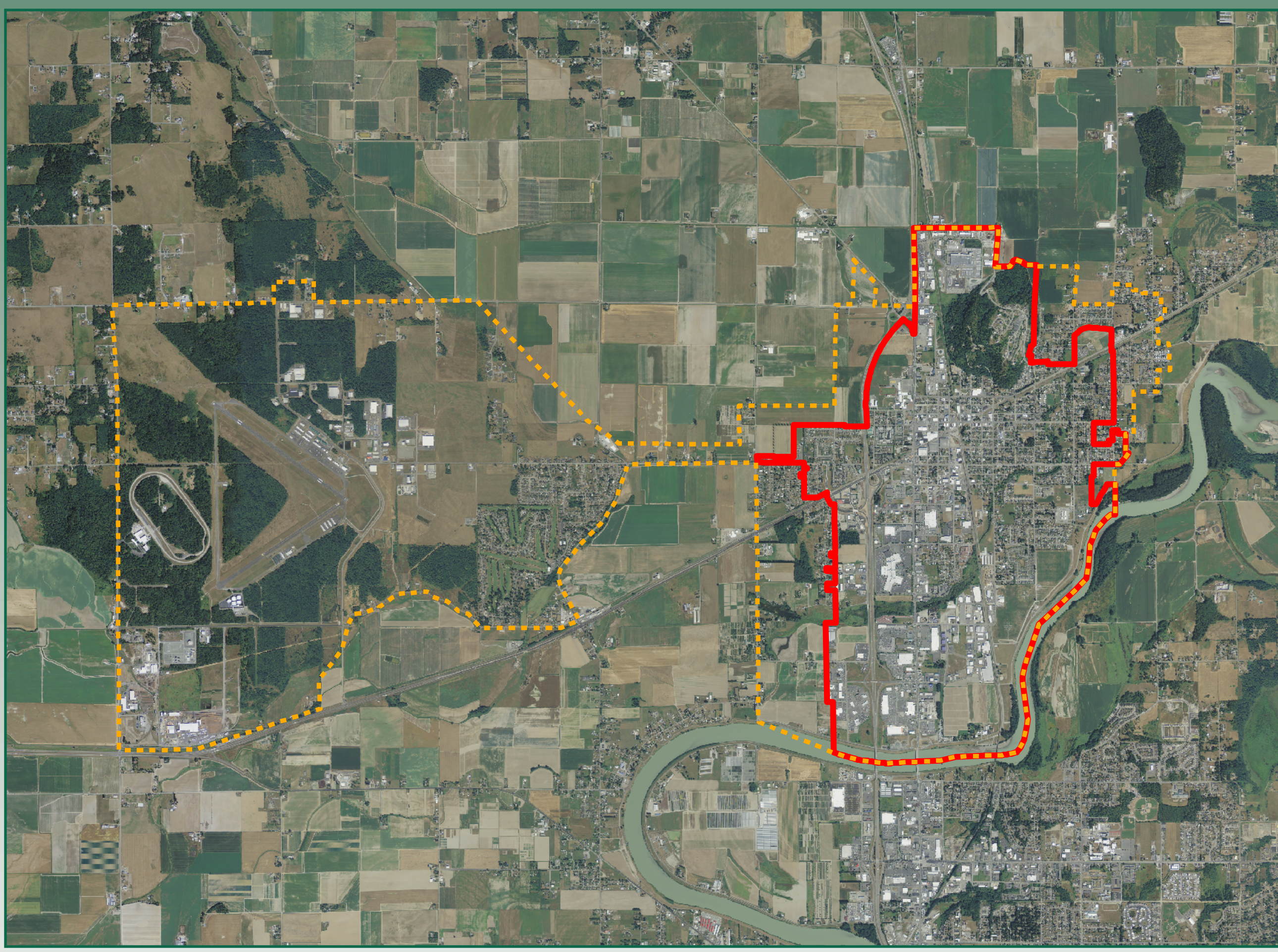
CITY OF BURLINGTON

SKAGIT COUNTY, WASHINGTON

WASTEWATER COMPREHENSIVE PLAN



G&O #10476
DECEMBER 2011

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CONSULTING ENGINEERS

CITY OF BURLINGTON

SKAGIT COUNTY, WASHINGTON

CITY OF Burlington

SKAGIT COUNTY, WASHINGTON INCORPORATED 1902

WASTEWATER COMPREHENSIVE PLAN

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DECEMBER 2011

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LIST OF ABBREVIATIONS

AAF	average annual flow
ac	acre
ACOE	Army Corps of Engineers
ADWF	average dry weather flow
AKART	all known, available, and reasonable technologies
avg.	average
BOD_5	5-day biochemical oxygen demand
BTU	British thermal units
$CaCO_3$	calcium carbonate
$CBOD_5$	5-day carbonaceous biochemical oxygen demand
CCWF	Centennial Clean Water Fund
cf	cubic feet
cfm	cubic feet per minute
CFR	Code of Federal Regulations
cfs	cubic feet per second
CFU	colony-forming units
CIP	Capital Improvement Projects
CM	construction management
CMU	concrete masonry units
COD	chemical oxygen demand
conc.	concentration
constr.	construction
CWA	Clean Water Act
cy	cubic yards
DMR	discharge monitoring reports
DNS	determination of non-significance
DO	dissolved oxygen
DOH	Department of Health
DT	dry tons
EA	each
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ERU	equivalent residential unit
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
F/M	food-to-microorganism ratio
fps	feet per second
ft^2	square feet
FTE	full-time equivalent
gal.	gallons
gfd	gallons per square foot per day

LIST OF ABBREVIATIONS (continued)

GMA	Growth Management Act
gpad	gallons per acre per day
gpcd	gallons per capita per day
gpd	gallons per day
gpd/ft^2	gallons per day per square foot
gph	gallons per hour
gpm	gallons per minute
gpm/ft^2	gallons per minute per square foot
HDPE	high density polyethylene
HMI	Human-Machine Interface
hp	horsepower
HPA	Hydraulic Project Approval
HRT	hydraulic residence time
HVAC	heating, ventilation, and air conditioning
I/I	infiltration and inflow
in.	inches
kVA	kilovolt-amps
kW	kilowatt
kWh	kilowatt hour
lb	pounds
lb/cap/d	pounds per capita per day
lb/d	pounds per day
lb/ft^2/d	pounds per square foot per day
lf	linear foot
LS	lump sum
max.	maximum
MBR	membrane bioreactor
MDF	maximum day flow
mg	milligrams
MG	million gallons
mgd	million gallons per day
mg/L	milligrams per liter
misc.	miscellaneous
mJ/cm^2	millijoules per square centimeter (UV dose measurement)
ml	milliliters
MLSS	mixed liquor suspended solids
mm	millimeter
MM	maximum month
MMF	maximum month flow
MSL	mean sea level
N/A	not applicable

LIST OF ABBREVIATIONS (continued)

NEPA	National Environmental Policy Act
NH_3	ammonia-nitrogen
NMFS	National Marine Fisheries Service
NO_3-N	nitrate - nitrogen
NPDES	National Pollutant Discharge Elimination System
NR	not reported
NRCS	National Resource Conservation Service
NTU	nephelometric turbidity units
NWI	National Wetlands Inventory
OD	outside diameter
OFM	Office of Financial Management
O&M	operation and maintenance
PDF	peak day flow
PFRP	process to further reduce pathogens
pH	negative log hydronium ion concentration
PHF	peak hour flow
PHS	priority habitat and species
PLC	Programmable Logic Controller
PMAC	plan to maintain adequate capacity
P.S.	pump station
psi	pounds per square inch
PSRP	process to significantly reduce pathogens
PWTF	Public Works Trust Fund
Q	flow rate
RAS	return activated sludge
RCW	Revised Code of Washington
ROW	right-of-way
rpm	revolutions per minute
SBR	sequencing batch reactor
scfm	standard cubic feet per minute
SEPA	State Environmental Policy Act
SERP	State Environment Review Process
sf	square feet
S.F.	safety factor
SR	State Route
SRF	State Revolving Fund
SRT	solids retention time
SWD	side water depth
TBD	to be determined
TDH	total dynamic head
TKN	total Kjehldahl nitrogen

LIST OF ABBREVIATIONS (continued)

TMDL	total maximum daily load
TSS	total suspended solids
UGA	Urban Growth Area
USFWS	United States Fish and Wildlife Service
USGS	United States Geologic Survey
UV	ultraviolet radiation
V	volts
VFD	variable frequency drive
VOC	volatile organic compounds
VS	volatile solids
VSS	volatile suspended solids
WAC	Washington Administrative Code
WAS	waste activated sludge
WDFW	Washington State Department of Fish and Wildlife
WT	wet tons
WWTP	wastewater treatment plant
µm	micrometer (micron)

EXECUTIVE SUMMARY

INTRODUCTION

This 2010 *Wastewater Comprehensive Plan* for the City of Burlington addresses the City's comprehensive planning needs for wastewater collection, transmission, treatment, and disposal for a 20-year planning period. Because substantial growth is projected for the Burlington area over the next 20 years, planning for that growth will be essential to properly accommodate new customers within the City and the Urban Growth Area (UGA). It is also important to evaluate the existing wastewater collection and treatment infrastructure, to determine its capability to serve the projected population and to determine equipment replacement needs for the planning period.

The planning period for this *Wastewater Comprehensive Plan* is from 2010 through 2030. This Plan was prepared in accordance with the provisions of the Revised Code of Washington (RCW), Section 90.48, *Water Pollution Control*, and Washington Administrative Code (WAC) Section 173-240-050, *General Sewer Plan.* Development of the Plan has been coordinated with the City's *2005 Comprehensive (Land Use) Plan* and Skagit County and Port of Skagit County planning efforts.

POPULATION PROJECTIONS

The population of the City of Burlington has increased an average of about 2.19 percent per year over the past 10 years. This population increase has been a result of development within the existing city limits as well as annexations, although few annexations occurred during the past 5 years. Several areas within the City are presently undeveloped or are developed at a lower density than allowed by current zoning, but it is considered highly unlikely that all residentially zoned areas in the City of Burlington will be redeveloped over the next 20 years. It is, however, proposed to utilize a population growth rate of 2.25 percent per year (slightly higher than the growth rate over the past 10 years) over the next 20 years to allow for service to developed areas presently outside the city limits, but within the UGA, that are presently served by septic tanks or other types of on-site treatment and disposal. These areas may be annexed to the City, or merely receive sewer service. Table E-1 shows the projected future population receiving sewer service at 5-year increments for the 20-year planning period for the City of Burlington based on a 2.25 percent annual growth rate. A small area adjacent to Anacortes Avenue, south of Gages Slough, it presently not sewered and is included in the 2010 population. This area is assumed to be sewered by the year 2015.

TABLE E-1

City of Burlington Projected Population

Year	City of Burlington Population(1)
2010	8,388
2015	9,375
2020	10,978
2025	11,711
2030	13,090

(1) Includes population within city limits and areas that could potentially be annexed by the City.

PROJECTED FLOW AND LOADING RATES

Per the *2005 City Comprehensive Plan*, the City of Burlington has a substantial amount of land that has the potential for new development and redevelopment. In particular, the City contains large acreages of underutilized and vacant commercial and industrial land. The Comprehensive Plan develops strategies for infill of the City that includes the flexibility in development regulations to encourage a variety of uses and businesses to locate in Burlington. In addition, the Western Service Area located in unincorporated Skagit County, and is served by the City of Burlington, includes large areas of vacant and underdeveloped land, including the Bayview Ridge area, which includes large areas of residential and commercial land. The development of the Bayview Ridge area is summarized in the *2008 Bayview Ridge Subarea Plan*. Lastly, the Western Service Area also includes the Port of Skagit County, which contains large areas of commercial and industrial land that are currently vacant or underdeveloped.

The existing (2010) and projected flow and loading rates to the City of Burlington sewer system and WWTP have been estimated for 2010, 2015, 2020, 2025, and 2030 conditions. It is assumed that the rate of infiltration and inflow (I/I) of stormwater into the existing sewer system will remain constant throughout the planning period. As the sewer system expands, newly sewered areas will also produce I/I, although at a lower rate than the existing system. Table E-2 provides the existing and projected wastewater flow and loading rates, and the currently permitted capacity of the wastewater treatment plant (WWTP).

TABLE E-2

NPDES-Permitted Capacity and Current and Projected Flow and Loading Rates for the WWTP

	NPDES Permit Capacity(1)	2010 Existing	Projection			
			2015	2020	2025	2030
Average Annual Flow (mgd)	NI(2)	1.57	1.62	1.79	1.87	2.51
Maximum Month Flow (mgd)	3.79	2.33	2.46	2.55	2.70	3.55
Peak Hour Flow (mgd)	NI(2)	6.43	6.71	6.93	7.19	8.95
Maximum Month BOD_5 Loading (lb/d)	7,356	5,020	5,620	5,900	6,900	10,500
Maximum Month TSS Loading (lb/d)	7,660	5,420	6,170	6,730	7,710	10,500

(1) Condition S4.A of City's NPDES permit (see Appendix A).
(2) NI = Not included in NPDES permit.

WASTEWATER COLLECTION SYSTEM

EXISTING FACILITIES

The City of Burlington wastewater collection system includes approximately 58 miles of gravity sewer pipes varying in size from 4-inch diameter local connections to 27-inch diameter interceptors. Due to the relatively flat terrain, much of the gravity collection system has been constructed at the minimum slope required to prevent solids from settling out during conveyance. In some areas, topography allows for greater slopes; however, an extensive system of pump stations and force main piping has been installed to convey wastewater in areas where topography causes gravity flow sewers to be very deep.

The City owns and operates 21 sewage pump stations. Pump Station No. 8 serves the Western Service Area exclusively and the force main from Pump Station No. 8 conveys the flow from this pump station into two large-diameter interceptors that discharge directly to the wastewater treatment plant. The existing sewer service area includes 28 sewer drainage basins.

WASTEWATER COLLECTION SYSTEM ANALYSIS

Wastewater flows were developed for each of the 28 existing sewer drainage basins as well as 20 potentially new drainage basins to serve areas that currently do not have sewer service. Each drainage basin in the City's wastewater collection system was analyzed for its ability to serve the future population and land use and to handle the projected wastewater flow rates.

This included a capacity analysis tha was performed for all the pump stations and force mains using the existing and future flows for each of the drainage basins and development of a hydraulic model to analyze the capacity of major gravity lines at existing and buildout conditions at peak hour wet weather flow rates. The results of the capacity analysis and hydraulic modeling were used to identify collection system components in need of rehabilitation or replacement. Table E-3 identifies facilities that have inadequate capacity.

TABLE E-3

Collection System: Capacity Deficiencies

Deficient Facilities	Anticipated Year of Deficiency	Description of Deficiency
Pump Station No. 4	2010	Pump station is currently over existing capacity.
Pump Station No. 14	2010	Pump station is currently over existing capacity.
Pump Station No. 6	2010	Pump station is currently slightly over existing capacity; upgrades are scheduled for 2014.
Pump Station No. 10	2030	Pump station is currently near existing capacity; upgrades are scheduled for 2016.
Pump Station No. 4 Force Main	Buildout	Pump station force main is near capacity at buildout flows.
Pump Station No. 6 Force Main	Buildout	Pump station force main is over capacity at buildout flows.
Pump Station No. 10 Force Main	Buildout	Pump station force main is over capacity at buildout flows.
Gravity Sewer	Buildout	Approximately 100 sections of gravity sewer may have the potential to be over capacity under buildout flows.

WASTEWATER TREATMENT PLANT

EXISTING FACILITIES

The City of Burlington wastewater treatment facility (WWTF) located at 900 South Section Street, was constructed on this site in the mid-1970s and has been extensively expanded and upgraded since that time. The WWTF is an activated sludge treatment facility and discharges to the Skagit River. The design capacity is presently 3.79 million gallons per day, peak monthly flow.

The existing WWTF liquid stream treatment processes include influent screening, grit removal, primary settling, biological treatment in aeration basins, secondary settling, and ultraviolet light disinfection. Primary sludge and waste activated sludge are digested in anaerobic digesters. The stabilized sludge is then dewatered by a belt filter press and dried in the sludge dryer. The dried sludge meets the Washington State Department of Ecology's Class A pathogen reduction and exceptional quality (EQ) standards (WAC 173-308) for relatively unrestricted use by the public. The dried sludge is presently picked up by local farmers for use as a soil amendment/fertilizer.

TREATMENT EVALUATION AT PROJECTED FLOW AND LOADING RATES

The capacities of the individual treatment processes to treat the projected flow and loading rates were evaluated. Also, the condition of the existing WWTP processes were evaluated based on visual observation and interviews with City staff. Recommended improvements to the WWTP during the 20-year planning period were developed based on the required capacity, performance, and operation and maintenance needs.

Although only a few immediate improvements are recommended at the wastewater treatment facility, it is recommended that some planning be provided to ensure that the facility has the required capacity when needed. It is recommended that the City complete the following actions to meet future wastewater treatment needs:

Immediate Actions

1. Increase the capacity of the influent pump station to a peak hour flow rate of 9.31 mgd (6,465 gpm). This should provide adequate capacity through 2030.

2. Install a second influent screen. The screen has been budgeted for and ordered by the City and is scheduled for delivery in September 2011.

3. Implement modifications to the digester gas piping and boiler, digester recirculation pumps, and digester piping valves to eliminate excessive moisture in the digester gas.

4. Conduct an assessment to determine the remaining useful life of the mechanisms for Primary Clarifiers 1A and 1B, Secondary Clarifiers 1A and 1B, and the gravity primary sludge thickener.

Actions to be Taken before 2015

1. Refurbish or replace the mechanisms for Primary Clarifiers 1A and 1B, Secondary Clarifiers 1A and 1B, and the gravity primary sludge thickener, if required.

Actions to be Taken during the Period of 2015 to 2020

1. Prepare a Design Report to add a second primary digester.

Actions to be Taken during the Period of 2020 to 2025

1. Design and construct a second primary digester.

2. Prepare a Predesign Report to increase aeration basin capacity.

Actions to be Taken during the Period of 2025 to 2030

1. Design and construct increased aeration basin capacity.

2. Prepare a Predesign Report to increase secondary clarifier capacity and WAS thickening capacity.

WATER RECLAMATION AND REUSE EVALUATION

This Plan presents a brief evaluation of the feasibility of reclaiming effluent from the WWTP and reusing it in the City. Landscape irrigation and sanitary sewer flushing are the most suitable uses of reclaimed water in the City. The estimated capital and operation and maintenance (O&M) costs to provide reclaimed water far exceed the potential revenue from sale or avoided value of City potable water used for these purposes. Other benefits of reclaimed water use may be cost-effective at some time in the future, but additional reclaimed water facilities are not included in the current capital improvement plan recommended in this Plan.

6-YEAR CAPITAL IMPROVEMENT PLAN (CIP)

The Plan contains a list of projects recommended for the City's capital improvement plan for the 6-year planning horizon. These are projects that are currently budgeted and include upgrades to pump stations, gravity sewer pipe, and components of the WWTP. The required capacity and timing of each recommended improvement are given for budgeting and financial projection purposes only. The actual design requirements and criteria should be determined at the design phase of the project. Updated population and flow data should be used when available to ensure that the proposed facilities are adequately sized to convey buildout flows. Additional projects that are not identified as part of the City's current CIP may become necessary to remedy an emergency situation, to address unforeseen problems, or to accommodate improvements proposed or required by other agencies. Due to budgetary constraints, the completion of such projects may require alterations to the recommended CIP. The City retains the flexibility to reschedule, expand, or reduce the projects included in the CIP and to add new projects to the CIP, as best determined by the City Council, when wastewater system emergencies occur, or new information becomes available for review and analysis. The City may reprioritize projects in the future to accommodate other agencies and unforeseen events. The CIP projects that are currently budgeted for construction within the next 6 years are summarized in Table E-4.

TABLE E-4

Budgeted Capital Improvement Projects

Project No.	Year of Construction	Improvement	Estimated Cost	Estimated Total Annual Cost	Paid By
S115	2012	Section Street Sewer	$100,000		COB(1)
	2012	Job 3 Hawthorne Street Sewer	$320,000	$ 420,000	COB
	2013	Rio Vista Sewer	$447,000		COB
S106	2013	Pump Station Landscaping	$ 10,000		COB
	2013	Job 1 – Schedule B: McKinley Street Sewer	$104,000	$ 561,000	COB
S131	2014	WWTP Lab/Admin Building Upgrades	$275,000		COB
S108	2014	Equipment Storage Building	$150,000		COB
S119	2014	Job 1 – Schedule C: Koch Street Sewer	$258,000		COB
S007	2014	Clarifier Drive Upgrade	$100,000	$ 783,000	COB
S007	2015	Clarifier Drive Upgrade	$100,000		COB
S106	2015	Pump Station Landscaping	$ 10,000		COB
S122	2015	Job 4: Regent Street Sewer	$170,000		COB
	2015	Sludge Dewatering Unit	$300,000	$ 580,000	COB
S109	2016	Pump Station No. 6	$900,000		COB
S111	2016	Pump Station No. 9	$175,000		COB
S114	2016	Sewer Line Replacement	$275,000		COB
S112	2016	Pump Station No. 10	$250,000		COB
S007	2016	Clarifier Drive Upgrade	$100,000	$1,700,000	COB
S007	2017	Clarifier Drive Upgrade	$100,000		COB
S112	2017	Pump Station No. 10	$250,000		COB
S114	2017	Sewer Line Replacement	$275,000	$ 625,000	COB

(1) City of Burlington.

OTHER CAPITAL IMPROVEMENT PLAN (CIP)

Table E-5 summarizes additional projects which are not currently budgeted by the City within the 6-year planning period. These projects are recommended for construction if funding becomes available.

TABLE E-5

Additional Capital Improvement Projects

Improvement	Estimated Cost
Pump Station No. 4	$500,000
Pump Station No. 13	$250,000
Pump Station No. 14	$ 50,000
WWTP Influent Pump Station	$ 75,000
Modifications to Digester Gas Piping and Boiler, Digester Recirculation Pumps, and Sludge Piping and Valves	$150,000
Primary Sludge Thickener Drive Upgrade	$100,000
Predesign Report to Add the Second Primary Anaerobic Digester	$ 40,000

CHAPTER 1

INTRODUCTION

GENERAL

This 2010 *Wastewater Comprehensive Plan* (Plan) for the City of Burlington (City) addresses the City's comprehensive planning needs for wastewater collection, transmission, treatment, and disposal for a 20-year planning period. The City of Burlington is located within Skagit County (County) in the State of Washington as shown on Figure 1-1. Because substantial growth is projected for the Burlington area over the next 20 years, planning for that growth will be essential to properly accommodate new customers within the City, the Urban Growth Area, and the sewer service area. It is also important to evaluate the existing wastewater collection and treatment infrastructure to determine its capability to serve the projected population and to determine required system improvement needs for the planning period.

This Plan was prepared in accordance with the provisions of the Revised Code of Washington (RCW), Section 90.48, *Water Pollution Control*, and Washington Administrative Code (WAC) Section 173-240-050, *General Sewer Plan.* Development of the Plan has been coordinated with the City's *2005 Comprehensive (Land Use) Plan* and Skagit County planning efforts; therefore, a planning period of 2010 to 2030 is used.

SCOPE OF WORK

The scope of work for the *Wastewater Comprehensive Plan* includes the following items:

- **Service Area Characterization:** The Plan identifies sewage drainage basins and the land use and zoning designations within each basin. The Plan provides information on the service area including climate, topography, geology, soils, surface water, groundwater, and sensitive areas. The Plan provides maps of these features in a format compatible with the City's existing system.

- **Population Projections:** The Plan estimates the existing population within the service area. The Plan projects populations for 6 years, 20 years, and buildout, for the entire service area and for each drainage basin. The population projections are consistent with the City's *2005 Comprehensive (Land Use) Plan* and Urban Growth Area (UGA) population projections.

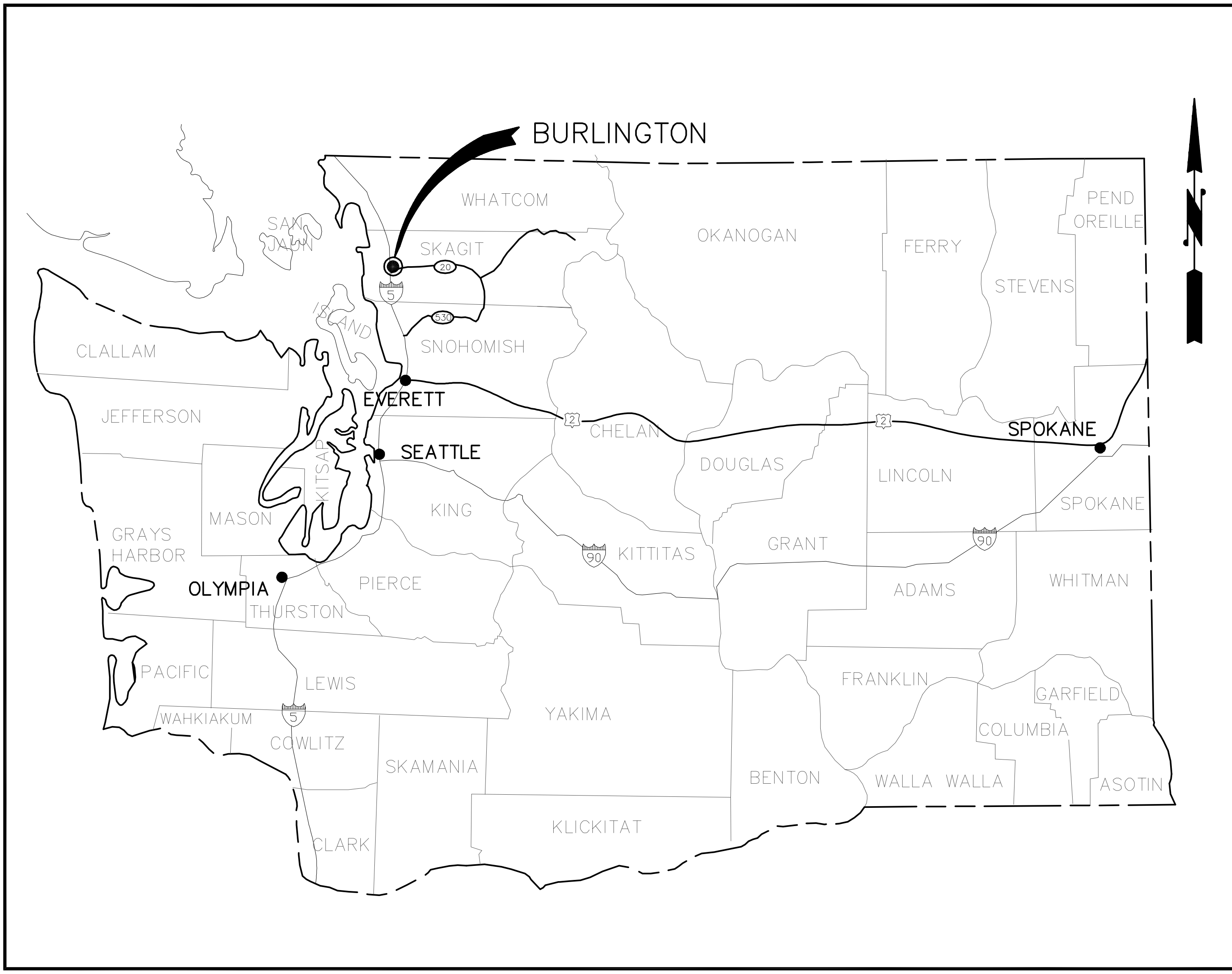
- **Existing Wastewater System:** The Plan updates information from the as-built drawings on the sewer invert elevations, manhole rim elevations, pipe diameter, force mains, and pump station information within the collection system service area. The Plan also identifies existing commercial, industrial, institutional, governmental, and recreational site customers; evaluates the condition of the collection system through a review of records, interviews with City staff, and field inspection of significant facilities; determines the capacity of the existing sewer system through a review of existing records, drawdown tests, and engineering reports; provides a discussion on the service area policies or ordinances; and provides a detailed narrative summary and develop a sewer base map of the City's sewer facilities.

- **Wastewater Flow and Loading Projections:** The Plan develops wastewater flow and loading projections based on factors for commercial, industrial, institutional, and residential (per capita) sources; establishes flows, characteristics and loadings of wastewater from outside agencies; develops design flows and loadings for average, maximum month, peak day, and peak hour flows to WWTP, pump stations, and collection system pipelines; and estimates and characterizes the infiltration/inflow (I/I) contribution, based on historical flow monitoring data, pump station run time data, and WWTP data.

- **Wastewater Treatment Plant Analysis:** The Plan describes the existing wastewater treatment and effluent disposal facilities; identifies potential sources for water reuse within the City's service area; evaluates the treatment process capacity to meet the 20-year flow projections and develops conceptual WWTP improvement projects and cost estimates to provide for the increased capacity; and estimates operation and maintenance costs for WWTP and biosolids management.

- **Performance and Design Criteria:** The Plan summarizes the collection system design criteria, as established by the City, surrounding cities, Skagit County, and the Washington State Department of Ecology. The Plan describes how these criteria, standards, and policies will be applied to existing and future wastewater system components and reviews and updates minimum design criteria in relation to Washington State Department of Ecology standards.

- **Hydraulic/Hydrologic Analysis:** The Plan creates a SewerCAD hydraulic model from as-built information for critical parts of the sewer collection system to include 10-inch and larger trunk lines, interceptors, pump stations, and force mains within the service area. The hydraulic model includes existing information on populations, flow meter records, pump station drawdown tests, run time records, and flow monitoring results. The hydraulic model is calibrated to simulate peak hour flows



CITY OF BURLINGTON

WASTEWATER COMPREHENSIVE PLAN

FIGURE 1–1
LOCATION MAP

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including infiltration and inflow, and uses future populations to identify collection system deficiencies and bottlenecks at future design flows.

- **Capital Improvement Plan:** The Plan develops 6-year and 20-year capital improvement plans for the collection system and WWTP, including expansions to expand service throughout the service area, infiltration/inflow reduction projects, improvements based on the results of the hydraulic model and from interviews with City staff, and improvements to reduce operation and maintenance costs. The Plan identifies improvements to be funded by the City and improvements that can potentially be funded by developers.

- **Financial:** The Plan describes and assesses the current financial status of the sewer system as well as lists and discusses available sources of revenue for system improvements including grant and loan programs. The Plan reviews the existing sewer charge system and recommends modifications as necessary. The sewer utility revenues and expenses are projected for the 6-year planning period based on historical cash flow and planned growth projections. The analysis includes the costs for additional staff and operation and maintenance costs related to CIP projects.

- **Plan Compilation and Distribution:** All of the scope of work information listed above is assembled in the draft Wastewater Comprehensive Plan and a SEPA checklist will be prepared for the Plan.

- **Submit to Agencies for Review:** The draft Wastewater Comprehensive Plan will be submitted to the Department of Ecology, Department of Health, Skagit County, and the various cities and special-purpose districts for comments. Any comments from agencies will be incorporated and the final plan will be submitted to the Department of Ecology for approval.

RELATED PLANNING DOCUMENTS

The following documents summarized below were consulted in the preparation of this *Wastewater Comprehensive Plan*.

GROWTH MANAGEMENT ACT (GMA)-RELATED PLANS, POLICIES, AND DEVELOPMENT REGULATIONS

City of Burlington 2005 Comprehensive Plan, November 2005

The City of Burlington completed a *Comprehensive Plan* in November 2005, in compliance with the Growth Management Act (GMA). This Plan provides a complete update of previous plans, including the 1991 Comprehensive Wastewater Plan, 1994

Comprehensive Plan, and the 1999 Comprehensive Plan update. This document complies with the GMA and is consistent with the planning policies of Skagit County and neighboring jurisdictions. Growth management planning goals, county-wide policies, land use, housing, business areas, commercial areas, industrial areas, special planning areas, capital facilities, surface water management and utilities, water, electric, natural gas, communication utilities, transportation, parks, recreation, open space, environmental areas, and critical areas are all addressed in this document.

Skagit County Bayview Ridge Subarea Plan, Reid Middleton, August 2008

Skagit County developed the *Bayview Ridge Subarea Plan* in 2008 in conjunction with the City of Burlington and the Port of Skagit County. The Plan develops policies for the long-term development of the Bayview Ridge Subarea. The planning was done under the County's Growth Management Act and addresses issues such as land use, business development, housing, transportation, capital facilities, utilities, open space, and public facilities.

WASTEWATER SYSTEM PLANNING

City of Burlington Comprehensive Wastewater Plan, PEI/Barrett Consulting Group, 1991

The 1991 *City of Burlington Comprehensive Wastewater Plan* developed projected population and wastewater production for the City through the year 2010. The service area characteristics and geography were examined and drainage basins were identified. The Plan estimated the infiltration and inflow into the collection system and recommended a program to control I/I. The Plan developed a 10-year Capital Improvement Plan that included the construction of a number of new pump stations and force mains as well as improvements to the WWTP and collection system.

City of Burlington Wastewater Facilities Plan, Gray & Osborne, July 1997

The 1997 *City of Burlington Wastewater Facilities Plan* updated the 1991 Comprehensive Wastewater Plan to account for the GMA and the City's updates to its Comprehensive Plan and in response to population growth in the sewer service area. The Plan provides a list of sewer improvements to extend sewer service throughout the planning area, particularly the Port of Skagit County and the Bayview Ridge areas west of the city limits. The Plan recommended two phases of expansion of the wastewater treatment plant. The Phase 1 expansion increased the capacity of the WWTP from 1.61 mgd to 3.79 mgd to provide capacity through 2015.

Criteria for Sewage Works Design, Washington State Department of Ecology, December 1998

The *Criteria for Sewage Works Design* (Orange Book) serves as a guide for the design of sewer collection, treatment, and reclamation systems. The Orange Book was used to ensure all the recommended improvements to the City's sewer collection and treatment systems were meeting the requirements of the Washington State Department of Ecology and the Washington State Department of Health.

CHAPTER 2

REGULATORY REQUIREMENTS

INTRODUCTION

Wastewater collection system planning includes an analysis of the City's ability to comply with the applicable regulatory requirements while providing a high level of service for existing and future customers. These requirements are outlined in federal, state, and local regulations, and enforced by a number of agencies. This chapter presents the legislation, regulations, permits, agencies, and design standards that may affect City's wastewater operations. The discussion presented here is general in nature; specific issues will be addressed as they occur within the context of following chapters.

LEGISLATION, REGULATIONS, AND PERMITS

In this section, the various state and federal legislation that may affect City's operations are discussed, as well as other relative permits, programs, and regulations.

FEDERAL CLEAN WATER ACT

The federal Water Pollution Control Act is the principal law regulating the water quality of the nation's waterways. Though originally enacted in 1948, it was significantly revised in 1972 and 1977, when it was commonly titled the "Clean Water Act" (CWA). The CWA has been amended several times since 1977. The 1987 amendments replaced the Construction Grants program with the State Revolving Fund (SRF), which provides low-cost loans for a range of water quality infrastructure projects.

The National Pollutant Discharge Elimination System (NPDES) is established by Section 402 of the CWA and subsequent amendments. The Washington State Department of Ecology (Ecology) administers NPDES permits under the authority of the United States Environmental Protection Agency (EPA). Most NPDES permits are valid for 5 years and place limits on the quantity and quality of pollutants that may be discharged. NPDES permits granted under Phase I of the CWA regulate point source discharges including wastewater discharges to surface water from municipal or industrial wastewater treatment facilities, stormwater discharges from industrial facilities, construction sites of more than 1 acre, and stormwater discharges from separate storm sewers serving populations of more than 100,000. Under Phase II rules, promulgated by EPA in March of 1999, NPDES permits are required for surface water discharges from construction sites greater than 1 acre, municipalities of 10,000 or more, and communities smaller than 10,000 with urban characteristics. The City of Burlington NPDES permit, which has an expiration date of September 30, 2010, is included in Appendix A (Permit No. WA-002015-0). The City is currently in the process of having its NPDES permit renewed. The City's current NPDES permit effluent limits are shown in Table 2-1.

TABLE 2-1

NPDES Permit Effluent Limitations

	Effluent Limit	
Parameter	**Average Monthly**	**Average Weekly**
BOD_5	30 mg/L, 948 lb/d	45 mg/L, 1,422 lb/d
TSS	30 mg/L, 948 lb/d	45 mg/L, 1,422 lb/d
Fecal Coliform Bacteria	200/100 ml	400/100 ml
pH	Minimum of 6.2 and Maximum of 9.0	

The 1985 enactment of the Revised Code of Washington (RCW) 90.48.480 and Washington State Administrative Code (WAC) 173-245 required all municipalities with combined sewer overflows (CSOs) to develop a plan to reduce annual CSOs to one event per year. The National CSO Control Strategy (1989, Federal Register 37370) officially classified combined sewer overflows as point source discharges subject to regulation under NPDES and CWA. In 1994, EPA published a CSO Control Policy Strategy (Federal Register 18688) that limits CSOs to four to six events per year depending on the sensitivity of the receiving water.

Section 307 of the CWA established the National Pretreatment Program. This program is designed to protect publicly owned treatment facilities and limits the amount of industrial or other non-residential pollutants discharged to municipal sewer systems.

The City is required to obtain an NPDES Construction Permit for projects greater than 1 acre in size.

A 401 Water Quality Certification is required under the CWA for any activity that may result in discharge to surface water, including excavation activities that occur in streams, wetlands, or other waters of the nation.

Section 404 of the CWA regulates discharges of fill or dredged materials in wetlands, including any related draining, flooding, and excavation. Pipeline and pump station projects in wetlands will require a Section 404 permit in addition to any related local permits. Activities that impact more than 1/3 acre will also require a Section 401 Certification.

CAPACITY, MANAGEMENT, OPERATIONS AND MAINTENANCE

The EPA has drafted an amendment to the NPDES regulations to address Sanitary Sewer Overflows (SSOs). The legal basis for this Capacity, Management, Operations and Maintenance (CMOM) regulation is that nearly all collection systems have unplanned releases at some time and that these releases must be regulated under the jurisdiction of the Clean Water Act. The EPA currently has not set a timetable for CMOM implementation.

The collection system regulatory requirements are as follows:

1. Meet additional general sewer system performance standards including up-to-date system maps, information management systems, and odor control requirements.

2. Maintain program documentation including the goals, organizational, and legal authority of the organization operating the collection system.

3. Develop an overflow response plan that can respond to releases in less than 1 hour and is demonstrated to have sufficient and adequate personnel and equipment, etc. Estimated volumes and durations of overflows must be measured and reported to the regulatory agency.

4. Plan for system maintenance and evaluation requirements that will mandate that the entire collection system be cleaned on a scheduled basis (for example, once every 5 years), be regularly inspected through TV work, and that a program for short- and long-term rehabilitation and replacement be generated. EPA has suggested a 1.5 to 2 percent system replacement rate, which implies that an entire collection system is replaced in a 50- to 70-year time period.

5. Develop a capacity assurance and management plan with flow meters to model infiltration and inflow (I/I) and system capacity. Ensure pump stations are metered, and properly operated and maintained.

6. Develop a self-audit program to evaluate and adjust performance.

7. Develop a program to communicate information on problems, costs, and improvements to the public and decision-makers.

This program will issue NPDES permits for tributary collection systems (owned and operated by local governments) that do not have NPDES permits for their own treatment plant(s). These requirements may be issued through a general NPDES permit instead of individual permits. Communities that have NPDES permits through their treatment plants will have these new CMOM requirements added to the existing permits.

There will be some relaxation of these requirements for small communities with design flows less than 1 mgd. However, it is uncertain exactly how streamlining will be applied, and the integrity of the collection system may be more important than size in determining which requirements will apply to a community. Because the underlying legal authority for this program is the federal Clean Water Act, these regulatory requirements will also be subject to citizen lawsuits.

ENDANGERED SPECIES ACT

On March 16, 1999, the National Marine Fisheries Service (NMFS) listed the Puget Sound Chinook as "threatened" under the Endangered Species Act (ESA). In addition, the United States Fish and Wildlife Service (USFWS) listed the Bull Trout as "threatened" on October 28, 1999. ESA listings are expected to significantly impact activities that affect salmon and trout habitat, such as water use, land use, construction activities, and wastewater disposal. Impacts to the City may include longer timelines for permit applications, and more stringent regulation of construction impacts and activities in riparian corridors.

The purpose of the 1972 ESA is to "provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved...." In pursuit of this goal, the ESA authorizes USFWS and NMFS to list species as endangered or threatened, and to identify and protect the critical habitat of listed species. USFWS has jurisdiction over terrestrial and freshwater plants and animals such as bull trout, while NMFS is responsible for protection of marine species including anadromous salmon. Under the ESA, endangered status is conferred upon "any species which is in danger of extinction throughout all or a significant portion of its range…," while threatened status is conferred upon "any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." The ESA defines critical habitat as the "geographical area containing physical and biological features essential to the conservation of the species."

Once a species is listed as endangered or threatened, the ESA makes it illegal for the government or individuals to "take" a listed species. "Take" has been interpreted by the federal courts to include "significant modification or degradation of critical habitat" that impairs essential behavior patterns. For species listed as endangered, the blanket prohibitions against "take" are immediate. However, threatened species may be protected through a more flexible Section 4(d) rule describing specific activities that are likely to result in a "take."

In response to existing and proposed ESA listings of salmon, steelhead, and trout species throughout Washington State, Governor Gary Locke established the Office of Salmon Recovery in 1997 to direct the State's salmon recovery efforts. The Office of Salmon Recovery is also supported by the Joint Natural Resources Council in the preparation of the Statewide Strategy to Recover Salmon, entitled "Extinction is Not an Option" (January 1999). The Joint Natural Resources Council is composed of representatives of state natural resource agencies. The goal of the Statewide Strategy is to restore wild salmon, steelhead, and trout populations to harvestable levels. Rather than attempting to avert additional ESA listings, the Statewide Strategy intends to provide local input into, and hopefully maintain some local control over, the salmon recovery regulatory processes that will inevitably affect the majority of Washington State.

NMFS listed the Puget Sound Chinook on March 16, 1999, and promulgated a final Section 4(d) rule in January 2001 which was updated again in August 2003.

The State of Washington has an agreement with NMFS to include model critical areas ordinances and stormwater management programs in the Section 4(d) rule as exempted activities. By adopting these model ordinances and complying with the Section 4(d) rule, local governments are afforded some protection from the possibility of federal prosecution or civil suits under the ESA. City activities will need to comply with any future provisions of the Section 4(d) rule, as well as revised critical areas ordinances.

RECLAIMED WATER STANDARDS

"Reclaimed water" is defined in RCW 90.46.010 as "effluent derived in any part from sewage from a wastewater treatment system that has been adequately and reliably treated, so that as a result of that treatment, it is suitable for a beneficial use or a controlled use that would not otherwise occur, and is no longer considered wastewater." Use of reclaimed water is an alternative to effluent disposal. In the State of Washington, any type of direct beneficial reuse of municipal wastewater is defined as water reuse or reclamation. *Water Reuse and Reclamation Standards* have been issued jointly by the Departments of Health and Ecology. This discussion is based on the current standards dated September 1997, which are adopted by reference in RCW Chapter 90.46, Reclaimed Water Use. Chapter 8 provides additional information on reclaimed water opportunities for the City.

The Water Reclamation and Reuse Standards define the water quality standards for reclaimed water. A Class A reclaimed water treatment facility must meet four minimum requirements, as follows:

1. **Continuously Oxidized:** Wastewater that at all times has been stabilized such that the monthly average BOD_5 and TSS are less than 30 mg/L, is non-putrescible, and contains dissolved oxygen.

2. **Continuously Coagulated:** Oxidized wastewater that at all times has been treated by a chemical equally effective method to destabilize and agglomerate colloidal and finely suspended matter prior to filtration.

3. **Continuously Filtered:** Oxidized and coagulated wastewater that at all times has been passed through a filtering media so that the turbidity of the filtered effluent does not exceed an average of 2 nephelometric turbidity units (NTU), determined monthly, and does not exceed 5 NTU at any time.

4. **Continuously Disinfected:** Oxidized, coagulated, and filtered wastewater that at all times has been disinfected to destroy or inactivate pathogenic organisms. A group of indicator microorganisms, coliform bacteria, are used to measure the effectiveness of the disinfection process. The Class A reclaimed water standard is a total coliform density of 2.2 per 100 milliliters (ml) for the median of the last 7 days of samples, with no sample having a density greater than 23 per 100 ml.

NATIONAL ENVIRONMENTAL POLICY ACT

The National Environmental Policy Act (NEPA) was established in 1969 and requires federal agencies to determine environmental impacts on all projects requiring federal permits or funding. If the project is determined to be environmentally insignificant, a Finding of No Significant Impact (FONSI) is issued; otherwise, an Environmental Impact Statement (EIS) is required. Obtaining grants and loans from federally funded state programs and federal agencies triggers an environmental report and in some cases a biological assessment. NEPA is not applicable to projects that do not include a federal component that would trigger the NEPA process.

FEDERAL CLEAN AIR ACT

The federal Clean Air Act requires all wastewater facilities to plan to meet the air quality needs of the region. The permitting of facilities is based upon a mass balance being performed to review if a facility is required to seek an air permit from a federal and/or local permitting agency. According to the Northwest Air Pollution Control Agency, other than occasional, very localized industry problems at March’s Point, this is an air quality attainment area with no identified long-term problems. Outdoor burning is prohibited in the Burlington city limits and Urban Growth Area by state action. An air quality permit for the City’s wastewater treatment plant is not currently required. The City has a registration certificate from the Northwest Air Pollution Control Agency to operate their biosolids dryer.

STATE WATER POLLUTION CONTROL ACT

The intent of the state Water Pollution Control Act is to “…maintain the highest possible control standards to ensure the purity of all waters of the state consistent with public health and the enjoyment…the propagation and protection of wildlife, birds, game, fish and other aquatic life, and the industrial development of the state.” Under RCW 90.48 and WAC 173-240, Ecology issues permits for wastewater treatment facilities and also land application of wastewater under WAC 246-271.

Submission of Plans and Reports for Construction of Wastewater Facilities, WAC 173-240

Prior to construction or modification of domestic wastewater facilities, engineering reports and plans and specifications must be submitted to and approved by Ecology. This regulation outlines procedures and requirements for the development of an engineering report that thoroughly examines the engineering and administrative aspects of a domestic wastewater facility project. This regulation defines a facility plan as described in federal regulations, 40 CFR Part 35, as an engineering report.

Key provisions of WAC 173-240 are provided below.

- An engineering report for a wastewater facility project must contain everything required for a general sewer plan unless an up-to-date general sewer plan is on file with Ecology.

- An engineering report shall be sufficiently complete so that plans and specifications can be developed from it without substantial changes.

- A wastewater facility engineering report must be prepared under the supervision of a professional engineer.

- The engineering report shall include the following information (letter designations are taken from WAC 173-240-060; requirements that include those found in 40 CFR 35.917 for federal facility plan requirements are noted with an asterisk, “*”).

  (a) Name, address, and phone number of owner.
  (b) Project description.
  (c) Current and projected wastewater flows and loadings.
  (d) Treatment standards.
  (e) Receiving water characteristics, including dilution zone.
  (f) Proposed treatment and disposal process, including an evaluation of alternatives.*
  (g) Basic design data and calculations for each unit process.
  (h) Site availability and relationship to 25/100 flood cycles and residential or developed areas.
  (i) Flow diagram with hydraulic profile.
  (j) Discussion of inflow and infiltration.*
  (k) Provisions for treating industrial waste, including pretreatment programs.*
  (l) Outfall analysis.
  (m) Method of final sludge disposal and alternatives considered.
  (n) Provisions for future needs.
  (o) Staffing and testing requirements.

(p) Estimated capital and O&M costs, evaluated in terms of annual costs and present worth.*

(q) A statement regarding compliance with any applicable state or local water quality plans pursuant to the federal Water Pollution Control Act, as amended.

(r) A statement regarding compliance with the State Environmental Policy Act (SEPA) or National Environmental Policy Act (NEPA), as applicable.

Criteria for Sewage Works Design, Washington State Department of Ecology

Ecology has published design criteria for collection systems and wastewater treatment plants. While these criteria are not legally binding, their use is strongly encouraged by Ecology since the criteria are used by the agency to review engineering reports for upgrading wastewater treatment systems. These design criteria, commonly referred to as the "Orange Book," primarily emphasize unit processes through secondary treatment. Any expansion or modification of the City's collection system and/or treatment plant will require continued conformance with Ecology criteria.

Certification of Operators of Wastewater Treatment Plants, WAC 173-230

Wastewater treatment plant operators are certified by the State Water and Wastewater Operators Certification Board. The operator assigned for the overall responsibility of operation of a wastewater treatment plant is defined by WAC 173-230 as the "operator in responsible charge." This individual must be State certified at or above the classification rating of the plant. The City's WWTP is currently assigned a Class III rating and the operating staff assigned to the plant has the required certification.

WATER QUALITY STANDARDS FOR SURFACE WATERS OF THE STATE OF WASHINGTON, CHAPTER 173-201A WAC

Basis of Regulations

The Washington State Department of Ecology has authority under the federal Water Pollution Control Act, also known as the Clean Water Act (CWA), to establish and administer programs to meet the requirements of the Act. Under RCW 98.40.35, the Washington Department of Ecology has the authority to establish "rules and regulations relating to standards of quality for waters of the state and for substances discharged therein..." The State of Washington also implements the National Pollutant Discharge Elimination System (NPDES) program created under the CWA.

Description of Regulations

WAC 173-201A establishes water quality standards within the State of Washington. The State adopted revised water quality standards on July 1, 2003. The standards are based on two objectives: protection of public health and enjoyment, and protection of fish, shellfish, and wildlife. For each surface water body in the State, the standards assign specific uses, such as aquatic life, recreation, or water supply. Water quality standards have been developed for each use, for parameters such as fecal coliform, dissolved oxygen, temperature, pH, turbidity, and toxic, radioactive, deleterious substances. The water uses that are defined in the standards for fresh water include:

Aquatic Life Uses

- Char spawning and rearing
- Core summer salmonid habitat
- Salmonid spawning, rearing, and migration
- Salmonid rearing and migration only
- Non-anadromous interior redbrand trout
- Indigenous warm water species

Recreational Uses

- Extraordinary primary contact recreation
- Primary contact recreation
- Secondary contact recreation

Water Supply Uses

- Domestic
- Agricultural
- Industrial
- Stock watering

Miscellaneous Uses

- Wildlife habitat
- Harvesting
- Commerce and navigation
- Boating
- Aesthetics

Water Quality Classifications for Fresh Waters

The City's outfall discharges to the Skagit River at mile 18.1. The Skagit River at the outfall discharge location is classified in WAC 173-201A-602 as having the following uses:

- Aquatic Life Uses: Salmonid spawning, rearing, and migration
- Recreation Use: Primary contact recreation
- Water Supply Uses: Domestic water, industrial water, agricultural water, and stock water
- Miscellaneous Uses: Wildlife habitat, harvesting, commerce/navigation, boating, and aesthetics

Water quality criteria for the Skagit River at the City of Burlington WWTP Outfall are shown in Table 2-2.

TABLE 2-2

Water Quality Criteria for Skagit River at the City of Burlington WWTP Outfall

Parameter	Surface Water Criteria Value
Temperature	17.5 degrees C (7-day average of daily maximum temperatures)
Dissolved Oxygen	>8.0 mg/L (lowest 1-day minimum)
Turbidity	<5 NTU over background (background <50 NTU) <10% increase over background (background >50 NTU
Dissolved Gas	<110% of saturation at any point of sample collection
pH	Not outside the range of 7.0 to 8.5 standard units, with no human-caused variation >0.5 standard unit
Bacteria	**Primary Contact Recreation:** Fecal coliform organism levels must not exceed a geometric mean value of 100 colonies/100 ml, with not more than 10% of all samples (or any single sample when less than 10 sample points exist) obtained for calculating the geometric mean value exceeding 200 colonies/100 ml

The water quality standards also have narrative criteria regarding toxic, radioactive, otherwise deleterious materials, or materials that impair aesthetics. These materials are prohibited in concentrations that affect aquatic life, human health, or impair aesthetics.

Numeric criteria for 29 toxic substances are listed in WAC 173-201A-240. Criteria are listed for both an acute and chronic basis and for certain substances (e.g., metals, chlorine, and ammonia), the criteria must be calculated as a function of receiving water pH, hardness, and whether salmonids are present.

Anti-Degradation Policy

The anti-degradation policy aims to maintain the highest possible quality of water in the state by preventing the deterioration of water bodies that currently have higher quality than the water quality standards require. The revised water quality standards define three tiers of waters in the anti-degradation policy.

Tier I water bodies are those with violations of water quality standards, from natural or human-caused conditions. The focus of water quality management is on maintaining or improving current uses, and preventing any further human-caused degradation.

Tier II water bodies are those of higher quality than required by the water quality standards. The focus of the policy is on preventing degradation of the water quality and to preserve the excellent natural qualities of the water body. New or expanded actions are not allowed to cause a “measurable change” in the water quality, unless they are demonstrated to be “necessary and in the overriding public interest.”

New or expanded actions that may cause a measurable change in water quality must conduct a Tier II review. For increased wastewater treatment plant discharges, this review will take place as part of the NPDES permit modification process. Measurable change, for the purpose of the anti-degradation policy, is defined as follows:

- Temperature increase greater than 0.3 degree C
- Dissolved oxygen concentration decrease greater than 0.2 mg/L
- Bacteria level increase greater than 2 CFU/100 ml
- pH change greater than 0.1 standard unit
- Turbidity increase greater than 0.5 NTU
- Any detectable change in concentration of toxic or radioactive substances, which include ammonia and chloride

A new or expanded action may be determined by Ecology to be necessary and in the overriding public interest based on a review of the following factors:

- Economic benefits, such as job creation
- Providing or contributing to necessary social services
- Status as a demonstration project using innovative technical or management approaches that produce a significant improvement over AKART
- Prevention or remediation of environmental or public health threats

- Societal or economic benefits of better health protection
- The loss of assimilative capacity for future industry or development
- The loss of benefits associated with the current high water quality, such as fishing or tourism uses

The new or expanded action would be allowed to measurably reduce the water quality only if it is demonstrated that the action has selected the combination of site, technical, and managerial approaches that will minimize the effect on water quality. Alternative approaches that must be evaluated include:

- Pollution prevention or source control to reduce toxic compound discharges
- Reuse or recycling of wastewater
- Water conservation to minimize production of wastewater
- Land application or infiltration to reduce surface water discharges
- Alternative or enhanced treatment technologies
- Improved operation and maintenance of existing facilities
- Seasonal or controlled discharge to avoid critical water quality conditions
- Water quality offsets with another water quality action (point or non-point source), providing no net decrease of water quality

Tier III water bodies are specially designated as outstanding resource waters. The revised standards do not initially define Tier III water bodies; however, the standards allow the public or Ecology to nominate water bodies for inclusion in the Tier III class. There are two classes within Tier III: Tier III(A) prohibits all future degradation, while Tier III(B) allows future degradation that does cause a "measurable change" to occur from well-controlled activities.

Discharge Permits

The primary means for achieving the water quality standards of WAC 173-201A is NPDES permits issued by Ecology and state waste discharge permits issued by both Ecology and the Department of Health (DOH).

Compliance Schedules

When it is not possible to achieve compliance with the standards in WAC 173-201A on an immediate basis, Ecology may issue an order with a compliance schedule to allow for further water quality studies, implementation of best management practices, or construction of necessary treatment capability. Compliance schedules may only be issued for existing discharges.

Assimilative capacity is a term that describes the surface water's ability to accept waste loadings without a permanent degradation of water quality. Ecology is presently conducting waste load capacity studies, also known as total maximum daily load (TMDL) studies, for several major watersheds in the State of Washington. TMDL is a regulatory term in the Clean Water Act which states the maximum allowable daily loading for a particular contaminant to the receiving waters in question.

The EPA, in consultation with Ecology, establishes and maintains a list of impaired water body segments, known as the 303(d) list. TMDL studies will generally be necessary to determine an allotted waste load for any single discharger.

Discharging to surface water requires an NPDES permit issued by Ecology under WAC 173-221. Minimum discharge standards for domestic wastewater facilities discharging to surface water are shown in Table 2-3.

TABLE 2-3

Minimum WWTP Effluent Standards for Surface Water Discharge (Reference WAC 173-221)

Parameter	Monthly Average Limit
Five-day Biochemical Oxygen Demand (BOD_5)	30 mg/L
Total Suspended Solids (TSS)	30 mg/L
Fecal Coliform	200/100 ml

Under WAC 173-201A, State Water Quality Standards, Ecology is authorized to condition NPDES permits so that the discharge meets water quality standards. Therefore, other permit conditions, in addition to or more stringent than the above (as shown in Table 2-1), could be added to ensure that the water quality of the receiving water is not degraded.

STATE ENVIRONMENTAL POLICY ACT

The WAC 173-240-050 requires a statement in all wastewater comprehensive plans regarding proposed projects in compliance with the State Environmental Policy Act (SEPA), if applicable. The City has determined that the 2010 Wastewater Comprehensive Plan builds on past work to provide a comprehensive assessment of the needs for wastewater collection, transmission, treatment, and disposal for the 20-year planning period. The plan was adopted as part of the Final Supplemental Environmental Impact Statement and Preferred Alternative for the 1994 Comprehensive Plan and Zoning Ordinance Amendments as further supplemented in 2005 under WAC 197-11-965. The adoption notice can be found in Appendix B.

GROWTH MANAGEMENT ACT

The Washington State Growth Management Act (GMA) was enacted in 1990 and requires certain local governments to plan for the population growth that will occur over the next 20 years within an established Urban Growth Area. The GMA also requires cities and the county to classify critical areas (wetlands, aquifer recharge areas, fish and wildlife habitat areas, geologically hazardous areas, and frequently flooded areas) and to establish development regulations to protect these areas.

ACCREDITATION OF ENVIRONMENTAL LABORATORIES (WAC 173-050)

The State of Washington recently established a requirement that all laboratories reporting data to comply with NPDES and surface water discharge (SWD) permits must be generated by an accredited laboratory. This accreditation program establishes specific tasks for quality assurance and quality control (QA/QC) that are intended to ensure the integrity of laboratory procedures. Accreditation requirements must be met for any on-site laboratory or outside laboratory used to analyze samples. Only accredited commercial laboratories may be used for analyses reported for compliance with NPDES or SWD permits. In planning for an on-site laboratory, staffing must be sufficient to allow for QA/QC procedures to be performed.

MINIMAL STANDARDS FOR SOLID WASTE HANDLING (WAC 173-304)

Grit and screenings are not subject to the sludge regulations in WAC 173-308, but its disposal is regulated under the state solid waste regulations in WAC 173-304. Waste placed in a municipal solid waste landfill must not contain free liquids, nor exhibit any of the criteria of a hazardous waste as defined by WAC 173-303. To be placed in a municipal solid waste landfill, grit and screenings must pass the paint filter test, which determines the amount of free liquids associated with the solids, and the toxic characteristics leachate procedure (TCLP) test, which determines if the waste has hazardous characteristics.

WETLANDS

Dredging and Filling Activities in Natural Wetlands (Section 404 of the Federal Water Pollution Control Act)

A U.S. Army Corps of Engineers permit is required when locating a structure, excavating, or discharging dredged or fill material in waters of the United States or transporting dredged material for the purpose of dumping it into ocean waters.

If wetland fill activities cannot be avoided, negative impacts can be mitigated by creating new wetland habitat in upland areas and if other federal agencies agree, the Corps will generally issue a permit.

Wetlands Executive Order 11990

This order directs federal agencies to minimize degradation of wetlands and enhance and protect the natural and beneficial values of wetlands. The order also mandates avoidance and mitigation of impacts to wetlands, and must be considered before an NPDES permit is issued. Assurances must be provided that the natural and beneficial values of wetlands will be protected and enhanced by the discharge.

SHORELINE SUBSTANTIAL DEVELOPMENT PERMIT

Shoreline substantial development (SSD) permits are required for projects in which the total cost or fair market value, whichever is higher, exceeds $5,000. The Shoreline Management Act of 1971 (RCW 90.58) establishes a broad policy giving preference to shoreline uses that protect water quality and the natural environment, depend on the proximity to the water, and preserve or enhance public access to the water. Specific details about exemptions from this permit are listed in WAC 173-27-040(2) and include development for which the total cost or fair market value, whichever is higher, does not exceed $5,000, normal maintenance or repair of existing structures (including damages by accident), construction of normal protective bulkheads common to single-family residences, emergency construction necessary to protect property from damage by the elements, construction and practices normal for farming and agriculture, construction or modification of navigational aids, single-family development, and the construction of docks for personal and/or community use.

The City of Burlington is exempt from the SSD permit process under WAC 173-27-040(2)(c), which relates to the construction of normal protective bulkheads common to single-family residences.

Shorelines are defined by lakes or reservoirs of 20 acres or greater, streams with a mean annual flow of 20 cubic feet per second or greater, marine waters, and an area inland 200 feet from the ordinary high-water mark. Projects are reviewed by local governments according to state guidelines and a local shoreline master program.

Local shoreline master programs are developed in accordance with guidelines from Ecology. In 2003, Ecology revised these guidelines to reflect new scientific information and the need for integration with the Growth Management Act and Endangered Species Act listings. These revisions were remanded through a court's decision and Ecology is currently in the process of re-evaluating the rules. While the Act's 200-foot statutory jurisdiction has not changed, Ecology has proposed more stringent project review within "Vegetation Management Corridors." Though this rule will mean a varying level of scrutiny within the shoreline area, the purpose is to use "Best Available Science" as required by the Growth Management Act to ensure that regulations are substantively linked to the protection of shoreline functions and values.

FLOODPLAIN DEVELOPMENT PERMIT

Local governments that are participating in the National Flood Insurance Program are required to review projects (including wastewater collection facilities) in a mapped floodplain and impose conditions to reduce potential flood damage from floodwater. A floodplain development permit is required prior to construction.

HYDRAULIC PROJECT APPROVAL (HPA)

Under the Washington State Hydraulic Code (WAC 220-110), the Washington State Department of Fish and Wildlife requires a Hydraulic Project Approval for activities that will "use, divert, obstruct, or change the natural flow or bed" of any waters of the State. For City activities such as pipeline crossings of streams, a Hydraulic Project Approval will be required, and must include provisions necessary to minimize project-specific and cumulative impacts to fish.

Because of ESA listings throughout Washington, the Washington State Department of Fish and Wildlife and NMFS are in the process of revising the Hydraulic Code to protect species listed as threatened or endangered. If NMFS determines that the revisions are sufficient to protect listed species, the State hopes the revised code will constitute an acceptable Habitat Conservation Plan under Section 10 of the ESA. If the acceptable Habitat Conservation Plan is approved, NMFS issues an Incidental Take Permit allowing incidental take of a listed species if the permittee has complied with the Habitat Conservation Plan. This Incidental Take Permit expires after an agreed-upon period of time and may then be revised by NMFS.

REGULATORY AGENCIES

The above regulations, permits, and programs are administered by various local, state, and federal agencies. The history, purpose, and authority of these agencies are discussed below.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (EPA)

The stated mission of the EPA is to protect human health and to safeguard the natural environment upon which life depends. EPA's purpose includes protecting all Americans from significant human health risks, ensuring that national environmental efforts are based on the best available scientific information, ensuring that federal laws are enforced fairly, and that environmental protection contributes to making our communities and ecosystems diverse, sustainable, and economically productive. The Washington State Department of Ecology (Ecology) currently administers NPDES permits and State Revolving Fund (SRF) loans on behalf of the EPA.

UNITED STATES FISH AND WILDLIFE SERVICE (USFWS)

Under the ESA, USFWS is responsible for the protection of all non-marine life, such as bull trout. Though USFWS may choose to invoke the blanket prohibitions of Section 9, the "threatened" status of bull trout allows more flexibility to establish regulations designed to protect these species. These regulations, known collectively as the Section 4(d) Rule, outline activities likely to result in a "take" of a threatened species as well as exempted activities.

NATIONAL MARINE FISHERIES SERVICE (NMFS)

Under the ESA, NMFS is responsible for the protection of marine life, including anadromous salmon such as the Puget Sound Chinook. When a species is listed as "endangered" the prohibitions against "take" of the species are immediate under Section 9 of the ESA. Though NMFS may choose to invoke the blanket prohibitions of Section 9, the "threatened" status of the Puget Sound Chinook allows more flexibility to establish regulations designed to protect these species. These regulations, known collectively as the Section 4(d) Rule, outline activities likely to result in a "take" of a threatened species as well as exempted activities.

UNITED STATES ARMY CORPS OF ENGINEERS

Under the CWA, the U.S. Army Corps of Engineers (Corps) is authorized to regulate discharge of fill and dredged material to waters of the United States, including wetlands. The Corps employs a system of General or Nationwide Permits for blanket authorization of activities, such as utility lines that have minimal adverse impact on the environment. In situations where adverse impact is probable, the Corps may issue an Individual Permit after reviewing an analysis of alternatives. Enforcement actions may be brought by the Corps or the EPA.

WASHINGTON STATE DEPARTMENT OF ECOLOGY

The mission of Ecology's Water Quality Program is to protect, preserve, and enhance surface and ground water quality and to promote the wise management of water for the benefit of current and future generations. Ecology performs various functions under state and federal authority and has both local and regional offices. Ecology is also responsible for awarding low-interest loans for pollution control projects through the SRF, and low-interest loans and grants through the Centennial Clean Water Fund.

Ecology issues permits under the State Water Pollution Control Act, Section 401 Water Quality Certification, and NPDES permits in compliance with the CWA under EPA authority. Ecology also reviews and approves plans for on-site systems exceeding 14,500 gallons per day (gpd), all systems receiving state or federal construction grants under the CWA, and systems using mechanical treatment or lagoons with ultimate design flows above 3,500 gpd. Ecology regulates discharge of waste to the State's groundwater, discharge of industrial or commercial waste to sewers, and the use of reclaimed water through the State Waste Discharge (SWD) Permit program. While City staff has little control over SWD permits, the City can comment on those permits prior to each renewal. Ecology's regional offices issue Temporary Modification of Water Quality Criteria Permits for construction near or in water that might cause short-term water quality violations.

Ecology also regulates the management and disposal of biosolids. The biosolids permit is a general permit that provides coverage for applicants that have conducted the required biosolids analysis. Chapter 7 of this Plan includes an evaluation of the City's biosolids handling process.

WASHINGTON STATE DEPARTMENT OF FISH AND WILDLIFE

Under WAC 220-110 and RCW 75.20, any form of work that uses, diverts, obstructs, or changes the natural flow or bed of any fresh water of the State requires Hydraulic Project Approval from the Department of Fish and Wildlife. Approval would be required for all City construction projects that cross or otherwise take place in streams or on shorelines.

STATE AND LOCAL HEALTH DEPARTMENTS

The Washington State Department of Health was formed in 1989 and is the primary state agency responsible for serving public health. The Washington State Department of Health issues Waste Discharge Permits for reclaimed water use in conjunction with Ecology and approves on-site wastewater disposal systems between 3,500 and 14,500 gpd.

The Skagit County Health Department is the local health department governing the City. In general, local health departments may adopt and enforce local regulations when they are consistent with or more stringent than state regulations. The local health departments have approval authority for on-site systems with design flows of up to 3,500 gpd.

PRETREATMENT REQUIREMENTS

Publicly owned treatment works are subject to local and national pretreatment standards (40 CFR, Part 403). Prohibited discharges could disrupt operations at the WWTP and potentially pass through the treatment process with inadequately treated effluent and discharge to receiving water. Prohibited discharges, at a minimum, include dredged spoils, solid waste, incinerator residue, medical waste, chemical wastes, biological and radioactive materials, heat, wrecked or discharged equipment, rock, sand, cellar dirt, agricultural and industrial wastes, and wastes containing the same characteristics of wastewater (i.e., pH, temperature, TSS, turbidity, color, BOD_5, chemical oxygen demand (COD), toxicity, or odor. A Sanitary Sewer Pretreatment Policy was adopted by the City in 2005 under Ordinance 1583.

GRAVITY SYSTEM

Ecology's design criteria requires that gravity systems be designed large enough to carry peak hourly flows, as well as steep enough to provide a minimum scouring velocity of 2 feet per second when flowing full. The City standard for minimum slope is in accordance with Ecology's standards for the size of sewer pipe. The City also has minimum standards for manhole construction and details specifying trench configuration, depth of cover, bedding materials, and road overlays that meet or exceed Ecology's standards. The current City's design standards for gravity systems are consistent with or exceed those of Ecology.

LIFT STATIONS

Lift stations and force mains must also be designed according to Ecology guidelines. The City plans to address any issues relating to current Ecology standards as a part of the City guidelines and through its capital improvement program.

ON-SITE SEPTIC SYSTEMS

In some cases, wastewater may be treated and disposed of on-site either by individual septic systems or community on-site systems. The City estimates approximately 35 septic systems within the sewer service area. Options for providing sewer service to areas currently unsewered are discussed later in this Plan.

Municipalities, such as cities and counties, are required under the GMA to eventually provide wastewater collection services to all residents of the Urban Growth Area that are currently not connected. On-site septic systems should be designed to meet the DOH design standards. Approval of the systems will be made either by the Skagit County Health Department for systems under 3,500 gallons per day, or DOH for systems less than 14,500 gallons per day but greater than 3,500 gallons per day, or Ecology for systems that are over 14,500 gallons per day in capacity. The State Board of Health statute that provides the authority for DOH to adopt rules for sewage treatment is RCW 43.20.

SEWER ORDINANCES AND PLANNING POLICIES

The City operates its sewer system as described in the City's Municipal Code Chapter 13.04, Sewage Disposal, Chapter 13.08, Sewer Rates, and Chapter 13.12, Septic Tank Sludge. In addition to the City's municipal code, the siting of any wastewater facilities outside of the city limits, such as lift stations, will have to adhere to Skagit County's planning and zoning policies at the time of construction.

CHAPTER 3

LAND USE, POPULATION PROJECTIONS AND SERVICE AREA CHARACTERISTICS

INTRODUCTION

In order to provide wastewater services for future growth, the wastewater system is in need of continuous evaluation and improvement. A planning period for the evaluation of the wastewater utility should be long enough to be useful for an extended period of time, but not so long as to be impractical. The planning period for this *Wastewater Comprehensive Plan* is from 2010 through 2030 to provide consistency with population projections and other planning documents. This chapter will present the population projections for the planning period. In addition, this chapter will review the land use and define the sewer service area and the sewer basins used for evaluation in this Plan. Various natural features of the service area are also discussed, such as topography, geology, soils, climate, sensitive areas, floodplains, wetlands, air quality, and surface and ground water resources. Information on the public utilities available in the area is also presented.

SERVICE AREA LOCATION

The City of Burlington is located in the northwest region of Washington State in Skagit County near the junction of Interstate 5 and Highway 20. The City is located on the Skagit River and can be seen on Figure 1-1.

The City currently provides sewer service to the majority of the area within the current city limits, although some homes within city limits are served by on-site septic systems.

The sewer service area for the City of Burlington (study area for this Plan) consists of the current city limits, the City's Urban Growth Area (UGA), and the sewer service area which includes regions west of the City in unincorporated Skagit County as shown on Figure 3-1. The City of Burlington uses the term UGA to specifically refer to the areas outside of the current city limits that are within the UGA. Skagit County currently has zoning and land use jurisdiction over these unincorporated areas. The city limits encompass approximately 2,803 acres and the UGA consists of 442 acres, for a total of 3,245 acres. The City's sewer service area encompasses an additional 4,748 acres, located in the Western Service Area, for a total sewer service area of 7,993 acres, excluding the area served by the Samish Water District pipeline.

SERVICE AREA HISTORY

The City of Burlington was incorporated in 1902 with a population of 260. The original wastewater treatment plant and collection system were constructed in 1946. In 1977, the City expanded the sanitary sewer system to serve development to the west of the City and constructed a secondary treatment plant located on Section Street, adjacent to the Skagit River.

NATURAL FEATURES OF THE SEWER SERVICE AREA

Various natural features of the service area are discussed below, including climate and precipitation, soils, geology, and site-sensitive areas, such as floodplains, and wetlands. The natural features of the service area will have an impact on the design and siting of wastewater collection and treatment facilities.

TOPOGRAPHY

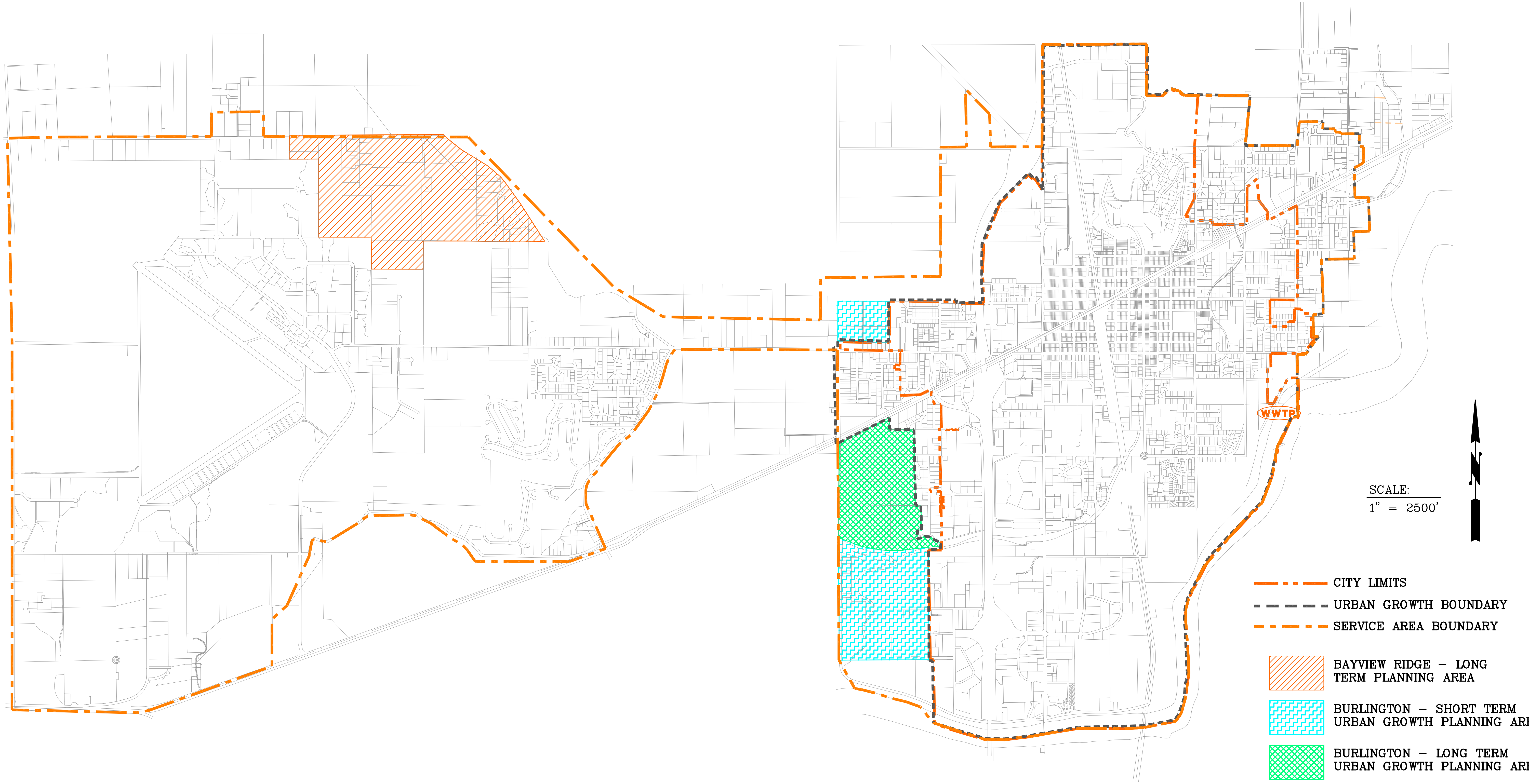
The geography of the City of Burlington is generally flat, with elevations ranging from 20 to 40 feet within the city limits. Figure 3-2 shows the topography of the Burlington area based on United States Geological Survey (USGS) maps. There are a few higher elevation areas within the City including Burlington Hill, which is located on the north side of the City. The elevations of Burlington Hill are up to 450 feet. In addition, the service area west of the City includes higher elevation areas, with elevations up to 140 feet.

SOILS AND GEOLOGY

Surface geology will determine the stability, strength, and permeability of soils, which impacts the suitability of land for building construction and on-site sewage systems. Figure 3-3 provides a map of the soil types, based on the United States Department of Agriculture, Soils Conservation Service.

CLIMATE

The National Oceanic and Atmospheric Administration (NOAA) collects data from a weather station in Burlington. Climate data from this station averaged over a 30-year period is summarized in Table 3-1. Winters are wet and mild. Snow falls occasionally, but usually melts within a few days.



CITY OF BURLINGTON
WASTEWATER COMPREHENSIVE PLAN

FIGURE 3–1
SANITARY SEWER SYSTEM SERVICE AREA

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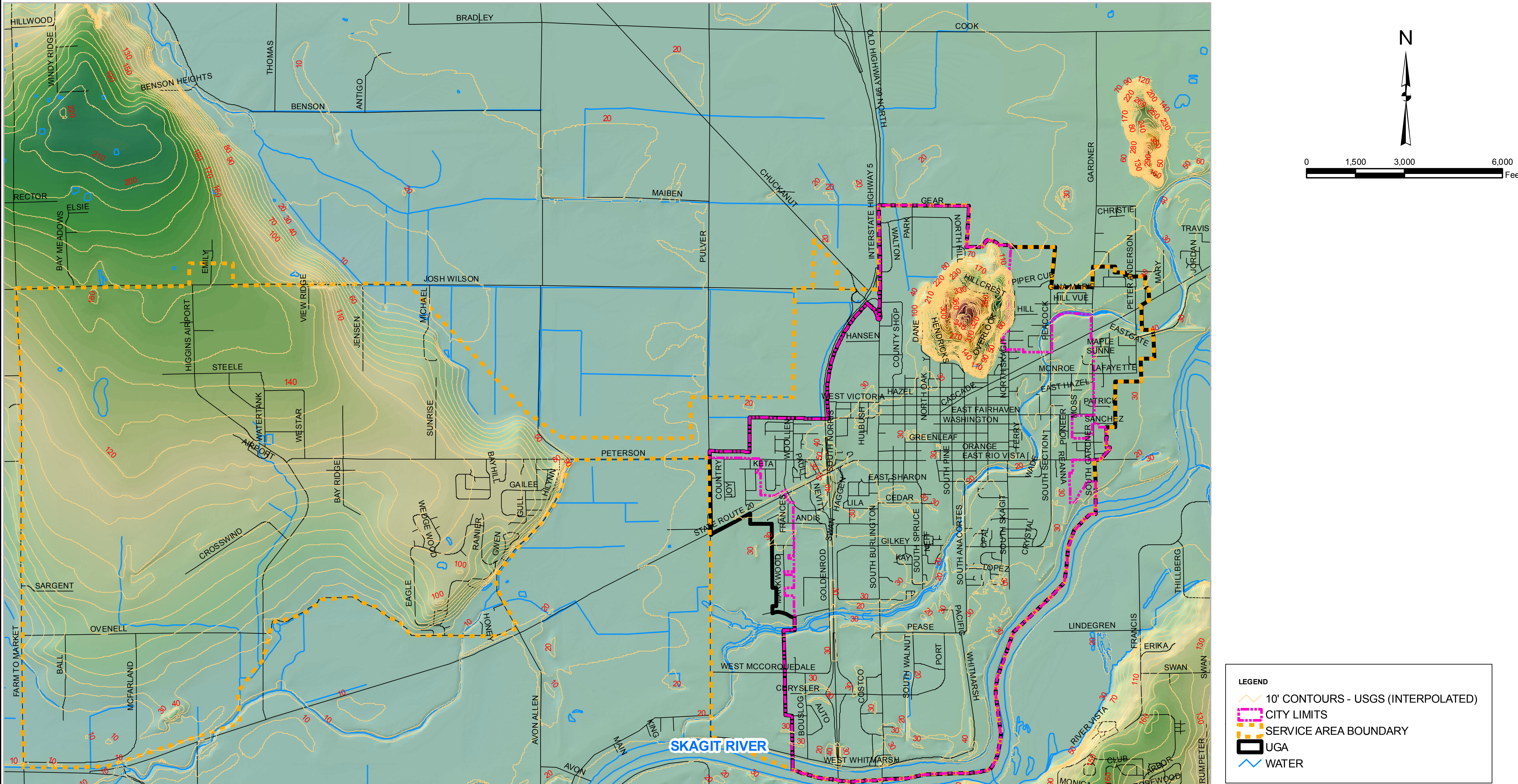

Source: USGS 10m DEM 2007

CITY OF BURLINGTON

SEWER COMPREHENSIVE PLAN
FIGURE 3-2
TOPOGRAPHY

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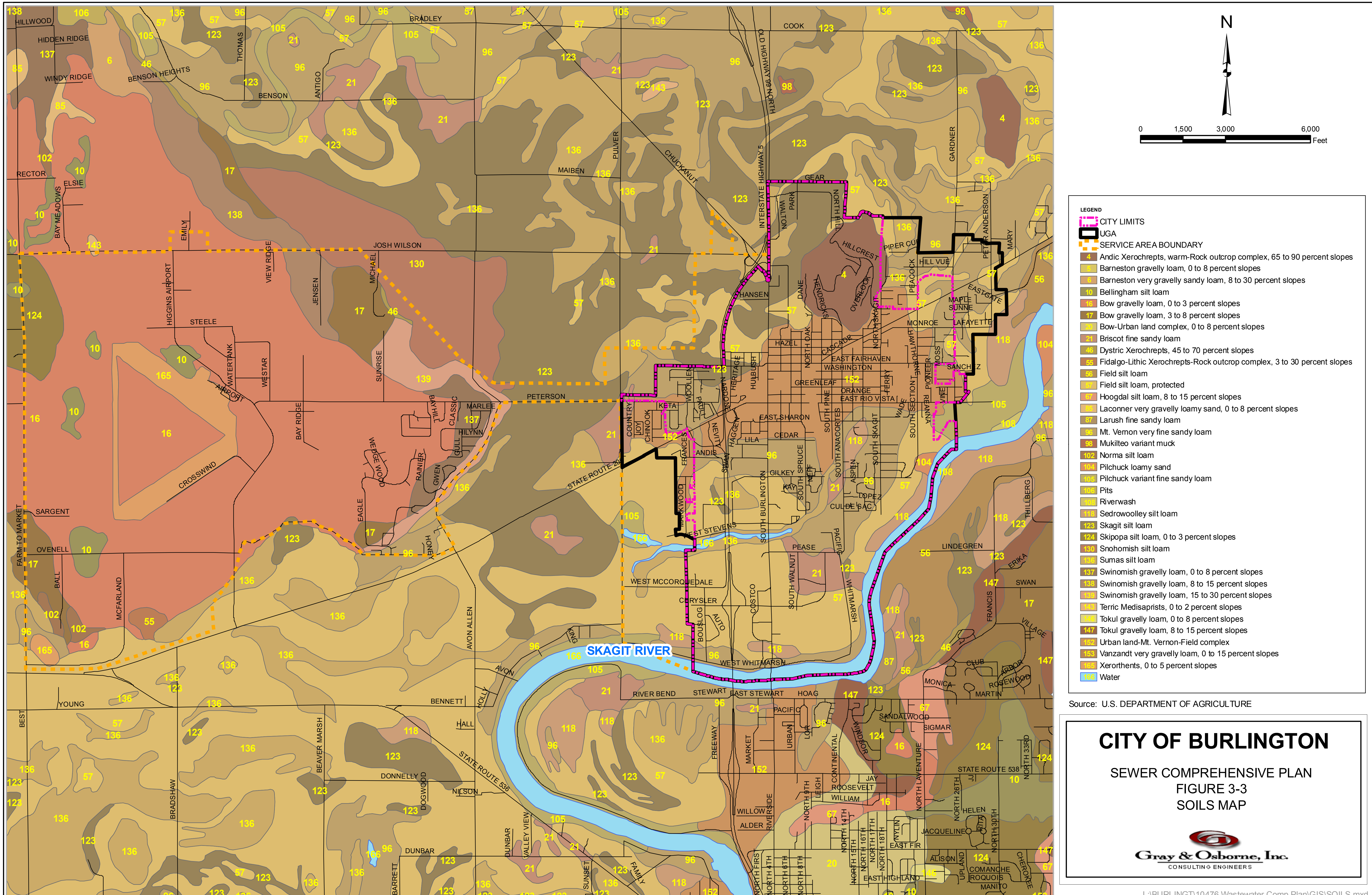

CITY OF BURLINGTON

SEWER COMPREHENSIVE PLAN
FIGURE 3-3
SOILS MAP

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TABLE 3-1

Average Precipitation and Temperature (1)

Month	Average Precipitation (inches)	Average Normal Temperature (°F)
January	5.83	39.6
February	3.87	42.1
March	4.22	45.6
April	3.77	49.7
May	2.96	55.1
June	2.67	59.5
July	1.55	63.1
August	1.70	63.6
September	2.74	58.8
October	4.29	51.3
November	6.92	44.3
December	5.55	39.6
Annual Total	**46.07**	**N/A**
Annual Average	**N/A**	**51.03**

(1) Climate data is from the Sedro-Wooley weather station, NOAA *Climatological Data, Annual Summary, Washington*, for the years 1970 through 2009.

