treatment works (POTW) comply with the pretreatment regulations in 40 CFR Part 403 and any additional regulations that the Environmental Protection Agency (U.S. EPA) may promulgate under Section 307(b) (pretreatment) and 308 (reporting) of the Federal Clean Water Act.

A. Discharge Authorization Required

Significant commercial or industrial operations must not be allowed to discharge wastes to the Permittee's sewerage system until they have received prior authorization from Ecology in accordance with chapter 90.48 RCW and chapter 173-216 WAC, as amended. The Permittee must immediately notify Ecology of any proposed new sources of wastewater from significant commercial or industrial operations.

B. Duty to Enforce Discharge Prohibitions

1. Under 40 CFR 403.5(a), the Permittee must not authorize or knowingly allow the discharge of any pollutants into its POTW which may be reasonably expected to cause pass through or interference, or which otherwise violate general or specific discharge prohibitions contained in 40 CFR Part 403.5 or WAC-173-216-060.

2. The Permittee must not authorize or knowingly allow the introduction of any of the following into their treatment works:

   a. Pollutants which create a fire or explosion hazard in the POTW (including, but not limited to waste streams with a closed cup flashpoint of less than 140 degrees Fahrenheit or 60 degrees Centigrade using the test methods specified in 40 CFR 261.21).

   b. Pollutants which will cause corrosive structural damage to the POTW, but in no case discharges with pH lower than 5.0, or greater than 11.0 standard units, unless the works are specifically designed to accommodate such discharges.

   c. Solid or viscous pollutants in amounts that could cause obstruction to the flow in sewers or otherwise interfere with the operation of the POTW.

d. Any pollutant, including oxygen-demanding pollutants, (BOD, etc.) released in a discharge at a flow rate and/or pollutant concentration which will cause interference with the POTW.

e. Petroleum oil, nonbiodegradable cutting oil, or products of mineral origin in amounts that will cause interference or pass through.

f. Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity which may cause acute worker health and safety problems.

g. Heat in amounts that will inhibit biological activity in the POTW resulting in interference but in no case heat in such quantities such that the temperature at the POTW headworks exceeds 40 degrees Centigrade (104 degrees Fahrenheit) unless Ecology, upon request of the Permittee, approves, in writing, alternate temperature limits.

h. Any trucked or hauled pollutants, except at discharge points designated by the Permittee.

i. Wastewaters prohibited to be discharged to the POTW by the Dangerous Waste Regulations (chapter 173-303 WAC), unless authorized under the Domestic Sewage Exclusion (WAC 173-303-071).

3. The Permittee must also not allow the following discharges to the POTW unless approved in writing by Ecology:

   a. Noncontact cooling water in significant volumes.

   b. Stormwater and other direct inflow sources.

   c. Wastewaters significantly affecting system hydraulic loading, which do not require treatment, or would not be afforded a significant degree of treatment by the system.

4. The Permittee must notify Ecology if any industrial user violates the prohibitions listed in this section (S7.B), and initiate enforcement action to promptly curtail any such discharge.

S8. APPLICATION FOR PERMIT RENEWAL

The Permittee must apply for permit renewal March 1, 2016.

S9. GROUND WATER MONITORING PLAN

The Permittee must develop a written ground water monitoring plan that describes how monitoring will be done following the procedures outlined in chapter 5 of Ecology's *Implementation Guidance for the Ground Water Quality Standards,* Publication No. 96-02.

The monitoring plan must provide step-by-step instructions to be followed by field staff during each step of sampling operations. The plan must include instructions for:

1. Recording field sampling notes, including blank forms to be used.
2. Locating wells.
3. Measuring water levels.
4. Pump installation, unless dedicated pumps are installed.
5. Well purging.
6. Sample collection.
7. Decontamination.
8. QA/QC procedures.

The draft plan must be submitted by February 1, 2012, for final approval.

GENERAL CONDITIONS

G1. SIGNATORY REQUIREMENTS

All applications, reports, or information submitted to Ecology must be signed as follows:

A. All permit applications must be signed by either a principal executive officer or ranking elected official.

B. All reports required by this permit and other information requested by Ecology must be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

1. The authorization is made in writing by the person described above and is submitted to Ecology at the time of authorization, and

2. The authorization specifies either a named individual or any individual occupying a named position.

C. Changes to authorization. If an authorization under paragraph B.2, above, is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization must be submitted to Ecology prior to or together with any reports, information, or applications to be signed by an authorized representative.

D. Certification. Any person signing a document under this section must make the following certification:

"I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

G2. RIGHT OF ENTRY

Representatives of Ecology have the right to enter at all reasonable times in or upon any property, public or for the purpose of inspecting and investigating conditions relating to the pollution or the possible pollution of any waters of the state. Reasonable times include normal business hours; hours during which production, treatment, or discharge occurs; or times when Ecology suspects a violation requiring immediate inspection. Representatives of Ecology must be allowed to have access to, and copy at reasonable cost, any records required to be kept under terms and conditions of the permit; to inspect any monitoring equipment or method required in the permit; and to sample the discharge, waste treatment processes, or internal waste streams.

G3. PERMIT ACTIONS

This permit is subject to modification, suspension, or termination, in whole or in part by Ecology for any of the following causes:

A. Violation of any permit term or condition;

B. Obtaining a permit by misrepresentation or failure to disclose all relevant facts;

C. A material change in quantity or type of waste disposal;

D. A material change in the condition of the waters of the state; or

E. Nonpayment of fees assessed pursuant to RCW 90.48.465.

Ecology may also modify this permit, including the schedule of compliance or other conditions, if it determines good and valid cause exists, including promulgation or revisions of regulations or new information.

G4. REPORTING A CAUSE FOR MODIFICATION

The Permittee must submit a new application at least 60 days before it wants to discharge more of any pollutant, a new pollutant, or more flow than allowed under this permit. The Permittee should use the state waste discharge permit application, and submit required plans at the same time. Required plans include an engineering report, plans and specifications, and an operations and maintenance manual (see chapter 173-240 WAC). Ecology may waive these plan requirements for small changes, so contact Ecology if they do not appear necessary. The Permittee must obtain the written concurrence of the receiving POTW on the application before submitting it to Ecology. The Permittee must continue to comply with the existing permit until it is modified or reissued. Submitting a notice of dangerous waste discharge (to comply with pretreatment or dangerous waste rules) triggers this requirement as well.