SURFACE WATER

The primary surface water affected by the Burlington WWTP is the Skagit River. The Skagit River originates in the north Cascades, flowing southwesterly and ending in Skagit Bay. The City of Burlington's wastewater outfall is located in the Skagit River, adjacent to the treatment plant at mile 18.1.

Average monthly flow rates recorded for the Skagit River are shown below in Table 3-2. These flows were recorded from the Mount Vernon gauging station and available from USGS Surface Water Daily Statistics for Washington.

TABLE 3-2

Average Monthly Flow Rates for the Skagit River[1]

Month	Average Flow (cfs)
January	18,900
February	17,300
March	15,600
April	14,800
May	19,000
June	22,400
July	19,300
August	11,700
September	9,120
October	11,100
November	19,600
December	18,600

(1) Flow data is from the Mount Vernon gauging station, USGS Water Daily Statistics for Washington, for the time period January 1, 1970 through September 30, 2009.

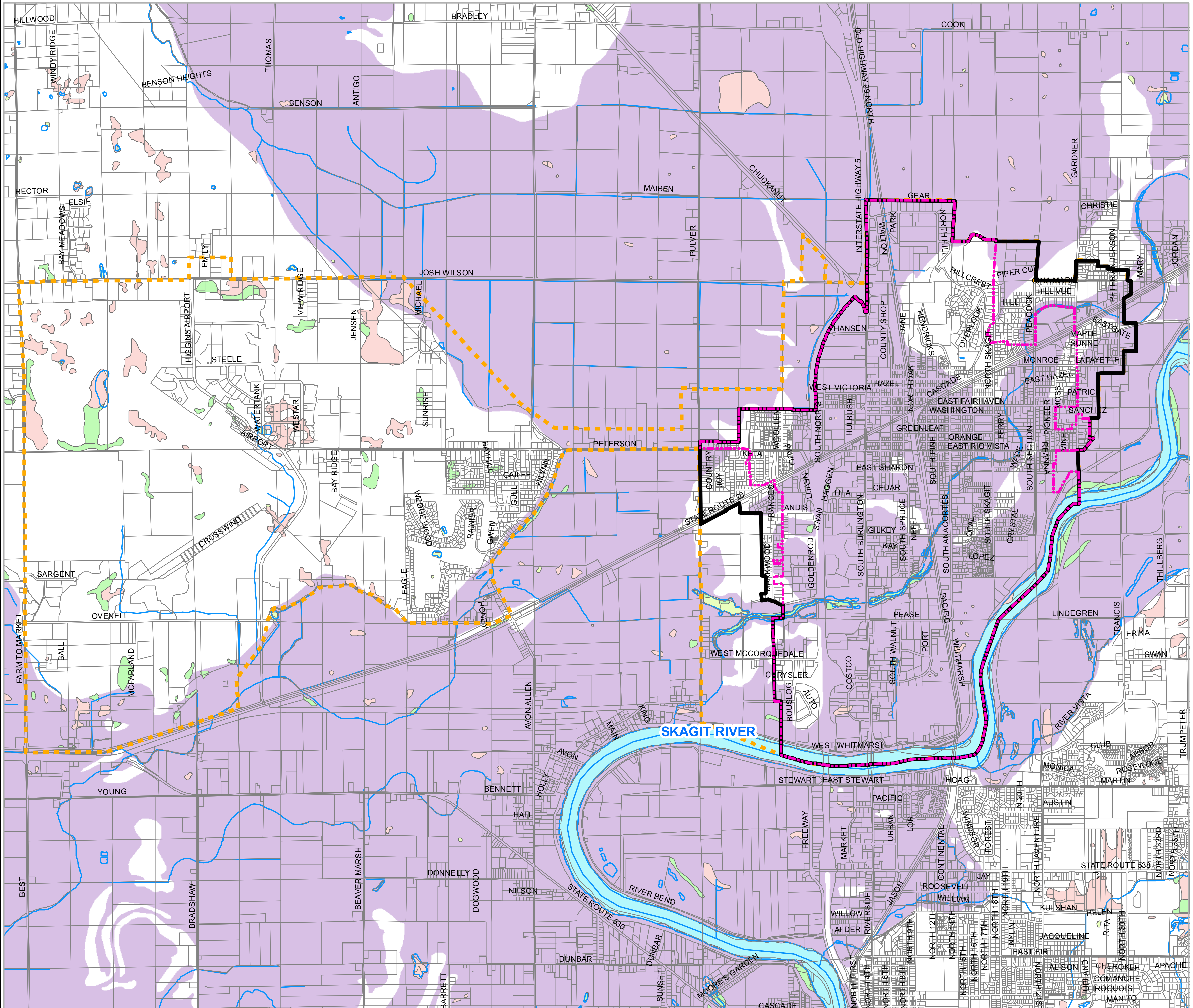
SENSITIVE AREAS

In 2002, the City of Burlington updated its Critical Areas Ordinance in accordance with the GMA. These regulations are compliant with the GMA and were developed and adopted using the best available science. Critical areas within the sewer service area include those classified as wetlands, flood hazard areas, fish and wildlife habitat, geologically hazardous areas including steep slopes, and groundwater recharge areas.

Flood hazard areas have been defined by Federal Emergency Management Agency (FEMA) floodplain boundary maps. Sensitive areas within the City of Burlington are shown on Figure 3-4. Much of the City and surrounding area are located within the 100-year floodplain as designated by FEMA.

SEWER DRAINAGE BASINS

The existing sewer service area currently includes 28 sewer drainage basins, as shown on Figure 3-5. The drainage basins will be used for evaluation of projected population and wastewater flow rates. The drainage basins were identified as areas that flow by gravity sewer either to pump stations or the WWTP. Because of the flat nature of much of the City, the majority of the system is served by gravity sewer which drains to pump stations. The majority of the pump stations discharge through a force main to a gravity sewer



LEGEND:

- CITY LIMITS
- UGA
- SERVICE AREA BOUNDARY
- PARCELS
- WATER

NATIONAL WETLANDS INVENTORY:

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine

FEMA ZONE

- 100-YEAR FLOODPLAIN

DATA SOURCES:
FEMA Q3 FLOOD DATA, WASHINGTON, 1998
U.S. DEPT. OF FISH AND WILDLIFE, NWI, 2000

CITY OF BURLINGTON

SEWER COMPREHENSIVE PLAN
FIGURE 3-4
SENSITIVE AREAS MAP

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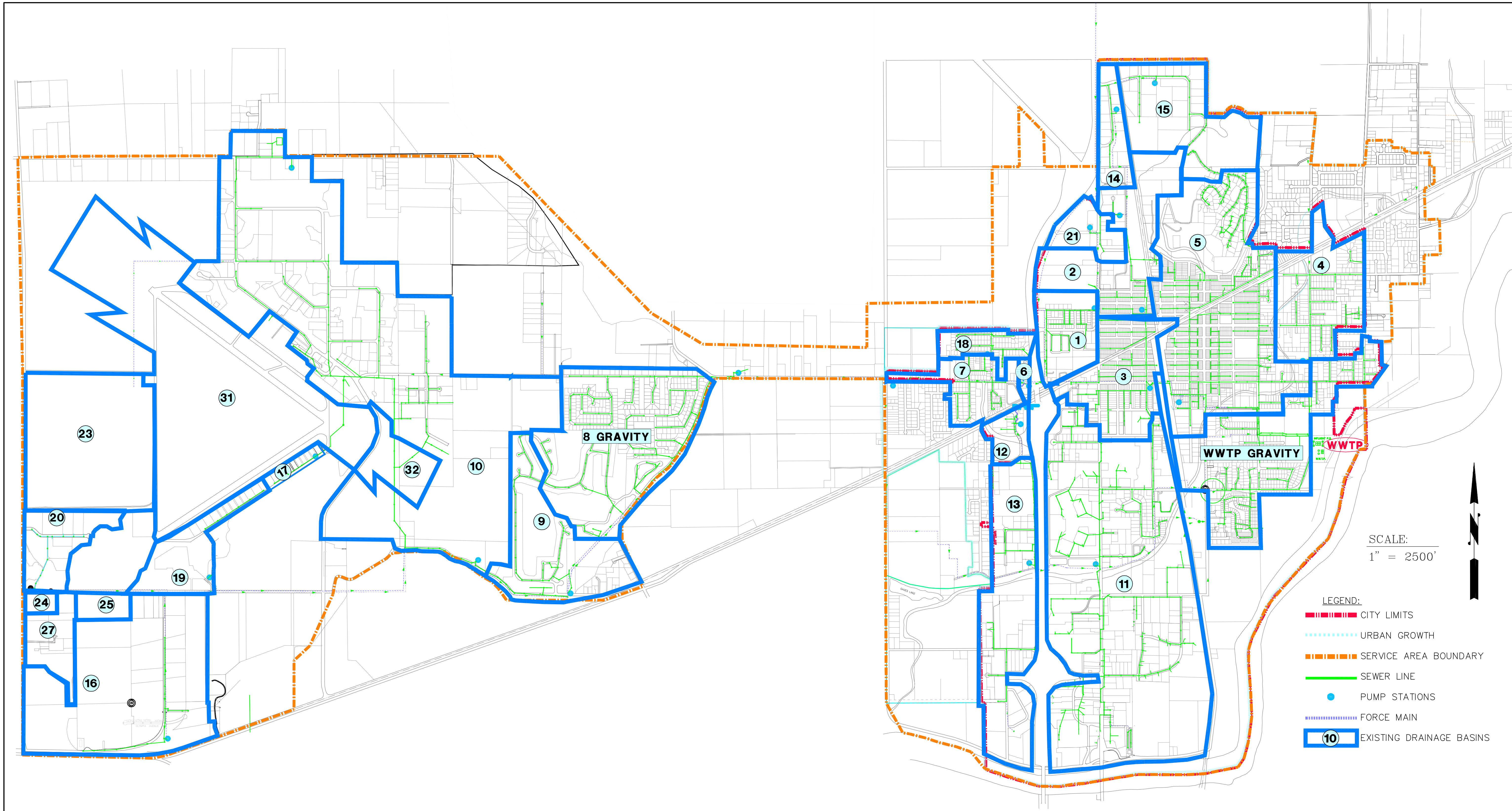

CITY OF BURLINGTON
WASTEWATER COMPREHENSIVE PLAN
FIGURE 3-5
EXISTING DRAINAGE BASINS

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system which drains to another pump station, eventually draining to the WWTP. A schematic representation of the City's existing lift stations and drainage basins is shown on Figure 3-6. Each drainage basin was assigned a number to help with identification on figures and tables. Table 3-3 provides the existing gravity drainage basins and the existing gravity area which currently drains to each basin.

TABLE 3-3

Sewer Drainage Basin Areas (1)

Drainage Basin No.	Drainage Basin Name	Gravity Area (acres)
1	Pump Station No. 1	76.04
2	Pump Station No. 2	137.25
3	Pump Station No. 3	137.45
4	Pump Station No. 4	134.51
5	Pump Station No. 5	377.29
6	Pump Station No. 6	4.79
7	Pump Station No. 7	68.21
8	Pump Station No. 8	265.17
9	Pump Station No. 9	149.75
10	Pump Station No. 10	837.44
11	Pump Station No. 11	738.58
12	Pump Station No. 12	25.96
13	Pump Station No. 13	214.26
14	Pump Station No. 14	48.93
15	Pump Station No. 15	149.67
16	Pump Station No. 16	334.41
17	Pump Station No. 17	10.17
18	Pump Station No. 18	33.27
19	Pump Station No. 19	82.39
20	Pump Station No. 20	64.25
21	Pump Station No. 21	47.37
22	Gravity to WWTP	235.31
23	PACCAR	242.47
24	Skagit County Recovery Facility	11.04
25	PSE	20.99
27	Dahlstead	51.95
31	Airport Runway 1	601.47
32	Airport Runway 2	57.47

(1) The sewer basin areas may not match values in other tables due to rounding.

Because many of the drainage basins receive flows from pump stations as well as gravity sewer, any flow analysis must include the upstream service areas which pump into the drainage basin. The flows will be developed in Chapter 5. In addition, the Pump Station No. 6 drainage basin also receives flow from the Samish Water District pipeline. This pipeline was originally constructed in 1976 to convey effluent from the Samish Water District wastewater treatment lagoon to the City sewer system for further treatment at the City's wastewater treatment plant. Since its original construction, several other customers have been added to the pipeline. Some of the major customers include the Washington State Department of Transportation rest stop near Alger, Whatcom Meadows Campgrounds, and several businesses near Cook Road. The pipeline also can accept standby capacity from the Casino. A full inventory of customers and pump stations and a map of the pipeline service area are provided in Appendix C. The Samish Water District has contracted for conveyance and treatment of an annual average flow of 250,000 gpd with the City of Burlington. This capacity includes the Samish Water District and all the additional customers, except the Skagit Valley Resort and Casino. The Casino has a separate agreement with the City for the conveyance and treatment of 60,000 gpd annual average flow.

The Casino has recently (2011) initiated construction of its own membrane bioreactor wastewater treatment facility and would, for the most part, discontinue discharge of wastewater to the Samish Water District pipeline. They will, however, maintain and cover the cost for a 60,000 gpd standby capacity in the City of Burlington wastewater conveyance and treatment system.

WATER SYSTEM

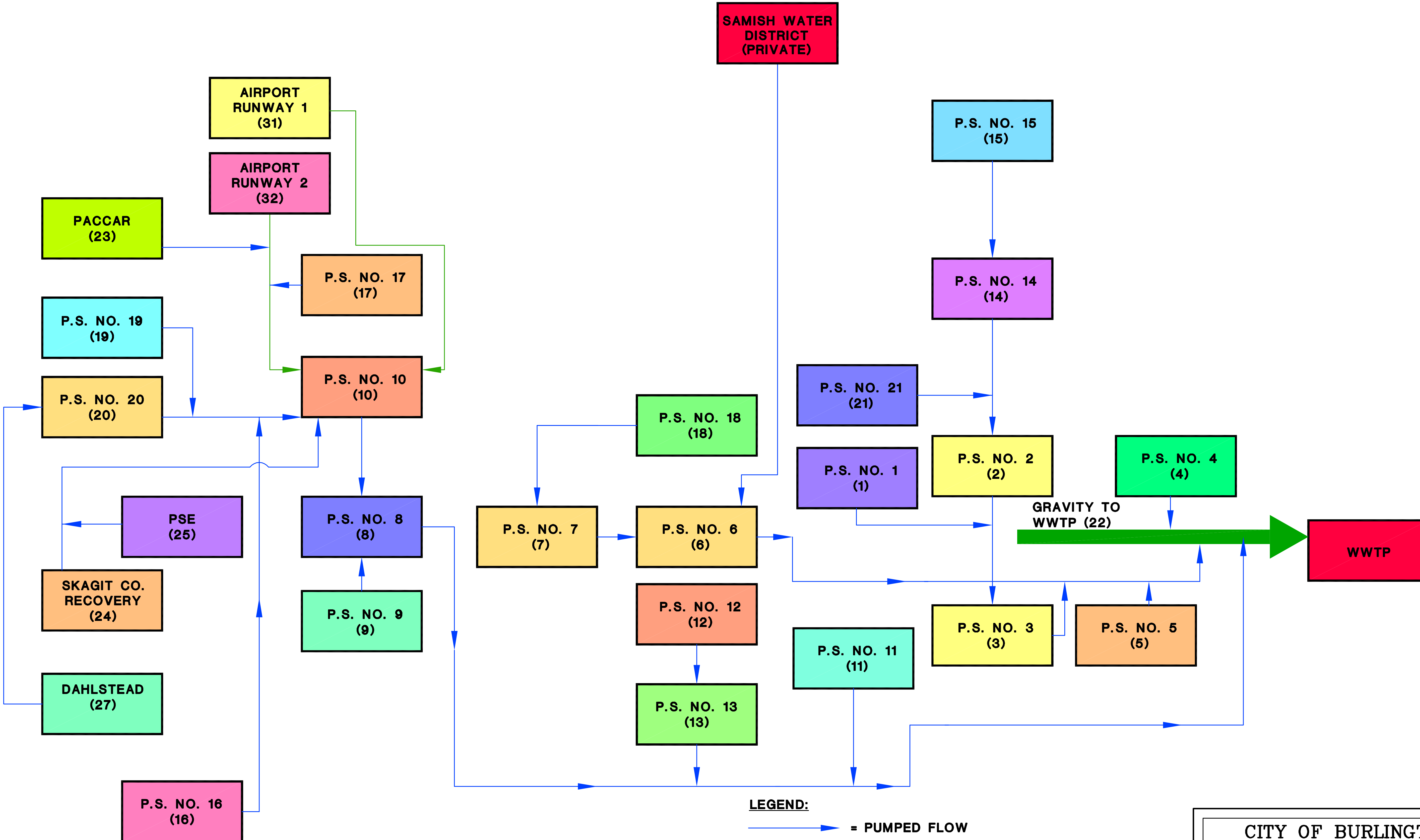
The Skagit County PUD operates a water system that supplies potable water to most areas of the City and the UGA as well as additional service areas.

ZONING AND LAND USE

The City has designated zoning classifications for areas within the city limits. Skagit County currently has zoning and land use jurisdiction over unincorporated areas that are provided sewer service by the City, including the areas within the City's UGA. The City and County zoning and land use designations are not identical so each are calculated separately.

EXISTING CITY ZONING

Figure 3-7 provides a map of current City zoning. The breakdown of the existing City zoning can be seen in Table 3-4. Residential zoning makes up about 34 percent of the total land area and approximately 28 percent of the residential zoning consists of single-family residential zones. The existing commercial zoning in Burlington is concentrated along Burlington Boulevard and includes the Cascade Mall as well as a



CITY OF BURLINGTON
WASTEWATER COMPREHENSIVE PLAN
FIGURE 3–6
EXISTING WASTEWATER SYSTEM DRAINAGE BASIN SCHEMATIC

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CONSULTING ENGINEERS

number of factory outlets. Another 15 percent of the total area is for public use or open spaces. This area includes city parks, schools, and highway right-of-way as well as privately owned land that is limited for development, such as in floodplains.

TABLE 3-4

Existing Zoning in City(1)

Land Use Designation	Land Use Category	Acreage	% of Total Acreage
R-1-6.0	Single-Family Residential	122	4.9%
R-1-7.6	Single-Family Residential	70	2.8%
R-1-8.4	Single-Family Residential	299	12.1%
R-1-9.6	Single-Family Residential	292	11.8%
R-2	Two-Family Residential	56	2.3%
R-3	Multifamily Residential	127	5.2%
R-S	Semipublic District	25	1.0%
M-1	Industrial District	241	9.8%
B-P	Business Park District	117	4.8%
C-1	Commercial District	635	25.8%
C-2	Heavy Commercial	344	14.0%
B-1	Business District	13	0.5%
MR-NB	Medium Residential and Neighborhood Business	40	1.6%
OSPA	Open Space, Parks, and Agriculture	55	2.2%
ROW	Right-of-Way	29	1.2%
Total		**2,465**	**100%**

(1) The zoning areas may not match other tables due to rounding.

EXISTING COUNTY ZONING

Figure 3-8 provides a map of current County zoning. The breakdown of the existing County zoning can be seen in Table 3-5. Residential zoning makes up about 20 percent of the total land area. The existing commercial zoning accounts for less than 1 percent of the total land area. Another 1 percent of the total area is for public use or open spaces.

TABLE 3-5

Existing County Zoning in Sewer Service Area[(1)(2)]

Land Use Designation	Land Use Category	Acreage	% of Total Acreage
AVR	Aviation Related	768	16.0%
Ag-NRL	Agricultural – Natural Resource Lands	361	7.5%
BR-CC	Bayview Ridge Community Center	40	0.8%
BR-HI	Bayview Ridge Heavy Industrial	924	19.2%
BR-LI	Bayview Ridge Light Industrial	1,212	25.2%
BR-R	Bayview Ridge Residential	708	14.7%
BR-URv	Bayview Ridge Urban Reserve	303	6.3%
NRI	Natural Resource Industrial	20	0.4%
RB	Rural Business	4	0.1%
RFS	Rural Freeway Service	1	0.0%
RI	Rural Intermediate	0	0.0%
RRv	Rural Reserve	22	0.5%
SSB	Small Scale Business	21	0.4%
URC-I	Urban Reserve Commercial-Industrial	0	0.0%
URR	Urban Reserve Residential	11	0.2%
WAT	Water	411	8.6%
Total		**4,806**	**100%**

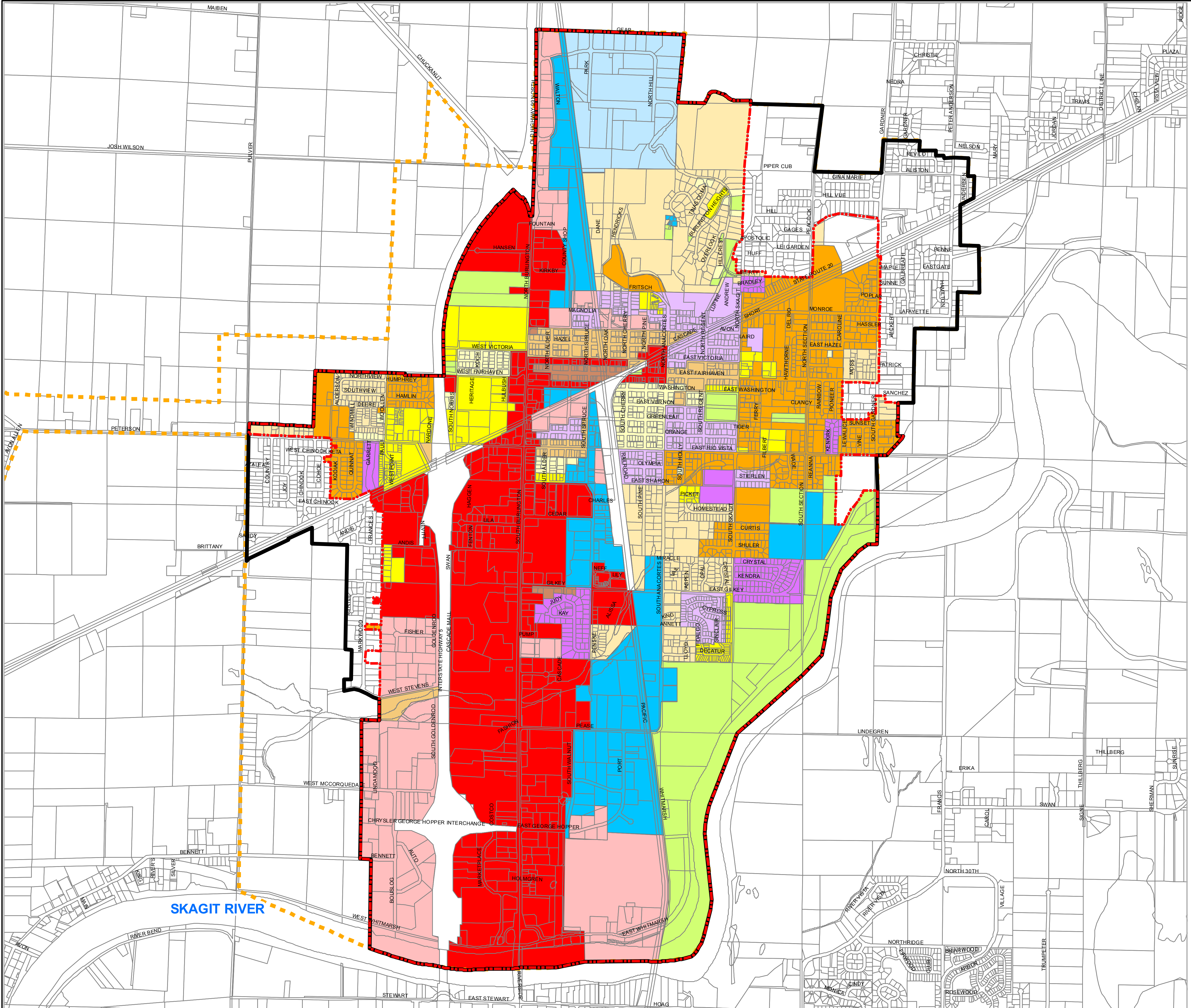
(1) The zoning areas may not match other tables due to rounding.
(2) Excludes rights-of-way.

FUTURE LAND USE

The City of Burlington is located mostly within the 100-year floodplain of the Skagit River and is relatively flat. The sewer service area to the west of the City is located at higher elevations above the 100-year floodplain.

The areas surrounding the City not in the sewer service area are mostly agricultural farmland. The City has worked with Skagit County and other organizations to design a program to protect the agricultural resource land at the edge of the City and to encourage higher density development in the existing city limits, with a focus on the downtown area. In addition, development outside of the city limits in the sewer service area is focused on the Bayview Ridge and Port of Skagit County areas.

The City expects that unincorporated UGAs will be annexed into the City as development occurs. In addition, the City has identified the west end of Gages Slough for incorporation into the City because it is the stormwater outfall for the City and is interested in restoring the wetland buffer and improving water quality. Another priority is to assist the Burlington-Edison School District in locating a site for a new school that has access to urban services.



N

0 900 1,800 3,600 Feet

LEGEND:

CITY LIMITS
UGA
SERVICE AREA BOUNDARY
PARCELS

ZONING:

R-1-6.0	SINGLE FAMILY RESIDENCE
R-1-7.6	SINGLE FAMILY RESIDENCE
R-1-8.4	SINGLE FAMILY RESIDENCE
R-1-9.6	SINGLE FAMILY RESIDENCE
R-2	TWO FAMILY RESIDENCE
R-3	MULTI FAMILY RESIDENCE
R-S	SEMI-PUBLIC DISTRICT
M-1	INDUSTRIAL DISTRICT
B-P	BUSINESS PARK DISTRICT
C-1	COMMERCIAL DISTRICT
C-2	HEAVY COMMERCIAL
B-1	BUSINESS DISTRICT
MR-NB	MEDIUM RESIDENTIAL & NEIGHBORHOOD BUSINESS
OSPA	OPEN SPACE, PARKS & AGRICULTURE

DATA SOURCES:
CITY OF BURLINGTON

CITY OF BURLINGTON

SEWER COMPREHENSIVE PLAN
FIGURE 3-7
CITY ZONING MAP

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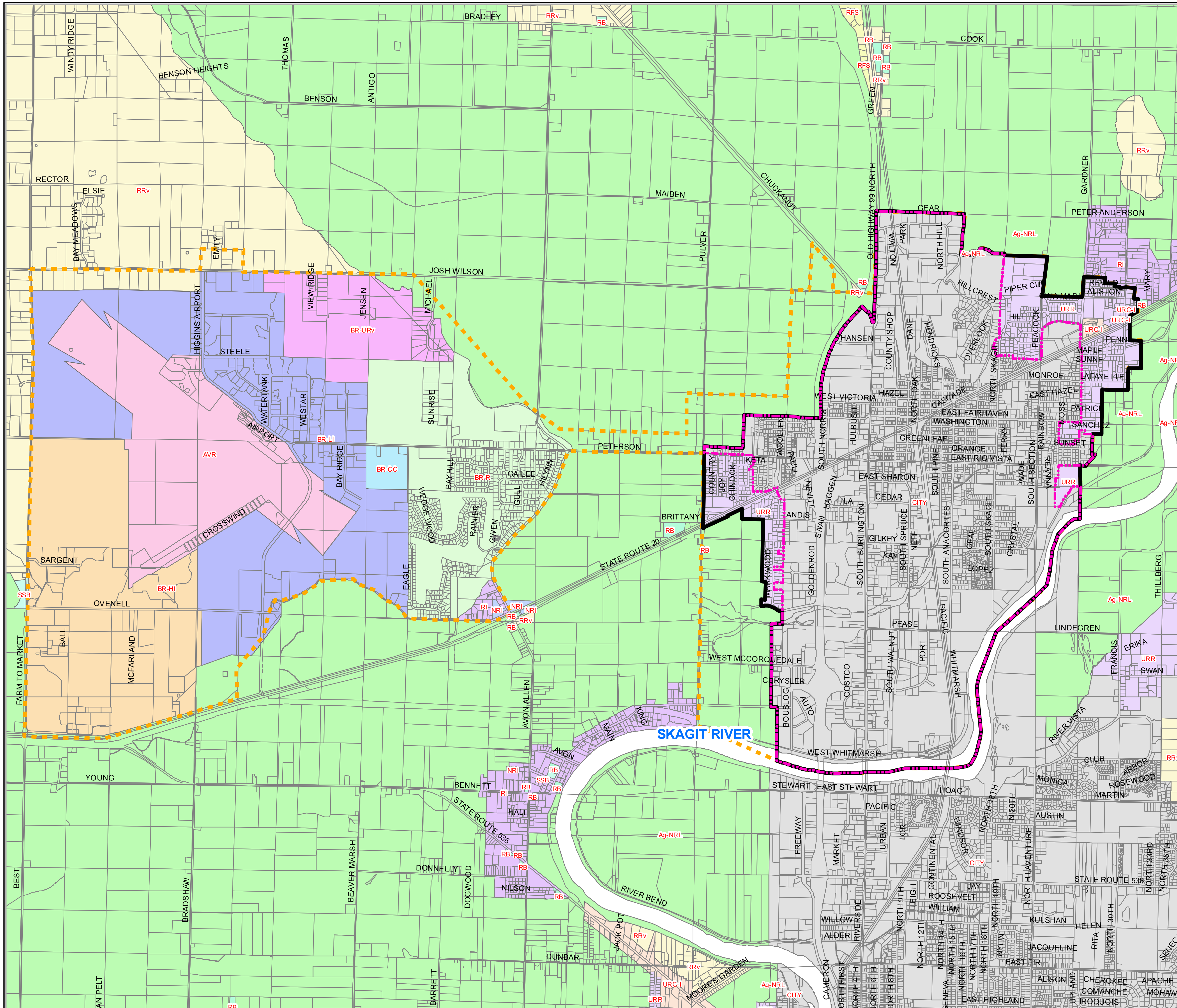

N

0 1,500 3,000 6,000 Feet

LEGEND:

- CITY LIMITS
- UGA
- SERVICE AREA BOUNDARY
- PARCELS

ZONING:

- AVR - AVIATION RELATED
- Ag-NRL - AGRICULTURAL - NATURAL RESOURCE LANDS
- BR-CC - BAYVIEW RIDGE COMMUNITY CENTER
- BR-HI - BAYVIEW RIDGE HEAVY INDUSTRIAL
- BR-LI - BAYVIEW RIDGE LIGHT INDUSTRIAL
- BR-R - BAYVIEW RIDGE RESIDENTIAL
- BR-URv - BAYVIEW RIDGE URBAN RESERVE
- CITY
- NRI - NATURAL RESOURCE INDUSTRIAL
- RB - RURAL BUSINESS
- RFS - RURAL FREEWAY SERVICE
- RI - RURAL INTERMEDIATE
- RRv - RURAL RESERVE
- SSB - SMALL SCALE BUSINESS
- URC-I - URBAN RESERVE COMMERCIAL-INDUSTRIAL
- URR - URBAN RESERVE RESIDENTIAL

DATA SOURCES:
SKAGIT COUNTY ZONING

CITY OF BURLINGTON

SEWER COMPREHENSIVE PLAN
FIGURE 3-8
COUNTY ZONING MAP

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POPULATION PROJECTIONS

CURRENT POPULATION

The 2010 census data were released in April 2011 and are accounted for in the subsequent tables and calculations. The City Planning Department has provided historical population and new construction information for the years 1989 through 2010 as seen in Table 3-6 and Table 3-7.

TABLE 3-6

City Historical Population 1989 to 2010

Year	Population(1)	Additions/Subtractions	Annual Growth Rate
1989	3,830	0	
1990	4,349	519	14%
1991	4,760	411	9%
1992	4,690 (2)	-70	-1%
1993	4,690	0	0%
1994	5,170	480	10%
1995	5,385	215	4%
1996	5,445	60	1%
1997	5,445	0	0%
1998	5,525	80	1%
1999	5,635	110	2%
2000	6,757	1,122	20%
2001	6,995	238	4%
2002	7,014 (3)	19	0%
2003	7,315	125	4%
2004	7,425	110	2%
2005	7,550	125	2%
2006	8,120	570	8%
2007	8,400	280	3%
2008	8,460	60	1%
2009	8,870	410	5%
2010	8,985 (4)	115	1%
2010	8,388 (5)	-482	-5%
2011	8,420	32	0%

(1) Population inside city limits.
(2) Correction of 1991 population by Washington State OFM.
(3) Based on 2000 Census data (updated November 30, 2001).
(4) Population update by Washington State OFM April 1, 2010.
(5) Based on 2010 Census data (updated April 2011).

TABLE 3-7

City Historical New Construction 1989 to 2010

Year	Commercial and Industrial (ft^2)	Single Family and Duplex (units)	Multifamily (units)
1989	733,029	7	128
1990	188,228	23	169
1991	287,680	8	6
1992	91,091	6	0
1993	287,455	66	40
1994	169,196	45	4
1995	70,229	44	55
1996	140,402	9	0
1997	244,701	15	0
1998	438,873	17	3
1999	334,356	34	11
2000	269,726	98	11
2001	170,061	109	96
2002	208,098	41	0
2003	88,027	82	0
2004	348,337	97	0
2005	503,663	146	8
2006	483,963	28	14
2007	81,140	33	4
2008	192,900	13	0
2009	95,786	25	0
Total	**5,426,941**	**946**	**549**

The population has increased an average of about 2.19 percent per year over the past 10 years. This population increase has been a result of development within the existing city limits as well as annexations, although few annexations occurred during the past 5 years.

PROJECTED FUTURE POPULATION

In the City of Burlington 2010 to 2015 Capital Improvement Plan, it has been estimated that the population will grow by 964 within the city limits during the period from 2009 through 2025 (16 years), corresponding to an annual growth rate of about 0.65 percent per year. This estimate of growth was based on the assumption that all new housing within city limits would be built on vacant land, which means that no land with existing housing would be redeveloped to the density allowed by zoning. Several areas within the city are presently developed at a lower density than what is allowed by the zoning. At a population of 2.74 people per dwelling unit, the current zoning allows for a population of a little more than 17,000 if developed in accordance with existing allowable development densities.

It is considered highly unlikely that all residentially zoned areas in the City of Burlington will be redeveloped over the next 20 years. It is, however, proposed to utilize a population growth rate of 2.25 percent per year (slightly higher than the growth rate over the past 10 years) over the next 20 years to allow for the service to developed areas presently outside the city limits, but within the UGA, that are presently served by septic tanks or other types of on-site treatment and disposal. These areas may be annexed to the City, or merely receive sewer service. Areas that are prime candidates for sewer service by the City of Burlington include the Raspberry Ridge housing development east of the City; an area immediately outside the northeast corner of the City, presently zoned "Urban Reserve Residential" by Skagit County; and an area immediately west of the western part of the City, around Markwood Lane and East of Pulver Road, between Peterson Road and State Highway 20, all zoned "Urban Reserve Residential" by Skagit County.

The 2.25 percent per year growth rate will also allow for providing sewer service to areas within the city limits that are presently not sewered, such as the area along Anacortes Avenue, south of Gages Slough.

Table 3-8 shows the projected future population at 5-year increments for the 20-year planning period for the City of Burlington based on a 2.25 percent annual growth rate.

TABLE 3-8

City of Burlington Projected Population

Year	City Population(1)
2010	8,388
2015	9,375
2020	10,978
2025	11,711
2030	13,090

(1) Includes city limits and areas that could potentially be annexed by the City.

CHAPTER 4

EXISTING FACILITIES

WASTEWATER COLLECTION SYSTEM

INTRODUCTION

The City of Burlington wastewater collection system includes gravity sewers, pump stations, and force mains. The existing sewer system, shown on Figure 4-1, consists of two distinctly separate systems: the City proper system and the Western Service Area system. The City proper system serves the area bounded by the city limits. The Western Service Area system serves the Port of Skagit County Airport and industrial area, the Skagit Golf and Country Club and a residential development around the golf course, and a few additional commercial and industrial customers in the immediate vicinity of the Port. The City of Burlington purchased the Port sewer system from the Port of Skagit County in 2000.

The City of Burlington also receives wastewater from the Samish Water District (District) through a 12-inch-diameter pipeline from the District's pretreatment lagoon at the south end of Lake Samish in Whatcom County, which flows to Pump Station 6 on Peterson Road in the City of Burlington. Effluent from the District's waste stabilization pond is pumped through this force main. Several pump stations along the District's pipeline alignment discharge wastewater to the pipeline, including a Washington State Department of Transportation rest area, the Thousand Trails Campgrounds, and several residential and commercial customers. The Skagit Valley Resort and Casino is also connected to the pipeline as a backup to their new treatment system. The District pipeline and associated pump stations are owned and operated by the District.

There are eleven additional privately owned pump stations which contribute to the Burlington collection system, as follows:

- Clear Snap at 15218 Josh Wilson Road discharging to Manhole 1269
- Burlington RV Park discharging to Manhole 486 in Holmgren Lane
- Skagit Ford at 620 Auto Boulevard discharging to Manhole 466
- Kar Mart Auto Group at 655 Auto Boulevard discharging to Manhole 466
- Kar Mart Auto Group at 660 Auto Boulevard discharging to Manhole 466
- Foothills Toyota at 675 Auto Boulevard discharging to Manhole 466

- Sunrise Lane discharging to Manhole 1073
- Olympic Tank Yard discharging to 6-inch force main in Ovenell Road
- Puget Sound Energy discharging to 6-inch force main in Ovenell Road
- Skagit County Energy Recovery Facility discharging to 6-inch force main in Ovenell Road
- Paccar, west of the Port of Skagit County Regional Airport, discharging to Manhole 1256

A small area within the city limits is served by individual septic tanks and drain fields. This area is located along Anacortes Avenue, south of Gages Slough.

A small farm labor housing development, located outside the city limits at Sanchez Lane (Raspberry Ridge) is served by its own community sewer system. The wastewater is treated in a community septic tank and discharged to a subsurface drain field.

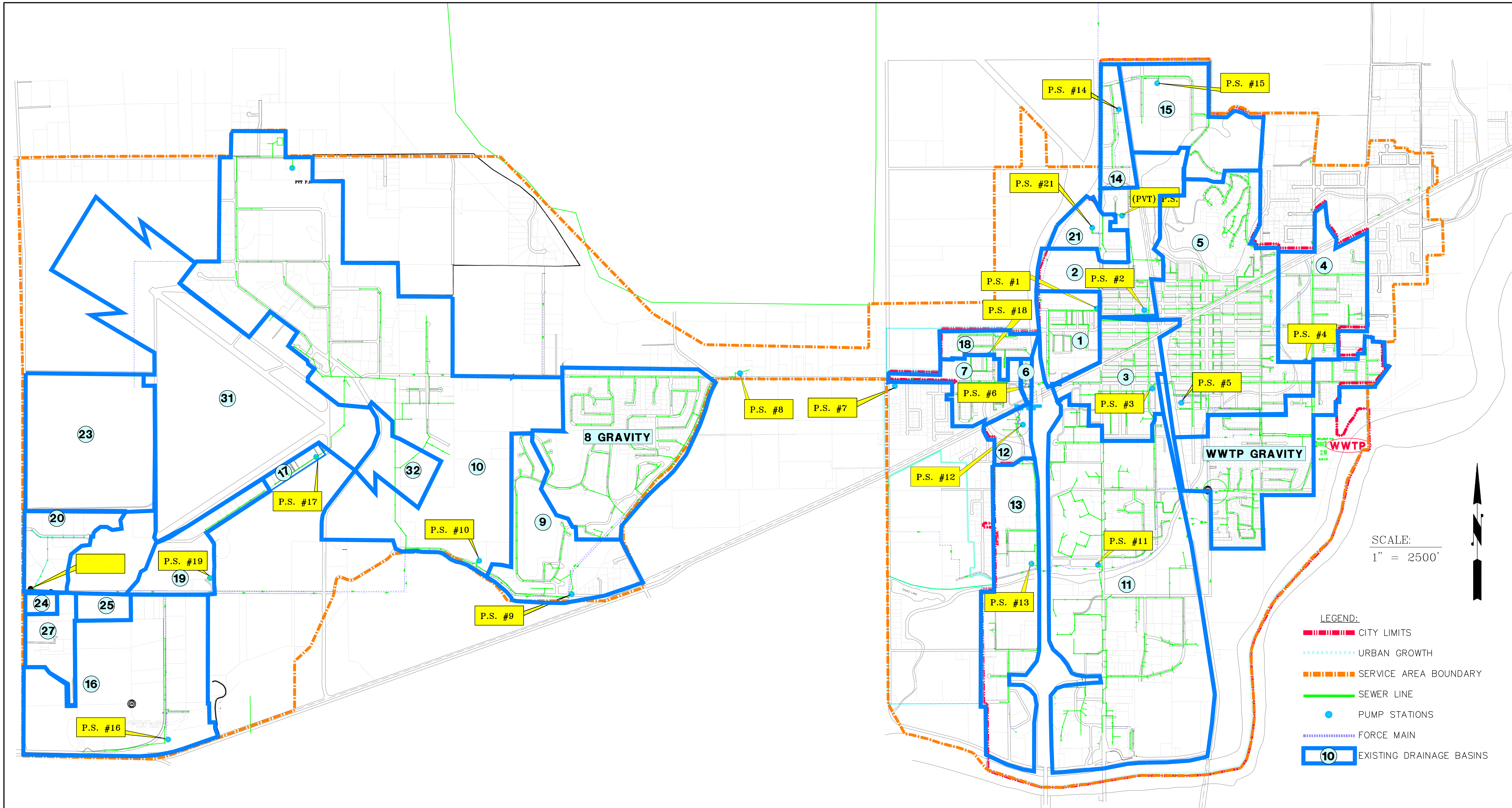
The original wastewater collection system, installed in 1946, consisted of 6-inch through 15-inch diameter concrete mortar joined pipe, which is still in use in places. An 18-inch diameter concrete outfall pipe carried the wastewater to the Skagit River. The original manholes were brick construction. The collection system service area has gradually increased since 1946, with the Western Service Area added as a part of a major sewer system expansion project in 1977. The pipeline from the Samish Water District was also completed in 1977.

GRAVITY SEWERS

The City of Burlington wastewater collection system includes approximately 58 miles of gravity sewer pipes varying in size from 4-inch diameter local connections to 27-inch diameter interceptors. Many types of pipe material have been used in the construction of the system including clay, concrete, polyvinyl chloride (PVC), and ductile iron.

Due to the relatively flat terrain, much of the gravity collection system has been constructed at the minimum slope required to prevent solids from settling out during transport. In some areas, topography allows for greater slopes; however, an extensive system of pump stations and force main piping is required to convey wastewater in areas where topography causes gravity flow sewers to be very deep.

An inventory of the gravity sewer lines is provided in Table 4-1.



CITY OF BURLINGTON
WASTEWATER COMPREHENSIVE PLAN
FIGURE 4-1
PUMP STATION LOCATIONS

Gray & Osborne, Inc.
CONSULTING ENGINEERS

TABLE 4-1

Gravity Sewer Inventory

Diameter (inches)	Total Length (feet)	Length (miles)	Portion of System (%)
4	1,970	0.37	0.64
6	34,360	6.51	11.24
8	165,310	31.31	54.09
10	54,030	10.23	17.68
12	36,310	6.88	11.88
15	4,530	0.86	1.48
18	1,610	0.30	0.53
21	6,760	1.28	2.21
27	730	0.14	0.24
Total	**305,610**	**57.88**	**100**

PUMP STATIONS AND FORCE MAINS

The City owns and operates 21 sewage pump stations. Pump Station 8 serves the Western Service Area exclusively, and the force main from Pump Station 8 conveys the flow from this pump station into two large-diameter interceptors that discharge directly to the wastewater treatment plant. Three of the force mains are common force mains which convey flows from more than one pump station. The force main from Pump Station 8, discussed above, also conveys flows from Pump Station 11 and Pump Station 13. The force main from Pump Station 6 also conveys flow from Pump Station 3 and Pump Station 5. The force main from Pump Station 16 also conveys flow from Pump Station 19 and Pump Station 20.

The City is currently in the process of connecting high-priority pump stations to the SCADA system. All others are equipped with an auto dialer that will notify City staff of alarms. Pump station locations are shown on Figure 4-1. Design data for the City's sewage pump stations is included in Table 4-2. Where appropriate, the data has been adjusted based on drawdown tests for each pump station performed by City of Burlington staff during the summer of 2010.

TABLE 4-2

City-Owned Sewage Pump Station Design Data

Pump Station	Location (address)	Installed/ Upgraded	Type	Pumps			
				Qty.	Capacity (gpm)	TDH (ft)	HP
1	115 West Victoria Avenue	1952/2006	Submersible	2	495	22.5	5
2	213 North Spruce Street	1946/2001	Submersible	2	390	15.5	3
3 (1)	404 East Rio Vista Avenue	1957/1977/ 2010	Submersible	2	1,500 2,150	62 50	40
4	331 South Section Street	1955/2006	Dry Pit	2	360	15	3
5 (1)	Olympia Avenue at Railroad Street	1977	Dry Pit	2	675 915	45 38	15
6 (1)	638 Peterson Road	1977	Dry Pit	2	1,400 918	48 63	25
7	18040 Peterson Road	1977/2000/ 2007	Submersible	2	760	68	25
8 (2)	17331 Peterson Road	1977/2004	Submersible	2	2,950 3,700	66 60	75
9	16505 Ovenell Road	1977	Submersible	2	645	35	15
10	16059 Ovenell Road	1977	Submersible	2	400	32	10
11 (2)	1385 South Burlington Boulevard	1981/2004	Submersible	2	1,283 1,650	47 30	25
12	875 Goldenrod Road	1986	Submersible	2	113	22	5
13 (2)	Goldenrod Road at Stevens Road	1992	Submersible	2	290 740	37 27	7-1/2
14	Walton Drive	1993	Submersible	2	130	46	10
15	North Hill Boulevard	1996	Submersible	2	297	22	5
16 (3)	14654 Ovenell Road	2000	Submersible	2	510	118	30
17 (4)	15409 Crosswind Drive	1999	Submersible	2	N/A	N/A	2
18	165 Woollen Road	2003	Submersible	2	194	30	5
19 (3)	14879 Ovenell Road	2003	Submersible	2	140	18	2
20 (3)	14101 Ovenell Road	2005	Submersible	2	305	83	20
21	185 Hanson Place	2007	Submersible	2	120	29.5	5

(1) Pump Stations 3, 5, and 6 discharge to a common force main. The upper numbers in the capacity and TDH columns indicate the conditions when all three pump stations discharge simultaneously to the force main. These numbers represent the rated capacity of the pump station. The lower numbers indicate the condition when each pump station is discharging by itself to the force main. The actual flow rate at any time would be somewhere between the two conditions.

(2) Pump Stations 8, 11, and 13 discharge to a common force main. The upper numbers in the capacity and TDH columns indicate the conditions when all three pump stations discharge simultaneously to the force main. These numbers represent the rated capacity of the pump station. The lower numbers indicate the condition when each pump station is discharging by itself to the force main. The actual flow rate at any time would be somewhere between the two conditions.

(3) Pump Stations 16, 19, and 20 discharge to a common force main. The stated capacities and TDHs for these pump stations have been obtained from drawdown tests and pump curves. No hydraulic analyses have been made on the force main system for these pump stations and it is unknown whether the pumps were operating alone or simultaneously with other pump stations when the drawdown tests were made.

(4) Pump information for Pump Station 17 pumps is not available.

An inventory of the force mains is shown in Table 4-3. Force mains vary in diameter from 4 to 24 inches, and asbestos-cement (AC), PVC, high-density polyethylene (HDPE), cast iron (CI), and ductile iron (DI) pipe materials are used. The force mains are shown on Figure 4-1.

TABLE 4-3

Force Main Inventory

Diameter (inches)	Length (feet)	Length (miles)
3	2,200	0.42
4	3,150	0.59
6	7,946	1.50
8	10,700	2.03
10	4,974	0.94
12	15,449	2.93
14	1,786	0.34
20	16,505	3.13
24	4,324	0.82
Total	**67,034**	**12.70**

WASTEWATER TREATMENT PLANT

INTRODUCTION

The first wastewater treatment plant (WWTP) in the City of Burlington was constructed in 1946. This WWTP was located south of Olympia Avenue, between Railroad Street and Pine Street, approximately where the existing Pump Station 5 is located. The original treatment plant consisted of rectangular primary clarifiers, chlorine disinfection, and anaerobic digestion of biosolids.

In 1976, the construction of a new secondary treatment facility was completed at the location of the existing treatment facility at 900 South Section Street. The original treatment facility at Olympia Avenue was abandoned. The new treatment facility, an activated sludge treatment facility, consisted of an influent pump station, comminutor structure, circular primary clarifiers, aeration basins, circular secondary clarifiers, a chlorine contact chamber, an effluent pump station, and an outfall and diffuser in the Skagit River.

A hydrocyclone and grit classifier removed grit from the primary sludge which was thickened, together with waste activated sludge, in a gravity thickener before it was digested in an aerobic digester. Digested sludge was thickened in a second gravity thickener before being dried in sludge drying beds. Dried biosolids were applied to permitted farmlands.

The facility was designed to treat a design flow (maximum month) of 1.61 million gallons per day (mgd) with an organic loading of 3,181 pounds of BOD_5 per day (lb BOD_5/d) and a solids loading of 3,181 pounds of TSS per day (lb TSS/d).

In the late 1980s to early 1990s, a septage receiving station and a belt filter press for sludge dewatering were added to the treatment plant. The septage receiving station consists of a mechanical bar screen, an underground holding tank, and a pump to meter the septage into the influent pump station. The addition of the septage receiving station allowed the treatment plant to receive septage from nearby communities.

The belt filter press was added to gain more capacity from the sludge drying beds. Polymer was added to the thickened digested sludge and pumped to the belt filter press for dewatering. The dewatered sludge was pumped to the sludge drying beds for air drying and storage before being applied to permitted farmlands.

Beginning in 1995, a major upgrade to the Burlington WWTP was initiated. This upgrade took place in several stages and significantly increased the capacity and effluent quality of the WWTP. The first project, “Influent Pump Station and Aeration Basin Modifications” completed in 1995, resulted in replacement of the constant-speed influent pump station pump controls with variable frequency drives (VFDs), addition of selector zones to the aeration basins, replacement of the mechanical mixing/sparge ring aeration system with a state-of-the art fine-bubble diffuser system, and a temporary extension of the chlorine contact basin into the effluent pump station wet well. These improvements allowed the maximum month flow capacity of the WWTP to be upgraded to 2.0 mgd. The organic loading was upgraded to 3,900 lb BOD_5/d and the solids loading was upgraded to 4,200 lb TSS/d.

The second project, “Headworks Modifications,” was completed in 1997 and included the construction of a new headworks structure with a Parshall flume influent flow meter, a fine screen with a bypass channel and space for an additional future fine screen, and a primary clarifier splitter box allowing the flow to be split between the existing primary clarifiers and two future primary clarifiers. This project increased the headworks capacity to a peak hour flow of 9.48 mgd, expandable to a future peak hour flow of 12.6 mgd (these peak hour flows correspond to maximum month flows of 3.79 mgd and 5.05 mgd, respectively).

The third project, “Administration Building,” also completed in 1997 added administration office space, a lunchroom, and locker room for the Sewer Department staff.

Finally, the fourth project, “Wastewater Treatment Plant Upgrade,” increased the maximum month flow capacity of the entire Burlington WWTP to 3.79 mgd, the organic load capacity to 7,356 lb BOD_5/d and the solids load capacity to 7,660 lb TSS/d. The project also added seasonal nitrification in anticipation of a seasonal effluent ammonia limit. Specific improvements included expansion of the influent pump station; the addition of a primary clarifier, aeration basins, and secondary clarifier with a capacity approximately equal to the existing treatment train; installation of new ultraviolet disinfection facilities to replace the existing chlorine contact tank and chlorination facilities; installation of a new outfall pipe with diffusers to the Skagit River and expansion of the effluent pump station; construction of a new solids handling building, new anaerobic digesters, and sludge storage area. The solids handling building houses a new waste activated sludge rotary screen thickener, the existing belt filter press for digested sludge dewatering, the anaerobic digester boiler and heat exchanger, and various pumps and equipment for the sludge handling process. The sludge drying beds were removed and a new vehicle storage building was constructed in the area left available. The electrical and control systems were upgraded, including a new standby generator. The construction of this project was completed in 2001.

In 2002, the City of Burlington purchased and installed a biosolids dryer that produces Class A biosolids at a solids concentration of 90 percent or more. This treatment allows unrestricted use of the biosolids produced at the Burlington WWTP.

The plant effluent limitations, as indicated in the existing NPDES permit are shown in Table 4-4. The NPDES permit, which was issued in 2005, is included in Appendix A.

TABLE 4-4

Current Treatment Plant Effluent Limits

Parameter	Limit
BOD_5 Monthly Average Concentration	30 mg/L (1)
BOD_5 Monthly Average Load	948 lb/d
BOD_5 Weekly Average Concentration	45 mg/L
BOD_5 Weekly Average Load	1,422 lb/d
TSS Monthly Average Concentration	30 mg/L (1)
TSS Monthly Average Load	948 lb/d
TSS Weekly Average Concentration	45 mg/L
TSS Weekly Average Load	1,422 lb/d
NH_4 Concentration	no limit presently in effect
Fecal Coliform Monthly Average Count	200/100 ml
Fecal Coliform Weekly Average Count	400/100 ml
Daily Minimum pH	$\geq$6.2
Daily Maximum pH	$\leq$9.0

(1) The monthly average concentration limitation for BOD_5 and TSS shall not exceed 30 mg/L or 15 percent of the respective influent concentrations, whichever is more stringent.

The existing treatment plant layout is provided on Figure 4-2 and the plant flow diagram on Figure 4-3.

SEPTAGE RECEIVING STATION

A septage receiving station is located at the wastewater treatment plant. The receiving station consists of a mechanical bar screen, a holding tank, and a pump to meter the septage into the influent pump station of the treatment plant. The treatment plant receives septage from nearby communities. The holding tank is aerated and can be injected with a chlorine solution for odor control.

INLUENT PUMP STATION

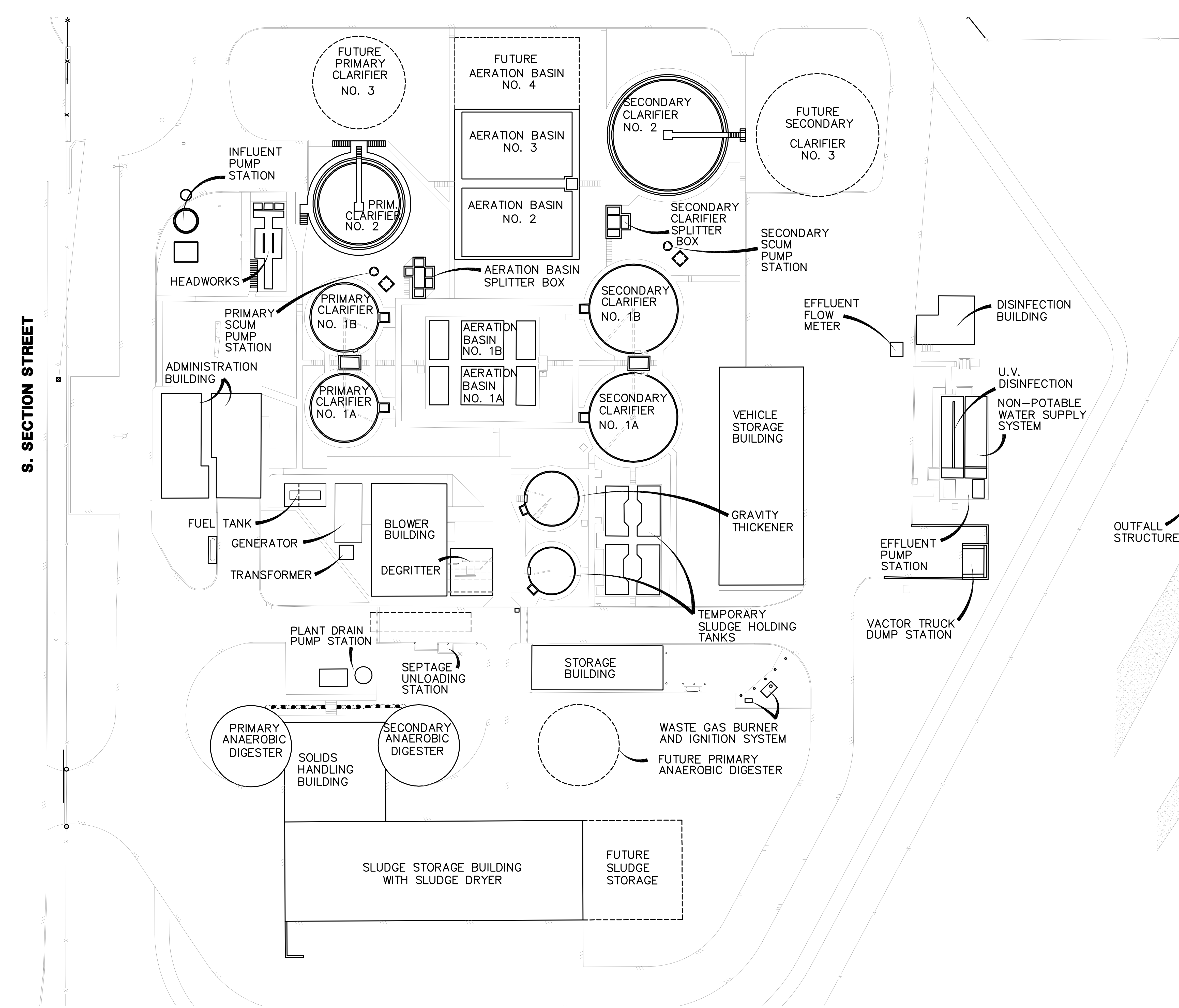
The influent pump station is located at the treatment plant site and pumps all sewage collected from the City through two parallel 16-inch force mains to the headworks. The pump station contains one large and two smaller submersible centrifugal variable speed pumps pumping out of a wet well. The rated capacity of the large pump is 4,385 gpm at 43 feet of total dynamic head. The rated capacity of each of the two smaller pumps is 2,300 gpm at 38 feet of total dynamic head. Thus, the nominal capacity of the influent pump station (the capacity with the largest pump out of service) is 4,600 gpm, or 6.624 mgd. An automatic control system maintains a constant liquid level in the wet well by varying the output of the pumps through a variable frequency speed control and an ultrasonic level sensor in the wet well.

HEADWORKS

The headworks contains a Parshall flume flow meter with an ultrasonic level sensor, an automatic mechanical fine screen with a bypass channel, and a third channel available to install a second screen. The Parshall flume has a nominal capacity of 21.4 mgd.

The screen will remove objects larger than 3/8 inches from the wastewater stream and convey them to a dumpster. The dumpster is periodically emptied by the solid waste utility. A manual bar screen is installed in the bypass channel to handle extreme flows or to be utilized when the fine screen is out of service. The influent screen has a capacity of 7.99 mgd.

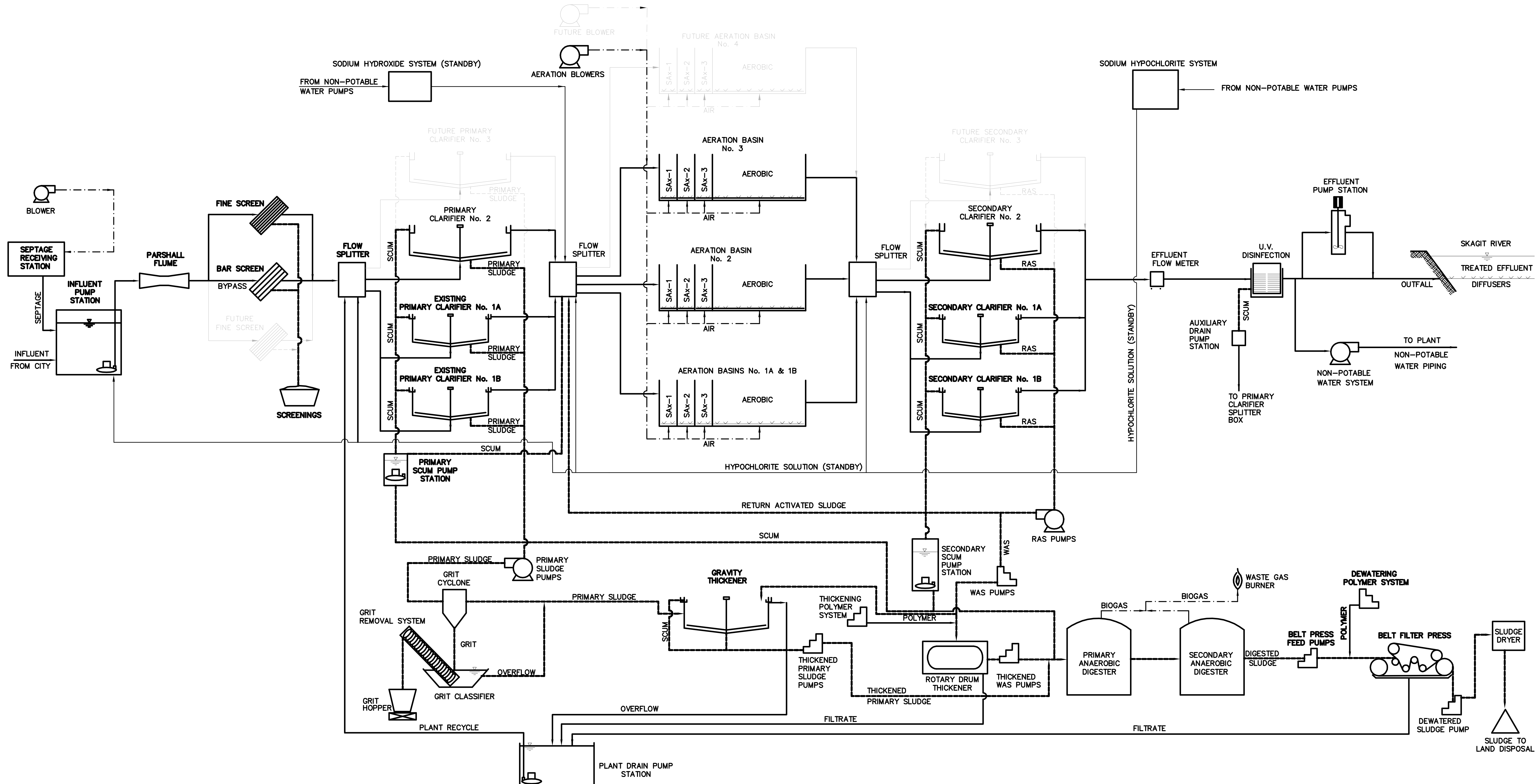
The primary clarifier splitter box is also a part of the headworks structure. The splitter box distributes the wastewater flow evenly between two primary clarifier treatment trains. It also allows for flow distribution to a future third primary clarifier treatment train. Discharge from the plant drain pump station enters the primary clarifier splitter box.



CITY OF BURLINGTON

WASTEWATER COMPREHENSIVE PLAN
FIGURE 4–2
WASTEWATER TREATMENT PLANT LAYOUT

Gray & Osborne, Inc.
CONSULTING ENGINEERS



CITY OF BURLINGTON

WASTEWATER COMPREHENSIVE PLAN

FIGURE 4-3

PROCESS SCHEMATIC

Gray & Osborne, Inc.
CONSULTING ENGINEERS

PRIMARY CLARIFIERS

Primary clarifiers are provided to reduce the loading to the secondary treatment process by removing a portion of the organic material and solids from the wastewater before it enters the aeration basins. Aeration basins and related equipment such as blowers can be reduced in size when primary clarification is provided. Typical removal efficiency across a primary clarifier is 30 to 35 percent BOD_5 and 60 to 70 percent TSS. One of the two primary clarifier treatment trains consists of two older 35-foot-diameter clarifiers operated in parallel. The other primary clarifier treatment train is a single newer 49-foot-diameter clarifier. At a hydraulic overflow rate of 1,000 gallons per day per square foot (gpd/ft^2), the primary clarifiers have a combined capacity of 3.81 mgd peak month flow. Primary clarifiers could operate at overflow rates as high as 3,000 gpd/ft^2 during peak hour flows. This corresponds to a primary clarifier peak hour flow capacity of 11.43 mgd.

All the clarifiers are center fed and peripheral draw-off. The screened wastewater flows through the influent column and enters the clarifier through submerged ports. A feed well surrounding the center column dissipates the velocity of the wastewater and causes it to flow downward. As the wastewater flows downward and outward, the solids settle out on the bottom while the clarified wastewater flows upward and out over a weir into the effluent channel. The clarifiers are equipped with a bottom scraper mechanism to move the settled sludge to the hopper located in the floor at the center of the clarifier. A scum scraper mechanism on the surface removes any floating material including grease. Periodically, the settled sludge is pumped though a grit cyclone to a gravity thickener. The grit cyclone removes the grit from the sludge stream. The centrifugal recessed impeller-type primary sludge pumps are located in the basement of the blower building and have a capacity of 63 gpm for each of two smaller clarifiers, and 125 gpm for the larger clarifier.

AERATION BASINS

The purpose of the activated sludge system is to remove suspended and colloidal solids and dissolved organic matter from the wastewater. This removal is accomplished by the introduction of the wastewater into a biological reactor (aeration basin) containing a high concentration of actively growing microorganisms in the presence of dissolved oxygen. The microorganisms utilize the waste material as a source of food to obtain the energy necessary for their own life processes and growth. The rapid growth of these organisms results in the creation of a flocculant biological mass which can be removed from the liquid stream by sedimentation in the secondary clarifiers, thus creating a clear effluent with a low organic content. In the activated sludge process, the high concentration of active biological mass is maintained by continuously recycling the organisms back into the aeration basins. Effective settling and separation of the biological mass from the liquid stream in the secondary clarifiers is essential to the proper operation of the activated sludge system.

At the City of Burlington wastewater treatment plant, three aeration basin treatment trains are provided. In the aeration basin splitter box, return activated sludge that has settled out in the secondary clarifiers is mixed with the effluent from the primary clarifiers and the combined flow is split between the three treatment trains. One treatment train consists of two older aeration basins operated in parallel. Each of the two older aeration basins has a volume of 21,960 cubic feet. The two other treatment trains each consist of one newer aeration basin with a volume of 43,983 cubic feet. The aeration basin splitter box is configured to add a fourth treatment train. All the aeration basins are complete mixed and aerated with a fine-bubble diffused air aeration system. Three multistage centrifugal blowers provide air for the diffuser system. Each blower is rated at 2,170 cfm at a pressure of 7.15 psi. Each aeration basin is equipped with three selector zones at the inlet to improve the settling characteristics of the activated sludge in the secondary clarifiers.

The capacity of the aeration basins can generally be determined based on a volumetric loading of 40 pounds of BOD_5 per day per 1,000 cubic feet of tank volume. This results in a total capacity of 5,275 pounds of BOD_5 per day in the primary effluent. If a 35 percent BOD_5 removal is assumed in the primary clarifiers, an influent BOD_5 capacity of 8,116 pound per day results, based on peak month loading rates. The BOD_5 removal capacity of aeration basins can be adjusted by operational parameters, such as mixed liquor suspended solids, solids wasting rate, solids retention time, and food-to-microorganism ratio. Therefore, as the BOD_5 removal capacity of the aeration basins approaches, the operational parameters should be reviewed and analyzed to establish appropriate expansion schemes.

Although the City of Burlington does not have ammonia limits at the present time, future requirements for nitrification in the aeration basin will affect the nominal BOD_5 removal capacity of the aeration basins.

SECONDARY CLARIFIERS

After the organic wastes in the influent wastewater have been converted to a bacterial sludge floc in the aeration basins, it is necessary to separate the sludge floc from the liquid stream. This separation and removal phase is accomplished in the secondary clarifiers.

The mixed liquor from the aeration basins flows by gravity to the secondary clarifier splitter box. The splitter box distributes the wastewater flow evenly between two secondary clarifier treatment trains. It also allows for flow distribution to a future third secondary clarifier treatment train. One of the two secondary clarifier treatment trains consists of two older 45-foot-diameter clarifiers operated in parallel. The other secondary clarifier treatment train is a single newer 65-foot-diameter clarifier. All the clarifiers are center fed and peripheral draw-off. The mixed liquor flows through the influent column and enters the clarifier through submerged ports. A feed well surrounding the center column dissipates the velocity of the mixed liquor and causes it to flow downward. As the mixed liquor flows downward and outward, the solids settle out on the bottom while the clarified effluent flows upward and out over a weir into the effluent channel. The clarifiers are equipped with a bottom scraper mechanism to move the settled sludge to the suction device located in the floor at the center of the clarifier. The majority of this sludge is returned to the aeration basins as return activated sludge (RAS). A smaller portion, the waste activated sludge (WAS), is pumped to the rotary drum thickener. A scum scraper mechanism on the surface removes any floating material including grease.

Secondary clarifiers are typically sized based on hydraulic overflow rates and solids loading rates. A typical peak month hydraulic overflow rate for the secondary clarifiers at the Burlington Wastewater Treatment Plant would be 600 gpd/ft^2. Based on this overflow rate, the combined peak month flow capacity for the secondary clarifiers is 3.90 mgd. Based on a typical peak hour flow overflow rate of 1,200 gpd/ft^2, the peak hour flow capacity of the secondary clarifiers is 7.80 mgd. The solids loading rate for the secondary clarifiers will vary with the mixed liquor suspended solids concentration maintained in the aeration basin and with the sludge recycle rate. Therefore, as the hydraulic capacity of the secondary clarifiers approaches, the solids loading rates should be reviewed and analyzed based on appropriate operational schemes.

ULTRAVIOLET DISINFECTION

Prior to discharge to the outfall line, the treated wastewater undergoes disinfection. Disinfection is the inactivation of potentially harmful (pathogenic) microorganisms from the treatment plant effluent. At the Burlington WWTP, disinfection is accomplished through the application of ultraviolet light. Ultraviolet light will disrupt the organisms' genetic material and will prevent them from reproducing. The ultraviolet disinfection facilities consist of a concrete channel with three banks of ultraviolet lamps, each containing 96 lamps. Two of the banks are capable of disinfecting a peak day flow of 6.64 mgd. This peak day flow corresponds to a peak month flow of 3.79 mgd (the design flow for the existing wastewater treatment facility). One of the banks is a redundant unit. A parallel channel has been provided to allow for future expansion of the disinfection facilities. The number of banks that is operating (one or two) is controlled by the effluent flow meter located immediately upstream of the ultraviolet disinfection facilities.

EFFLUENT PUMP STATION

The effluent pump station pumps the treated wastewater to the Skagit River during a flood condition and/or during a high instantaneous flow through the treatment plant. The pumps are located in a sump at the end of the ultraviolet disinfection facilities. The pumps are activated by a high water level in the effluent sump, which also closes a slide gate on the gravity line to prevent backflow into the sump. The pumps are vertical turbine pumps with a rated capacity of 9,900 gpm (14.3 mgd) at 37.5 feet total dynamic head.

Under normal plant flow and river water level conditions, effluent flows by gravity from the pump sump to the outfall and diffusers in the river.

RIVER OUTFALL

The river outfall consists of an outfall structure and three separate 10-inch-diameter diffusers and one 20-inch-diameter diffuser in the Skagit River. The flow is either pumped or flows by gravity to the outfall structure, where it is split between the four diffuser pipes. The current hydraulic capacity of the outfall is about 7,750 gpm (11.2 mgd).

SOLIDS HANDLING SYSTEM

The solids handling system consists of a primary sludge gravity thickener, a waste activated sludge rotary drum thickener, primary and secondary anaerobic digesters, a belt filter press dewatering system, and a sludge dryer. Primary sludge from the primary clarifiers is pumped to the grit cyclone and then to the primary sludge gravity thickener. The thickener concentrates the sludge before it enters the anaerobic digester, thereby reducing the required digester volume while still providing adequate solids retention time. The primary sludge thickener is a 26-foot-diameter circular tank with center feed and peripheral draw off. It is equipped with sludge scrapers on the bottom and a scum scraper on the surface to remove floating materials, similar in design to the clarifiers. At a surface loading rate of 24 pounds per square foot per day, the capacity of the gravity thickener is 12,744 pounds of suspended solids per day, corresponding to a peak month influent suspended solids load of 19,600 pounds per day at a 65 percent suspended solids removal rate through the primary clarifiers. The thickened sludge is pumped to the primary anaerobic digester while the supernatant is pumped to the primary clarifier splitter box.

The WAS rotary drum thickener is located on the ground floor in the solids handling building. WAS is pumped to the rotary drum thickener, where it is mixed with polymer before entering thickener. The thickener flocculates, conditions, and thickens WAS to about 5 percent solids. The thickened WAS is discharged into a hopper and pumped to the primary anaerobic digester. The rotary drum thickener has a rated WAS flow capacity of 250 gpm at a solids concentration of 1.0 percent solids or higher. If the rotary drum thickener is operated 6 hours every workday, the thickener has a WAS load capacity of 5,140 pounds per day, corresponding to a peak month BOD_5 loading of 8,565 pounds per day if a solids yield of 0.6 pound of waste solids per pound of influent BOD_5 is assumed. The filtrate is pumped to the primary clarifier splitter box.

The anaerobic digester system includes a primary anaerobic digester and a secondary digester. The primary digester is mixed by a pumped mixing system and heated to about 95 to 100 degrees Fahrenheit by a boiler and heat exchange system. The boiler can be heated by methane gas produced by the digestion process or by natural gas. The volume of each of the two digesters is 39,100 cubic feet, which will provide a hydraulic detention time of 16 days for each digester. The anaerobic digester system was specifically designed to stabilize sludge generated from peak month treatment plant influent BOD_5 and TSS loads of 7,376 and 7,660 pounds per day, respectively. The primary digester is a fixed cover design, while the secondary digester is a floating cover design, allowing for variations in the water surface elevation as a result of batch removal of digested sludge.

The digested sludge is pumped to a belt filter press dewatering unit located on the ground floor of the solids handling building. The digested sludge is mixed with polymer before dewatering. The belt filter press has a hydraulic capacity of about 120 gpm at a solids concentration of 3 percent. If the belt filter press is operated 6 hours every workday, it would have the capacity to dewater digested sludge generated from peak month treatment plant influent BOD_5 and TSS loads of approximately 14,000 and 14,650 pounds per day, respectively. The press will dewater the sludge to a solids concentration of 20 percent or more. The filtrate is pumped to the primary clarifier splitter box. The belt filter press assembly is equipped with a lime feed and mixer system for lime treatment of the dewatered sludge, although lime stabilization is not currently practiced.

The dewatered sludge is pumped to a sludge drying unit. At this unit, the sludge is heated so that the excess water evaporates and pathogens are reduced. The dried sludge has a solids concentration of 90 percent or more and a fecal coliform count below 1,000 per gram of solids. This process is approved by the regulatory agencies to produce Class A biosolids which allows unrestricted use of the biosolids. The dried sludge is currently picked up by a local farmer and used as soil amendment.

The sludge drying unit has a capacity of 400 pounds of solids per hour and is presently operated for 240 hours (10 days) at a time. It would take a minimum of 24 hours (2 days) for cool-down and preparation for the next run period. If the dryer is operated on a schedule of 240 hours on/72 hours off, it would dry digested and dewatered sludge generated from peak month treatment plant influent BOD_5 and TSS loads of approximately 14,000 and 14,650 pounds per day, respectively, which is the same capacity as the digested sludge dewatering belt filter press.

SUMMARY OF TREATMENT PLANT COMPONENT CAPACITIES

Table 4-5 summarizes the capacities of the major treatment units, as discussed above.

TABLE 4-5

Summary of Treatment Plant Flow Capacity Limits for Individual Equipment

Treatment Unit	Peak Month Flow Capacity (mgd)	Peak Hour Flow Capacity (mgd)	Peak Month BOD_5 Capacity (lb/d)[(1)]	Peak Month TSS Capacity (lb/d)[(1)]
Influent Pump Station	—	6.62	—	—
Influent Flow Meter	—	21.4	—	—
Influent Screen	—	7.99	—	—
Primary Clarifiers	3.81	11.4	—	—
Aeration Basins	—	—	8,116	—
Secondary Clarifiers	3.90	7.80	—	—
UV Disinfection	3.79	—	—	—
Effluent Pump Station	—	14.3	—	—
Outfall	—	11.2	—	—
Gravity Thickener	—	—	—	19,600
WAS Rotary Drum Thickener	—	—	8,565	—
Anaerobic Digesters	—	—	7,356	7,660
Belt Filter Press	—	—	14,000	14,650
Sludge Dryer	—	—	14,000	14,650

(1) These capacities are general guides only. Actual capacities will depend on specific operational parameters in effect at the time, such as aeration basin MLSS, solids retention time, food-to-microorganism ratio, and operational times and frequencies for equipment.

CHAPTER 5

WASTEWATER FLOW AND LOADING PROJECTIONS

INTRODUCTION

Adequate design of wastewater treatment and conveyance facilities requires determination of the quantity and quality of wastewater generated from each of the contributing sources. Municipal wastewater is domestic in origin, with large portions of the flow contributed by commercial and industrial businesses and by institutional facilities such as schools, hospitals, and municipal functions. Infiltration and inflow (I/I) contributions result from groundwater and surface water entering the sewer system during periods of high groundwater levels and rainfall, respectively. In this chapter, wastewater flow and loading generated in the City of Burlington's sewer system and handled by the treatment plant are estimated.

Water consumption data, WWTP daily monitoring reports (DMRs), flow meter records, and lift station run time records from previous years are used to estimate unit quantities for critical parameters related to zoning, land use, and overall land area in the existing service area. These unit quantities are then applied to project future zoning to determine the design criteria for selecting and sizing the facilities required to serve the study area in future years.

DEFINITIONS OF TERMS

The terms and abbreviations used in the analysis are described below, listed in alphabetical order.

AVERAGE ANNUAL FLOW

Average annual flow (AAF) is the average daily flow over a calendar year. This flow parameter is used to estimate annual operation and maintenance costs for treatment and lift station facilities.

AVERAGE DRY WEATHER FLOW

Average dry weather flow (ADWF) is the average wastewater flow rate during periods when the groundwater table is low and precipitation is at its lowest of the year. The dry weather flow period in western Washington normally occurs during June through September. During this time, the wastewater strength is highest, due to the lack of dilution with the ground and surface water components of infiltration and inflow. The higher strength, coupled with higher temperatures and longer detention times in the sewer system, create the greatest potential for system odors during this time. The average dry weather flow is the average daily flow during the three lowest consecutive flow months of the year. For this study, average flow rates for July through October are used.

BIOCHEMICAL OXYGEN DEMAND (BOD)

Biochemical oxygen demand (BOD) is a measure of the oxygen required by microorganisms in the biochemical oxidation of organic matter. BOD is an indicator of the organic strength of the wastewater. If BOD is discharged untreated to the environment, biodegradable organics will deplete natural oxygen resources and result in the development of septic (anaerobic) conditions. BOD data, together with other parameters, are used in the sizing of the treatment facilities and provide a measurement for determining the effectiveness of the treatment process. BOD is expressed as a concentration in terms of milligrams per liter (mg/L) and as a load in terms of pounds per day (lb/d). The term BOD typically refers to a 5-day BOD, often written BOD_5, since the BOD test protocol requires 5 days for completion. BOD_5 of wastewater is composed of two components—a carbonaceous oxygen demand ($CBOD_5$) and a nitrogenous oxygen demand ($NBOD_5$).

OTHER CONTAMINANTS OF CONCERN

Contaminants of concern in wastewater, in addition to BOD and suspended solids, include nutrients, priority pollutants, heavy metals, and dissolved organics. The aggregate presence of deleterious priority pollutants, heavy metals, or dissolved organics can be measured through the acute toxicity test. This test determines the acute (short-term) effect of the wastewater effluent on marine species. The City's discharge permit includes effluent limitations on biodegradable organics (BOD_5), suspended solids, pathogens (fecal coliform), and pH.

Nutrients, such as nitrogen and phosphorus along with carbon, are essential requirements for growth. When discharged to the aquatic environment, these nutrients can lead to the growth of undesirable aquatic life. When discharged in excessive amounts on land, they can also lead to the pollution of groundwater. Additionally, in too high a concentration, nutrients, particularly ammonia, can be toxic to aquatic life. The City's discharge permit does not include nutrient limits at this time.

Priority pollutants are organic and inorganic compounds selected on the basis of their known or suspected carcinogenicity, mutagenicity, teratogenicity, or high acute toxicity. Many of these compounds are found in wastewater. Inorganic constituents, including heavy metals, are often present in wastewater due to commercial and industrial activities and may have to be removed if the presence of the metals will adversely affect the receiving water, or if the wastewater is to be reused. Some heavy metals (most notably copper) can be present in wastewater due to leaching from drinking water pipes.

DOMESTIC WASTEWATER

Domestic wastewater is wastewater generated from single- and multifamily residences. Domestic wastewater flow is generally expressed as a unit flow based on the average contribution from each person per day. The unit quantity is expressed in terms of gallons per capita per day (gpcd).

EQUIVALENT RESIDENTIAL UNIT (ERU)

An equivalent residential unit (ERU) is a baseline wastewater generator that represents the average single-family residential household. An ERU can also express the average annual flow contributed by a single-family household in units of gallons per day, or an annual average loading (of 5-day biochemical oxygen demand or total suspended solids) contributed by a single-family household in units of pounds per day.

INFILTRATION

Infiltration is groundwater entering a sewer system by means of defective pipes, pipe joints, or manhole walls. Infiltration quantities exhibit seasonal variation in response to groundwater levels. Storm events or irrigation trigger a rise in the groundwater levels and increase infiltration. The greatest infiltration is observed following significant storm events preceded by prolonged periods of precipitation. Since infiltration is related to the total amount of piping and appurtenances in the ground and not to any specific water use component, it is generally expressed in terms of the total land area being served. The unit quantity generally used is gallons per acre per day (gpad).

INFLOW

Inflow is surface water entering the sewer system from yard, roof, and footing drains, from cross connections with storm drains, and through holes in manhole covers. Peak inflow occurs during heavy storm events when storm sewer systems are taxed beyond their capacity, resulting in hydraulic backups and local ponding. Inflow can be expressed in terms of gallons per capita per day or gallons per acre per day.

Treatment plant flow records are utilized to characterize combined infiltration and inflow in the sewer system in terms of peak hour, maximum day, maximum month, and average annual I/I.

MAXIMUM DAY FLOW

Maximum day flow (MDF) is the highest daily flow during a calendar year. The maximum day flow in western Washington usually occurs in response to a significant storm event preceded by prolonged periods of rainfall or snowmelt, which have previously developed a high groundwater table in the service area. Maximum day flow is used in sizing some treatment processes. Maximum day flow is typically determined from treatment plant flow records and projected future flow rates.

MAXIMUM MONTH FLOW (TREATMENT DESIGN FLOW)

Maximum month flow (MMF) is the highest monthly average flow during a calendar year. In western Washington, the maximum month flow occurs in the winter due to the presence of more I/I. This wintertime flow is composed of the normal domestic, commercial, and institutional flows with significant contributions from inflow and infiltration. The predicted maximum month flow at the end of the design period is used as the design flow for sizing treatment processes and selecting treatment equipment.

NON-RESIDENTIAL WASTEWATER

Non-residential wastewater is wastewater generated from commercial or industrial activities, such as restaurants, retail and wholesale stores, service stations, and office buildings. In this Plan, sewage from institutional customers, such as Sierra Pacific Industries and the Cascade Mall, is considered non-residential wastewater. Non-residential wastewater quantities are expressed in this Plan in terms of equivalent residential units (ERUs).

PEAK HOUR FLOW

Peak hour flow (PHF) is the highest hourly flow during a calendar year. The peak hour flow in western Washington usually occurs in response to a significant storm event preceded by prolonged periods of rainfall, which have previously developed a high groundwater table in the service area. Peak hour flow rates are used in sizing the hydraulic capacity of wastewater collection, treatment, and pumping components. Peak hour flow is typically determined from treatment plant flow records and projected future flow rates.

SANITARY WASTEWATER

Sanitary wastewater, also known as base flow, refers to the domestic and non-residential wastewater produced by the sewer customers not including any infiltration or inflow.

SUSPENDED SOLIDS

Suspended solids are the solid matter carried in the waste stream. The total suspended solids (TSS) concentration in a wastewater sample is determined by filtering a known volume of the sample, drying the filter paper, and measuring the increase in weight of the filter paper. TSS is expressed in the same terms as BOD; mg/L for concentration and lb/d for mass load. The amount of TSS in the wastewater is used in the sizing of treatment facilities and provides another measure of the treatment effectiveness. The concentration of TSS in wastewater affects the treatment plant biosolids production rate, treatment and storage requirements, and ultimate disposal requirements.

WASTEWATER

Wastewater is water-carried waste from residential, business, and institutional facilities, together with quantities of groundwater and surface water which enter the sewer system through defective piping and direct surface water inlets. The total wastewater flow is quantitatively expressed in millions of gallons per day (mgd).

EXISTING WASTEWATER FLOW AND LOADING RATES

Wastewater treatment plant (WWTP) records for the 5-year period from 2006 through 2010 were reviewed and analyzed to determine recent wastewater characteristics and influent loading rates. January 2009 records were also used in developing peak flow rates due to exceptionally high precipitation including snowmelt. Recent wastewater flow and loading rates were then used in conjunction with projected population, zoning classifications, and employment data to determine projected future wastewater flow and loading rates.

HISTORICAL WASTEWATER FLOW RATES

Table 5-1 summarizes the average WWTP flow rates for the 5-year period from January 2006 through December 2010, based on the City's DMRs. Appendix D provides the DMR data for this time period. The reported flow rate is measured on the influent and does not include in-plant recycle flow.

The maximum month WWTP flow rates for each year ranged from 1.73 mgd in 2010 to 2.29 mgd in 2009. The increase in estimated City population from 8,120 to 8,985 people over the period did not appear be responsible for the variations in the flow rates. In fact, the annual average flow has decreased over the past 2 years, which indicates that the ongoing program to reduce the amount of infiltration/inflow has been successful. Precipitation seemed to have a more direct effect on the variations in the peak flow rates.

In January 2006, the Puget Sound region experienced higher-than-average rainfall, which led to large volumes of infiltration and inflow at treatment facilities throughout the region. In January 2006, the monthly average wastewater flow at the Burlington WWTP was 2.01 mgd. In January 2009, heavy rainfall in the beginning of the month followed snowfall and accumulation of snow on the ground during the latter part of the previous month (December 2008). The resulting average monthly flow for January 2009 was 2.29 mgd, the highest on record. Including even the high flows in January 2009, the maximum month flow rates have consistently been well below the discharge permit limitation of 3.79 mgd.

TABLE 5-1

Burlington WWTP Historical Flow Rates

Year	Average Dry Weather Flow[(1)] (mgd)	Annual Average Flow (mgd)	Maximum Month Flow (mgd)	Maximum Day Flow (mgd)
2006	1.36	1.58	2.01	2.43
2007	1.42	1.60	1.94	2.58
2008	1.44	1.65	1.85	2.66
2009	1.20	1.52	2.29	2.88
2010	1.28	1.46	1.73	2.64
Average	**1.34**	**1.56**	**1.96**	**2.64**
Maximum	**1.44**	**1.65**	**2.29**	**2.88**

(1) July through October.

Figure 5-1 provides a graphical representation of wastewater flow rates measured at the City of Burlington WWTP from 2000 through 2006.

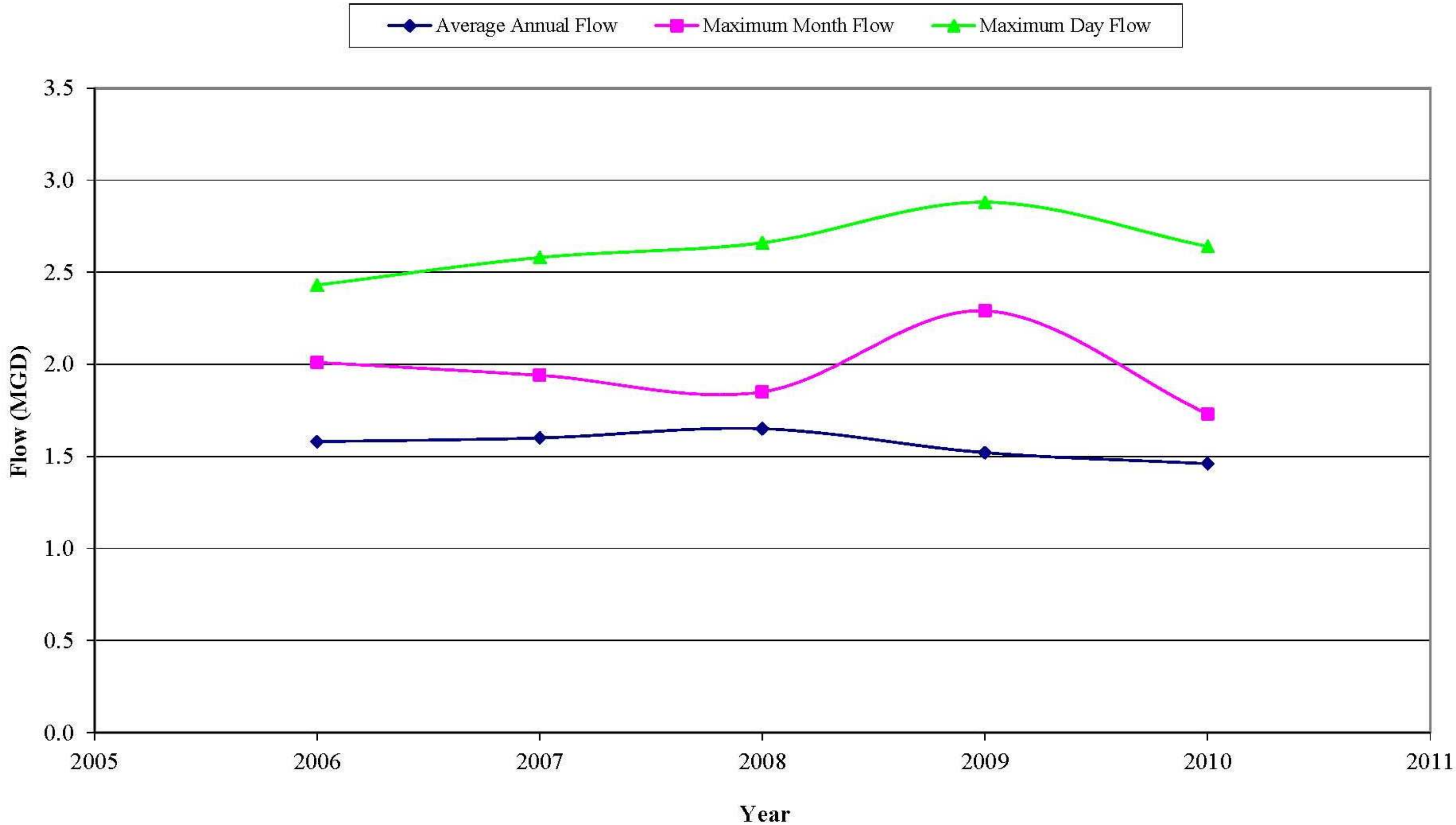


FIGURE 5-1

Burlington WWTP Historical Flow Rates Chart

Historical Flow Rates from the Samish Water District Pipeline

Table 5-2 summarizes the average Samish Water District pipeline flow rates for the period from January 2007 through May 2010, based on readings from a magnetic flow meter on the pipeline as it enters Pump Station 6.

TABLE 5-2

Samish Water District Pipeline Historical Flow Rates (January 2007 through May 2010)

Year	Average Dry Weather Flow[1] (gpd)	Annual Average Flow (gpd)	Maximum Month Flow (gpd)
2007	174,000	201,000	247,000
2008	146,000	187,000	236,000
2009	157,000	200,000	240,000
2010[2]	—	243,000	259,000
Average	**159,000**	**208,000**	**246,000**
Maximum	**174,000**	**243,000**	**259,000**

(1) July through October.
(2) January through May only.

Table 5-3 summarizes the average flow rates from the Skagit Valley Resort and Casino for the 4-year period from January 2007 through December 2010, based on flow meter readings at the Casino.

TABLE 5-3

Skagit Valley Resort and Casino Historical Flow Rates (January 2007 through December 2010)

Year	Average Dry Weather Flow[1] (gpd)	Annual Average Flow (gpd)	Maximum Month Flow (gpd)
2007	41,000	41,000	54,000
2008	35,000	32,000	38,000
2009	20,000[2]	26,000[2]	50,000
2010	47,000	50,000	61,000
Average	**36,000**	**37,000**	**51,000**
Maximum	**47,000**	**50,000**	**61,000**

(1) July through October.
(2) The flow meter was calibrated in October 2009. The flow meter readings were low between January and October 2009

Historical Flow Rates from the Western Service Area

Table 5-4 summarizes the average flow rates from the Western Service Area for the period from January 2008 through May 2010, based on flow meter readings at Pump Station 8.

TABLE 5-4

Western Service Area Historical Flow Rates (January 2007 through December 2010)

Year	Average Dry Weather Flow(1) (gpd)	Annual Average Flow (gpd)	Maximum Month Flow (gpd)
2008	171,000	245,000	348,000
2009	161,000	246,000	482,000
2010(2)	—	264,000	322,000
Average	**166,000**	**252,000**	**384,000**
Maximum	**171,000**	**264,000**	**482,000**

(1) July through October.
(2) January through May.

Septage Flow Rates

Septage from septic tanks in Skagit County, outside the City of Burlington sewer service area, is discharged for treatment at the wastewater treatment plant. Table 5-5 summarizes the average flow rates for septage discharge for the 4-year period from January 2007 through December 2010, based on flow meter readings at the septage receiving station at the wastewater treatment plant.

As can be seen from Table 5-5, the discharge of septage has decreased over the past few years, mostly due to the fact that the Town of LaConner has begun to accept septage at its wastewater treatment facility.

TABLE 5-5

Historical Flow Rates for Discharged Septage at the Burlington WWTP (January 2007 through December 2010)

Year	Average Dry Weather Flow(1) (gpd)	Annual Average Flow (gpd)	Maximum Month Flow (gpd)
2007	2,800	2,500	3,600
2008	2,100	2,000	2,400
2009	1,500	1,700	2,300
2010	1,500	1,300	1,700
Average	**2,000**	**1,900**	**2,500**
Maximum	**2,800**	**2,500**	**3,600**

(1) July through October.

City of Burlington Flow Rates

By subtracting all the wastewater contributors from the total wastewater flows (Table 5-1) the wastewater flows generated within the City of Burlington corporate limits can be determined, as shown in Table 5-6 for the 4-year period from January 2007 through December 2010 (where actual data was not available, average values were used).

TABLE 5-6

Historical Flow Rates for Wastewater Generated within the Burlington City Limits (January 2007 through December 2010)

Year	Average Dry Weather Flow(1) (mgd)	Annual Average Flow (mgd)	Maximum Month Flow (mgd)
2007	1.077	1.145	1.305
2008	1.121	1.216	1.264
2009	0.881	1.072	1.566
2010	0.954	0.952	1.151
Average	**1.008**	**1.096**	**1.322**
Maximum	**1.121**	**1.216**	**1.566**

(1) July through October.

HISTORICAL INFLUENT LOADING RATES

Historical Burlington WWTP Wastewater Loading Rates

The annual average and maximum month BOD_5 and TSS mass loading rates for 2006 through 2010 at the Burlington WWTP are listed in Table 5-7 and shown graphically on Figure 5-2. The influent wastewater is sampled in the channel downstream of the influent pump station. The sampled wastewater does not include the in-plant recycle flow.

TABLE 5-7

Burlington WWTP Historical Influent BOD_5 and TSS Loading Rates

Year	Annual Average BOD_5 Loading (lb/d)	Maximum Month BOD_5 Loading (lb/d)	Annual Average TSS Loading (lb/d)	Maximum Month TSS Loading (lb/d)
2006	3,608	4,242	3,838	4,598
2007	4,204	4,704	4,417	5,221
2008	4,014	5,831	4,335	5,366
2009	4,050	4,898	4,408	5,408
2010	3,829	4,535	3,487	4,321
Average	**3,941**	**4,842**	**4,097**	**4,983**
Maximum	**4,204**	**5,831**	**4,417**	**5,408**

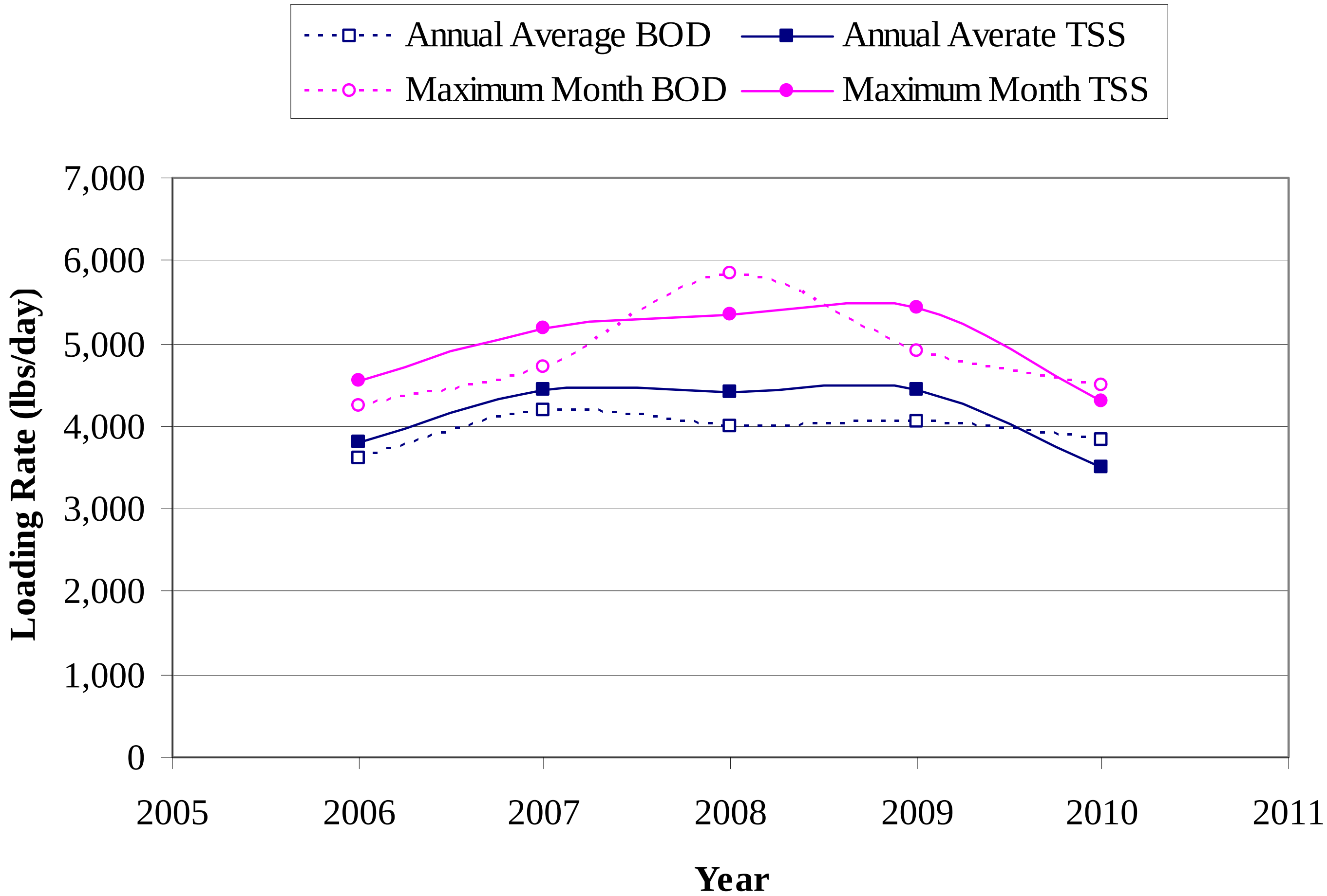


FIGURE 5-2

Burlington WWTP Influent BOD_5 and TSS Loading Rates Chart

Historical Wastewater Loading Rates from the Samish Water District Pipeline

Table 5-8 summarizes the wastewater loading rates from the Samish Water District pipeline from January 2008 through May 2010, based on analysis of samples from an automatic sampler located in Pump Station 6.

TABLE 5-8

Samish Water District Pipeline Historical Loading Rates (January 2007 through May 2010)

Year	Annual Average BOD_5 Loading (lb/d)	Maximum Month BOD_5 Loading (lb/d)	Annual Average TSS Loading (lb/d)	Maximum Month TSS Loading (lb/d)
2008	172	238	150	207
2009	216	387	166	277
2010	253	340	176	234
Average	**214**	**322**	**164**	**239**
Maximum	**253**	**387**	**176**	**277**

Table 5-9 summarizes the wastewater loading rates from the Skagit Valley Resort and Casino for the 4-year period from January 2008 through December 2010, based on flow meter readings at the Casino.

TABLE 5-9

Skagit Valley Resort and Casino Historical Loading Rates (January 2008 through December 2010)

Year	Annual Average BOD_5 Loading (lb/d)	Maximum Month BOD_5 Loading (lb/d)	Annual Average TSS Loading (lb/d)	Maximum Month TSS Loading (lb/d)
2008	128	163	107	166
2009	120	260	75	139
2010	232	289	151	182
Average	**160**	**237**	**111**	**162**
Maximum	**232**	**289**	**151**	**182**

Septage Loading Rates

During June and July of 2011, four samples from the septage discharged at the Burlington wastewater treatment plant were analyzed for BOD_5 and TSS. The average

BOD_5 was determined to be 5,900 mg/L, while the maximum BOD_5 was determined to be 6,850 mg/L. The average and maximum TSS were 29,500 mg/L and 44,300 mg/L, respectively.

Table 5-10 summarizes the average loading rates for septage discharge for the 4-year period from January 2007 through December 2010, assuming above analytical results indicate annual average and maximum month values.

TABLE 5-10

Historical Loading Rates for Septage Discharged at the Burlington WWTP (January 2007 through December 2010)

Year	Annual Average BOD_5 Loading (lb/d)	Maximum Month BOD_5 Loading (lb/d)	Annual Average TSS Loading (lb/d)	Maximum Month TSS Loading (lb/d)
2007	123	206	615	1,330
2008	98	137	492	887
2009	84	131	418	850
2010	64	97	320	628
Average	**92**	**143**	**461**	**924**
Maximum	**123**	**206**	**615**	**1,330**

Historical Loading Rates from the Western Service Area

Historical loading rates from the Western Service Area have been estimated by subtracting the loading rates from the Samish Water District and discharge of septage and distributing the remaining loadings based on flows from the Western Service Area and the City of Burlington (based on WWTP flow records less the Samish Water District Pipeline, septage discharge, and the Western Service Area). This procedure assumes that the strength of the wastewater from the Western Service Area is similar to the strength of the wastewater treatment plant influent. This has been substantiated by five samples taken from the influent at Pump Station 8 during June and July 2011. Table 5-11 summarizes the average loading rates estimated to be generated in the Western Service Area for the 4-year period from January 2007 through December 2010.

TABLE 5-11

**Historical Loading Rates for the Western Service Area
(January 2007 through December 2010)**

Year	Annual Average BOD_5 Loading (lb/d)	Maximum Month BOD_5 Loading (lb/d)	Annual Average TSS Loading (lb/d)	Maximum Month TSS Loading (lb/d)
2007	685	962	673	872
2008	630	1,186	632	1,006
2009	702	1,039	725	1,096
2010	742	902	660	816
Average	**690**	**1,022**	**673**	**948**
Maximum	**742**	**1,186**	**725**	**1,096**

City of Burlington Loading Rates

By subtracting all the wastewater contributors from the total wastewater loadings (Table 5-7), the wastewater loadings generated within the City of Burlington corporate limits can be determined, as shown in Table 5-12 for the 4-year period from January 2007 through December 2010 (where actual data was not available, average values were used).

TABLE 5-12

**Historical Loading Rates Generated Within the Burlington Corporate Limits
(January 2007 through December 2010)**

Year	Annual Average BOD_5 Loading (lb/d)	Maximum Month BOD_5 Loading (lb/d)	Annual Average TSS Loading (lb/d)	Maximum Month TSS Loading (lb/d)
2007	3,182	3,214	2,965	3,360
2008	3,114	4,270	3,061	3,266
2009	3,048	3,340	3,099	3,185
2010	2,770	3,196	2,268	2,643
Average	**3,029**	**3,505**	**2,848**	**3,114**
Maximum	**3,182**	**4,270**	**3,099**	**3,360**

Discussion of Wastewater Loading Rate Trends

Table 5-7 and Figure 5-2 show that the BOD_5 and TSS loading rates to the WWTP appeared to have peaked in 2008 and have subsequently declined. In fact, the loading rates for 2010 were substantially lower than those for the previous 3 years. The maximum allowable loading rates in the NPDES permit (7,356 lb/d BOD_5 and 7,660 lb/d TSS) have not been exceeded. Table 5-13 shows the WWTP per capita BOD_5 and TSS loading generated by the population within the Burlington City limits, as determined from Burlington population data and Table 5-12.

TABLE 5-13

City per Capita BOD_5 and TSS Loading Rates

Year	Estimated Sewered Population	Per Capita Annual Average BOD_5 Loading (lb/cap/d)	Per Capita Annual Average TSS Loading (lb/cap/d)
2007	8,400	0.38	0.35
2008	8,460	0.37	0.36
2009	8,870	0.34	0.35
2010	8,388	0.33	0.27

The per capita values for BOD_5 and TSS shown in Table 5-13 are considerably higher than typical values for communities shown in the literature (0.2 to 0.25 lb/cap/d for both BOD_5 and TSS). This is most probably due to the large numbers of retail centers and restaurants located in the City. These types of establishments usually have high-strength wastewater and would serve a population that extends far beyond the Burlington corporate limits.

The fact that the per capita loading rates have decreased in the past couple of years is the result of an aggressive industrial pretreatment program that has been implemented by the City of Burlington in recent years. This pretreatment program includes requirements for installation and maintenance of grease traps for restaurants and other industrial or commercial establishments that may discharge fats, oils, and grease (FOG) to the sanitary sewer system. Excess FOG could clog up sewer lines and increase the organic load to the wastewater treatment plant. The City's FOG control program has successfully reduced the organic and solids load to the wastewater treatment plant.

In order to be conservative in the projection of future waste loads, the average of 2009 and 2010 per capita loads will be used. It is recommended that the City's industrial waste pretreatment program, including the FOG control program continue as it has during the past few years to ensure that the per capita waste loads are maintained at the lower levels.

The Western Service Area is expected to generate wastewater with characteristics similar to the City itself. The BOD_5 and TSS concentrations resulting from using the per capita loadings discussed above for the wastewater generated within the City of Burlington will be used to determine the loadings from the Western Service Area.

The Samish Water District is presently under contract with the City of Burlington to discharge an annual average flow of 250,000 gpd to Pump Station 6. The Skagit Valley Resort and Casino, which has historically discharged an annual average flow up to 60,000 gpd through the same pipeline, has commissioned the construction of its own wastewater treatment facility and will not be discharging to Burlington in the future. The Casino has, however, requested that the City of Burlington maintain a standby capacity of an average annual flow of 60,000 gpd in case of emergencies. They will pay a monthly charge for the maintenance of this capacity.

The terms of the contract with the Samish Water District are not expected to change over the next 20 years. The future annual average flows from the Samish Water District will be 250,000 gpd and the loading rates will be calculated from existing data, without the Skagit Valley Resort and Casino. Future peak month conditions will include the Skagit Valley Resort and Casino, with appropriate peak month/annual average peaking factors applied, and loads based on concentrations currently seen.

The discharge of septage to the wastewater treatment plant is expected to increase in the future, to above the levels seen in 2008. Skagit County has recently passed an ordinance requiring homeowners with septic tanks to have tanks pumped out every 3 years. This should greatly increase the amount of septage that has to be treated in Skagit County. This increase cannot be predicted at this time, but for the purpose of this Plan, it is assumed that the amount of septage to be discharged to the Burlington wastewater treatment facility will be double the 2008 level over the next 20 years.

EXISTING EQUIVALENT RESIDENTIAL UNITS

CALCULATION OF EXISTING WASTEWATER ERUS

Equivalent residential units (ERUs) are used to express the amount of water or sewer use by non-residential customers as an equivalent number of residential customers. The *water consumption* ERU value is calculated by dividing the total volume of water utilized by single-family residences (SFRs) by the total number of active single-family residential connections.

The *wastewater* ERU value is calculated based on winter water use and an estimate of how much of that water enters the sewer system. Winter water use is used to estimate the sanitary wastewater flow rate, exclusive of infiltration and inflow, because the amount of winter water consumption typically is nearly equal to sanitary wastewater flow, except for a minor amount of water that does not enter the sewer system (such as winter irrigation flow). Summer water consumption is not used because it may include irrigation water that does not enter the sewer.

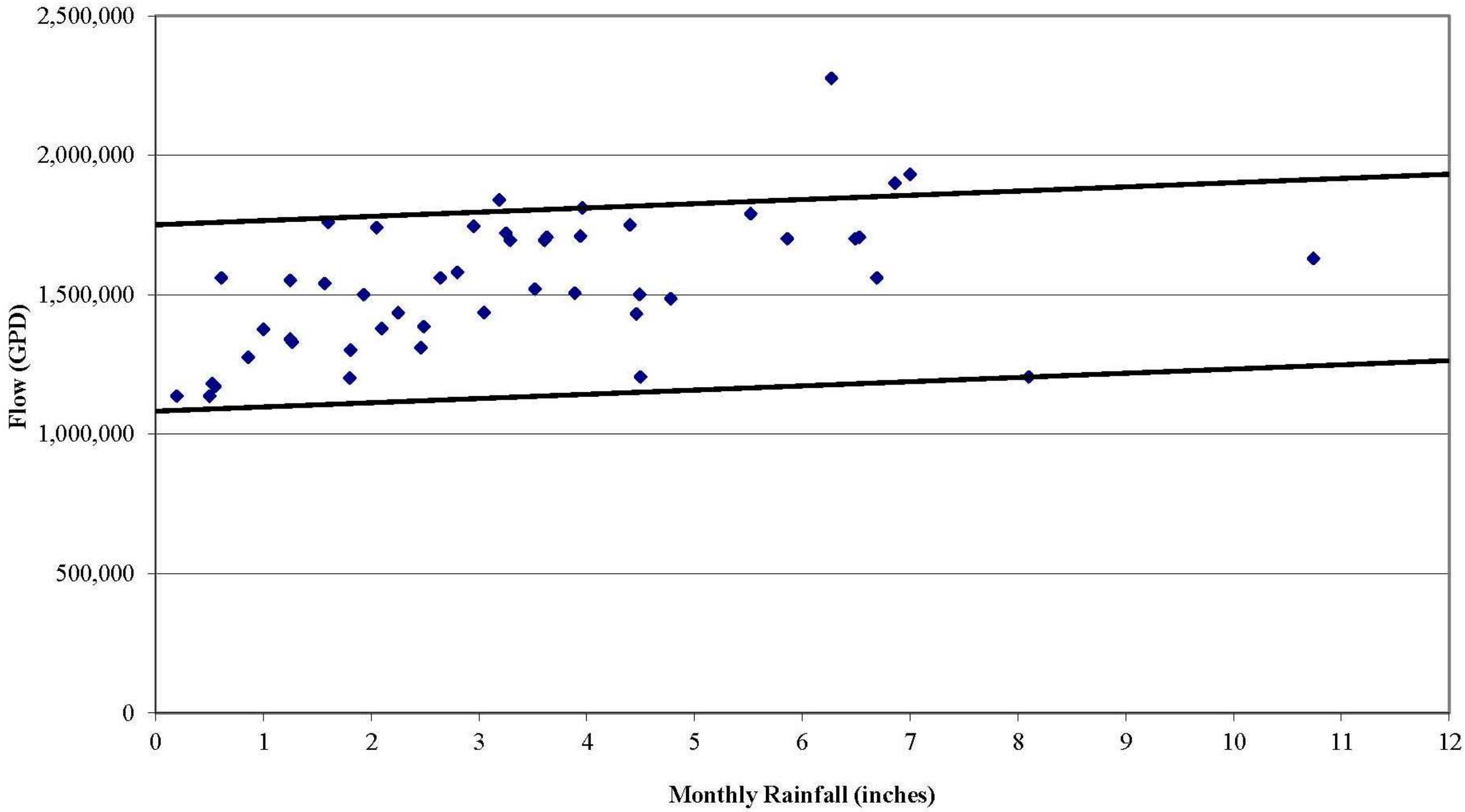


FIGURE 5-3

Variation of Influent Flow with Monthly Rainfall

The water system serving the City of Burlington and the surrounding area is operated by Skagit County PUD. The City receives water use records from Skagit County PUD for wastewater billing. Wastewater billing records were available for the sewered customers both inside the City as well as outside of the City in the Western Service Area. To determine the number of single-family residences with sewer service and their corresponding winter wastewater flows, the City's sewer billing records were reviewed. Table 5-14 summarizes the City's wastewater ERU value based on winter wastewater use for 2010.

As shown in Table 5-14, the average daily single-family residential winter wastewater flow (which is equivalent to one ERU) is 138 gallons per day for the City and 140 gallons per day for the service area outside of the City. For purposes of projecting future demands, the average City single-family winter wastewater flow ERU value of 138.5 gallons per day is used. This assumes all water enters the sewer system and is consistent with City billing.

TABLE 5-14

2010 Residential Wastewater Flows

Category	No. of Units	Flow (gpd)	Flow/Unit (gpd)
Inside City			
R-1 (Single-Family Residential)	1,726	239,029	138.5
R-2 (Two-Family Residential)	72	8,962	124
R-3 (Multifamily Residential)	1,016	118,866	117
Outside City			
R-1 (Single-Family Residential)	625	87,208	140
R-2 (Two-Family Residential)	2	201	100
R-3 (Multifamily Residential)	57	5,017	88

EXISTING NUMBER OF EQUIVALENT RESIDENTIAL UNITS

The existing number of ERUs discharging to the City of Burlington sewer system has been estimated for residential and commercial customer classes. Non-residential ERUs have been estimated based on winter wastewater flow records, flow meter records, and the wastewater ERUs.

Residential ERUs

The number of existing residential ERUs was determined by summarizing the City's wastewater billing records. This method includes multifamily as well as single-family connections. The records indicate 2,814 residential connections for 2,649 ERUs in the City and 684 residential connections for 667 ERUs in the Western Service Area for a total of 3,316 ERUs. The City's 2010 population was estimated at 8,985 people. The population of the Western Service Area is not known. Dividing the City's population by the number of ERUs in the City gives an average household size of 3.36 residents per ERU. Dividing the City's total residential wastewater flow of 366,857 gallons per day by the City's population provides an estimated wastewater flow of 40.8 gallons per person per day. The residential ERU information is summarized in Table 5-15.

TABLE 5-15

2010 Residential ERUs

Customer	ERUs	Flow (gpd)	Population	Flow/Person (gpd)
Residential – Inside City	2,649	366,857	8,985	40.8
Residential – Outside City	667	92,426	N/A	N/A
Total	**3,316**	**459,283**	**N/A**	**N/A**

Commercial ERUs

The commercial customer class includes commercial, mixed-use, industrial, and institutional connections, such as schools and government buildings. The wastewater billing records indicate a commercial flow of 231,243 gallons per day in the City and 11,161 gallons per day outside of the City. In addition to wastewater billing records, some of the larger customers are billed based on flow meter use records. The quantity of commercial ERUs was developed by dividing the average commercial winter wastewater flows by the average residential winter wastewater flow ERU value of 138.5 gallons per day. The commercial ERU information is summarized in Table 5-16.

TABLE 5-16

2010 Commercial ERUs

Customer	Flow (gpd)	ERUs
Commercial – Inside City	231,243	1,670
Commercial – Outside City	11,161	81
Samish Water District (1)	157,256	1,136
Skagit County Recovery Facility	6,352	46
PACCAR	4,090	30
Puget Sound Energy	746	5
Septic Tanks (1)	3,300	24
Seafood	6,929	50
Sierra Pacific	7,680	55
Total	**428,757**	**3,097**

(1) The flows from the Samish Water District and septic tanks contain sewage from both residential and commercial sources. These flows are included in the commercial flows.

Summary of Existing Wastewater ERUs

Table 5-17 summarizes the 2010 wastewater ERUs and ERU ratios for each customer class.

TABLE 5-17

Summary of 2010 ERUs for Each Customer Class

Customer	Flow (gpd)	No. of ERUs	% Total ERUs
Residential	459,283	3,316	51.7%
Commercial	428,757	3,096	48.3%
Total	**888,040**	**6,412**	**100%**

INFILTRATION AND INFLOW

In addition to domestic and industrial flows, sewer systems can carry water from a variety of other sources. During periods of precipitation, increased groundwater levels and surface water flows can contribute significant quantities of water to sanitary sewer systems. This additional flow is termed infiltration and inflow (I/I).

Infiltration refers to groundwater entering a sewer system by means of defective pipes, pipe joints, or manhole walls. High infiltration flows occur when the groundwater levels rise due to significant storm events, prolonged periods of precipitation, or high tides in marine shoreline areas. Infiltration is not associated with any particular water use; it is related not only to groundwater levels, but also to collection system size, condition, and materials. Infiltration is frequently expressed either as gallons per acre served per day (gpad) or as gallons per diameter inch-mile of pipe (gpim).

Inflow refers to surface water entering the sewer system from such sources as yard, roof, and footing drains, cross connections with storm drains, and leaking manhole covers. Peak inflow occurs during heavy storm events when increased flows cause hydraulic backups and local ponding. Particularly high inflow periods may occur when mild weather and heavy rainfall follow a period of heavy snowfall. Inflow is usually expressed in terms of gpad.

There are several ways both to express flows due to I/I and to determine whether this flow is excessive. The primary criteria used to determine whether I/I flows are excessive are established by the EPA. According to the EPA, I/I can be demonstrated to be excessive if the average wet weather domestic flow is less than 120 gpcd and the peak domestic flow during a storm event is less than 275 gpcd.

To determine whether I/I exceeds accepted standards, the population served by the sanitary sewer system must first be established. Although information is available regarding the number and distribution of system hookups, the exact number of persons served by the system is not known. For purposes of this analysis, the City's 2010 population of 8,388 has been used.

The monthly average influent flows to the Burlington wastewater treatment plant have been plotted against monthly precipitation for the period from January 2007 through December 2009. This plot is shown on Figure 5-3. As can be seen, all the individual data points (except one, for January 2009) on the plot fall between two parallel lines. The lower line represents the periods with no or negligible infiltration, while the upper line represents maximum infiltration. Where the upper line intersects the y-axis, representing no precipitation, will indicate the flow to the wastewater treatment plant containing the maximum amount of infiltration and negligible inflow. The flow to the Burlington wastewater treatment plant, based on records from January 2007 through December 2009, is 1,750,000 gpd.

A similar analysis was made on the flow meter records from the Samish Water District pipeline to Pump Station 6 and the flow meter records from Pump Station 8, representing the flow from the Western Service Area. The wastewater flows containing the highest amount of infiltration with negligible amounts of inflow from these sources are 231,000 gpd from the Samish Water District pipeline and 280,000 gpd from the Western Service Area. Subtracting these two sources from the total wastewater flow to the wastewater treatment plant yields a wastewater flow of 1,239,000 gpd originating within the city limits. The 2010 commercial flow within the Burlington corporate limits is 231,000 gpd, as shown in Table 5-16. Subtracting this flow from the wastewater flow generated from within the city limits gives a residential flow of 1,008,000 gpd, including maximum infiltration with negligible inflow. This flow represents a per capita flow of 120 gpcd, which is below the EPA criterion of 125 gpcd. The City of Burlington, therefore, does not have excessive infiltration in accordance with EPA definitions. A similar analysis presented in the City of Burlington Wastewater Facilities Plan (Gray & Osborne, Inc., July 1997) concluded that the average per capita wet weather domestic flow to the Burlington wastewater treatment plant was 128 gpcd. This reduction in the per capita wet weather flow indicates that the City of Burlington infiltration reduction program has been successful.

The highest daily flow recorded at the Burlington wastewater treatment plant occurred on January 8, 2009, and was 2.882 mgd. This flow was the result of heavy rainfall for 2 days preceded by a period of heavy snowfall and low temperatures. Thus, inflow to the sewer system would be caused by both rainfall and snowmelt. These conditions will be used to establish the flows occurring during a storm event. On January 8, 2009, the flow entering the sewer system from the pipeline from the Samish Water District was 426,000 gallons per day. The flow received from the Western Service Area through Pump Station 8 on this day was 863,000 gallons per day. Subtracting these two external wastewater sources as well as the commercial contribution of 231,000 gpd from the peak day wastewater flow of 2.882 mgd yields a residential flow of 1.362 mgd that is generated within the City of Burlington. This corresponds to a per capita flow of 162 gpcd for a population of 8,388, which is below the EPA criterion of 275 gpcd for domestic flow occurring during a storm event. The City of Burlington, therefore, does not have excessive inflow in accordance with EPA definitions. A similar analysis presented in the City of Burlington Wastewater Facilities Plan (Gray & Osborne, Inc., July 1997) concluded that the average per capita domestic flow to the Burlington wastewater treatment plant during a storm event was 203 gpcd. Although the City of Burlington has not had an active program to reduce existing inflow to the sewer system, the City's Sewer Use Ordinance prohibits property owners from connecting inflow sources, such as roof, footing, and area drains, to the sanitary sewer system. The apparent reduction of inflow since 1997 shows that the City has been successful in enforcing this ordinance for new sewer extensions and connections.

Table 5-18 shows a breakdown of the base sewage flow, infiltration, and inflow from the various existing drainage basins in the City of Burlington service area. The various flow components were estimated using the same procedure as for the overall wastewater treatment plant flow shown on Figure 5-3, by plotting the flows from the various drainage areas against the monthly precipitation. The flows from the Samish Water District pipeline, Pump Station 8, Port 1, Port 2, and the wastewater treatment plant are based on actual flow meter readings. The flows from the rest of the pump stations are based on pump drawdown tests and run time meter readings. Caution should be exercised in literal interpretation of the data presented in Table 5-18, as several inaccuracies may be inherent in the data. However, the information presented will indicate areas within the City's service area that may experience high infiltration/inflow which should be targeted for further investigation.

TABLE 5-18

Infiltration/Inflow from the Various Drainage Basins

Drainage Basin	Peak Day Flow (gpd)	Base Flow (gpd)	Infiltration (gpd)	Inflow (gpd)	Basin Area [(1)] (acres)	Infiltration (gpad)	Inflow (gpad)
Pump Station 1	293,000	83,000	54,000	156,000	52.05	1,037	2,997
Pump Station 2	208,000	14,700	53,000	140,300	370.14	143	379
Pump Station 3	799,000	168,000	122,000	509,000	559.64	218	910
Pump Station 4	188,000	30,000	97,000	61,000	134.51	721	453
Pump Station 5	1,357,000	267,000	225,000	518,000	936.93	240	553
Pump Station 6	310,000	163,000	96,000	226,000	N/A[(2)]	N/A[(2)]	N/A[(2)]
Samish Water District Pipeline	426,000	103,000	129,000	197,000	N/A[(2)]	N/A[(2)]	N/A[(2)]
Pump Station 7	201,000	49,000	21,000	131,000	101.48	207	1,291
Pump Station 8	1,976,000	112,000	174,000	1,690,000	1,623.43	107	1,041
Pump Station 9	98,000	22,000	23,000	53,000	130	178	408
Pump Station 10	288,000	27,000	81,000	180,000	359	226	501
Pump Station 11	435,000	223,000	116,000	96,000	775.46	150	124
Pump Station 13	45,000	19,000	6,000	20,000	240.22	25	83
Pump Station 14	79,000	5,000	31,000	43,000	198.61	156	217
Pump Station 15	88,200	3,300	9,500	75,600	149.67	63	583
Pump Station 16	41,000	1,700	22.070	17,230	100	220	172
Pump Station 18	32,800	11,300	9,100	12,400	33.27	274	373
Pump Station 19	1,410	6	630	774	26	24	30
Pump Station 20	915	0	290	625	101	3	6
Port 1	137,000	12,500	65,000	59,500	156	417	381
Port 2	19,900	1,500	6,300	12,200	30	210	407
Wastewater Treatment Plant	2,882,000	1,080,000	650,000	1,152,000	4,060.54[(3)]	128[(4)]	243[(4)]

(1) Drainage basin area includes only the existing developed areas.
(2) The drainage basin for the Samish Water District pipeline service area is unknown.
(3) Excludes area served by the Samish Water District pipeline.
(4) Excludes flows from the Samish Water District pipeline.

One area of interest is the Pump Station 1 drainage area, which appears to be subject to both high infiltration and inflow. Several projects designed to reduce infiltration have been undertaken in this area and several more projects have been designed and are scheduled for construction over the next several years. Inflow, however, has not been addressed. It is recommended that smoke testing be performed in the Pump Station 1 drainage area in order to identify sources of inflow and possible remediation. I/I should be reassessed when the infiltration reduction process has been completed.

Another area of interest is the old downtown area served by gravity by Pump Stations 3, 4, and 5, and to a lesser degree, Pump Station 2 (this can partially be concluded by subtracting the flows to Pump Station 2 from the flows to Pump Station 3 and 5, and subtracting the flows to Pump Station 14 from the flows to Pump Station 2). Again, several projects designed to reduce infiltration have been undertaken in this area and several more projects have been designed and are scheduled for construction over the next several years. It is recommended that smoke testing be performed in the old downtown area in order to identify sources of inflow and possible remediation. I/I should be reassessed when the infiltration reduction process has been completed.

A third area of interest is the Pump Station 7 drainage area, which appears to be subject to high inflow. The Pump Station 18 drainage area, being a part of the Pump Station 7 drainage area, does not appear to contribute significantly to this problem. Smoke testing of the Pump Station 7 drainage area, with the Pump Station 18 drainage area being of a lower priority, is recommended.

A fourth area if interest is the Bayview Ridge residential area which flows by gravity to Pump Station 8. The flows from this area can be estimated by subtracting the flows for Pump Stations 9 and 10 from the flows for Pump Station 8. One interesting aspect of the flows from Pump Station 8 is that, as the peak day flow at the wastewater treatment plant occurred on January 8, 2009, the peak flow from Pump Station 8 occurred on January 10, 2009. The flow from Pump Station 8 was 863,000 gpd on January 8 and 1,976,000 gpd on January 10, 2009, a 229 percent increase over flows of January 8, 2009. These increases were not observed at Pump Stations 9 and 10, which indicate the increased flows are originating in the Bayview Ridge residential area. The City of Burlington has recently cleaned and TV inspected the sewers in this area and no significant sources of infiltration were found. The fact that the flow increases appear to be delayed indicate that they are associated with increased groundwater table elevation and could be originating from footing drains and sump pumps. Some direct connections of roof drains to the sewer system could also be the cause of some of the flow increase. The City of Burlington made a similar analysis as a result of heavy rainfall during the period from December 8 through 14, 2010, and also made the conclusion that a significant amount of inflow originated in the Bayview Ridge residential area. However, during this period, the daily influent flow to the wastewater treatment plant peaked at 2,638,000 gpd on December 13, 2010, while the daily flow to Pump Station 8 peaked at 640,000 gpd on December 14, 2010.

Another recent period when heavy snowfall was followed by warmer temperatures and high rainfall occurred at the end of February/beginning of March in 2011. During this period, the wastewater treatment plant peaked at 2,383,000 gpd on March 1, 2011, while the daily flow to Pump Station 8 peaked at 526,000 gpd, also on March 1, 2011.

Based on the information presented in Table 5-18, which is based on the conditions during January 2009, it appears that 5,000 gpad or higher inflow may be generated in the Bayview Ridge residential area, which would make this area the top priority for smoke testing for identification and remediation of inflow sources. The conditions observed during December 2010 indicate an inflow of about 1,200 gpad, which is still relatively high.

The Pump Station 15 drainage area appears to be subject to moderate inflow and should be smoke tested. Also, the sewers serving the Port of Skagit County, as measured by flow meters (Port 1 and Port 2) appear to be subject to moderate infiltration and inflow.

In summary, the City of Burlington's infiltration reduction program appears to be working well. The City is currently been spending about $150,000 per year on sewer cleaning and TV inspection and sewer line rehabilitation or replacement. In addition, the City is implementing several specific projects designed to upgrade sewer lines and reduce infiltration/inflow. It is recommended that this program will continue for several years. In addition, it is recommended that an additional $50,000 per year be included in the Capital Improvement Plan for inflow control, including smoke testing, wet weather flow monitoring, and physical improvements, including enforcement of the Sewer Use Ordinance. Continued removal of infiltration/inflow will result in additional capacity available in the existing lines and treatment plant for growth.

The following would be the recommended priorities for smoke testing and inflow reduction:

1. Bayview Ridge residential area
2. Pump Station 1 drainage area
3. Pump Station 7 drainage area, except the Pump Station 18 drainage area
4. Old downtown area
5. Pump Station 15 drainage area
6. Port of Skagit County (infiltration reduction)
7. Remainder of the system

PROJECTED WASTEWATER FLOW RATES

Per the 2005 *City Comprehensive Plan*, the City of Burlington has a substantial amount of land that has the potential for new development and redevelopment. In particular, the City contains large acreages of underutilized and vacant commercial and industrial land. The Comprehensive Plan develops strategies for infill of the City that includes the flexibility in development regulations to encourage a variety of uses and businesses to locate in Burlington. In addition, the Western Service Area located in Skagit County includes large areas of vacant and underdeveloped land. The Bayview Ridge area includes large areas of residential and commercial land. The development of the Bayview Ridge area is summarized in the 2008 *Bayview Ridge Subarea Plan*. Lastly, the Western Service Area also includes the Port of Skagit County, which contains large areas of commercial and industrial land that are currently vacant or underdeveloped.

FLOW COMPONENTS

Residential Projections

The City's land use zoning classifications include a minimum lot size per dwelling unit as shown in Table 5-19 below. Flow projections are based on the full development of the residential areas to the densities shown. For purposes of projecting future wastewater demands, the average City single-family winter wastewater flow ERU value of 138 gallons per day is used. The 2008 *Bayview Ridge Subarea Plan* develops a minimum density of four units per acre, with the potential for development of up to six units per acre with contributions to the Farmland Legacy Program. We assumed that all the Bayview Ridge residential areas would be developed at six units per acre which is equivalent to 7,260 square feet per unit. In addition, we assumed that other County zoning designations including the City and Urban Reserve Residential would also be developed at the 7,600 square feet per unit density, as shown in Table 5-19.

TABLE 5-19

Residential Land Development Projections

Land Use	Land Use Category	City/County Zoning	Density (ft^2/unit)
R-1-6.0	Single-Family Residential	City	6,000
R-1-7.6	Single-Family Residential	City	7,600
R-1-8.4	Single-Family Residential	City	8,400
R-1-9.6	Single-Family Residential	City	9,600
R-2	Two-Family Residential	City	3,800
R-3	Multifamily Residential	City	3,000
BR-R	Bayview Ridge Residential	County	7,260
BR-URv	Bayview Ridge Urban Reserve	County	7,260
CITY	City	County	7,600
URR	Urban Reserve Residential	County	7,600

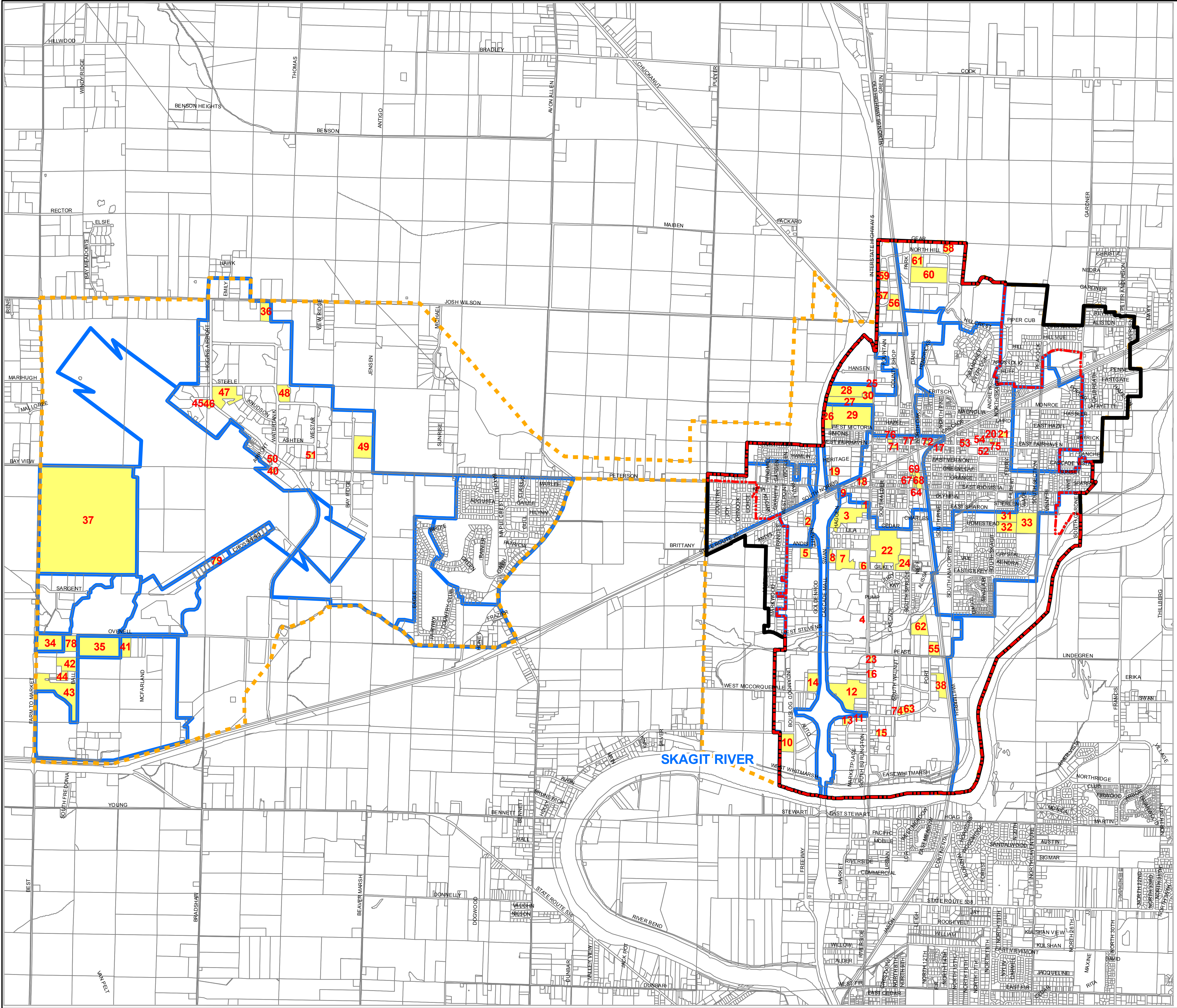
Commercial Projections

Commercial and industrial wastewater flows are typically based on the land area and expressed as the flow unit gallons per acre per day (gpad). For non-residential zoned areas, the previous Comprehensive Plan used an estimated wastewater flow of 1,200 gpad for commercial flows and industrial flows in the eastern portion of the service area, and 500 gpad for industrial flows in the western portion of the service area. However, there are nine non-residential land use zoning classifications within the City of Burlington and an additional 10 non-residential land use zoning classifications within the County service area. To develop more accurate wastewater flows for each of the non-residential land use zoning classifications, we looked at the City's billing records. We attempted to identify existing high water users within each non-residential zoning classification. Where enough records were available, we found the billing records and parcel size for each of these users and calculated an average flow in gpad. The businesses that we used to calculate the flows can be seen on Figure 5-4. The calculated averages were rounded up to the design flow that will be used to calculate commercial and industrial flow projections as seen in Table 5-20. For some of the land use zoning classifications, there were not enough billing records available, so we estimated the design flow based on the 1997 Wastewater Facilities Plan and the flows that were calculated from similar land use zoning classifications.

TABLE 5-20

Non-Residential Wastewater Flow Projections

Land Use	Land Use Category	City/County Zoning	Calculated Avg. Flow (gpad)	Design Flow (gpad)
R-S	Semi-Public District	City	4,585	4,600
M-1	Industrial District	City	1,100	1,100
B-P	Business Park District	City	114	500
C-1	Commercial District	City	1,057	1,100
C-2	Heavy Commercial	City	595	600
B-1	Business District	City	1,553	1,600
MR-NB	Medium Residential & Neighborhood Business	City	N/A	600
OSPA	Open Space, Parks & Agriculture	City	N/A	0
ROW	Right-of-Way	City	N/A	0
AVR	Aviation Related	County	N/A	0
Ag-NRL	Agricultural – Natural Resource Lands	County	N/A	0
BR-CC	Bayview Ridge Community Center	County	N/A	600
BR-HI	Bayview Ridge Heavy Industrial	County	445	500
BR-LI	Bayview Ridge Light Industrial	County	54	500
NRI	Natural Resource Industrial	County	N/A	600
RB	Rural Business	County	N/A	1,200
RI	Rural Intermediate	County	N/A	600
RRv	Rural Reserve	County	321	500
URC-I	Urban Reserve Commercial-Industrial	County	N/A	600



N

0 1,500 3,000 6,000 Feet

LEGEND:

- CITY LIMITS
- UGA
- SERVICE AREA BOUNDARY
- PARCELS
- DRAINAGE BASINS
- LOT USED FOR ZONING CLASSIFICATION SEWER USAGE CALCULATION

DATA SOURCES:
CITY OF BURLINGTON

CITY OF BURLINGTON

SEWER COMPREHENSIVE PLAN
FIGURE 5-4
AVERAGE WASTEWATER FLOW PARCELS

Gray & Osborne, Inc.
CONSULTING ENGINEERS

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PROJECTED WASTEWATER FLOWS FOR BUILDOUT CONDITIONS

The projected wastewater flow rates developed in this Plan for buildout conditions are based on the full utilization of all the land in the City's wastewater service area. The residential flows are based on full development of residential areas based on the maximum number of lots per acre per the City or County land use zoning. For purposes of projecting future single-family wastewater demands, the average City single-family winter wastewater flow ERU value of 138.5 gallons per day is used. For two-family and multifamily residences, the flow value of 124 gallons per day and 117 gallons per day per unit, respectively, were used. In addition, all commercial and industrial wastewater flows will be based on full development of all the available land based on the City or County land use zoning. The design flows in gpad as calculated or assumed in the previous section will be used for projecting future commercial wastewater flows. The projected flow rates for full utilization to the maximum densities of all the areas within the City's service area can be seen in Table 5-21.

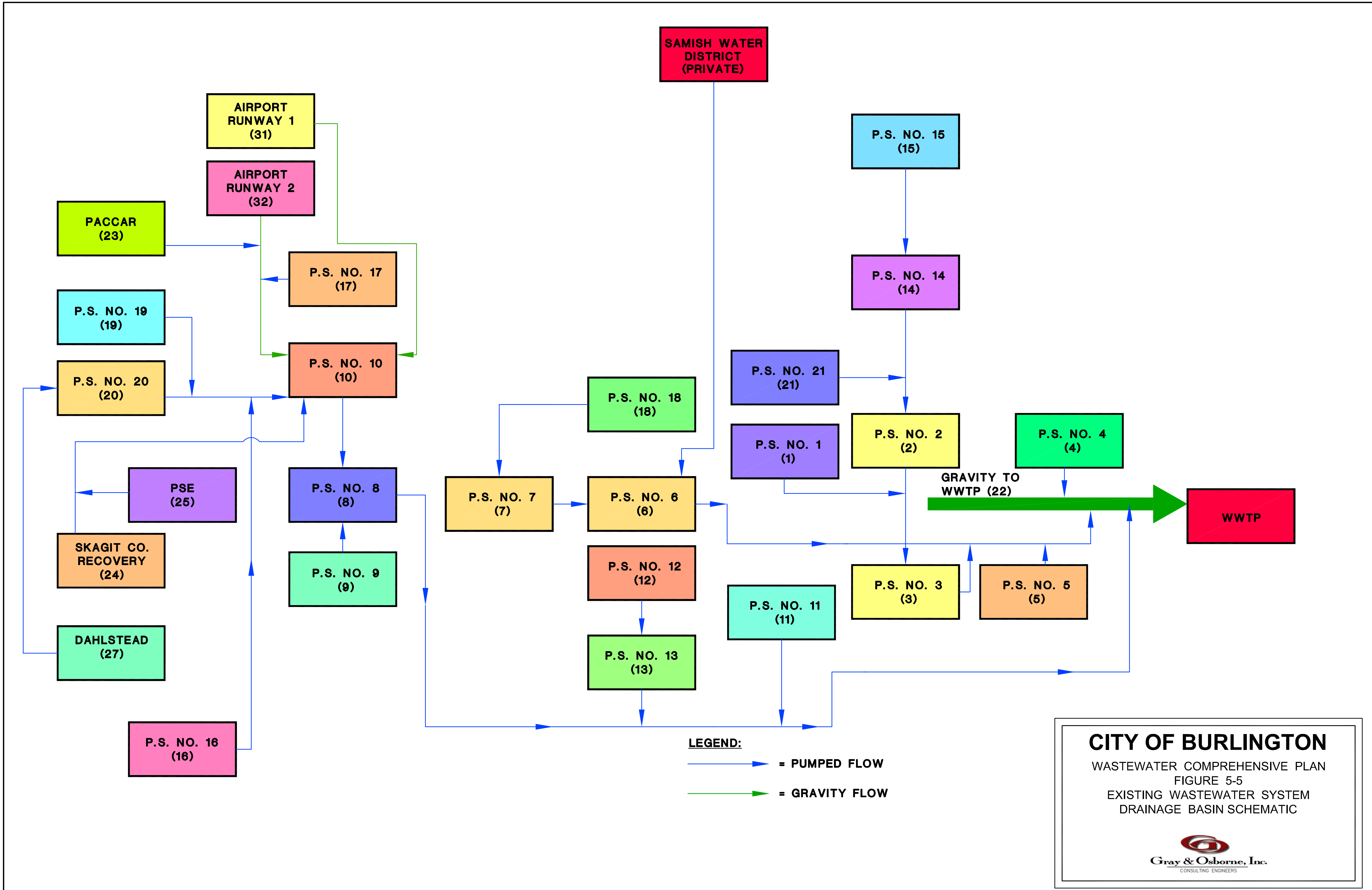
TABLE 5-21

City of Burlington Full Utilization Flow Rate Projections

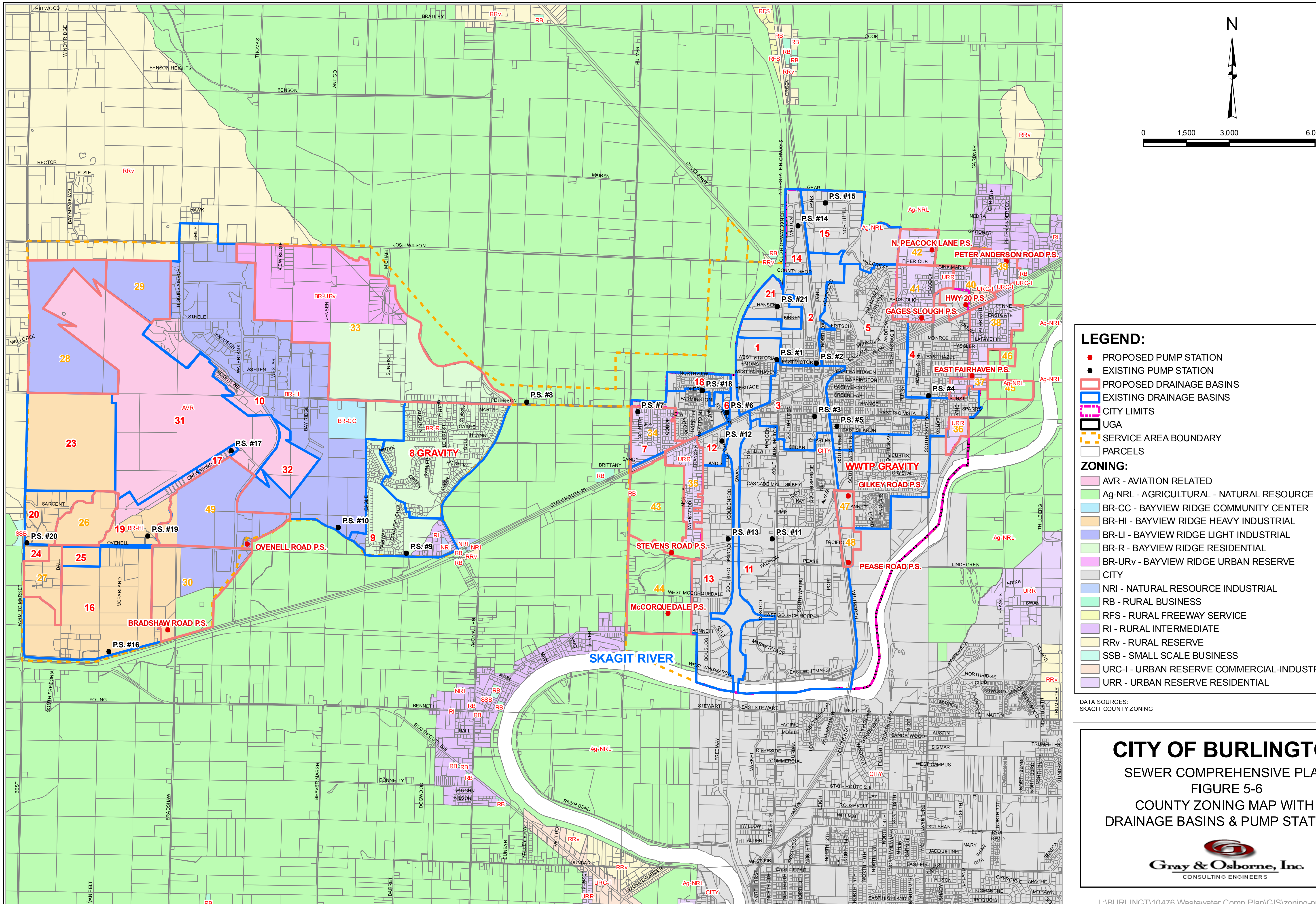
Land Use	Land Use Category	Total Area (acres)	Density (ft^2/unit)	Flow Rate (gpd/ERU)	Flow Rate (gpad)
R-1-6.0	Single-Family Residence	121.72	6,000	138	—
R-1-7.6	Single-Family Residence	69.75	7,600	138	—
R-1-8.4	Single-Family Residence	299.12	8,400	138	—
R-1-9.6	Single-Family Residence	291.51	9,600	138	—
R-2	Two-Family Residence	55.82	3,800	124	—
R-3	Multifamily Residence	127.09	3,000	117	—
R-S	Semipublic District	25.15	—	—	4,600
M-1	Industrial District	240.81	—	—	1,100
B-P	Business Park District	117.13	—	—	500
C-1	Commercial District	635.00	—	—	1,100
C-2	Heavy Commercial	344.37	—	—	600
B-1	Business District	12.95	—	—	1,600
MR-NB	Medium Residential & Neighborhood Business	39.63	—	—	600
OSPA	Open Space, Parks & Agriculture	54.89	—	—	0
Other	Right-of-Way, etc.	28.72	—	—	0
AVR	Aviation Related	767.84	—	—	0
Ag-NRL	Agricultural-Natural Resource Lands	360.87	—	—	0
BR-CC	Bayview Ridge Community Center	40.11	—	—	600
BR-HI	Bayview Ridge Heavy Industrial	924.11	—	—	500
BR-LI	Bayview Ridge Light Industrial	1,211.04	—	—	500
BR-R	Bayview Ridge Residential	707.89	7,260	138	—
BR-URv	Bayview Ridge Urban Reserve	303.45	7,260	138	—
CITY	City	19.53	7,600	138	—
NRI	Natural Resource Industrial	3.50	—	—	600
RB	Rural Business	0.73	—	—	1,200
RI	Rural Intermediate	22.36	—	—	600
RRv	Rural Reserve	21.30	—	—	500
URC-1	Urban Reserve Commercial-Industrial	11.24	—	—	600
URR	Urban Reserve Residential	411.49	7,600	138	—
Total		**7,269**	—	—	—

DRAINAGE BASINS

A schematic drawing of the City's existing drainage basins can be seen on Figure 5-5. As development continues in areas within the City's sewer service area that are currently unsewered, additional drainage basins will be formed. Figure 5-6 shows the existing sewer service area including the existing City's wastewater drainage basins and the proposed drainage basins within the City's sewer service area. Existing drainage basins can be seen in blue and proposed drainage basins are seen in pink. Figure 5-6 also shows



CITY OF BURLINGTON
WASTEWATER COMPREHENSIVE PLAN
FIGURE 5-5
EXISTING WASTEWATER SYSTEM
DRAINAGE BASIN SCHEMATIC



LEGEND:

- PROPOSED PUMP STATION
- EXISTING PUMP STATION
- PROPOSED DRAINAGE BASINS
- EXISTING DRAINAGE BASINS
- CITY LIMITS
- UGA
- SERVICE AREA BOUNDARY
- PARCELS

ZONING:

- AVR - AVIATION RELATED
- Ag-NRL - AGRICULTURAL - NATURAL RESOURCE LANDS
- BR-CC - BAYVIEW RIDGE COMMUNITY CENTER
- BR-HI - BAYVIEW RIDGE HEAVY INDUSTRIAL
- BR-LI - BAYVIEW RIDGE LIGHT INDUSTRIAL
- BR-R - BAYVIEW RIDGE RESIDENTIAL
- BR-URv - BAYVIEW RIDGE URBAN RESERVE
- CITY
- NRI - NATURAL RESOURCE INDUSTRIAL
- RB - RURAL BUSINESS
- RFS - RURAL FREEWAY SERVICE
- RI - RURAL INTERMEDIATE
- RRv - RURAL RESERVE
- SSB - SMALL SCALE BUSINESS
- URC-I - URBAN RESERVE COMMERCIAL-INDUSTRIAL
- URR - URBAN RESERVE RESIDENTIAL

DATA SOURCES:
SKAGIT COUNTY ZONING

CITY OF BURLINGTON

SEWER COMPREHENSIVE PLAN
FIGURE 5-6
COUNTY ZONING MAP WITH
DRAINAGE BASINS & PUMP STATIONS

Gray & Osborne, Inc.
CONSULTING ENGINEERS

L:\BURLINGT\10476 Wastewater Comp Plan\GIS\zoning-pump_stations.mxd proposed pump stations that will be necessary to serve proposed drainage basins. Each drainage basin was provided a number which corresponds to the numbers seen on the figures. The existing and proposed drainage basins can be seen in Table 5-22.

TABLE 5-22

Existing and Proposed Drainage Basins

Basin No.	Basin Name	Existing/ Proposed	Basin Area(1) (acres)	Buildout Annual Avg.(2) Flow (gpd)
1	Pump Station 1	Existing	76	83,568(3)
2	Pump Station 2	Existing	383	272,627(3)
3	Pump Station 3	Existing	597	489,418
4	Pump Station 4	Existing	426	320,237
5	Pump Station 5	Existing	377	380,710
6	Pump Station 6	Existing	174	366,566(4)
7	Pump Station 7	Existing	169	147,459
8	Pump Station 8	Existing	4,046	1,730,197
9	Pump Station 9	Existing	150	116,293
10	Pump Station 10	Existing	3,045	909,088(5)(6)
11	Pump Station 11	Existing	739	732,807
12	Pump Station 12	Existing	26	29,888
13	Pump Station 13	Existing	454	380,251
14	Pump Station 14	Existing	199	126,752
15	Pump Station 15	Existing	150	84,257
16	Pump Station 16	Existing	796	270,293
17	Pump Station 17	Existing	10	5,085(6)
18	Pump Station 18	Existing	33	24,010
19	Pump Station 19	Existing	93	31,385(5)(6)
20	Pump Station 20	Existing	663	291,285(5)
21	Pump Station 21	Existing	47	51,815
22	WWTP Gravity	Existing	289	207,778(3)
23	PACCAR	Existing	449	224,650(3)
24	Skagit County Recovery Facility	Existing	11	5,519
25	Puget Sound Energy	Existing	21	10,494
26	Ovenell Road	Proposed	66	0(5)
27	Dahlstead	Existing	52	25,976
28	Farm to Market Road	Proposed	207	103,415
29	Bayview Ridge Light Industrial	Proposed	90	44,825
30	Bradshaw Road Pump Station	Proposed	369	72,203(5)
31	Airport 1	Existing	601	0(6)
32	Airport 2	Existing	57	0(6)
33	Bayview Ridge Residential	Proposed	586	485,255
34	Chinook Drive	Proposed	68	53,512
35	Markwood Lane	Proposed	60	47,235
36	Rio Vista Avenue	Proposed	15	11,945

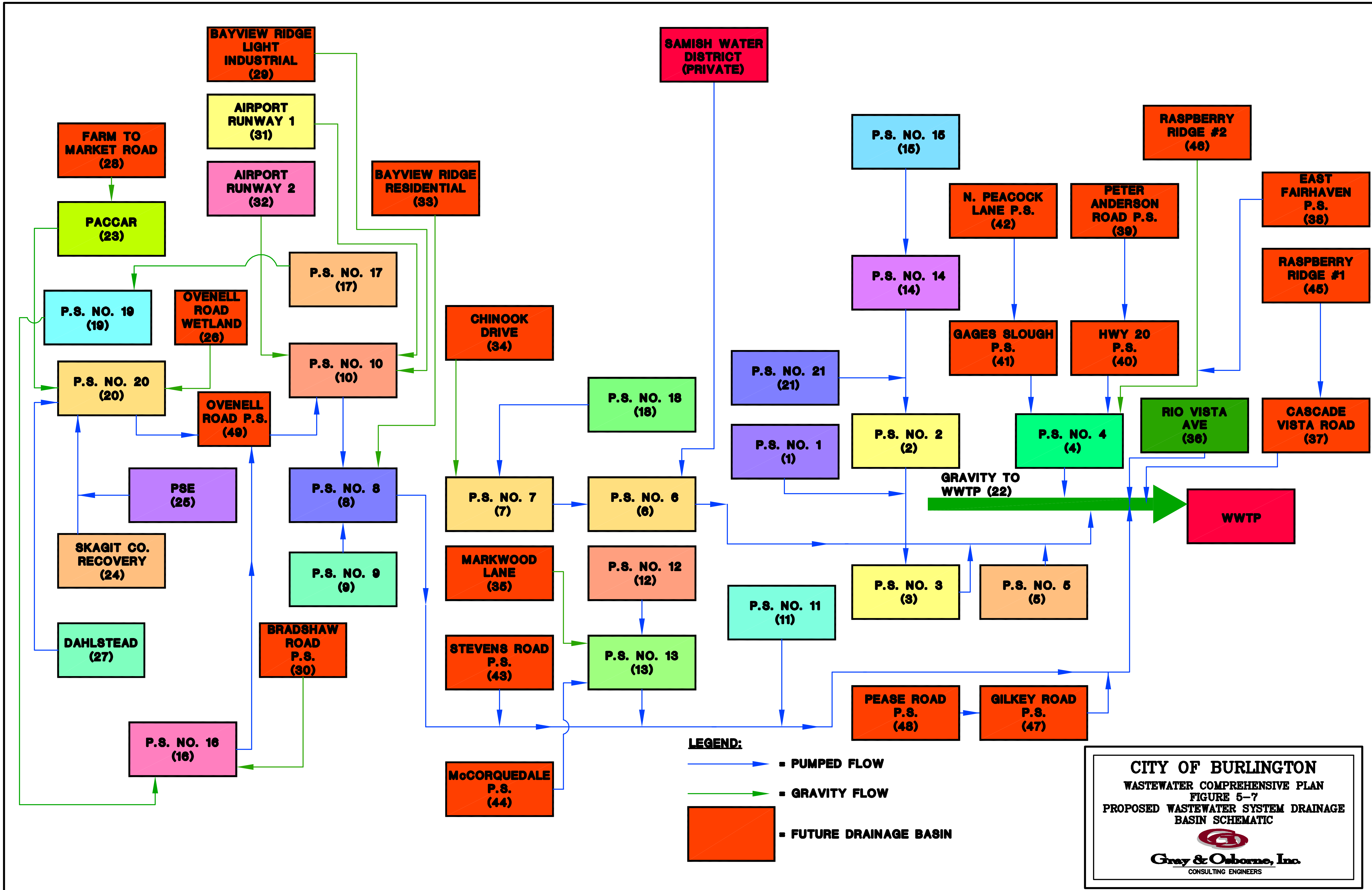
TABLE 5-22 (continued)

Existing and Proposed Drainage Basins

Basin No.	Basin Name	Existing/ Proposed	Basin Area[1] (acres)	Buildout Annual Avg.[2] Flow (gpd)
37	Cascade Vista Road	Proposed	39	22,134
38	East Fairhaven Pump Station	Proposed	84	66,448
39	Peter Anderson Road Pump Station	Proposed	33	26,420
40	Highway 20 Pump Station	Proposed	89	68,342
41	Gages Slough Pump Station	Proposed	112	88,400
42	North Peacock Lane Pump Station	Proposed	38	29,823
43	Stevens Road Pump Station	Proposed	132	104,609[7]
44	McCorquedale Pump Station	Proposed	154	121,824[7]
45	Raspberry Ridge 1	Proposed	24	10,350[8]
46	Raspberry Ridge 2	Proposed	7	10,350[8]
47	Pease Road Pump Station	Proposed	35	38,245
48	Gilkey Road Pump Station	Proposed	17	18,569
WWTP	**All Flows to WWTP**	**Existing**	**7,269**	**4,750,817**

(1) Drainage basin area includes the area of any upstream drainage basins that pump or flow by gravity into the drainage basin.
(2) Buildout average annual flows include the flows from any drainage basins upstream that pump or flow by gravity into the drainage basin.
(3) These flows include records for flows from schools. We assumed that existing schools within this drainage basin will remain schools and not be redeveloped.
(4) The Pump Station 6 drainage basin and any drainage basins which receive flows from Pump Station 6 include an annual average daytime flow of 208,000 gpd from the Samish Water District.
(5) Wetland and wetland buffer areas were identified within this drainage basin. From discussions with the Port of Skagit County, flows assume these wetland and buffer areas will not be developed.
(6) Flows assume that areas within this drainage basin zoned Aviation Related that are currently business related will be redeveloped to maximum capacity, and areas that are currently airport runways and open space will remain undeveloped.
(7) Flows assume that areas within this drainage basin zoned Agricultural will be developed as residential with 7,600 ft^2 size lots.
(8) Flows assume 75 residential units will be allowed to connect in this drainage basin per discussions with City staff.

The flows developed for each drainage basin in this section include the flows from any drainage basins upstream that feed into that drainage basin. For example the Pump Station 2 drainage basin includes the area that drains by gravity to the pump station as well as flows from the Pump Station 21 and Pump Station 14 drainage basins. A schematic drawing of the all the proposed drainage basins and how they will be served can be seen on Figure 5-7. Chapter 6, Collection System Analysis, will evaluate each of the drainage basins and the collection system in more depth.



CITY OF BURLINGTON
WASTEWATER COMPREHENSIVE PLAN
FIGURE 5–7
PROPOSED WASTEWATER SYSTEM DRAINAGE BASIN SCHEMATIC

PROJECTED INFILTRATION AND INFLOW RATES

The projected wastewater flow rates for the City of Burlington WWTP include a sanitary component and an I/I component. The existing I/I received by the Burlington WWTP is primarily due to stormwater connections and defects in the older portions of the sewer system, which includes some areas of the Western Service Area. It is assumed that the excess I/I will be gradually removed as a part of the sewer replacement and I/I control program presently a part of the City of Burlington Capital Improvement Program and as recommended previously in this chapter.

Table 5-23 provides the criteria that will be used to project I/I flow rates from newly sewered as well as rehabilitated areas, based on benchmark values used in other communities.

TABLE 5-23

Projected Infiltration/Inflow Rates

Parameter	I/I Flow Rate (gpad) [1]
Dry Weather Infiltration	60
Annual Average	150
Maximum Month	300
Maximum Day	500
Peak Hour	1,100

(1) Projected I/I flow rates for newly sewered areas are based on benchmarks used by other communities.

PROJECTED TOTAL WASTEWATER FLOW RATES

In order to establish the required capacity of facilities, such as gravity sewer lines and pump stations, peak hour rather than average flow has to be considered. A ratio of peak hour flow to annual average flow is given in *Criteria for Sewage Works Design* (Ecology, 1998). This ratio, termed the “Peaking Factor” (*PF*), is given to be:

$$PF = \frac{18 + \sqrt{P}}{4 + \sqrt{P}}$$

where *P* is the population equivalent in thousands. Since much of the City and Western Service Area include non-residential flow, the commercial and industrial flows need to be converted into an equivalent population. The population equivalent is the total annual average flow divided by the flow per capita per day of 40.8 gallons per capita per day (gpcd).

Using the projected sanitary wastewater flow rates and the I/I flow rates, the total wastewater flow rates are then estimated as follows for each of the drainage basins:

$$\begin{aligned}&Total\ Wastewater\ Peak\ Hour\ Flow\ Rate =\\&Annual\ Average\ Wastewater\ Flow\ Rate + Estimated\ Sewer\ System\ I/I\ Flow\ Rate\end{aligned}$$

Table 5-24 provides the projected wastewater flow rates including I/I flow.

TABLE 5-24

Projected Wastewater Flow Rates for Existing and Proposed Drainage Basins

Basin No.	Basin Name	Area(1) (acres)	Buildout Equivalent Population(2)	Buildout Peak Hour Flow (gpd)	Buildout I/I(3) (gpd)	Buildout Peak Hour Flow with I/I(4) (gpd)
1	Pump Station 1	76	2,047	299,002	82,073	381,075
2	Pump Station 2	383	6,677	852,330	398,556	1,250,886(5)
3	Pump Station 3 Gravity	597	11,987	1,407,628	613,325	2,020,953(5)
4	Pump Station 4	426	7,843	979,493	467,660	1,447,153
5	Pump Station 5	377	9,324	1,136,348	396,595	1,532,943
6	Pump Station 6 Gravity	174	3,884	2,017,255	191,309	2,208,564(6)
7	Pump Station 7 Gravity	169	3,612	497,337	186,046	683,383
8	Pump Station 8 Gravity	4,046	42,376	4,035,005	3,062,139	7,097,143
9	Pump Station 9 Gravity	150	2,848	402,544	164,725	567,269
10	Pump Station 10 Gravity	3,045	22,265	2,368,866	1,961,064	4,329,931(7)(8)
11	Pump Station 11 Gravity	739	17,948	1,978,399	797,198	2,775,597
12	Pump Station 12 Gravity	26	732	116,065	28,259	144,324
13	Pump Station 13 Gravity	454	9,313	1,135,174	498,675	1,633,849
14	Pump Station 14 Gravity	199	3,104	434,726	218,454	653,180
15	Pump Station 15 Gravity	150	2,064	301,235	164,627	465,862
16	Pump Station 16 Gravity	796	6,632	847,360	595,745	1,443,105
17	Pump Station 17 Gravity	10	125	21,440	11,187	32,627(8)
18	Pump Station 18 Gravity	33	588	94,527	36,592	131,119
19	Pump Station 19 Gravity	93	769	121,484	69,047	190,531(7)(8)
20	Pump Station 20 Gravity	663	7,134	902,588	640,826	1,543,414(7)
21	Pump Station 21 Gravity	47	1,269	193,318	51,976	245,293
22	WWTP Gravity	289	5,089	672,766	305,083	977,849(5)
23	PACCAR	449	5,502	720,282	494,231	1,214,513(5)
24	Skagit Co. Recovery Facility	11	135	23,211	12,143	35,353
25	Puget Sound Energy	21	257	43,091	23,087	66,178
26	Ovenell Road	66	0	0	0	0(7)
27	Dahlstead	52	636	101,777	57,147	158,924
28	Farm to Market Road	207	2,533	362,347	227,513	589,860
29	Bayview Ridge Light Industrial	90	1,098	169,146	98,614	267,760

TABLE 5-24 (continued)

Projected Wastewater Flow Rates for Existing and Proposed Drainage Basins

Basin No.	Basin Name	Area[(1)] (acres)	Buildout Equivalent Population[(2)]	Buildout Peak Hour Flow (gpd)	Buildout I/I[(3)] (gpd)	Buildout Peak Hour Flow with I/I[(4)] (gpd)
30	Bradshaw Road Pump Station	369	1,768	261,862	158,847	420,709[(7)]
31	Airport 1	601	0	0	0	0[(8)]
32	Airport 2	57	0	0	0	0[(8)]
33	Bayview Ridge Residential	586	11,885	1,397,458	644,662	2,042,120
34	Chinook Drive	68	1,311	199,127	74,420	273,547
35	Markwood Lane	60	1,157	177,523	65,690	243,213
36	Rio Vista Avenue	15	293	48,772	16,612	65,384
37	Cascade Vista Road	39	542	87,559	42,749	130,308
38	East Fairhaven Pump Station	84	1,627	242,779	92,411	335,190
39	Peter Anderson Rd Pump Station	33	647	103,407	36,742	140,149
40	Highway 20 Pump Station	89	1,674	249,081	98,031	347,111
41	Gages Slough Pump Station	112	2,165	314,594	122,940	437,534
42	North Peacock Lane Pump Station	38	730	115,829	41,476	157,305
43	Stevens Road Pump Station	132	2,562	366,100	145,068	511,169[(9)]
44	McCorquedale Pump Station	154	2,984	419,612	169,422	589,034[(9)]
45	Raspberry Ridge 1	24	253	42,525	26,361	68,886[(10)]
46	Raspberry Ridge 2	7	253	42,525	7,788	50,314[(10)]
47	Pease Road Pump Station	35	937	146,024	38,245	184,268
48	Gilkey Road Pump Station	17	455	74,183	18,569	92,752
WWTP	**All Flows to WWTP**	**7,269**	**120,240**	**9,195,167**	**6,515,292**	**15,710,460**

(1) Drainage basin area includes the area of any upstream drainage basins that pump or flow by gravity into the drainage basin.

(2) Equivalent population was calculated by converting commercial flows into populations using a flow rate of 40.8 gpcd as shown in Table 6-15.