G5. PLAN REVIEW REQUIRED

Prior to constructing or modifying any wastewater control facilities, an engineering report and detailed plans and specifications must be submitted to Ecology for approval in accordance with chapter 173-240 WAC. Engineering reports, plans, and specifications should be submitted at least 180 days prior to the planned start of construction. Facilities must be constructed and operated in accordance with the approved plans.

G6. COMPLIANCE WITH OTHER LAWS AND STATUTES

Nothing in the permit excuses the Permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

G7. TRANSFER OF THIS PERMIT

In the event of any change in control or ownership of facilities from which the authorized discharge emanate, the Permittee must notify the succeeding owner or controller of the existence of this permit by letter, a copy of which must be forwarded to Ecology.

A. Transfers by Modification

Except as provided in paragraph (B) below, this permit may be transferred by the Permittee to a new owner or operator only if this permit has been modified or revoked and reissued under 40 CFR 122.62(b)(2), or a minor modification made under 40 CFR 122.63(d), to identify the new Permittee and incorporate such other requirements as may be necessary under the Clean Water Act.

B. Automatic Transfers

This permit may be automatically transferred to a new Permittee if:

1. The Permittee notifies Ecology at least thirty (30) days in advance of the proposed transfer date.
2. The notice includes a written agreement between the existing and new Permittees containing a specific date transfer of permit responsibility, coverage, and liability between them.
3. Ecology does not notify the existing Permittee and the proposed new Permittee of its intent to modify or revoke and reissue this permit. A modification under this subparagraph may also be minor modification under 40 CFR 122.63. If this notice is not received, the transfer is effective on the date specified in the written agreement.

G8. PAYMENT OF FEES

The Permittee must submit payment of fees associated with this permit as assessed by Ecology. Ecology may revoke this permit if the permit fees established under chapter 173-224 WAC are not paid.

G9. PENALTIES FOR VIOLATING PERMIT CONDITIONS

Any person who is found guilty of willfully violating the terms and conditions of this permit is guilty of a crime, and upon conviction thereof may be punished by a fine of up to ten thousand dollars and costs of prosecution, or by imprisonment in the discretion of the court. Each day upon which a willful violation occurs may be deemed a separate and additional violation.

Any person who violates the terms and conditions of a waste discharge permit incurs, in addition to any other penalty as provided by law, a civil penalty in the amount of up to ten thousand dollars for every such violation. Each and every such violation is a separate and distinct offense, and in case of a continuing violation, every day's continuance is considered a separate and distinct violation.

G10. DUTY TO PROVIDE INFORMATION

The Permittee must submit to Ecology, within a reasonable time, all information which Ecology may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The Permittee must also submit to Ecology upon request, copies of records required to be kept by this permit.

G11. DUTY TO COMPLY

The Permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

G12. CONTRACT REVIEW

The Permittee must submit to Ecology any proposed contract for the operation of any wastewater treatment facility covered by this permit. The review is to ensure consistency with chapters 90.46 and 90.48 RCW. In the event that Ecology does not comment within a thirty (30)-day period, the Permittee may assume consistency and proceed with the contract.

APPENDIX 1

EFFLUENT CHARACTERIZATION FOR POLLUTANTS

THIS LIST INCLUDES EPA-REQUIRED POLLUTANTS (PRIORITY POLLUTANTS) AND SOME ECOLOGY PRIORITY TOXIC CHEMICALS (PBTs)

The following table with analytical methods and levels is to be used as guidance for effluent and ground water characterization and in the permit application when renewal is required.

Ecology may require additional pollutants to be analyzed within a group when the permit is renewed. The objectives of this table are to reduce the number of analytical "non-detects" in applications and to measure effluent concentrations near or below criteria values where possible at a reasonable cost. If an applicant or Permittee knows that an alternate, less sensitive method (higher DL and QL) from 40 CFR Part 136 is sufficient to produce measurable results in their effluent, that method may be used for analysis.

	Pollutant & CAS No. *(if available)*	**Recommended Analytical Protocol**	**Detection (DL)**[2] ***µg/L unless specified***	**Quantitation Level (QL)** [3] ***µg/L unless specified***
1	**CONVENTIONALS**			
	Biochemical Oxygen Demand	SM5210-B		2 mg/L
	Chemical Oxygen Demand	SM5220-D		10 mg/L
	Total Organic Carbon	SM5310-B/C/D		1 mg/L
	Total Suspended Solids	SM2540-D		5 mg/L
	Total Ammonia (as N)	SM4500-NH3- GH		0.3 mg/L
	Flow	Calibrated device		
	Dissolved oxygen	4500-OC/OG		0.2 mg/L
	Temperature (max. 7-day avg.)	Analog recorder or use micro-recording devices known as thermistors		0.2º C
	pH	SM4500-H^+ B	N/A	N/A
1	**NONCONVENTIONALS**			
	Total Alkalinity	SM2320-B		5 mg/L as CaCo3
	Bromide (24959-67-9)	4110 B	100	400
	Chlorine, Total Residual	4500 Cl G		50.0
	Color	SM2120 B/C/E		10 color unit
	Fecal Coliform	SM 9221E	N/A	N/A
	Fluoride (16984-48-8)	SM4500-F E	25	100
	Nitrate-Nitrite (as N)	4500-NO3- E/F/H		100
	Nitrogen, Total Kjeldahl (as N)	4500-NH3-C/E/FG		300
	Ortho-Phosphate (PO_4 as P)	4500- PE/PF	30	100
	Phosphorus, Total (as P)	4500-PE/PF	30	100
	Oil and Grease (HEM)	1664A		5,000
	Radioactivity	Table 1E		
	Salinity	SM2520-B		3 PSS
	Settleable Solids	SM2540 -F		100
	Sulfate (as mg/L SO_4)	SM4110-B		200
	Sulfide (as mg/L S)	4500-S^2F/D/E/G		200
	Sulfite (as mg/L SO_3)	SM4500-SO3B		2000