(3) Infiltration and inflow was calculated by multiplying the developable area within the drainage basin by 1,100 gpad.

(4) Peak hour flows include the flows from any drainage basins upstream that pump or flow by gravity into the drainage basin.

(5) These flows include records for flows from schools. We assumed that existing schools within this drainage basin will remain schools and not be redeveloped.

(6) The Pump Station 6 drainage basin and any drainage basins which receive flows from Pump Station 6 include an annual average daytime flow of 208,000 gpd from the Samish Water District.

(7) Wetland and wetland buffer areas were identified within this drainage basin. From discussions with the Port of Skagit County, flows assume these wetland and buffer areas will not be developed.

(8) Flows assume that areas within this drainage basin zoned Aviation Related that are currently business related will be redeveloped to maximum capacity and areas that are currently airport runways and open space will remain undeveloped.

(9) Flows assume that areas within this drainage basin zoned Agricultural will be developed as residential with 7,600 ft^2 size lots.

(10) Flows assume 75 residential units will be allowed to connect in this drainage basin per discussions with City staff.

PROJECTED FLOWS FOR THE PLANNING PERIOD

The flow projections up to this point have been made for buildout conditions, which represent the maximum flows to be expected based on the current planning area and zoning classifications within the planning area. Since it is unrealistic to expect buildout conditions to occur over the next 20 years, an attempt has been made to project a realistic increase in wastewater loads during this period. The City of Burlington wastewater service area will be divided into four components:

1. City of Burlington UGA
2. Western Service Area
3. Samish Water District Pipeline
4. Septage Discharge at the Wastewater Treatment Plant

CITY OF BURLINGTON UGA

The City of Burlington UGA consists of the area within the existing Burlington corporate limits and the areas immediately surrounding the City designated by Skagit County to be within the City's UGA. As discussed in Chapter 3, the City of Burlington 2010 to 2015 Capital Improvement Plan estimates that the population within the existing city limits will increase by 0.65 percent per year over the next 16 years, based on development of existing undeveloped properties. For the purpose of this Plan, it is assumed that the population within the existing city limits will increase by 1.3 percent per year over the next 20 years. This growth rate, being twice the rate established by developing vacant properties only, will allow for some redevelopment of areas already developed. Also, for the purpose of this Plan, it is assumed that commercial, industrial, governmental, and institutional activities will increase at the same rate as the population increase; thus, the annual average flows within the existing city limits are estimated to increase by 1.3 percent per year in the following drainage basins:

1. Pump Station 1
2. Pump Station 2
3. Pump Station 3
4. Pump Station 4 (existing sewer service area only)
5. Pump Station 5
6. Pump Station 6 (existing sewer service area only, excluding SWD pipeline)
7. Pump Station 7 (existing sewer service area only)
11. Pump Station 11
13. Pump Station 13 (existing sewer service area only)
14. Pump Station 14
15. Pump Station 15
18. Pump Station 18
22. Wastewater Treatment Plant (existing gravity sewer service area)

Also, as discussed in Chapter 3, it is proposed to utilize a population growth rate of 2.25 percent per year over the next 20 years. The additional 0.95 percent per year increase is estimated to originate in the following unsewered drainage basins:

21. Pump Station 21
34. Chinook Drive
35. Markwood Lane
36. Rio Vista Avenue
37. Cascade Vista Road
38. East Fairhaven Pump Station
39. Peter Anderson Road Pump Station
40. Highway 20 Pump Station
41. Gages Slough Pump Station
42. North Peacock Lane Pump Station
45. Raspberry Ridge 1
46. Raspberry Ridge 2
47. Gilkey Road Pump Station
48. Pease Road Pump Station

Pump Station 21 is an existing pump station serving a drainage area currently within the city limits, but receives no flow at the present time. The Gilkey Road and Pease Road Pump Stations would serve areas without sewer service within the city limits. These three drainage areas will be analyzed as being a part of the 0.95 percent per year growth rate, outside the existing city limits. The flows from these areas will be distributed among the various areas proportionally for the buildout flows as presented in Table 5-22.

Table 5-25 shows the projected annual average sanitary wastewater flows for the various drainage areas within the existing city limits that are subject to the 1.3 percent per year growth rate. Existing flows were estimated utilizing pump station records combined with the water use data presented in Tables 5-15 and 5-16.

TABLE 5-25

Projected Annual Average Sanitary Wastewater Flows from Drainage Areas within Existing City Limits

Drainage Basin	Existing (2010) Annual Avg. Flow (gpd)	2015 Annual Avg. Flow (gpd)	2020 Annual Avg. Flow (gpd)	2025 Annual Avg. Flow (gpd)	2030 Annual Avg. Flow (gpd)
1. Pump Station 1	79,000	83,600	83,600	83,600	83,600
2. Pump Station 2	10,000	10,700	11,500	12,400	13,300
3. Pump Station 3	135,000	143,700	148,200	153,000	158,100
4. Pump Station 4	22,000	23,600	25,400	27,300	29,300
5. Pump Station 5	77,000	82,700	88,800	95,400	102,500
6. Pump Station 6	50,000	53,700	57,700	62,000	66,600
7. Pump Station 7	43,000	46,200	49,600	53,300	57,200
11. Pump Station 11	180,000	193,300	206,800	223,100	239,600
13. Pump Station 13	12,000	12,900	13,800	14,900	16,000
14. Pump Station 14	5,000	5,400	5,800	6,200	6,700
15. Pump Station 15	3,300	3,500	3,800	4,100	4,400
18. Pump Station 18	9,300	10,000	10,700	11,500	12,400
22. Gravity to WWTP	122,000	131,000	140,800	151,200	162,400
Total to WWTP	**598,000**	**640,900**	**681,500**	**726,900**	**774,500**

Table 5-26 shows the projected annual average sanitary wastewater flows for the various drainage areas outside the existing city limits, but inside the UGA, including Pump Station 21 and the Gilkey Road and Pease Road Pump Stations, subject to the 0.95 percent per year growth rate. It is assumed that these drainage areas will be sewered and connected to the existing wastewater collection system according to the following schedule:

Sewer Connections Made Between the Years 2010 to 2015:

21. Pump Station 21
37. Cascade Vista Road
45. Raspberry Ridge 1
46. Raspberry Ridge 2

Sewer Connections Made Between the Years 2015 to 2020:

34. Chinook Drive
36. Rio Vista Avenue
37. East Fairhaven Pump Station
47. Gilkey Road Pump Station
48. Pease Road Pump Station

Sewer Connections Made Between the Years 2020 to 2025:

35. Markwood Lane
39. Peter Anderson Road Pump Station
40. Highway 20 Pump Station
41. Gages Slough Pump Station
42. North Peacock Lane Pump Station

TABLE 5-26

Projected Annual Average Sanitary Wastewater Flows from Drainage Areas within Existing UGA Expected to Be Sewered in the Near Future

Drainage Basin	Existing (2010) Annual Avg. Flow (gpd)	2015 Annual Avg. Flow (gpd)	2020 Annual Avg. Flow (gpd)	2025 Annual Avg. Flow (gpd)	2030 Annual Avg. Flow (gpd)	Buildout Annual Avg. Flow (gpd)
21. Pump Station 21	0	14,000	14,800	15,500	16,300	51,800
34. Chinook Drive	0	0	15,400	16,100	16,900	53,500
35. Markwood Lane	0	0	0	14,200	14,900	47,200
36. Rio Vista Avenue	0	0	3,500	3,600	3,800	11,900
37. Cascade Vista Road	0	13,600	13,800	13,900	14,100	22,100
38. E. Fairhaven Pump Station	0	0	19,000	19,900	20,900	66,400
39. P. Anderson Road Pump Station	0	0	0	7,900	8,300	26,400
40. Highway 20 Pump Station	0	0	0	20,500	21,500	68,300
41. Gages Slough Pump Station	0	0	0	26,600	27,900	88,400
42. N. Peacock Lane Pump Station	0	0	0	9,000	9,400	29,800
45. Raspberry Ridge 1	0	10,400	10,400	10,400	10,400	10,400
46. Raspberry Ridge 2	0	10,400	10,400	10,400	10,400	10,400
47. Gilkey Road Pump Station	0	0	10,900	11,400	12,000	38,200
48. Pease Road Pump Station	0	0	5,400	5,600	5,900	18,600
Total to WWTP	**0**	**38,000**	**87,800**	**152,100**	**158,700**	**458,200**

The flows from all the drainage areas outside the city limits, but within the UGA, will have to pass through one of the drainage areas shown in Table 5-26 to reach the wastewater treatment plant, as follows:

- Area 21, Pump Station 21 flows will pass through Area 2, Pump Station 2 and Area 3, Pump Station 3
- Area 34, Chinook Drive flows will pass through Area 7, Pump Station 7 and Area 6, Pump Station 6
- Area 35, Markwood Lane flows will pass through Area 13, Pump Station 13

- Area 36, Rio Vista Avenue flows will pass through Area 22, Gravity Flows to the Wastewater Treatment Plant

- Area 37, Cascade Vista Road receives flows from Area 45, Raspberry Ridge 1 and the combined flow will pass though Area 22, Gravity Flows to the Wastewater Treatment Plant

- Area 38, East Fairhaven Pump Station flows will pass through Area 4, Pump Station 4

- Area 40, Highway 20 Pump Station receives flows from Area 39, Peter Anderson Road Pump Station and the combined flow will pass through Area 4, Pump Station 4

- Area 41, Gages Slough Pump Station receives flows from Area 42, North Peacock Lane Pump Station and the combined flow will pass through Area 4, Pump Station 4

- Area 46, Raspberry Ridge 2 will flow through Area 4, Pump Station 4

- Area 47, Gilkey Road Pump Station receives flows from Area 48, Pease Road Pump Station and the combined flow will pass through Area 22, Gravity Flows to the Wastewater Treatment Plant

Table 5-27 combines the information presented in Tables 5-25 and 5-26 to show the total flows generated within the Burlington UGA as they pass through the existing facilities in the UGA.

TABLE 5-27

Projected Annual Average Sanitary Wastewater Flows from Drainage Areas within the Burlington UGA

Drainage Basin	Existing (2010) Annual Avg. Flow (gpd)	2015 Annual Avg. Flow (gpd)	2020 Annual Avg. Flow (gpd)	2025 Annual Avg. Flow (gpd)	2030 Annual Avg. Flow (gpd)	Buildout Annual Avg. Flow (gpd)
1. Pump Station 1	79,000	83,600	83,600	83,600	83,600	83,600
2. Pump Station 2	10,000	24,700	26,300	27,900	29,600	272,600
3. Pump Station 3	135,000	157,700	163,000	168,500	174,400	489,400
4. Pump Station 4	22,000	34,000	54,800	104,700	110,000	320,200
5. Pump Station 5	77,000	82,700	88,800	95,400	102,500	380,700
6. Pump Station 6	50,000	53,700	73,100	78,100	83,500	158,600
7. Pump Station 7	43,000	46,200	65,000	69,400	74,100	147,400
11. Pump Station 11	180,000	193,300	206,800	223,100	239,600	732,800
13. Pump Station 13	12,000	12,900	13,800	29,100	30,900	380,300
14. Pump Station 14	5,000	5,400	5,800	6,200	6,700	126,800
15. Pump Station 15	3,300	3,500	3,800	4,100	4,400	84,300
18. Pump Station 18	9,300	10,000	10,700	11,500	12,400	24,000
22. Gravity to WWTP	122,000	144,600	169,000	180,000	192,300	207,800
Total to WWTP	**598,000**	**678,900**	**769,300**	**879,000**	**933,200**	**2,669,800**

The information presented in Tables 5-26 and 5-27 can be utilized to establish the peak hour flow to each of the pump station in the UGA. The peak hour flow is the required capacity of each of the pump station. Table 5-28 shows the peak hour flow for the 5-year increments during the planning period as well as buildout conditions for each of the existing and planned major pump stations within the Burlington UGA. The capacity of the existing pump stations are also shown to establish which pump stations are in need of additional capacity. Pump Station 6 also will receive flow from outside the UGA and is not included in Table 5-28. The required capacity of Pump Station 6 will be discussed later in this chapter.

The conclusions that can be drawn from the information presented in Table 5-28 will be discussed in Chapter 6.

TABLE 5-28

Projected Peak Hour Flow to Each Pump Station within the Burlington UGA

Pump Station	Existing (2010) Peak Hour Flow with I/I (gpm)	2015 Peak Hour Flow with I/I (gpm)	2020 Peak Hour Flow with I/I (gpm)	2025 Peak Hour Flow with I/I (gpm)	2030 Peak Hour Flow with I/I (gpm)	Buildout Peak Hour Flow with I/I (gpm)	Existing Capacity (gpm)(1)
1. Pump Station 1	254	265	265	265	265	265	495
2. Pump Station 2	305	344	348	352	357	869	390
3. Pump Station 3	745	792	803	815	827	1,403	1,500
4. Pump Station 4	385	416	466	579	591	1,005	360
5. Pump Station 5	457	470	484	498	514	1,053	675
7. Pump Station 7	242	250	294	305	315	475	760
11. Pump Station 11	966	992	1,019	1,051	1,083	1,927	1,283
13. Pump Station 13	207	383	385	425	429	1,135	290
14. Pump Station 14	166	167	169	170	171	454	130
15. Pump Station 15	124	125	126	126	127	324	297
18. Pump Station 18	52	54	56	58	61	91	194
21. Pump Station 21	36	75	78	80	82	170	120
38. East Fairhaven Pump Station	—	—	117	119	122	233	—
39. P. Anderson Road Pump Station	—	—	—	48	49	97	—
40. Highway 20 Pump Station	—	—	—	125	127	241	—
41. Gages Slough Pump Station	—	—	—	158	161	304	—
42. N. Peacock Lane Pump Station	—	—	—	55	56	109	—
47. Gilkey Road Pump Station	—	—	58	59	61	128	—
48. Pease Road Pump Station	—	—	29	29	30	64	—

(1) Based on drawdown tests performed by the City of Burlington.

WESTERN SERVICE AREA

The Western Service Area all drains to Pump Station 8, which in turn conveys the flow directly to the large-diameter gravity sewers by the wastewater treatment plant. It is assumed that the Western Service Area generally will grow at the same rate as the City of Burlington, at 2.25 percent per year. It is further assumed that this growth will only take place in existing drainage basins and no new drainage area will be connected during the 20-year planning horizon, except the Bayview Ridge Residential Area (Drainage Basin 33) will be developed and contribute wastewater flows at buildout conditions in 2030, the last year of the planning period. The development of the Bayview Ridge Residential Area would be in addition to the 2.25 percent per year growth assumed for the rest of the Western Service Area. The wastewater from the Bayview Ridge Residential Area would be conveyed directly to the existing 18-inch-diameter plugged gravity sewer stub-out in Peterson Road, draining directly to Pump Station 8, without passing through any other drainage basins.

Table 5-29 shows the projected annual average sanitary wastewater flows for the various drainage areas within the Western Service Area, based on the assumptions stated above. Existing flows were estimated utilizing pump station records combined with the water use data presented in Tables 5-15 and 5-16.

TABLE 5-29

Projected Annual Average Sanitary Wastewater Flows from Drainage Areas within the Western Service Area

Drainage Basin	Existing (2010) Annual Avg. Flow (gpd)	2015 Annual Avg. Flow (gpd)	2020 Annual Avg. Flow (gpd)	2025 Annual Avg. Flow (gpd)	2030 Annual Avg. Flow (gpd)	Buildout Annual Avg. Flow (gpd)
8. Pump Station 8 (1)	112,000	125,200	139,900	156,400	660,000 (2)	1,730,197
9. Pump Station 9	22,000	24,600	27,500	30,700	34,300	116,293
10. Pump Station 10	27,000	30,200	33,700	37,700	42,100	909,088
16. Pump Station 16	2,500	2,800	3,100	3,500	3,900	270,793
19. Pump Station 19	50	60	60	70	80	31,355
20. Pump Station 20	300	340	370	420	470	291,285
33. Bayview Ridge Residential	0	0	0	0	485,255	485,255

(1) Represents total flow to the wastewater treatment plant from the Western Service Area.
(2) Includes Bayview Ridge Residential Area.

The information presented in Table 5-29 can be utilized to establish the peak hour flow to each of the existing pump stations in the Western Service Area. The peak hour flow is the required capacity of each of the pump station. Table 5-30 shows the peak hour flow for the 5-year increments during the planning period as well as buildout conditions for each of the major existing pump stations in the Western Service Area. The capacity of the existing pump stations are also shown to establish which pump stations are in need of additional capacity.

The conclusions that can be drawn from the information presented in Table 5-30 will be discussed in Chapter 6.

TABLE 5-30

Projected Peak Hour Flows from Drainage Areas within the Western Service Area

Drainage Basin	Existing (2010) Peak Hour Flow with I/I (gpm)	2015 Peak Hour Flow with I/I (gpm)	2020 Peak Hour Flow with I/I (gpm)	2025 Peak Hour Flow with I/I (gpm)	2030 Peak Hour Flow with I/I (gpm)	Buildout Peak Hour Flow with I/I (gpm)	Existing Pump Station Capacity (gpm)(2)
8. Pump Station 8 (1)	862	890	921	955	2,298(3)	4,922	2,950
9. Pump Station 9	175	182	189	197	206	394	645
10. Pump Station 10	348	356	365	375	386	3,001	400
16. Pump Station 16	84	85	86	87	87	996	510
19. Pump Station 19	20	20	20	20	20	132	140
20. Pump Station 20	20	20	20	20	20	1,072	305
33. Bayview Ridge Residential	0	0	0	0	1,418	1,418	—

(1) Represents total flow to the wastewater treatment plant from the Western Service Area.
(2) Based on drawdown tests performed by the City of Burlington.
(3) Includes Bayview Ridge Residential Area.

SAMISH WATER DISTRICT PIPELINE

The future flows from the Samish Water District pipeline will be based on based on the existing agreements with the users of this pipeline. The Samish Water District has a contract for discharging an annual average flow of 250,000 gpd to Pump Station 6. This flow includes all dischargers to the pipeline, except the Skagit Valley Resort and Casino (Casino). This agreement is not expected to change over the next 20 years.

The Casino has had a separate agreement with the City of Burlington to discharge an annual average flow of 60,000 gpd to Pump Station 6. However, as this Plan is being written, the Casino is in the process of constructing its own wastewater treatment facility and will discontinue discharging to the City of Burlington sewer system.

The Casino has submitted a request to the City of Burlington, however, for the City to maintain a reserve capacity for the Casino through 2016, in the case of temporary upsets of their new treatment facility, or if they generate wastewater in excess of the capacity of their new treatment facility. Based on these considerations, the existing annual average flow from the Samish Water District pipeline will be 310,000 gpd, but will decrease to 250,000 gpd within the next 5 years. However, the flow from the Casino should be added when peak flows are considered until the end of 2016.

Beginning in 2017, the Casino would no longer have an agreement for disposal of wastewater to the Burlington sewer system. Wastewater from the Casino will not enter the Burlington sewer system at any time after 2017.

Historically, the maximum month flow from the Samish Water District pipeline has been 1.28 times the annual average flow. Thus, the projected maximum month flow from the Samish Water District pipeline until the end of 2016 will be 1.28 x 310,000 gpd = 396,800 gpd. After 2016, the projected maximum flow from the Samish Water District pipeline will be 1.28 x 250,000 = 320,000 gpd.

The Samish Water District has a waste stabilization pond pretreatment system prior to the wastewater being pumped to the Samish Water District pipeline for conveyance to the City of Burlington sewer system. The effluent flows from this treatment system are conveyed to the City of Burlington during night when the wastewater flows are generally low. Peak hour flows, on which the capacities of wastewater pump stations and pipelines are based, normally occur during the daytime hours. Therefore, the flows from the Samish Water District pretreatment system will be subtracted from the total contracted flow in order to estimate peak hour flows to Pump Station 6.

The annual average flow from the Samish Water District pretreatment system for the period of January 2007 through May 2010 was 102,000 gpd. This leaves an annual average flow of 310,000 gpd – 102,000 gpd = 208,000 gpd discharged during daytime until 2016. Applying a peaking factor of 3.24 to this flow (based on the procedure discussed previously in this chapter), a peak hour flow of 673,400 gpd results for flow from the Samish Water District pipeline until 2016. It is assumed that the above flows include infiltration/inflow.

Beginning in 2017, the daytime annual average flow discharged through the Samish Water District pipeline would be 250,000 – 102,000 = 148,000 gpd. The appropriate peaking factor for this annual average flow is 3.37, resulting in a peak hour flow of 498,900 gpd.

As discussed previously, the required capacity of Pump Station 6 depends on the flow from the Samish Water District pipeline, as well as the flows from Pump Station 7. Pump Station 7 has recently been upgraded with new pumps and discharge piping. The capacities of the two pumps in Pump Station 7 have been established to be 874 gpm and 763 gpm for Pump 1 and Pump 2, respectively. Although the expected peak hour flow from the Pump Station 7 drainage basin is 475 gpm at buildout, it is assumed that the existing pumps will remain throughout the planning horizon (through 2030), but will be replaced by pumps sized to match the peak hour flow at buildout after the planning period. Thus, Pump Station 6 will receive a peak hour flow of 874 gpm from Pump Station 7 through 2030 and 475 gpm after 2030.

Table 5-31 shows the peak hour flow for the 5-year increments during the planning period as well as buildout conditions for Pump Station 6, including flows from Pump Station 7, the Samish Water District pipeline, and the local area around Pump Station 6 draining by gravity to this pump station. The capacity of the existing Pump Station 6 is also shown.

The conclusions that can be drawn from the information presented in Table 5-31 will be discussed in Chapter 6.

TABLE 5-31

Projected Peak Hour Flows to Pump Station 6

Drainage Basin	Existing (2010) Peak Hour Flow with I/I (gpm)	2015 Peak Hour Flow with I/I (gpm)	2020 Peak Hour Flow with I/I (gpm)	2025 Peak Hour Flow with I/I (gpm)	2030 Peak Hour Flow with I/I (gpm)	Buildout Peak Hour Flow with I/I (gpm)	Existing Pump Station Capacity (gpm)(1)
6. Pump Station 6 (1)	1,363	1,367	1,246	1,248	1,250	1,077	918

(1) Based on drawdown tests performed by the City of Burlington.

SEPTAGE

As discussed previously in this chapter, the septage flow rate has decreased over the past couple of years due to the fact that the Town of LaConner has started to accept septage at its wastewater treatment facility. However, the septage volumes generated in Skagit County are expected to increase in the future. Skagit County has recently enacted an ordinance requiring all homeowners served by septic tanks to clean their septic tanks every 3 years. For the purpose of this Plan, it is assumed that existing annual average septage flows are the average of 2007 and 2008 flows, and that the septage volumes will double over the next 20 years. Table 5-32 shows the projected annual average septage flows to the Burlington wastewater treatment plant over the planning period.

TABLE 5-32

Projected Annual Average Septage Flows

Year	Annual Average Septage Flow (gpd)
2010 (Existing)	2,500
2015	3,000
2020	3,500
2025	4,200
2030	5,000
Buildout	5,000

It is assumed that septage flows will not increase significantly beyond 2030 because further development will take place in existing sewered UGAs.

WASTEWATER TREATMENT PLANT FLOWS

Tables 5-33, 5-34, and 5-35 show the derivation of the total annual average, maximum month, and peak hour flows to the wastewater treatment plant, respectively.

TABLE 5-33

Projected Total Annual Average Flows to the Wastewater Treatment Plant

Wastewater Source	Existing (2010) (gpd)	2015 (gpd)	2020 (gpd)	2025 (gpd)	2030 (gpd)	Buildout (gpd)
Burlington UGA						
Sanitary Flow	598,000	678,900	769,300	879,000	933,200	2,669,800
I/I (150 gpad)	435,700	446,100	462,600	462,600	462,600	470,900
Total	1,033,700	1,125,000	1,231,900	1,341,600	1,395,300	3,140,700
Western Service Area						
Sanitary Flow	112,000	125,200	139,900	156,400	660,000	1,730,200
I/I (150 gpad)	116,200	116,200	116,200	116,200	204,200	417,500
Total	228,200	241,400	256,100	272,600	864,200	2,147,700
Samish Water District Pipeline	310,000	250,000	250,000	250,000	250,000	250,000
Septage	2,500	3,000	3,500	4,200	5,000	5,000
Total to WWTP	**1,574,400**	**1,619,400**	**1,741,500**	**1,868,400**	**2,514,500**	**5,543,400**

TABLE 5-34

Projected Total Maximum Month Flows to the Wastewater Treatment Plant

Wastewater Source	Existing (2010) (gpd)	2015 (gpd)	2020 (gpd)	2025 (gpd)	2030 (gpd)	Buildout (gpd)
Burlington UGA						
Sanitary Flow(1)	717,600	814,700	923,200	1,054,800	1,119,800	3,203,800
I/I (300 gpad)	871,400	892,200	925,200	925,200	925,200	941,800
Total	1,589,000	1,706,900	1,848,400	1,980,000	2,045,000	4,145,600
Western Service Area						
Sanitary Flow(1)	134,400	150,200	163,900	187,700	792,000	2,076,200
I/I (300 gpad)	232,400	232,400	232,400	232,400	408,400	835,100
Total	366,800	382,600	400,300	420,100	1,200,400	2,911,300
Samish Water District Pipeline(2)	365,800	365,800	295,000	295,000	295,000	295,000
Septage	3,600	4,300	5,400	6,000	7,200	7,200
Total to WWTP	**2,325,200**	**2,459,600**	**2,549,100**	**2,701,100**	**3,547,600**	**7,359,100**

(1) Based on flow records, maximum month sanitary wastewater flow is taken to be 1.2 x annual average flow.

(2) Based on flow records, maximum month flow is 1.18 x annual average flow, including I/I.

TABLE 5-35

Projected Total Peak Hour Flows to the Wastewater Treatment Plant

Wastewater Source	Existing (2010) (gpd)	2015 (gpd)	2020 (gpd)	2025 (gpd)	2030 (gpd)	Buildout (gpd)
Annual Average Sanitary Wastewater Flow(1)	918,000	1,012,100	1,056,300	1,183,400	1,741,200	4,548,000
Population Equivalent	22,483	24,788	25,871	28,984	42,645	111,389
Peaking Factor	2.60	2.56	2.54	2.49	2.33	1.96
Peak Hour Sanitary Wastewater Flow	2,386,800	2,591,000	2,683,000	2,946,700	4,057,000	8,914,100
I/I (1,100 gpad)	4,047,300	4,123,500	4,244,500	4,244,500	4,889,900	6,515,300
Total to WWTP	**6,434,100**	**6,514,500**	**6,927,500**	**7,191,200**	**8,946,900**	**15,429,400**

(1) Excludes 102,000 gpd from the Samish Water District treatment lagoons, which is discharged at night and will not contribute to peak hour flow. Flows also include 60,000 gpd from Skagit Valley Resort and Casino through 2015.

PROJECTED LOADING RATES FOR THE PLANNING PERIOD

Future WWTP BOD_5 and TSS loading rates are estimated by multiplying the projected population by the respective loading rate per capita developed previously in this chapter. An annual average BOD_5 of 0.335 pounds per capita per day (lb/cap/d) and an annual average TSS of 0.31 lb/cap/d will be used for the City of Burlington UGA. These represents the average of 2009 and 2010 loading rates and are estimated to include residential, commercial, industrial, and institutional loads. Sanitary wastewater from the Western Service Area is estimated to have the same BOD_5 and TSS concentrations as existing levels which were determined by averaging 2009 and 2010 loads. Wastewater loadings contributed by the Samish Water District pipeline and septage are derived from actual historical wastewater strengths. Tables 5-36 and 5-37 show the estimated annual average and maximum BOD_5 loads, respectively, throughout the planning period and for buildout conditions from the various wastewater contributors.

TABLE 5-36

Projected Total Annual Average BOD_5 Loads to the Wastewater Treatment Plant

Wastewater Source	Existing (2010) (lb/d)	2015 (lb/d)	2020 (lb/d)	2025 (lb/d)	2030 (lb/d)	Buildout (lb/d)
Burlington UGA	2,810	3,190	3,610	4,130	4,390	12,550
Western Service Area	720	810	900	1,010	4,250	11,150
Samish Water District Pipeline	340	80	80	80	80	80
Septage	120	140	170	200	240	240
Total to WWTP	**3,990**	**4,220**	**4,760**	**5,420**	**8,960**	**24,020**

TABLE 5-37

Projected Total Maximum Month BOD_5 Loads to the Wastewater Treatment Plant

Wastewater Source	Existing (2010) (lb/d)	2015 (lb/d)	2020 (lb/d)	2025 (lb/d)	2030 (lb/d)	Buildout (lb/d)
Burlington UGA(1)	3,260	3,700	4,190	4,790	5,090	14,560
Western Service Area(2)	1,070	1,200	1,330	1,490	4,930	12,930
Samish Water District Pipeline(3)	510	510	120	120	120	120
Septage(4)	180	210	260	300	360	360
Total to WWTP	**5,020**	**5,620**	**5,900**	**6,700**	**10,500**	**27,970**

(1) Based on historical data, maximum month/annual average BOD_5 is 1.16.
(2) Based on historical data, maximum month/annual average BOD_5 is 1.48, except for 2030 and beyond, the ratio is estimated to be 1.16 (similar to Burlington UGA), because a larger portion of the wastewater will be domestic in origin.
(3) Based on historical data, maximum month/annual average BOD_5 is 1.50.
(4) Based on historical data, maximum month/annual average BOD_5 is 1.51.

Tables 5-38 and 5-39 show the estimated annual average and maximum TSS loads, respectively, throughout the planning period and for buildout conditions from the various wastewater contributors.

TABLE 5-38

Projected Total Annual Average TSS Loads to the Wastewater Treatment Plant

Wastewater Source	Existing (2010) (lb/d)	2015 (lb/d)	2020 (lb/d)	2025 (lb/d)	2030 (lb/d)	Buildout (lb/d)
Burlington UGA	2,600	2,950	3,340	3,820	4,060	11,610
Western Service Area	690	720	860	960	4,070	10,660
Samish Water District Pipeline	260	80	80	80	80	80
Septage	620	740	880	5,900	1,240	1,240
Total to WWTP	**4,170**	**4,540**	**5,260**	**6,750**	**9,450**	**23,590**

TABLE 5-39

Projected Total Maximum Month TSS Loads to the Wastewater Treatment Plant

Wastewater Source	Existing (2010) (lb/d)	2015 (lb/d)	2020 (lb/d)	2025 (lb/d)	2030 (lb/d)	Buildout (lb/d)
Burlington UGA(1)	2,830	3,220	3,640	4,160	4,430	12,650
Western Service Area(2)	970	1,090	1,210	1,350	4,470	11,620
Samish Water District Pipeline(3)	380	380	120	120	120	120
Septage(4)	1,240	1,480	1,760	2,080	2,480	2,480
Total to WWTP	**5,420**	**6,170**	**6,730**	**7,710**	**11,500**	**26,870**

(1) Based on historical data, maximum month/annual average BOD_5 is 1.09.
(2) Based on historical data, maximum month/annual average BOD_5 is 1.41, except for 2030 and beyond, the ratio is estimated to be 1.09 (similar to Burlington UGA), because a larger portion of the wastewater will be domestic in origin.
(3) Based on historical data, maximum month/annual average BOD_5 is 1.46.
(4) Based on historical data, maximum month/annual average BOD_5 is 2.00.

Table 5-40 shows a summary of the estimated hydraulic, BOD_5, and TSS loads to the wastewater treatment plant.

TABLE 5-40

Summary of Projected Totals to the Wastewater Treatment Plant

Parameter	Existing (2010)	2015	2020	2025	2030	Buildout
Annual Average Flow (mgd)	1.57	1.62	1.74	1.87	2.51	5.54
Maximum Month Flow (mgd)	2.33	2.46	2.55	2.70	3.55	7.36
Peak Hour Flow (mgd)	6.43	6.71	6.93	7.19	8.95	15.43
Annual Average BOD_5 (lb/d)	3,990	4,220	4,760	5,420	8,960	24,020
Maximum Month BOD_5 (lb/d)	5,020	5,620	5,900	6,700	10,500	27,970
Annual Average TSS (lb/d)	4,170	4,540	5,260	5,900	9,450	23,590
Maximum Month TSS (lb/d)	5,420	6,170	6,730	7,710	11,500	26,870

CHAPTER 6

COLLECTION SYSTEM ANALYSIS

INTRODUCTION

The City's wastewater collection system was analyzed for its ability to serve the future population and land use presented in Chapter 3, and the projected wastewater flow rates described in Chapter 5. The City's sewer system was organized into three categories for analysis:

- Pump Stations
- Force Mains
- Major Gravity Lines

The physical condition of the existing wastewater collection system was analyzed through review of previous reports, existing City sewer base maps and data, interviews with City staff, and drawdown testing of pump stations. A hydraulic model was developed to analyze the capacity of major gravity lines at buildout conditions at peak hour wet weather flow rates. The pump station and force main capacities were analyzed using the projected flow rates developed in Chapter 5. The results of the capacity analysis and estimates of physical condition were used to identify collection system components in need of rehabilitation or replacement.

EVALUATION OF PUMP STATIONS

The condition of the existing pump stations was evaluated through previous reports, interviews with City staff, run time records, drawdown testing, and projected wastewater flows. The existing pump stations are in serviceable condition. Station upgrades have been designed for Pump Station 6 and Pump Station 10, with the construction scheduled for 2014 and 2015, respectively.

SCADA AND TELEMETRY

All the lift stations are connected to SCADA or an auto-dialer. Most of the pump stations are connected by phone or fiber optic to an auto-dialer. The auto-dialer places a call if the pump station goes into an alarm mode. Five of the pump stations are connected into a supervisory control and data acquisition (SCADA) telemetry system located at the WWTP. The SCADA system offers the ability to monitor more information and to adjust functions and set points remotely. The City is planning to connect the remaining pump stations to the SCADA system.

FLOW METERS

Pump Stations 8 and 3 are equipped with flow meters on the discharge force main. Pump Station 6 has a flow meter on the inlet discharge from the Samish Water District force main. The flows from the remainder of the pump stations are by pump run time meters. In general, City staff record the pump run time hours three times a week for the majority of the pump stations and once a week for a few of the smaller pump stations. It is recommended that the City install flow meters on the remainder of the larger pump station force mains. The flow meters can be connected to the SCADA system when it has been installed. The flow meters will be able to save a considerable amount of staff time spent driving around and recording run time hours. In particular, the City should consider installing flow meters on pump stations which discharge to a common force main.

GENERATORS

Six of the 21 pump stations have on-site standby generators. The remaining pump stations utilize portable generators for standby power. However, all the pump stations have bypass connections which include the ability to install temporary bypass pumps to pump from the wet well into the force main. The planned upgrades to Pump Station 6 and Pump Station 10 include new permanent generators. It is recommended that some of the larger lift stations be provided with on-site generators to increase system reliability. The pump stations and the types of generators can be seen in Table 6-1.

TABLE 6-1

Pump Station Generator Data

Pump Station	Pump Horsepower	Generator Type
1	5	Portable
2	3	Portable
3	40	On-Site
4	3	On-Site
5	15	On-Site
6	25	On-Site
7	25	Portable
8	75	On-Site
9	15	Portable
10	10	Portable
11	25	On-Site
12	5	Portable
13	7.5	Portable
14	10	Portable
15	5	Portable
16	30	Portable
17	2	Portable
18	5	Portable
19	2	Portable
20	20	Portable
21	5	Portable

PUMP EFFICIENCY AND DRAWDOWN TESTING

Drawdown testing was performed by City staff for the majority of the pump stations. The City measured the time to pump down the wet well 1 foot with each pump. In addition, the time to fill the wet well 1 foot was measured. The drawdown capacity for each pump was calculated based on these measurements and the wet well size and volume for 1 foot of wet well height. Table 6-2 provides the pump station design capacities and the drawdown test capacities.

TABLE 6-2

Pump Station Drawdown Test Results

Pump Station	Pump Design Capacity (gpm)	Pump 1 Drawdown Capacity (gpm)	Pump 2 Drawdown Capacity (gpm)
1	495	497	541
2	390	420	392
3(1)	1,500 2,150	N/A	N/A
4	360	361	412
5(1)	675 915	915	1,061
6(1)	1,400 918	965	918
7	760	874	763
8(2)	2,950 3,700	N/A	N/A
9	645	725	646
10	400	407	408
11(2)	1,283 1,650	1,343	1,283
12	113	211	244
13(2)	290 740	384	390
14	130	131	138
15	297	306	297
16(3)	510	529	508
17(4)	N/A	N/A	N/A
18	194	211	194
19(3)	140	185	141
20(3)	305	305	305
21	120	N/A	N/A

(1) Pump Stations 3, 5, and 6 discharge to a common force main. The upper numbers in the capacity column indicate the conditions when all three pump stations discharge simultaneously to the force main. This number represents the rated capacity of the pump station. The lower numbers indicate the condition when each pump station is discharging by itself to the force main. The actual flow rate at any time would be somewhere between the two conditions.

(2) Pump Stations 8, 11, and 13 discharge to a common force main. The upper numbers in the capacity column indicate the conditions when all three pump stations discharge simultaneously to the force main. This number represents the rated capacity of the pump station. The lower numbers indicate the condition when each pump station is discharging by itself to the force main. The actual flow rate at any time would be somewhere between the two conditions.

(3) Pump Stations 16, 19, and 20 discharge to a common force main. The stated capacities for these pump stations have been obtained from drawdown tests and pump curves. No hydraulic analyses have been made on the force main system for these pump stations and it is unknown whether the pumps were operation alone or simultaneously with other pump stations when the drawdown tests were made.

(4) Pump information for Pump Station 17 pumps is not available.

The drawdown test results show that the pump capacities are at or above the design capacities. The drawdown pump results show that the Pump Station 13 pumps do not appear to be operating efficiently. The pump curves show these pumps operating near 40 percent efficiency, when they should be operating closer to the 70 to 80 percent efficiency range. It is recommended that more efficient and possibly higher capacity pumps be swapped out for the existing pumps at Pump Station 13. This could be done separately or concurrently with the installation of a permanent generator.

PUMP STATION CAPACITY

The City owns and operates 21 pump stations. An additional eight pump stations are anticipated as drainage basins are connected to the sewer system. The capacity evaluation of the pump stations was conducted by comparing the existing capacities to the projected wastewater flows. The evaluation includes the existing, 2015, 2020, 2025, 2030, and buildout projected peak hour wastewater flows. The existing pump station capacities are summarized in Chapter 4 and the projected wastewater flows are summarized in Chapter 5. The results of the pump station capacity evaluation can be seen in Table 6-3.

TABLE 6-3

Pump Station Capacity Evaluation

Pump Station	Existing (2010) Peak Hour Flow with I/I (gpm)	2015 Peak Hour Flow with I/I (gpm)	2020 Peak Hour Flow with I/I (gpm)	2025 Peak Hour Flow with I/I (gpm)	2030 Peak Hour Flow with I/I (gpm)	Buildout Peak Hour Flow with I/I (gpm)	Existing Capacity (gpm)
1. Pump Station 1	254	265	265	265	265	265	495
2. Pump Station 2	305	376	384	392	401	869	390
3. Pump Station 3	745	818	832	847	863	1,403	1,500
4. Pump Station 4	385	664	690	717	747	1,005	360
5. Pump Station 5	457	470	484	498	514	1,065	675
6. Pump Station 6	1,363	1,367	1,368	1,370	1,372	969	918
7. Pump Station 7	242	315	328	343	358	475	760
8. Pump Station 8	862	900	943	992	2,342	4,929	2,950
9. Pump Station 9	175	184	194	206	219	400	645
10. Pump Station 10	348	359	371	386	402	3,007	400
11. Pump Station 11	966	992	1,019	1,051	1,083	1,927	1,283
12. Pump Station 12	—	—	—	—	—	—	—
13. Pump Station 13	207	445	453	461	470	1,135	290
14. Pump Station 14	166	167	169	170	171	454	130
15. Pump Station 15	124	125	126	126	127	324	297
16. Pump Station 16	84	85	87	88	90	1,002	510
17. Pump Station 17 (1)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
18. Pump Station 18	52	54	56	58	61	91	194
19. Pump Station 19	20	20	20	20	20	132	140
20. Pump Station 20	20	20	20	20	20	1,072	305
21. Pump Station 21	36	109	115	121	128	170	120
38. East Fairhaven Pump Station	—	156	164	172	180	233	—
39. Peter Anderson Road Pump Station	—	64	67	71	74	97	—
40. Highway 20 Pump Station	—	162	170	178	187	241	—
41. Gages Slough Pump Station	—	205	215	225	237	304	—
42. North Peacock Lane Pump Station	—	72	76	80	84	109	—
47. Gilkey Road Pump Station	—	81	86	91	96	128	—
48. Pease Road Pump Station	—	40	43	45	48	64	—
49. Ovenell Road Pump Station	—	—	—	—	—	1,959	—

(1) Pump information for Pump Station 17 pumps is not available.

The analysis shows that Pump Stations 4 and 14 are currently slightly over their existing capacities. Pump Station 6 is also shown to be over capacity and Pump Station 10 is nearing existing capacity. Both Pump Stations 6 and 10 have been designed for upgrades and the projects are currently scheduled to be constructed in 2014 and 2016, respectively. Pump Station 2 is currently under capacity, but is projected to be at capacity between 2020 and 2025. Pump Station 13 is currently under capacity, but is anticipated to be over capacity by 2015 and is currently operating inefficiently as discussed earlier in this chapter. Pump Station 21 is anticipated to be at capacity in 2025. The remaining pump stations have capacity to serve flows until buildout conditions.

EVALUATION OF FORCE MAINS

The capacity of the City's force mains is tied directly to the pump station capacity evaluation. The existing force main capacity is based on a maximum design velocity of 8 feet per second (fps). However, the maximum velocity of 8 fps is not ideal and results in large head losses for longer force mains. The flow to each force main is equal to the flow to the lift stations which pump to that force main. Table 6-4 compares the pumping capacity of each of the pump stations with the force main capacities.

TABLE 6-4

Force Main Capacity Evaluation

Force Main	Existing Force Main Size (inches)	Existing Capacity [(1)] (gpm)	Existing (2010) Peak Hour Flow with I/I (gpm)	Buildout Peak Hour Flow with I/I (gpm)
Pump Station 1 [(2)]	6 8	705 1,253	254	265
Pump Station 2	8	1,253	305	869
Pump Station 4	8	1,253	385	1,005
Pump Station 6 [(3)]	12 14	2,820 3,838	1,363 2,565	969 3,437
Pump Station 7	12	2,820	242	475
Pump Station 8 [(4)]	20 24 14 20	7,832 11,279 3,838 7,832	1,069 2,035 1,018 1,018	6,419 8,346 4,173 4,301
Pump Station 9	10	1,958	175	400
Pump Station 10	12	2,820	348	3,007
Pump Station 12 [(5)]	4	313	—	113
Pump Station 14	6	705	166	454
Pump Station 15	6	705	124	324
Pump Station 16	8	1,253	84	1,002
Pump Station 17 [(5)]	3	176	—	23
Pump Station 18	4	313	52	91
Pump Station 19	6	705	20	132
Pump Station 20	6	705	20	1,072
Pump Station 21	4	313	36	170

(1) Existing capacity is based on a maximum force main velocity of 8 fps.

(2) Pump Station 1 has a 6-inch force main which increases to an 8-inch force main.

(3) Pump Stations 6 and 3 discharge to a 12-inch common force main. The force main increases to 14 inches as Pump Station 5 discharges to the force main.

(4) Pump Stations 8, 13, and the future McCorquedale Pump Station discharge to a 20-inch common force main. The force main increases to 24 inches as Pump Station 11 discharges to the force main. The flow from the 24-inch force main is split evenly between a 14-inch and 20-inch force main at South Anacortes Street. The future Gilkey Road Pump Station discharges into the 20-inch force main after the split.

(5) Existing flows were not calculated for Pump Stations 12 and 17 because of the small drainage basin area and the low flows seen in run time records. Pump information for Pump Station 17 pumps is not available.

The analysis shows that the Pump Station 4 force main will be near capacity under buildout flows. We recommend this force main be upsized to 10 inches when the pump station is upgraded. The 14-inch force main from Pump Station 6 is shown to be over capacity under buildout flows. This force main should be upsized as buildout flows are achieved. The 14-inch force main from Pump Station 8 is shown to be over capacity under buildout flows. However, the analysis splits the flows from the 24-inch force main equally between the 14-inch force main and 20-inch force main at South Anacortes Street. A plug valve on each of the force mains that can be throttled to split the flows to between the two force mains and the combination of both force mains can accept the buildout flows. The Pump Station 10 force main is slightly over capacity under buildout flows. This force main is long, so a larger force main or a parallel force main should be constructed as buildout flows are achieved.

HYDRAULIC MODEL

A hydraulic model of the City’s wastewater collection system is presented in this section, including a description of model development and the assumptions used in the model. This model has two main functions: (1) to provide information to develop recommended improvements to convey the projected flow rates, and (2) to evaluate the system with the recommended capital improvements to verify capacity. The model can be updated and maintained for use as a tool to aid in future planning and design.

MODEL DEVELOPMENT

Physical Model

The major gravity sewer lines of the City’s sewer system were modeled using SewerCAD. Figure 6-1 shows the sewer lines that were included in the hydraulic model.

The hydraulic model was developed from record drawing information provided by the City. The accuracy of the hydraulic model results depends on the accuracy of the data input to the model. In some cases, reliable invert elevations of manholes were not known, and invert elevations were linearly interpolated between known invert elevations upstream and downstream. Data used in the hydraulic model is shown in Table 6-5.

TABLE 6-5

Sewer System Information from City Data

Category	Gravity Sewers	Manholes
Number	Pipe ID number based on upstream manhole number	Manhole number based on City's numbering convention
Dimension	Length from City records	Not applicable
Elevation	Upstream and downstream pipe invert elevations from City records	Ground elevations from City records
Size	Pipe diameters from City records	Assumed 48-inch manhole size
Flow Criteria	Assumed Manning's roughness coefficient of 0.013 which corresponds to average concrete pipe	Not applicable

Sewage Flow Model

The hydraulic model was used to simulate peak hour flow rates for the projected buildout flow conditions. Sanitary sewer flow projections determined in Chapter 5 were applied for each of the sewer drainage basins.

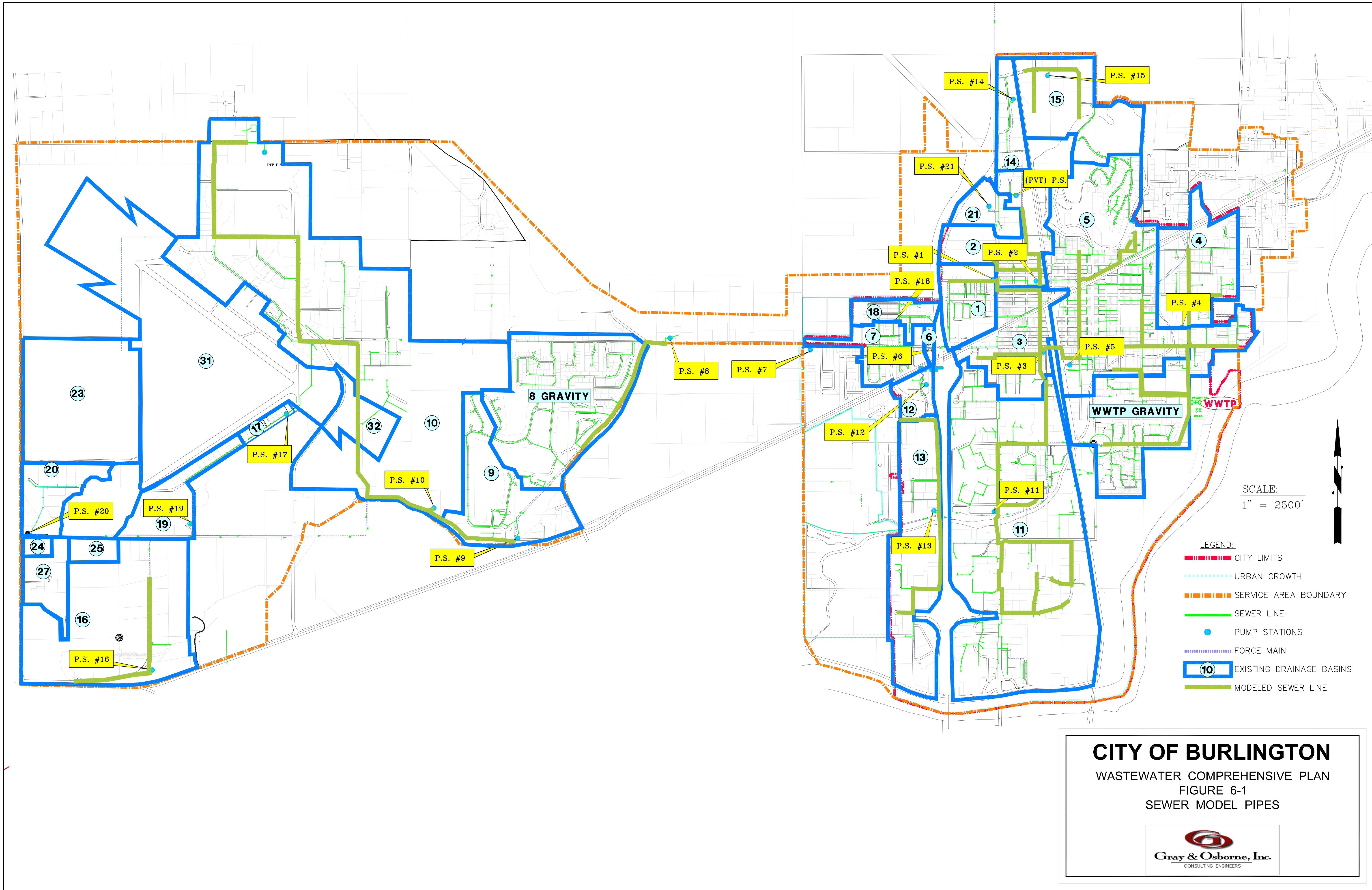
For the existing sewer drainage basins with 10-inch or larger sewer pipes, the projected buildout flows were distributed within the drainage basins. Flows from pump stations were input at the force main discharge manholes. For proposed drainage basins, flows were input at the anticipated gravity drainage discharge or force main discharge manhole. Only the existing sewer system was modeled and it was assumed that when future drainage basins are connected to the system, new pipes will be sized to receive projected flows. Appendix E provides the distribution and flow rates input into the sewer model.

Model Evaluation Criteria

The buildout model run identifies sewers that may be hydraulically deficient if a peak hour flow event including infiltration and inflow happened with the estimated buildout flow conditions. The criteria for listing a gravity sewer pipe as "deficient" are that at peak hour flow, the flow exceeds the capacity of the pipe. The capacity of the pipe is calculated using Reynold's equation assuming that the pipe is flowing full. The slope of the pipe is calculated using pipe length and the difference between the pipe invert elevations as recorded in the City's record drawing data. Pipes that marginally exceed their capacity may result in an acceptable surcharge, i.e., a surcharge level in the upstream manhole that does not flood.

RESULTS OF HYDRAULIC MODELING ANALYSIS

The model was run with the projected buildout sanitary and I/I flow rates, and the capacities of the existing sewer pipes were compared to the estimated peak hour flow



CITY OF BURLINGTON

WASTEWATER COMPREHENSIVE PLAN
FIGURE 6-1
SEWER MODEL PIPES

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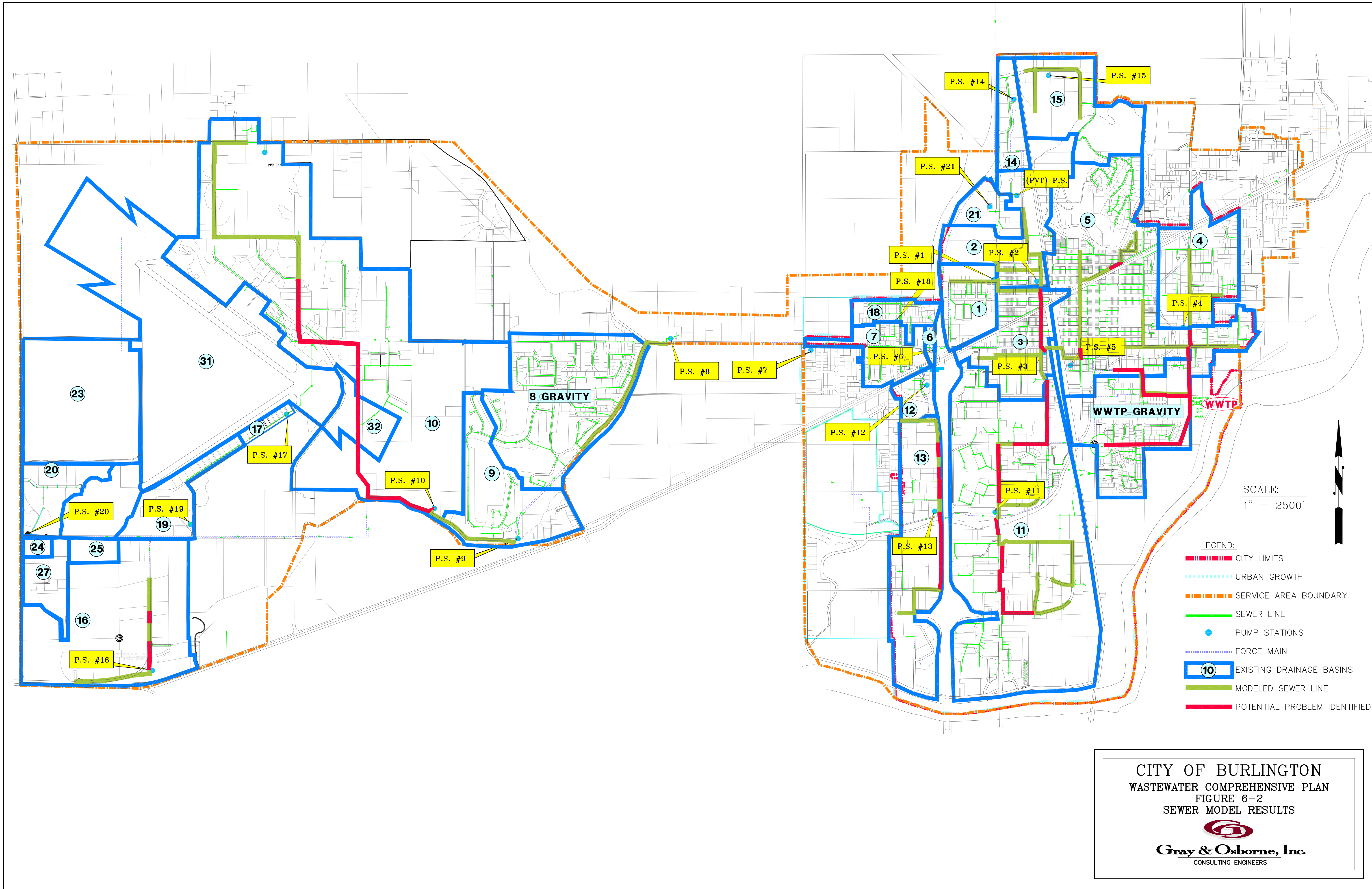

P.S. #14
P.S. #15
P.S. #21
(PVT) P.S.
P.S. #1
P.S. #2
P.S. #18
P.S. #4
P.S. #5
P.S. #6
P.S. #3
P.S. #7
P.S. #8
8 GRAVITY
WWTP GRAVITY
WWTP
P.S. #12
P.S. #11
P.S. #13
P.S. #17
P.S. #10
P.S. #9
P.S. #20
P.S. #19
P.S. #16
SCALE:
1" = 2500'
N
LEGEND:
CITY LIMITS
URBAN GROWTH
SERVICE AREA BOUNDARY
SEWER LINE
PUMP STATIONS
FORCE MAIN
EXISTING DRAINAGE BASINS
MODELED SEWER LINE
POTENTIAL PROBLEM IDENTIFIED
CITY OF BURLINGTON
WASTEWATER COMPREHENSIVE PLAN
FIGURE 6-2
SEWER MODEL RESULTS
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rates. The projected buildout flow rates can be used to size components for new projects; however, they are very conservative. Table 6-6 provides information on all the existing system components with that may have insufficient capacity under buildout conditions and Figure 6-2 shows the locations of the deficient pipes. These include pipes that have acceptable surcharge levels. Full-size maps of the deficient pipes can be seen in Appendix F.

TABLE 6-6

Hydraulic Model Results – Deficiencies at Projected Buildout Conditions

Pipe Label	Wastewater Flow (gpd)	Capacity Exceedance (gpm)	Existing Pipe Size	Pipe Size Required to Accept Flow
P-1177	4,809,600	2,274	10 inch	18 inch
P-1178	4,809,600	2,850	10 inch	21 inch
P-1179	4,809,600	2,794	10 inch	21 inch
P-1180	4,809,600	2,895	10 inch	24 inch
P-1181	4,809,600	2,811	10 inch	21 inch
P-1182	4,809,600	2,855	10 inch	21 inch
P-1183	4,809,600	2,837	10 inch	21 inch
P-1184	4,809,600	2,328	10 inch	18 inch
P-1185	1,512,000	668	8 inch	12 inch
P-1186	1,512,000	442	8 inch	10 inch
P-1187	1,512,000	266	8 inch	10 inch
P-1188	1,512,000	151	8 inch	10 inch
P-1189	1,512,000	130	8 inch	10 inch
P-1190	1,512,000	151	8 inch	10 inch
P-1201	1,356,480	161	8 inch	10 inch
P-1202	1,356,480	165	8 inch	10 inch
P-1203	1,356,480	84	8 inch	10 inch
P-1222	1,356,480	175	8 inch	10 inch
P-1223	1,356,480	339	8 inch	10 inch
P-1225	1,356,480	572	8 inch	12 inch
P-1226	1,045,440	396	8 inch	12 inch
P-1227	1,045,440	482	8 inch	15 inch
P-1236	1,045,440	306	8 inch	12 inch
P-1238	1,045,440	464	8 inch	12 inch
P-1239	1,045,440	391	8 inch	12 inch
P-1240	734,400	115	8 inch	10 inch
P-1241	734,400	113	8 inch	10 inch
P-1242	734,400	111	8 inch	10 inch
P-1245	734,400	117	8 inch	10 inch
P-1246	734,400	138	8 inch	10 inch

TABLE 6-6 (continued)

Hydraulic Model Results – Deficiencies at Projected Buildout Conditions

Pipe Label	Wastewater Flow (gpd)	Capacity Exceedance (gpm)	Existing Pipe Size	Pipe Size Required to Accept Flow
P-1324	882,720	283	10 inch	15 inch
P-1323	882,720	302	10 inch	15 inch
P-1321	462,240	36	10 inch	12 inch
P-278	1,926,720	612	12 inch	18 inch
P-287	1,926,720	533	12 inch	15 inch
P-292	1,926,720	584	12 inch	15 inch
P-293	1,926,720	577	12 inch	15 inch
P-294	1,779,840	166	12 inch	15 inch
P-295	1,779,840	808	10 inch	15 inch
P-448	802,080	211	8 inch	10 inch
P-445	802,080	171	8 inch	10 inch
P-444	594,720	37	8 inch	10 inch
P-443	594,720	61	8 inch	10 inch
P-441	594,720	50	8 inch	10 inch
P-452	584,640	29	8 inch	10 inch
P-453	584,640	95	8 inch	10 inch
P-454	584,640	31	8 inch	10 inch
P-455	584,640	34	8 inch	10 inch
P-456	584,640	53	8 inch	10 inch
P-556	1,388,160	73	12 inch	15 inch
P-555	1,388,160	148	12 inch	15 inch
P-523	1,388,160	292	10 inch	12 inch
P-515	1,110,240	312	10 inch	15 inch
P-506	1,110,240	288	10 inch	12 inch
P-505	1,110,240	147	8 inch	10 inch
P-504	1,110,240	422	8 inch	12 inch
P-500	1,110,240	413	8 inch	12 inch
P-499	1,110,240	170	8 inch	10 inch
P-498	1,110,240	441	8 inch	12 inch
P-538	1,110,240	443	8 inch	12 inch
P-536	555,840	43	8 inch	10 inch
P-535	555,840	64	8 inch	10 inch
P-534	555,840	35	8 inch	10 inch
P-568	1,108,800	77	10 inch	12 inch
P-572	1,108,800	228	10 inch	12 inch
P-588	1,108,800	138	10 inch	12 inch

TABLE 6-6 (continued)

Hydraulic Model Results – Deficiencies at Projected Buildout Conditions

Pipe Label	Wastewater Flow (gpd)	Capacity Exceedance (gpm)	Existing Pipe Size	Pipe Size Required to Accept Flow
P-591	1,108,800	232	10 inch	12 inch
P-595	1,108,800	7	10 inch	12 inch
P-652	554,400	38	8 inch	10 inch
P-670	554,400	29	8 inch	10 inch
P-671	554,400	34	8 inch	10 inch
P-647	554,400	4	8 inch	10 inch
P-646	554,400	28	8 inch	10 inch
P-645	554,400	25	8 inch	10 inch
P-644	554,400	25	8 inch	10 inch
P-643	554,400	31	8 inch	10 inch
P-642	554,400	24	8 inch	10 inch
P-641	554,400	11	8 inch	10 inch
P-683	1,222,560	141	12 inch	15 inch
P-166	1,222,560	164	12 inch	15 inch
P-105	459,360	7	8 inch	10 inch
P-777	8,036,640	4,064	10 inch	18 inch
P-780	2,050,560	277	12 inch	15 inch
P-781	2,050,560	637	12 inch	15 inch
P-786	2,050,560	615	12 inch	15 inch
P-17	1,846,080	263	10 inch	10 inch
P-18	1,447,200	91	12 inch	15 inch
P-718	5,986,080	3,665	10 inch	24 inch
P-314	5,986,080	3,652	10 inch	24 inch
P-714	5,986,080	3,781	10 inch	27 inch
P-712	5,986,080	3,862	10 inch	27 inch
P-709	5,986,080	3,704	10 inch	24 inch
P-707	5,986,080	3,716	10 inch	24 inch
P-705	5,986,080	3,728	10 inch	24 inch
P-703	5,986,080	3,732	10 inch	24 inch
P-697	5,986,080	3,602	10 inch	24 inch
P-691	5,986,080	3,297	12 inch	24 inch
P-774	6,508,800	1,616	21 inch	27 inch
P-773	6,508,800	1,620	21 inch	27 inch
P-770	6,508,800	1,561	21 inch	27 inch
P-769	6,508,800	1,589	21 inch	27 inch
P-764	6,508,800	1,646	21 inch	27 inch

TABLE 6-6 (continued)

Hydraulic Model Results – Deficiencies at Projected Buildout Conditions

Pipe Label	Wastewater Flow (gpd)	Capacity Exceedance (gpm)	Existing Pipe Size	Pipe Size Required to Accept Flow
P-739	6,508,800	1,948	18 inch	24 inch
P-736	6,304,320	2,399	18 inch	27 inch
P-735	6,304,320	2,386	18 inch	27 inch
P-731	6,304,320	1,711	18 inch	24 inch
P-730	6,304,320	313	18 inch	21 inch
P-728	6,304,320	2,222	18 inch	24 inch
P-729	6,304,320	2,238	18 inch	24 inch

The analysis shows that approximately 100 sections of gravity sewer pipe will not have capacity to accept projected buildout sanitary and I/I peak hour wastewater flows. The analysis also shows that the vast majority of these pipe sections only need to be upsized one pipe size to accept the projected flows. For this reason, we do not recommend any immediate upgrades to sewer pipes based on the hydraulic modeling analysis. As future development occurs and new drainage basins are added to the collection system, the projected wastewater flows should be updated and checked in the hydraulic model. As existing sewer pipes are repaired or replaced, the City should consider upsizing these pipes to accept the projected buildout flows. In general, the cost to upsize a gravity sewer pipe by one size is relatively minor.

The analysis also shows that the existing 18-inch and 21-inch gravity sewer pipes on Gilkey Road will not have the capacity accept projected buildout sanitary and I/I peak hour wastewater flows. However, if the plug valve on the Pump Station 8 force main is throttled, more of the flow can be sent to the 21-inch gravity sewer pipe off Skagit Street and the combination of both gravity pipes can accept the projected buildout flows.

INFILTRATION AND INFLOW

Infiltration and inflow rates were developed in Chapter 5 for each of the existing drainage basins within the City of Burlington service area. The City has an ongoing annual I/I reduction program. The program has been successful in identifying pipes in need of repair and reducing the amount of I/I entering the sanitary sewer system. We recommend that the City continue the I/I reduction program. Eliminating excessive I/I flow can reduce the wear and tear and operating costs at the lift stations and for equipment at the WWTP. In addition, upgrades may be delayed for future facilities such as pump stations, force mains, and gravity sewer lines. One of the most cost-effective methods of identifying sources of I/I is through smoke testing. As discussed in Chapter 5, the following are the recommended priorities for smoke testing and inflow reduction:

1. Bayview Ridge Residential Area
2. Pump Station 1 Drainage Area
3. Pump Station 7 Drainage Area, except Pump Station 18 Drainage Area
4. Old Downtown Area
5. Pump Station 15 Drainage Area
6. Port of Skagit County
7. Remainder of system

CHAPTER 7

WASTEWATER TREATMENT PLANT ANALYSIS

INTRODUCTION

The purpose of this chapter is to evaluate the City of Burlington wastewater treatment plant (WWTP) for its ability to meet its treatment objectives based on projected future flow and loading rates. The projected flow and loading rates for the planning period (2010 to 2030) were determined in Chapter 5. The treatment plant effluent quality must meet the requirements in the current National Pollution Discharge Elimination System (NPDES) permit for 5-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), fecal coliform, and pH (Table 4-5) at these projected conditions. Modifications to increase the operational efficiency or performance of the WWTP will also be recommended. The hydraulic capacity of the treatment plant will be evaluated at the projected peak hour flow.

The WWTP has consistently met its permit effluent limits for BOD_5 and TSS removal since the last upgrade (2001).

PROJECTED FLOW AND LOADING RATES

Table 7-1 presents a comparison of the NPDES-permitted capacity for flow and loading with the projected flow and loading rates that were developed in Chapter 5. Based on these projections, the permitted maximum month (MM) BOD_5 and TSS loading rates may be exceeded around 2025 if the City experiences the growth discussed in Chapter 3. The maximum month flow (MMF) rate will not exceed the permitted capacity, even if the Bayview Ridge Residential Area is developed.

The City's NPDES permit (Appendix A) mandates that when the monthly average flow or loading reaches 85 percent of the capacity listed in the permit for 3 consecutive months or it is projected that the facility would reach design capacity within 5 years, the City must submit a plan to maintain adequate capacity (PMAC) to the Washington State Department of Ecology (Ecology). These requirements are typical in NPDES permits because sufficient time is needed to plan, design, and construct additional capacity. The maximum month influent flow, BOD_5, or TSS have never exceeded 85 percent of the NPDES-permitted design criteria during the past 4 years. Due to continued projected growth in the community, the treatment plant may exceed the 85 percent threshold for maximum month BOD_5 within the next 10 to 15 years, and for the maximum month TSS loads within the next 5 to 10 years. It should be emphasized that the existing and projected flows and loads presented in Table 7-1 include the contracted capacities for the Samish Water District and the Skagit Valley Resort and Casino. The actual discharges from these entities rarely approach their contracted capacities at the present time.

TABLE 7-1

Comparison of NPDES-Permitted Capacity to Current and Projected Flow and Loading Rates

	NPDES Permit Capacity(1)	Existing (2010)	Projections			
			2015	2020	2025	2030
Average Annual Flow (mgd)	NI(2)	1.57	1.62	1.79	1.87	2.51
Maximum Month Flow (mgd)	3.79	2.33	2.46	2.55	2.70	3.55
Peak Hour Flow (mgd)	NI	6.43	6.71	6.93	7.19	8.95
Maximum Month BOD_5 Loading (lb/d)	7,356	5,020	5,620	5,900	6,900	10,500
Maximum Month TSS Loading (lb/d)	7,660	5,420	6,170	6,730	7,710	10,500

(1) Condition S4.A of City's NPDES permit (see Appendix A).
(2) NI = Not included in NPDES permit.

TREATMENT EVALUATION AT PROJECTED FLOW AND LOADING RATES

OVERVIEW

This section provides an evaluation of the capacity of the liquid and solids treatment processes to treat the projected flow and loading rates. The resulting process loading rates are compared to accepted design criteria for each treatment process as presented in Table 4-6.

This section also provides a brief analysis of each component and the applicable criteria, and develops recommended improvements. Some of the more detailed capacity analyses were presented in Chapter 4.

INFLUENT PUMP STATION

The capacity of the existing influent pump station will be exceeded within the next few years. Improvements would include the replacement of existing pumps with higher capacity pumps since the structures and piping should have the capacity to accommodate buildout peak hour flows. At the buildout peak hour flow of 15.55 mgd, the velocity in the two 16-inch-diameter force mains would be 8.6 feet per second; it is desirable to keep this velocity at less than 8 feet per second. However, as the influent pumps are equipped with variable frequency drives, this velocity may be acceptable for short periods of time.

HEADWORKS

The existing headworks consist of a Parshall flume flow meter and a fine screen. The Parshall flume influent flow meter has a capacity of 21.4 mgd, which is more than adequate for buildout conditions. The existing influent screen has a rated peak hour flow capacity of 7.99 mgd, which should be adequate until the Bayview Ridge Residential Area is fully developed (assumed to take place in 2030). The City of Burlington, however, plans to add a second influent screen to the headworks in 2011, bringing the total influent screening capacity to 15.98 mgd. This capacity should be adequate through buildout conditions. The existing influent screen is about 14 years old. The installation of a second screen will reduce the wear of the existing screen and increase the life of the installation.

PRIMARY CLARIFIERS

The primary clarifiers have a maximum month flow capacity of 3.81 mgd and a peak hour flow capacity of 11.4 mgd. This will be adequate throughout the 20-year planning horizon. The mechanisms for the two smaller primary clarifiers (1A and 1B) are almost 40 years old. The City of Burlington should consider overhauling or replacing these clarifier mechanisms in the near future.

AERATION BASINS

The existing aeration basins are estimated to have a capacity equivalent to an influent maximum month BOD_5 load of 8,116 pounds per day. This load is estimated take place sometime between 2025 and 2030. Therefore, an expansion of aeration basin capacity is not an immediate concern. However, if major development occurs, a detailed evaluation of the aeration and possible improvements would be warranted.

SECONDARY CLARIFIERS

The capacity of the secondary clarifiers is limited to a peak hour flow of 7.80 mgd based on the cursory analysis presented in Chapter 4. This would be adequate until major development takes place in the Bayview Ridge Residential Area (or elsewhere). It is recommended that when major developments are being planned, a capacity analysis be performed for the secondary clarifiers based on peak solids loading rates and MLSS inventory shifts (storage of MLSS in the secondary clarifiers will result in a lower MLSS in the aeration basins during peak flows, resulting in a lower MLSS in the aeration basins and a possible higher allowable flow rate to the secondary clarifiers). It is possible that simple improvements, such as the installation of Stamford baffles in the existing secondary clarifiers, would increase the allowable loading rates.

As for the primary clarifiers, the mechanisms for the two smaller secondary clarifiers (1A and 1B) are almost 40 years old. The City of Burlington should consider overhauling or replacing these clarifier mechanisms in the near future.

ULTRAVIOLET DISINFECTION SYSTEM

The existing ultraviolet disinfection system was originally designed for a maximum month flow of 3.79 mgd. At this capacity, existing ultraviolet disinfection system should be adequate throughout the planning period. The ultraviolet structure has an unused parallel channel in which future ultraviolet disinfection equipment could be installed, resulting in a doubling of the capacity of the system to a maximum month flow of 7.58 mgd. This is greater than the maximum month flow under buildout conditions.

EFFLUENT PUMP STATION

The existing effluent pump station has a capacity of 14.3 mgd, which is more than adequate for the planning period.

OUTFALL

The outfall piping system has a capacity of about 11.2 mgd. This is more than adequate for the planning period.

GRAVITY THICKENER

The gravity thickener, thickening primary sludge subsequent to grit removal, has an equivalent maximum month TSS load capacity of 19,600 pounds per day, which is more than adequate for the 20-year planning period. However, the mechanism for the thickener is almost 40 years old. The City of Burlington should consider overhauling or replacing the gravity thickener mechanism in the near future.

WASTE ACTIVATED SLUDGE (WAS) ROTARY DRUM THICKENER

The WAS rotary drum thickener has an estimated capacity equivalent to a maximum month BOD_5 load of 8,565 pounds per day. This would be adequate until 2030, when it is estimated that the Bayview Ridge Residential Area develops. When this area develops, the thickener should be replaced with equipment with a capacity to be determined at that time.

ANAEROBIC DIGESTERS

The capacity of the anaerobic digestion system is basically the same at the maximum month permitted BOD_5 and TSS loads to the wastewater treatment plant, 7,356 pounds per day and 7,660 pounds per day, respectively (see Table 7-1). This means that the capacity of the anaerobic digesters may be exceeded sometime around 2025, based on the assumptions regarding growth presented in this Plan. Provisions have been made for the installation of a second primary digester, which would double the capacity of the anaerobic digester system. It is recommended that planning for the installation of this second primary digester be initiated within the next 10 years so that construction of this new digester may be completed before the influent loads reach the limiting capacities of the digestion system.

The anaerobic digestion system is also in need of several other improvements in order to improve maintenance of the system:

- The digested boiler and gas piping should be upgraded to remove moisture in the digester gas. Moisture is highly corrosive to the boiler and results in excessive maintenance and parts replacement.

- The digester recirculation centrifugal pumps should be replaced with positive displacement pumps in order to reduce cavitation due to digester gas being released.

- Some valves on the sludge piping are subject to struvite formation resulting in inoperable valves. These valves should be replaced with glass-lined valves.

These improvements should be implemented as soon as possible.

SLUDGE DEWATERING

The capacity of existing belt filter press used for digested sludge dewatering exceeds projected 2030 wastewater loads.

SLUDGE DRYING

The sludge drying unit producing Class A biosolids would provide adequate capacity if operated approximately 24 hours per day 20 days per month under 2030 maximum month load conditions. This operational schedule will be feasible utilizing the existing sludge dryer.

RECOMMENDED WWTP PLAN

Although only a few immediate improvements are required at the City of Burlington wastewater treatment facility, it is recommended that some planning take place to ensure that the wastewater treatment facility has the required capacity when the need arises. It is recommended that the City of Burlington take the following actions in order to provide for the future wastewater treatment needs for the community:

1. **Immediate Actions:**

   - Increase the capacity of the influent pump station to a peak hour flow rate of 9.31 mgd (6,465 gpm). This should provide adequate capacity through 2030.
   - Install the second influent screen. The screen has already been budgeted for and ordered by the City of Burlington. It is scheduled for delivery in September 2011.
   - Implement modifications to the digester gas piping and boiler, digester recirculation pumps, and digester piping valves.
   - Perform as assessment to determine the remaining useful life of the mechanisms for Primary Clarifiers 1A and 1B, Secondary Clarifiers 1A and 1B, and the gravity primary sludge thickener.

2. **Actions to Be Taken Before 2015:**

   - Refurbish or replace the mechanisms for Primary Clarifiers 1A and 1B, Secondary Clarifiers 1A and 1B, and the gravity primary sludge thickener, if required.

3. **Actions to Be Taken during the Period of 2015 to 2020:**

   - Prepare a Design Report to add the second primary digester.

4. **Actions to Be Taken during the Period of 2020 to 2025:**

   - Design and construct a second primary digester.
   - Prepare a Predesign Report to increase aeration basin capacity.

5. **Actions to Be Taken during the Period of 2025 to 2030:**

   - Design and construct increased aeration basin capacity.
   - Prepare a Predesign Report to increase secondary clarifier capacity and WAS thickening capacity.

WATER RECLAMATION AND REUSE EVALUATION

INTRODUCTION

The State Legislature has declared there is “a primary interest in the development of facilities to provide reclaimed water to replace potable water in non-potable applications, to supplement existing surface and groundwater supplies, and to assist in meeting the future water requirements of the state.” In accordance with this declaration and

RCW 90.48, this Wastewater Comprehensive Plan must evaluate the potential for water reuse.

Wastewater reclamation and reuse can have benefits for a community's water supply and wastewater management. Production of reclaimed water for use in non-potable applications can be especially beneficial to public water systems facing water supply shortages through physical or water rights supply limitations. Reclaimed water can delay or eliminate the need for additional water rights or potable water system capital improvements. The utility may be able to generate additional revenue by selling reclaimed water. Reclaimed water, in some cases, may be stored in the groundwater aquifer and recovered for later use by the utility. Water reclamation may also provide benefits to wastewater disposal responsibilities where receiving water constraints preclude increased discharge into a surface water body. Beyond the benefits to utilities, reclaimed water may provide environmental and aesthetic benefits to the community, such as augmenting stream flow, creating wetlands habitat, or improving recreation facilities.

This chapter presents a brief evaluation of the feasibility of reclaiming effluent from the WWTP and reusing it in the City.

WATER RECLAMATION AND REUSE STANDARDS IN THE STATE OF WASHINGTON

In contrast to effluent disposal, water reclamation (i.e., reuse of treated effluent) is management of integrated water resources. In the State of Washington, any type of direct beneficial reuse of municipal wastewater is defined as water reuse or reclamation. Water Reuse and Reclamation (WRR) Standards have been issued jointly by the Departments of Health (DOH) and Ecology. This discussion is based on the current standards dated September 1997, which are adopted by reference in RCW Chapter 90.46, Reclaimed Water Use.

Reuse standards for the State of Washington were developed following an analysis of similar standards used in the States of California, Arizona, Texas, and Florida where reuse of municipal wastewater has been underway for many years.

The State of Washington reuse standards for municipal wastewater can be broken down into the four following areas:

1. Treatment Standards
2. Allowable Uses of Reclaimed Water
3. Use Area Requirements
4. Operational and Reliability Requirements

A key difference between water reuse and effluent disposal is in the level of reliability required within the treatment process, distribution, and use areas. The State of

Washington's reuse treatment standards call for continuous compliance, meaning that the treatment standard must be met on a constant basis or the treated water cannot be used as reclaimed water.

Treatment Standards

The State of Washington's standards for municipal wastewater reuse have four classifications (Classes A, B, C, and D) based on the type of treatment provided, as shown in Table 7-2. Class A reclaimed water, the highest classification, is generally required for uses with potential for public contact. Under RCW 90.46, Class A reclaimed water means reclaimed water that, at a minimum, is at all times an oxidized, coagulated, filtered, disinfected wastewater. To meet Class A reclaimed water standards, the facility effluent must be coagulated and filtered in order to meet a turbidity standard. Reclaimed water must be disinfected to meet a coliform standard that is much stricter than the standard for secondary effluent.

TABLE 7-2

State of Washington Reclaimed Water Treatment Standards

Reuse Class	Continuously Oxidized (1)	Continuously Coagulated (2)	Continuously Filtered (3)	Disinfection Total Coliform Density(4) 7-Day Median Value	Single Sample
D	Yes	No	No	≤ 240/100 ml	no standard
C	Yes	No	No	≤ 23/100 ml	240/100 ml
B	Yes	No	No	≤ 2.2/100 ml	23/100 ml
A	Yes	Yes	Yes	≤ 2.2/100 ml	23/100 ml

(1) Oxidized wastewater is defined as wastewater in which organic matter has been stabilized such that the BOD_5 does not exceed 30 mg/L and the TSS does not exceed 30 mg/L (monthly average basis), is non-putrescable (does not have a foul smell), and contains dissolved oxygen.

(2) Coagulated wastewater is defined as an oxidized wastewater in which colloidal and finely divided suspended matter have been destabilized and agglomerated prior to filtration by the addition of chemicals or an equally effective method.

(3) Filtered wastewater is defined as an oxidized, coagulated wastewater that has been passed through natural undisturbed soils or filter media, such as sand or anthracite, so that the turbidity as determined by an approved laboratory method does not exceed an average operating turbidity of 2 nephelometric turbidity units (NTU), determined monthly, and does not exceed 5 NTU at any time.

(4) Disinfection is a process that destroys pathogenic organisms by physical, chemical, or biological means. The disinfection standards use coliform density as the measure of pathogen destruction. DOH recommends that a chlorine residual of 0.5 mg/L be maintained during conveyance from the reclamation facility to the use area to avoid biological growth.

Allowable Uses of Reclaimed Municipal Wastewater

Allowable water reuse methods are presented in Table 7-3. Most of these methods provide limited potential due to the relatively small quantities and seasonal nature of the reuse method. Two reuse methods that offer the potential for 100 percent reuse on a year-round basis are groundwater recharge and stream flow augmentation.

However, the general basis for the reuse criteria is that when unlimited public access to the reclaimed water is involved, the criteria will require Class A reclaimed water. Essentially, this means that for a water reclamation project to have any degree of flexibility as well as a potential for relatively unrestricted use, the reclaimed water should meet the Class A reuse standard.

TABLE 7-3

Allowable Uses of Reclaimed Water

Use	Class of Reclaimed Water Required			
	A	B	C	D
Irrigation of Non-Food Crops				
Trees and Fodder, Fiber, and Seed Crops	Yes	Yes	Yes	Yes
Sod, Ornamental Plants for Commercial Use, Pasture to Which Milking Cows or Goats Have Access	Yes	Yes	Yes	No
Irrigation of Food Crops				
Spray Irrigation				
All food crops	Yes	No	No	No
Food crops which undergo physical or chemical processing sufficient to destroy all pathogenic agents	Yes	Yes	Yes	Yes
Surface Irrigation				
Crop	Yes	Yes	No	No
Root crops	Yes	No	No	No
Orchards and vineyards	Yes	Yes	Yes	Yes
Landscape Irrigation				
Restricted Access Areas (e.g., cemeteries, freeway landscaping)	Yes	Yes	Yes	No
Open Access Areas (e.g., golf courses, parks, playgrounds, etc.)	Yes	No	No	No
Impoundments				
Landscape Impoundments	Yes	Yes	Yes	No
Restricted Recreational Impoundments	Yes	Yes	No	No
Non-Restricted Recreational Impoundments	Yes	No	No	No
Fish Hatchery Basins	Yes	Yes	No	No
Decorative Fountains	Yes	Yes	No	No
Other Uses				
Flushing of Sanitary Sewers	Yes	Yes	Yes	Yes
Street Cleaning				
Street sweeping, brush dampening	Yes	Yes	Yes	No
Street washing, spray	Yes	No	No	No
Washing of Corporation Yards, Lots, and Sidewalks	Yes	Yes	No	No
Dust Control (dampening unpaved roads, other surfaces)	Yes	Yes	Yes	No

TABLE 7-3 (continued)

Allowable Uses of Reclaimed Water

Use	Class of Reclaimed Water Required			
	A	B	C	D
Other Uses (continued)				
Dampening of Solid for Compaction (construction, landfills, etc.)	Yes	Yes	Yes	No
Water Jetting for Consolidation of Backfill Around Reclaimed Water, Sewage, Storm Drainage, Gas, Electrical Pipelines	Yes	Yes	Yes	No
Fire Fighting Protection				
Dumping from aircraft	Yes	Yes	Yes	No
Hydrants or sprinkler systems in buildings	Yes	No	No	No
Toilet and Urinal Flushing	Yes	No	No	No
Ship Ballast	Yes	Yes	Yes	No
Washing Aggregate and Making Concrete	Yes	Yes	Yes	No
Industrial Boiler Feed	Yes	Yes	Yes	No
Industrial Cooling				
Aerosols or other mist not created	Yes	Yes	Yes	No
Aerosols or other mist created (e.g., cooling towers, spraying)	Yes	No	No	No
Industrial Process				
Without exposure to workers	Yes	Yes	Yes	No
With exposure of workers	Yes	No	No	No

Use Area Requirements

The WRR standards establish criteria for siting and identifying water reclamation projects and their facilities. Water reclamation storage facilities, valves, and piping must be clearly labeled and no cross connections between potable water and reclaimed water lines are allowed. A key area requirement for a water reclamation project is setback distance. Table 7-4 summarizes setback requirements for water reclamation facilities.

TABLE 7-4

Setback Distances for Reclaimed Water in the State of Washington

Reclaimed Water Use/Facility	Minimum Distance to Potable Water Well			
	Class A	**Class B**	**Class C**	**Class D**
Spray or Surface Irrigation	50 feet	50 feet	100 feet	300 feet
Unlined Storage Pond or Impoundment	500 feet	500 feet	500 feet	1,000 feet
Lined Storage Pond or Impoundment	100 feet	100 feet	100 feet	200 feet
Pipeline	50 feet	100 feet	100 feet	300 feet
Minimum Distance Between Irrigation Area and Public Areas	0 foot	50 feet	50 feet	100 feet

Operational and Reliability Requirements

Under the reuse standards there are a number of operational and reliability requirements for a water reclamation facility. Some key requirements are summarized below:

1. Minimum Class III Operator
2. Critical equipment and process failures must be signaled by an alarm
3. Emergency storage/disposal in event of facility failure
4. Operating records provided to DOH as well as Ecology
5. No bypass reuse areas of untreated or partially treated water
6. A standby power supply or long-term disposal or storage facilities

POTENTIAL FOR REUSE IN THE CITY OF BURLINGTON

The potential benefits and uses of reclaimed water were evaluated for applicability to the City of Burlington.

Upland Water Reuse

The Skagit River reach near the City's effluent discharge meets all the applicable water quality standards. Ecology has determined that the City's effluent discharge does not have a reasonable potential to cause exceedances of water quality standards in the Skagit River. Therefore, the City does not have a need to implement water reuse in order to reduce discharge into the Skagit River based on the current NPDES permit and water quality standards.

Offsets to Existing Water Rights

The water system in the City of Burlington is owned and operated by Skagit County PUD, which owns and administers all water rights associated with water supply. The City of Burlington could negotiate water rights agreements with Skagit County PUD.

Substitution of Potable Water Uses

Potable water in the City of Burlington is used for residential, commercial, industrial, municipal, and irrigation uses. Substitution of potable water with reclaimed water for uses not requiring potable water quality reduces the demand on potable water.

Landscape Irrigation

The most visible water application in the City that does not require potable quality water is landscape irrigation of City parks, schools, and other facilities. Landscape irrigation of sites with public access requires Class A reclaimed water. To date in Washington State, reclaimed water has not been supplied for irrigation of residential lawns due to maintenance and cross-connection control concerns.

In 2004, the City of Burlington commissioned an evaluation of utilizing reclaimed water to irrigate the Skagit River Park and the Rotary Park, located south of the existing Burlington wastewater treatment facility. This evaluation, provided in Appendix G, concluded that the most cost-effective alternative to supply irrigation water to these parks was purchasing water from Skagit County PUD. The City of Burlington is already using secondary effluent for landscape irrigation at the wastewater treatment facility site.

Sanitary Sewer Flushing

Another potential use for reclaimed water in Burlington is sanitary sewer flushing. Reclaimed water used for flushing sanitary sewers must at least meet Class D standards.

City of Burlington is already using secondary effluent for sanitary sewer flushing. Secondary effluent meets the criteria for Class D reclaimed water (see Table 7-2).

Recommended Uses

It is recommended that the City of Burlington continue to utilize reclaimed effluent for landscape irrigation on the wastewater treatment plant site and for sanitary sewer flushing. Based on the discussion above, it is also recommended that additional uses for reclaimed water be pursued as opportunities arise.

CHAPTER 8

CAPITAL IMPROVEMENT PLAN

INTRODUCTION

To implement the collection system improvements and wastewater treatment plant improvements discussed in Chapters 6 and 7, it is recommended that the City implement the Capital Improvement Plan (CIP) presented in this chapter. The projects presented here will require City funds to construct.

The required capacity and timing of each recommended improvement are given for budgeting and financial projection purposes only. The actual design parameters should be evaluated at the design phase of the project. Updated population and flow data should be used when available to ensure that the proposed facilities are adequately sized to transport buildout flows.

Additional projects that are not identified as part of the City's CIP may become necessary. Such projects may be required in order to remedy an emergency situation, to address unforeseen problems, or to accommodate improvements proposed or required by other agencies. Due to budgetary constraints, the completion of such projects may require alterations to the recommended CIP. The City retains the flexibility to reschedule, expand, or reduce the projects included in the CIP and to add new projects to the CIP, as best determined by the City Council, when new information becomes available for review and analysis.

BUDGETED CAPITAL IMPROVEMENTS PROJECTS

The City has prepared a preliminary Capital Improvement List for budgeting purposes. The CIP projects that are currently budgeted for construction within the next 6 years are summarized in Table 8-1. The costs presented in Table 8-1 are based on 2011 costs and have been prepared for guidance in project evaluation from the information available at the time of preparation. The final costs of the project will depend on the actual labor and material costs, actual site conditions, competitive market conditions, final project scope, final project schedule, and other variable factors. As a result, the final project costs will vary from the costs presented below. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.

TABLE 8-1

Budgeted Capital Improvement Projects

No.	Year	Improvements	Cost	Annual Totals	Financier
S115	2012	Section Street Sewer	$100,000		COB[(1)]
	2012	Job 3 Hawthorne Street Sewer	$320,000	$420,000	COB
	2013	Rio Vista Sewer	$447,000		COB
S106	2013	Pump Station Landscaping	$10,000		COB
	2013	Job 1 Schedule B: McKinley Street Sewer	$104,000	$561,000	COB
S131	2014	WWTP Lab/Admin Building Upgrades	$275,000		COB
S108	2014	Equipment Storage Building	$150,000		COB
S119	2014	Job 1 Schedule C: Koch Street Sewer	$258,000		COB
S007	2014	Clarifier Drive Upgrade	$100,000	$783,000	COB
S007	2015	Clarifier Drive Upgrade	$100,000		COB
S106	2015	Pump Station Landscaping	$10,000		COB
S122	2015	Job 4: Regent Street Sewer	$170,000		COB
	2015	Sludge Dewatering Unit	$300,000	$580,000	COB
S109	2016	Pump Station 6	$900,000		COB
S111	2016	Pump Station 9	$175,000		COB
S114	2016	Sewer Line Replacement	$275,000		COB
S112	2016	Pump Station 10	$250,000		COB
S007	2016	Clarifier Drive Upgrade	$100,000	$1,700,000	COB
S007	2017	Clarifier Drive Upgrade	$100,000		COB
S112	2017	Pump Station 10	$250,000		COB
S114	2017	Sewer Line Replacement	$275,000	$625,000	COB

(1) City of Burlington.

S115 **Section Street Sewer**

Project Details: This project will replace a portion of the concrete sewer pipe in Section Street with new PVC sewer which will have the capacity to accept projected buildout flows. The project will be constructed as a portion of a road and sidewalk improvement project.
Estimated Completion: 2012
Estimated Project Cost: $100,000

Job 3 Hawthorne Street Sewer

Project Details: This project will replace approximately 1,000 linear feet of old concrete sewer pipe with new PVC sewer which will have the capacity to accept projected buildout flows.
Estimated Completion: 2012
Estimated Project Cost: $320,000

Rio Vista Sewer

Project Details: This project will replace approximately 1,400 linear feet of old concrete sewer pipe with new PVC sewer which will have the capacity to accept projected buildout flows.
Estimated Completion: 2013
Estimated Project Cost: $447,000

S106 **Pump Station Landscaping**

Project Details: This project will update and refurbish landscaping at the existing pump stations. Plantings, site clearing, and debris removal will all be accomplished.
Estimated Completion: 2013
Estimated Project Cost: $10,000

Job 1 Schedule B: McKinley Street Sewer

Project Details: This project will replace approximately 400 linear feet of old 6-inch concrete sewer pipe with new 8-inch PVC sewer which will have the capacity to accept projected buildout flows.
Estimated Completion: 2013
Estimated Project Cost: $104,000

S131 **Lab/Admin Building Upgrades**

Project Details: This project would upgrade the existing laboratory and administrative space.
Estimated Completion: 2014
Estimated Project Cost: $275,000

S108 **Equipment Storage Building**

Project Details: This project would upgrade the existing equipment storage space.
Estimated Completion: 2014
Estimated Project Cost: $150,000

S119 **Job 1 Schedule C: Koch Street Sewer**

Project Details: This project will replace approximately 700 linear feet of old 6-inch concrete sewer pipe with new 8-inch PVC sewer which will have the capacity to accept projected buildout flows. The construction will include storm drainage improvements.
Estimated Completion: 2014
Estimated Project Cost: $258,000

S007 **Clarifier Drive Upgrade**

Project Details: This project will assess the condition of the existing mechanisms for the clarifiers constructed in the 1970s and refurbish or replace them, as required.
Estimated Completion: 2014 to 2017
Estimated Project Cost: $400,000

S106 **Pump Station Landscaping**

Project Details: This project will update and refurbish landscaping at the existing pump stations. Plantings, site clearing, and debris removal will all be accomplished.
Estimated Completion: 2015
Estimated Project Cost: $10,000

S122 **Job 4: Regent Street Sewer**

Project Details: This project will replace approximately 1,000 linear feet of old 6-inch concrete sewer pipe with new 8-inch PVC sewer which will have the capacity to accept projected buildout flows.
Estimated Completion: 2015
Estimated Project Cost: $170,000

Sludge Dewatering Unit

Project Details: This project will refurbish or replace the existing digested sludge belt filter press dewatering unit. The existing unit should have adequate capacity for the 20-year planning period, but some parts may be approaching the end of their useful life.
Estimated Completion: 2015
Estimated Project Cost: $300,000

S109 **<u>Pump Station 6</u>**

Project Details: This project is currently designed to upgrade the existing Pump Station 6 from a 900 gpm capacity to a 1,580 gpm capacity pump station.
Estimated Completion: 2016
Estimated Project Cost: $900,000

S111 **<u>Pump Station 9</u>**

Project Details: This project will add a new control panel and a permanent generator to the site.
Estimated Completion: 2016
Estimated Project Cost: $175,000

S114 **<u>Sewer Line Replacement</u>**

Project Details: This project is part of an ongoing replacement program to replace aging and leaky sewer lines and manholes.
Estimated Completion: 2016
Estimated Project Cost: $275,000

S112 **<u>Pump Station 10</u>**

Project Details: This project is currently designed to upgrade the existing Pump Station 10 from a 400 gpm to a 1,575 gpm pump station and add a permanent generator.
Estimated Completion: 2016 to 2017
Estimated Project Cost: $500,000

S114 **<u>Sewer Line Replacement</u>**

Project Details: This project is part of an ongoing replacement program to replace aging and leaky sewer lines and manholes.
Estimated Completion: 2017
Estimated Project Cost: $275,000

S106 **<u>Pump Station Landscaping</u>**

Project Details: This project will update and refurbish landscaping at the existing pump stations. Plantings, site clearing, and debris removal will all be accomplished.
Estimated Completion: 2017
Estimated Project Cost: $10,000

OTHER RECOMMENDED CAPITAL IMPROVEMENTS PROJECTS

Additional projects which are not currently budgeted are recommended within the 6-year planning period. We recommend these projects be constructed if the funding becomes available. We have provided a description of each recommended project and a budgetary project cost.

Pump Station 4

Project Details: Our analysis shows this pump station is currently under capacity. We recommend that the lift station be upgraded to accept projected wastewater flows. The project is currently scheduled for construction in 2018.
Estimated Completion: N/A
Estimated Project Cost: $500,000

Pump Station 13

Project Details: Our analysis shows this pump station is currently under capacity. In addition, the pumps appear to be operating inefficiently. We recommend that the existing pumps be replaced with higher capacity pumps that operate more efficiently. The higher capacity, more efficient pumps will save on energy costs and add capacity to the pump station to avoid pump station upgrade until flows increase. A standby generator should also be added to this pump station.
Estimated Completion: N/A
Estimated Project Cost: $250,000

Pump Station 14

Project Details: Our analysis shows this pump station is currently under capacity. In addition, Pump Station 15, which is upstream of this pump station, pumps at a much higher rate. We recommend that the pump station be upgraded to accept projected wastewater flows.
Estimated Completion: N/A
Estimated Project Cost: $50,000

Wastewater Treatment Plant Influent Pump Station

Project Details: Our analysis shows this pump station will be under capacity within a few years. We recommend that the pump station be upgraded from 4,600 gpm to 6,465 gpm capacity.
Estimated Completion: N/A
Estimated Project Cost: $75,000

Predesign Report to Add the Second Primary Anaerobic Digester

Project Details: Prepare a Predesign Report for adding a second primary anaerobic digester including all appurtenances, such as gas and heating system sludge pumping systems, and piping systems.
Estimated Completion: N/A
Estimated Project Cost: $40,000

CHAPTER 9

FINANCIAL ANALYSIS

This chapter presents an analysis of funding strategies for the City of Burlington to finance recommended wastewater system capital improvements presented in the previous chapters. The financial status of the sewer facility, funding sources, and recommended funding programs to pay for the scheduled improvements are discussed.

FINANCIAL STATUS OF EXISTING SEWER UTILITY

CURRENT SEWER RATES

The current rates became effective January 1, 2010. The City of Burlington Municipal Code is included in Appendix H. Burlington charges customers according to three tiers for up to 500 cubic feet of usage, and an additional fee for each additional 100 cubic feet of usage. Rates vary for residents inside and outside the city limits. Sewer bills are collected bimonthly and are based on average winter water use records. Table 9-1 summarizes monthly sewer rates. The base residential fee of $30.56 corresponds to an in-city customer producing less than or equal to 500 cubic feet of low-strength sewage.

TABLE 9-1

Monthly Sewer Rates(1)

	In-City Residential and Commercial (2)			Out-of-City Residential and Commercial (2)		
	2008	2009	2010	2008	2009	2010
Low Strength						
First 500 cubic feet	$28.81	$29.67	$30.56	$36.01	$37.09	$38.20
Additional 100 cubic feet	$ 4.11	$ 4.23	$ 4.36	$ 5.14	$ 5.29	$ 5.45
Medium Strength						
First 500 cubic feet	$40.98	$42.21	$43.48	$51.23	$52.77	$54.35
Additional 100 cubic feet	$ 6.55	$ 6.75	$ 6.95	$ 8.20	$ 8.44	$ 8.69
High Strength						
First 500 cubic feet	$52.73	$54.31	$55.94	$65.91	$67.89	$69.93
Additional 100 cubic feet	$ 8.89	$ 9.16	$ 9.43	$11.11	$11.45	$11.79

(1) City of Burlington Municipal Code No. 13.08.
(2) Source: http://www.ci.burlington.wa.us/page.asp_Q_navigationid_E_132.

GENERAL FACILITY CHARGES

The City of Burlington imposes a general facility charge (GFC) for all new connections to the sewer system to finance improvements to the wastewater system which are required to service future growth. GFCs are generally established as one-time charges assessed against new sewer customers as a way to recover a part of the cost of additional system capacity constructed for their use.

Typical items of construction financed by the general facility charge are wastewater treatment facilities, pump stations, interceptors, and other general improvements that benefit the entire system.

New residential building customers pay for city inspections associated with connecting to the system, plus a GFC of $3,130 for each unit up to three. Larger residential buildings with more than three units are assessed a GFC of $2,503 per unit. These charges apply only to citizens located within city limits. Customers outside city limits are assessed a GFC of $4,505 for buildings with up to three units and $3,604 for buildings with more than three units. Not included in these GFC charges are costs for main taps and side sewer connections needed to connect to the city system. GFC costs are summarized in Table 9-2 and include the GFC rate plus a $100 permit and inspection fee required for all new connections.

Certain facilities, such as restaurants, are considered high-strength customers because of their high load production potential and are subject to a different connection and service fees. Connection charges for these high-strength customers are calculated by multiplying the number of seats in the facility by 2 pounds of BOD per day per seat, then multiplying this value by $2,057 per pound of BOD per day. Facilities with a well-maintained grease interceptor are also eligible for a connection charge discount of 25 percent. This base connection fee is then added to the number of plumbing fixtures in the facility. The formula is seen below.

TABLE 9-2

City and Surrounding Area General Facility Charges

Location	Cost
Within City Limits	
Commercial (per fixture)	$ 156
Residential (per unit)	
≤ 3 units	$3,130
> 3 units	$2,503
Outside City Limits	
Commercial (per fixture)	$ 226
Residential (per unit)	
≤ 3 units	$4,505
> 3 units	$3,604

HISTORICAL FINANCIAL OPERATIONS

The City of Burlington operates two individual fund sources, the City Sewer Fund and the Sewer Capital Improvements Fund. Historical financial operations for 2007 through 2010 are summarized in Table 9-3. Net revenues are calculated as total revenues minus total expenditures. While the City had surplus funds in 2007, 2008, and 2009, the combined funds showed a deficit of almost $500,000 in 2010.

TABLE 9-3

Sewer Utility Historical Financial Operations (1)

Revenues	2007	2008	2009	2010
Net Cash and Investments	$ 2,731,217	$ 3,901,397	$ 4,512,071	$ 4,577,484
Licenses and Permits	$ 257,292	$ 357,167	$ 204,080	$ 192,668
Sewer Charges	$ 2,990,473	$ 2,963,148	$ 2,963,993	$ 3,197,865
Miscellaneous	$ 188,249	$ 134,587	$ 77,389	$ 57,531
Non Revenues	$ 3,567,765	$ 2,513,582	$ 2,150,372	$ 2,195,684
Other Sources	$ 1,418,175	$ 1,365,000	$ 1,665,000	$ 1,500,000
Total Revenues	**$11,153,171**	**$11,234,881**	**$11,572,905**	**$11,721,232**
Expenses	**2007**	**2008**	**2009**	**2010**
Net Cash and Investments	$ 0	$ 0	$ 4,577,484	$ 4,300,584
Salaries and Wages	$ 524,152	$ 523,221	$ 567,737	$ 624,216
Personnel Benefits	$ 204,399	$ 213,721	$ 233,034	$ 255,367
Supplies	$ 84,225	$ 68,170	$ 86,427	$ 95,752
Other Services	$ 516,422	$ 519,340	$ 642,230	$ 650,266
Non-Expenditures	$ 4,558,188	$ 3,631,536	$ 2,104,894	$ 3,586,549
Other Financing Uses	$ 1,542,125	$ 1,525,000	$ 1,836,200	$ 1,683,420
Debt Service	$ 221,938	$ 197,788	$ 172,888	$ 145,100
Capital Outlay	$ 197,695	$ 539,997	$ 448,760	$ 875,054
Total Expenses	**$ 7,849,144**	**$ 7,218,773**	**$10,669,654**	**$12,216,308**
Combined Net Revenues	**$ 3,304,027**	**$ 4,016,108**	**$ 903,251**	**($ 495,076)**

(1) Values derived from information supplied by the City of Burlington.

PROJECTED GROWTH, REVENUES, EXPENSES, AND RESERVES

Projected Growth

In order to project future revenues, the growth of the number of customers must be estimated. In Chapter 3, sewer service area population was projected to grow approximately 3 percent annually during the 6-year planning period (from 2011 through 2017). In addition, the City estimated a sewer population growth of 2 percent in the 2010 Projected Expenditure Report. The more conservative rate of 2 percent from the Expenditure Report will be used for this financial analysis.

Projected Revenues

Table 9-4 summarizes the projected operating revenues for the years 2011 through 2017. Revenue streams include continual collection of sewer rates, new sewer connections, septage disposal, and investment interest. Monthly sewer charges and new connection charges comprise an average of 95.4 percent of the City's total sewer revenues. Thus, an increase in GFCs and sewer rates will have the largest impact on the City's overall revenue stream.

Projected Expenditures

The projected operating expenses for 2011 through 2017 are summarized in Table 9-5. The values are based on the City's 2010 Projected Expenditure Report. Projections for operation and maintenance expenditures are based on a 4 percent annual increase. Data was taken from values provided by the City and verified using typical projections for population growth (2 percent) and inflation (3.5 percent). Noteworthy is the fact that after 2013, the City will have no debt service expenditures. The City does not plan to add personnel, and salary, wage, and benefits increases are included under operations and maintenance.

Projected Net Revenues

Table 9-6 shows the combined net revenues (revenues minus expenditures) for 2011 through 2017. These data show negative net revenues for each year except 2014 and 2015. Over the 6-year planning period, total net revenues are projected to be ($2,381,613), which is a significant deficit. This deficit leads to a decreasing reserve balance.

Projected Reserves

The projected reserve balance is listed in Table 9-6 and seen on Figure 9-1. This value equals the existing reserve account balance plus combined net revenues. In order to maintain financial solvency as well as being able to deal with unexpected expenses such as emergency maintenance or equipment failure, the City has expressed a desire to maintain a reserve balance of $3 million. As inflation and costs for services increase in the coming years, maintaining sufficient reserves will become increasingly important to pay for incidental and emergency repairs or maintenance.

Figure 9-1 shows a steady decline in the reserve balance until 2017. The reserve balance in 2017 is projected to be $1.34 million, significantly below the City's operational goal of $3 million. The City will be required to increase revenue streams in order to increase net revenues as well as its reserve balance. The most effective method for increasing net revenues is to increase rates and/or GFCs, and these options are discussed in later sections of this chapter.

TABLE 9-4

Projected Revenues for City Combined Sewer Funds

Year	2011	2012	2013	2014	2015	2016	2017
Sewer Services	$3,054,134	$3,084,675	$3,115,522	$3,146,677	$3,178,144	$3,209,926	$3,242,025
Septage Disposal	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 70,000	$ 70,000
Sewer Connections Fees	$ 200,000	$ 200,000	$ 200,000	$ 200,000	$ 250,000	$ 250,000	$ 250,000
Investment Interest	$ 75,000	$ 80,000	$ 85,000	$ 90,000	$ 95,000	$ 100,000	$ 105,000
Miscellaneous	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000
Total Revenues	**$3,390,134**	**$3,425,675**	**$3,461,522**	**$3,497,677**	**$3,584,144**	**$3,630,926**	**$3,668,025**

TABLE 9-5

Projected Expenses for City Combined Sewer Funds

Projected Combined Fund Expenditures							
Year	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Sewer Projects	$ 199,000	$ 420,000	$ 560,800	$ 682,900	$ 180,000	$1,735,000	$ 535,000
Equipment Upgrades	$ 325,000	$ 348,000	$ 269,000	$ 435,000	$ 645,000	$ 402,000	$ 425,000
I/I Program	$ 150,000	$ 150,000	$ 150,000	$ 50,000	$ 75,000	$ 200,000	$ 200,000
Personnel	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
Operations and Maintenance	$1,753,242	$1,823,372	$1,896,307	$1,972,159	$2,051,046	$2,133,087	$2,218,411
Engineering	$ 25,000	$ 25,000	$ 110,000	$ 55,000	$ 155,000	$ 95,000	$ 100,000
Debt Service	$1,026,915	$1,027,600	$1,029,600	$ 0	$ 0	$ 0	$ 0
Allocations	$ 178,048	$ 185,170	$ 192,577	$ 200,280	$ 208,291	$ 216,623	$ 225,288
Total Expenditures	**$3,657,205**	**$3,979,142**	**$4,208,284**	**$3,395,339**	**$3,314,337**	**$4,781,710**	**$3,703,699**

TABLE 9-6

Projected Reserves for City Combined Sewer Funds

Year	2011	2012	2013	2014	2015	2016	2017
Total Revenues	$3,390,134	$3,425,675	$3,461,522	$3,497,677	$3,584,144	$3,630,926	$3,668,025
Total Expenditures	$3,657,205	$3,979,142	$4,208,284	$3,395,339	$3,314,337	$4,781,710	$3,703,699
Combined Net Revenues	($ 267,071)	($ 553,467)	($ 746,762)	$ 102,338	$ 269,807	($1,150,784)	($ 35,674)
Reserve Account Balance 2010 = $3,720,969	**$3,453,898**	**$2,900,431**	**$2,153,669**	**$2,256,007**	**$2,525,814**	**$1,375,030**	**$1,339,356**

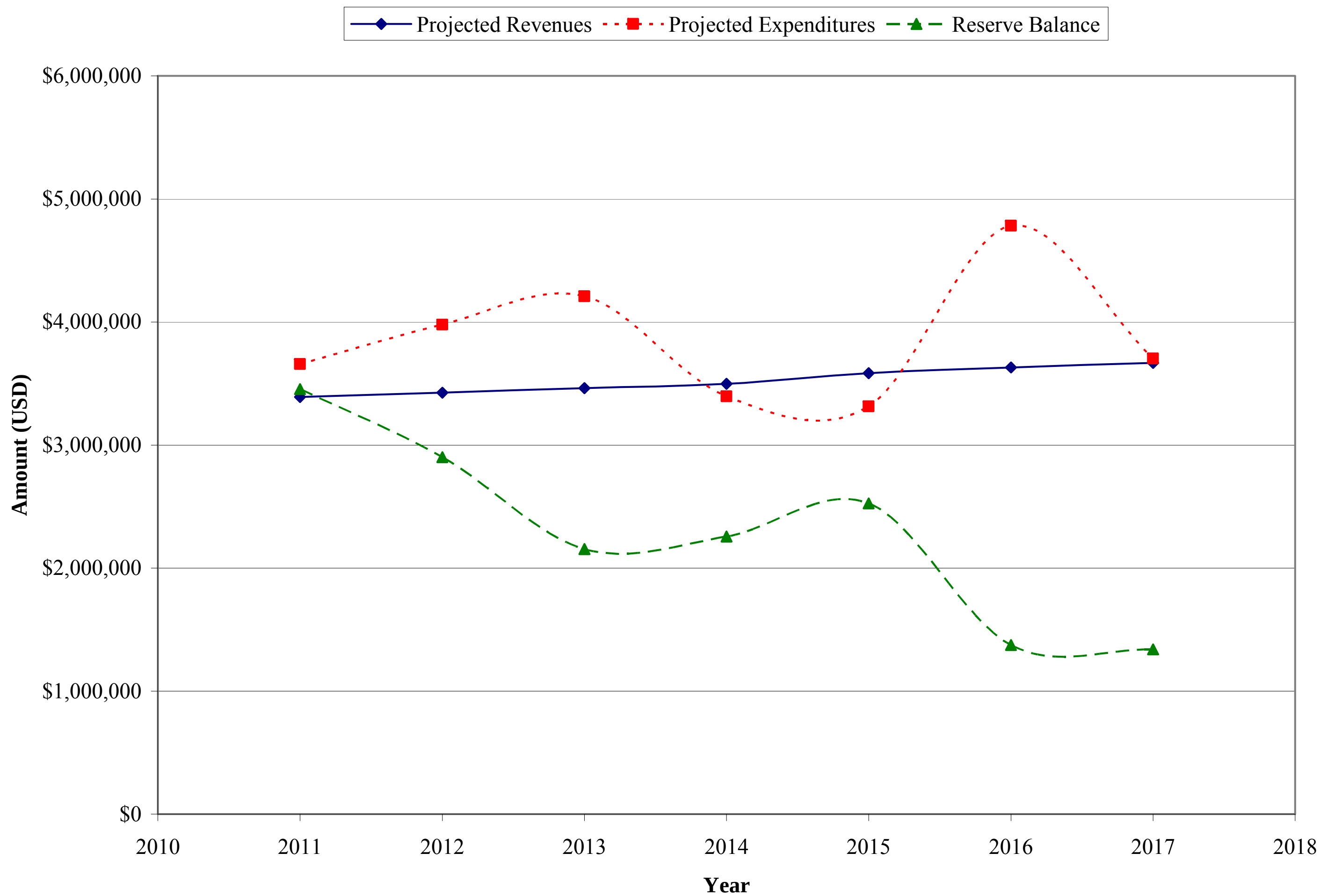


FIGURE 9-1

Projected Revenues, Expenses, and Reserve Balance for 2011 through 2017

Capital Improvement Projects

Capital improvement projects to be funded over the period 2011 through 2017 are described in Chapter 6 and Chapter 7 and are summarized in Table 9-7. These capital improvement projects are meant to repair and upgrade systems to provide better service to customers. These improvements include modifications to pump stations, electrical panel upgrades, generator improvements, and continual sewer line repair/replacement.

TABLE 9-7

Capital Improvement Projects

No.	Year	Improvements	Cost	Annual Totals	Financier
S115	2012	Section Street Sewer	$100,000		COB[1]
	2012	Job 3 Hawthorne Street Sewer	$320,000	$ 420,000	COB
	2013	Rio Vista Sewer	$447,000		COB
S106	2013	Pump Station Landscaping	$ 10,000		COB
	2013	Job 1 Schedule B: McKinley Street Sewer	$104,000	$ 561,000	COB
S131	2014	Lab/Admin Building Upgrades	$275,000		COB
S108	2014	Equipment Storage Building	$150,000		COB
S119	2014	Job 1 Schedule C: Koch Street Sewer	$258,000	$ 683,000	COB
S106	2015	Pump Station Landscaping	$ 10,000		COB
S122	2015	Job 4: Regent Street Sewer	$170,000	$ 180,000	COB
S109	2016	Pump Station 6	$900,000		COB
S111	2016	Pump Station 9	$175,000		COB
S112	2016	Pump Station 10	$250,000		COB
S114	2016	Sewer Line Replacement	$275,000	$1,600,000	COB
S112	2017	Pump Station 10	$250,000		COB
S114	2017	Sewer Line Replacement	$275,000	$ 525,000	COB

(1) City of Burlington.

Maintaining cash reserves at an appropriate level to provide for operations, revenue stabilization, emergency repair or replacement of essential equipment, and for capital maintenance is an element of sound utility management.

In order to fund these capital improvement projects, a combination of grants, loans, and rate increases should be considered. It is unlikely that the City will be able to successfully fund their desired improvement projects as well as maintain a reasonable reserve balance without increased rates for existing sewer customers. To supplement rate increases, the City could increase the number of new connections by providing service to unsewered areas within the UGA. This increase in GFCs would serve to bolster the City's fund balances as well as to help keep rates for existing customers low.

While revenues are projected to increase (Figure 9-1), there is significant risk in this prediction. If the number of customers does not grow as expected, then revenues will not increase as predicted, leaving the City with fewer funds to complete desired projects. Furthermore, any unexpected expenses such as emergency maintenance/repair of sewage systems or equipment failure will incur additional expense. The City must then use reserve funds for this purpose, further decreasing the overall reserve balance.

Recommendations for Funding Capital Improvement Projects

In order to successfully fund the recommended capital improvement projects, as well as maintain sufficient reserve balances, the City should increase sewer rates. Rates were recently increased by 3 percent each year for 3 years beginning in 2008. A similar rate increase schedule beginning in 2012 will both improve sewer revenues and increase the reserve balance. A suggested rate increase schedule is shown in Table 9-8.

TABLE 9-8

Suggested Schedule of Rate Increases

	In-City Residential and Commercial			Out-of-City Residential and Commercial		
	2012	2013	2014	2012	2013	2014
Low Strength						
First 500 cubic feet	$31.48	$32.42	$33.39	$39.35	$40.53	$41.74
Additional 100 cubic feet	$ 4.49	$ 4.63	$ 4.76	$ 5.61	$ 5.78	$ 5.96
Medium Strength						
First 500 cubic feet	$44.78	$46.13	$47.51	$55.98	$57.66	$59.39
Additional 100 cubic feet	$ 7.16	$ 7.37	$ 7.59	$ 8.95	$ 9.22	$ 9.50
High Strength						
First 500 cubic feet	$57.62	$59.35	$61.13	$72.03	$74.19	$76.41
Additional 100 cubic feet	$ 9.71	$10.00	$10.30	$12.14	$12.51	$12.88

Figure 9-2 shows the projected revenues and reserve balance, should this rate increase schedule be enacted. The ending reserve balance would be $4.48 million in 2017, significantly greater than the City's goal of $3 million. This would give the City added flexibility to fund capital improvement projects discussed in Chapter 8, which are not currently budgeted, as well as sewer improvement projects that will be required as the current system ages.

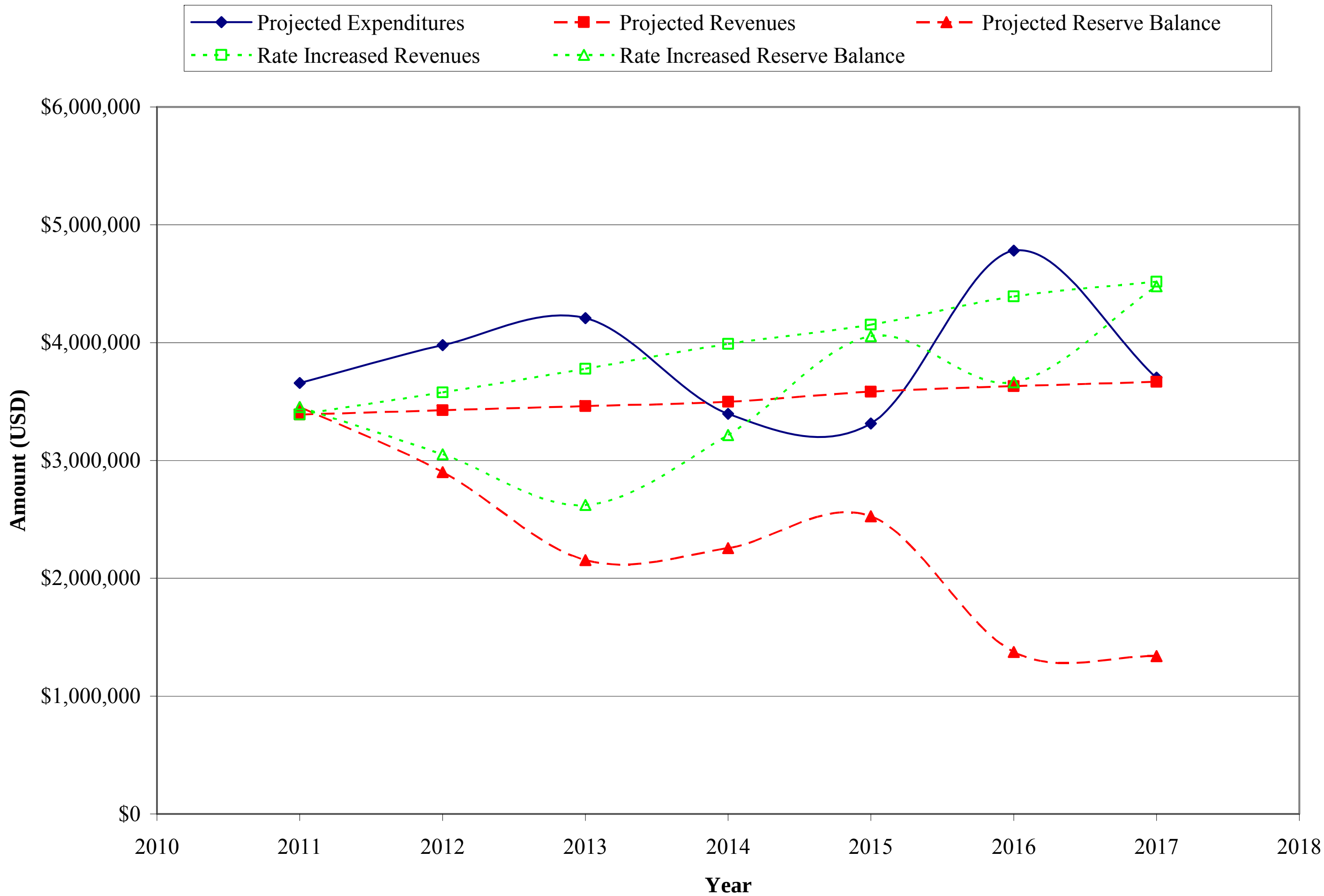


FIGURE 9-2

Projected Revenues and Reserve Balance with Recommended Rate Increases

AVAILABLE FUNDING SOURCES

Grants:	Centennial Clean Water Fund (CCWF) Community Development Block Grant (CDBG) Community Investment Fund (CIF) U.S. Economic Development Administration (US EDA) U.S. EPA State and Tribal Assistance Grant (STAG) USDA Forest Service, Rural Assistance Program (USFS) USDA Rural Development (RD)
Loans:	Water Pollution Control State Revolving Fund (SRF) Public Works Trust Fund (PWTF) Community Economic Revitalization Board (CERB) USDA Rural Development (RD)
Bonds:	Revenue Bonds General Obligation Bonds
Other:	Utility Local Improvement Districts

GRANTS

Centennial Clean Water Fund (CCWF)

The Department of Ecology administers the State Revolving Fund (SRF) and Centennial Clean Water Fund (CCWF) programs that provide low-interest loans for water pollution control projects. CCWF loan and grant terms are dependent upon the average market rate published in the bond buyer's index for tax-exempt municipal bonds for the period from 60 to 30 days prior the annual funding cycle begins. Currently, Ecology offers 20-year loans at 2.75 percent interest rates (60 percent of average market rate) and 5-year loans at 1.35 percent interest rates (30 percent of average market rate). The primary program requirements are to have an approved facilities plan for treatment works and to demonstrate the ability to repay the loan through a dedicated funding source. The loans can be used to finance sewer system replacement for the elimination of excessive infiltration and inflow, and for the construction of facilities with reserve capacities to accommodate flows corresponding to the 20-year projected growth in the service area. Land acquisition is not eligible for SRF funding.

Grant money is available only to those who can document hardship. Where financial hardship is determined, the total eligible project cost cannot exceed $10 million and the grant amount cannot be more than half, or $5 million. Hardship is demonstrated when project costs for construction of facilities result in total cost for debt service and operation and maintenance in excess of between 2.0 and 3.0 percent of the median household income. A project may be phased and receive funds from several cycles to complete the project. In addition, a higher grant amount may be available if the 3-year average local unemployment rate exceeds the 3-year average statewide unemployment rate. Grants require a 50 percent matching fund, which is provided by a mandatory SRF loan.

Community Development Block Grant (CDBG)

The Community Development Block Grant program is a competitive source of federal funding for a broad range of community development projects. A primary requirement of the CDBG program is that the project must principally benefit at least 51 percent of the low-to-moderate income residents of the project area. The State typically receives about $7 million in federal funds per funding cycle. CDBG has two programs including General Purpose and Planning Only. The General Purpose program provides grant funds for the design, construction, or reconstruction of water and sewer systems up to the amount of $750,000. The Planning Only program includes projects such as comprehensive plans, community development plans, capital improvement plans, and other plans such as land use and urban environmental design, economic development, floodplain and wetlands management, transportation, and utilities. Planning Only grants are limited to $24,000 for a single applicant or $40,000 for a joint applicant.

Eligible applicants for the CDBG programs include cities and towns with fewer than 50,000 people or counties with populations of less than 200,000. Though port districts and economic development districts are not eligible to apply directly, a city or county can submit a joint application and include these entities as partners.

Community Investment Fund (CIF)

The Community Investment Fund partners with CDBG to fund projects that benefit at least 51 percent of low-to-moderate income residents. An applicant would first apply to the CDGB General Purpose program and meet the income limits of that program. At the discretion of the Public Works Board and if the applicant is turned down for the General Purpose program, an applicant may be asked to apply to the Community Investment Fund. Additional grant funding, in the amount of approximately $1 million may be obtained.

To qualify for CIF, the project must be rated as one of the top three of the local WA-CERT Priority Rating Process, serve a minimum of 51.5 percent low-to-moderate income residents, and receive at least 65 points with the General Purpose application.

U.S. Economic Development Administration (US EDA)

US EDA offers competitive grants up to $1 million for projects within Region 10. Projects are selected locally by an economic development district and submitted to Congress for competitive selection among other regions in the United States. Similar to CERB, applicants must have an industrial partner ready to proceed or a feasibility study that establishes realistic job creation.

U.S. EPA State and Tribal Assistance Grant (STAG)

Local jurisdictions within the State of Washington can apply to the State and Tribal Assistance Grant program through the office of their local Congressional representative. The Congressional representative will work to add the project as a line item to the VA/HUD Appropriations Bill. Applicants can obtain grant funds up to approximately $2 million.

U.S. Forest Service (USFS)

Forest Service grants are available through the Rural Community Assistance Program to assist rural communities that are dependent on natural resources. Project proposals must show a broad community benefit that result in greater ability to improve economically, socially, or environmentally. The project must have the potential for economic development and/or job creation/retention. An application must be located within 100 miles of a Forest Service office and be able to document a history of at least 15 percent dependency on forest products. Grant funds are available for components of planning and design and are limited to $50,000.

USDA Rural Development (RD)

The RD Rural Utility Service administers water and wastewater loan and grant programs to improve the quality of life and promote economic development in rural areas. RD has both loan, and under certain conditions, grant programs. Grants are awarded when the annual debt service portion of the utility rate exceeds 1.0 percent to 1.5 percent of the municipality's median household income.

In addition, an RD loan program exists for needy communities unable to obtain funding by commercial means through the sale of revenue bonds. This program provides 30- to 40-year loans at an interest rate that is based on federal rates and varies with the commercial market. RD loans are revenue bonds with a 1.1 debt coverage factor.

Eligible projects include the construction, expansion, extension, or improvement of rural water, sanitary sewers, solid waste disposal, storm, and wastewater disposal facilities.

Basic criteria for RD funding are:

- Inability to obtain funds from other sources at reasonable terms.
- A 45 percent grant is available if the median household income of the service area exceeds 80 percent of the statewide non-metropolitan median household income.
- A 75 percent grant is eligible if the median household income for the service area is below either the poverty line or 80 percent of the state

non-metropolitan median household income – whichever is higher. This grant also requires the project to be necessary for health and safety concerns.

Eligible applicants include municipalities; counties; non-profit corporations, associations, or cooperatives; and federally recognized Indian tribes in rural areas with populations of less than 10,000.

LOANS

Public Works Trust Fund (PWTF)

The Public Works Trust Fund is a revolving loan fund designed to help local governments finance public works projects through low-interest loans and technical assistance. The PWTF, established in 1985 by legislative action, offers loans substantially below market rates, payable over periods ranging up to 20 years. To be eligible for the PWTF programs, an applicant must be a local government such as a city, county, or a special purpose utility district.

PWTF has four loan programs including Construction, Preconstruction, Planning, and Emergency. PWTF loan terms are summarized in Table 9-9.

TABLE 9-9

Public Works Trust Fund Loan Types and Terms

Loan Type	Local Match	Interest Rate	Term	Loan Limit
Construction	15%	0.50%	20 years	$10,000,000
	10%	1.00%	20 years	$10,000,000
	5%	2.00%	20 years	$10,000,000
Preconstruction(1)	15%	0.50%	20 years	$ 1,000,000
	10%	1.00%	20 years	$ 1,000,000
	5%	2.00%	20 years	$ 1,000,000
Planning(2)	0%	0.00%	6 years	$ 50,000
Emergency(2)	0%	4.00%	20 years	$ 500,000

(1) Preconstruction loans can be refinanced to a 20-year term, if the applicant obtains a subsequent PWTF construction loan.

(2) While a match is not required, it is recommended.

The Construction program accepts applications once per year in the spring, and money is available in approximately one year. The Preconstruction and Planning programs are open year-round and must be submitted to the Public Works Board prior to the 15th of the month for review at the next board meeting. These funds become available shortly after the Public Works Board makes their final decision as to the award. Emergency projects must have a locally declared emergency and are applied for on an open cycle depending on the availability of funds. Project expenditures are reimbursable from the date of the declared emergency.

An applicant must have a long-term plan for financing its public works needs. If the applicant is a county or city, it must adopt the 1/4 percent real estate excise tax that is dedicated to public works construction projects. Eligible public works projects include streets, roads, bridges, storm sewers, sanitary sewer collection and treatment systems, and domestic water. Loans are presently offered only for purposes of repair, replacement, rehabilitation, reconstruction, or improvement of existing eligible public works systems. Eligible project costs can include expenses related to serving 20-year forecasted growth as identified in growth management comprehensive plans.

Since limited trust fund dollars are available, local jurisdictions must compete for the funds. The applications are carefully evaluated, and the Public Works Board submits a prioritized list of those projects to the legislature that are recommended to receive low-interest financing. The legislature reviews the list and indicates its approval through the passage of an appropriation from the Public Works Assistance Account to cover the cost of the proposed loans. Once the Governor has signed the appropriation bill into law (an action that usually occurs by the following April), those local governments recommended to receive loans are offered a formal loan agreement with appropriate interest rates and terms as determined by the Public Works Board.

Community Economic Revitalization Board (CERB)

The Community Economic Revitalization Board's prime mission is to partner with business and private industry and local governments to maintain and create jobs. Established by the Legislature in 1982, CERB provides low-interest loans, and in unique circumstances grants, to help finance local public infrastructure necessary to develop or retain stable business and industrial activities. Projects eligible for funding include roads, domestic and industrial water systems, sanitary and storm sewers, port facilities, and general-purpose industrial buildings.

CERB provides loans up to $1 million and where applicable, grants in the amount of $300,000. The interest rate is tied to the current cost of a 10-year bond and a local match of 10 percent is required.

Eligible applicants include Washington State subdivisions in partnership with private enterprise. If there is no economic partner, a local government can produce a feasibility study that documents realistic job retention or creation. Applications must be submitted 45 days prior to a regularly scheduled CERB meeting, typically in January, March, July, and November.

BONDS

Revenue Bonds

The most common source of funds for construction of major utility improvements is the sale of revenue bonds. These are tax-free bonds issued by a city. The major source of funds for debt service on revenue bonds is from monthly sewer service charges. In order to sell revenue bonds marketable to investors, they typically have contractual provisions requiring minimum debt coverage amounts. The entity must show that its annual net operating income (gross income less operation and maintenance expenses) is equal to or greater than a factor, typically 1.2 to 1.4 times the annual debt service on all par debt. If a coverage factor has not been specified, it will be determined at the time of any future bond issues.

General Obligation Bonds

A city may by council action or special election issue general obligation bonds to finance almost any project of general benefit to the city. The bonds are repaid by tax assessments levied against all privately owned properties within the city. This includes vacant property that would not otherwise contribute to the cost of the specific improvements. This type of bond issue is usually reserved for municipal improvements that are of general benefit to the public, such as arterial streets, bridges, lighting, municipal buildings, firefighting equipment, parks, and water and wastewater facilities. General obligation bonds are the most attractive bonds to investors because they are backed by the municipality's full taxing authority and carry the lowest rate of interest of any type of bond that a city may issue.

Disadvantages of general obligation bonds include the following:

- Voter approval is often required. The city will incur the legal costs of drafting a ballot measure and pay for the cost of holding a special election. Additional costs include investing staff time toward public education of the need for the project.

- There are legal and practical limits on the amount of general obligation debt a city can issue. Financing capital improvements through general obligation debt reduces the ability of the city to issue additional general obligation debt, which is often the only source of outside financing for many general government facilities.

OTHER

Utility Local Improvement Districts

Another potential source of funds for improvements can be obtained through the formation of Utility Local Improvement Districts (ULIDs) involving a special assessment made against properties benefiting by the improvements. ULID bonds are further backed by a legal claim to the revenues generated by the utility, similar to revenue bonds.

Sewer system expansion is a frequent application of ULID financing. Typically, ULIDs are formed by the city at the written request (by petition) of the property owners within a specific section of the city's service area. Upon receipt of a sufficient number of signatures on petitions and acceptance by the city council, the local improvement area is formed. Therefore, a sewer system is designed for that particular area in accordance with the city's sewer comprehensive plan. Each separate property in the ULID is assessed in accordance with the special benefits the property receives from the water or wastewater system improvements. A citywide ULID could form part of a financing package for large-scale capital projects such as sewer line extensions or replacements that benefit all residents in the service area. The assessment places a lien on the property that must be paid in full upon sale of the property. ULID participants have the option of paying their assessment immediately upon receipt, thereby reducing the portion of the costs financed by the ULID bonds.

The advantages of ULID financing over rate financing include:

- The ability to avoid interest costs by early payment of assessments.
- If the ULID assessment is paid in installments, it may be eligible to be deducted from federal income taxes.
- Low-income senior citizens may be able to defer assessment payments until the property is sold.
- Some Community Block Grant funds are available to property owners with incomes near or below poverty level. Funds are available only to reduce assessments.

The major disadvantage to the ULID process is that it may be politically difficult to approve formation. The ULID process may be stopped if 40 percent of the property owners protest its formation. Also, there are significant legal and administrative costs associated with the ULID process, which increases total project costs by approximately 30 percent over other financing options.

APPENDIX A

NPDES PERMIT

Issuance Date: September 30, 2005
Effective Date: October 1, 2005
Expiration Date: September 30, 2010

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
WASTE DISCHARGE PERMIT No. WA-002015-0

State of Washington
DEPARTMENT OF ECOLOGY
Northwest Regional Office
3190 – 160th Avenue SE
Bellevue, Washington 98008-5452

In compliance with the provisions of
The State of Washington Water Pollution Control Law
Chapter 90.48 Revised Code of Washington
and
The Federal Water Pollution Control Act
(The Clean Water Act)
Title 33 United States Code, Section 1251 et seq.

CITY OF BURLINGTON

900 East Fairhaven Avenue

Burlington, Washington 98233

Plant Location: 900 South Section Street Burlington, Washington 98233	Receiving Water: Skagit River, River Mile 18
Water Body I.D. No.: WA-03-1010	Discharge Location: Latitude: 48° 28' 04" N Longitude: 122° 18' 30" W
Plant Type: POTW with conventional mixed activated sludge with selectors	

is authorized to discharge in accordance with the Special and General Conditions that follow.

Kevin C. Fitzpatrick
Water Quality Section Manager
Northwest Regional 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	November 15, 2005
S3.E.	Noncompliance Notification	As necessary	
S4.B.	Plans for Maintaining Adequate Capacity	As necessary	
S4.C.	Notification of New/Altered Sources	As necessary	
S5.G.	Submission of Final Operations and Maintenance Manual Operations and Maintenance Manual Update or Review Confirmation Letter	1/permit cycle As necessary	October 1, 2007, 2 years from effective data
S6.D.	Industrial User Survey	1/permit cycle	March 31, 2010 with application for renewal
S8.A.	Acute Toxicity Characterization Data	2/permit cycle, as follows: July 2006 January 2007	 November 1, 2006 May 1, 2007
S8.A.	Acute Toxicity Tests Characterization Summary Report	1/permit cycle	May 1, 2007
S8.C.	Acute Toxicity Compliance Monitoring Reports	As necessary	
S8.D.	Acute Toxicity: “Causes and Preventative Measures for Transient Events”	As necessary	
S8.D.	Acute Toxicity TI/TRE Plan	As necessary	
S8.E.	Acute Toxicity Testing with Permit Application	2/permit cycle, as follows: March 2009 September 2009	March 31, 2010, with application for permit renewal
S9.A.	Chronic Toxicity Characterization Data	2/permit cycle, as follows: July 2006 January 2007	 November 1, 2006 May 1, 2007
S9.A.	Chronic Toxicity Tests Characterization Summary Report	1/permit cycle	May 1, 2007
S9.C.	Chronic Toxicity Compliance Monitoring Reports	As necessary	
S9.D.	Chronic Toxicity: “Causes and Preventative Measures for Transient Events”	As necessary	
S9.D.	Chronic Toxicity TI/TRE Plan	As necessary	

Permit Section	Submittal	Frequency	First Submittal Date
E9.E.	Chronic Toxicity Testing with Permit Application	2/permit cycle, as follows: June 2009 December 2009	March 31, 2010, with application for permit renewal
S10.	Chemical Analysis of Influent and Effluent and Priority Pollutants	3/permit cycle, as follows: January 2009 June 2009 December 2009	March 31, 2010, with application for permit renewal
S11.	Outfall Evaluation	1/permit cycle	March 31, 2010, with application for permit renewal
G1.	Notice of Change in Authorization	As necessary	
G4.	Permit Application for Substantive Changes to the Discharge	As necessary	
G5.	Engineering Report for Construction or Modification Activities	As necessary	
G7.	Application for Permit Renewal	1/permit cycle	March 31, 2010
G21.	Notice of Planned Changes	As necessary	
G22.	Reporting Anticipated Noncompliance	As necessary	

SPECIAL CONDITIONS

S1. DISCHARGE LIMITATIONS

A. Effluent Limitations

All discharges and activities authorized by this permit shall be consistent with the terms and conditions of this permit. The discharge of any of the following pollutants more frequently than, or at a level in excess of, that identified and authorized by this permit shall constitute a violation of the terms and conditions of this permit.

Beginning on the effective date of this permit and lasting through the expiration date, the Permittee is authorized to discharge municipal wastewater at the permitted location subject to complying with the following limitations:

EFFLUENT LIMITATIONS[a]: OUTFALL # 1		
Parameter	**Average Monthly**	**Average Weekly**
Biochemical Oxygen Demand[b] (5-day)	30 mg/L, 948 lbs/day	45 mg/L, 1422 lbs/day
Total Suspended Solids[b]	30 mg/L, 948 lbs/day	45 mg/L, 1422 lbs/day
Fecal Coliform Bacteria	200 /100 mL	400 /100 mL
pH	Daily minimum is equal to or greater than 6.2 and the daily maximum is less than or equal to 9.0.	
[a] The average monthly and weekly effluent limitations are based on the arithmetic mean of the samples taken with the exception of fecal coliform, which is based on the geometric mean.		
[b] The average monthly effluent concentration for BOD_5 and Total Suspended Solids shall not exceed 30 mg/L or 15 percent of the respective monthly average influent concentrations, whichever is more stringent.		

B. Mixing Zone Descriptions

The maximum boundaries of the mixing zones are defined in accordance with WAC 172-201A-100 as follows:

The boundary of the mixing zone is limited to 309 feet downstream of the outfall discharge and 100 feet upstream. The associated dilution factor at the edge of this mixing zone is estimated to be 41.6 to 1.

The zone of acute criteria exceedance is limited to 31 feet downstream of the outfall discharge and 10 feet upstream. The associated dilution factor at the edge of the acute zone is estimated to be 15.2 to 1.[1]

[1] Letter from C. Andrew Martin and Gary S. Mauseth of Beck Consultants Inc. to John P. Wilson and Michael Johnson of Gray and Osborne, Inc. regarding *Supplemental Modeling, Wastewater Treatment Plant Discharge Analysis, City of Burlington, Skagit County, Washington*, dated June 5, 1998.

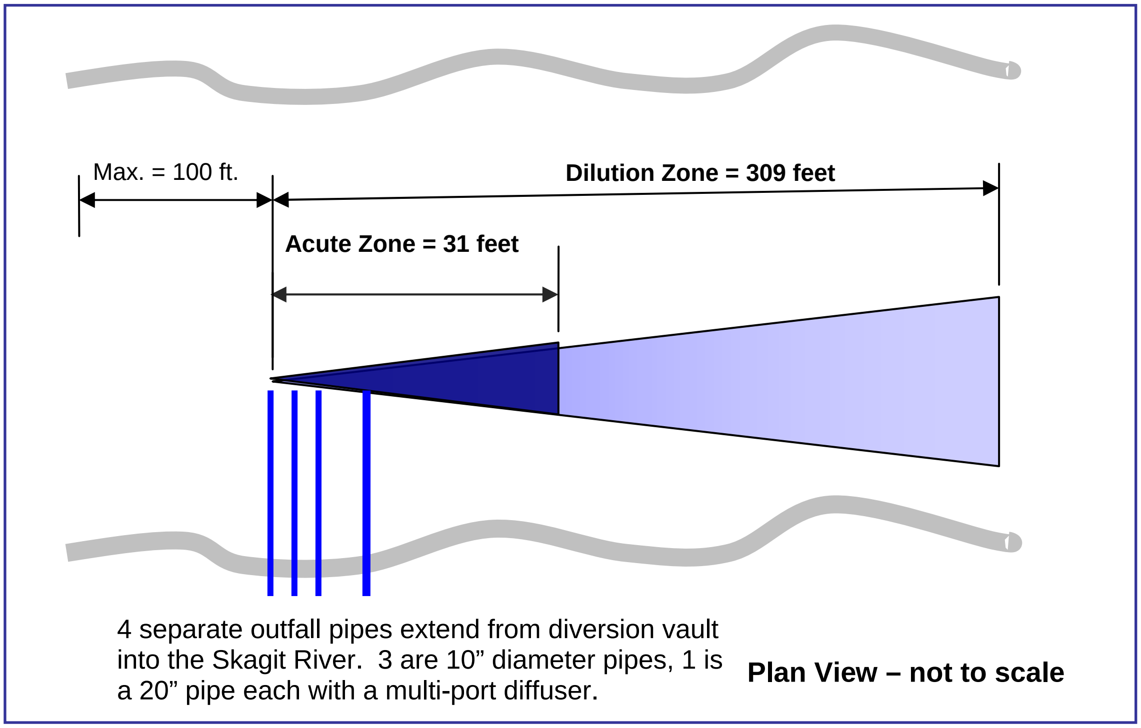


Figure 1: Mixing Zone Diagram

S2. MONITORING REQUIREMENTS

A. Monitoring Schedule

The Permittee shall perform the following compliance monitoring according to the schedule listed below:

Category	Parameter	Units	Sample Point	Minimum Sampling Frequency	Sample Type
Wastewater Influent[b]	Flow	MGD	Influent	Continuous[a]	On-line
“	BOD_5	mg/l	Influent	3/week	24-hour comp.
“	TSS	mg/l	Influent	3/week	24-hour comp.
Wastewater Effluent	Flow	MGD	Final Effluent	Continuous[a]	On-line
	BOD_5	mg/l	Final Effluent	3/week	24-hour comp.
“	TSS	mg/l	Final Effluent	3/week	24-hour comp.
“	pH	Standard Units	Final Effluent	Daily	Grab
“	Fecal Coliform Bacteria	cfu/100 mL	Final Effluent	5/week	Grab

[a] Continuous means uninterrupted except for brief lengths of time for calibration, for power failure, or for unanticipated equipment repair or maintenance.

[b] The influent flow measurement is used as the compliance point for the design criteria limit.

The Permittee shall perform the following characterization monitoring according to the schedule listed below:

Category	Parameter	Units	Sample Point	Minimum Sampling Frequency	Sample Type
Acute Toxicity Testing	As required in S8.		Final Effluent	2/permit cycle	24-hour comp.
Chronic Toxicity Testing	As required in S9.		Final Effluent	2/permit cycle	24-hour comp.
Additional Chemical Analysis of Effluent	As required, refer to S. 10.		Final Effluent	3/permit cycle during last year of permit	As specified in the fact sheet, Appendix D

B. Sampling and Analytical Procedures

Samples and measurements taken to meet the requirements of this permit shall be representative of 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.

Sampling and analytical methods used to meet the monitoring requirements specified in this permit shall 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 (Department).

C. Flow Measurement

Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the quantity of monitored flows. The devices shall be installed, calibrated, and maintained to ensure that the accuracy of the measurements is consistent with the accepted industry standard for that type of device. Frequency of calibration shall be in conformance with manufacturer's recommendations and at a minimum frequency of at least one (1) calibration per year. Calibration records shall be maintained for at least three (3) years.

D. Laboratory Accreditation

All monitoring data required by the Department shall be prepared by a laboratory registered or accredited under the provisions of, *Accreditation of Environmental Laboratories*, Chapter 173-50 WAC. Flow, temperature, settleable solids, conductivity, pH, and internal process control parameters are exempt from this requirement. Conductivity and pH shall be accredited if the laboratory must otherwise be registered or accredited. The Department exempts crops, soils, and hazardous waste data from this requirement pending accreditation of laboratories for analysis of these media.

S3. REPORTING AND RECORDKEEPING REQUIREMENTS

The Permittee shall monitor and report in accordance with the following conditions. The falsification of information submitted to the Department shall constitute a violation of the terms and conditions of this permit.

A. Reporting

The first monitoring period begins on the effective date of the permit. Monitoring results shall be submitted monthly. The first report submittal is due November 15, 2005, for data from October 2005. Monitoring data obtained during each monitoring period shall be summarized, reported, and submitted on a discharge monitoring report (DMR) form provided, or otherwise approved, by the Department. DMR forms shall be received by the Department no later than the 15th day of the month following the completed monitoring period, unless otherwise specified in this permit. Priority pollutant analysis data shall be submitted no later than forty-five (45) days following the monitoring period. Unless otherwise specified, all toxicity test data shall be submitted within sixty (60) days after the sample date. The report(s) shall be sent to the Department of Ecology, Northwest Regional Office, 3190 – 160th Avenue SE, Bellevue, Washington 98008-5452.

All laboratory reports providing data for organic and metal parameters shall 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.

Discharge monitoring report forms must be submitted monthly whether or not the facility was discharging. If there was no discharge during a given monitoring period, submit the form as required with the words "no discharge" entered in place of the monitoring results.

B. Records Retention

The Permittee shall retain records of all monitoring information for a minimum of three (3) years. Such information shall 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. This period of retention shall be extended during the course of any unresolved litigation regarding the discharge of pollutants by the Permittee or when requested by the Department.

C. Recording of Results

For each measurement or sample taken, the Permittee shall record the following information: (1) the date, exact place, method, and time of sampling or measurement; (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; and (6) the results of all analyses.

D. Additional Monitoring by the Permittee

If the Permittee monitors any pollutant more frequently than required by this permit using test procedures specified by Condition S2 of this permit, then the results of such monitoring shall be included in the calculation and reporting of the data submitted in the Permittee's DMR.

E. Noncompliance Notification

In the event the Permittee is unable to comply with any of the terms and conditions of this permit due to any cause, the Permittee shall:

1. Immediately take action to stop, contain, and cleanup unauthorized discharges or otherwise stop the noncompliance, correct the problem and, if applicable, repeat sampling and analysis of any noncompliance immediately and submit the results to the Department within thirty (30) days after becoming aware of the violation.

2. Immediately notify the Department of the failure to comply.

3. Submit a detailed, written report to the Department within thirty (30) days (five [5] days for upsets and bypasses), unless requested earlier by the Department. The report shall contain a description of the noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

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.

F. Maintaining a Copy of This Permit

A copy of this permit must be kept at the treatment plant and be made available upon request to the public or Ecology inspectors.

G. Bypass Reporting – Anacortes Drinking Water Plant Intake

The Permittee shall work cooperatively with the Anacortes Drinking Water Treatment Plant to protect the use of the Skagit River as a source of drinking water. Treatment plant staff shall notify the Anacortes Drinking Water Treatment Plant of any discharge conditions that may interfere with the treatment process or degrade the quality of drinking water produced at the Anacortes Drinking Water Treatment Plant. Discharges of inadequately disinfected sewage or treatment plant effluent to the Skagit River resulting from collection system overflows, plant bypasses, failure of the disinfection system, or any other unusual occurrences that interfere with the use of the Skagit River as a raw drinking water source shall be reported by phone immediately to the Department of Ecology and the Anacortes Water Treatment Plant. The Department of Ecology's Northwest Regional Office 24-hour number is 425-649-7000 and the Anacortes Water Treatment Plant 24-hour number is 360-428-1598.

S4. FACILITY LOADING

A. Design Criteria

Flows or waste loadings of the following design criteria for the permitted treatment facility shall not be exceeded:

Average flow for the maximum month:	3.79 MGD
BOD_5 loading for maximum month:	7,356 lbs/day
TSS loading for maximum month:	7,660 lbs/day

B. Plans for Maintaining Adequate Capacity

The Permittee shall submit to the Department a plan and a schedule for continuing to maintain capacity when:

1. The actual flow or waste load reaches 85 percent of any one of the design criteria in S4.A for three (3) consecutive months; or

2. When the projected increase would reach design capacity within five (5) years,

whichever occurs first. If such a plan is required, it shall contain a plan and schedule for continuing to maintain capacity. The capacity as outlined in this plan must be sufficient to achieve the effluent limitations and other conditions of this permit. This plan shall address any of the following actions or any others necessary to meet the objective of maintaining capacity.

1. 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.

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

3. Limitation on future sewer extensions or connections or additional waste loads.

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

5. 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 the Department prior to any construction. The plan shall specify any contracts, ordinances, methods for financing, or other arrangements necessary to achieve this objective.

C. Duty to Mitigate

The Permittee is required to 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

The Permittee shall submit written notice to the Department whenever any new discharge or a substantial change in volume or character of an existing discharge into the POTW is proposed which: (1) would interfere with the operation of, or exceed the design capacity of, any portion of the POTW; (2) is not part of an approved general sewer plan or approved plans and specifications; or (3) would be subject to pretreatment standards under 40 CFR Part 403 and Section 307(b) of the Clean Water Act. This notice shall include an evaluation of the 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)].

S5. OPERATIONS AND MAINTENANCE

The Permittee shall at all times properly operate and maintain all facilities and 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 also 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 3 plant by the State of Washington shall be in responsible charge of the day-to-day operation of the wastewater treatment plant. An operator certified for at least a Class 2 plant shall be in charge during all regularly scheduled shifts.

B. O & M Program

The Permittee shall institute an adequate Operations and Maintenance Program for their entire sewage system. Maintenance records shall be maintained on all major electrical and mechanical components of the treatment plant, as well as the sewage system and pumping stations. Such records shall clearly specify the frequency and type of maintenance recommended by the manufacturer and shall show the frequency and type of maintenance performed. These maintenance records shall be 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 limitations on a short-term basis for any reason, and such reduction cannot be avoided, the Permittee shall give written notification to the Department, if possible, thirty (30) days prior to such activities, detailing 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 their obligations under this permit.

D. Electrical Power Failure

The Permittee is responsible for maintaining adequate safeguards to 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 either by means of alternate power sources, standby generator, or retention of inadequately treated wastes.

The Permittee shall maintain Reliability Class I (EPA 430-99-74-001) at the wastewater treatment plant, which requires a backup power source sufficient to operate all vital components and critical lighting and ventilation during peak wastewater flow conditions.

E. Prevent Connection of Inflow

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

F. Bypass Procedures

Bypass, which is the intentional diversion of waste streams from any portion of a treatment facility, is prohibited, and the Department may take enforcement action against a Permittee for bypass unless one of the following circumstances (1, 2, or 3) is applicable.

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

   Bypass is authorized if it is for essential maintenance and does not have the potential to cause violations of limitations or other conditions of this permit, or adversely impact public health as determined by the Department prior to the bypass. The Permittee shall submit prior notice, if possible, at least ten (10) days before the date of the bypass.

2. Bypass which is unavoidable, unanticipated, and results in noncompliance of this permit.

   This bypass is permitted 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. There are no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, stopping production, maintenance during normal periods of equipment downtime (but not if adequate backup equipment should have been installed in the exercise of reasonable engineering judgement to prevent a bypass which occurred during normal periods of equipment downtime or preventative maintenance), or transport of untreated wastes to another treatment facility.

   c. The Department is properly notified of the bypass as required in Condition S3.E of this permit.

3. Bypass which is anticipated and has the potential to result in noncompliance of this permit.

The Permittee shall notify the Department at least thirty (30) days before the planned date of bypass. The notice shall contain: (1) a description of the bypass and its cause; (2) an analysis of all known alternatives which would eliminate, reduce, or mitigate the need for bypassing; (3) a cost-effectiveness analysis of alternatives including comparative resource damage assessment; (4) the minimum and maximum duration of bypass under each alternative; (5) a recommendation as to the preferred alternative for conducting the bypass; (6) the projected date of bypass initiation; (7) a statement of compliance with SEPA; (8) a request for modification of water quality standards as provided for in WAC 173-201A-110, if an exceedance of any water quality standard is anticipated; and (9) steps taken or planned to reduce, eliminate, and prevent reoccurrence of the bypass.

For probable construction bypasses, the need to bypass is to be identified as early in the planning process as possible. The analysis required above shall be considered during preparation of the engineering report or facilities plan and plans and specifications and shall be included to the extent practical. In cases where the probable need to bypass is determined early, continued analysis is necessary up to and including the construction period in an effort to minimize or eliminate the bypass.

The Department will consider the following prior to issuing an administrative order for this type of bypass:

a. If the bypass is necessary to perform construction or maintenance-related activities essential to meet the requirements of this permit.

b. If there are feasible alternatives to bypass, 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.

c. If the bypass is planned and scheduled 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, the Department will approve or deny the request. The public shall be notified and given an opportunity to comment on bypass incidents of significant duration, to the extent feasible. Approval of a request to bypass will be by administrative order issued by the Department under RCW 90.48.120.

G. Operations and Maintenance Manual

The approved Operations and Maintenance Manual shall be kept available at the treatment plant and all operators shall follow the instructions and procedures of this manual.

An Operations and Maintenance (O&M) Manual shall be prepared by the Permittee in accordance with WAC 173-240-080 and be submitted to the Department for approval within two (2) years after permit effective date. Submittal is due by October 1, 2007. In addition to requirements of WAC 173-240-080 (1) through (5), the O&M Manual shall 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 process 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 (e.g. defining maximum allowable discharge rate for draining a tank, blocking all floor drains before beginning the overhaul of a stationary engine.)

The O&M Manual shall be reviewed by the Permittee as needed to keep all information current. Substantial changes or updates to the O&M Manual shall be submitted to the Department whenever they are incorporated into the manual as needed.

S6. PRETREATMENT

A. General Requirements

The Permittee shall work with the Department to ensure that all commercial and industrial users of the publicly owned treatment works (POTW) are in compliance with the pretreatment regulations promulgated in 40 CFR Part 403 and any additional regulations that may be promulgated under Section 307(b) (pretreatment) and 308 (reporting) of the Federal Clean Water Act.

B. Wastewater Discharge Permit Required

The Permittee shall not allow significant industrial users (SIUs) to discharge wastewater to the Permittee's sewerage system until such user has received a Wastewater Discharge Permit from the Department in accordance with Chapter 90.48 RCW and Chapter 173-216 WAC, as amended.

C. Identification and Reporting of Existing, New, and Proposed Industrial Users

1. The Permittee shall take continuous, routine measures to identify all existing, new, and proposed SIUs and potential significant industrial users (PSIUs) discharging or proposing to discharge to the Permittee's sewerage system (see Appendix B of fact sheet for definitions).

2. Within thirty (30) days of becoming aware of an unpermitted existing, new, or proposed industrial user who may be an SIU, the Permittee shall notify such user by registered mail that, if classified as an SIU, they shall be required to apply to the Department and obtain a State Waste Discharge Permit. A copy of this notification letter shall also be sent to the Department within this same thirty (30)-day period.

3. The Permittee shall also notify all PSIUs, as they are identified, that if their classification should change to an SIU, they shall be required to apply to the Department for a State Waste Discharge Permit within thirty (30) days of such change.

D. Industrial User Survey

The Permittee shall complete and submit to the Department an Industrial User Survey listing all SIUs and PSIUs discharging to the POTW. The survey shall be received by the Department by March 31, 2010, with the application for permit renewal. At a minimum, the list of SIUs and PSIUs shall be developed by means of a telephone book search, a water utility billing records search, and a physical reconnaissance of the service area. Information on PSIUs shall at least include: the business name, telephone number, address, description of the industrial process(es), and the known wastewater volumes and characteristics. For assistance with the development of the Industrial User Survey, the Permittee shall refer to the Department's guidance document entitled "Performing an Industrial User Survey."

E. Duty to Enforce Discharge Prohibitions

1. In accordance with 40 CFR 403.5(a), the Permittee shall not authorize or knowingly allow the discharge of any pollutants into its POTW which cause pass through or interference, or which otherwise violates general or specific discharge prohibitions contained in 40 CFR Part 403.5 or WAC-173-216-060.

2. The Permittee shall 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 40º C (104º F) unless the Department, 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. All of the following are prohibited from discharge to the POTW unless approved in writing by the Department under extraordinary circumstances (such as a lack of direct discharge alternatives due to combined sewer service or the need to augment sewage flows due to septic conditions):

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 shall notify the Department if any industrial user violates the prohibitions listed in this section.

S7. RESIDUAL SOLIDS

Residual solids include screenings, grit, scum, primary sludge, waste activated sludge, and other solid waste. The Permittee shall store and handle all residual solids in such a manner so as to prevent their entry into state ground or surface waters. The Permittee shall not discharge leachate from residual solids to state surface or ground waters.

S8. ACUTE TOXICITY

A. Effluent Characterization

The Permittee shall conduct acute toxicity testing on the final effluent to determine the presence and amount of acute (lethal) toxicity. The two acute toxicity tests listed below shall be conducted on each sample taken for effluent characterization.

Effluent characterization for acute toxicity shall be conducted biannually for one year from July 2006 to January 2007. A written report shall be submitted to the Department within ninety (90) days after the sample date with submittals received by November 1, 2006, and May 1, 2007, for the July 2006 and January 2007 sampling events, respectively. The Acute Toxicity Tests Characterization Summary Report must be submitted by May 1, 2007.

Acute toxicity testing shall follow protocols, monitoring requirements, and quality assurance/quality control procedures specified in this section. A dilution series consisting of a minimum of five concentrations and a control shall be used to estimate the concentration lethal to 50% of the organisms (LC_{50}). The percent survival in 100% effluent shall also be reported.

Acute toxicity tests shall be conducted with the following species and protocols:

Freshwater Chronic Toxicity Test Species		**Method**
Fathead minnow	*Pimephales promelas*	EPA/600/4-90/027F
Daphnid	*Ceriodaphnia dubia*, *Daphnia pulex*, or *Daphnia magna*	EPA/600/4-90/027F

B. Effluent Limit for Acute Toxicity

The Permittee has an effluent limit for acute toxicity if, after completing one year of effluent characterization, either:

(1) The median survival of any species in 100% effluent is below 80%, or

(2) Any one test of any species exhibits less than 65% survival in 100% effluent.

If an effluent limit for acute toxicity is required by Subsection B at the end of one year of effluent characterization, the Permittee shall immediately complete all applicable requirements in Subsections C, D, and E.

If no effluent limit is required by Subsection B at the end of one year of effluent characterization, then the Permittee shall complete all applicable requirements in Subsection E.

The effluent limit for acute toxicity is no acute toxicity detected in a test concentration representing the acute critical effluent concentration (ACEC).

In the event of failure to pass the test described in Subsection C of this section for compliance with the effluent limit for acute toxicity, the Permittee is considered to be in compliance with all permit requirements for acute whole effluent toxicity as long as the requirements in Subsection D are being met to the satisfaction of the Department.

The ACEC means the maximum concentration of effluent during critical conditions at the boundary of the zone of acute criteria exceedance assigned pursuant to WAC 173-201A-100. The zone of acute criteria exceedance is authorized in Section S1 of this permit. The ACEC equals 6.5% effluent (which is 1/15.2, the acute dilution factor).

C. Monitoring for Compliance With an Effluent Limit for Acute Toxicity

Monitoring to determine compliance with the effluent limit shall be conducted quarterly for the remainder of the permit term using each of the species listed in Subsection A on a rotating basis and performed using at a minimum 100% effluent, the ACEC, and a control. The Permittee shall schedule the toxicity tests in the order listed in the permit unless the Department notifies the Permittee in writing of another species rotation schedule. The percent survival in 100% effluent shall be reported for all compliance monitoring.

Compliance with the effluent limit for acute toxicity means no statistically significant difference in survival between the control and the test concentration representing the ACEC. The Permittee shall immediately implement Subsection D if any acute toxicity test conducted for compliance monitoring determines a statistically significant difference in survival between the control and the ACEC using hypothesis testing at the 0.05 level of significance (Appendix H, EPA/600/4-89/001). If the difference in survival between the control and the ACEC is less than 10%, the hypothesis test shall be conducted at the 0.01 level of significance.

D. Response to Noncompliance With an Effluent Limit for Acute Toxicity

If the Permittee violates the acute toxicity limit in Subsection B, the Permittee shall begin additional compliance monitoring within one week from the time of receiving the test results. This additional monitoring shall be conducted weekly for four consecutive weeks using the same test and species as the failed compliance test. Testing shall determine the LC_{50} and effluent limit compliance. The discharger shall return to the original monitoring frequency in Subsection C after completion of the additional compliance monitoring.

If the Permittee believes that a test indicating noncompliance will be identified by the Department as an anomalous test result, the Permittee may notify the Department that the compliance test result might be anomalous and that the Permittee intends to take only one additional sample for toxicity testing and wait for notification from the Department before completing the additional monitoring required in this subsection. The notification to the Department shall accompany the report of the compliance test result and identify the reason for considering the compliance test result to be anomalous. The Permittee shall complete all of the additional monitoring required in this subsection as soon as possible after notification by the Department that the compliance test result was not anomalous. If the one additional sample fails to comply with the effluent limit for acute toxicity, then the Permittee shall proceed without delay to complete all of the additional monitoring required in this subsection. The one additional test result shall replace the compliance test result upon determination by the Department that the compliance test result was anomalous.

If all of the additional compliance monitoring conducted in accordance with this subsection complies with the permit limit, the Permittee shall search all pertinent and recent facility records (operating records, monitoring results, inspection records, spill reports, weather records, production records, raw material purchases, pretreatment records, etc.) and submit a report to the Department on possible causes and preventive measures for the transient toxicity event which triggered the additional compliance monitoring.

If toxicity occurs in violation of the acute toxicity limit during the additional compliance monitoring, the Permittee shall submit a Toxicity Identification/Reduction Evaluation (TI/RE) plan to the Department. The TI/RE plan submittal shall be within sixty (60) days after the sample date for the fourth additional compliance monitoring test. If the Permittee decides to forgo the rest of the additional compliance monitoring tests required in this subsection because one of the first three additional compliance monitoring tests failed to meet the acute toxicity limit, then the Permittee shall submit the TI/RE plan within sixty (60) days after the sample date for the first additional monitoring test to violate the acute toxicity limit. The TI/RE plan shall be based on WAC 173-205-100(2) and shall be implemented in accordance with WAC 173-205-100(3).

E. Monitoring When There Is No Permit Limit for Acute Toxicity

The Permittee shall test final effluent twice (2 times) in the last (4) quarters prior to submission of the application for permit renewal (March 2009 and September 2009). All species used in the initial acute effluent characterization or substitutes approved by the Department shall be used and results submitted to the Department as a part of the permit renewal application process. Test results shall be submitted with the application for permit renewal.

F. Sampling and Reporting Requirements

1. All reports for effluent characterization or compliance monitoring shall be submitted in accordance with the most recent version of Department of Ecology Publication #WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria,* in regards to format and content. Reports shall contain bench sheets and reference toxicant results for test methods. If the lab provides the toxicity test data on floppy disk for electronic entry into the Department's database, then the Permittee shall send the disk to the Department along with the test report, bench sheets, and reference toxicant results.

2. Testing shall be conducted on 24-hour composite effluent samples. Composite samples taken for toxicity testing shall be cooled to 4 degrees Celsius while being collected and shall be sent to the lab immediately upon completion. Grab samples must be shipped on ice to the lab immediately upon collection. If a grab sample is received at the testing lab within one hour after collection, it must have a temperature below 20° C at receipt. If a grab sample is received at the testing lab within 4 hours after collection, it must be below 12° C at receipt. All other samples must be below 8° C at receipt. The lab shall begin the toxicity testing as soon as possible but no later than 36 hours after sampling was ended. The lab shall store all samples at 4° C in the dark from receipt until completion of the test.

3. All samples and test solutions for toxicity testing shall have water quality measurements as specified in Department of Ecology Publication #WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria,* or most recent version thereof.

4. All toxicity tests shall meet quality assurance criteria and test conditions in the most recent versions of the EPA manual listed in Subsection A and the Department of Ecology Publication #WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*. If test results are determined to be invalid or anomalous by the Department, testing shall be repeated with freshly collected effluent.

5. Control water and dilution water shall be laboratory water meeting the requirements of the EPA manual listed in Subsection A or pristine natural water of sufficient quality for good control performance.

6. The whole effluent toxicity tests shall be run on an unmodified sample of final effluent.

7. The Permittee may choose to conduct a full dilution series test during compliance monitoring in order to determine dose response. In this case, the series must have a minimum of five effluent concentrations and a control. The series of concentrations must include the ACEC.

8. All whole effluent toxicity tests, effluent screening tests, and rapid screening tests that involve hypothesis testing, and do not comply with the acute statistical power standard of 29% as defined in WAC 173-205-020, must be repeated on a fresh sample with an increased number of replicates to increase the power.

S9. CHRONIC TOXICITY

A. Effluent Characterization

The Permittee shall conduct chronic toxicity testing on the final effluent. The two chronic toxicity tests listed below shall be conducted on each sample taken for effluent characterization.

Effluent characterization for chronic toxicity shall be conducted biannually for one year from July 2006 to January 2007. A written report shall be submitted to the Department within ninety (90) days after the sample date with submittals received by November 1, 2006, and May 1, 2007, for the July 2006 and January 2007 sampling events, respectively. The Chronic Toxicity Tests Characterization Summary Report must be submitted by May 1, 2007

The Permittee shall conduct chronic toxicity testing during effluent characterization on a series of at least five concentrations of effluent in order to determine appropriate point estimates. This series of dilutions shall include the ACEC. The Permittee shall compare the ACEC to the control using hypothesis testing at the 0.05 level of significance as described in Appendix H, EPA/600/4-89/001.

Chronic toxicity tests shall be conducted with the following species and protocols:

Freshwater Chronic Toxicity Test Species		Method
Fathead minnow	*Pimephales promelas*	EPA/600/4-91/002
Water flea	*Ceriodaphnia dubia*	EPA/600/4-91/002

B. Effluent Limit for Chronic Toxicity

After completion of effluent characterization, the Permittee has an effluent limit for chronic toxicity if any test conducted for effluent characterization shows a significant difference between the control and the ACEC at the 0.05 level of significance using hypothesis testing (Appendix H, EPA/600/4-89/001) and shall complete all applicable requirements in Subsections C, D, and E.

If no significant difference is shown between the ACEC and the control in any of the chronic toxicity tests, the Permittee has no effluent limit for chronic toxicity and only subsections E.

The effluent limit for chronic toxicity is no toxicity detected in a test concentration representing the chronic critical effluent concentration (CCEC).

In the event of failure to pass the test described in subsection C, of this section, for compliance with the effluent limit for chronic toxicity, the Permittee is considered to be in compliance with all permit requirements for chronic whole effluent toxicity as long as the requirements in subsection D are being met to the satisfaction of the Department.

The CCEC means the maximum concentration of effluent allowable at the boundary of the mixing zone assigned in S1. pursuant to WAC 173-201A-100. The CCEC equals 2.4% effluent.

C. Monitoring for Compliance With an Effluent Limit for Chronic Toxicity

Monitoring to determine compliance with the effluent limit shall be conducted quarterly for the remainder of the permit term using each of the species listed in Subsection A on a rotating basis and performed using at a minimum the CCEC, the ACEC, and a control. The Permittee shall schedule the toxicity tests in the order listed in the permit unless the Department notifies the Permittee in writing of another species rotation schedule.

Compliance with the effluent limit for chronic toxicity means no statistically significant difference in response between the control and the test concentration representing the CCEC. The Permittee shall immediately implement Subsection D if any chronic toxicity test conducted for compliance monitoring determines a statistically significant difference in response between the control and the CCEC using hypothesis testing at the 0.05 level of significance (Appendix H, EPA/600/4-89/001). If the difference in response between the control and the CCEC is less than 20%, the hypothesis test shall be conducted at the 0.01 level of significance.

In order to establish whether the chronic toxicity limit is eligible for removal from future permits, the Permittee shall also conduct this same hypothesis test

(Appendix H, EPA/600/4-89/001) to determine if a statistically significant difference in response exists between the ACEC and the control.

D. Response to Noncompliance With an Effluent Limit for Chronic Toxicity

If a toxicity test conducted for compliance monitoring under Subsection C determines a statistically significant difference in response between the CCEC and the control, the Permittee shall begin additional compliance monitoring within one week from the time of receiving the test results. This additional monitoring shall be conducted monthly for three consecutive months using the same test and species as the failed compliance test. Testing shall be conducted using a series of at least five effluent concentrations and a control in order to be able to determine appropriate point estimates. One of these effluent concentrations shall equal the CCEC and be compared statistically to the nontoxic control in order to determine compliance with the effluent limit for chronic toxicity as described in Subsection C. The discharger shall return to the original monitoring frequency in Subsection C after completion of the additional compliance monitoring.