	Pollutant & CAS No. *(if available)*	Recommended Analytical Protocol	Detection (DL)[2] *µg/L unless specified*	Quantitation Level (QL)[3] *µg/L unless specified*
	Surfactants	SM5540 C		50
	Total dissolved solids	SM2540 C		20 mg/L
	Total Hardness	2340B		200 as CaCO3
	Aluminum, Total (7429-90-5)	200.8	2.0	10
	Barium Total (7440-39-3)	200.8	0.5	2.0
	Boron Total (7440-42-8)	200.8	2.0	10.0
	Cobalt, Total (7440-48-4)	200.8	0.05	0.25
	Iron, Total (7439-89-6)	200.8	12.5	50
	Magnesium, Total (7439-95-4)	200.8	10	50
	Molybdenum, Total (7439-98-7)	200.8	0.1	0.5
	Manganese, Total (7439-96-5)	200.8	0.1	0.5
	Tin, Total (7440-31-5)	200.8	0.3	1.5
	Titanium, Total (7440-32-6)	200.8	0.5	2.5
1	**METALS, CYANIDE & TOTAL PHENOLS**			
	Antimony, Total (7440-36-0)	200.8	0.3	1.0
	Arsenic, Total (7440-38-2)	200.8	0.1	0.5
	Beryllium, Total (7440-41-7)	200.8	0.1	0.5
	Cadmium, Total (7440-43-9)	200.8	0.05	0.25
	Chromium (hex) dissolved (185-402-99)	SM3500-Cr EC	0.3	1.2
	Chromium, Total (7440-47-3)	200.8	0.2	1.0
	Copper, Total (7440-50-8)	200.8	0.4	2.0
	Lead, Total (7439-92-1)	200.8	0.1	0.5
	Mercury, Total (7439-97-6)	1631E	0.0002	0.0005
	Nickel, Total (7440-02-0)	200.8	0.1	0.5
	Selenium, Total (7782-49-2)	200.8	1.0	1.0
	Silver, Total (7440-22-4)	200.8	0.04	0.2
	Thallium, Total (7440-28-0)	200.8	0.09	0.36
	Zinc, Total (7440-66-6)	200.8	0.5	2.5
	Cyanide, Total (7440-66-6)	335.4	5	10
	Cyanide, Available	SM4500-CN G	5	10
	Phenols, Total	EPA 420.1		50
	DIOXIN			
	2,3,7,8-Tetra-Chlorodibenzo-P-Dioxin (176-40-16)	1613B	1.3 pg/L	5 pg/L
1	**VOLATILE COMPOUNDS**			
	Acrolein (107-02-8)	624	5	10
	Acrylonitrile (107-13-1)	624	1.0	2.0
	Benzene (71-43-2)	624	1.0	2.0
	Bis(2-Chloroethyl)ether (111-44-4)	611/625	1.0	2.0
	Bis(2-Chloroisopropyl) ether (108-60-1)	611/625	1.0	2.0
	Bromoform (75-25-2)	624	1.0	2.0
	Carbon tetrachloride (108-90-7)	624/601 or SM6230B	1.0	2.0
	Chlorobenzene (108-90-7)	624	1.0	2.0
	Chloroethane (75-00-3)	624/601	1.0	2.0
	2-Chloroethylvinyl Ether (110-75-8)	624	1.0	2.0
	Chloroform (67-66-3)	624 or SM6210B	1.0	2.0
	Dibromochloromethane (124-48-1)	624	1.0	2.0
	1,2-Dichlorobenzene (95-50-1)	624	1.9	7.6

	Pollutant & CAS No. *(if available)*	Recommended Analytical Protocol	Detection (DL)[2] *µg/L unless specified*	Quantitation Level (QL)[3] *µg/L unless specified*
	1,3-Dichlorobenzene (541-73-1)	624	1.9	7.6
	1,4-Dichlorobenzene (106-46-7)	624	4.4	17.6
	3,3'-Dichlorobenzidine (91-94-1)	605/625	0.5	1.0
	Dichlorobromomethane (75-27-4)	624	1.0	2.0
	1,1-Dichloroethane (75-34-3)	624	1.0	2.0
	1,2-Dichloroethane (107-06-2)	624	1.0	2.0
	1,1-Dichloroethylene (75-35-4)	624	1.0	2.0
	1,2-Dichloropropane (78-87-5)	624	1.0	2.0
	1,3-dichloropropylene (mixed isomers) (542-75-6)	624	1.0	2.0
	Ethylbenzene (100-41-4)	624	1.0	2.0
	Methyl bromide (74-83-9) (Bromomethane)	624/601	5.0	10.0
	Methyl chloride (74-87-3) (Chloromethane)	624	1.0	2.0
	Methylene chloride (75-09-2)	624	5.0	10.0
	1,1,2,2-Tetrachloroethane (79-34-5)	624	1.9	2.0
	Tetrachloroethylene (127-18-4)	624	1.0	2.0
	Toulene (108-88-3)	624	1.0	2.0
	1,2-Trans-Dichloroethylene (156-60-5) (Ethylene dichloride)	624	1.0	2.0
	1,1,1-Trichloroethane (71-55-6)	624	1.0	2.0
	1,1,2-Trichloroethane (79-00-5)	624	1.0	2.0
	Trichloroethylene (79-01-6)	624	1.0	2.0
	Vinyl chloride (75-01-4)	624/SM6200B	1.0	2.0
1	**ACID COMPOUNDS**			
	2-Chlorophenol (95-57-8)	625	1.0	2.0
	2,4-Dichlorophenol (120-83-2)	625	0.5	1.0
	2,4-Dimethylphenol (105-67-9)	625	0.5	1.0
	4,6-dinitro-o-cresol (534-52-1) (2-methyl-4,6,-dinitrophenol)	625/1625B	1.0	2.0
	2,4 dinitrophenol (51-28-5)	625	1.0	2.0
	2-Nitrophenol (88-75-5)	625	0.5	1.0
	4-nitrophenol (100-02-7)	625	0.5	1.0
	Parachlorometa cresol (59-50-7) (4-chloro-3-methylphenol)	625	1.0	2.0
	Pentachlorophenol (87-86-5)	625	0.5	1.0[10]
	Phenol (108-95-2)	625	2.0	4.0
	2,4,6-Trichlorophenol (88-06-2)	625	2.0	4.0
1	**BASE/NEUTRAL COMPOUNDS (compounds in bold are Ecology PBTs)**			
	Acenaphthene (83-32-9)	625	0.2	0.4
	Acenaphtylene (208-96-8)	625	0.3	0.6
	Anthracene (120-12-7)	625	0.3	0.6
	Benzidine (92-87-5)	625	12	24
	Benzyl butyl phthalate (85-68-7)	625	0.3	0.6
	Benzo(*a*)anthracene (56-55-3)	625	0.3	0.6
	Benzo(j)fluoranthene (205-82-3)	625	0.5	1.0
	Benzo(r,s,t)pentaphene (189-55-9)	625	0.5	1.0
	Benzo(*a*)pyrene (50-32-8)	610/625	0.5	1.0