If the Permittee believes that a test indicating noncompliance will be identified by the Department as an anomalous test result, the Permittee may notify the Department that the compliance test result might be anomalous and that the Permittee intends to take only one additional sample for toxicity testing and wait for notification from the Department before completing the additional monitoring required in this subsection. The notification to the Department shall accompany the report of the compliance test result and identify the reason for considering the compliance test result to be anomalous. The Permittee shall complete all of the additional monitoring required in this subsection as soon as possible after notification by the Department that the compliance test result was not anomalous. If the one additional sample fails to comply with the effluent limit for chronic toxicity, then the Permittee shall proceed without delay to complete all of the additional monitoring required in this subsection. The one additional test result shall replace the compliance test result upon determination by the Department that the compliance test result was anomalous.

If all of the additional compliance monitoring conducted in accordance with this subsection complies with the permit limit, the Permittee shall search all pertinent and recent facility records (operating records, monitoring results, inspection records, spill reports, weather records, production records, raw material purchases, pretreatment records, etc.) and submit a report to the Department on possible causes and preventive measures for the transient toxicity event which triggered the additional compliance monitoring.

If toxicity occurs in violation of the chronic toxicity limit during the additional compliance monitoring, the Permittee shall submit a Toxicity Identification/Reduction Evaluation (TI/RE) plan to the Department. The TI/RE plan submittal shall be within sixty (60) days after the sample date for the third additional compliance monitoring test. If the Permittee decides to forgo the rest of the additional compliance monitoring tests required in this subsection because one of the first two additional compliance monitoring tests failed to meet the chronic toxicity limit, then the Permittee shall submit the TI/RE plan within sixty (60) days after the sample date for the first additional monitoring test to violate the chronic toxicity limit. The TI/RE plan shall be based on WAC 173-205-100(2) and shall be implemented in accordance with WAC 173-205-100(3).

E. Monitoring When There Is No Permit Limit for Chronic Toxicity

The Permittee shall test final effluent twice (2 times) in the last (4) quarters prior to submission of the application for permit renewal (June 2009 and December 2009). All species used in the initial chronic effluent characterization or substitutes approved by the Department shall be used and results submitted to the Department as a part of the permit renewal application process. Test results shall be submitted with the application for permit renewal.

F. <u>Sampling and Reporting Requirements</u>

1. All reports for effluent characterization or compliance monitoring shall be submitted in accordance with the most recent version of Department of Ecology Publication #WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*, in regards to format and content. Reports shall contain bench sheets and reference toxicant results for test methods. If the lab provides the toxicity test data on floppy disk for electronic entry into the Department's database, then the Permittee shall send the disk to the Department along with the test report, bench sheets, and reference toxicant results.

2. Testing shall be conducted on 24-hour composite effluent samples. Composite samples taken for toxicity testing shall be cooled to 4 degrees Celsius while being collected and shall be sent to the lab immediately upon completion. Grab samples must be shipped on ice to the lab immediately upon collection. If a grab sample is received at the testing lab within one hour after collection, it must have a temperature below 20° C at receipt. If a grab sample is received at the testing lab within four hours after collection, it must be below 12° C at receipt. All other samples must be below 8° C at receipt. The lab shall begin the toxicity testing as soon as possible but no later than 36 hours after sampling was ended. The lab shall store all samples at 4° C in the dark from receipt until completion of the test.

3. All samples and test solutions for toxicity testing shall have water quality measurements as specified in Department of Ecology Publication #WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria,* or most recent version thereof.

4. All toxicity tests shall meet quality assurance criteria and test conditions in the most recent versions of the EPA manual listed in Subsection A and the Department of Ecology Publication #WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*. If test results are determined to be invalid or anomalous by the Department, testing shall be repeated with freshly collected effluent.

5. Control water and dilution water shall be laboratory water meeting the requirements of the EPA manual listed in Subsection A or pristine natural water of sufficient quality for good control performance.

6. The whole effluent toxicity tests shall be run on an unmodified sample of final effluent.

7. The Permittee may choose to conduct a full dilution series test during compliance monitoring in order to determine dose response. In this case, the series must have a minimum of five effluent concentrations and a control. The series of concentrations must include the ACEC and the CCEC.

8. All whole effluent toxicity tests, effluent screening tests, and rapid screening tests that involve hypothesis testing, and do not comply with the chronic statistical power standard of 39% as defined in WAC 173-205-020, must be repeated on a fresh sample with an increased number of replicates to increase the power.

S.10. ADDITIONAL TESTING OF EFFLUENT

The Permittee shall conduct chemical analyses of effluent samples collected from the wastewater treatment system in accordance with protocols, monitoring requirements, and QA/QC procedures specified in this section.

A. Additional Chemical Analysis

The following parameters shall be tested on the Permittee's final effluent, from at least three grab samples during the term of the permit:

Ammonia (as N)
Dissolved Oxygen
Total Kjeldahl Nitrogen (TKN)
Nitrate + Nitrite Nitrogen
Oil & Grease
Total Phosphorus
Total Dissolved Solids (TDS)

B. Priority Pollutant Scans

Three priority pollutant scans shall be conducted on the Permittee's final effluent during the term of this permit. Testing should be during the last year of the permit in January, July, and December of 2009. Each analysis shall be done on a 24-hour composite of the final effluent. The samples shall be taken at least four months apart. The results shall be submitted with EPA Form 3510-2A (NPDES application form) at the time of reapplication for renewal of this permit, submittal due March 31, 2010.

A listing of the parameters required in these analyses is found in Appendix D of the fact sheet accompanying this permit, and can also be found in EPA Form 3510-2A, Part D, "Expanded Effluent Testing Data."

C. Protocols

Sample analysis shall be conducted in accordance with 40 CFR Part 136.

D. Quality Assurance/Quality Control Procedures

The Permittee shall follow the quality assurance procedures of 40 CFR Part 136.

S11. OUTFALL EVALUATION

The Permittee shall inspect the submerged portion of the outfall line and diffuser to document its integrity and continued function. If conditions allow for a photographic verification, it shall be included in the report. Results shall be submitted with the application for permit renewal.

GENERAL CONDITIONS

G1. SIGNATORY REQUIREMENTS

All applications, reports, or information submitted to the Department shall be signed and certified.

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

B. All reports required by this permit and other information requested by the Department shall 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 a person described above and submitted to the Department.

2. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters. (A duly authorized representative may thus be 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 satisfying the requirements of paragraph B.2 above must be submitted to the Department 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 shall 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 INSPECTION AND ENTRY

The Permittee shall allow an authorized representative of the Department, upon the presentation of credentials and such other documents as may be required by law:

A. To enter upon the premises where a discharge is located or where any records must be kept under the terms and conditions of this permit.

B. To have access to and copy - at reasonable times and at reasonable cost - any records required to be kept under the terms and conditions of this permit.

C. To inspect - at reasonable times - any facilities, equipment (including monitoring and control equipment), practices, methods, or operations regulated or required under this permit.

D. To sample or monitor - at reasonable times - any substances or parameters at any location for purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act.

G3. PERMIT ACTIONS

This permit may be modified, revoked and reissued, or terminated either at the request of any interested person (including the Permittee) or upon the Department's initiative. However, the permit may only be modified, revoked and reissued, or terminated for the reasons specified in 40 CFR 122.62, 122.64 or WAC 173-220-150 according to the procedures of 40 CFR 124.5.

A. The following are causes for terminating this permit during its term, or for denying a permit renewal application:

1. Violation of any permit term or condition.

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

3. A material change in quantity or type of waste disposal.

4. A determination that the permitted activity endangers human health or the environment, or contributes to water quality standards violations and can only be regulated to acceptable levels by permit modification or termination [40 CFR Part 122.64(3)].

5. A change in any condition that requires either a temporary or permanent reduction, or elimination of any discharge or sludge use or disposal practice controlled by the permit [40 CFR Part 122.64(4)].

6. Nonpayment of fees assessed pursuant to RCW 90.48.465.

7. Failure or refusal of the Permittee to allow entry as required in RCW 90.48.090.

B. The following are causes for modification but not revocation and reissuance except when the Permittee requests or agrees:

1. A material change in the condition of the waters of the state.

2. New information not available at the time of permit issuance that would have justified the application of different permit conditions.

3. Material and substantial alterations or additions to the permitted facility or activities which occurred after this permit issuance.

4. Promulgation of new or amended standards or regulations having a direct bearing upon permit conditions, or requiring permit revision.

5. The Permittee has requested a modification based on other rationale meeting the criteria of 40 CFR Part 122.62.

6. The Department has determined that good cause exists for modification of a compliance schedule, and the modification will not violate statutory deadlines.

7. Incorporation of an approved local pretreatment program into a municipality's permit.

C. The following are causes for modification or alternatively revocation and reissuance:

1. Cause exists for termination for reasons listed in A1 through A7 of this section, and the Department determines that modification or revocation and reissuance is appropriate.

2. The Department has received notification of a proposed transfer of the permit. A permit may also be modified to reflect a transfer after the effective date of an automatic transfer (General Condition G8) but will not be revoked and reissued after the effective date of the transfer except upon the request of the new Permittee.

G4. REPORTING PLANNED CHANGES

The Permittee shall, as soon as possible, but no later than sixty (60) days prior to the proposed changes, give notice to the Department of planned physical alterations or additions to the permitted facility, production increases, or process modification which will result in: 1) the permitted facility being determined to be a new source pursuant to

40 CFR 122.29(b); 2) a significant change in the nature or an increase in quantity of pollutants discharged; or 3) a significant change in the Permittee's sludge use or disposal practices. Following such notice, and the submittal of a new application or supplement to the existing application, along with required engineering plans and reports, this permit may be modified, or revoked and reissued pursuant to 40 CFR 122.62(a) to specify and limit any pollutants not previously limited. Until such modification is effective, any new or increased discharge in excess of permit limits or not specifically authorized by this permit constitutes a violation of the terms and conditions of this permit.

G5. PLAN REVIEW REQUIRED

Prior to constructing or modifying any wastewater control facilities, an engineering report and detailed plans and specifications shall be submitted to the Department for approval in accordance with Chapter 173-240 WAC. Engineering reports, plans, and specifications shall be submitted at least one hundred and eighty (180) days prior to the planned start of construction unless a shorter time is approved by Ecology. Facilities shall be constructed and operated in accordance with the approved plans.

G6. COMPLIANCE WITH OTHER LAWS AND STATUTES

Nothing in this permit shall be construed as excusing the Permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

G7. DUTY TO REAPPLY

The Permittee shall apply for permit renewal at least one hundred and eighty (180) days prior to the specified expiration date of this permit.

G8. TRANSFER OF THIS PERMIT

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

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 the Department 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. The Department 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.

G9. REDUCED PRODUCTION FOR COMPLIANCE

The Permittee, in order to maintain compliance with its permit, shall control production and/or all discharges upon reduction, loss, failure, or bypass of the treatment facility until the facility is restored or an alternative method of treatment is provided. This requirement applies in the situation where, among other things, the primary source of power of the treatment facility is reduced, lost, or fails.

G10. REMOVED SUBSTANCES

Collected screenings, grit, solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall not be resuspended or reintroduced to the final effluent stream for discharge to state waters.

G11. DUTY TO PROVIDE INFORMATION

The Permittee shall submit to the Department, within a reasonable time, all information which the Department 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 shall also submit to the Department upon request, copies of records required to be kept by this permit.

G12. OTHER REQUIREMENTS OF 40 CFR

All other requirements of 40 CFR 122.41 and 122.42 are incorporated in this permit by reference.

G13. ADDITIONAL MONITORING

The Department may establish specific monitoring requirements in addition to those contained in this permit by administrative order or permit modification.

G14. PAYMENT OF FEES

The Permittee shall submit payment of fees associated with this permit as assessed by the Department.

G15. PENALTIES FOR VIOLATING PERMIT CONDITIONS

Any person who is found guilty of willfully violating the terms and conditions of this permit shall be deemed guilty of a crime, and upon conviction thereof shall be punished by a fine of up to ten thousand dollars ($10,000) 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 shall incur, in addition to any other penalty as provided by law, a civil penalty in the amount of up to ten thousand dollars ($10,000) for every such violation. Each and every such violation shall be a separate and distinct offense, and in case of a continuing violation, every day's continuance shall be deemed to be a separate and distinct violation.

G16. UPSET

Definition – "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations 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.

An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of the following paragraph are met.

A Permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that: 1) an upset occurred and that the Permittee can identify the cause(s) of the upset;
2) the permitted facility was being properly operated at the time of the upset;
3) the Permittee submitted notice of the upset as required in Condition S3.E; and
4) the Permittee complied with any remedial measures required under S4.C of this permit.

In any enforcement proceeding, the Permittee seeking to establish the occurrence of an upset has the burden of proof.

G17. PROPERTY RIGHTS

This permit does not convey any property rights of any sort, or any exclusive privilege.

G18. DUTY TO COMPLY

The Permittee shall 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.

G19. TOXIC POLLUTANTS

The Permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if this permit has not yet been modified to incorporate the requirement.

G20. PENALTIES FOR TAMPERING

The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than two (2) years per violation, or by both. If a conviction of a person is for a violation committed after a first conviction of such person under this Condition, punishment shall be a fine of not more than $20,000 per day of violation, or by imprisonment of not more than four (4) years, or by both.

G21. REPORTING ANTICIPATED NONCOMPLIANCE

The Permittee shall give advance notice to the Department by submission of a new application or supplement thereto at least one hundred and eighty (180) days prior to commencement of such discharges, of any facility expansions, production increases, or other planned changes, such as process modifications, in the permitted facility or activity which may result in noncompliance with permit limits or conditions. Any maintenance of facilities, which might necessitate unavoidable interruption of operation and degradation of effluent quality, shall be scheduled during noncritical water quality periods and carried out in a manner approved by the Department.

G22. REPORTING OTHER INFORMATION

Where the Permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application, or in any report to the Department, it shall promptly submit such facts or information.

G23. REPORTING REQUIREMENTS APPLICABLE TO EXISTING MANUFACTURING, COMMERCIAL, MINING, AND SILVICULTURAL DISCHARGERS

The Permittee belonging to the categories of existing manufacturing, commercial, mining, or silviculture must notify the Department as soon as they know or have reason to believe:

A. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in this permit, if that discharge will exceed the highest of the following “notification levels”:

1. One hundred micrograms per liter (100 μg/l).

2. Two hundred micrograms per liter (200 μg/l) for acrolein and acrylonitrile; five hundred micrograms per liter (500 μg/l) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/l) for antimony.

3. Five (5) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR 122.21(g)(7).

4. The level established by the Director in accordance with 40 CFR 122.44(f).

B. That any activity has occurred or will occur which would result in any discharge, on a nonroutine or infrequent basis, of a toxic pollutant which is not limited in this permit, if that discharge will exceed the highest of the following “notification levels”:

1. Five hundred micrograms per liter (500 μg/L).

2. One milligram per liter (1 mg/L).

3. Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR 122.21(g)(7).

4. The level established by the Director in accordance with 40 CFR 122.44(f).

G24. COMPLIANCE SCHEDULES

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than fourteen (14) days following each schedule date.

APPENDIX B

ENVIRONMENTAL IMPACT STATEMENT (EIS) ADOPTION SHEET

WAC 197-11-965 Adoption notice.

ADOPTION OF EXISTING ENVIRONMENTAL DOCUMENTS

Adoption for EIS

Description of current proposal: The August 2011 update of the City of Burlington Wastewater Comprehensive Plan builds on past work to provide a comprehensive assessment of the needs for wastewater collection, transmission, treatment, and disposal for a 20-year planning period. The plan evaluates the existing wastewater collection and treatment infrastructure to determine its capability to serve the projected population and to determine the required system improvement needs for the planning period. The improvements are focused on upgrading pump stations, pipe sizes, equipment and buildings at the plant, and landscaping at the pump stations.

Proponent: The City of Burlington

Location of current proposal: This is a regional sanitary sewer system, including north to Lake Samish in Whatcom County with connections along the way, and west to Farm to Market Road at Bayview Ridge, as well as serving the City Limits and Urban Growth Area.

Title of document being adopted: Final Supplemental Environmental Impact Statement and Preferred Alternative for the 1994 Comprehensive Plan and Zoning Ordinance Amendments as Further Supplemented in 2005.

Agency that prepared document being adopted: City of Burlington

Date adopted document was prepared: April 1994 with 2005 Supplement

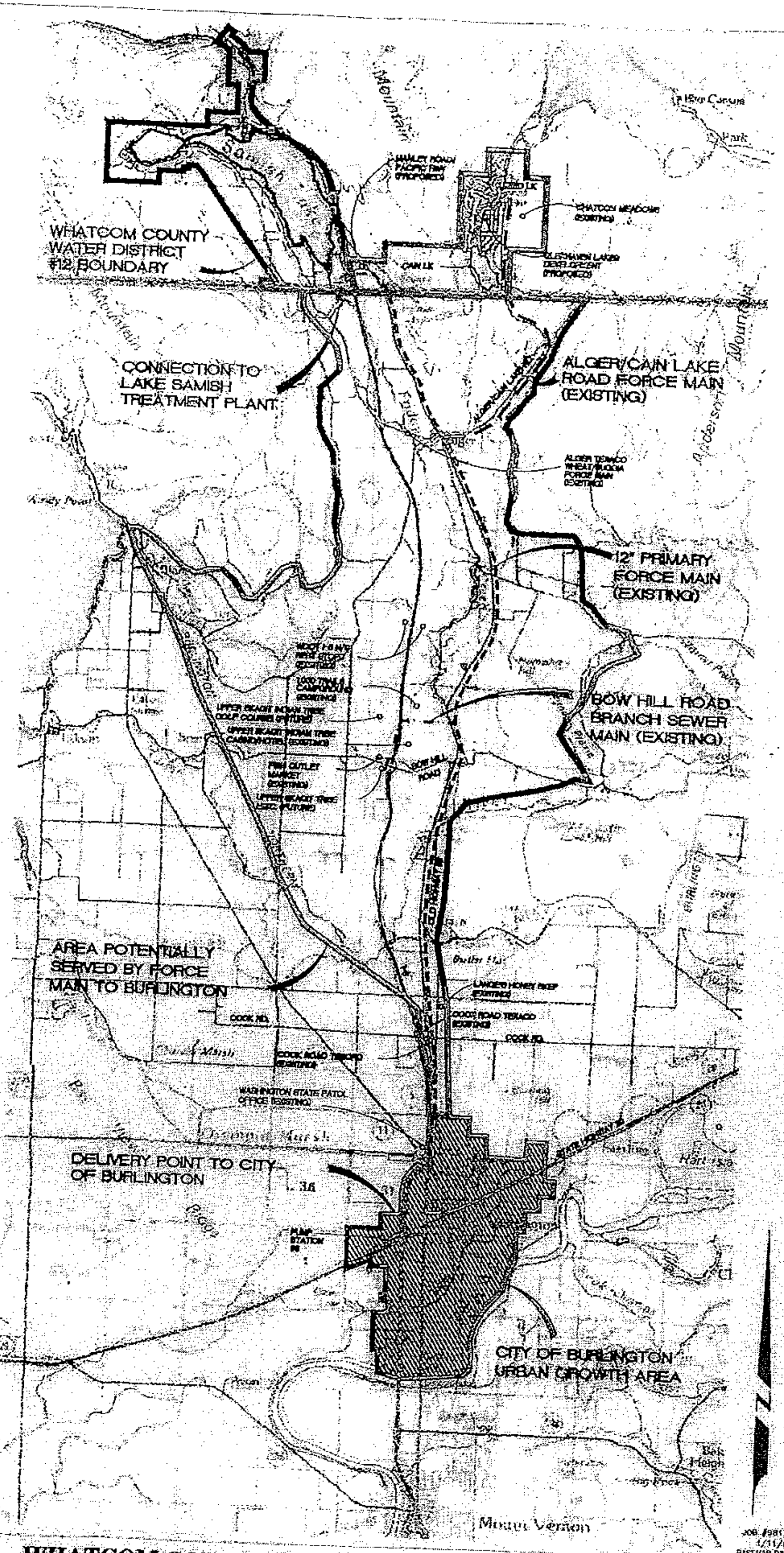
The documents have not been challenged. The documents are available to be read at the City of Burlington Planning Department, 833 South Spruce Street, Burlington WA 8:00 a.m.-5:00 p.m. M-F.

We have identified and adopted this document as being appropriate for this proposal after independent review. The document meets our environmental review needs for the current proposal and will accompany the proposal to the decisionmaker.

Name of agency adopting document : The City of Burlington
Responsible Official: Margaret Fleek Margaret Fleek
Position/Title: Planning Director
Phone: 360-755-9717
Address: City of Burlington Planning Department
833 S. Spruce Street
Burlington WA 98233
Date: October 14, 2011

APPENDIX C

SAMISH WATER DISTRICT CUSTOMERS AND MAP



WHATCOM COUNTY WATER DISTRICT NO. 12

Sewer Force Main Map - Lake Samish to City of Burlington WWTP

EXHIBIT

SAMISH WATER DISTRICT
BURLINGTON FORCE MAIN

Prepared by: E.A. Sterling, Wilson Engineering LLC
Prepared on: 03/23/2010
Prepared for: City of Burlington, Gray and Osborne, Inc.
Supporting City of Burlington Rebuild of Burlington PS #6

SUMMARY OF WASTEWATER FLOWS

Burlington Force Main – Listing of Wastewater Sources	Rated Pump Station Capacity or Customer Flow Rate
• Samish WD Treatment Lagoon PS #4	700 gpm @ 53-ft TDH
• Whatcom Meadows PS #9	242 gpm @ 137-ft TDH
• Alger PS #10	84 gpm @ 78-ft TDH
• Thousand Trails PS #11	276 gpm @ 51-ft TDH
• Skagit Speedway PS #16	95 gpm @ 25-ft TDH
• Upper Skagit Tribe PS #17	495 gpm @ 29-ft TDH
• Upper Skagit Tribe PS #18	230 gpm @ 40-ft TDH
• Burlington FM Customers (not covered by above pump stations)	17 each Commercial & 80 each Residential Customers

Samish WD Treatment Lagoon PS #4

- Samish WD pumps daily from PS#4 during the off-peak hours of 10pm to 2am.
- Average daily flow currently varies from 0.80 to 1.20 Mgd.
- Per the current agreement with the City of Burlington, the District has a total contractual capacity reserve of 250,000 gpd.

Whatcom Meadows PS #9

- Whatcom Meadows PS #9 services Whatcom Meadows Campground, a residential campground facility in Whatcom County near Cain Lake and Reed Lake.
- Whatcom Meadows currently contracts with the District for 250 LUEs or 46,250 gpd of sewer service.

Alger PS #10

- Alger PS #10 services the Alger Shell (I-5 Exit 240) and the Alger Storage Facility.
- The facilities feeding into Alger PS #10 currently contract with the District for 9 LUEs or 1,665 gpd of sewer service.

Thousand Trails PS #11

- Thousand Trails PS #11 lifts wastewater from Thousand Trails Campground and the WSDOT I-5 Rest Areas north of Bow Hill Road to the Burlington Force Main via District's Bow Hill Gravity Main.
- Thousand Trails Campground currently contracts with the District for 47 LUEs or 8,695 gpd of sewer service.
- WSDOT currently contracts with the District for 2 LUEs or 370 gpd of sewer service.

Skagit Speedway PS #16

- The Skagit Speedway PS #16 services only Skagit Speedway flows which peak during race season (May to September) on Friday through Sunday nights.
- Skagit Speedway currently contracts with the District for 3 LUEs or 555 gpd of sewer service.

Upper Skagit Tribe PS #17 & #18

- Upper Skagit Tribe PS #17 lifts wastewater from the Skagit Casino to the Burlington Force Main via the District's Bow Hill Gravity Main.
- The Upper Skagit Tribe PS #18 lifts wastewater from the Tribe's installation south of Bow Hill Road to the Burlington Force Main via the District's Bow Hill Gravity Main.
- The Upper Skagit Tribe currently contracts with the District to transport a maximum flow of 60,000 gpd.

Burlington FM Customers (not covered by PS #9 – PS #18)

- There are 17 each commercial customers connected to the Burlington Force Main which are not covered by PS #9 through PS #18.

COMMERCIAL CUSTOMER NAME	ADDRESS
– Alger Food Mart	2180 Old Highway 99 N. Road, Burlington
– Samish Fish Hatchery	5585 Old Highway 99 N. Road, Burlington
– Washington State Patrol	10945 Chuckanut Drive, Burlington
– Fairfield Inn	9384 Old Highway 99 N. Road, Burlington
– Jack-in-the-Box, Inc.	9408 Old Highway 99 N. Road, Burlington
– Larson Cook Road LLC	9596 Old Highway 99 N. Road, Burlington
– Whispering Firs Alger LLC	1745 Old Highway 99 N. Road, Burlington
– Grant Springer	1693 Old Highway 99 N. Road, Burlington
– Alger Christian Reform Church	1475 Silver Run Lane, Bellingham
– Mike Roeter	9596 Old Highway 99 N. Road, Burlington
– Alger Bar & Grille	1758 Old Highway 99 N. Road, Burlington
– Cook Road Shell	9440 Old Highway 99 N. Road, Burlington
– Kesselring Gun Shop	4024 Old Highway 99 N. Road, Burlington
– Gas & Go 76	9572 Old Highway 99 N. Road, Burlington
– Lang's Honey Shop	18898 Dahlstedt Rd., Burlington
– Associated Petroleum Products	9552 Old Highway 99 N. Road, Burlington
– Robert Smith	Old Highway 99 N. Road, Burlington

- There are eighty (80) residential customers connected to the Burlington Force Main which are not covered by PS #9 through PS #18.

APPENDIX D

DISCHARGE MONTHLY REPORTS

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	001	Month	January	Year	2006
Facility Name	City of Burlington			Location	900 South Section St.		
Receiving Water	Skagit River				Burlington, WA 98233		
Plant Type	Activated Sludge				Check box if NO DISCHARGE for month		

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.747			224	3264	1.610				8	117	96	6.6	
2	1.616			172	2318	1.477				4	54	98	6.7	1.8
3	1.727	250	3601	192	2765	1.608	7	101	97	7	101	96	6.4	1.6
4	1.604	286	3826	344	4602	1.454	7	94	98	11	147	97	6.5	1.2
5	1.623			280	3790	1.677				10	135	96	6.7	0
6	1.983	149	2464	268	4432	2.197	7	116	95	7	116	97	6.9	1
7	1.832			260	3973	1.931				8	122	97	6.7	
8	2.087			204	3551	2.245				10	174	95	6.7	
9	1.895	232	3667	240	3793	1.991	7	111	97	10	158	96	6.7	0
10	2.086			320	5567	2.197				4	70	99	6.6	1.4
11	2.432	145	2941	352	7140	2.697	8	162	94	10	203	97	6.7	1.7
12	2.207	154	2835	160	2945	2.364	9	166	100	7	203	93	6.7	0.7
13	2.117			332	5862	2.420				4	71	99	6.8	1.6
14	2.117			132	2331	2.242				2	35	98	7.0	
15	1.893			176	2779	2.037				2	32	99	6.8	
16	1.894			184	2906	2.037				3	47	98	6.7	0
17	2.228	192	3568	212	3939	2.352	9	167	95	11	204	100	6.8	0.7
18	2.063	258	4439	256	4405	2.030	6	103	98	5	86	98	6.7	1
19	1.996			272	4528	1.900				15	250	94	6.7	1
20	2.090	204	3556	204	3556	2.092	7	122	97	6	105	97	6.8	0
21	2.175			164	2975	2.070				7	127	96	6.7	
22	2.090			144	2510	1.970				2	35	99	6.7	
23	2.044	193	3290	200	3409	1.921	6	102	97	2	34	99	6.4	1.6
24	1.974			388	6388	1.839				4	66	99	6.5	1.3
25	1.945	123	1995	208	3374	1.944	7	114	94	6	97	97	6.4	0.6
26	1.891	208	3280	200	3154	1.780	7	110	97	6	95	97	6.4	1.6
27	1.882			228	3579	1.744				3	47	99	6.8	0
28	1.871			268	4182	1.854				7	109	97	6.9	
29	1.878			308	4824	1.738				5	78	98	6.9	
30	2.145	179	3202	188	3363	2.048	6	107	97	9	161	95	6.9	1.4
31	2.164			280	5053	2.235				15	271	95	6.7	1
Total	61.296													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.977	198	3282	237	3911	1.990	7	121	97	7	114	97	6.4	9.00
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.2	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	2.432	286	4439	388	7140	2.697	8	145		8	126		7.0	13.00
Limit							45	1422		45	1422		9.0	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

COMMENT AND EXPLANATION OF ANY VIOLATIONS MUST BE ATTACHED ON A SEPARATE SHEET.

Mail to: Department of Ecology, Northwest Regional Office, Water Quality, 3190 160th Ave SE Bellevue, WA 98008

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 gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the 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.

Roger LaRue, Sewer Department Supervisor

Signature/Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	February
Year	2006				
Facility Name	City of Burlington			Location	900 South Section St.
Receiving Water	Skagit River				Burlington, WA 98233
Plant Type	Activated Sludge			Check box if NO DISCHARGE for month	

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	2.124	163	2887	160	2834	2.206	4	71	98	2	35	99	6.7	1.5
2	2.208			200	3683	2.337				13	239	94	6.7	1.9
3	2.158	252	4535	252	4535	2.399	12	216	95	15	270	94	6.8	0.5
4	2.209			184	3390	2.186				9	166	95	6.7	
5	2.401			152	3044	2.349				12	240	92	6.7	
6	2.243	114	2133	100	1871	2.155	7	131	94	10	187	90	6.8	1.0
7	2.133			236	4198	2.066				11	196	95	6.8	0.7
8	2.071	252	4353	260	4491	1.988	9	155	96	9	155	97	6.8	1.0
9	2.010	156	2615	120	2012	2.045	7	117	96	5	84	96	6.8	1.3
10	1.967			180	2953	1.861				2	33	99	6.7	1.5
11	1.922			208	3334	1.821				6	96	97	6.7	
12	1.937			152	2455	1.836				5	96	96	6.8	
13	1.908	196	3119	160	2546	1.821	9	143	95	8	127	95	6.8	1.6
14	1.882			180	2825	1.877				10	157	94	6.9	1.6
15	1.838	186	2851	160	2453	1.708	11	169	94	13	199	92	6.7	1.2
16	1.818			184	2790	1.724				6	91	97	6.7	1.0
17	1.781	135	2005	188	2792	1.649	7	104	95	2	30	99	6.6	1.3
18	1.811			312	4712	1.824				4	60	99	6.8	
19	1.783			156	2320	1.676				5	74	97	6.7	
20	1.776			180	2666	1.655				15	222	92	6.8	0.0
21	1.808	288	4343	176	2654	1.676	8	121	97	9	136	95	6.7	0.7
22	1.732	293	4232	232	3351	1.611	9	130	97	10	144	96	6.8	1.4
23	2.039			408	6938	2.083				8	136	98	6.8	2.0
24	2.359	245	4820	244	4800	2.132	17	334	93	14	275	94	6.7	0.9
25	2.057			204	3500	2.139				3	51	99	6.8	
26	2.338			156	3042	2.129				6	117	96	6.8	
27	2.003	155	2589	156	2606	2.091	7	117	95	3	50	98	6.7	1.3
28	1.912			208	3317	2.120				5	80	98	6.8	1.5
29														
30														
31														
Total	56.228													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	2.008	203	3374	197	3290	1.970	9	151	95	8	134	96	6.6	16.0
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.2	200.0
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	2.401	293	4820	408	6938	2.399	11	194		0	0		6.9	22.0
Limit							45	1422		45	1422		9.0	400.0

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Roger LaRue, Sewer Department Supervisor

Signature/Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	March
Year	2006				
Facility Name	City of Burlington			Location	900 South Section St.
Receiving Water	Skagit River				Burlington, WA 98233
Plant Type	Activated Sludge			Check box if NO DISCHARGE for month	

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.890			200	3153	1.951				8	126	96	6.90	0.00
2	1.868			260	4051	1.988				4	62	98	6.90	1.83
3	1.861	196	3042	180	2794	1.797	10	155	95	8	124	96	6.60	0.00
4	1.791			364	5437	1.760				5	75	99	6.80	
5	1.786			296	4409	1.721				7	104	98	6.80	
6	1.819	227	3444	164	2488	1.685	10	152	96	7	106	96	6.80	1.43
7	1.748			216	3149	1.694				6	87	97	6.80	1.23
8	1.693	241	3403	224	3163	1.586	8	113	97	6	85	97	6.80	0.00
9	1.746			260	3786	1.591				4	58	98	6.80	0.00
10	1.765	146	2149	144	2120	1.752	7	103	95	9	132	94	6.90	0.00
11	1.738			180	2609	1.600				7	101	96	6.80	
12	1.733			188	2717	1.618				6	101	96	6.90	
13	1.710	251	3580	192	2738	1.590	7	100	97	8	114	96	6.70	1.57
14	1.666			160	2223	1.558				8	111	95	6.80	1.23
15	1.653	268	3695	280	3860	1.540	7	97	97	8	110	97	6.80	1.11
16	1.648			196	2694	1.618				10	137	95	6.90	1.36
17	1.643	271	3713	312	4275	1.503	9	123	97	10	137	97	6.80	1.43
18	1.624			204	2763	1.513				8	108	96	6.80	
19	1.629			212	2880	1.498				7	95	97	6.80	
20	1.609	280	3757	176	2362	1.505	7	94	98	4	54	98	6.80	1.43
21	1.579			240	3161	1.659				7	92	97	6.80	1.52
22	1.571	264	3459	248	3249	1.659	8	105	97	8	105	97	6.70	1.40
23	1.563			320	4171	1.770				16	209	95	6.70	2.03
24	1.571	301	3944	240	3145	1.672	17	223	94	9	118	96	7.00	2.70
25	1.590			384	5092	1.550				6	80	98	7.10	
26	1.590			224	2970	1.572				6	80	97	6.90	
27	1.634	313	4265	288	3925	1.717	10	136	97	10	136	97	6.80	1.11
28	1.621			292	3948	1.671				8	108	97	6.90	1.57
29	1.628	151	2050	244	3313	1.512	9	122	94	10	136	96	6.80	1.00
30	1.593			256	3401	1.572				10	133	96	6.80	1.00
31	1.585	331	4375	276	3648	1.480	8	106	98	9	119	97	6.70	1.57
Total	52.145													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.682	249	3452	239	3345	1.642	9	125	96	8	108	97	6.60	1.15
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200.00
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.890	331	4375	384	5437	1.988	11	141		0	0		7.10	65.00
Limit							45	1422		45	1422		9.00	400.00

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Roger LaRue, Sewer Department Supervisor

Signature/Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	April
Year	2006				
Facility Name	City of Burlington	Location	900 South Section St. Burlington, WA 98233		
Receiving Water	Skagit River				
Plant Type	Activated Sludge	Check box if NO DISCHARGE for month	☐		

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS		FECAL COLIFORM
1	1.602			280	3741	1.618				6	80	98	6.9	
2	1.602			224	2993	1.618				8	107	96	6.8	
3	1.661	256	3546	220	3048	1.561	6	83	98	7	97	97	6.7	23
4	1.647			224	3077	1.528				6	82	97	6.7	73
5	1.624	217	2939	224	3034	1.533	4	54	98	5	68	98	6.7	10
6	1.596			200	2662	1.536				6	80	97	6.8	20
7	1.592	271	3598	252	3346	1.641	6	80	98	9	119	96	7.0	30
8	1.631			336	4570	1.645				4	54	99	7.0	
9	1.693			448	6326	1.612				6	85	99	6.9	
10	1.729	274	3951	216	3115	1.654	6	87	98	12	173	94	6.8	30
11	1.640			292	3994	1.776				12	164	96	6.7	10
12	1.655	314	4334	244	3368	1.826	4	55	99	7	164	95	6.7	33
13	1.705			264	3754	1.829				4	57	98	6.7	30
14	1.776	246	3644	248	3673	1.859	6	89	98	9	133	96	6.9	210
15	2.134			328	5838	2.275				8	142	98	6.9	
16	1.983			212	3506	2.129				5	83	98	6.9	
17	1.810	191	2883	208	3140	1.846	4	60	98	3	45	99	6.7	1
18	1.710			272	3879	1.639				3	43	99	6.6	1
19	1.646	282	3871	176	2416	1.729	4	55	99	5	69	97	6.8	33
20	1.643			188	2576	1.653				4	55	98	6.8	33
21	1.655	205	2830	228	3147	1.699	4	55	98	3	41	99	6.9	60
22	1.608			176	2360	1.524				4	54	98	6.8	
23	1.641			204	2792	1.557				6	82	97	6.8	
24	1.644	265	3633	172	2358	1.556	3	41	99	2	27	99	6.8	5
25	1.581			212	2795	1.540				4	53	98	6.8	33
26	1.577	271	3564	240	3157	1.498	4	53	99	4	53	98	6.7	10
27	1.583			332	4383	1.590				4	53	99	7.0	35
28	1.493	277	3449	260	3237	1.468	4	50	99	2	25	99	6.6	43
29	1.493			260	3237	1.407				2	25	99	6.6	
30	1.593			260	3454	1.374				2	27	99	6.8	
31														
Total	49.947													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.665	256	3520	247	3433	1.657	5	63	98	5	78	98	6.6	20
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.2	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	2.134	314	4334	448	6326	2.275	5	77		0	0		7.0	36
Limit							45	1422		45	1422		9.0	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Roger LaRue, Sewer Department Supervisor

Signature/Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No. WA-002015-0 Discharge No. 1 Month May Year 2006

Facility Name City of Burlington Location 900 South Section St.

Receiving Water Skagit River Burlington, WA 98233

Plant Type Activated Sludge Check box if NO DISCHARGE for month ☐

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.545	266	3427	104	1340	1.441	3	39	99	2	26	98	6.6	10
2	1.343			360	4032	1.419				3	34	99	6.9	47
3	1.494	242	3015	372	4635	1.571	5	62	98	6	75	98	6.8	43
4	1.464			296	3614	1.672				6	73	98	7.0	77
5	1.472	251	3081	256	3143	1.581	7	86	97	4	49	98	6.6	47
6	1.436			276	3305	1.495				8	96	97	6.8	
7	1.436			248	2970	1.495				7	84	97	6.7	
8	1.556	193	2505	352	4568	1.398	8	104	96	9	117	97	6.7	
9	1.271			252	2671	1.168				7	74	97	6.7	10
10	1.275	306	3254	320	3403	1.170	9	96	97	9	96	97	6.7	10
11	1.296			228	2464	1.290				9	97	96	6.9	1
12	1.305	302	3287	220	2394	1.171	9	98	97	8	97	96	6.6	7
13	1.439			260	3120	1.590				4	48	98	7.0	23
14	1.482			384	4746	1.404				5	62	99	6.9	
15	1.485	344	4260	252	3121	1.395	10	124	97	5	62	98	6.7	
16	1.452			280	3391	1.416				3	36	99	6.8	4
17	1.257	333	3491	320	3355	1.175	7	73	98	6	63	98	6.8	45
18	1.215	270	2736	296	2999	1.113	5	51	98	6	61	98	6.8	8
19	1.230			392	4021	1.180				5	51	99	6.8	15
20	1.470			248	3040	1.377				7	86	97	6.8	2
21	1.542			324	4167	1.430				5	64	98	6.8	
22	1.587	346	4580	272	3600	1.488	4	53	99	5	66	98	6.9	
23	1.629			388	5271	1.813				10	136	97	6.7	24
24	1.534	207	2648	572	7318	1.648	5	64	98	6	77	99	6.7	3
25	1.510			312	3929	1.629				4	50	99	6.7	10
26	1.525	260	3307	336	4273	1.675	3	38	99	2	25	99	6.7	4
27	1.581			168	2215	1.821				9	119	95	6.7	11
28	1.600			344	4590	1.738				7	93	98	6.7	
29	1.634			268	3652	1.752				10	136	96	6.7	1
30	1.576			220	2892	1.711				9	118	96	6.7	1
31	1.452	210	2543	300	3633	1.475	5	61	98	12	145	96	6.7	8
Total	45.093													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.455	272	3241	297	3609	1.474	6	73	98	6	78	98	6.6	9
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.2	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.634	346	4580	572	7318	1.821	9	99		0	0		7.0	37
Limit							45	1422		45	1422		9.0	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

COMMENT AND EXPLANATION OF ANY VIOLATIONS MUST BE ATTACHED ON A SEPARATE SHEET.

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Roger LaRue, Sewer Department Supervisor

Signature/Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	June
Year	2006				
Facility Name	City of Burlington			Location	900 South Section St.
Receiving Water	Skagit River				Burlington, WA 98233
Plant Type	Activated Sludge			Check box if NO DISCHARGE for month	

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS		FECAL COLIFORM
1	1.447	200	2414	204	2462	1.514	5	60	98	11	133	95	6.80	15
2	1.607	300	4021	360	4825	1.710	6	80	98	10	134	97	6.60	33
3	1.520			428	5426	1.328				5	63	99	6.40	
4	1.453			300	3635	1.285				14	170	95	6.50	
5	1.646	246	3377	240	3295	1.551	7	96	97	14	192	94	6.60	153
6	1.582			264	3483	1.647				11	145	96	6.50	17
7	1.493	311	3872	344	4283	1.438	6	75	98	11	137	97	6.60	77
8	1.518			396	5013	1.476				11	139	97	6.50	<1
9	1.580	340	4480	420	5534	1.370	9	119	97	9	119	98	6.50	31
10	1.574			264	3466	1.490				8	105	97	6.60	
11	1.489			268	3328	1.570				4	50	99	6.60	
12	1.536	291	3728	188	2408	1.471	6	77	98	8	50	98	6.60	44
13	1.501			272	3405	1.445				7	88	97	6.60	7
14	1.512	230	2900	268	3380	1.427	4	50	98	6	76	98	6.70	30
15	1.471	251	3079	200	2454	1.402	4	49	98	5	61	98	6.70	37
16	1.361			320	3632	1.394				9	102	97	6.60	67
17	1.486			344	4263	1.457				11	136	97	6.60	
18	1.502			264	3307	1.426				8	100	97	6.60	
19	1.309	315	3439	232	2533	1.320	6	66	98	4	44	98	6.60	70
20	1.277			292	3110	1.386				8	85	97	6.60	57
21	1.352			328	3698	1.502				7	79	98	6.70	60
22	1.316	294	3227	440	4829	1.480	4	44	99	6	66	99	6.70	38
23	1.335			520	5790	1.577				6	67	99	6.60	150
24	1.351			408	4597	1.493				9	101	98	6.50	
25	1.428			244	2906	1.565				10	119	96	6.50	
26	1.495	342	4264	372	4638	1.542	7	87	98	8	100	98	6.60	8
27	1.411			412	4848	1.330				7	82	98	6.80	60
28	1.351	293	3301	256	2884	1.394	6	68	98	9	101	96	6.40	27
29	1.357			320	3622	1.274				6	68	98	6.40	20
30	1.335	347	3863	220	2449	1.240	7	78	98	7	78	97	6.60	33
31														
Total	43.595													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.453	289	3536	313	3783	1.450	6	73	98	8	100	97	6.40	31
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.646	347	4480	520	5790	1.710	7	97		0	0		6.80	67
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Roger LaRue, Sewer Department Supervisor

Signature/Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	**Discharge No.**	1
Month	July	**Year**	2006
Facility Name	City of Burlington	**Location**	900 South Section St. Burlington, WA 98233
Receiving Water	Skagit River		
Plant Type	Activated Sludge	Check box if NO DISCHARGE for month	☐

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS		FECAL COLIFORM
1	1.454			368	4463	1.457				6	73	98	6.70	
2	1.413			452	5327	1.303				6	71	99	6.70	
3	1.368	327	3731	248	2829	1.259	5	57	98	4	46	98	6.70	12
4	1.341			300	3355	1.224				4	45	99	6.80	15
5	1.301	233	2528	248	2691	1.880	6	65	97	8	87	97	6.70	35
6	1.355			460	5198	1.207				9	102	98	6.70	15
7	1.287	364	3907	320	3435	1.270	8	86	98	11	118	97	6.40	13
8	1.340			368	4113	1.150				3	34	99	6.30	
9	1.413			348	4101	1.212				4	47	99	6.50	
10	1.390	326	3779	252	2921	1.278	5	58	98	7	81	97	6.50	39
11	1.332			268	2977	1.394				8	89	97	6.60	77
12	1.383	394	4544	300	3460	1.467	10	115	97	2	89	97	6.70	51
13	1.521	286	3628	305	3869	1.590	5	63	98	7	89	98	6.70	32
14	1.482			384	4746	1.742				6	74	98	6.60	1
15	1.482			376	4647	1.742				12	148	97	6.70	
16	1.430			176	2099	1.383				2	24	99	6.60	
17	1.387	312	3609	296	3424	1.300	2	23	99	3	35	99	6.60	6
18	1.363			320	3638	1.309				4	45	99	6.50	24
19	1.307	505	5505	492	5363	1.212	5	55	99	7	76	99	6.70	9
20	1.262			268	2821	1.278				9	95	97	6.30	33
21	1.454	384	4657	300	3638	1.366	5	61	99	7	85	98	6.40	50
22	1.426			380	4519	1.458				6	71	98	6.50	
23	1.280			320	3416	1.187				5	53	98	6.60	
24	1.314	390	4274	252	2762	1.208	4	44	99	6	66	98	6.60	12
25	1.472			344	4223	1.392				13	160	96	6.60	10
26	1.482	354	4375	476	5883	1.346	8	99	98	14	173	97	6.70	102
27	1.500			264	3303	1.417				14	175	95	6.70	43
28	1.437	492	5896	272	3260	1.470	8	96	98	20	240	93	6.80	50
29	1.472			264	3241	1.375				10	123	96	6.60	
30	1.456			264	3206	1.337				8	97	97	6.60	
31	1.463	282	3441	248	3026	1.355	6	73	98	14	171	94	6.60	50
Total	43.367													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.399	358	4144	320	3740	1.373	6	69	98	8	93	97	6.30	22
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.521	505	5896	492	5883	1.880	7	80		0	0		6.80	30
Limit							45	1422		45	1422		9.00	400

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Roger LaRue, Sewer Department Supervisor

Signature/Date

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Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	August
Year	2006				
Facility Name	City of Burlington			Location	900 South Section St.
Receiving Water	Skagit River				Burlington, WA 98233
Plant Type	Activated Sludge			Check box if NO DISCHARGE for month	☐

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS		FECAL COLIFORM
1	1.501			572	7160	1.399				14	175	98	6.60	115
2	1.451	260	3146	324	3921	1.349	7	85	97	18	218	94	6.70	82
3	1.433	430	5139	324	3872	1.497	8	96	98	15	179	95	6.80	78
4	1.436			264	3162	1.297				13	156	95	6.60	55
5	1.382			340	3919	1.263				29	334	91	6.70	
6	1.412			308	3627	1.305				20	236	94	6.70	
7	1.422	361	4281	360	4269	1.325	7	83	98	18	213	95	6.60	33
8	1.416			708	8361	1.514				20	236	97	6.60	72
9	1.428	245	2918	352	4192	1.536	5	60	98	16	191	95	6.50	308
10	1.378			376	4321	1.594				14	161	96	6.40	260
11	1.465	273	3336	320	3910	1.578	4	49	99	6	73	98	6.40	15
12	1.465			368	4496	1.578				3	73	98	6.40	
13	1.426			232	2759	1.620				2	24	99	6.40	
14	1.259	386	4053	236	2478	1.353	4	42	99	3	32	99	6.60	107
15	1.223			576	5875	1.329				8	82	99	6.70	125
16	1.293	418	4508	440	4745	1.343	9	97	98	5	54	99	6.60	81
17	1.394			408	4743	1.607				6	70	99	6.90	265
18	1.277	302	3216	392	4175	1.361	9	96	97	6	64	98	6.70	99
19	1.239			248	2563	1.169				10	103	96	7.00	
20	1.310			244	2666	1.126				2	22	99	6.80	
21	1.303	315	3423	356	3869	1.205	5	54	98	3	33	99	6.60	59
22	1.218			260	2641	1.120				2	20	99	7.00	63
23	1.211			376	3798	1.105				4	40	99	6.40	173
24	1.365	326	3711	356	4053	1.373	7	80	98	6	68	98	6.60	32
25	1.204			456	4579	1.092				4	40	99	6.70	50
26	1.203	352	3532	324	3251	1.203	8	80	98	4	40	99	6.90	
27	1.275			316	3360	1.207				5	53	98	6.80	
28	1.296	377	4075	336	3632	1.214	7	76	98	2	22	99	6.70	34
29	1.234			524	5393	1.149				3	31	99	6.70	72
30	1.363	374	4251	524	5957	1.283	6	68	98	3	34	99	6.70	118
31	1.397			300	3495	1.334				5	58	98	6.70	
Total	41.679													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.344	340	3815	372	4169	1.336	7	74	98	9	101	98	6.40	81
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.501	430	5139	708	8361	1.620	8	82		0	0		7.00	124
Limit							45	1422		45	1422		9.00	400

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Roger LaRue, Sewer Department Supervisor

Signature/Date

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Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	September	Year	2006
Facility Name	City of Burlington			Location	900 South Section St.
Receiving Water	Skagit River				Burlington, WA 98233
Plant Type	Activated Sludge			Check box if NO DISCHARGE for month	

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS		FECAL COLIFORM
1	1.379	226	2599	312	3588	1.456	5	58	98	6	69	98	6.40	18
2	1.409			536	6299	1.349				5	59	99	6.70	
3	1.375			328	3761	1.306				6	69	98	6.70	
4	1.368			292	3331	1.199				9	103	97	6.80	1
5	1.465	182	2224	288	3519	1.383	7	86	96	18	220	94	6.70	23
6	1.319	233	2563	300	3300	1.440	5	55	98	10	110	97	6.80	37
7	1.324			456	5035	1.624				9	99	98	6.80	33
8	1.389	229	2653	372	4309	1.514	7	81	97	33	382	91	6.60	59
9	1.390			280	3246	1.513				16	185	94	6.60	
10	1.486			244	3024	1.585				14	174	94	6.70	
11	1.436	327	3916	360	4311	1.455	6	72	98	7	84	98	6.50	63
12	1.381			440	5068	1.296				26	84	98	6.70	59
13	1.360	193	2189	332	3766	1.411	5	57	97	10	113	97	6.80	41
14	1.420			252	2984	1.307				12	142	95	6.50	29
15	1.463	234	2855	308	3758	1.344	7	85	97	14	171	95	6.50	39
16	1.369			392	4476	1.196				6	69	98	6.60	
17	1.379			276	3174	1.194				7	81	97	6.60	
18	1.449	233	2816	268	3239	1.345	4	48	98	7	85	97	6.60	60
19	1.432			436	5207	1.366				6	72	99	6.70	59
20	1.372	477	5458	420	4806	1.420	7	80	99	15	172	96	6.70	57
21	1.595	59	785	320	4257	1.480	6	80	90	6	80	98	6.60	27
22	1.448			536	6473	1.234				2	24	100	6.60	4
23	1.366			400	4557	1.391				2	23	100	6.80	
24	1.361	214	2429	276	3133	1.245	3	34	99	2	23	99	6.70	
25	1.317			424	4657	1.228				5	55	99	6.60	37
26	1.219	229	2328	296	3009	1.326	7	71	97	3	30	99	6.70	49
27	1.195			424	4226	1.346				7	70	98	6.70	23
28	1.222	261	2660	336	3424	1.357	5	51	98	4	41	99	6.80	97
29	1.241			304	3146	1.496				5	52	98	6.70	110
30	1.184			228	2251	1.303				4	39	98	6.70	
31														
Total	41.113													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.370	238	2729	348	3978	1.370	6	66	97	9	99	97	6.40	33
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.595	477	5458	536	6473	1.624	6	74		0	0		6.80	54
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Roger LaRue, Sewer Department Supervisor

Signature/Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	October	Year	2006
Facility Name	City of Burlington			Location	900 South Section St.
Receiving Water	Skagit River				Burlington, WA 98233
Plant Type	Activated Sludge				Check box if NO DISCHARGE for month

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.248			272	2831	1.340				6	62	98	6.70	
2	1.261	270	2840	256	2692	1.243	5	53	98	4	42	98	6.80	37
3	1.238			424	4378	1.232				5	52	99	6.90	113
4	1.234	224	2305	384	3952	1.104	5	51	98	10	103	97	6.70	124
5	1.177			372	3652	1.057				4	39	99	6.80	132
6	1.205	412	4140	304	3055	1.203	5	50	99	4	40	99	6.80	49
7	1.184			380	3752	1.037				3	30	99	6.70	
8	1.214			456	4617	1.085				5	51	99	6.80	
9	1.264			376	3964	1.133				5	53	99	6.70	25
10	1.259			320	3360	1.134				5	53	98	6.70	13
11	1.272	346	3671	320	3395	1.317	5	53	99	8	85	98	6.90	39
12	1.175	420	4116	412	4037	1.072	7	69	98	8	85	98	6.60	75
13	1.110	497	4601	440	4073	1.987	3	28	99	4	37	99	6.60	5
14	1.147			480	4592	1.148				4	38	99	7.00	
15	1.174			276	2702	1.027				4	39	99	7.00	
16	1.360	369	4185	260	2949	1.211	7	79	98	5	57	98	6.80	35
17	1.249			304	3167	1.323				8	83	97	6.90	72
18	1.960	413	6751	288	4708	1.423	9	147	98	4	65	99	6.80	52
19	1.387			352	4072	1.596				7	81	98	6.80	151
20	1.428	348	4145	244	2906	1.509	7	83	98	10	119	96	6.60	44
21	1.428			464	5526	1.509				4	48	99	6.70	
22	1.350			300	3378	1.454				3	34	99	6.80	
23	1.324	454	5013	292	3224	0.871	7	77	98	8	88	97	6.70	43
24	1.348			372	4182	1.570				12	135	97	6.80	119
25	1.373	414	4741	464	5313	1.521	8	92	98	15	172	97	6.60	41
26	1.348			428	4812	1.486				10	112	98	6.50	51
27	1.341	398	4451	560	6263	1.370	8	89	98	9	101	98	6.50	25
28	1.306			588	6405	1.089				6	65	99	6.50	
29	1.367			396	4515	1.155				6	68	98	6.50	
30	1.427	352	4189	332	3951	1.288	7	83	98	8	95	98	6.50	3
31	1.353			304	3430	1.213				6	68	98	6.40	
Total	40.511													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.307	378	4242	368	3995	1.281	6	73	98	6	71	98	6.40	31
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.960	497	6751	588	6405	1.987	8	103		0	0		7.00	80
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Roger LaRue, Sewer Department Supervisor

Signature/Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No. WA-002015-0 Discharge No. 1 Month November Year 2006

Facility Name: City of Burlington Location: 900 South Section St.

Receiving Water: Skagit River Burlington, WA 98233

Plant Type: Activated Sludge Check box if NO DISCHARGE for month

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	PH	FECAL COLIFORM
1	1.302	317	3442	384	4170	1.145	4	43	99	7	76	98	6.60	13
2	1.318			672	7387	1.173				11	121	98	6.40	43
3	1.445	291	3507	240	2892	1.437	8	96	97	7	84	97	6.60	33
4	1.425			416	4944	1.267				4	48	99	6.60	
5	1.509			480	6041	1.349				7	88	99	6.60	
6	1.612	327	4396	396	5324	1.496	6	81	98	11	148	97	6.70	147
7	1.871			248	3870	2.034				10	156	96	6.60	132
8	1.639	248	3390	236	3226	1.690	10	137	96	12	164	95	6.60	67
9	1.501			316	3956	1.390				8	100	97	6.50	171
10	1.501	208	2604	212	2654	1.390	10	125	95	1	13	100	6.50	190
11	1.677			308	4308	1.551				7	98	98	6.80	
12	1.686			440	6187	1.572				6	98	98	6.60	
13	1.992	278	4618	224	3721	1.967	6	100	98	11	183	95	6.60	38
14	1.821			288	4374	1.964				7	106	98	6.50	177
15	1.681			392	5496	1.812				6	84	98	6.50	48
16	1.643	214	2932	148	2028	1.768	6	82	97	6	82	96	6.50	65
17	1.689	371	5226	448	6311	1.887	8	113	98	8	113	98	6.50	44
18	1.562			300	3908	1.720				5	65	98	6.30	
19	1.567			228	2980	1.665				10	131	96	6.50	
20	1.547	292	3767	260	3355	1.599	7	90	98	10	129	96	6.40	15
21	1.629	293	3981	228	3098	1.745	5	68	98	10	136	96	6.60	68
22	1.661	335	4641	264	3657	1.748	5	69	99	4	55	98	6.40	99
23	1.654			300	4138	1.725				8	110	97	6.60	253
24	1.528			180	2294	1.378				12	153	93	6.70	2
25	1.716			416	5954	1.484				5	72	99	6.60	
26	1.733			176	2544	1.484				4	58	98	6.60	
27	1.833			312	4770	1.771				4	61	99	6.70	3
28	1.803	242	3639	284	4271	1.848	9	135	96	14	211	95	6.70	13
29	1.706	242	3443	200	2846	1.575	4	57	98	6	85	97	6.50	60
30	1.592	334	4435	400	5311	1.425	3	40	99	6	80	99	6.50	14
31														
Total	48.843													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.628	285	3859	313	4200	1.602	7	88	98	8	104	97	6.30	30
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.992	371	5226	672	7387	2.034	9	121		0	0		6.80	135
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Roger LaRue, Sewer Department Supervisor

Signature/Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	December	Year	2006
Facility Name	City of Burlington			Location	900 South Section St.		
Receiving Water	Skagit River				Burlington, WA 98233		
Plant Type	Activated Sludge				Check box if NO DISCHARGE for month		

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS		FECAL COLIFORM
1	1.689			360	5071	1.585				5	70	99	6.70	4
2	1.759			396	5809	1.624				2	29	99	6.70	
3	1.759			264	3873	1.482				2	29	99	6.70	
4	1.717	257	3680	224	3208	1.601	7	100	97	14	200	94	6.80	27
5	1.602			264	3527	1.451				14	187	95	6.80	20
6	1.503	283	3547	192	2407	1.339	3	38	99	2	25	99	6.50	20
7	1.622			352	4762	1.472				6	81	98	6.50	29
8	1.615	340	4579	388	5226	1.602	7	94	98	6	81	98	6.60	15
9	1.603			400	5348	1.467				6	80	99	6.60	
10	1.602			360	4810	1.458				3	40	99	6.60	
11	1.557	372	4831	312	4051	1.400	6	78	98	8	104	97	6.50	1
12	1.583			292	3855	1.628				4	104	97	6.60	113
13	1.620	357	4823	292	3945	1.692	9	122	97	11	149	96	6.60	13
14	1.736			456	6602	1.851				3	43	99	6.80	4
15	1.877	221	3460	352	5510	2.182	4	63	98	7	110	98	6.90	1
16	1.790			384	5733	1.940				9	134	98	6.80	
17	1.801			424	6369	1.927				30	451	93	6.70	
18	1.637	223	3045	228	3113	1.736	8	109	96	15	205	93	6.50	49
19	1.630			276	3752	1.559				12	163	96	6.60	35
20	1.599	325	4334	380	5068	1.556	5	67	98	5	67	99	6.60	29
21	1.624			248	3359	1.482				13	176	95	6.60	28
22	1.639	230	3144	632	8639	1.498	6	82	97	8	109	99	6.50	35
23	1.694			392	5538	1.702				7	99	98	6.80	
24	1.791			212	3167	1.672				10	149	95	6.70	
25	1.704			156	2217	1.434				8	114	95	6.80	31
26	1.564			112	1461	1.420				3	39	97	6.80	17
27	1.813	359	5428	376	5685	1.709	4	60	99	5	76	99	6.80	10
28	1.799	333	4996	360	5401	1.692	5	75	98	6	90	98	6.70	12
29	1.687	243	3419	300	4221	1.659	5	70	98	7	98	98	6.90	8
30	1.632			576	7840	1.396				12	163	98	6.90	
31	1.621			220	2974	1.365				2	27	99	6.90	
Total	51.869													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.673	295	4107	328	4598	1.599	6	80	98	8	113	97	6.50	14
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.877	372	5428	632	8639	2.182	6	88		0	0		6.90	35
Limit							45	1422		45	1422		9.00	400

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Roger LaRue, Sewer Department Supervisor

Signature/Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No. 1	Month	January	Year 2007
Facility Name	City of Burlington		Location	900 South Section St.	
Receiving Water	Skagit River			Burlington, WA 98233	
Plant Type	Activated Sludge			Check box if NO DISCHARGE for month	

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.599			220	2934	1.468				8	107	96	6.90	4
2	1.702			244	3464	1.574				13	185	95	6.80	28
3	2.065	305	5253	524	9024	1.682	16	276	95	18	310	97	6.80	53
4	2.079	241	4179	400	6936	2.537	11	191	95	19	329	95	6.60	110
5	2.016	262	4405	324	5448	2.245	10	168	96	20	336	94	6.60	30
6	2.016			312	5246	2.245				2	34	99	6.80	
7	2.063			236	4060	2.433				19	327	92	6.60	
8	2.111	174	3063	168	2958	2.262	19	335	89	25	440	85	6.50	160
9	2.048			212	3621	2.165				11	188	95	6.60	13
10	1.867	208	3239	380	5917	1.848	6	93	97	9	140	98	6.40	47
11	1.942			344	5572	1.965				10	162	97	6.50	17
12	1.939	175	2830	216	3493	1.859	10	162	94	8	162	95	6.50	20
13	1.882			328	5148	1.816				7	110	98	6.70	
14	1.890			420	6620	1.764				11	173	97	6.80	
15	2.160			132	2378	1.906				8	144	94	6.70	1
16	1.853			356	5502	1.759				9	139	97	6.50	72
17	1.827	252	3840	352	5363	1.713	4	61	98	4	61	99	6.60	95
18	1.872	224	3497	192	2998	1.872	5	78	98	4	62	98	6.60	47
19	1.977	216	3561	240	3957	2.070	14	231	94	20	330	92	6.70	143
20	2.057			196	3362	2.164				23	395	88	6.60	
21	2.008			144	2412	2.016				22	368	85	6.60	
22	1.962	210	3436	176	2880	1.930	5	82	98	1	16	99	6.60	37
23	1.992			282	4685	1.988				10	166	96	6.70	83
24	1.939	247	3994	248	4010	1.847	8	129	97	9	146	96	6.80	44
25	1.895			344	5437	1.841				8	126	98	6.70	50
26	1.848	194	2990	228	3514	1.728	5	77	97	4	62	98	6.60	10
27	1.808			296	4463	1.765				4	60	99	6.70	
28	1.805			128	1927	1.720				3	45	98	6.70	
29	1.803	353	5308	376	5654	1.743	2	30	99	6	90	98	6.90	1
30	1.797			404	6055	1.793				5	75	99	6.80	27
31	1.784	263	3913	296	4404	1.710	4	60	98	4	60	99	6.80	1
Total	59.606													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.923	237	3822	281	4498	1.917	9	141	96	10	173	96	6.40	25
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	2.160	353	5308	524	9024	2.537	12	212		0	0		6.90	42
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

COMMENT AND EXPLANATION OF ANY VIOLATIONS MUST BE ATTACHED ON A SEPARATE SHEET.

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Roger LaRue, Sewer Department Supervisor

Signature/Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	February	Year 2007
Facility Name	City of Burlington			Location	900 South Section St.
Receiving Water	Skagit River				Burlington, WA 98233
Plant Type	Activated Sludge				Check box if NO DISCHARGE for month

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.693			276	3897	1.561				3	42	99	6.90	15
2	1.692	331	4671	344	4854	1.601	4	56	99	6	85	98	6.80	7
3	1.626			364	4936	1.658				6	81	98	6.90	
4	1.673			188	2623	1.565				6	84	97	7.00	
5	1.671	276	3846	236	3289	1.574	4	56	99	2	28	99	6.80	8
6	1.630			348	4731	1.831				6	82	98	6.90	36
7	1.626			228	3092	1.728				3	41	99	6.60	36
8	1.652			564	7771	1.746				9	124	98	6.80	23
9	1.627	284	3854	264	3582	1.728	6	81	98	7	95	97	6.70	19
10	1.627			400	5428	1.728				5	68	99	6.90	
11	1.667			244	3392	1.795				5	70	98	6.90	
12	1.644	289	3962	232	3181	1.750	7	96	98	7	70	98	6.70	50
13	1.570			244	3195	1.665				4	52	98	6.70	28
14	1.570	279	3653	256	3352	1.470	7	92	97	5	65	98	6.80	32
15	1.534			204	2610	1.401				7	90	97	6.70	120
16	1.818	266	4033	240	3639	1.856	8	121	97	6	91	98	6.80	10
17	1.718			368	5273	1.613				6	86	98	6.80	
18	1.754			526	7695	1.669				4	59	99	6.80	
19	1.754			324	4740	1.669				5	73	98	6.80	16
20	1.877			216	3381	1.790				7	110	97	6.70	43
21	1.802	208	3126	200	3006	1.828	10	150	95	9	135	96	6.80	72
22	1.590	235	3116	200	2652	1.490	9	119	96	10	133	95	6.70	47
23	1.772	272	4020	212	3133	1.722	7	103	97	7	103	97	6.70	141
24	1.953			214	3486	2.097				8	130	96	6.70	
25	1.953			268	4365	2.009				10	163	96	6.70	
26	1.900	207	3280	184	2916	1.887	9	143	96	13	206	93	6.70	13
27	1.678			200	2799	1.827				10	140	95	6.90	10
28	1.769	251	3703	172	2538	1.919	8	118	97	6	89	97	6.60	66
29														
30														
31														
Total	47.840													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.709	263	3751	276	3913	1.721	7	103	97	7	93	97	6.60	24
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.953	331	4671	564	7771	2.097	9	124		0	0		7.00	50
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Roger LaRue, Sewer Department Supervisor

Signature / Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No. 1	Month	March	Year 2007
Facility Name	City of Burlington		Location	900 South Section St.	
Receiving Water	Skagit River			Burlington, WA 98233	
Plant Type	Activated Sludge			Check box if NO DISCHARGE for month	

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.770			184	2716	1.986				13	192	93	6.80	40
2	1.756	432	6327	544	7967	1.900	9	132	98	12	176	98	6.50	58
3	1.785			228	3394	1.912				11	164	95	6.70	
4	1.787			188	2802	1.961				14	209	93	6.70	
5	1.807	301	4536	260	3918	1.969	10	151	97	13	196	95	6.50	75
6	1.773			204	3017	2.083				10	148	95	6.70	70
7	1.776	271	4014	312	4621	1.835	9	133	97	15	222	95	6.60	31
8	1.745			208	3027	1.308				12	175	94	6.90	70
9	1.739	264	3829	256	3713	1.404	5	73	98	5	73	98	6.60	28
10	1.753			280	4094	1.664				9	132	97	6.50	
11	1.930			224	3606	1.711				8	129	96	6.60	
12	1.955	261	4256	192	3131	1.999	6	98	98	4	129	96	6.70	48
13	1.892			320	5049	1.495				11	174	97	6.70	99
14	1.939	256	4140	272	4399	1.906	6	97	98	6	97	98	6.70	256
15	1.879			300	4701	1.974				9	141	97	6.60	31
16	1.885	203	3191	420	6603	1.879	9	141	96	7	110	98	6.70	42
17	1.885			192	3018	2.014				5	79	97	6.70	
18	2.019			276	4647	2.246				8	135	97	6.70	
19	1.997	263	4380	200	3331	2.131	8	133	97	4	67	98	6.70	4
20	1.948			268	4354	2.609				3	49	99	6.70	1
21	1.918	422	6750	376	6015	2.082	9	144	98	5	80	99	6.70	5
22	1.897			252	3987	1.937				5	79	98	6.60	12
23	1.952	281	4575	248	4037	2.048	5	81	98	6	98	98	6.60	27
24	2.050			352	6018	2.373				6	103	98	6.80	
25	2.580			328	7058	2.640				5	108	98	6.60	
26	2.530	151	3186	156	3292	2.568	6	127	96	13	274	92	6.70	24
27	2.360			268	5275	2.200				6	118	98	6.70	19
28	2.023	272	4589	268	4522	2.252	4	67	99	4	67	99	6.50	21
29	1.935			160	2582	2.056				5	81	97	6.70	8
30	1.938	251	4057	300	4849	2.194	5	81	98	6	97	98	6.80	13
31	1.909			68	1083	1.982				5	80	93	6.70	
Total	60.112													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.939	279	4448	261	4220	2.010	7	112	97	8	128	97	6.50	26
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	2.580	432	6750	544	7967	2.640	9	139		0	0		6.90	69
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Roger LaRue, Sewer Department Supervisor

Signature / Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No. 1	Month	April	Year 2007
Facility Name	City of Burlington		Location	900 South Section St. Burlington, WA 98233	
Receiving Water	Skagit River				
Plant Type	Activated Sludge		Check box if NO DISCHARGE for month		☐

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.854			296	4577	1.946				3	46	99	6.70	
2	1.840	228	3499	196	3008	1.867	4	61	98	3	46	98	6.60	1
3	1.838			308	4721	1.873				3	46	99	6.70	1
4	1.738	253	3667	216	3131	1.730	3	43	99	3	43	99	6.40	12
5	1.210			280	2826	1.856				5	50	98	6.60	16
6	1.690	368	5187	344	4849	1.841	4	56	99	3	42	99	6.60	43
7	1.693			220	3106	1.918				3	42	99	6.70	
8	1.871			172	2684	2.090				4	62	98	6.70	
9	1.869	273	4255	216	3367	2.126	4	62	99	5	78	98	6.70	22
10	1.879			380	5955	2.217				6	94	98	6.60	25
11	1.828	326	4970	300	4574	2.034	6	91	98	6	91	98	6.60	37
12	1.786			320	4766	1.979				4	91	98	6.70	15
13	1.795	360	5389	416	6228	1.993	7	105	98	5	75	99	6.60	10
14	1.870			288	4492	1.975				3	47	99	6.60	
15	1.841			276	4238	1.885				4	61	99	6.70	
16	1.842	261	4010	240	3687	2.058	7	108	97	8	123	97	6.70	9
17	1.755			280	4098	2.059				8	117	97	6.60	42
18	1.731	288	4158	240	3465	1.719	5	72	98	5	72	98	6.60	18
19	1.745			204	2969	1.711				6	87	97	6.60	36
20	1.713	347	4957	472	6743	1.849	8	114	98	8	114	98	6.70	33
21	1.713			304	4343	1.849				4	57	99	6.60	
22	1.685			236	3316	1.640				4	56	98	6.70	
23	1.697	269	3807	280	3963	1.648	5	71	98	5	71	98	6.70	31
24	1.626			192	2604	1.750				8	108	96	6.80	63
25	1.679	327	4579	360	5041	1.707	6	84	98	6	84	98	7.00	2
26	1.659			448	6199	1.602				4	55	99	6.90	13
27	1.673	341	4758	320	4465	1.598	5	70	99	3	42	99	6.80	18
28	1.654			480	6621	1.695				4	55	99	6.80	
29	1.645			360	4939	1.592				4	55	99	6.90	
30	1.671			272	3791	1.607				7	98	97	6.80	1
31														
Total	52.090													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.736	303	4436	297	4292	1.847	5	78	98	5	70	98	6.40	13
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.879	368	5389	480	6743	2.217	7	98		0	0		7.00	19
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW=Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Roger LaRue, Sewer Department Supervisor

Signature / Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	May	Year 2007
Facility Name	City of Burlington			Location	900 South Section St. Burlington, WA 98233	
Receiving Water	Skagit River					
Plant Type	Activated Sludge			Check box if NO DISCHARGE for month		

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.593	290	3853	368	4889	1.536	6	80	98	5	66	99	6.80	1
2	1.635	537	7322	412	5618	1.569	5	68	99	4	55	99	6.80	1
3	1.615			440	5926	1.546				5	67	99	6.80	3
4	1.615	275	3704	320	4310	1.675	5	67	98	5	67	98	6.90	2
5	1.581			484	6382	1.511				8	105	98	6.80	
6	1.673			212	2958	1.612				10	140	95	6.80	
7	1.694	291	4111	228	3221	1.617	5	71	98	7	99	97	6.80	43
8	1.589			288	3817	1.582				8	106	97	6.80	25
9	1.625	224	3036	192	2602	1.667	7	95	97	7	95	96	6.80	15
10	1.514			348	4394	1.506				8	101	98	6.70	8
11	1.557	378	4908	328	4259	1.690	11	143	97	8	104	98	6.50	42
12	1.569			236	3088	1.838				8	104	97	6.80	
13	1.587			280	3706	1.720				11	146	96	6.80	
14	1.635	331	4513	288	3927	1.773	7	95	98	6	82	98	6.50	2
15	1.601			432	5768	1.773				8	107	98	6.80	8
16	1.537	317	4063	384	4922	1.709	9	115	97	8	103	98	6.80	15
17	1.578			228	3001	1.794				9	118	96	6.70	13
18	1.509	346	4354	220	2769	1.702	8	101	98	7	88	97	6.70	5
19	1.483			472	5838	1.720				4	49	99	6.70	
20	1.492			444	5525	1.662				6	75	99	6.70	
21	1.600	372	4964	320	4270	1.767	8	107	98	6	80	98	6.60	53
22	1.468			428	5240	1.448				5	61	99	6.80	40
23	1.453	192	2327	228	2763	1.557	6	73	97	5	61	98	6.80	1
24	1.353			364	4107	1.298				7	79	98	6.70	20
25	1.534	333	4260	304	3889	1.585	12	154	96	10	128	97	6.80	53
26	1.534			304	3889	1.585				6	77	98	6.70	
27	1.473			316	3882	1.522				4	49	99	6.70	
28	1.451			244	2953	1.390				8	97	97	6.70	5
29	1.554	314	4070	220	2851	1.502	8	104	97	8	104	96	6.70	43
30	1.449	354	4278	376	4544	1.441	10	121	97	9	109	98	6.70	42
31	1.482			324	4005	1..420				7	87	98	6.60	28
Total	48.033													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.549	325	4269	324	4171	1.610	8	99	98	7	91	98	6.50	10
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.694	537	7322	484	6382	1.838	9	111		0	0		6.90	22
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Roger LaRue, Sewer Department Supervisor

Signature / Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No. 1	Month	June	Year 2007
Facility Name	City of Burlington		Location	900 South Section St.	
Receiving Water	Skagit River			Burlington, WA 98233	
Plant Type	Activated Sludge			Check box if NO DISCHARGE for month	

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.479	306	3774	236	2911	1.549	9	111	97	10	123	96	6.60	7
2	1.479			328	4046	1.447				4	49	99	6.60	
3	1.517			360	4555	1.457				5	63	99	6.80	
4	1.350	325	3659	248	2792	1.295	9	101	97	9	101	96	6.90	11
5	1.420			276	3269	1.350				7	83	97	6.70	1
6	1.504	608	7626	536	6723	1.436	8	100	99	9	113	98	6.70	20
7	1.562			308	4012	1.447				9	117	97	6.60	13
8	1.529	341	4348	348	4438	1.616	11	140	97	10	128	97	6.80	51
9	1.490			280	3479	1.425				8	99	97	6.80	
10	1.566			272	3552	1.505				10	131	96	6.80	
11	1.601	324	4326	320	4273	1.512	9	120	97	10	134	97	6.80	14
12	1.598			308	4105	1.547				10	134	97	6.60	10
13	1.487	291	3609	260	3224	1.535	10	124	97	10	124	96	6.70	40
14	1.324	354	3909	400	4417	1.261	9	99	97	9	99	98	6.60	71
15	1.313			296	3241	1.289				6	66	98	6.50	31
16	1.391			420	4872	1.419				7	81	98	6.80	
17	1.425			320	3803	1.327				6	71	98	6.70	
18	1.410	315	3704	264	3104	1.314	7	82	98	6	71	98	6.70	60
19	1.329			264	2926	1.245				7	78	97	6.40	24
20	1.329			328	3636	1.475				5	55	98	6.70	1
21	1.325	239	2641	232	2564	1.497	6	66	97	8	88	97	6.80	42
22	1.281	379	4049	428	4573	1.551	14	150	96	9	96	98	6.80	44
23	1.342			368	4119	1.458				7	78	98	6.70	
24	1.392			352	4086	1.540				6	70	98	6.60	
25	1.347	329	3696	284	3190	1.472	7	79	98	8	90	97	6.60	11
26	1.259			240	2520	1.434				5	53	98	6.60	22
27	1.261	404	4249	308	3239	1.415	7	74	98	10	105	97	6.60	24
28	1.250			400	4170	1.218				5	52	99	6.70	29
29	1.298	422	4568	456	4936	1.332	8	87	98	9	97	98	6.70	20
30	1.298			660	7145	1.332				4	43	99	6.70	
31														
Total	42.156													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.405	357	4166	337	3931	1.423	9	103	97	8	90	98	6.40	17
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.601	608	7626	660	7145	1.616	10	121		0	0		6.90	20
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Roger LaRue, Sewer Department Supervisor

Signature / Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No. 1	Month	July	Year 2007
Facility Name	City of Burlington		Location	900 South Section St.	
Receiving Water	Skagit River			Burlington, WA 98233	
Plant Type	Activated Sludge			Check box if NO DISCHARGE for month	

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.522			488	6194	1.439				3	38	99	6.70	
2	1.500	343	4291	448	5604	1.408	5	63	99	15	188	97	6.80	87
3	1.485	362	4483	540	6688	1.435	8	99	98	13	161	98	6.70	37
4	1.436			552	6611	1.427				8	96	99	6.80	1
5	1.352			372	4195	1.266				18	203	95	6.70	23
6	1.328	407	4508	280	3101	1.365	10	111	98	22	244	92	6.70	5
7	1.334			480	5340	1.247				11	122	98	6.70	
8	1.325			600	6630	1.227				4	44	99	6.70	
9	1.289	380	4085	424	4558	1.233	6	65	98	10	108	98	6.60	20
10	1.290			432	4648	1.204				6	65	99	6.60	3
11	1.308	459	5007	404	4407	1.220	6	65	99	8	87	98	6.60	1
12	1.266			360	3801	1.186				6	87	98	6.60	43
13	1.264	423	4459	396	4175	1.197	6	63	99	8	84	98	6.50	27
14	1.326			340	3760	1.334				8	88	98	6.40	
15	1.294			452	4878	1.188				8	86	98	6.60	
16	1.299	491	5319	400	4333	1.226	6	65	99	9	98	98	6.60	18
17	1.301			492	5338	1.248				7	76	99	6.70	20
18	1.325	583	6442	688	7603	1.241	5	55	99	7	77	99	6.60	22
19	1.386	416	4809	412	4762	1.479	6	69	99	10	116	98	6.60	9
20	1.382			640	7377	1.643				5	58	99	6.40	7
21	1.439			460	5521	1.568				16	192	97	6.60	
22	1.398			400	4664	1.514				8	93	98	6.70	
23	1.353	444	5010	432	4875	1.453	6	68	99	7	79	98	6.60	3
24	1.343			484	5421	1.459				7	78	99	6.60	13
25	1.312	441	4825	360	3939	1.287	4	44	99	4	44	99	6.50	9
26	1.306			660	7189	1.401				7	76	99	6.60	16
27	1.278	361	3848	336	3581	1.190	5	53	99	6	64	98	6.40	3
28	1.301			508	5512	1.228				3	33	99	6.60	
29	1.303			560	6086	1.229				4	43	99	6.70	
30	1.281	380	4060	400	4273	1.159	5	53	99	8	85	98	6.40	4
31	1.349			604	6795	1.277				6	68	99	6.60	1
Total	41.675													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.344	422	4704	465	5221	1.322	6	67	99	8	96	98	6.40	9
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.522	583	6442	688	7603	1.643	8	91		0	0		6.80	14
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Roger LaRue, Sewer Department Supervisor

Signature / Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	August	Year	2007
Facility Name	City of Burlington			Location	900 South Section St.		
Receiving Water	Skagit River				Burlington, WA 98233		
Plant Type	Activated Sludge				Check box if NO DISCHARGE for month		☐

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.342			528	5910	1.382				9	101	98	6.80	20
2	1.375			656	7523	1.237				8	92	99	6.50	20
3	1.350	372	4188	320	3603	1.258	7	79	98	7	79	98	6.50	11
4	1.336			520	5794	1.357				6	67	99	6.80	
5	1.338			404	4508	1.264				6	67	99	6.60	
6	1.372	639	7312	780	8925	1.282	7	80	99	6	69	99	6.60	22
7	1.369	425	4852	436	4978	1.265	9	103	98	9	103	98	6.60	17
8	1.388	482	5580	432	5001	1.290	8	93	98	8	93	98	6.60	27
9	1.367			292	3329	1.281				6	68	98	6.50	15
10	1.288			528	5672	1.187				6	64	99	6.40	20
11	1.264			332	3500	1.134				5	53	98	6.45	
12	1.287			464	4980	1.191				5	53	99	6.70	
13	1.319	229	2519	576	6336	1.216	6	66	97	6	66	99	6.60	7
14	1.312			452	4946	1.203				10	109	98	6.50	10
15	1.276	560	5959	456	4853	1.169	7	74	99	11	117	98	6.50	15
16	1.284			480	5140	1.203				6	64	99	6.50	10
17	1.291	162	1744	740	7968	1.311	13	140	92	14	151	98	6.80	1
18	1.301			200	2170	1.197				15	163	93	6.40	
19	1.301			860	9331	1.201				13	141	98	6.50	
20	1.375	364	4174	266	3050	1.282	10	115	97	18	206	93	6.40	10
21	1.404			420	4918	1.561				19	222	95	6.50	10
22	1.394	418	4860	484	5627	1.632	9	105	98	9	105	98	6.60	17
23	1.384			400	4617	1.514				17	196	96	6.60	27
24	1.368	403	4598	440	5020	1.660	14	160	97	15	171	97	6.80	43
25	1.393			356	4136	1.534				17	197	95	6.80	
26	1.434			288	3444	1.542				15	179	95	6.70	
27	1.421	380	4503	360	4266	1.562	8	95	98	11	130	97	6.70	17
28	1.398			568	6622	1.563				12	140	98	6.60	20
29	1.361	327	3712	324	3678	1.340	7	79	98	10	114	97	6.60	60
30	1.366			276	3144	1.400				10	114	96	6.80	40
31	1.386	372	4300	360	4161	1.311	10	116	97	13	150	96	6.50	23
Total	41.844													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.350	395	4485	452	5069	1.340	9	100	97	10	118	97	6.40	16
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.434	639	7312	860	9331	1.660	10	120		0	0		6.80	28
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Roger LaRue, Sewer Department Supervisor

Signature / Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	September	Year	2007
Facility Name	City of Burlington			Location	900 South Section St.		
Receiving Water	Skagit River				Burlington, WA 98233		
Plant Type	Activated Sludge				Check box if NO DISCHARGE for month		

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.421			536	6352	1.317				10	119	98	6.60	
2	1.409			528	6205	1.314				13	153	98	6.70	
3	1.361			296	3360	1.279				10	114	97	6.70	7
4	1.461			304	3704	1.351				13	158	96	6.40	47
5	1.430	286	3411	424	5057	1.366	10	119	97	12	143	97	6.50	27
6	1.359	331	3752	344	3899	1.298	11	125	97	13	147	96	6.70	15
7	1.400	443	5172	400	4670	1.444	15	175	97	12	140	97	7.00	33
8	1.401			388	4534	1.444				6	70	98	6.80	
9	1.383			284	3276	1.253				4	46	99	6.80	
10	1.356	351	3911	332	3755	1.265	11	123	97	5	57	98	6.80	17
11	1.336			348	3877	1.339				6	67	98	6.40	7
12	1.347	388	4738	452	5078	1.285	8	90	98	8	67	99	6.90	62
13	1.353			360	4062	1.463				12	135	97	6.30	50
14	1.350	236	2665	400	4504	1.258	11	124	95	11	124	97	6.70	5
15	1.354			560	6324	1.252				6	68	99	7.00	
16	1.322			304	3352	1.218				7	77	98	7.00	
17	1.420	421	4803	360	4263	1.307	8	91	98	10	118	97	6.40	13
18	1.368			464	5294	1.260				8	91	98	6.50	27
19	1.484	641	7645	552	6832	1.410	9	107	99	12	149	98	6.30	17
20	1.430			388	4627	1.489				13	155	97	6.40	73
21	1.432	441	5396	436	5207	1.382	10	122	98	14	167	97	6.30	90
22	1.467			284	3475	1.360				12	147	96	6.60	
23	1.484			256	3168	1.387				10	124	96	6.70	
24	1.484	201	2488	256	3168	1.404	5	62	98	2	25	99	6.50	17
25	1.458			508	6177	1.590				14	170	97	6.60	33
26	1.451	354	4284	328	3969	1.687	12	145	97	16	194	95	6.30	10
27	1.455			580	7038	1.589				9	109	98	6.50	11
28	1.566	337	4401	360	4702	1.719	8	104	98	14	183	96	6.50	32
29	1.467			160	1958	1.596				4	49	98	6.60	
30	1.464			292	3565	1.584				10	122	97	6.60	
31														
Total	42.473													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.416	369	4389	383	4515	1.397	10	116	97	10	116	97	6.30	22
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.566	641	7645	580	7038	1.719	12	140		0	0		7.00	33
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Roger LaRue, Sewer Department Supervisor

Signature / Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	October	Year	2007
Facility Name	City of Burlington			Location	900 South Section St.		
Receiving Water	Skagit River				Burlington, WA 98233		
Plant Type	Activated Sludge				Check box if NO DISCHARGE for month		☐

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.706	276	3927	308	4382	1.827	13	185	95	25	356	92	6.60	24
2	1.551			412	5329	1.722				17	220	96	6.60	84
3	1.599	268	3574	348	4641	1.654	8	107	97	13	173	96	6.30	20
4	1.947			496	8054	2.098				18	292	96	6.30	27
5	1.643	323	4426	296	4056	1.569	7	96	98	18	247	94	6.60	32
6	1.567			216	2823	1.592				8	105	96	6.50	
7	1.575			548	7198	1.440				10	131	98	6.60	
8	1.674	307	4286	232	3239	1.593	7	98	98	13	181	94	6.70	20
9	1.609			252	3382	1.522				9	121	96	6.40	58
10	1.527	321	4088	284	3617	1.419	6	76	98	13	166	95	6.60	18
11	1.642			372	5094	1.567				15	205	96	6.60	20
12	1.541	257	3303	324	4164	1.417	7	90	97	13	205	95	6.50	7
13	1.440			272	3267	1.453				9	108	97	6.60	
14	1.420			260	3079	1.331				5	59	98	6.50	
15	1.405	300	3515	240	2812	1.312	5	59	98	14	164	94	6.30	11
16	1.440			260	3122	1.317				12	144	95	6.50	6
17	1.549	165	2132	272	3514	1.423	5	65	97	14	181	95	6.50	13
18	1.496			300	3743	1.383				12	150	96	6.40	17
19	1.623	326	4413	352	4765	1.619	13	176	96	31	420	91	6.60	5
20	1.601			560	7477	1.506				5	67	99	6.50	
21	1.567			416	5437	1.493				10	131	98	6.70	
22	1.643	256	3508	236	3234	1.543	7	96	97	23	315	90	6.60	10
23	1.539			504	6469	1.619				4	51	99	6.50	13
24	1.470	366	4487	348	4266	1.707	6	74	98	9	110	97	6.80	10
25	1.549			340	4392	1.666				6	78	98	6.40	5
26	1.621	276	3731	348	4705	1.727	7	95	97	20	270	94	6.40	7
27	1.571			256	3354	1.757				14	183	95	6.30	
28	1.607			208	2788	1.700				16	214	92	6.80	
29	1.592	300	3983	280	3718	1.691	3	40	99	4	53	99	6.70	7
30	1.590			268	3554	1.685				4	53	99	6.60	3
31	1.553	296	3834	285	3691	1.690	9	117	97	6	78	98	6.70	3
Total	48.857													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.576	288	3800	326	4302	1.582	7	98	97	13	169	96	6.30	13
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.947	366	4487	560	8054	2.098	9	129		0	0		6.80	32
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Roger LaRue, Sewer Department Supervisor

Signature / Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	November	Year	2007
Facility Name	City of Burlington			Location	900 South Section St.		
Receiving Water	Skagit River				Burlington, WA 98233		
Plant Type	Activated Sludge				Check box if NO DISCHARGE for month		

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.506			268	3366	1.634				22	276	92	6.50	42
2	1.548	376	4854	352	4544	1.606	11	142	97	17	219	95	6.40	30
3	1.545			416	5360	1.455				13	168	97	6.50	
4	1.565			256	3341	1.469				14	183	95	6.60	
5	1.568	277	3622	540	7062	1.487	15	196	95	37	484	93	6.60	10
6	1.512			272	3430	1.382				12	151	96	6.60	13
7	1.508	294	3698	280	3521	1.405	12	151	96	20	252	93	6.60	43
8	1.444			300	3613	1.340				23	277	92	6.50	37
9	1.492	314	3907	288	3584	1.364	10	124	97	19	236	93	6.50	23
10	1.542			684	8796	1.537				12	154	98	6.60	
11	1.536			436	5585	1.434				28	359	94	6.40	
12	1.564			436	5687	1.436				25	359	94	6.40	1
13	1.615	344	4633	288	3879	1.527	8	108	98	14	189	95	6.50	33
14	1.532	333	4255	320	4089	1.393	7	89	98	9	115	97	6.40	5
15	1.531			320	4086	1.399				14	179	96	6.60	27
16	1.514	167	2109	324	4091	1.510	12	152	93	16	202	95	6.40	27
17	1.725			316	4546	1.629				4	58	99	6.60	
18	1.548			260	3357	1.428				7	90	97	6.60	
19	1.542	288	3704	224	2881	1.421	10	129	97	25	322	89	6.60	20
20	1.649	303	4167	372	5116	1.537	7	96	98	14	193	96	6.60	3
21	1.618	316	4264	276	3724	1.524	11	148	97	16	216	94	6.50	14
22	1.488			300	3723	1.473				12	149	96	6.80	20
23	1.256			472	4944	1.193				7	73	99	6.60	24
24	1.364			448	5096	1.232				11	125	98	6.80	
25	1.433			480	5737	1.396				18	215	96	6.60	
26	1.422	284	3368	284	3368	1.296	8	95	97	11	130	96	6.60	5
27	1.413			280	3300	1.248				9	106	97	6.60	18
28	1.485	334	4137	380	4706	1.368	9	111	97	10	124	97	6.30	5
29	1.479			320	3947	1.342				11	136	97	6.70	7
30	1.468	306	3746	320	3918	1.469	10	122	97	12	147	96	6.90	10
31														
Total	45.412													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.514	303	3882	350	4413	1.431	10	128	97	15	196	95	6.30	14
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.725	376	4854	684	8796	1.634	13	163		0	0		6.90	21
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Roger LaRue, Sewer Department Supervisor

Signature / Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	December	Year 2007
Facility Name	City of Burlington			Location	900 South Section St. Burlington, WA 98233
Receiving Water	Skagit River				
Plant Type	Activated Sludge			Check box if NO DISCHARGE for month	☐

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.439			412	4945	1.340				9	108	98	6.80	
2	1.435			344	4117	1.281				15	180	96	6.80	
3	1.606	249	3335	428	5733	1.470	7	94	97	10	134	98	6.80	5
4	1.619			256	3457	1.521				10	135	96	6.70	42
5	1.572	372	4877	352	4615	1.584	15	197	96	13	170	96	7.00	20
6	1.640			228	3118	1.542				10	137	96	7.00	7
7	1.483	417	5158	316	3908	1.578	10	124	98	7	87	98	6.90	55
8	1.525			220	2798	1.724				11	140	95	7.00	
9	1.624			260	3521	1.733				10	135	96	7.00	
10	1.630	376	5111	280	3806	1.731	10	136	97	15	204	95	6.90	40
11	1.606			280	3750	1.761				11	147	96	6.80	7
12	1.640	291	3980	308	4213	1.753	9	123	97	14	147	97	6.80	13
13	1.617			360	4855	1.722				12	162	97	6.80	18
14	1.718	265	3797	260	3725	1.936	11	158	96	9	129	97	6.90	39
15	1.702			408	5791	1.821				8	114	98	6.90	
16	1.731			324	4677	1.848				12	173	96	6.90	
17	1.798	233	3494	440	6598	1.678	10	150	96	11	165	98	6.80	27
18	1.783			224	3331	1.765				15	223	93	6.90	15
19	1.853	276	4265	332	5131	1.861	13	201	95	18	278	95	7.00	10
20	1.831			252	3848	1.722				13	199	95	6.90	5
21	1.730	256	3694	252	3636	1.609	13	188	95	19	274	92	6.70	70
22	1.730			268	3867	1.609				7	101	97	7.00	
23	1.672			248	3458	1.634				14	195	94	6.90	
24	1.725			196	2820	1.623				18	259	91	6.80	7
25	1.608			256	3433	1.506				16	215	94	6.80	1
26	1.513	184	2322	212	2675	1.396	8	101	96	14	177	93	6.60	5
27	1.893	276	4357	276	4357	1.793	12	189	96	14	221	95	6.70	100
28	2.015	427	7176	552	9276	2.047	9	151	98	19	319	97	6.90	10
29	1.978			452	7456	1.928				12	198	97	6.80	
30	2.005			400	6689	1.920				9	150	98	6.90	
31	1.845			292	4493	1.733				8	123	97	6.70	
Total	52.566													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.696	302	4297	313	4455	1.683	11	151	96	12	174	96	6.60	14
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	2.015	427	7176	552	9276	2.047	13	163		0	0		7.00	21
Limit							45	1422		45	1422		9.00	400

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Roger LaRue, Sewer Department Supervisor

Signature / Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	Janurary	Year	2008
Facility Name	City of Burlington			Location	900 South Section St.		
Receiving Water	Skagit River				Burlington, WA 98233		
Plant Type	Activated Sludge				Check box if NO DISCHARGE for month		

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.759			440	6455	1.759				33	484	93	6.90	
2	1.653	337	4646	244	3364	1.541	15	207	96	25	345	90	6.80	8
3	1.723	219	3147	248	3564	1.791	14	201	94	16	230	94	6.90	30
4	1.698	242	3427	340	4815	1.623	11	156	95	12	170	96	6.80	43
5	1.692			268	3782	1.783				8	113	97	7.00	18
6	1.634			216	2944	1.714				8	109	96	7.00	
7	1.682	272	3816	300	4208	1.741	12	168	96	21	295	93	6.90	43
8	1.636			296	4039	1.791				14	191	95	6.90	5
9	1.666	311	4321	308	4279	1.725	10	139	97	15	208	95	7.00	98
10	1.623			324	4386	1.708				9	122	97	7.00	89
11	1.777	301	4461	248	3675	1.862	8	119	97	8	119	97	6.70	344
12	1.783			244	3628	2.005				14	119	97	7.10	
13	1.839			240	3681	1.913				12	184	95	6.90	
14	1.818	204	3093	212	3214	1.930	12	182	94	13	197	94	6.70	130
15	1.903			312	4952	2.059				17	270	95	6.90	40
16	1.812	244	3687	312	4715	1.813	10	151	96	16	242	95	6.50	67
17	1.770			232	3425	1.757				14	207	94	6.60	18
18	1.453	190	2302	200	2424	1.351	6	73	97	8	97	96	6.80	53
19	1.685			368	5171	1.673				6	84	98	6.80	
20	1.800			440	6605	1.725				11	165	98	6.90	
21	1.681			472	6617	1.563				10	140	98	6.80	1
22	1.726			228	3282	1.640				12	173	95	6.90	13
23	1.667	182	2530	284	3948	1.575	10	139	95	14	195	95	6.90	45
24	1.687	209	2941	292	4108	1.625	7	98	97	8	113	97	6.90	15
25	1.680	206	2886	256	3587	1.554	6	84	97	7	98	97	6.70	27
26	1.575			308	4046	1.629				4	53	99	6.90	
27	1.575			268	3520	1.629				3	39	99	6.90	
28	1.611			456	6127	1.534				11	148	98	6.80	10
29	1.634	293	3993	320	4361	1.512	9	123	97	12	164	96	6.80	8
30	1.636	249	3397	192	2620	1.540	6	82	98	4	55	98	6.90	10
31	1.677			240	3357	1.677				12	168	95	7.00	4
Total	52.555													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.695	247	3475	294	4158	1.701	10	137	96	12	171	96	6.50	21
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.903	337	4646	472	6617	2.059	13	188		0	0		7.10	58
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Roger LaRue, Sewer Department Supervisor

Signature / Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	001	Month	February	Year	2008
Facility Name	City of Burlington			Location	900 South Section St.
Receiving Water	Skagit River				Burlington, WA 98233
Plant Type	Activated Sludge			Check box if NO DISCHARGE for month	

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.755	315	4611	288	4215	1.686	11	161	97	14	205	95	6.9	10
2	1.860			360	5584	1.777				10	155	97	7.0	
3	1.798			276	4139	1.722				7	105	97	6.9	
4	1.738	240	3479	208	3015	1.630	9	130	96	11	159	95	6.9	10
5	1.753	256	3743	224	3275	1.624	9	132	96	7	102	97	6.9	8
6	1.840	252	3867	188	2885	1.973	14	215	94	14	215	93	6.6	15
7	1.817			220	3334	2.004				8	121	96	7.0	13
8	1.804			284	4273	1.918				9	135	97	6.6	15
9	2.288			236	4503	2.442				8	153	97	7.0	
10	2.111			356	6268	2.254				13	229	96	6.9	
11	2.071			284	4905	2.163				10	173	96	6.6	10
12	2.106	241	4233	280	4918	2.352	13	228	95	11	173	96	6.8	17
13	1.970	213	3500	240	3943	2.094	10	164	95	15	246	94	6.9	20
14	1.900			180	2852	1.870				9	143	95	6.7	38
15	1.907	238	3785	244	3881	1.845	9	143	96	11	175	95	6.9	5
16	1.870			208	3244	1.913				11	172	95	7.0	
17	1.847			204	3142	1.777				10	154	95	6.9	
18	1.717	308	4410	464	6644	1.654	7	100	98	7	100	98	6.9	1
19	1.763			248	3646	1.706				12	176	95	6.9	23
20	1.705	235	3342	240	3413	1.656	8	114	97	12	171	95	6.8	10
21	1.797			408	6115	1.833				14	210	97	7.0	20
22	1.703	223	3167	508	7215	1.635	7	99	97	26	369	95	6.9	17
23	1.639			292	3991	1.644				7	96	98	7.0	
24	1.613			452	6080	1.559				7	94	98	6.5	
25	1.682	257	3605	244	3423	1.568	6	84	98	6	84	98	6.6	8
26	1.602			200	2672	1.532				6	80	97	6.8	10
27	1.618	269	3630	340	4588	1.520	5	67	98	6	81	98	6.6	33
28	1.624			284	3847	1.637				5	68	98	7.0	13
29	1.576	356	4679	360	4732	1.484	6	79	98	6	79	98	6.8	46
30														
31														
Total	52.474													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.809	261.8	3850.0	286.9	4304.6	1.809	9	132	97	10	153	96	6.5	13.00
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.2	200
	MAX	MAX	MAX	MAX	MAX	MAX	MAX	MAX		MAX	MAX		MAX	MAX
Monthly	2.288	356	4679	508	7215	2.442	11	177		11	179		7.0	18.00
Limit							45	1422		45	1422		9.0	400

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Roger LaRue, Sewer Department Supervisor

Signature/Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	March	Year	2008
Facility Name	City of Burlington			Location	900 South Section St.
Receiving Water	Skagit River				Burlington, WA 98233
Plant Type	Activated Sludge			Check box if NO DISCHARGE for month	☐

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.682			324	4545	1.660				5	70	98	7.00	
2	1.714			236	3374	1.613				10	143	96	6.90	
3	1.632	230	3131	212	2886	1.503	6	82	97	7	95	97	7.10	5
4	1.692			508	7169	1.579				13	183	97	6.70	10
5	1.605	221	2958	280	3748	1.689	6	80	97	8	107	97	6.70	17
6	1.664			312	4330	1.750				7	97	98	6.80	10
7	1.603	214	2861	256	3422	1.674	7	94	97	6	80	98	7.00	25
8	1.710			304	4335	1.599				6	86	98	6.90	
9	1.622			352	4762	1.723				7	95	98	6.80	
10	1.700	254	3601	228	3233	1.610	6	85	98	6	85	97	6.80	36
11	1.762			324	4761	1.675				4	59	99	6.70	22
12	1.736	289	4184	280	4054	1.635	9	130	97	5	59	99	6.80	27
13	1.702			320	4542	1.727				8	114	98	6.90	6
14	1.754	235	3438	260	3803	1.641	6	88	97	6	88	98	6.90	20
15	1.762			524	7700	1.772				43	632	92	7.00	
16	1.775			284	4204	1.675				18	266	94	6.80	
17	1.757	271	3971	232	3400	1.660	8	117	97	5	73	98	6.90	12
18	1.763			264	3882	1.655				7	103	97	6.60	10
19	1.708	265	3775	232	3305	1.625	9	128	97	9	128	96	6.80	10
20	1.781			284	4218	1.818				6	89	98	6.90	5
21	1.788	215	3206	216	3221	1.732	8	119	96	8	119	96	6.70	10
22	1.874			220	3438	1.780				28	438	87	6.70	
23	1.785			216	3216	1.716				5	74	98	6.70	
24	1.902	210	3331	200	3173	1.835	9	143	96	5	79	98	6.60	23
25	1.779			240	3561	1.895				3	45	99	6.70	2
26	1.804	231	3475	220	3310	2.029	11	165	95	5	75	98	6.90	8
27	1.821			212	3220	1.974				5	76	98	6.80	4
28	1.881	217	3404	244	3828	2.006	11	173	95	6	94	98	6.80	1
29	1.962			400	6545	2.009				14	229	97	6.90	
30	2.000			480	8006	2.128				6	100	99	6.80	
31	2.082	228	3959	232	4028	2.245	8	139	96	2	35	99	6.70	7
Total	54.802													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.768	237	3484	287	4233	1.762	8	119	97	9	130	97	6.60	10
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	2.082	289	4184	524	8006	2.245	10	160		0	0		7.10	19
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

COMMENT AND EXPLANATION OF ANY VIOLATIONS MUST BE ATTACHED ON A SEPARATE SHEET.

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Roger LaRue, Sewer Department Supervisor

Signature / Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	April
Facility Name	City of Burlington			Location	900 South Section St.
Receiving Water	Skagit River				Burlington, WA 98233
Plant Type	Activated Sludge			Check box if NO DISCHARGE for month	

Year: 2008

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.999			212	3534	2.275				8	133	96	6.80	3
2	1.943	274	4440	288	4667	2.132	13	211	95	6	97	98	6.70	11
3	1.861			300	4656	1.962				5	78	98	6.60	3
4	1.804	176	2648	732	11013	1.983	7	105	96	4	60	99	6.70	3
5	1.820			228	3461	2.108				6	91	97	6.80	
6	1.801			212	3184	1.952				6	90	97	6.70	
7	1.841	320	4913	276	4238	2.013	11	169	97	6	92	98	6.70	4
8	1.875			516	8069	2.041				10	156	98	6.70	3
9	1.837	255	3907	236	3616	2.021	9	138	96	7	107	97	6.80	2
10	1.772			472	6975	1.898				12	177	97	6.80	2
11	1.801	298	4476	220	3304	1.731	12	180	96	10	150	95	6.90	21
12	1.746			496	7223	1.707				7	150	98	6.70	
13	1.723			268	3851	1.690				6	86	98	6.80	
14	1.742	473	6872	392	5695	1.661	10	145	98	12	174	97	6.80	29
15	1.691			484	6826	1.768				5	71	99	6.90	4
16	1.705	400	5688	344	4892	1.668	7	100	98	7	100	98	6.70	1
17	1.640			444	6073	1.577				6	82	99	6.70	2
18	1.655	641	8848	592	8171	1.626	9	124	99	6	83	99	6.90	107
19	1.634			252	3434	1.704				19	259	92	7.00	
20	1.725			220	3165	1.669				13	187	94	6.90	
21	1.732	483	6977	532	7685	1.694	6	87	99	4	58	99	6.80	3
22	1.721			416	5971	1.685				8	115	98	6.80	4
23	1.719	529	7584	544	7799	1.679	8	115	98	6	86	99	6.80	9
24	1.655			368	5079	1.596				7	97	98	6.80	1
25	1.605	511	6840	460	6157	1.654	7	94	99	8	107	98	6.90	1
26	1.585			272	3596	1.524				8	106	97	6.80	
27	1.579			328	4319	1.618				5	66	98	6.90	
28	1.683	500	7018	400	5614	1.620	5	70	99	2	28	100	6.80	15
29	1.817			244	3698	2.011				8	121	97	6.90	13
30	1.851	362	5588	324	5002	2.008	8	123	98	9	139	97	6.60	17
31														
Total	52.562													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.752	402	5831	369	5366	1.809	9	128	98	8	112	98	6.60	5
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.999	641	8848	732	11013	2.275	10	162		0	0		7.00	15
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Roger LaRue, Sewer Department Supervisor

Signature / Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	May	Year	2008
Facility Name	City of Burlington			Location	900 South Section St.		
Receiving Water	Skagit River				Burlington, WA 98233		
Plant Type	Activated Sludge				Check box if NO DISCHARGE for month		

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.709			408	5815	2.012				6	86	99	6.90	17
2	1.695	309	4368	284	4015	1.835	6	85	98	6	85	98	6.70	7
3	1.665			412	5721	1.908				5	69	99	6.80	
4	1.681			404	5664	1.812				4	56	99	6.60	
5	1.680	346	4848	376	5268	1.817	4	56	99	5	70	99	6.60	3
6	1.631			280	3809	1.876				4	54	99	6.80	7
7	1.617	350	4720	280	3776	1.701	4	54	99	5	67	98	6.80	18
8	1.620			332	4486	1.881				6	81	98	6.70	1
9	1.599	346	4614	336	4481	1.631	9	120	97	7	93	98	6.90	7
10	1.599			348	4641	1.631				3	40	99	6.70	
11	1.575			320	4203	1.505				4	53	99	6.80	
12	1.624	310	4199	272	3684	1.614	8	108	97	7	53	99	6.60	28
13	1.580			324	4269	1.563				8	105	98	6.80	37
14	1.816	268	4059	240	3635	1.895	12	182	96	13	197	95	6.70	53
15	1.915	278	4440	280	4472	1.880	5	80	98	3	48	99	6.70	15
16	1.826			256	3899	1.821				5	76	98	6.80	9
17	1.730			448	6464	1.784				8	115	98	7.00	
18	1.812			400	6045	1.845				6	91	99	6.90	
19	1.760			316	4638	1.743				4	59	99	6.80	36
20	1.858	339	5253	384	5950	1.956	10	155	97	9	139	98	6.90	15
21	1.872	386	6026	440	6869	1.816	5	78	99	4	62	99	6.70	8
22	1.982	347	5736	388	6414	1.972	9	149	97	7	116	98	6.80	1
23	1.881			376	5899	1.936				8	126	98	6.80	5
24	1.814			412	6233	1.746				3	45	99	6.80	
25	1.734			200	2892	1.683				8	116	96	6.80	
26	1.687	299	4207	340	4784	1.636	4	56	99	1	14	100	6.80	3
27	1.683			200	2807	1.628				6	84	97	6.80	73
28	1.782	330	4904	312	4637	1.833	11	163	97	7	104	98	6.80	15
29	1.768			264	3893	1.894				8	118	97	6.50	1
30	1.768	279	4114	220	3244	1.892	13	192	95	11	162	95	6.70	28
31	1.758			200	2932	2.012				5	73	98	7.00	
Total	53.721													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.733	322	4730	324	4695	1.799	8	114	98	6	86	98	6.50	10
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.982	386	6026	448	6869	2.012	10	137		0	0		7.00	23
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Roger LaRue, Sewer Department Supervisor

Signature / Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	June
Year	2008				
Facility Name	City of Burlington			Location	900 South Section St.
Receiving Water	Skagit River				Burlington, WA 98233
Plant Type	Activated Sludge			Check box if NO DISCHARGE for month	

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.823			208	3162	1.970				2	30	99	6.70	
2	1.880	332	5205	220	3449	2.005	9	141	97	13	204	94	6.70	10
3	1.755			624	9133	1.870				8	117	99	6.70	20
4	1.949	274	4454	352	5722	1.940	6	98	98	11	179	97	6.60	27
5	1.868			220	3427	2.018				7	109	97	6.70	7
6	2.001	266	4439	256	4272	2.221	10	167	96	9	150	96	6.70	63
7	2.084			408	7091	2.071				6	104	99	6.80	
8	2.057			448	7686	2.004				8	137	98	6.70	
9	1.919	168	2689	168	2689	1.851	5	80	97	5	80	97	6.60	27
10	2.143			320	5719	2.151				18	322	94	6.80	23
11	2.045	238	4059	188	3206	2.188	11	188	0	18	307	90	6.70	22
12	2.027			208	3516	1.940				13	307	91	6.80	52
13	1.957	240	3917	220	3591	1.980	4	65	98	7	114	97	6.70	15
14	1.957			308	5027	1.980				4	65	99	6.80	
15	1.873			276	4311	1.805				3	47	99	6.80	
16	1.804	257	3867	200	3009	1.757	7	105	97	13	196	94	6.80	22
17	1.794			220	3292	1.740			97	14	209	94	6.80	29
18	1.785	290	4317	344	5121	1.742	10	149		16	238	95	6.70	40
19	1.777			236	3498	1.922				27	400	89	6.90	10
20	1.788	209	3117	400	5965	1.824	10	149	95	17	254	96	6.70	30
21	1.814			336	5083	1.760				8	121	98	6.90	
22	1.767			368	5423	1.672				14	206	96	6.90	
23	1.776	229	3392	208	3081	1.704	7	104	97	13	193	94	6.70	5
24	1.785			300	4466	2.026				28	417	91	6.80	30
25	1.732	254	3669	224	3236	1.870	9	130	96	11	159	95	6.70	40
26	1.757			288	4220	1.908				15	220	95	6.70	97
27	1.680	303	4245	300	4203	1.850	12	168	96	9	126	97	6.70	20
28	1.651			300	4131	1.955				12	165	96	6.90	
29	1.650			196	2697	1.816				11	151	94	6.80	
30	1.655	280	3865	220	3037	1.752	7	97	98	8	110	96	6.80	107
31														
Total	55.553													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.852	257	3941	285	4415	1.910	8	126	89	12	181	95	6.60	25
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	2.143	332	5205	624	9133	2.221	9	134		0	0		6.90	27
Limit							45	1422		45	1422		9.00	400

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Roger LaRue, Sewer Department Supervisor

Signature / Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	**Discharge No.** 1	**Month**	July	**Year** 2008
Facility Name	City of Burlington		**Location**	900 South Section St.	
Receiving Water	Skagit River			Burlington, WA 98233	
Plant Type	Activated Sludge			Check box if NO DISCHARGE for month	☐

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.698			232	3285	1.822				13	184	94	6.80	186
2	1.697	288	4076	400	5661	1.850	11	156	96	16	226	96	6.80	197
3	1.706	339	4823	340	4838	1.871	14	199	96	14	199	96	6.90	3
4	1.761			340	4993	1.845				18	264	95	7.10	1
5	1.597			256	3410	1.526				10	133	96	7.00	
6	1.717			248	3551	1.635				11	158	96	7.00	
7	1.720	304	4361	544	7804	1.673	7	100	98	7	100	99	7.00	1
8	1.731			256	3696	1.777				15	217	94	7.10	37
9	1.733	389	5622	240	3469	1.670	13	188	97	14	202	94	7.00	58
10	1.710			312	4450	1.625				12	171	96	7.00	60
11	1.670	315	4387	320	4457	1.677	9	125	97	9	125	97	7.10	160
12	1.680			512	7174	1.620				14	125	98	7.00	
13	1.671			384	5351	1.603				9	125	98	6.90	
14	1.677	288	4028	228	3189	1.593	9	126	97	12	168	95	6.70	147
15	1.653			400	5514	1.741				18	248	96	7.40	163
16	1.587	239	3163	216	2859	1.747	10	132	96	14	185	94	7.40	30
17	1.503	253	3171	260	3259	1.733	18	226		14	175	95	7.40	45
18	1.482			344	4252	1.603			93	16	198	95	6.80	6
19	1.482			284	3510	1.603				17	210	94	7.10	
20	1.445			264	3182	1.603				12	145	95	7.10	
21	1.474	288	3540	240	2950	1.454	6	74	98	8	98	97	6.90	103
22	1.459			256	3115	1.483				12	146	95	7.10	33
23	1.443	311	3743	400	4814	1.336	8	96	97	6	72	99	7.00	80
24	1.450			256	3096	1.332				12	145	95	7.00	176
25	1.432	329	3929	344	4108	1.450	11	131	97	11	131	97	6.90	40
26	1.385			228	2634	1.275				7	81	97	7.00	
27	1.406			360	4221	1.344				5	59	99	7.00	
28	1.461	280	3412	284	3460	1.338	11	134	96	15	183	95	6.90	20
29	1.399			300	3500	1.308				12	140	96	7.00	3
30	1.390	331	3837	320	3710	1.328	12	139	96	13	151	96	7.00	197
31	1.372			392	4485	1.247				13	149	97	7.00	50
Total	48.591													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.567	304	4007	315	4129	1.571	11	141	96	12	159	96	6.70	36
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.761	389	5622	544	7804	1.871	11	152		0	0		7.40	72
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Roger LaRue, Sewer Department Supervisor

Signature / Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	August	Year 2008
Facility Name	City of Burlington			Location	900 South Section St.	
Receiving Water	Skagit River				Burlington, WA 98233	
Plant Type	Activated Sludge				Check box if NO DISCHARGE for month	

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.561	344	4478	340	4426	1.654	12	156	97	10	130	97	7.20	1
2	1.541			652	8379	1.495				11	141	98	6.80	
3	1.512			460	5801	1.421				11	139	98	6.60	
4	1.534	272	3480	256	3275	1.439	12	154	96	9	115	96	7.10	40
5	1.496			324	4042	1.510				12	150	96	7.30	1
6	1.425	383	4552	392	4659	1.465	15	178	96	19	226	95	7.10	13
7	1.417			272	3214	1.606				16	189	94	7.00	5
8	1.434	328	3923	380	4545	1.654	20	239	94	27	323	93	7.20	47
9	1.412			344	4051	1.547				37	436	89	7.20	
10	1.415			332	3918	1.520				41	484	88	7.30	
11	1.389	306	3545	260	3012	1.380	10	116	97	5	58	98	7.30	10
12	1.393			456	5298	1.372				11	58	99	7.30	10
13	1.377	299	3434	392	4502	1.501	10	115	97	9	103	98	7.30	1
14	1.416			252	2976	1.554				6	71	98	7.30	5
15	1.428	225	2680	564	6717	1.580	8	95	96	8	95	99	6.80	25
16	1.377			432	4961	1.360				9	103	98	6.80	
17	1.353			460	5191	1.273			98	8	90	98	6.90	
18	1.378	387	4448	316	3632	1.300	9	103		7	80	98	7.20	37
19	1.454			392	4754	1.366				12	146	97	7.20	7
20	1.454	324	3929	376	4560	1.528	9	109	97	9	109	98	7.00	110
21	1.664			408	5662	1.631				11	153	97	7.20	80
22	1.541	326	4190	312	4010	1.569	9	116	97	6	77	98	7.10	43
23	1.539			540	6931	1.604				14	180	97	7.10	
24	1.414			252	2972	1.570				6	71	98	7.20	
25	1.622	272	3679	260	3517	1.547	9	122	97	9	122	97	7.20	17
26	1.481			280	3458	1.439				8	99	97	6.90	18
27	1.545	311	4007	400	5154	1.436	10	129	97	10	129	98	7.00	33
28	1.545			408	5257	1.587				13	168	97	7.10	13
29	1.588	304	4026	384	5086	1.482	9	119	97	7	93	98	6.80	38
30	1.599			224	2987	1.785				7	93	97	6.80	
31	1.537			312	3999	1.579				9	115	97	6.90	
Total	45.841													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.479	314	3875	369	4547	1.508	11	135	97	12	147	97	6.60	14
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.664	387	4552	652	8379	1.785	16	162		0	0		7.30	40
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Roger LaRue, Sewer Department Supervisor

Signature / Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	September	Year	2008
Facility Name	City of Burlington			Location	900 South Section St.		
Receiving Water	Skagit River				Burlington, WA 98233		
Plant Type	Activated Sludge				Check box if NO DISCHARGE for month		

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.479			248	3059	1.365				10	123	96	6.70	1
2	1.494	265	3302	260	3240	1.380	8	100	97	8	100	97	6.90	10
3	1.476	313	3853	264	3250	1.414	12	148	96	16	197	94	6.90	97
4	1.448			256	3092	1.640				11	133	96	7.00	17
5	1.561	294	3828	300	3906	1.746	16	208	95	16	208	95	7.00	47
6	1.350			368	4143	1.446				17	191	95	6.80	
7	1.483			276	3414	1.610				22	272	92	7.00	
8	1.486	190	2355	240	2974	1.583	6	74	97	12	149	95	6.80	80
9	1.374			524	6005	1.526				19	218	96	6.70	40
10	1.404	247	2892	260	3044	1.542	9	105	96	13	152	95	6.90	100
11	1.400			268	3129	1.340				20	234	93	6.90	27
12	1.367	335	3819	328	3739	1.311	15	171	96	12	234	94	6.80	100
13	1.363			368	4183	1.289				21	239	94	6.60	
14	1.359			340	3854	1.268				17	193	95	6.60	
15	1.394	326	3790	240	2790	1.303	12	140	96	15	174	94	6.70	33
16	1.391			248	2877	1.311				19	220	92	6.60	27
17	1.370	282	3222	280	3199	1.280	8	91		9	103	97	6.80	33
18	1.422			244	2894	1.414			97	13	154	95	6.50	157
19	1.386	330	3815	332	3838	1.269	9	104	97	18	208	95	6.70	7
20	1.366			336	3828	1.269				7	80	98	6.60	
21	1.445			292	3519	1.319				4	48	99	6.60	
22	1.394	382	4441	268	3116	1.262	10	116	97	9	105	97	6.60	144
23	1.332			328	3644	1.242				4	44	99	6.60	18
24	1.294	348	3756	248	2676	1.112	11	119	97	6	65	98	6.60	1
25	1.283			256	2739	1.166				4	43	98	6.60	11
26	1.276	367	3906	240	2554	1.347	13	138	96	12	128	95	6.50	16
27	1.204			528	5302	1.159				6	60	99	6.60	
28	1.214			484	4900	1.127				6	61	99	6.70	
29	1.260	363	3815	284	2984	1.176	8	84	98	6	63	98	6.70	167
30	1.235			300	3090	1.149				7	72	98	6.60	11
31														
Total	41.310													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.377	311	3599	307	3499	1.346	11	123	97	12	142	96	6.50	26
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.561	382	4441	528	6005	1.746	12	152		0	0		7.00	61
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Robert VanSickle, Operations Foreman

Signature / Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	October	Year 2008
Facility Name	City of Burlington			Location	900 South Section St.
Receiving Water	Skagit River				Burlington, WA 98233
Plant Type	Activated Sludge				Check box if NO DISCHARGE for month

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.191	367	3645	280	2781	1.221	16	159	96	8	79	97	6.50	27
2	1.208			308	3103	1.105				6	60	98	6.50	9
3	1.394	331	3848	412	4790	1.336	4	47	99	3	35	99	6.60	51
4	1.372			400	4577	1.259				8	92	98	6.70	
5	1.444			364	4384	1.314				5	60	99	6.60	
6	1.388	317	3670	284	3288	1.282	7	81	98	5	58	98	6.60	13
7	1.394			344	3999	1.403				9	105	97	6.50	3
8	1.398	273	3183	280	3265	1.479	10	117	96	9	105	97	6.60	27
9	1.483			580	7174	1.563				12	148	98	6.60	42
10	1.383	294	3391	290	3345	1.569	4	46	99	8	92	97	6.60	7
11	1.304			212	2306	1.360				9	98	96	6.40	
12	1.307			96	1046	1.404				8	98	91	6.70	
13	1.383	295	3403	352	4060	1.460	8	92	97	7	81	98	6.60	28
14	1.471			388	4760	1.542				12	147	97	6.60	12
15	1.337	340	3791	348	3880	1.437	4	45	99	4	45	99	6.20	7
16	1.347	323	3629	320	3595	1.377	9	101	97	9	101	97	6.30	1
17	1.303			320	3477	1.171				10	109	97	6.40	7
18	1.267			476	5030	1.172				8	85	98	6.50	
19	1.255	324	3391	396	4145	1.167	9	94	97	8	84	98	6.70	
20	1.316			348	3819	1.216				7	77	98	6.70	31
21	1.352	347	3913	440	4961	1.398	9	101	97	11	124	98	6.50	25
22	1.319			360	3960	1.234				6	66	98	6.50	5
23	1.245	302	3136	380	3946	1.186	7	73	98	9	93	98	6.70	22
24	1.272			324	3437	1.181				9	95	97	6.70	17
25	1.227			388	3970	1.088				5	51	99	6.70	
26	1.225	329	3361	432	4414	1.097	8	82	98	6	61	99	6.70	
27	1.242			356	3688	1.145				3	31	99	6.60	47
28	1.259	338	3549	360	3780	1.311	9	95	97	10	105	97	6.50	5
29	1.312			356	3895	1.211				5	55	99	6.50	60
30	1.320	341	3754	400	4404	1.223	6	66	98	8	88	98	6.50	10
31	1.290			376	4045	1.175				6	65	98	6.50	20
Total	41.008													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.323	323	3547	354	3914	1.293	8	86	98	8	84	98	6.20	14
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.483	367	3913	580	7174	1.569	9	96		0	0		6.70	7
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Robert VanSickle, WWTP Operations Foreman

Signature / Date

(360) 757-4085

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	November
Year	2008				
Facility Name	City of Burlington			Location	900 South Section St. Burlington, WA 98233
Receiving Water	Skagit River				
Plant Type	Activated Sludge			Check box if NO DISCHARGE for month	

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.290			356	3830	1.175				5	54	99	6.50	
2	1.284			404	4326	1.143				4	43	99	6.70	
3	1.331	337	3741	380	4218	1.195	6	67	98	6	67	98	6.70	25
4	1.511			304	3831	1.516				7	88	98	6.90	50
5	1.524	323	4105	300	3813	1.403	11	140	97	9	114	97	6.60	30
6	1.397	341	3973	480	5592	1.287	9	105	97	11	128	98	6.50	51
7	2.071			300	5182	2.156				13	225	96	6.50	28
8	2.039			296	5034	2.000				6	102	98	6.60	
9	1.726			360	5182	1.652				7	101	98	6.70	
10	1.664	353	4899	448	6217	1.557	8	111	98	7	97	98	6.60	7
11	1.516			484	6119	1.678				10	126	98	6.60	4
12	1.937			308	4976	2.068				13	126	97	6.90	25
13	1.986	231	3826	240	3975	2.127	10	166	96	12	199	95	6.50	25
14	1.880	257	4030	284	4453	2.147	10	157	96	12	188	96	6.50	7
15	1.734			544	7867	1.828				11	159	98	6.60	
16	1.673			144	2009	1.817				10	140	93	6.20	
17	1.657	221	3054	304	4201	1.749	7	97		10	138	97	6.60	35
18	1.666			468	6503	1.208			97	13	181	97	6.50	10
19	1.608	278	3728	368	4935	1.535	8	107	97	9	121	98	6.50	50
20	1.586			300	3968	1.529				22	291	93	6.50	47
21	1.602	266	3554	208	2779	1.411	9	120	97	6	80	97	6.50	33
22	1.532			192	2453	1.369				7	89	96	6.80	
23	1.487			248	3076	1.326				8	99	97	6.60	
24	1.517	395	4997	308	3897	1.288	7	89	98	6	76	98	6.60	27
25	1.613			332	4466	1.452				9	121	97	6.80	20
26	1.614	381	5129	256	3446	1.416	7	94	98	6	81	98	6.70	47
27	1.543			300	3861	1.441				5	64	98	6.70	7
28	1.394	345	4011	484	5627	1.203	6	70	98	8	93	98	6.60	3
29	1.661			424	5874	1.601				9	125	98	6.70	
30	2.015			480	8066	1.990				9	151	98	6.70	
31														
Total	49.058													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.635	311	4087	343	4659	1.576	8	110	97	9	122	97	6.20	20
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	2.071	395	5129	544	8066	2.156	9	145		0	0		6.90	35
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

COMMENT AND EXPLANATION OF ANY VIOLATIONS MUST BE ATTACHED ON A SEPARATE SHEET.

Mail to: Department of Ecology, Northwest Regional Office, Water Quality, 3190 160th Ave SE Bellevue, WA 98008

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Robert VanSickle, WWTP Operations Foreman

Signature / Date

(360) 757-4085 EX 2

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No. 1	Month	December	Year 2008
Facility Name	City of Burlington		Location	900 South Section St.	
Receiving Water	Skagit River			Burlington, WA 98233	
Plant Type	Activated Sludge			Check box if NO DISCHARGE for month	☐

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.883	365	5732	344	5402	1.879	8	126	98	10	157	97	6.60	67
2	1.786			424	6316	1.752				12	179	97	7.00	30
3	1.747	317	4619	436	6353	1.705	13	189	96	19	277	96	6.30	13
4	1.661			344	4765	1.601				13	180	96	6.70	26
5	1.605	229	3065	328	4391	1.676	9	120	96	12	161	96	6.90	25
6	1.585			324	4283	1.547				6	79	98	6.80	
7	1.644			296	4058	1.586				10	137	97	6.80	
8	1.637	302	4123	252	3440	1.581	9	123	97	7	96	97	6.70	16
9	1.592			296	3930	1.524				11	146	96	6.80	16
10	1.682	242	3395	244	3423	1.873	11	154	95	10	140	96	6.90	38
11	1.657			240	3317	1.782				11	152	95	6.80	16
12	1.632	204	2777	212	2886	1.746	9	122	96	7	152	95	6.80	20
13	1.632			500	6805	1.746				10	136	98	6.80	
14	1.772			296	4374	1.913				13	192	96	6.70	
15	1.742	179	2601	240	3487	1.831	8	116	96	16	232	93	6.80	36
16	1.784			296	4404	1.866				15	223	95	6.80	87
17	1.682	219	3072	220	3086	1.842	11	154	96	12	168	95	6.70	23
18	1.648	214	2941	420	5773	1.778	8	110	95	8	110	98	6.70	6
19	1.574			120	1575	1.529				13	171	89	6.80	43
20	1.584			216	2853	1.556				15	198	93	6.90	
21	1.718			320	4585	1.690				20	287	94	6.90	
22	1.722	219	3145	208	2987	1.699	12	172	95	11	158	95	6.70	27
23	1.694	236	3334	196	2769	1.795	12	170	95	11	155	94	6.80	55
24	1.679			228	3193	1.783				10	140	96	6.80	49
25	1.679			200	2801	1.783				4	56	98	6.70	9
26	1.555	522	6770	456	5914	1.528	12	156	98	8	104	98	6.70	13
27	1.996			224	3729	2.028				5	83	98	6.80	
28	2.658			196	4345	2.965				25	554	87	6.70	
29	2.545	185	3927	200	4245	2.750	13	276	93	17	361	92	6.70	121
30	2.454	169	3459	204	4175	2.739	14	287	92	15	307	93	6.70	27
31	2.271	167	3163	176	3333	2.406	7	133	96	9	170	95	6.50	340
Total	55.500													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.790	251	3741	279	4097	1.854	10	161	95	12	183	95	6.30	30
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	2.658	522	6770	500	6805	2.965	12	232		0	0		7.00	102
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Robert VanSickle, WWTP Operations Foreman

Signature / Date

(360) 757-4085 EX 2

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	January	Year 2009
Facility Name	City of Burlington			Location	900 South Section St.
Receiving Water	Skagit River				Burlington, WA 98233
Plant Type	Activated Sludge				Check box if NO DISCHARGE for month ☐

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	2.281			300	5707	2.543				23	438	92	6.80	198
2	2.335			548	10672	2.517				65	1266	88	6.70	180
3	2.189			332	6061	2.365				16	292	95	6.80	
4	2.039			336	5714	2.133				13	221	96	6.80	
5	2.199	193	3540	268	4915	2.344	13	238	93	27	495	90	6.80	195
6	2.267			260	4916	2.374				16	303	94	6.80	60
7	2.858	192	4576	236	5625	3.459	7	167	96	7	167	97	6.70	187
8	2.882			204	4903	4.569				20	481	90	6.70	20
9	2.846	113	2682	228	5412	3.724	10	237	91	15	356	93	6.70	1
10	2.846			200	4747	3.724				4	95	98	6.50	
11	2.240			168	3139	3.266				6	112	96	6.80	
12	2.803	122	2852	160	3740	3.449	6	140	95	6	112	97	6.80	10
13	2.765			160	3690	3.472				7	161	96	6.60	20
14	2.655	146	3233	160	3543	3.109	7	155	95	4	89	98	6.70	8
15	2.528			240	5060	2.968				6	127	98	6.90	5
16	2.405	160	3209	228	4573	2.813	7	140	96	9	181	96	6.90	10
17	2.359			376	7397	2.719				6	118	98	6.80	
18	2.279			336	6386	2.437				9	171	97	6.70	
19	2.234	297	5534	368	6856	2.393	7	130	98	5	93	99	6.60	8
20	2.256			176	3311	2.416				11	207	94	6.70	5
21	2.132	235	4179	328	5832	2.265	9	160	96	10	178	97	6.70	5
22	2.102			240	4207	2.223				7	123	97	6.50	8
23	2.101	213	3732	240	4205	2.224	8	140	96	9	158	96	6.80	20
24	1.975			196	3228	1.959				10	165	95	6.80	
25	1.993			240	3989	1.945				5	83	98	6.80	
26	2.008	227	3802	404	6766	1.938	9	151	96	9	151	98	6.80	1
27	1.940			232	3754	1.910				6	97	97	6.70	3
28	1.951	235	3824	200	3254	1.993	5	81	98	7	114	97	6.90	7
29	1.909			240	3821	1.897				6	96	98	6.80	10
30	1.902	225	3569	240	3807	1.837	9	143	96	7	111	97	6.80	31
31	1.790			160	2389	1.847				7	105	96	6.90	
Total	71.069													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	2.293	197	3728	258	4891	2.607	8	157	96	12	221	96	6.50	10
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	2.882	297	5534	548	10672	4.569	10	214		0	0		6.90	55
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Robert VanSickle, WWTP Operations Foreman

Signature / Date

(360) 757-4085 EX 2

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	February	Year	2009
Facility Name	City of Burlington			Location	900 South Section St.
Receiving Water	Skagit River				Burlington, WA 98233
Plant Type	Activated Sludge				Check box if NO DISCHARGE for month

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.839			240	3681	1.809				6	92	98	6.70	
2	1.746	268	3903	212	3087	1.701	8	116	97	7	102	97	6.80	7
3	1.912			464	7399	2.063				5	80	99	6.80	7
4	1.858	206	3192	188	2913	2.021	7	108	97	7	108	96	6.70	22
5	1.813			272	4113	1.973				7	106	97	6.80	10
6	1.782	252	3745	212	3151	2.054	9	134	96	7	104	97	6.80	37
7	1.768			412	6075	1.879				9	133	98	6.70	
8	1.811			476	7189	1.973				9	136	98	6.70	
9	1.762	262	3850	264	3880	1.885	6	88	98	7	103	97	6.80	17
10	1.812			240	3627	1.796				5	76	98	6.60	1
11	1.803	258	3880	272	4090	1.805	6	90	98	5	75	98	6.80	10
12	1.801			212	3184	1.725				5	75	98	6.70	13
13	1.778	230	3411	176	2610	1.646	5	74	98	2	30	99	6.70	200
14	1.768			200	2949	1.775				5	74	98	6.80	1
15	1.800			260	3903	1.703				3	45	99	6.80	
16	1.754			280	4096	1.652				7	102	98	6.90	4
17	1.723			200	2874	1.643			98	7	101	97	6.90	27
18	1.674	413	5766	372	5194	1.580	7	98		11	154	97	6.90	17
19	1.675	300	4191	244	3409	1.567	8	112	97	6	84	98	6.80	9
20	1.675	267	3730	232	3241	1.689	8	112	97	5	70	98	6.80	10
21	1.675			352	4917	1.583				8	112	98	6.90	
22	1.732			320	4622	1.633				6	87	98	6.80	
23	1.786	478	7120	360	5362	1.700	8	119	98	6	89	98	7.00	17
24	1.727			248	3572	1.749				7	101	97	6.70	10
25	1.658	293	4052	268	3706	1.535	10	138	97	5	69	98	6.70	20
26	1.867			272	4235	1.776				10	156	96	6.70	3
27	1.779	288	4273	228	3383	1.710	6	89	98	7	104	97	6.60	3
28	1.686			320	4500	1.742				7	98	98	6.80	
29														
30														
31														
Total	49.464													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.767	293	4259	278	4106	1.763	7	107	97	6	95	98	6.60	10
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.912	478	7120	476	7399	2.063	8	119		0	0		7.00	13
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Robert VanSickle, WWTP Operations Foreman

Signature / Date

(360) 757-4085 EX 2

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	March	Year	2009
Facility Name	City of Burlington			Location	900 South Section St.		
Receiving Water	Skagit River				Burlington, WA 98233		
Plant Type	Activated Sludge				Check box if NO DISCHARGE for month		

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.802			148	2224	0.165				15	225	90	6.90	
2	1.777	290	4298	240	3557	1.700	14	207	95	15	222	94	6.70	1
3	1.721			320	4593	1.186				3	43	99	6.80	13
4	1.658	272	3761	296	4093	1.767	6	83	98	7	97	98	6.70	5
5	1.635			300	4091	1.467				8	109	97	6.90	5
6	1.511	269	3390	228	2873	1.765	6	76	98	5	63	98	6.80	80
7	1.512			256	3228	1.765				4	50	98	6.90	
8	1.475			240	2952	1.716				1	12	100	6.80	
9	1.485	319	3951	208	2576	1.737	5	62	98	1	12	100	6.80	3
10	1.518			200	2532	1.753				6	76	97	6.90	1
11	1.487	296	3671	248	3076	1.735	6	74	98	3	37	99	6.90	4
12	1.544			236	3039	1.920				5	37	99	7.00	5
13	1.500	264	3303	364	4554	1.584	4	50	98	2	25	99	6.80	7
14	1.495			596	7431	1.603				3	37	99	6.90	
15	1.563			444	5788	1.291				5	65	99	7.10	
16	1.612	215	2890	404	5431	1.244	6	81	97	6	81	99	7.00	7
17	1.644			304	4168	1.667				6	82	98	6.90	20
18	1.594	322	4281	268	3563	1.660	6	80	98	6	80	98	6.80	30
19	1.574			280	3676	1.708				5	66	98	6.80	1
20	1.554	241	3123	176	2281	1.570	6	78	98	5	65	97	6.80	200
21	1.555			228	2957	1.636				4	52	98	6.90	
22	1.569			308	4030	1.593				4	52	99	6.90	
23	1.534	243	3109	224	2866	1.546	6	77	98	4	51	98	6.90	24
24	1.521	274	3476	308	3907	1.535	7	89	97	5	63	98	6.90	24
25	1.525	264	3358	336	4273	1.542	5	64	98	6	76	98	6.70	2
26	1.542			316	4064	1.704				3	39	99	6.70	5
27	1.464			404	4933	1.499				4	49	99	6.80	5
28	1.465			324	3959	1.472				8	98	98	6.90	
29	1.568			316	4132	1.558				9	118	97	7.00	
30	1.537			224	2871	1.574				2	26	99	7.00	20
31	1.613			240	3229	1.642				4	54	98	6.80	7
Total	48.554													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.566	272	3551	290	3772	1.558	6	85	98	5	70	98	6.70	8
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.802	322	4298	596	7431	1.920	9	122		0	0		7.10	15
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Robert VanSickle, WWTP Operations Foreman

Signature / Date

(360) 757-4085 EX 2

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	April	Year 2009
Facility Name	City of Burlington			Location	900 South Section St.	
Receiving Water	Skagit River				Burlington, WA 98233	
Plant Type	Activated Sludge				Check box if NO DISCHARGE for month	

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.665	236	3277	268	3721	2.024	8	111	97	7	97	97	7.10	13
2	1.916	260	4155	308	4922	2.168	8	128	97	7	112	98	6.90	10
3	1.876	291	4553	280	4381	2.161	8	125	97	8	125	97	6.90	20
4	1.662			276	3826	1.925				8	111	97	6.90	
5	1.682			196	2749	1.954				12	168	94	6.90	
6	1.610			204	2739	1.847				5	67	98	6.90	27
7	1.545	240	3092	204	2629	1.864	7	90	97	7	90	97	7.10	37
8	1.543	219	2818	272	3500	1.755	6	77	97	3	39	99	7.00	240
9	1.562			404	5263	1.769				2	26	100	6.90	17
10	1.541	338	4344	404	5192	1.630	5	64	99	5	64	99	6.70	33
11	1.539			176	2259	1.662				3	39	98	6.80	
12	1.569			248	3245	1.569				15	39	99	6.90	
13	1.655	212	2926	200	2761	1.653	6	83	97	7	97	97	6.90	89
14	1.593			360	4783	1.611				8	106	98	6.40	30
15	1.516	233	2946	264	3338	1.643	6	76	97	8	101	97	6.50	33
16	1.489			368	4570	1.542				9	112	98	6.50	1
17	1.496	228	2845	304	3793	1.557	6	75		5	62	98	6.50	47
18	1.571			424	5555	1.742			97	4	52	99	6.60	
19	1.583			268	3538	1.651				8	106	97	6.50	
20	1.567	242	3163	280	3659	1.649	6	78	98	5	65	98	6.60	7
21	1.492			480	5973	1.561				7	87	99	6.60	20
22	1.452	280	3391	312	3778	1.649	7	85	98	5	61	98	6.70	22
23	1.419			284	3361	1.502				5	59	98	6.70	11
24	1.346	252	2829	364	4086	1.617	6	67	98	3	34	99	6.60	66
25	1.402			420	4911	1.547				1	12	100	6.70	
26	1.408			400	4697	1.468				6	70	99	6.60	
27	1.390	300	3478	332	3849	1.467	6	70	98	6	70	98	6.50	20
28	1.391			500	5800	1.452				4	46	99	6.40	11
29	1.407	308	3614	496	5820	1.665	6	70	98	10	117	98	6.50	5
30	1.377			460	5283	1.776				7	80	98	6.70	13
31														
Total	46.264													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.542	260	3388	325	4133	1.703	7	86	97	6	77	98	6.40	20
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.916	338	4553	500	5973	2.168	8	121		0	0		7.10	43
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

COMMENT AND EXPLANATION OF ANY VIOLATIONS MUST BE ATTACHED ON A SEPARATE SHEET.

Mail to: Department of Ecology, Northwest Regional Office, Water Quality, 3190 160th Ave SE Bellevue, WA 98008

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Robert VanSickle, WWTP Operations Foreman

Signature / Date

(360) 757-4085 EX 2

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	May
Facility Name	City of Burlington			Location	900 South Section St. Burlington, WA 98233
Receiving Water	Skagit River			Year	2009
Plant Type	Activated Sludge			Check box if NO DISCHARGE for month	

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.362	308	3499	388	4407	1.663	6	68	98	3	34	99	6.40	28
2	1.303			380	4129	1.595				5	54	99	6.50	
3	1.390			392	4544	1.647				4	46	99	6.40	
4	1.386	233	2693	360	4161	1.639	6	69	97	5	58	99	6.60	1
5	1.429			508	6054	1.694				3	36	99	6.70	13
6	1.429	344	4100	348	4147	1.699	8	95	98	6	72	98	6.70	1
7	1.730			472	6810	2.034				13	188	97	6.50	1
8	1.664	249	3456	352	4885	1.725	5	69	98	7	97	98	6.60	16
9	1.560			208	2706	1.680				11	143	95	6.50	
10	1.498			136	1699	1.560				10	125	93	6.50	
11	1.506	255	3203	340	4270	1.548	8	100	97	10	126	97	6.60	3
12	1.692			404	5701	1.715				3	126	98	6.70	13
13	1.658	330	4563	368	5089	1.778	8	111	98	13	180	96	6.50	7
14	1.683			364	5109	1.858				12	168	97	6.60	57
15	1.651	217	2988	236	3250	1.720	8	110	96	9	124	96	6.60	22
16	1.551			420	5433	1.735				9	116	98	6.90	
17	1.556			260	3374	1.630			98	5	65	98	6.70	
18	1.598	300	3998	384	5118	1.663	6	80		6	80	98	6.70	40
19	1.757			320	4689	1.890				14	205	96	6.80	1
20	1.689	204	2874	121	1704	2.101	7	99	97	8	113	93	6.50	90
21	1.635			368	5018	1.902				17	232	95	6.40	15
22	1.536	242	3100	188	2408	1.700	8	102	97	11	141	94	6.60	33
23	1.444			392	4721	1.780				12	145	97	6.70	
24	1.515			316	3993	1.801				2	25	99	6.50	
25	1.479	333	4108	308	3799	1.752	4	49	99	4	49	99	6.50	33
26	1.503			388	4864	1.801				4	50	99	6.40	1
27	1.475	304	3740	508	6249	1.559	5	62	98	11	135	98	6.50	1
28	1.445			528	6363	1.506				7	84	99	6.50	7
29	1.420	276	3269	528	6253	1.596	5	59	98	11	130	98	6.30	33
30	1.419			420	4970	1.596				15	178	96	6.40	
31	1.378			572	6574	1.423				3	34	99	6.40	
Total	47.341													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.527	277	3507	364	4597	1.709	6	83	98	8	108	97	6.30	9
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.757	344	4563	572	6810	2.101	8	107		0	0		6.90	18
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Robert VanSickle, WWTP Operations Foreman

Signature / Date

(360) 757-4085 EX 2

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	June	Year	2009
Facility Name	City of Burlington			Location	900 South Section St.
Receiving Water	Skagit River				Burlington, WA 98233
Plant Type	Activated Sludge			Check box if NO DISCHARGE for month	

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.441	210	2524	312	3750	1.489	2	24	99	8	96	97	6.90	20
2	1.404			292	3419	1.468				9	105	97	6.90	3
3	1.375	402	4610	376	4312	1.429	8	92	98	11	126	97	6.70	87
4	1.419			452	5349	1.623				17	201	96	7.00	6
5	1.409	428	5029	448	5264	1.502	6	71	99	9	106	98	6.50	10
6	1.424			412	4893	1.481				11	131	97	6.50	
7	1.393			544	6320	1.450				9	105	98	6.70	
8	1.438	373	4473	324	3886	1.523	8	96	98	11	132	97	6.70	127
9	1.376			672	7712	1.564				11	126	98	6.80	15
10	1.370	202	2308	564	6444	1.440	5	57	98	5	57	99	6.90	1
11	1.328			692	7664	1.398				9	100	99	6.80	13
12	1.310	348	3802	348	3802	1.382	7	76	98	10	100	97	6.80	8
13	1.236			680	7010	1.339				10	103	99	6.70	
14	1.307			164	1788	1.375				13	142	92	7.00	
15	1.334	385	4283	368	4094	1.383	9	100	98	12	134	97	6.90	43
16	1.353			364	4107	1.396				13	147	96	6.80	30
17	1.401	419	4896	484	5655	1.586	6	70		9	105	98	6.80	137
18	0.144			440	529	1.498			99	15	18	97	6.60	10
19	1.370	417	4765	300	3428	1.420	7	80	98	10	114	97	6.60	10
20	1.414			432	5094	1.526				9	106	98	6.70	
21	1.467			448	5481	1.518				8	98	98	6.70	
22	1.435			384	4596	1.490				11	132	97	6.60	7
23	1.391			340	3944	1.640				18	209	95	6.70	10
24	1.347	383	4303	372	4179	1.653	5	56	99	7	79	98	6.60	20
25	1.417	516	6098	870	10281	1.568	7	83	99	15	177	98	6.70	10
26	1.404	559	6546	376	4403	1.880	20	234	96	19	222	95	6.90	7
27	1.363			440	5002	1.657				6	68	99	6.70	
28	1.368			420	4792	1.663				8	91	98	6.60	
29	1.367	363	4138	344	3922	1.643	6	68	98	10	114	97	6.50	29
30	1.310			504	5506	1.704				26	284	95	6.50	
31														
Total	40.115													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.337	385	4444	439	4888	1.523	7	85	98	11	124	97	6.50	15
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.467	559	6546	870	10281	1.880	11	124		0	0		7.00	28
Limit							45	1422		45	1422		9.00	400

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Robert VanSickle, WWTP Operations Foreman

Signature / Date

(360) 757-4085 EX 2

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	July	Year	2009
Facility Name	City of Burlington			Location	900 South Section St.		
Receiving Water	Skagit River				Burlington, WA 98233		
Plant Type	Activated Sludge				Check box if NO DISCHARGE for month		☐

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.294	590	6367	540	5828	1.412	10	108	98	19	205	96	6.40	1
2	1.312	530	5799	520	5690	1.383	7	77	99	3	33	99	6.50	17
3	1.313			628	6877	0.138				9	99	99	6.40	1
4	1.306			525	5718	1.386				6	65	99	6.50	
5	1.159			324	3132	1.238				4	39	99	6.50	
6	1.301	740	8029	600	6510	1.393	5	54	99	8	87	99	6.20	5
7	1.372			568	6499	1.408				18	206	97	6.50	1
8	1.326	74	818	672	7432	1.369	9	100	88	19	210	97	6.40	10
9	1.323			624	6885	1.482				15	166	98	6.40	173
10	1.248	227	2363	480	4996	1.334	11	114	95	20	208	96	6.40	340
11	1.298			540	5846	1.395				10	108	98	6.50	
12	1.316			336	3688	1.395				19	108	97	6.50	
13	1.369	334	3813	364	4156	1.408	4	46	99	11	126	97	6.40	1
14	1.364			268	3049	1.520				19	216	93	6.30	10
15	1.221	403	4104	400	4073	1.322	7	71	98	11	112	97	6.50	1
16	1.159			356	3441	1.213				10	97	97	6.70	1
17	1.166	382	3715	336	3267	1.232	7	68		7	68	98	6.60	15
18	1.166			412	4006	1.231			98	11	107	97	6.50	
19	1.160			504	4876	1.224				22	213	96	7.30	
20	1.090	625	5682	680	6182	0.774	10	91	98	22	200	97	6.50	150
21	1.140			476	4526	1.233				6	57	99	6.50	10
22	1.091	497	4522	484	4404	1.412	5	45	99	9	82	98	6.70	23
23	1.092			360	3279	1.401				7	64	98	6.90	40
24	1.142	375	3572	508	4838	1.534	5	48	99	8	76	98	6.60	57
25	1.155			396	3815	1.449				7	67	98	6.60	
26	1.091			320	2912	1.366				5	45	98	6.70	
27	1.112	466	4322	324	3005	1.397	3	28	99	5	46	98	6.70	12
28	1.139			380	3610	1.450				6	57	98	6.50	13
29	1.129	377	3550	304	2862	1.376	6	56	98	9	85	97	6.40	30
30	1.137			376	3565	1.219				9	85	98	6.50	11
31	1.155	410	3949	360	3468	1.217	5	48	99	5	48	99	6.60	40
Total	37.646													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.214	431	4329	450	4595	1.300	7	68	98	11	109	98	6.20	11
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.372	740	8029	680	7432	1.534	8	87		0	0		7.30	38
Limit							45	1422		45	1422		9.00	400

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Don Erickson, Sewer Dept Foreman

Signature / Date

(360) 757-4085 EX 3

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	August	Year 2009
Facility Name	City of Burlington			Location	900 South Section St.
Receiving Water	Skagit River				Burlington, WA 98233
Plant Type	Activated Sludge				Check box if NO DISCHARGE for month

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.146			448	4282	1.210				7	67	98	6.60	
2	1.118			472	4401	1.210				4	37	99	6.60	
3	1.104	382	3517	352	3241	1.210	5	46	99	11	101	97	6.50	1
4	1.019			416	3535	1.055				13	110	97	6.70	7
5	1.079	375	3375	308	2772	1.128	3	27	99	7	63	98	6.60	30
6	1.099			404	3703	1.100				5	46	99	6.70	27
7	1.074	375	3359	320	2866	1.233	6	54	98	7	63	98	6.70	1
8	1.126			804	7550	1.155				3	28	100	6.60	
9	1.160			192	1857	1.183				9	87	95	6.70	
10	1.109	490	4532	376	3478	1.126	5	46	99	7	65	98	6.70	22
11	1.301			392	4253	0.917				7	76	98	6.60	63
12	1.313	463	5070	652	7140	1.475	7	77	98	6	76	99	6.80	10
13	1.238			472	4873	1.276				9	93	98	6.70	1
14	1.254	391	4089	416	4351	1.289	8	84	98	12	126	97	6.60	40
15	1.254			376	3932	1.287				5	52	99	6.80	
16	1.250			332	3461	1.310				37	386	89	6.80	
17	1.215	395	4003	356	3607	1.261	7	71		7	71	98	6.80	7
18	1.237			404	4168	1.512			98	9	93	98	6.50	1
19	1.205	522	5246	280	2814	1.512	10	100	98	11	111	96	6.40	73
20	1.180			552	5432	1.474				10	98	98	6.40	5
21	1.234	509	5238	572	5887	1.640	11	113	98	10	103	98	6.40	26
22	1.241			268	2774	1.550				12	124	96	6.30	
23	1.189			468	4641	1.488				7	69	99	6.20	
24	1.182	479	4722	428	4219	1.477	6	59	99	7	69	98	6.30	33
25	1.206			372	3742	1.355				9	91	98	6.60	37
26	1.245	445	4621	420	4361	1.302	8	83	98	9	93	98	6.50	10
27	1.245			376	3904	1.311				7	73	98	6.40	27
28	1.241	424	4388	352	3643	1.462	10	103	98	9	93	97	6.70	40
29	1.230			460	4719	1.554				5	51	99	6.70	
30	1.225			412	4209	1.306				5	51	99	6.60	
31	1.197			404	4033	1.275				5	50	99	6.60	1
Total	36.916													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.191	438	4347	415	4124	1.311	7	72	98	9	88	98	6.20	11
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.313	522	5246	804	7550	1.640	9	95		0	0		6.80	26
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Robert VanSickle, WWTP Operations Foreman

Signature / Date

(360) 757-4085 EX 2

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	September
Facility Name	City of Burlington			Location	900 South Section St. Burlington, WA 98233
Receiving Water	Skagit River			Year	2009
Plant Type	Activated Sludge			Check box if NO DISCHARGE for month	☐

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.079	423	3807	356	3204	1.131	7	63	98	9	81	97	6.30	5
2	1.071	490	4377	444	3966	1.103	6	54	99	5	45	99	6.30	17
3	1.093			484	4412	1.167				10	91	98	6.30	10
4	1.139	389	3695	400	3800	1.183	6	57	98	5	47	99	6.40	18
5	1.151			416	3993	1.337				5	48	99	6.40	
6	1.169			280	2730	1.206				6	58	98	6.50	
7	1.134			260	2459	1.150				4	38	98	6.50	1
8	1.130	550	5183	440	4147	1.175	4	38	99	4	38	99	6.50	2
9	1.034	627	5407	476	4105	1.082	6	52	99	2	17	100	6.70	4
10	1.058			340	3000	1.092				2	18	99	6.60	18
11	1.027	414	3546	576	4934	1.027	15	128	99	3	26	99	6.60	32
12	1.049			388	3394	0.900				4	26	99	6.70	
13	1.126			400	3756	1.235				3	28	99	6.70	
14	1.109	412	3811	356	3293	1.198	6	55	99	7	65	98	6.80	5
15	1.221			360	3666	1.281				4	41	99	6.70	11
16	1.157	406	3918	404	3898	1.250	10	96	98	12	116	97	6.70	7
17	1.229			328	3362	1.275				5	51	98	6.70	23
18	1.143	494	4709	336	3203	1.246	10	95	98	10	95	97	6.80	51
19	1.208			472	4755	1.433				6	60	99	6.70	
20	1.209			448	4517	1.255				5	50	99	6.70	
21	1.193			336	3343	1.276				12	119	96	6.70	1
22	1.163	353	3424	452	4384	1.229	9	87	97	11	107	98	6.80	27
23	1.171	365	3565	340	3320	1.231	6	59	98	16	156	95	6.60	11
24	1.144	354	3377	360	3435	1.301	16	153	95	13	124	96	6.30	17
25	1.149			276	2645	1.196				14	134	95	6.60	3
26	1.127			340	3196	1.203				9	85	97	6.70	
27	1.149			352	3373	1.182				10	96	97	6.70	
28	1.146			304	2906	1.110				12	115	96	6.70	3
29	1.239	337	3482	352	3637	1.475	12	124	96	12	124	97	6.30	5
30	1.159	444	4292	540	5220	1.419	8	77	98	14	135	97	6.60	18
31														
Total	34.176													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.139	433	4042	387	3668	1.212	9	81	98	8	74	98	6.30	8
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.239	627	5407	576	5220	1.475	10	100		0	0		6.80	14
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Robert VanSickle, WWTP Operations Foreman

Signature / Date

(360) 757-4085 EX 2

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	October	Year	2009
Facility Name	City of Burlington			Location	900 South Section St. Burlington, WA 98233
Receiving Water	Skagit River				
Plant Type	Activated Sludge			Check box if NO DISCHARGE for month	☐

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.193			388	3860	1.452				12	119	97	6.70	71
2	1.201	397	3976	408	4087	1.571	17	170	96	13	130	97	6.30	13
3	1.109			388	3589	1.360				15	139	96	6.60	
4	1.156			312	3008	1.404				15	145	95	6.60	
5	1.149	506	4849	340	3258	1.434	15	144	97	11	105	97	6.70	48
6	1.099			312	2860	1.384				8	73	97	6.70	7
7	1.126	383	3597	352	3306	1.420	15	141	96	11	103	97	6.80	29
8	1.119			420	3920	1.238				19	177	95	6.70	15
9	1.078	392	3524	356	3201	1.237	23	207	94	13	117	96	6.80	7
10	1.087			496	4497	1.156				11	100	98	6.70	
11	1.074			436	3905	1.114				9	81	98	6.80	
12	1.100	458	4202	296	2716	1.117	11	101	98	7	81	97	6.70	12
13	1.159			356	3441	1.186				8	77	98	6.90	29
14	1.094	508	4635	428	3905	1.125	15	137	97	5	46	99	6.70	17
15	1.131			340	3207	1.249				12	113	96	6.60	24
16	1.093	384	3500	348	3172	1.139	12	109	97	10	91	97	6.70	11
17	1.093			1484	13528	1.139				7	64	100	6.70	
18	1.511			868	10938	1.575				4	50	100	6.70	
19	1.242	345	3574	276	2859	1.273	8	83	98	4	41	99	6.80	51
20	1.194			476	4740	1.224				7	70	99	6.50	5
21	1.195	412	4106	308	3070	1.377	13	130	97	5	50	98	6.60	22
22	1.246			296	3076	1.272				8	83	97	6.40	13
23	1.307	371	4044	408	4447	1.363	8	87	98	7	76	98	6.60	22
24	1.560			432	5620	1.690				3	39	99	6.60	
25	1.225			388	3964	1.252				8	82	98	6.40	
26	1.558			248	3222	1.627				8	104	97	6.70	82
27	1.789	302	4506	240	3581	1.929	17	254	94	9	134	96	6.50	4
28	1.449	316	3819	320	3867	1.518	12	145	96	9	109	97	6.50	33
29	1.351			212	2389	1.426				8	90	96	6.50	15
30	1.536	293	3753	200	2562	1.742	19	243	94	7	90	97	6.60	4
31	1.528			424	5403	1.612				4	51	99	6.60	
Total	38.752													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.250	390	4007	405	4168	1.374	14	150	96	9	91	97	6.30	17
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.789	508	4849	1484	13528	1.929	18	214		0	0		6.90	33
Limit							45	1422		45	1422		9.00	400

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Robert VanSickle, WWTP Operations Foreman

Signature / Date

(360) 757-4085 EX 2

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	November
Year	2009				
Facility Name	City of Burlington	Location	900 South Section St.		
Receiving Water	Skagit River		Burlington, WA 98233		
Plant Type	Activated Sludge	Check box if NO DISCHARGE for month	☐		

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.493			280	3486	1.590				5	62	98	6.70	
2	1.422	316	3748	636	7543	1.530	9	107	97	6	71	99	6.70	13
3	1.453			360	4362	1.762				9	109	98	6.60	10
4	1.391	343	3979	336	3898	1.559	11	128	97	9	104	97	6.60	16
5	1.379			336	3864	1.731				7	81	98	6.60	89
6	1.483	399	4935	440	5442	1.908	16	198	96	7	87	98	6.70	31
7	1.542			272	3498	1.880				8	103	97	6.60	
8	1.598			228	3039	1.938				9	120	96	6.60	
9	1.549	288	3721	304	3927	1.875	11	142	96	7	90	98	6.50	20
10	1.628	221	3001	264	3584	1.955	10	136	95	8	109	97	6.30	6
11	1.713			292	4172	2.195				7	100	98	6.40	6
12	1.662			172	2384	2.030				9	100	96	6.50	3
13	1.483	329	4069	340	4205	1.829	10	124	97	11	136	97	6.60	27
14	1.520			488	6186	1.651				3	38	99	6.60	
15	1.471			516	6330	1.543				2	25	100	6.60	
16	1.476	495	6093	376	4628	1.563	6	74	99	3	37	99	6.60	20
17	1.719			468	6709	1.926			98	6	86	99	6.60	4
18	1.726	460	6622	356	5125	1.879	7	101		3	43	99	6.50	9
19	1.783			344	5115	1.879				6	89	98	6.60	4
20	1.948	512	8318	508	8253	1.879	3	49	99	5	81	99	6.60	7
21	1.930			520	8370	1.968				8	129	98	6.70	
22	1.857			276	4275	1.824				11	170	96	6.70	
23	2.034	285	4835	344	5835	2.045	9	153	97	7	119	98	6.60	4
24	1.887	210	3305	248	3903	1.865	9	142	96	8	126	97	6.60	11
25	1.773	485	7172	464	6861	1.866	7	104	99	2	30	100	6.50	4
26	2.050			568	9711	2.277				4	68	99	6.60	7
27	2.117			400	7062	2.295				6	106	99	6.50	2
28	1.977			548	9036	2.158				14	231	97	6.60	
29	2.080			492	8535	2.231				8	139	98	6.60	
30	1.967	236	3872	176	2887	2.150	15	246	94	11	180	94	6.70	10
31														
	51.111													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.704	352	4898	378	5408	1.893	9	131	97	7	99	98	6.30	9
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	2.117	512	8318	636	9711	2.295	12	144		0	0		6.70	22
Limit							45	1422		45	1422		9.00	400

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Robert VanSickle, WWTP Operations Foreman

Signature / Date

(360) 757-4085 EX 2

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No. WA-002015-0 Discharge No. 1 Month December Year 2009

Facility Name City of Burlington Location 900 South Section St.

Receiving Water Skagit River Burlington, WA 98233

Plant Type Activated Sludge Check box if NO DISCHARGE for month ☐

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	2.098			228	3989	2.205				10	175	96	6.60	3
2	1.930	324	5215	204	3284	2.073	11	177	97	11	177	95	6.50	32
3	1.926			172	2763	2.232				11	177	94	6.50	35
4	1.907	184	2926	312	4962	2.033	13	207	93	9	143	97	6.50	11
5	1.859			492	7628	1.952				6	93	99	6.70	6
6	1.850			272	4197	1.955				11	170	96	6.80	
7	1.793	266	3978	212	3170	1.882	8	120	97	7	105	97	6.60	5
8	1.632			332	4519	1.913				5	68	98	6.60	42
9	1.703	287	4076	232	3295	1.968	18	256	94	17	241	93	6.70	193
10	1.683			476	6681	1.962				14	197	97	6.60	22
11	1.664	238	3303	232	3220	1.976	12	167	95	5	69	98	6.60	1
12	1.674			196	2736	2.001				9	69	97	6.80	
13	1.490			176	2187	1.940				9	112	95	6.70	
14	1.596	321	4273	420	5590	1.910	25	333	92	14	186	97	6.80	5
15	1.683			172	2414	1.929				11	154	94	6.50	9
16	1.660	269	3724	188	2603	1.966	12	166	96	13	180	93	6.80	29
17	1.605			272	3641	2.015				13	174	95	6.90	44
18	1.601	274	3659	348	4647	1.947	11	147	96	11	147	97	6.80	11
19	1.610			388	5210	1.947				1	13	100	6.70	
20	1.597			300	3996	1.744				12	160	96	6.80	
21	1.666	216	3001	444	6169	1.728	7	97	97	5	69	99	6.90	20
22	1.867			276	4298	2.067				20	311	93	6.70	22
23	1.761	303	4450	300	4406	1.839	11	162	96	13	191	96	6.80	20
24	1.736			584	8455	1.887				11	159	98	6.70	4
25	1.605	533	7135	572	7657	1.655	3	40	99	6	80	99	6.70	2
26	1.391			568	6589	1.446				2	23	100	6.60	
27	1.570			508	6652	1.667				6	79	99	6.60	
28	1.565	286	3733	280	3655	1.635	7	91	98	7	91	98	6.70	9
29	1.616			284	3828	1.799				8	108	97	6.40	29
30	1.565	315	4111	412	5377	1.612	8	104	97	7	91	98	6.70	1
31	1.498	305	3810	256	3198	1.552	7	87	98	6	75	98	6.70	33
Total	52.401													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.690	294	4100	326	4549	1.885	11	154	96	9	132	97	6.40	11
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	2.098	533	7135	584	8455	2.232	16	252		0	0		6.90	15
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Mail to: Department of Ecology, Northwest Regional Office, Water Quality, 3190 160th Ave SE Bellevue, WA 98008

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Robert VanSickle, WWTP Operations Foreman

Signature / Date

(360) 757-4085 EX 2

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No. WA-002015-0 Discharge No. 1 Month January Year 2010

Facility Name: City of Burlington Location: 900 South Section St.