	Pollutant & CAS No. *(if available)*	Recommended Analytical Protocol	Detection (DL)[2] *µg/L unless specified*	Quantitation Level (QL)[3] *µg/L unless specified*
	3,4-benzofluoranthene (Benzo(b)fluoranthene) (205-99-2)	610/625	0.8	1.6
	11,12-benzofluoranthene (Benzo(k)fluoranthene) (207-08-9)	610/625	0.8	1.6
	Benzo(*ghi*)Perylene (191-24-2)	610/625	0.5	1.0
	Bis(*2-chloroethoxy)*methane (111-91-1)	625	5.3	21.2
	Bis(*2-chloroethyl*)ether (111-44-4)	611/625	0.3	1.0
	Bis(*2-chloroisopropyl*)ether (108-60-1)	625	0.3	0.6
	Bis(*2-ethylhexyl*)phthalate (117-81-7)	625	0.1	0.5
	4-Bromophenyl phenyl ether (101-55-3)	625	0.2	0.4
	2-Chloronaphthalene (91-58-7)	625	0.3	0.6
	4-Chlorophenyl phenyl ether (7005-72-3)	625	0.3	0.5
	Chrysene (218-01-9)	610/625	0.3	0.6
	Dibenzo (a,j)acridine (224-42-0)	610M/625M	2.5	10.0
	Dibenzo (a,h)acridine (226-36-8)	610M/625M	2.5	10.0
	Dibenzo(a-*h*)anthracene (53-70-3)(1,2,5,6-dibenzanthracene)	625	0.8	1.6
	Dibenzo(a,e)pyrene (192-65-4)	610M/625M	2.5	10.0
	Dibenzo(a,h)pyrene (189-64-0)	625M	2.5	10.0
	3,3'-Dichlorobenzidine (91-94-1)	605/625	0.5	1.0
	Diethyl phthalate (84-66-2)	625	1.9	7.6
	Dimethyl phthalate (131-11-3)	625	1.6	6.4
	Di-n-butyl phthalate (84-74-2)	625	0.5	1.0
	2,4-dinitrotoluene (121-14-2)	609/625	0.2	0.4
	2,6-dinitrotoluene (606-20-2)	609/625	0.2	0.4
	Di-n-octyl phthalate (117-84-0)	625	0.3	0.6
	1,2-Diphenylhydrazine (*as Azobenzene*) (122-66-7)	1625B	5.0	20
	Fluoranthene (206-44-0)	625	0.3	0.6
	Fluorene (86-73-7)	625	0.3	0.6
	Hexachlorobenzene (118-74-1)	612/625	0.3	0.6
	Hexachlorobutadiene (87-68-3)	625	0.5	1.0
	Hexachlorocyclopentadiene (77-47-4)	1625B/625	0.5	1.0
	Hexachloroethane (67-72-1)	625	0.5	1.0
	Indeno(*1,2,3-cd*)Pyrene (193-39-5)	610/625	0.5	1.0
	Isophorone (78-59-1)	625	0.5	1.0
	3-Methyl cholanthrene (56-49-5)	625	2.0	8.0
	Naphthalene (91-20-3)	625	0.3	0.6
	Nitrobenzene (98-95-3)	625	0.5	1.0
	N-Nitrosodimethylamine (62-75-9)	607/625	2.0	4.0
	N-Nitrosodi-n-propylamine (621-64-7)	607/625	0.5	1.0
	N-Nitrosodiphenylamine (86-30-6)	625	0.5	1.0
	Perylene (198-55-0)	625	1.9	7.6
	Phenanthrene (85-01-8)	625	0.3	0.6
	Pyrene (129-00-0)	625	0.3	0.6
	1,2,4-Trichlorobenzene (120-82-1)	625	0.3	0.6
1	**PESTICIDES/PCBs**			
	Aldrin (309-00-2)	608	0.025	0.05
	alpha-BHC (319-84-6)	608	0.025	0.05

	Pollutant & CAS No. *(if available)*	Recommended Analytical Protocol	Detection (DL)[2] *µg/L unless specified*	Quantitation Level (QL)[3] *µg/L unless specified*
	beta-BHC (319-85-7)	608	0.025	0.05
	gamma-BHC (58-89-9)	608	0.025	0.05
	delta-BHC (319-86-8)	608	0.025	0.05
	Chlordane (57-74-9)	608	0.025	0.05
	4,4'-DDT (50-29-3)	608	0.025	0.05
	4,4'-DDE (72-55-9)	608	0.025	0.05[10]
	4,4' DDD (72-54-8)	608	0.025	0.05
	Dieldrin (60-57-1)	608	0.025	0.05
	alpha-Endosulfan (959-98-8)	608	0.025	0.05
	beta-Endosulfan (33213-65-9)	608	0.025	0.05
	Endosulfan Sulfate (1031-07-8)	608	0.025	0.05
	Endrin (72-20-8)	608	0.025	0.05
	Endrin Aldehyde (7421-93-4)	608	0.025	0.05
	Heptachlor (76-44-8)	608	0.025	0.05
	Heptachlor Epoxide (1024-57-3)	608	0.025	0.05
	PCB-1242 (53469-21-9)	608	0.25	0.5
	PCB-1254 (11097-69-1)	608	0.25	0.5
	PCB-1221 (11104-28-2)	608	0.25	0.5
	PCB-1232 (11141-16-5)	608	0.25	0.5
	PCB-1248 (12672-29-6)	608	0.25	0.5
	PCB-1260 (11096-82-5)	608	0.13	0.5
	PCB-1016 (12674-11-2)	608	0.13	0.5
	Toxaphene (8001-35-2)	608	0.24	0.5

1. An X placed in this box means you must analyze for all pollutants in the group.
2. Detection level (DL) or detection limit means the minimum concentration of an analyte (substance) that can be measured and reported with a 99% confidence that the analyte concentration is greater than zero as determined by the procedure given in 40 CFR Part 136, Appendix B.
3. Quantitation Level (QL) is equivalent to EPA's Minimum Level (ML) which is defined in 40 CFR Part 136 as the minimum level at which the entire GC/MS system must give recognizable mass spectra (background corrected) and acceptable calibration points. These levels were published as proposed in the *Federal Register* on March 28, 1997.

APPENDIX C – SEPA CHECKLIST

WHATCOM COUNTY
Planning & Development Services
5280 Northwest Drive
Bellingham, WA 98226-9097
360-676-6907, TTY 800-833-6384
360-738-2525 Fax

J.E. "Sam" Ryan
Director

SEPA Determination of Nonsignificance (DNS)

File: SEP2012-00034

Project Description: A non-project action to amend the Whatcom County Comprehensive plan, adopt the Whatcom County Water District No. 13 Comprehensive Sewer Plan and Wastewater Treatment Plant Engineering Report and adopt the Fire District 14 Capital Facilities Plan for capital facility planning for the east Whatcom County, including the Columbia Valley UGA, Sumas UGA and surrounding areas.

Proponent: Whatcom County Planning and Development Services

Address and Parcel #: East Whatcom County, including the Columbia Valley UGA, Sumas UGA, City of Sumas and surrounding area.

Lead Agency: Whatcom County Planning & Development Services

Zoning: Non-Project proposal **Comp Plan:** Non-Project proposal

The lead agency for this proposal has determined that with proper mitigation, no significant adverse environmental impacts are likely. Pursuant to RCW 43.21C.030(2)(c), an environmental impact statement (EIS) is not required. This decision was made following review of the completed SEPA environmental checklists and other information on file with the lead agency. The environmental checklists that have been prepared for this action are as follows; Whatcom County PDS Capital Facility Planning for the East County (Sewer and Fire Protection) Checklist dated May 1, 2012 and Whatcom County Water District #13 Comprehensive Sewer Plan and WWTP Engineering Report, dated April 16, 2012. This information is available to the public on request.

__ There is no comment period for this DNS.

X Pursuant to WAC 197-11-340(2), the lead agency will not act on this proposal for 14 days from the date of issuance indicated below. Comments must be received by May 29, 2012 and should be sent to: **Matt Aamot**

Responsible Official: Tyler Schroeder
Title: Planning Manager
Telephone: 360-676-6907
Address: 5280 Northwest Drive
Bellingham, WA 98226

Date of Issuance: May 14, 2012 **Signature:** _____

An aggrieved agency or person may appeal this determination to the Whatcom County Hearing Examiner. Application for appeal must be filed on a form provided by and submitted to the Whatcom County Current Planning Division located at 5280 Northwest Drive, Bellingham, WA 98226, during the ten days following the comment period, concluding June 8, 2012.

You should be prepared to make a specific factual objection. Contact Whatcom County Current Planning Division for information about the procedures for SEPA appeals.

STATE ENVIRONMENTAL POLICY ACT
ENVIRONMENTAL CHECKLIST

A. BACKGROUND

1. Name of proposed project (if applicable):

Whatcom County Water District No. 13 Comprehensive Sewer Plan and WWTP Engineering Report

2. Name of Applicant:

Whatcom County Water District No. 13

3. Address and phone number of applicant and contact person:

Whatcom County Water District No. 13
523 Sprague Valley Drive
Maple Falls, WA 98266
(360) 599-1801
Kelly Wynn, WWTP Operator

4. Date checklist prepared:

October 2011 – REVISED April 2012

5. Agency requesting checklist:

Whatcom County Water District No. 13

6. Proposed timing or schedule (including phasing, if applicable):

Adoption of Comprehensive Sewer Plan – Spring 2012.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

The plan will serve as the guideline for future capital improvement activity by the District.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

None.

9. **Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.**

Plat applications may be pending, but proposed development therein is expected to be consistent with this plan.

10. **List any government approvals or permits that will be needed for your proposal, if known.**

Whatcom County
Washington State Department of Ecology
Washington State Department of Health

11. **Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (lead agencies may modify this form to include additional specific information on project description).**

The Comprehensive Sewer Plan (CSP) discusses the existing service area characteristics, population, and land use, and projects the growth within the District study area (the intersection of the District and Urban Growth Area [UGA] boundaries). The plan discusses design criteria, sewer demand, the existing system, and proposed system expansion and improvements. The plan will be used as a guide for improving the existing system and for future planning and growth in Whatcom County Water District No. 13. The original CSP was prepared in 1975 to support the Peaceful Valley plat. Since completion of the original facilities and prior to the economic downturn around year 2008, the area has seen significant growth and a transition from recreational use to year-round residents. The County has designated a portion of the District as a UGA. This CSP updates the original plan in order to be consistent with current planning documents and to address projected growth in the District. Similarly the WWTP Engineering Report reviews existing and forecast wastewater flows and loadings, existing process and discharge requirements, and identifies improvement needed for providing adequate capacity and treatment in the future.

12. **Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or details plans submitted with any permit applications related to this checklist.**

The District is located in the Columbia Valley area northeast of Bellingham and just north of Kendall, Whatcom County, Washington, and includes areas in Sections 21, 22, 23, 27, and 28, Township 40 North, Range 5 East.

TO BE COMPLETED BY APPLICANT

EVALUATION FOR AGENCY USE ONLY

B. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site (circle one): *Flat*, rolling, *hilly*, *steep slopes*, mountainous, other: lakes.

The study area lies on the flat valley floor and a portion of Sprague Lake is contained within its boundary. The District extends up mountain slopes on both sides of the valley.

b. What is the steepest slope on the site (approximate percent slope)?

10% within the study area.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck): If you know the classification of agricultural soils, specify them and note any prime farmland.

Seven different soil units can be found in the study area. A detailed list of the soils can be found on the Natural Resources Conservation Service's Web Soil Survey website.

The central area of the valley—and the majority of the study area—is comprised of silty loam. As the study area trends to the slopes, the soil transitions to gravelly loam.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

Landslide debris associated with the early recessional stages of the Vashon glacial period is found at the south end of the District. The debris blocks groundwater movement, which is then manifested in surface features such as springs and Kendall and Sprague Lakes. There is no indication of more recent activity within the study area.

e. Describe the purpose, type and approximate quantities of any filling or grading proposed. Indicate source of fill.

Sewer-line trenches will be excavated and backfilled as much as possible with native material. The County may require imported backfill depending on condition and type of native soil. Backfill will come from local suppliers.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

Erosion during construction should be minimal. Construction erosion requirements will be imposed.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

New impervious surfaces will be created as a part of development of the UGA. Impervious surfaces will be addressed in project-specific documents.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

Construction documents prepared for system improvements will require the contractor to utilize erosion/sedimentation control measures to prevent erosion by covering erodible embankments, hydroseeding, filter fabric and straw bale filters, and other measures as necessary to meet local and state requirements. The contractor will be required to schedule operations such that excavation, embankment, and restoration work proceeds commensurate with his ability to complete restoration, mulching, seeding, and other erosion control measures immediately following disturbance of the earth.

2. Air

a. What types of emissions to the air would result from the proposal (i.e., dust, automobile, odors, industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities if known.

There will be normal dust and machinery emissions during construction, but no emissions after construction. The contractor will be required to limit emissions as required by the appropriate regulatory agencies and to control dust emissions so as not to damage property or vegetation or create a nuisance for the public. Expansion of the sewer collection system will include expansion of and upgrade modifications to the existing sewage treatment plant. An analysis of and recommendation for controlling odors associated with the plant will be included in the design.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

No.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

The contractor will be required to control dust during construction by applying water, sweeping streets, and/or washing vehicles exiting the site.

3. Water

a. Surface:

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands). If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

Yes, the District contains portions of Sprague Lake and its outlet.

2) **Will the project require any work over, in or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.**

Expansion of the collection system or connection to the existing system may encroach within 200-feet.

3) **Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.**

All areas impacted by construction will be restored to original contours, to the extent feasible. Construction will consist of excavation of sewer-line trenches (average 9 feet deep, 1½ cy per foot of trench) and installation of pipe and backfill with native materials. If required by the County due to poor materials and close proximity to or location within roadway, backfill gravel will replace native material in about 2/3 or the trench cross-section (1 cy per foot of trench). Backfill gravel would come from local materials yards.

4) **Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.**

No.

5) **Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.**

No.

6) **Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.**

No.

b. Ground:

1) **Will ground water be withdrawn, or will water be discharged to ground water? Give general description, purpose, and approximate quantities if known.**

See answer below.

2) **Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals...; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.**

Treated effluent is currently discharged via infiltration basins. Discharge from the WWTP is not expected to exceed the limits established in the current State Wastewater Discharge permit and only equipment replacement is anticipated within the 20-year planning period. However, the timing of the next significant WWTP upgrade is subject to growth within the sewer service area and corresponding increase of connections to the

sewer system. If the growth projections adopted by Whatcom County are realized, an upgrade would be required sooner (completion by year 2020).

c. Water Runoff (including storm water):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

The finished collection systems projects will not result in an increased amount of impervious area, with the exception of additional crushed rock surfacing on existing roadway shoulders as may be required by the County. Improvements at the WWTP will result in additional impervious area (buildings, basins, etc) and drainage impacts will be addressed per Whatcom County regulations. Current drainage patterns will not be altered by the finished projects.

Storm water runoff impacting the construction zone will be intercepted for sediment control prior to release to its normal outfall.

The construction documents will require that the contractor utilize sediment control facilities per the specifications and local/state requirements to ensure that sediment-laden water does not enter the natural drainage system.

2) Could waste materials enter ground or surface waters? If so, generally describe.

Treated wastewater will be discharged to the ground as discussed above. In rare circumstances, sewer blockages or extended power outages combined with backup power system failure could result in wastewater overflow.

d. Proposed measures to reduce or control surface, ground and runoff water impacts, if any:

Erosion/sediment control facilities will be required as discussed previously. Projects are planned to provide adequate capacity for anticipated wastewater flows, to improve maintenance abilities, to replace deteriorated sewer mains, and to increase the reliability of the lift stations and standby power equipment.

4. Plants

a. Check or circle types of vegetation found on the site:

X	Deciduous trees: alder, maple, aspen, other
X	Evergreen trees: fir, cedar, pine, other
X	Shrubs
X	Grass
X	Pasture
	Crops or grain
X	Wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
X	Water plants: water lily, eelgrass, milfoil, other
	Other types of vegetation

b. What kind and amount of vegetation will be removed or altered?

To be determined on a project-specific basis.

c. List threatened or endangered species known to be on or near the site.

None known.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

Vegetation removed or disturbed will be restored following construction.

5. Animals

a. Circle any birds and animals that have been observed on or near the site or are known to be on or near the site:

birds: ***hawk, heron, eagle, songbirds***, other:_____
mammals: ***deer***, bear, elk, **beaver**, other:_____
fish: ***bass***, salmon, ***trout***, herring, shellfish, other:_____

b. List any threatened or endangered species known to be on or near the site.

Bald eagles are present in the vicinity. Within the study area, no Wildlife Habitat Conservation Areas were identified on the *Foothills Subarea Plan Critical Areas Article VII* map.

c. Is the site part of a migration route? If so, explain.

The Columbia Valley UGA appears to be within the Pacific Flyway.

d. Proposed measures to preserve or enhance wildlife, if any:

None.

6. Energy and Natural Resources

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

Electricity will be necessary for pumping of wastewater as well as vault lighting, control and ventilation. Diesel fuel is used for operation of standby generator engines.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

No.

c. **What kinds of energy conservation features are included in the plans of this proposal. List other proposed measures to reduce or control energy impacts, if any:**

None.

7. **Environmental Health**

a. **Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.**

The main risk would occur during construction from machinery and construction practices. This could include spills of small amounts of oil and gas because of improper filling and/or machinery failures.

1) **Describe special emergency services that might be required.**

Spill clean-up services during construction. Emergency/portable generators for continued operation of system.

2) **Proposed measures to reduce or control environmental health hazards, if any:**

Contractors are required to ensure all personnel are properly trained and construction equipment is properly maintained as required by WISHA.

b. **Noise**

1) **What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?**

None.

2) **What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.**

During construction, noise levels will increase from construction equipment engines during normal working hours. Periodic testing and operation of standby generators during power outages will generate noise for short periods of time. Following construction, noise levels will return to their previous levels and consist of minimal noise from pump stations and the sewage treatment plant during operations.

3) **Proposed measures to reduce or control noise impacts, if any:**

Construction would be limited to daylight hours. Federal, state and local noise standards will regulate construction noise. Contractors will be required to ensure proper maintenance of equipment.

8. Land and Shoreline Use

a. What is the current use of the site and adjacent properties?

Construction will take place within existing county right-of-way or on private properties. Adjacent properties range from single-family homes to grass fields to dense trees.

b. Has the site been used for agriculture? If so, describe.

N/A.

c. Describe any structures on the site.

Typically, the "site" is within public right-of-way, free of structures. The actual "site" will vary depending on the project. Several existing District structures include the treatment plant buildings and facilities and lift station facilities, which are below grade in most cases.

d. Will any structures be demolished? If so, what?

N/A.

e. What is the current zoning classification of the site?

The majority of the District within the study area is zoned Urban Residential 4 Units/Acre. Approximately 40 acres are zoned General Commercial and are west of Kendall Road. Beyond the study area, the zoning is mostly Rural Forestry, with small areas zoned Rural 1 Unit/5 Acres and 1 Unit/10 Acres.

Actual land use is almost exclusively residential. The District's treatment plant is located in the southwestern portion of the study area and the drainfields are more centrally located.

f. What is the current comprehensive plan designation of the site.

The study area is designated Columbia Valley UGA in the Whatcom County Comprehensive Plan.

g. If applicable, what is the current shoreline master program designation of the site?

The area in the vicinity of Sprague Lake has several shoreline designations including Rural, Conservancy, and Natural.

h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.

Not known.

i. Approximately how many people would reside or work in the completed project?

The estimated population for the study area is 1,595 for the year 2029.

j. Approximately how many people would the completed project displace?

None.

k. Proposed measures to avoid or reduce displacement impacts, if any:

N/A

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

All projects are submitted for review and approval by the regulating authority, and the CSP and report have used the Foothills Subarea planning data in their development.

9. Housing

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

N/A

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

N/A

c. Proposed measures to reduce or control housing impacts, if any:

N/A

10. Aesthetics

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

To be determined on a project-specific basis.

b. What views in the immediate vicinity would be altered or obstructed?

None.

c. Proposed measures to reduce or control aesthetic impacts, if any:

Design review of all proposed construction.

11. Light and Glare

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

To be determined on a project-specific basis.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

No.

c. What existing off-site sources of light or glare may affect your proposal?

None.

d. Proposed measures to reduce or control light and glare impacts, if any:

None.

12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?

Trail and park development is anticipated for the area. Fishing, rafting, and skiing opportunities exist nearby.

b. Would the proposed project displace any existing recreational uses? If so, describe.

No.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

None.

13. Historic and Cultural Preservation

a. Are there any places or objects listed on, or proposed for, national, state, or local preservation registers known to be on or next to the site? If so, generally describe.

None known.

b. Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site.

None.

c. Proposed measures to reduce or control impacts, if any:

N/A

14. Transportation

a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.

The primary access is Kendall Road (State Route 547) with several county roads throughout the area. Typically, existing roads will remain in service, with minor delays, during construction.

b. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?

Not known.

c. How many parking spaces would the completed project have? How many would the project eliminate?

As required by regulations; none will be eliminated.

d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).

Development is expected that will require public improvements. New sewer infrastructure would be installed within the new roads along with other utilities.

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

No.

f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.

One to two trips per week could be associated with maintenance of the system.

g. Proposed measures to reduce or control transportation impacts, if any:

During construction signage and flaggers will be used to control traffic.

15. Public Services

a. Would the project result in an increased need of public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe.

No.

b. Proposed measures to reduce or control direct impacts on public services, if any.

None.

16. Utilities

a. Circle utilities currently available at the site: ***electricity,*** natural gas, ***water, refuse service, telephone, sanitary sewer, septic system, other.***

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity that might be needed.

Future construction activities, specific for each project, will consist of trenching for sewer line installation and restoration and upgrading lift stations facilities and the WWTP. Whatcom County Water District No. 13 will own the system.

C. SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: Rodney Lanyon

Date Submitted: April 16, 2012

D. SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?

Temporary increase in noise and air emissions due to construction of proposed sewer facilities. As the community grows, more sewage flow will be generated requiring an increase in conveyance and discharge capacity.

Proposed measures to avoid or reduce such increases are:

Require compliance with local and state regulations.

2. How would the proposal be likely to affect plants, animals, fish, or marine life?

The implementation of the 2012 Comprehensive Sewer Plan is not expected to impact flora or fauna in the vicinity.

Proposed measures to protect or conserve plants, animals, fish, or marine life are:

Utilizing a comprehensive plan controls the effects of development.

3. How would the proposal be likely to deplete energy or natural resources?

Installation of materials and use of electricity, diesel oil, and fuel are required in relatively small amounts. The 2012 Comprehensive Sewer Plan is not expected to have a significant impact on natural resources.

Proposed measures to protect or conserve energy and natural resources are:

Energy conservation may be realized through appropriate materials and processes that would be required for each element of construction and ongoing operation.

4. **How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, flood-plains, or prime farmlands?**

The implementation of the plan will not have a significant impact on environmentally sensitive areas. Most of the proposed facilities will be installed along existing transportation and utility corridors or within new development as regulated by the County. Some projects may involve construction in critical areas, such as wetlands or along shorelines. Each project will be permitted and constructed in accordance with the appropriate regulations.

Proposed measures to protect such resources or to avoid or reduce impacts are:

Comply with local and state requirements. Implementing a sewer comprehensive plan reduces the overall amount of construction activity and minimizes the effects of development.

5. **How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?**

The plan will not significantly affect land and shoreline use. The proposal would provide new facilities and improve existing facilities, in compliance with existing land and shoreline use plans.

Proposed measures to avoid or reduce shoreline and land use impacts are:

None. No significant impacts are anticipated.

6. **How would the proposal be likely to increase demands on transportation or public services and utilities?**

This proposal will not significantly increase demands on transportation or public services and utilities. Instead, the CSP supports planning activities for the area, which are expected to generate the need for an array of services within the UGA.

Proposed measures to reduce or respond to such demand(s) are:

None. No significant impact is anticipated.

7. **Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.**

The proposal will generate no conflicts.

APPENDIX D – COLLECTION SYSTEM HYDRAULIC ANALYSIS

Whatcom County Water District No. 13
Comprehensive Sewer Plan

Full Build-Out Population and Sewage Flows

Used "5 fps" worksheet on 1/11/10 for this projection. RCEs: 1,908; AA: 0.47 MGD; MMA: 0.61 MGD. Used adopted sub-area plan growth rate and map, no Balfour development.

prepared by: ***CHS Engineers, LLC***

date: 8/9/2010 by: SG
Revised 2/25/2012 RL checked: RL

gpm to cfs conversion = 0.00222801

Mannings n = 0.013

Dia.(gravity, inches) = [2 x [(1.5874 x n x conversion factor x Q)/(1.49 x pi x S^(1/2))]^(3/8)] x 12

Look-up function for PF: =IF(B16<O6,N6,(IF(B16<O7,N7,(N8))))

Sewage Flow	70 gpcd
Pop Density	2.87 ppl/unit*
Peak Infiltration	500 gpad
Peak Inflow	600 gpad
Total I/I	1100 gpad

Peak Factor Curve

4.00	100 AC
3.00	1000 AC
2.20	5000 AC

Basin/Sub-basin (Tributary to:)	Sub-Basin Area, AC	Average Density, Units/AC	Basin Peak Factor	**Sub-Basin Flows** Q_{san}, gpm	$Q_{I/I}$, gpm	**Q_T, gpm**	Acreage, AC	Tributary Units	PF	Q_{san}, gpm	$Q_{I/I}$, gpm	**Q_T, gpm**	Slope of Gravity Main*, ft/ft	Existing or Proposed Gravity Main, inches	Gravity Sewer $Q_{capacity}$, gpm	Gravity Sewer Q_T/Q_{cap}, %	Minimum Force Main Diameter @ 5 fps, inches	Existing Force Main Diameter (if applicable), inches	Notes
New dev (east) to I via MH D-8	90.0	4.0	4.00	200.9	68.8	**269.7**	90.0	360	4.00	201	69	**270**	0.0060	8	421	64.0%			
I (to MH D-1)	49.4	2.5	4.00	69.8	37.7	**107.5**	139.4	485	3.96	268	106	**374**	0.0060	8	421	88.8%			Install 4,220 LF 8" sewer trunk.
New dev (east) to MH D-1	61.5	4.0	4.00	137.3	47.0	**184.3**	61.5	246	4.00	137	47	**184**	0.0100	8	544	33.9%			Install 3,245 LF 8" sewer trunk.
To pump station (merges @ MH B-10)							201	731	3.89	397	153	**550**	0.0080	8	486	113.1%	6.7	4	Need 6" dia. FM (~1,820 LF) to pass 550 gpm (at 6.2 fps) & upsize 231 LF d/s gravity main to 10". Existing pump station capacity is 300 gpm; expand to 550 gpm.
H (to MH B-10)	15.5	2.1	4.00	18.4	11.8	**30.3**	216	764	3.87	413	165	**578**	0.0040	8	344	168.0%			Upsize 194 LF reach d/s of MH B-10 to 10".
G (to MH B-9)	27.6	2.7	4.00	41.9	21.1	**62.9**	28	75	4.00	42	21	**63**	0.0070	8	455	13.8%			
MH B-9							244	839	3.84	449	186	**636**	0.0030	10	540	117.7%	7.2		
E (w/ all previous flows to MH B-2)	15.0	2.6	4.00	21.8	11.5	**33.2**	259	878	3.82	468	198	**666**	0.0040	10	624	106.8%			Upsize 1,400 LF pipe between MH B-8 and MH B-2 to 12".
F (to MH B-2)	8.7	2.9	4.00	14.0	6.6	**20.6**	9	25	4.00	14	7	**21**	0.0040	8	344	6.0%			
MH B-2							268	903	3.81	480	204	**685**	0.0030	10	540	126.8%	7.5		
J (to MH A-10)	12.1	2.2	4.00	15.1	9.2	**24.3**	12	27	4.00	15	9	**24**	0.0137	10	1,154	2.1%			Crosses Sumas-Kendall Road; upgrade 483 LF pipe to 12".
D (w/ all previous flows to MH A-10)	2.1	1.4	4.00	1.7	1.6	**3.3**	282	933	3.80	494	214	**708**	0.0030	10	540	131.1%			
New dev (south) to MH A-8	14.5	4.0	4.00	32.4	11.1	**43.4**	15	58	4.00	32	11	**43**	0.0025	12	802	5.4%			Install 1,350 LF 8" sewer trunk, 45-gpm pump station, 1,840 LF 4" force main.
C (w/ all previous flows to MH A-3)	15.0	2.9	4.00	24.6	11.5	**36.0**	311	1035	3.77	544	225	**768**	0.0025	12	802	95.9%			
New dev (West2) to MH A-3	187.0	4.0	3.90	407.3	142.8	**550.2**	187	748	3.90	407	143	**550**	0.0025	12	802	68.6%			Install 3,415 LF 8" and 650 LF 10" sewer trunk.
B	3.6	2.5	4.00	5.0	2.8	**7.8**		9					0.0025	12	802				With new development to the north, upsize 717 LF sewer trunk d/s of MH A-3 to 15".
New dev (West1) to MH A-1A**	28.3	4.0	4.00	63.2	21.6	**84.8**		113					0.0150	8	666				Install pump station (85 gpm capacity) and 1,050 LF 4" force main (2.2 fps).
A	1.1	2.7	4.00	1.7	0.8	**2.5**		3					0.0150	8	666				
WWTP							531.4	1,908	3.52	937	393	**1,330**	0.00743	12	1,382	96.2%	10.4		Influent Pump Station design criteria (per permit): 0.35 MGD (243 gpm). Expand Influent Pump Station capacity to 1,325 gpm.
																			Increase drainfield capacity: 13 units needed for 2029 projections, 56 units for build-out.
Total with lake	553.8																		Install "parallel" 8-inch forcemain (~3,400 LF) and pump.

* flattest slope relatively close to node
**directed to MH A-1A using a pump station and force main.

Area of lake 22.4 acres

Shading indicates data input cells
Shading indicates node on collector system and summing of previous cells.

Growth based on comprehensive planning adopted by the Whatcom County Council on 11/24/09 and as shown on revised planning map dated 11/25/09.
- Tributary units set to equal planning documents including Whatcom Co. comp plan (11/09), final EIS, and latest Foothills subarea plan (5/10)
- Previously, commercial growth anticipated same RCE as 4/AC rate, so acreage used to determine growth.
- People per household increased from 2.79 to 2.87 per district-specific forecasting provided in the County's FEIS, Appendix C, for its UGA review.

8/26/10: cell B31 was adjusted to reflect information that western boundary is based on 505 contour per 8/24/10 M. Aamot email, which reduced build-out by 18 RCEs
Resulting change reduced future Influent Pump Station capacity to 1,325; no change to drainfield units at build-out.

2/25/2012 - Cell B31 acreage added back to reflect such area is in the "study area"