Receiving Water: Skagit River Burlington, WA 98233

Plant Type: Activated Sludge Check box if NO DISCHARGE for month ☐

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.557			252	3272	1.716				7	91	97	6.80	1
2	1.499			316	3951	1.548				9	113	97	6.80	
3	1.640			400	5471	1.721				7	96	98	6.80	
4	1.700	304	4310	212	3006	1.776	7	99	98	8	113	96	6.60	20
5	2.250			208	3903	2.368				17	319	92	6.80	67
6	2.036	197	3345	340	5773	2.160	10	170	95	15	255	96	6.70	20
7	1.842			180	2765	1.930				7	108	96	6.80	29
8	1.809	261	3938	216	3259	1.926	6	91	98	5	75	98	6.80	55
9	1.956			228	3719	2.189				6	98	97	6.90	
10	1.905			188	2987	2.035				13	207	93	7.00	
11	1.858	136	2107	148	2293	1.960	7	108	95	7	108	95	6.80	11
12	1.904			148	2350	2.215				7	108	95	6.60	22
13	1.842	234	3595	240	3687	2.193	8	123	97	7	108	97	6.70	10
14	1.848			216	3329	2.195				17	262	92	6.80	18
15	1.880	289	4531	228	3575	2.002	10	157	97	15	235	93	6.80	11
16	1.864			216	3358	2.049				10	155	95	6.80	
17	1.831			152	2321	1.971				10	153	93	6.70	
18	1.733			156	2255	1.844				8	116	95	6.80	7
19	1.772			446	6591	1.916				12	177	97	6.70	11
20	1.698	313	4432	192	2719	1.813	6	85	98	5	71	97	6.70	1
21	1.647	346	4753	256	3516	1.792	11	151	97	13	179	95	6.50	22
22	1.611	235	3157	208	2795	1.875	14	188	94	18	242	91	6.80	64
23	1.596			552	7347	1.914				16	213	97	6.80	
24	1.628			364	4942	1.926				6	81	98	6.80	
25	1.612	284	3818	200	2689	1.878	13	175	95	20	269	90	6.80	11
26	1.540			288	3699	1.818				10	128	97	6.90	73
27	1.509	280	3524	320	4027	1.880	11	138	96	20	252	94	6.90	20
28	1.518			264	3342	1.813				7	89	97	6.80	98
29	1.498	235	2936	220	2749	1.870	14	175	94	16	200	93	6.80	13
30	1.526			352	4480	1.814				25	318	93	6.80	
31	1.564			284	3704	1.835				23	300	92	6.80	
Total	53.673													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.731	260	3704	258	3673	1.934	10	138	96	12	169	95	6.50	17
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	2.250	346	4753	552	7347	2.368	13	163		0	0		7.00	34
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Robert VanSickle, WWTP Operations Foreman

Signature / Date

(360) 757-4085 EX 2

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	February
Year	2010				
Facility Name	City of Burlington			Location	900 South Section St.
Receiving Water	Skagit River				Burlington, WA 98233
Plant Type	Activated Sludge				Check box if NO DISCHARGE for month

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.610	253	3397	220	2954	1.887	13	175	95	17	228	92	6.80	13
2	1.563			280	3650	1.851				8	104	97	6.80	62
3	1.587	273	3613	212	2806	1.847	12	159	96	11	146	95	6.80	51
4	1.593			300	3986	1.929				15	199	95	6.90	37
5	1.486	476	5899	280	3470	1.764	14	174	97	12	149	96	6.90	20
6	1.521			256	3247	1.636				9	114	96	6.90	
7	1.472			236	2897	1.530				9	110	96	6.80	
8	1.452	293	3548	240	2906	1.461	10	121	97	9	109	96	6.80	
9	1.447			268	3234	1.618				9	109	97	6.90	20
10	1.466	286	3497	248	3032	1.539	9	110	97	10	122	96	6.40	10
11	1.508	293	3685	336	4226	1.527	10	126	97	9	113	97	6.40	10
12	1.434			384	4592	1.446				4	113	98	6.60	3
13	1.476			376	4628	1.606				18	222	95	7.00	6
14	1.475			368	4527	1.510				15	185	96	6.90	
15	1.479			376	4638	1.515				16	197	96	6.80	
16	1.525			160	2035	1.573				9	114	94	6.60	
17	1.567	315	4117	264	3450	1.611	8	105	97	9	118	97	6.70	20
18	1.534	278	3557	296	3787	1.564	8	102	97	9	115	97	6.60	9
19	1.483	285	3525	284	3513	1.658	9	111	97	12	148	96	6.70	31
20	1.429			268	3194	1.596				12	143	96	6.70	77
21	1.470			216	2648	1.506				13	159	94	6.60	83
22	1.412	295	3474	240	2826	1.461	11	130	96	12	141	95	6.50	
23	1.425			208	2472	1.473				11	131	95	6.40	23
24	1.500	184	2302	380	4754	1.541	6	75	97	10	125	97	6.60	27
25	1.530			200	2552	1.705				15	191	93	6.80	5
26	1.482	283	3498	212	2620	1.728	7	87	98	15	185	93	6.60	20
27	1.531			496	6333	1.786				7	89	99	6.70	123
28	1.515			464	5863	1.748				5	63	99	6.90	
29														
30														
31														
Total	41.972													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.499	293	3676	288	3601	1.629	10	123	97	11	141	96	6.40	21
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.610	476	5899	496	6333	1.929	13	169		0	0		7.00	32
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Robert VanSickle, WWTP Operations Foreman

Signature / Date

(360) 757-4085 EX 2

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No. WA-002015-0 — Discharge No. 1 — Month Mar-10 — Year 2010

Facility Name: City of Burlington — Location: 900 South Section St., Burlington, WA 98233

Receiving Water: Skagit River

Plant Type: Activated Sludge — Check box if NO DISCHARGE for month [ ]

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.492	331	4119	260	3235	1.761	8	100	98	11	137	96	6.70	10
2	1.485			272	3369	1.864				9	111	97	6.80	5
3	1.535	234	2996	252	3226	1.804	7	90	97	8	102	97	6.40	60
4	1.533			248	3171	1.801				9	115	96	6.50	15
5	1.480	283	3493	220	2716	1.782	17	210	94	11	136	95	6.60	20
6	1.425			276	3280	1.618				5	59	98	6.50	
7	1.364			240	2730	1.401				4	46	98	6.60	
8	1.433	426	5091	248	2964	1.440	10	120	98	14	167	94	6.70	20
9	1.476			240	2954	1.505				14	172	94	6.60	24
10	1.435	403	4823	376	4500	1.459	11	132	97	13	156	97	6.50	17
11	1.429			264	3146	1.463				13	155	95	6.60	5
12	1.516	316	3995	220	2782	1.631	12	152	96	17	155	94	6.80	1
13	1.596			284	3780	1.318				17	226	94	6.40	
14	1.455			180	2184	1.481				13	158	93	6.70	
15	1.511	257	3239	248	3125	1.542	4	50	98	6	76	98	6.70	3
16	1.457			304	3694	1.607				9	109	97	6.70	9
17	1.513	346	4366	384	4845	1.531	5	63	99	6	76	98	6.70	1
18	1.458			232	2821	1.508				5	61	98	6.40	2
19	1.448	157	1896	224	2705	1.492	3	36	98	5	60	98	6.90	3
20	1.280			240	2562	1.355				7	75	97	6.70	
21	1.322			216	2382	1.352				4	44	98	6.70	
22	1.396			280	3260	1.415				5	58	98	6.60	9
23	1.423			248	2943	1.468				4	47	98	6.60	49
24	1.377	351	4031	200	2297	1.439	5	57	99	5	57	98	6.30	27
25	1.367	369	4207	244	2782	1.548	5	57	99	6	68	98	6.70	33
26	1.497	317	3958	240	2996	1.524	5	62	98	4	50	98	6.60	51
27	1.440			272	3267	1.559				6	72	98	6.60	
28	1.414			228	2689	1.461				5	59	98	6.60	
29	1.493	299	3723	220	2739	1.515	4	50	99	6	75	97	6.60	3
30	1.559			324	4213	1.821				5	65	98	6.70	1
31	1.452	281	3403	304	3681	1.771	5	61	98	6	73	98	6.60	1
Total	45.061													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.454	312	3810	258	3130	1.556	7	88	98	8	97	97	6.30	8
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.596	426	5091	384	4845	1.864	11	135		0	0		6.90	28
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Robert VanSickle, WWTP Operations Foreman

Signature / Date

(360) 757-4085 EX 2

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	April	Year	2010
Facility Name	City of Burlington			Location	900 South Section St.		
Receiving Water	Skagit River				Burlington, WA 98233		
Plant Type	Activated Sludge				Check box if NO DISCHARGE for month		

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.434			288	3444	1.708				5	60	98	6.60	18
2	1.467	276	3377	192	2349	1.845	6	73	98	7	86	96	6.80	3
3	1.402			212	2479	1.708				3	35	99	6.70	
4	1.402			272	3180	1.708				9	105	97	6.70	
5	1.318	315	3463	224	2462	1.615	4	44	99	3	33	99	6.50	4
6	1.365			344	3916	1.639				3	34	99	6.40	10
7	1.298	319	3453	224	2425	1.732	5	54	98	4	43	98	6.60	7
8	1.603			328	4385	1.643				5	67	98	6.50	9
9	1.593	285	3786	240	3189	1.661	4	53	99	3	40	99	6.60	7
10	1.494			380	4735	1.680				2	25	99	6.70	
11	1.425			344	4088	1.475				7	83	98	6.60	
12	1.420	358	4240	284	3363	1.471	6	71	98	7	83	98	6.60	25
13	1.465			268	3274	1.504				4	49	99	6.60	10
14	1.428	232	2763	268	3192	1.477	5	60	98	5	60	98	6.60	13
15	1.406			224	2627	1.471				3	35	99	6.50	40
16	1.465	332	4056	276	3372	1.619	5	61	98	2	24	99	6.70	40
17	1.409			216	2538	1.467				2	24	99	6.50	
18	1.426			132	1570	1.467				1	12	99	6.50	
19	1.358	393	4451	240	2718	1.427	5	57	99	6	68	98	6.60	4
20	1.368			288	3286	1.562				2	23	99	6.60	4
21	1.485	362	4483	244	3022	1.540	6	74	98	7	87	97	6.70	7
22	1.550			412	5326	1.609				17	220	96	6.60	3
23	1.430	159	1896	316	3769	1.511	4	48	97	5	60	98	6.60	2
24	1.493			252	3138	1.631				13	162	95	6.80	
25	1.509			300	3776	1.547				7	88	98	6.70	
26	1.494	353	4398	272	3389	1.547	3	37	99	4	50	99	6.50	1
27	1.511			408	5142	1.566				3	38	99	6.50	1
28	1.500	428	5354	408	5104	1.551	5	63	99	5	63	99	6.60	1
29	1.457			540	6562	1.859				4	49	99	6.60	13
30	1.446	339	4088	280	3377	1.811	16	193	95	13	157	95	6.50	7
31														
Total	43.421													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	13
Monthly	1.447	319	3832	289	3507	1.602	6	68	98	5	65	98	6.40	22
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.603	428	5354	540	6562	1.859	7	80		0	0		6.80	7
Limit							45	1422		45	1422		9.00	400

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Robert VanSickle, WWTP Operations Foreman

Signature / Date

(360) 757-4085 EX 2

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	May	Year	2010
Facility Name	City of Burlington			Location	900 South Section St.		
Receiving Water	Skagit River				Burlington, WA 98233		
Plant Type	Activated Sludge				Check box if NO DISCHARGE for month		

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.432			280	3344	1.680				10	119	96	6.40	
2	1.521			196	2486	1.794				11	140	94	6.50	
3	1.712	313	4469	256	3655	1.904	7	100	98	9	129	96	6.60	183
4	1.627			204	2768	1.912				11	149	95	6.40	5
5	1.563	260	3389	248	3233	1.843	5	65	98	11	143	96	6.30	9
6	1.544			352	4533	1.920				6	77	98	6.70	9
7	1.469	312	3822	332	4067	1.730	10	123	97	9	110	97	6.30	31
8	1.449			296	3577	1.645				6	73	98	6.30	
9	1.491			316	3929	1.551				6	75	98	6.30	
10	1.440	334	4011	248	2978	1.500	7	84	98	12	144	95	6.60	13
11	1.457			284	3451	1.806				11	134	96	6.60	77
12	1.342	371	4152	288	3223	1.401	10	112	97	11	134	96	6.60	17
13	1.416			352	4157	1.473				15	177	96	6.50	33
14	1.415	354	4178	256	3021	1.603	14	165	96	19	224	93	6.50	7
15	1.384			444	5125	1.452				5	58	99	6.60	
16	1.405			480	5624	1.457				7	82	99	6.50	
17	1.409	344	4042	244	2867	1.459	22	259	94	20	235	92	6.60	47
18	1.366			348	3965	1.418				15	171	96	6.60	53
19	1.372	331	3787	444	5080	1.404	15	172	95	20	229	95	6.60	40
20	1.438			332	3982	1.506				20	240	94	6.40	33
21	1.378	361	4149	320	3678	1.593	17	195	95	23	264	93	6.70	67
22	1.386			260	3005	1.474				34	393	87	6.40	
23	1.442			244	2934	1.518				32	385	87	6.50	
24	1.454	380	4608	256	3104	1.526	16	194	96	31	376	88	6.50	10
25	1.398			264	3078	1.486				16	187	94	6.60	87
26	1.338	332	3705	252	2812	1.505	15	167	95	21	234	92	6.70	40
27	1.467			332	4062	1.605				32	392	90	6.60	13
28	1.794	507	7586	524	7840	2.154	10	150	98	9	135	98	6.60	246
29	2.138			432	7703	2.392				21	374	95	6.80	
30	2.013			188	3156	2.153				11	185	94	6.70	
31	1.822	179	2720	180	2735	1.960	9	137	95	15	228	92	6.80	1
Total	46.882													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.512	337	4201	305	3844	1.672	12	148	96	15	193	94	6.30	25
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	2.138	507	7586	524	7840	2.392	18	209		0	0		6.80	41
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Robert VanSickle, WWTP Operations Foreman

Signature / Date

(360) 757-4085 EX 2

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	June	Year	2010
Facility Name	City of Burlington			Location	900 South Section St.
Receiving Water	Skagit River				Burlington, WA 98233
Plant Type	Activated Sludge				Check box if NO DISCHARGE for month

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.959			600	9803	2.095				24	392	96	6.70	10
2	1.887	273	4296	244	3840	2.115	17	268	94	15	236	94	6.70	1
3	1.859			476	7380	2.203				4	62	99	6.70	33
4	1.743	478	6949	528	7675	2.112	4	58	99	9	131	98	6.60	7
5	1.760			296	4345	2.174				37	543	88	6.60	
6	1.703			264	3750	2.099				5	71	98	6.50	
7	1.766	446	6569	540	7953	2.127	3	44	99	10	147	98	6.70	8
8	1.672			328	4574	1.883				3	42	99	6.70	14
9	1.691	309	4358	308	4344	2.029	13	183	96	14	197	95	6.60	9
10	1.869			220	3429	2.292				9	140	96	6.80	13
11	1.739	236	3423	200	2901	1.874	9	131	96	5	73	98	6.80	2
12	1.633			460	6265	1.728				6	73	99	6.80	
13	1.600			532	7099	1.705				5	67	99	6.70	
14	1.545	308	3969	188	2422	1.652	9	116	97	4	52	98	6.70	3
15	1.547			216	2787	1.695				4	52	98	6.60	3
16	1.494	284	3539	280	3489	1.577	9	112	97	5	62	98	6.50	36
17	1.479			444	5477	1.556				4	49	99	6.60	5
18	1.454	455	5517	190	2304	1.493	8	97	98	1	12	99	6.70	5
19	1.375			262	3004	1.573				11	126	96	6.60	
20	1.446			242	2918	1.503				7	84	97	6.70	
21	1.443	386	4645	240	2888	1.468	7	84	98	3	36	99	6.60	8
22	1.462			260	3170	1.518				5	61	98	6.70	87
23	1.304	320	3480	280	3045	1.378	8	87	98	6	65	98	6.70	5
24	1.502			460	5762	1.617				5	63	99	6.70	13
25	1.526	290	3691	264	3360	1.794	13	165	96	7	89	97	6.70	4
26	1.507			208	2614	1.611				4	50	98	6.70	
27	1.485			268	3319	1.582				7	87	97	6.70	
28	1.470	349	4279	244	2991	1.544	9	110	97	5	61	98	6.80	27
29	1.472			268	3290	1.590				7	86	97	6.80	62
30	1.446	352	4245	284	3425	1.549	13	157	96	5	60	98	6.70	10
31														
Total	47.838													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.595	345	4535	320	4321	1.771	9	124	97	8	109	97	6.50	8
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.959	478	6949	600	9803	2.292	10	143		0	0		6.80	26
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Robert VanSickle, WWTP Operations Foreman

Signature / Date

(360) 757-4085 EX 2

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	July
Year	2010				
Facility Name	City of Burlington			Location	900 South Section St.
Receiving Water	Skagit River				Burlington, WA 98233
Plant Type	Activated Sludge			Check box if NO DISCHARGE for month	☐

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.397			272	3169	1.640				10	117	96	6.80	43
2	1.493	336	4184	292	3636	1.581	13	162	96	3	37	99	6.70	20
3	1.416			512	6046	1.595				5	59	99	6.70	
4	1.398			192	2239	1.501				11	128	94	6.70	
5	1.322	471	5193	488	5380	1.390	10	110	98	2	22	100	6.70	2
6	1.432			272	3248	1.527				9	107	97	6.60	7
7	1.431	342	4082	268	3198	1.698	15	179	96	8	95	97	6.80	13
8	1.434			248	2966	1.769				9	108	96	6.70	40
9	1.369	348	3973	360	4110	1.721	12	137	97	6	69	98	6.70	20
10	1.378			228	2620	1.709				7	80	97	6.60	
11	1.391			212	2459	1.692				5	58	98	6.70	
12	1.367	310	3534	264	3010	1.657	12	137	96	6	58	98	6.60	1
13	1.496			300	3743	1.753				5	62	98	6.60	7
14	1.392	354	4110	308	3576	1.711	9	104	97	11	128	96	6.50	13
15	1.374			308	3529	1.803				17	195	94	6.40	60
16	1.331	278	3086	244	2709	1.594	9	100	97	12	133	95	6.40	30
17	1.366			544	6197	1.671				4	46	99	6.50	
18	1.372			444	5080	1.661				7	80	98	6.60	
19	1.395	270	3141	254	2955	1.690	3	35	99	3	35	99	6.50	1
20	1.368			304	3468	1.646				10	114	97	6.20	3
21	1.346	305	3424	292	3278	1.412	8	90	97	16	180	95	6.50	7
22	1.180			256	2519	1.249				9	89	96	6.70	8
23	1.163	296	2871	296	2871	1.177	5	48	98	3	29	99	6.80	3
24	1.178			376	3694	1.309				2	20	99	6.40	
25	1.138			254	2411	1.172				2	19	99	6.50	
26	1.148	377	3610	272	2604	1.162	5	48	99	8	77	97	6.70	8
27	1.123			288	2697	1.168				7	66	98	6.50	1
28	1.288	457	4909	400	4297	1.344	18	193	96	9	97	98	6.50	13
29	1.284			288	3084	1.317				8	86	97	6.50	1
30	1.356	333	3766	296	3347	1.529	6	68	98	12	136	96	6.40	7
31	1.309			304	3319	1.367				15	160	95	6.50	
Total	41.435													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.337	344	3837	311	3467	1.523	10	109	97	8	87	97	6.20	7
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.496	471	5193	544	6197	1.803	13	150		0	0		6.80	10
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Robert VanSickle, WWTP Operations Foreman

Signature / Date

(360) 757-4085 EX 2

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	August	Year	2010
Facility Name	City of Burlington			Location	900 South Section St.		
Receiving Water	Skagit River				Burlington, WA 98233		
Plant Type	Activated Sludge				Check box if NO DISCHARGE for month		

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.357			288	3259	1.399				7	79	98	6.50	
2	1.334	390	4339	288	3204	1.362	6	67	98	9	100	97	6.40	1
3	1.296			312	3372	1.354				9	97	97	6.60	18
4	1.286	344	3689	284	3046	1.329	4	43	99	7	75	98	6.30	1
5	1.304			268	2915	1.487				10	109	96	6.40	9
6	1.299	416	4507	280	3033	1.337	6	65	99	9	98	97	6.50	26
7	1.349			404	4545	1.363				8	90	98	7.00	
8	1.438			348	4174	1.465				6	72	98	7.00	
9	1.309	344	3755	260	2838	1.355	3	33	99	7	76	97	6.60	1
10	1.345			296	3320	1.556				6	67	98	6.50	16
11	1.299	474	5135	400	4333	1.566	4	43	99	8	87	98	6.40	56
12	1.292			376	4052	1.673				9	87	98	6.20	24
13	1.294	395	4263	252	2720	1.603	6	65	98	7	76	97	6.40	53
14	1.293			244	2631	1.609				7	75	97	6.40	
15	1.288			244	2621	1.619				8	86	97	6.50	
16	1.273	411	4364	244	2591	1.607	8	85	98	9	96	96	6.60	47
17	1.253			320	3344	1.606				10	105	97	6.50	63
18	1.256	399	4180	272	2849	1.408	6	63		6	63	98	6.60	1
19	1.260			328	3447	1.499				13	137	96	6.30	37
20	1.295	402	4342	436	4709	1.418	6	65	99	10	108	98	6.50	3
21	1.216			500	5071	1.326				8	81	98	6.60	
22	1.197			356	3554	1.299				8	80	98	6.50	
23	1.257	475	4980	500	5242	1.333	4	42	99	6	63	99	6.50	7
24	1.212			576	5822	1.449				15	152	97	6.30	5
25	1.209	336	3388	320	3227	1.322	6	60	98	11	111	97	6.40	60
26	1.073			356	3186	1.182				6	54	98	6.50	15
27	1.273	457	4852	420	4459	1.394	5	53	99	9	96	98	6.50	13
28	1.215			272	2756	1.488				11	111	96	6.50	
29	1.184			188	1856	1.351				11	109	94	6.60	
30	1.262	328	3452	244	2568	1.428	6	63	98	11	116	95	6.60	30
31	1.155			272	2620	1.330				13	125	95	6.40	11
Total	39.373													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.270	398	4250	327	3463	1.436	5	57	99	9	93	97	6.20	11
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.438	475	5135	576	5822	1.673	7	71		0	0		7.00	16
Limit							45	1422		45	1422		9.00	400

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Robert VanSickle, WWTP Operations Foreman

Signature / Date

(360) 757-4085 EX 2

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No. 1	Month	September	Year 2010
Facility Name	City of Burlington		Location	900 South Section St.	
Receiving Water	Skagit River			Burlington, WA 98233	
Plant Type	Activated Sludge			Check box if NO DISCHARGE for month	☐

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.366	444	5058	400	4557	1.495	6	68	99	24	273	94	6.60	79
2	1.182			292	2879	1.385				12	118	96	6.40	14
3	1.158	408	3940	292	2820	1.410	11	106	97	19	183	93	6.50	7
4	1.169			312	3042	1.301				5	49	98	6.50	
5	1.163			408	3957	1.280				3	29	99	6.50	
6	1.186	353	3492	380	3759	1.308	2	20	99	1	10	100	6.50	4
7	1.593			256	3401	1.754				10	133	96	6.70	1
8	1.391	354	4107	288	3341	1.688	7	81	98	11	128	96	6.50	30
9	1.207			296	2980	1.507				8	81	97	6.60	78
10	1.203	390	3913	380	3813	1.648	6	60	98	7	70	98	6.60	25
11	1.175			280	2744	1.393				9	88	97	6.60	
12	1.194			252	2509	1.482				7	88	96	6.90	
13	1.257	385	4036	364	3816	1.529	7	73	98	9	94	98	6.60	40
14	1.150			364	3491	1.458				8	77	98	6.60	138
15	1.125	309	2899	232	2177	1.410	6	56	98	7	66	97	6.60	25
16	1.154			304	2926	1.250				8	77	97	6.50	7
17	1.136	437	4140	308	2918	1.298	7	66	98	9	85	97	6.60	4
18	1.190			252	2501	1.228				8	79	97	6.50	
19	1.312			236	2582	1.380				8	88	97	6.70	
20	1.303	344	3738	248	2695	1.351	6	65	98	9	98	96	6.70	7
21	1.395			264	3071	1.457				9	105	97	6.70	18
22	1.214	364	3685	304	3078	1.452	13	132	96	13	132	96	6.70	
23	1.231			256	2628	1.319				9	92	96	6.50	230
24	1.292	538	5797	328	3534	1.342	6	65	99	8	86	98	6.60	3
25	1.291			280	3015	1.342				4	43	99	6.60	1
26	1.309			460	5022	1.413				5	55	99	6.50	
27	1.396			192	2235	1.470				8	93	96	6.70	8
28	1.344			196	2197	1.547				11	123	94	6.60	18
29	1.273	305	3238	304	3228	1.373	6	64	98	9	96	97	6.60	1
30	1.303	333	3619	316	3434	1.423	5	54	98	7	76	98	6.40	5
31														
Total	37.662													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.255	382	3974	301	3145	1.423	7	70	98	9	94	97	6.40	10
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.593	538	5797	460	5022	1.754	8	87		0	0		6.90	21
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Don Erickson, Foreman

Signature / Date

(360) 757-4085 EX 2

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	October
Facility Name	City of Burlington			Location	900 South Section St. Burlington, WA 98233
Receiving Water	Skagit River			Year	2010
Plant Type	Activated Sludge			Check box if NO DISCHARGE for month	☐

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.321	316	3481	292	3217	1.421	3	33	99	3	33	99	6.50	1
2	1.312			296	3239	1.522				5	55	98	6.50	
3	1.331			252	2797	1.426				3	33	99	6.50	
4	1.395	264	3071	236	2746	1.468	6	70	98	7	81	97	6.60	3
5	1.248			332	3456	1.512				7	73	98	6.60	23
6	1.180	330	3248	272	2677	1.467	4	39	99	9	89	97	6.50	64
7	1.150			340	3261	1.443				5	48	99	6.50	6
8	1.225	205	2094	288	2942	1.597	7	72	97	9	92	97	6.50	4
9	1.301			160	1736	1.538				3	33	98	6.50	
10	1.437			252	3020	1.703				4	48	98	6.60	
11	1.385			284	3280	1.688				11	127	96	6.50	1
12	1.316			292	3205	1.599				9	127	96	6.60	1
13	1.247	238	2475	304	3162	1.498	7	73	97	11	114	96	6.50	8
14	1.169	330	3217	332	3237	1.535	6	58	98	9	88	97	6.40	10
15	1.211	460	4646	336	3394	1.273	6	61	99	14	141	96	6.50	2
16	1.202			296	2967	1.224				7	70	98	6.90	
17	1.202			292	2927	1.244			96	7	70	98	6.60	
18	1.239	240	2480	320	3307	1.239	10	103		11	114	97	6.50	1
19	1.241			320	3312	1.212				9	93	97	6.40	28
20	1.202	343	3438	296	2967	1.357	8	80	98	11	110	96	6.40	10
21	1.173			184	1800	1.235				7	68	96	6.50	22
22	1.184	275	2716	440	4345	1.166	7	69	97	12	118	97	6.50	1
23	1.186			228	2255	1.195				9	89	96	6.50	
24	1.226			292	2986	1.231				10	102	97	6.60	
25	1.279	452	4621	420	4480	1.272	4	43	99	6	64	99	6.50	1
26	1.342			240	2686	1.166				5	56	98	6.50	1
27	1.270	202	2140	252	2669	1.276	7	74	97	9	95	96	6.40	5
28	1.228	433	4435	284	2909	1.259	6	61	99	11	113	96	6.50	3
29	1.243			296	3069	1.248				3	31	99	6.50	1
30	1.204			388	3896	1.309				5	50	99	6.40	
31	1.306			212	2309	1.313				5	54	98	6.40	
Total	38.955													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.257	314	3251	291	3040	1.375	6	64	98	8	80	97	6.40	3
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.437	460	4821	440	4480	1.703	8	84		0	0		6.90	10
Limit							45	1422		45	1422		9.00	400

AVG=Average AVW =Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

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Robert VanSickle, WWTP Operations Foreman

Signature / Date

(360) 757-4085 EX 2

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No.	1	Month	November
Year	2010				
Facility Name	City of Burlington			Location	900 South Section St.
Receiving Water	Skagit River				Burlington, WA 98233
Plant Type	Activated Sludge			Check box if NO DISCHARGE for month	

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.294	398	4295	356	3842	1.280	9	97	98	16	173	96	6.60	42
2	1.431			240	2864	1.629				15	179	94	6.40	7
3	1.371	209	2390	320	3659	1.609	6	69	97	11	126	97	6.50	3
4	1.270			272	2881	1.529				6	64	98	6.30	45
5	1.312	336	3677	268	2932	1.658	5	55	99	3	33	99	6.70	23
6	1.278			268	2856	1.472				3	32	99	6.60	
7	1.355			248	2803	1.578				2	23	99	6.60	
8	1.580	327	4309	208	2741	1.814	4	53	99	9	119	96	6.60	46
9	1.540			304	3904	1.759				9	116	97	6.40	7
10	1.510	309	3891	412	5188	1.554	5	63	98	11	139	97	6.60	13
11	1.350			196	2207	1.363				8	90	96	6.60	6
12	1.465	384	4692	232	2835	1.452	4	49	99	9	90	97	6.50	8
13	1.368			248	2829	1.427				2	23	99	6.70	
14	1.395			196	2280	1.389				3	35	98	6.80	
15	1.426	327	3889	248	2949	1.426	5	59	98	9	107	96	6.60	16
16	1.551			352	4553	1.549				8	103	98	6.60	49
17	1.519	389	4928	232	2939	1.516	6	76	98	11	139	95	6.40	4
18	1.631			224	3047	1.621				11	150	95	6.50	2
19	1.605	209	2798	168	2249	1.728	6	80	97	9	120	95	6.50	3
20	1.534			228	2917	1.533				15	192	93	6.60	
21	1.503			200	2507	1.524				9	113	96	6.60	
22	1.502	204	2555	172	2155	1.507	4	50	98	8	100	95	6.60	1
23	1.441			276	3317	1.429				10	120	96	6.60	1
24	1.421	166	1967	232	2749	1.568	6	71	96	13	154	94	6.60	3
25	1.377			244	2802	1.438				10	115	96	6.60	1
26	1.305	190	2068	192	2090	1.324	4	44	98	9	98	95	6.70	1
27	1.389			376	4356	1.425				5	58	99	6.90	
28	1.485			272	3369	1.535				9	111	97	6.90	
29	1.536	208	2665	236	3023	1.578	5	64	98	10	128	96	6.80	1
30	1.520			240	3042	1.556				8	101	97	6.60	1
31														
Total	43.264													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.442	281	3394	255	3063	1.526	5	64	98	9	105	96	6.30	5
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	1.631	398	4928	412	5188	1.814	7	74		0	0		6.90	15
Limit							45	1422		45	1422		9.00	400

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Robert VanSickle, WWTP Operations Foreman

Signature / Date

(360) 757-4085 EX 2

Phone Number

WASTEWATER TREATMENT PLANT MONITORING REPORT

Permit No.	WA-002015-0	Discharge No. 1	Month	December	Year 2010
Facility Name	City of Burlington		Location	900 South Section St.	
Receiving Water	Skagit River			Burlington, WA 98233	
Plant Type	Activated Sludge			Check box if NO DISCHARGE for month	☐

	INFLUENT					EFFLUENT								
Frequency	Measure	3/week	Calc.	3/week	Calc.	Measure	3/week	Calc.	Calc.	3/week	Calc.	Calc.	Daily	5/Week
Type	On-Line	24-HC	Daily	24-HC	Daily	On-Line	24-HC	Daily	1/month	24-HC	Daily	1/month	Grab	Grab
Units	MGD	MG/L	LBS/DAY	MG/L	LBS/DAY	MGD	MG/L	LBS/DAY	% REMOVAL	MG/L	LBS/DAY	% REMOVAL	STANDARD UNITS	#/100 ML
Day of the Month	FLOW	BOD 5-DAY	BOD 5-DAY	TSS	TSS	FLOW	BOD 5-DAY	BOD 5-DAY	BOD 5-DAY	TSS	TSS	TSS	pH	FECAL COLIFORM
1	1.617	171	2306	216	2913	2.000	6	81	96	16	216	93	6.90	1
2	1.572			256	3356	1.808				14	184	95	6.70	3
3	1.473	256	3145	228	2801	1.815	9	111	96	12	147	95	6.90	7
4	1.482			172	2126	1.707				3	37	98	6.70	
5	1.456	285	3461	216	2623	1.709	6	73	98	2	24	99	6.80	
6	1.458			268	3259	1.720				21	255	92	6.90	5
7	1.426			252	2997	1.692				14	166	94	6.70	12
8	1.369	284	3243	184	2101	1.733	9	103	97	13	148	93	7.00	17
9	1.625			520	7047	1.708				8	108	98	6.90	7
10	1.710	293	4179	220	3138	2.064	8	114	97	9	128	96	7.00	1
11	1.671			428	5965	1.950				3	42	99	6.70	
12	2.140			432	7710	2.519				6	42	99	6.70	
13	2.638			240	5280	3.257				14	308	94	6.80	7
14	2.386	181	3602	172	3423	2.693	5	99	97	17	338	90	6.60	44
15	2.130	187	3322	188	3340	2.218	7	124	96	9	160	95	6.80	11
16	1.949			220	3576	2.086				7	114	97	6.60	1
17	1.871	252	3932	268	4182	2.033	4	62		3	47	99	6.70	4
18	1.772			196	2897	1.849			98	7	103	96	6.70	
19	1.742			176	2557	1.801				5	73	97	6.70	
20	1.681	272	3813	220	3084	1.730	5	70	98	5	70	98	6.80	5
21	1.700	340	4821	316	4480	1.920	6	85	98	3	43	99	6.80	1
22	1.598	300	3998	248	3305	1.650	5	67	98	7	93	97	6.60	10
23	1.582			236	3114	1.769				1	13	100	6.80	1
24	1.622			232	3138	1.681				5	68	98	6.60	5
25	1.523			224	2845	1.567				9	114	96	6.70	
26	1.347			200	2247	1.391				3	34	99	6.80	
27	1.564	276	3600	224	2922	1.614	6	78	98	5	65	98	6.50	3
28	1.588			224	2967	1.772				5	66	98	6.90	4
29	1.586	248	3280	240	3175	1.646	7	93	97	6	79	98	6.80	5
30	1.588	157	2079	208	2755	1.631	8	106	95	6	79	97	6.80	3
31	1.548			460	5939	1.916				4	52	99	6.80	13
Total	52.414													
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	MIN	GEM
Monthly	1.691	250	3484	254	3589	1.892	7	90	97	8	110	97	6.50	5
Limit	3.790		7356		7660		30	948	>85%	30	948	>85%	6.20	200
	MAX	MAX	MAX	MAX	MAX	MAX	AVW	AVW		AVW	AVW		MAX	GEM 7
Monthly	2.638	340	4821	520	7710	3.257	8	105		0	0		7.00	7
Limit							45	1422		45	1422		9.00	400

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Robert VanSickle, WWTP Operations Foreman

Signature / Date

(360) 757-4085 EX 2

Phone Number

APPENDIX E

HYDRAULIC MODEL FLOW INPUTS

Sewer Model Manhole Flow Inputs

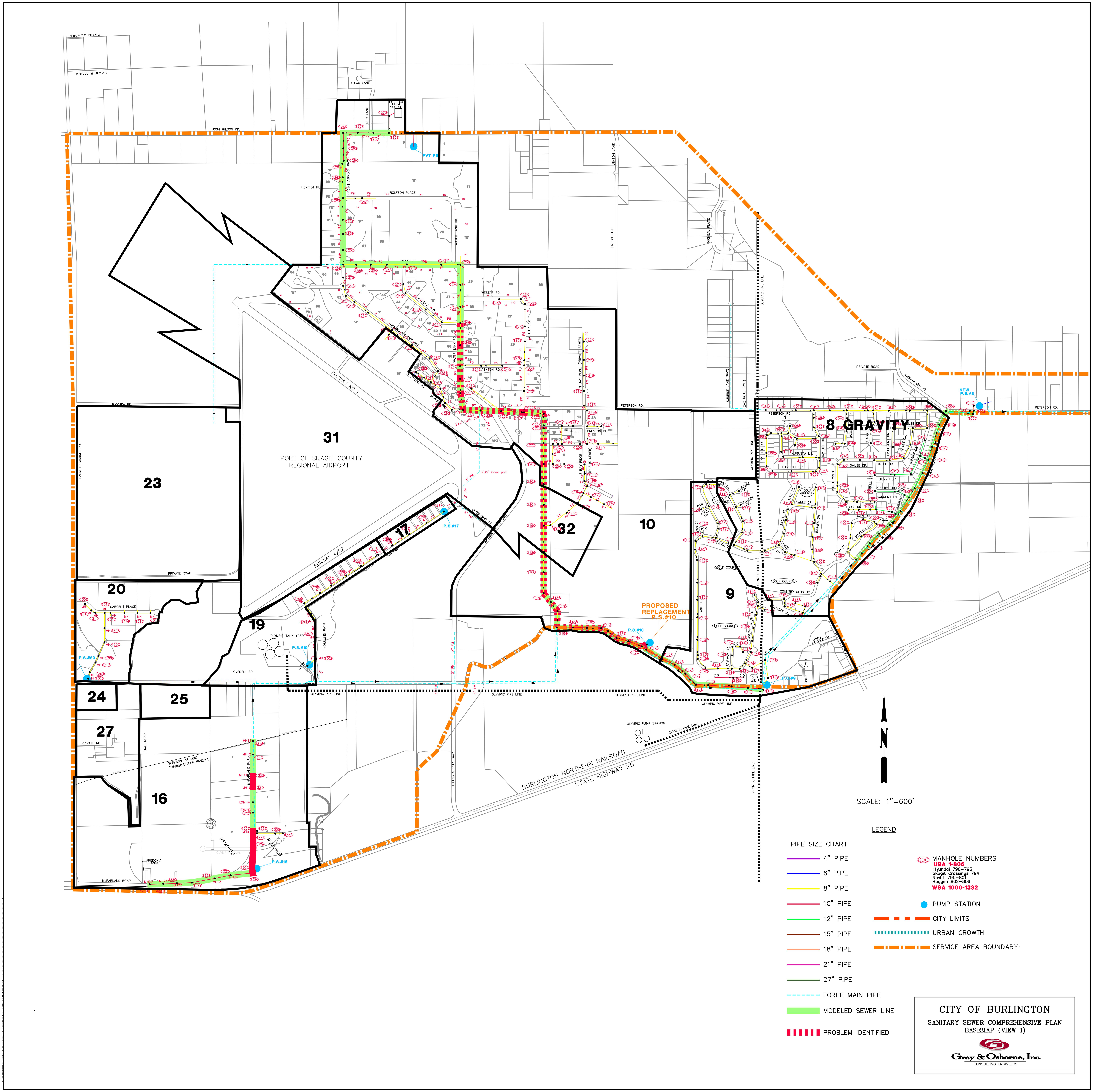
City Manhole Number	Sewer Manhole Number	Flow Description	Percentage	Drainage Basin	Drainage Basin Peak Hour Flow with I/I (gpm)	Manhole Peak Hour Flow with I/I (gpm)
1332	MH-1332	1/2 LS#16 Gravity Flow	50%	16	641	321
1318	MH-1318	1/2 LS#16 Gravity Flow	50%	16	641	321
1323	MH-1323	Drainage Basin #30 Flows	100%	30	276	276
1269	MH-1269	1/10 Drainage Basin #10 Gravity Flow	10%	10	1,082	108
1260	MH-1260	Drainage Basin #29 Flow	100%	29	186	186
1250	MH-1250	2/10 Drainage Basin #10 Gravity Flow	20%	10	1,082	216
1239	MH-1239	2/10 Drainage Basin #10 Gravity Flow	20%	10	1,082	216
1238	MH-1238	Drainage Basin #31 Flow	100%	31	0	0
1225	MH-1225	2/10 Drainage Basin #10 Gravity Flow	20%	10	1,082	216
1202	MH-1202	Drainage Bain #32 Flow	100%	32	0	0
1190	MH-1190	1/10 Drainage Basin #10 Gravity Flow	10%	10	1,082	108
1184	MH-1184	2/10 Drainage Basin #10 Gravity Flow	20%	10	1,082	216
1184	MH-1184	Drainage Basin #16 Flow	100%	16	988	988
1184	MH-1184	Drainage Basin #20 Flow	100%	20	1,072	1,072
1086	MH-1086	Drainage Basin #9 Flow	100%	9	394	394
464	MH-464	1/4 Drainage Basin #13 Flow	25%	13	578	144
458	MH-458	Drainage Basin #44 Flow	100%	44	118	118
456	MH-456	1/4 Drainage Basin #13 Flow	25%	13	578	144
445	MH-445	1/4 Drainage Basin #13 Flow	25%	13	578	144
435	MH-435	1/4 Drainage Basin #13 Flow	25%	13	578	144
438	MH-438	Drainage Bain #12 Flow	100%	12	100	100
538	MH-538	2/10 Drainage Basin #11 Flow	20%	11	1,927	385
441	MH-441	Drainage Basin #35 Flow	100%	35	169	169
542	MH-542	1/10 Drainage Basin #11 Flow	10%	11	1,927	193
545	MH-545	1/10 Drainage Basin #11 Flow	10%	11	1,927	193
531	MH-531	1/10 Drainage Basin #11 Flow	10%	11	1,927	193
567	MH-567	1/10 Drainage Basin #11 Flow	10%	11	1,927	193
595	MH-595	2/10 Drainage Basin #11 Flow	20%	11	1,927	385
641	MH-641	2/10 Drainage Basin #11 Flow	20%	11	1,927	385
638	MH-638	1/4 Drainage Basin #3 Flow	25%	3	408	102
904	MH-904	1/4 Drainage Basin #3 Flow	25%	3	408	102
293	MH-293	1/4 Drainage Basin #3 Flow	25%	3	408	102
323	MH-323	1/4 Drainage Basin #3 Flow	25%	3	408	102
295	MH-295	Drainage Basin #2 Flow	100%	2	869	869
357	MH-357	1/2 Drainage Basin #1 Flow	50%	1	265	132
351	MH-351	1/2 Drainage Basin #1 Flow	50%	1	265	132
325	MH-325	Drainage Basin #1 Flow	100%	1	265	265
332	MH-332	Drainage Basin #14 Flow	100%	14	454	454
331A	MH-331A	1/2 Drainage Basin #2 Flow	50%	2	320	160
328	MH-328	Drainage Basin #21 Flow	100%	21	170	170
328	MH-328	1/2 Drainage Basin #2 Flow	50%	2	320	160
268	MH-268	1/3 Drainage Basin #15 Flow	33%	15	324	107
261	MH-261	1/3 Drainage Basin #15 Flow	67%	15	324	217
114	MH-114	1/10 Drainage Basin #5 Flow	10%	5	1,065	106
100	MH-100	1/10 Drainage Basin #5 Flow	10%	5	1,065	106
104	MH-104	2/10 Drainage Basin #5 Flow	20%	5	1,065	213
120	MH-120	1/10 Drainage Basin #5 Flow	10%	5	1,065	106
276	MH-276	1/10 Drainage Basin #5 Flow	10%	5	1,065	106
74	MH-74	1/10 Drainage Basin #5 Flow	10%	5	1,065	106
682	MH-682	1/10 Drainage Basin #5 Flow	10%	5	1,065	106
153	MH-153	1/10 Drainage Basin #5 Flow	10%	5	1,065	106
59	MH-59	1/10 Drainage Basin #5 Flow	10%	5	1,065	106

Sewer Model Manhole Flow Inputs

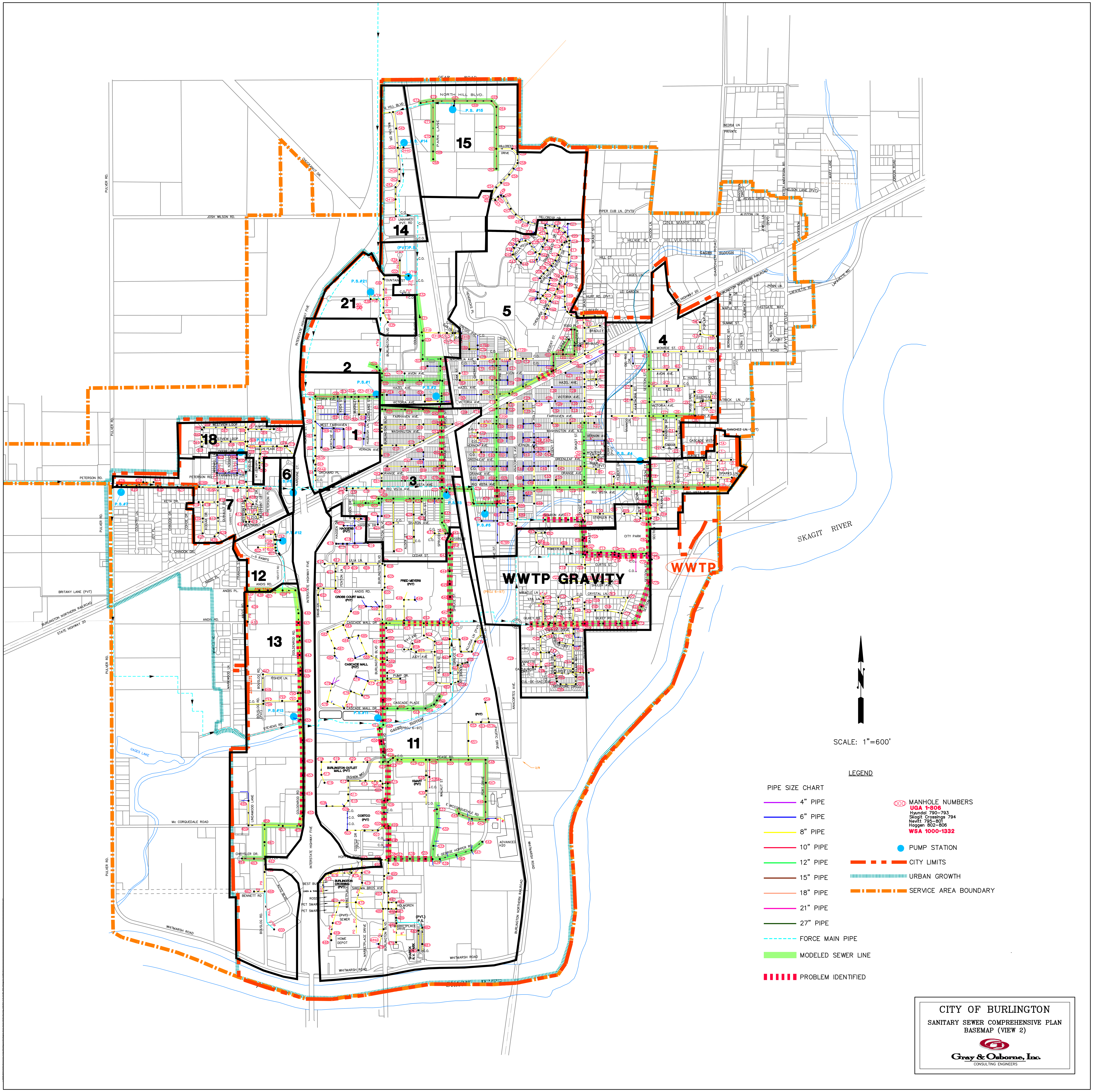
City Manhole Number	Sewer Manhole Number	Flow Description	Percentage	Drainage Basin	Drainage Basin Peak Hour Flow with I/I (gpm)	Manhole Peak Hour Flow with I/I (gpm)
47	MH-47	1/4 Drainage Basin #4 Flow	25%	4	316	79
47	MH-47	Drainage Basin #40 Flow	100%	40	241	241
47	MH-47	Drainage Basin #41 Flow	100%	41	304	304
41	MH-41	1/4 Drainage Basin #4 Flow	25%	4	316	79
34	MH-34	1/4 Drainage Basin #4 Flow	25%	4	316	79
28	MH-28	1/4 Drainage Basin #4 Flow	25%	4	316	79
28	MH-28	Drainage Basin #38 Flow	100%	38	233	233
28	MH-28	Drainage Basin #46 Flow	100%	46	35	35
7	MH-7	1/4 Drainage Basin #22 Flow	25%	22	570	142
7	MH-7	Drainage Basin #37 Flow	100%	37	90	90
12	MH-12	Drainage Basin #36 Flow	100%	36	45	45
19	MH-19	Drainage Basin #4 Flow	100%	4	1,005	1,005
786	MH-786	1/4 Drainage Basin #22 Flow	25%	22	570	142
739	MH-739	1/4 Drainage Basin #22 Flow	25%	22	570	142
729	MH-729	1/4 Drainage Basin #22 Flow	25%	22	570	142
729	MH-729	1/2 Drainage Basin #8 Flow	50%	8	4,917	2,458
729	MH-729	1/2 Drainage Basin #11 Flow	50%	11	1,927	964
729	MH-729	1/2 Drainage Basin #13 Flow	50%	13	1,135	567
729	MH-729	1/2 Drainage Basin #43 Flow	50%	43	355	177
729	MH-729	1/2 Drainage Basin #47 Flow	50%	47	128	64
708	MH-708	1/2 Drainage Basin #8 Flow	50%	8	4,917	2,458
708	MH-708	1/2 Drainage Basin #11 Flow	50%	11	1,927	964
708	MH-708	1/2 Drainage Basin #13 Flow	50%	13	1,135	567
708	MH-708	1/2 Drainage Basin #43 Flow	50%	43	355	177
708	MH-708	1/2 Drainage Basin #47 Flow	50%	47	128	64
691	MH-691	Drainage Basin #3 Flow	100%	3	1,403	1,403
691	MH-691	Drainage Basin #5 Flow	100%	5	1,065	1,065
691	MH-691	Drainage Basin #6 Flow	100%	6	1,689	1,689

APPENDIX F

SEWER MODEL RESULTS MAP



PORT OF SKAGIT COUNTY REGIONAL AIRPORT
RUNWAY NO 1
RUNWAY 4/22
8 GRAVITY
PROPOSED REPLACEMENT P.S.#10
BURLINGTON NORTHERN RAILROAD
STATE HIGHWAY 20
JOSH WILSON RD.
PETERSON RD.
McFARLAND ROAD
OLYMPIC PIPE LINE
OLYMPIC PUMP STATION
OLYMPIC TANK YARD
OVENELL RD.
SARGENT PLACE
PRIVATE ROAD
FARM TO MARKET RD.
HIGGINS AIRPORT WAY
COUNTRY CLUB DR.
GOLF COURSE
REMOVED
P.S.#10
P.S.#16
P.S.#17
P.S.#19
P.S.#20
23
31
20
19
17
32
10
9
24
25
27
16
SCALE: 1"=600'
LEGEND
PIPE SIZE CHART
4" PIPE
6" PIPE
8" PIPE
10" PIPE
12" PIPE
15" PIPE
18" PIPE
21" PIPE
27" PIPE
FORCE MAIN PIPE
MODELED SEWER LINE
PROBLEM IDENTIFIED
MANHOLE NUMBERS
UGA 1-806
Hyundai 790-793
Skagit Crossings 794
Nevitt 795-801
Hoggen 802-806
WSA 1000-1332
PUMP STATION
CITY LIMITS
URBAN GROWTH
SERVICE AREA BOUNDARY
CITY OF BURLINGTON
SANITARY SEWER COMPREHENSIVE PLAN
BASEMAP (VIEW 1)
Gray & Osborne, Inc.
CONSULTING ENGINEERS



CITY OF BURLINGTON
SANITARY SEWER COMPREHENSIVE PLAN
BASEMAP (VIEW 2)
Gray & Osborne, Inc.
CONSULTING ENGINEERS
SCALE: 1"=600'
LEGEND
PIPE SIZE CHART
4" PIPE
6" PIPE
8" PIPE
10" PIPE
12" PIPE
15" PIPE
18" PIPE
21" PIPE
27" PIPE
FORCE MAIN PIPE
MODELED SEWER LINE
PROBLEM IDENTIFIED
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WSA 1000-1332
PUMP STATION
CITY LIMITS
URBAN GROWTH
SERVICE AREA BOUNDARY
WWTP GRAVITY
WWTP
SKAGIT RIVER
INTERSTATE HIGHWAY FIVE
STATE HIGHWAY 20
BURLINGTON NORTHERN RAILROAD

APPENDIX G

CITY OF BURLINGTON PARK IRRIGATION ANALYSIS

Potable water purchased from the Skagit Public Utility District (PUD) is currently used to irrigate 30 acres of the City's Skagit River Park. The City desires to increase the irrigation coverage to 81 acres and is considering the use of reclaimed water as an alternate to purchasing potable water. The purpose of this engineering report is to develop an approach for using reclaimed water, and to perform an economic comparison of the two alternatives.

IRRIGATION DEMAND

The required irrigation quantity is presented in Table ES-1.

Table ES-1. Skagit River Park Irrigation Demand

Condition	Irrigation Area, acres	Irrigation Rate, in/week	Average Irrigation Demand, mgd [a]	Average Irrigation Demand, gpm [b]	Peak Irrigation Demand, mgd [a,c]	Peak Irrigation Demand, gpm [b, c]
Future	81	1	0.314	218	0.628	436

[a] mgd: million gallons per day
[b] gpm: gallons per minute
[c] Peak rate is based on assumption that park land is irrigated only during an 12-hour period of a 24-hour day

RECLAMATION APPROACH

The source for reclaimed water would be the City's wastewater treatment plant, which is located adjacent to Skagit River Park. The use of Class A reclaimed water, the highest quality established by the Washington State Department of Ecology, is recommended. Class A reclaimed water is suitable for direct public contact, but is not suitable for potable use. To produce Class A reclaimed water, secondary effluent from the wastewater treatment plant would need to be coagulated, filtered, and further disinfected.

A number of different technologies for water reclamation were considered in this report. For the basis of economic comparison, the recommended process would consist of: (1) alum and polymer chemical addition followed by flocculation to agglomerate suspended solids; (2) a cloth media filter to remove suspended solids; and (3) sodium hypochlorite solution addition (chlorination) to further disinfect the reclaimed water and control the growth of microorganisms in the reclaimed water distribution system.

Additional evaluation of technologies is recommended if the water reuse approach is implemented. Specifically, field visits to other installations by City operations and maintenance staff is recommended to verify that the proposed process approach is acceptable and reliable.

IRRIGATION DISTRIBUTION

The irrigation distribution system would need to be expanded for both the water reuse and potable water irrigations approaches. With potable water irrigation, a second water meter would need to be added. Irrigation piping used for reclaimed water would be color-coded purple to designate that the water is not suitable for potable use.

UPDATES FROM DRAFT REPORT

The City and consultant met on July 29, 2005 to discuss the draft report. It was initially concluded that the distribution arrangement for the reuse and potable options should be revised. However, in the subsequent discussion with the City Parks Director, it was concluded that distribution arrangements would not be revised.

During the meeting, it was also requested that salvage value be considered in the economic analysis and that a map of the irrigation areas be included. Both of these revisions have been incorporated into the revised report.

ECONOMIC COMPARISON

An economic cost model was developed to compare the two alternatives. Capital costs and annual operating costs were developed for the two approaches. Over the last the last five years, Skagit PUD water rates have increased annually by 3 percent. All future operations and maintenance costs, including those for reclaimed water treatment, were assumed to increase by 3 percent annually to reflect PUD rate impacts. The results of the economic comparison are presented in Table ES-2.

Table ES-2. Economic Comparison of Irrigation Alternatives

Item	Alternative 1 - Spray Irrigation with Class A Reclaimed Water	Alternative 2 - Spray Irrigation with Potable Water
Description	Irrigation with filtered wastewater effluent	Irrigation with Potable Water
Annual Water Consumption, cu ft	5,124,523	5,124,523
20-Year Water Consumption, cu ft	102,490,457	102,490,457
Capital Cost for Improvements	$1,175,100	$272,200
Present Worth Cost of Purchasing Potable Water	$0	$1,264,405
Present Worth of Operation and Maintenance	$252,468	$39,807
Fertilizer Value of Nitrogen in Reclaimed Water	-$36,386	0
Salvage Value	-$118,230	-$43,418
Total Present Worth	$1,272,952	$1,532,994
Average Annual Cost	$105,418	$126,953
Relative Costs	**100%**	**120%**
Cost, dollars per 100 cu ft	$1.24	$1.50
Average Annual Cost Savings for Reuse	**$21,535**	

Economic analysis based on an interest rate of 4.5 percent

The results from the economic comparison show that the cost of irrigation with reclaimed water is approximately 20 percent less than the cost of purchasing Skagit PUD water for irrigation. The cost of delivered irrigation water is estimated to be $1.24 per 100 cubic feet for reclaimed water and $1.50 per 100 cubic feet for potable water. The cost savings is greater than the cost estimating accuracy. Therefore, there is a definite economic advantage to water reuse.

The model shows that the economic comparison is sensitive to interest rate used in the analysis. At an interest rate of 3 percent, the cost of reclamation would be 36 percent less than potable water, and at 6 percent interest rate, reclamation would be 8 percent less costly than potable water irrigation.

WATER REUSE BENEFITS

In addition to an economic advantage, there are a number of other benefits to be gained from using reclaimed water:

- Potable water is preserved for drinking water uses.
- Wastewater treatment requirements are continually becoming more stringent and future effluent discharge permitting conditions for the Skagit River are likely to become more restrictive and costly. Irrigation of Skagit River Park with reclaimed water essentially serves as a demonstration project for effluent diversion and alternative wastewater management strategies in advance of changing regulations. Effluent diversion would occur during the critical low-flow condition in the river, likely to be the most restrictive condition for future effluent permitting.
- Water recycling reduces reliance on the Skagit PUD for potable water. For irrigation purposes, the City would not be subject to rising drinking water rates. Use of alternative sources may also reduce the need for the Skagit PUD to develop more potable water supplies.
- The City's role as an environmental steward in protecting water quality and promoting recycling is enhanced.

WATER REUSE DISADVANTAGES

Implementation of a water reuse program would also have some disadvantages:

- A public involvement program would be required to educate the public on the benefits of using reclaimed water for irrigation. The safety of using reclaimed water would need to be clearly identified.
- Although the proposed reclaimed water treatment system is fairly simple, additional City staff resources would be needed to operate and maintain the system.
- A capital improvement project would be required to establish reuse treatment.

City of Burlington – Park Irrigation Analysis

DRAFT January 4, 2005

Executive Summary

The objective of this project is to evaluate alternatives and provide a recommendation to the City of Burlington to irrigate additional acreage within Skagit River Park.

The Skagit River Park consists of approximately one hundred (100) acres. Thirty (30) acres of this is currently irrigated from a metered connection to a Skagit PUD water distribution main. This supply is then boosted through a City owned pump to adequately maintain irrigation system pressures within this thirty (30) acres. The City would like to irrigate an additional acreage (51 acres). If the water requirement is assumed to be 1 acre-foot per acre, then the City would need an additional 51 acre-feet per year (AF/YR). This equates to approximately 2.2 million cubic feet per year, or 22,000 units of 100 cubic feet per year.

The City also owns Rotary Park, which is located a few blocks north of Skagit River Park and just west of the City's Wastewater Treatment Plant (WWTP). The 32 acres of the Rotary Park are irrigated by withdrawing water from a ground water well. A water right claim for the well is on file at Ecology for 150 gallons per minute (gpm) and 2 acre-feet per year (AF/Yr).

The following options were evaluated as possible solutions for irrigation of the additional acreage of the Skagit River Park.

1. Securing additional water rights for irrigation.
2. Utilizing the existing Rotary Park well or other nearby irrigation wells to spread any excess water.
3. Construction of a small packaged Membrane Bioreactor (MBR) treatment facility adjacent to the Cities WWTP for reuse of a portion of the wastewater stream.
4. Purchase additional water from Skagit PUD.

The evaluation will show that uncertainty exists in securing additional water rights, the Rotary Park well does not have excess water, and the construction of the MBR is costly. Based upon the evaluation, purchasing additional water from Skagit PUD is recommended.

1.0 Secure Additional Water Rights

As stated above, the City has a water right claim #149403 for 150 gpm and 2 AF/Yr to irrigate Rotary Park. The claim was filed by Roland Delahunt to Ecology on June 28, 1974. The City does not have any water rights for this irrigation use. The City has a water right application on file with Ecology which was submitted to Ecology in November 1999, to irrigate 75 acres in Skagit River Park for approximately 25 days per year. The quantities requested are for 292 gpm and 45 AF/Yr.

Ecology is not processing new applications for water due to the backlog of water rights, their focus on change applications, and their involvement with regional water approaches. Unless the application addresses regional supply needs, the application is a health emergency, or there will be a net benefit to the system, the likelihood of a new water right application for irrigation being processed over the next few years is very low.

2.0 Existing/Neighboring Rights – Purchase/Change Applications/ Place of Use/Spreading

An option is to obtain existing water rights. The City could consider purchasing three water rights in order to irrigate Skagit Park. The water rights are listed in the following table.

Table 2-1 Adjacent Irrigation Water Rights

Water Right #	Priority Date	Type of Use	Q(i) gpm	Q(a) AF/Yr	Active Water Right	Point of Withdrawal
745-A	3/2/1951	Irrigation of 29 acres	290 gpm	58 AF/Yr	Yes	Gov't Lot 12, Sec.8, T34N, R4E.
1378-P	5/4/1950	Irrigation	100 gpm	21 AF/Yr	No	SW¼ NW ¼ Sec.8, T34N, R 4E.
2766-P	1/15/1955	Irrigation	120 gpm	30 AF/Yr	No	SE¼ NW¼ Sec.8 T 34N, R4E.

Any irrigation water right considered for purchasing needs evaluation to ensure that the water right is in good standing (extent and validity) including whether the water been put to beneficial use, or whether it has been relinquished or abandoned. Beneficial use means quantities of water applied in a non-wasteful way. Five successive years of non-use can put the water right at risk of relinquishment. If pumping rates can be obtained along with annual amounts supplied over the last five years, this would support that the water has been put to beneficial use. If the period for non-use is greater than five successive years, Ecology will consider legitimate reasons for such non-use. These reasons should be discussed with Ecology prior to purchasing the water right.

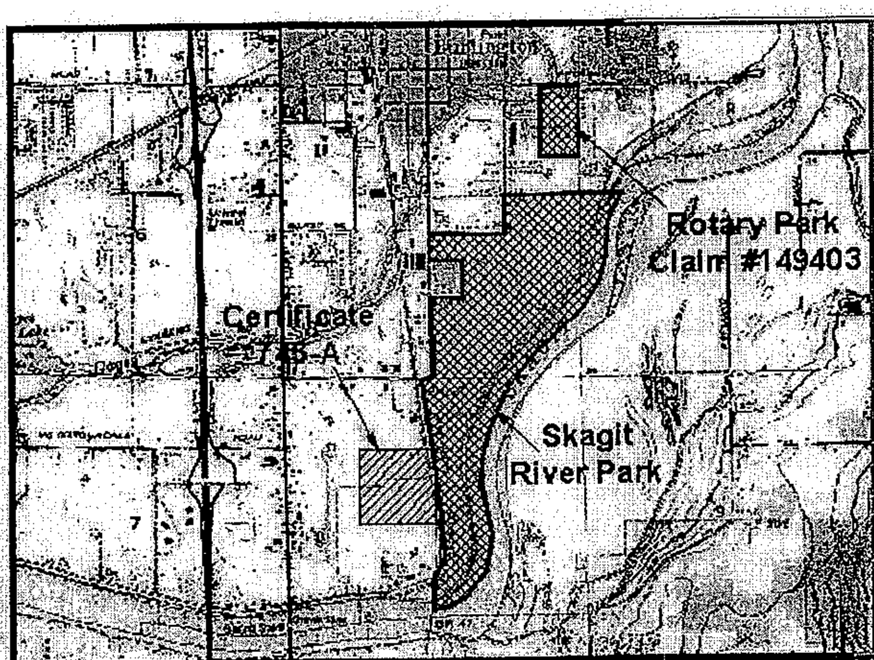
Of the three water rights considered above, only Certificate 745-A has not been cancelled. Permit 2766 was cancelled with the sale of the property. Permit 1378 was cancelled due to not following up to the agreed to development schedule and being non-responsive to agency requests[1]. Both permits are not an option since they have been cancelled. The City should consider the next steps needed for water under Certificate 745-A to irrigate Skagit River Park which includes obtaining historical evidence that shows that water has been put to beneficial use

[1] E-mail correspondence with Dorothy Glenn, Ecology NWRO 12/21/04

at the certificated quantities and explains time periods of non-use. If this can be verified, then a change application would have to be filed with Ecology. Prior to filing a change application, it should be noted that the costs of purchasing a water right, on average, are estimated anywhere from $300-$1000 AF/Yr. So, for 51 AF/Yr, the possible estimated range for purchasing a water right would be $15,300-$51,000.

The City of Burlington would have to file an application with Ecology to change the place of use either for their claim or for Certificate 745-A. The place of use is where the water is allowed to be used. Exhibit 2-2 shows the place of use of the certificate and Burlington's claim in relation to Skagit River Park.

EXHIBIT 2-2



The place of use of the certificate and the claim are different from the Skagit River Park. RCW 90.44.100 allows a water right holder to withdraw public waters without losing priority of the right and change the withdrawal point and/or place of use of water, as long as the following criteria is met. The change:

- Must not cause detriment or injury to existing rights
- Must not be detrimental to the public welfare;
- Shall not allow for the enhancement of the right perfected under the original certificate; and
- Any new withdrawal must come from the same source as the original water right.

Moreover, a water right holder of irrigation rights can add acreage or new purposes of use to the existing water right through a change application (spreading). Spreading allows new purposes and additional acreage. Spreading implies that excessive water exists or is achievable through conservation. The claim used for irrigating Rotary Park does not have excessive amounts for spreading. A better candidate would be adjacent land irrigated under Certificate 745-A for 290 gpm and 58 AF/Yr for the irrigation of 29 acres. Burlington will have to determine if the 58 acre-feet of water allowed under Certificate 745-A is adequate to meet the needs for Skagit River Park and/or the existing property. It should be noted that change applications that seek to spread irrigation rights can be required to determine an annual consumptive quantity[2]. An annual consumptive quantity includes water use, return flows, and efficiency factors.

Change applications are not expedited by Ecology unless the Washington State Department of Health declares a health emergency or the application will result in a net benefit to the system. Two other options are available in some instances, which could result in a more expedited process for change applications.

Water Conservancy Boards are an option that initiates the processing of water rights at the local level. The Board will generate Reports of Examination, but any decision made by the Board is reviewed by Ecology and can be affirmed, reversed, or modified. However, at this time, this option is not currently available for getting a change application processed since no conservancy board exists for Skagit County.

The City of Burlington could however utilize the "consultant pool" process. The City would enter into an agreement with Ecology to pay Ecology's costs of hiring, managing, and overseeing an independent consultant that is selected from the "consultant pool". The consultant would then begin the processing with Ecology making the final decision. The City of Burlington would pay for the processing costs of the City of Burlington change application and any other change applications in line ahead of its' change application drawing from the same source (which would be anything in hydraulic continuity with the Skagit River). On average, a minimum range of consultant pool costs is from $15,000 to $30,000.

Thus, the expectation that Ecology will process a change application to change a place of use or to spread to additional acreage is low but if the "consultant pool" process was utilized, the application could possibly get processed within a reasonable time period, however there would additional costs involved.

3.0 Construction of MBR Facility/Reuse Costs

The cost associated with reuse varies depending on the required treatment levels, economies of size, and required conveyance construction. A Membrane Bioreactor (MBR) capital costs are estimated from $200,000 to $600,000 for a peak demand of 175 gpm. Besides the capital cost to construct, other costs include operation and maintenance (O&M) cost.

[2] Ecology Policy 1210 POLICY FOR THE EVALUATION OF CHANGES TO ENABLE IRRGATION OF ADDITIONAL ACREAGE OR THE ADDITION OF NEW PURPOSES OF USE TO EXISTING WATER RIGHTS.

A summary of water reclamation projects in western Washington shows that the capital costs for reuse projects range from $100,000 to $32,000,000, for a variety of capacities. Operation and maintenance (O&M) costs vary depending on the type of water reuse project. The cost per amount of water reused ranges from $15,000 to $924,000 per million gallons per day (mgd). Table 3-1,[3] provides examples, in 2001, of reuse projects and associated costs in Snohomish, King, and Pierce Counties.

Based upon costs for other facilities similar to that in Burlington, an estimated of treatment upgrade costs for upgrade the reuse to a MBR facility at the existing waste water treatment plant in Burlington is approximately $ per mgd. Annual O&M costs associated with operating a facility of this size are estimated to be on the order of $.

[3] Taken from Table 7-1 of the 2001 Central Puget Sound Regional Supply Outlook

Table 3-1
Summary of Reclaimed Water Projects in Snohomish, King, and Pierce Counties

County	Status[1]	Project	Previous/ Current Water Source	Mgd	Intended Use	Seasonal or Year-Round	Conveyance to Point of Use	Capital Cost	O & M Cost
Snohomish	In Operation	WWTPs	Unknown	Unknown	In-plant use	Unknown	Internal	Unknown	Unknown
Snohomish	In Design/ Construction	Kimberly-Clark Paper Mill	City of Everett	4[3]	Non-contact cooling in heat exchanger	Year-round	New pipeline and pump by others	$250,000[5]	$25,000[5]
Snohomish	Planning/ Development	Poplar tree farm	New development	1.5	Irrigation–tree farm	Seasonal	Little needed–adjacent to plant	$100,000	$15,000
Snohomish	Feasibility Stage	Old Weyerhaeuser Mill Site	New development	Unknown	Industrial cooling	Year-round	New Kimberly-Clark pipe	Unknown	Unknown
Snohomish	Feasibility Stage	Everett Parks	City of Everett	Unknown	Irrigation–golf & parks	Seasonal	New Kimberly-Clark pipe	Unknown	Unknown
Snohomish	Feasibility Stage	Nursery	City of Everett	Unknown	Irrigation–plants	Seasonal	Little needed–adjacent to plant	Unknown	Unknown
King	Operational 2000	City of Snoqualmie –golf course	New development	1.5	Irrigation–golf & public landscaping	Seasonal	NA	$1,660,000	$22,000
King	Operational 1994	West Point treatment plant	SPU	0.7	In-plant use & irrigation–public landscapes	Year-round	None needed–using on site	$800,000	$200,000
King	Operational 1996	Renton treatment plant	Renton	1.3	In-plant use & irrigation–public landscapes	Year-round	None needed–using on site	$3,000,000	$400,000
King	Operational	Fort Dent Park in Tukwila	Tukwila	0.1	Irrigation–ball fields	Seasonal	Built 1 mile pipe	$1,000,000	$6,000
King	Planning/ Development	Lakehaven Utility District–Mirror Lake	Lakehaven Utility District	0.7–2.0	Groundwater recharge through septic systems	Year-round	New pipes to homeowners' septic systems	$6,000,000–$8,000,000	Unknown
King	Planning/	Pilot satellite	River	3	Non-potable	Seasonal	New pipes	$32,000,000	$500,000

	Development	plant							
Pierce	Operational 1984	Chambers Creek Treatment Plant	City of Tacoma	1	Non-potable, process	Year-round	On-site	$250,000	Unknown
Pierce	Planning/ Development	Chambers Creek Properties	New development	Unknown	Irrigation–golf	Seasonal and year-round	0.5 to 2 miles	Unknown	Unknown
Pierce	Planning/ Development	Existing Orting New Cascadia	Orting New development	1	Irrigation–golf, school, parks	Seasonal	New pipelines	$7,200,000	$121,000
Pierce	Planning/ Development	Crystal Mountain	New development	0.1	Snowmaking & irrigation–landscape	Seasonal	New pipes	$8,700,000	$700,000
Pierce	Planning/ Development	Mt Rainier Resort-Park Junction	New development	0.1	Irrigation–golf/public landscape & HVAC	Seasonal	Unknown	Unknown	Unknown
Pierce	Feasibility Stage	Simpson Tacoma Kraft Mill	City of Tacoma	10	Non-potable	Year-round	1.5 miles	$29,000,000	$3,000,000
Pierce	Feasibility Stage	Stone Consolidated Mill[6]	River	5.2	Non-potable	Year-round	0.5 miles	$16,000,000	$2,000,000

WWTP = wastewater treatment plant ccf = 100 cubic feet mgd = million gallons per day.

1 In Operation = Currently Operating; In Design/Construction = Funds Committed, Construction or operation imminent; In Planning/Development = Some thought, possible concept report; Feasibility Stage = Discussion but no detail on specifics
2 Financial calculations based on 25-year life, 6% interest rate unless otherwise noted.
3 Uses 8 mgd of reclaimed water, replaces 4 mgd potable.
4 Marginal cost only.
5 Based on capital costs only as O&M not readily available.
6 Going out of business but site could be redeveloped.

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water reuse projects. Grants and lo
protection activities.

3.1.2 State Revolving

Similar to the CCWF, the State Revol
available to local governments and tri
Only loans are available through this f
same as CCWF applications.

Loans are available for up to 100 perce
2002 are 0.5 percent interest rate for a
20-year term.

3.1.3 Public Works Trust

The Public Works Trust Fund (PWTF)
towns, counties, or special districts w
The projects can include streets, road
systems. The emphasis of allocating fu
and/or repair of existing systems. No
funds will be granted to rehabilitate or r

The loans are issued at up to 2 perc
applications requesting 95 percent fun
when municipalities provide 10 perc
municipalities provide 15 percent of th
after contract execution. Debt service
qualifications, the PWTF does require t
property and that they have a well-defi

3.1.4 Rate Revenues

One way in which the water systems c
of the revenue generated from wastew
either to use of funds directly for such
such as those mentioned above, wou
generated from rates.

4.0 Purchase Additional

The City of Burlington currently purc
municipal rights and provides the prim
irrigation of the whole Skagit River Pa
determine if the current pump has th
assessing a higher water bill to the Ci
their pump. The City's disadvantage

3.1 Financing

There are many options available
MBR project. The following is a
of which have been previously u
concerning the external funding so
be found relating to each of these
sources could possibly provide ade
in Table 3-1 and possibly for the M

Ext	
Program	Address
Centennial Clean Water Fund	Department of Ecol P.O. Box 47600 Olympia, WA 985
State Revolving Loan Fund	Department of Ecol P.O. Box 47600 Olympia, WA 985
Public Works Trust Fund	Public Works Boar P.O. Box 48319 Olympia, WA 985

3.1.1 Centennial C

The Centennial Clean Water Fun
measures to prevent and control wa
funding cycle.

CCWF is the largest State grant pro
planning, design, and construction
primary focus of the program is p
water quality benefit. The annual o
cycle can range anywhere from S
projects to be funded in Fiscal Yea
30, 2006, had an open application p

Each public body is limited to a ma
$2.5 million available for each of
remaining three projects. Grant fu
on the type of project.

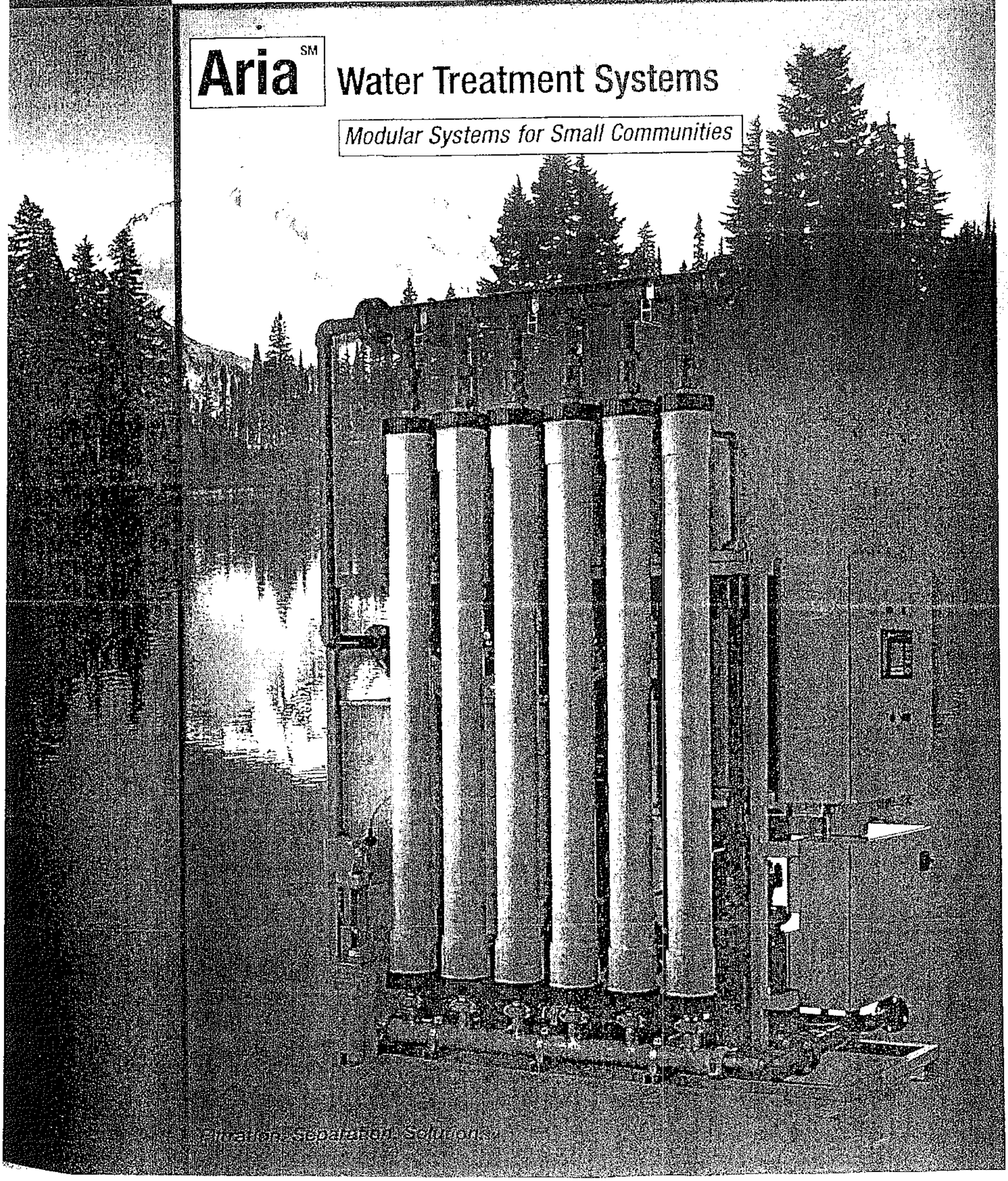
Funding from this program is not a
existing residential needs. Funding
are available to protect a source o

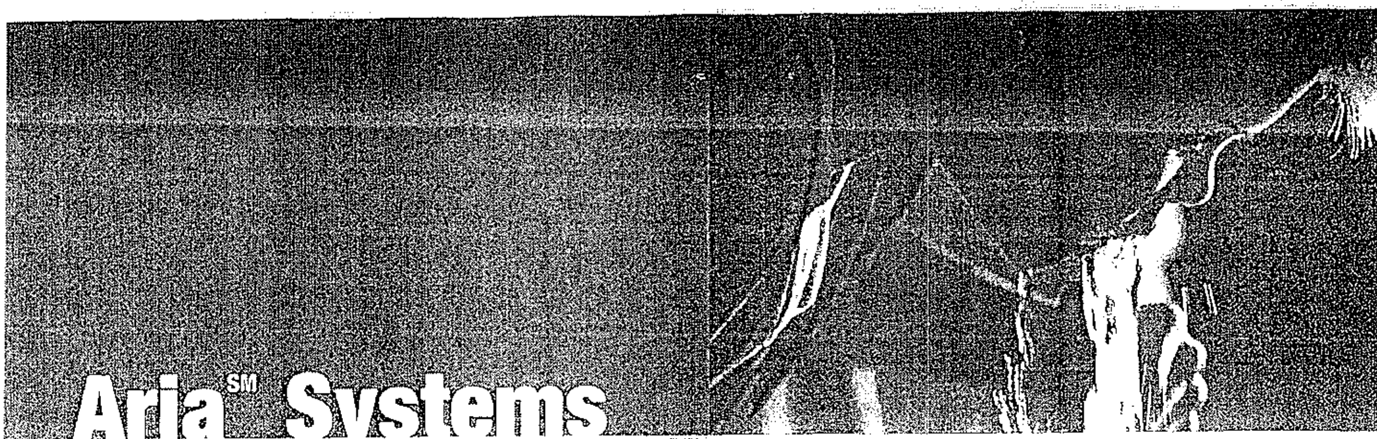
PALL

Water Processing

Aria[SM] Water Treatment Systems

Modular Systems for Small Communities



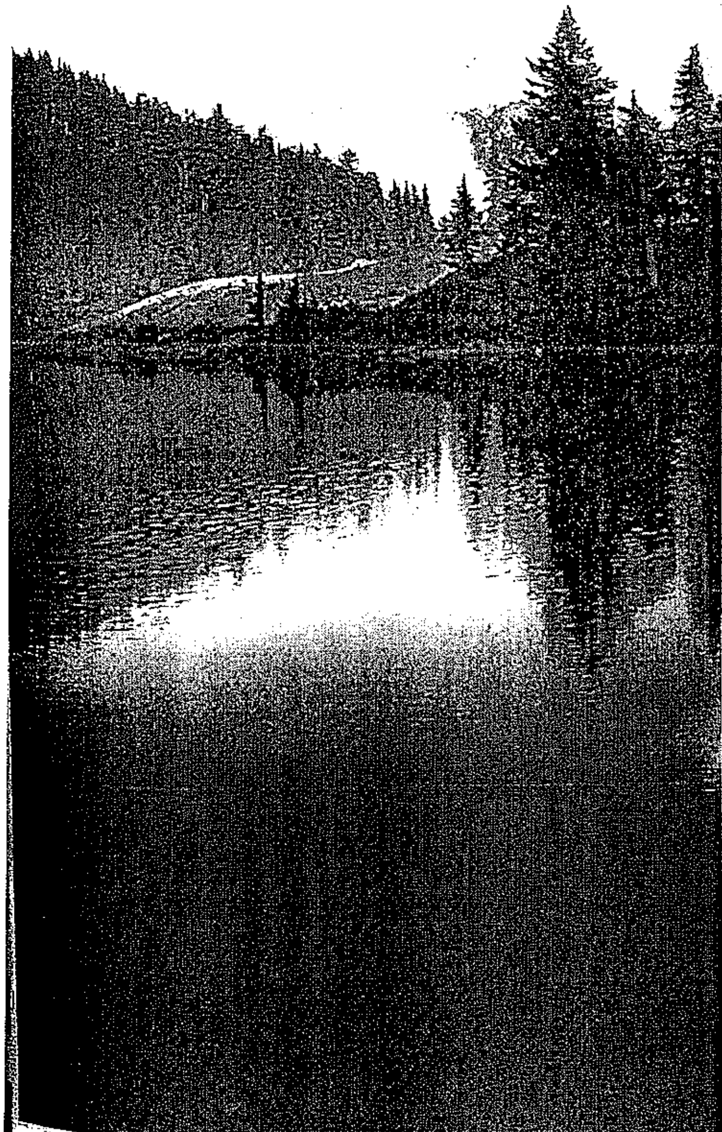


Aria℠ Systems

Pall's Aria water treatment systems are specifically designed to produce drinking water that meets today's stringent standards. Aria systems use uniquely designed filtration modules in a hollow fiber configuration to remove:

- Turbidity
- Bacteria
- Cysts and Oocysts
- Iron and Manganese

from ground and surface waters and secondary wastewater effluent.



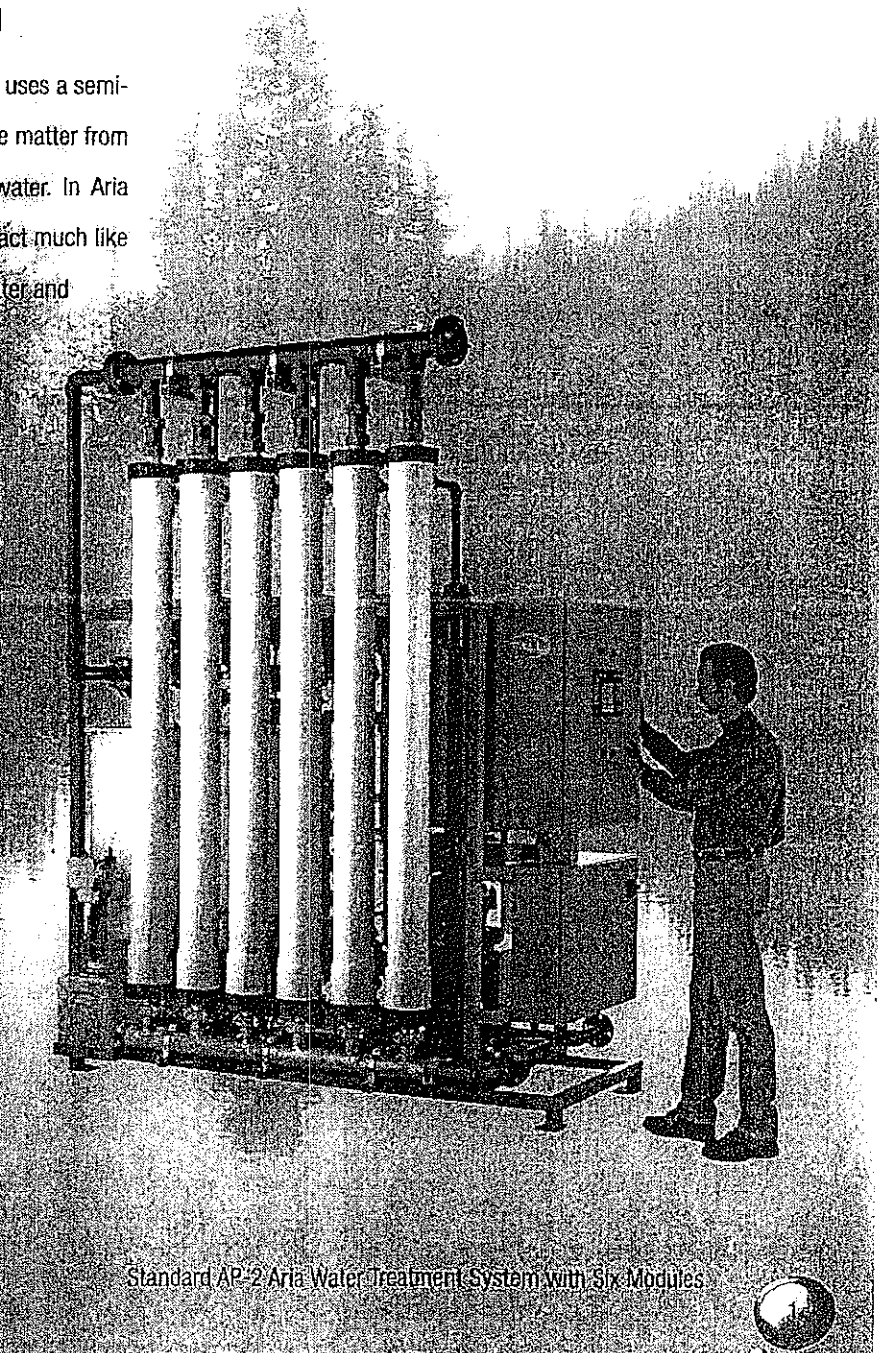
The Microza* hollow fibers are highly permeable membranes resulting in high water production rates. Each hollow fiber module provides high active surface area (538 ft²). Pall's dedication to a simplified process and control design has produced a family of systems that are characterized by:

- Long-Service Hollow Fiber Membranes
- Operator Friendly Controls
- Surface Water Treatment Without Coagulation
- Unique Air Scrub and Flush
- High Recovery Filtration
- Compatibility with Chlorine and Other Common Treatment Chemicals
- Minimized Cost of Operation
- Ease of Installation Using Modular Skids
- Compact System Footprint
- Full System NSF 61 Listing
- ISO 9001 Certified Manufacturing

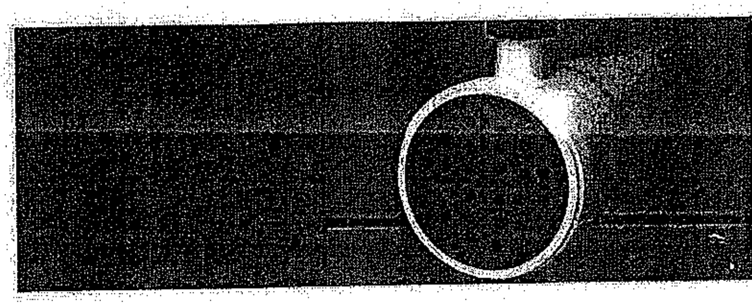
* Microza is a registered trademark of Asahi Chemical Industry Co., Ltd.

Introduction to Membrane Filtration

Membrane filtration is a pressure driven process that uses a semi-permeable (porous) membrane to separate particulate matter from soluble components in the carrier fluid, such as water. In Aria systems, microfiltration or ultrafiltration membranes act much like a very fine sieve to retain particulate matter while water and its soluble components pass through the membrane as filtrate, or filtered water. The retained solids are concentrated in a waste stream that is discharged from the membrane system. The pore size of the membrane controls the fraction of the particulate matter that is removed. Membranes having a smaller pore size remove more of the very fine matter such as silica, bacteria, and parasitic cysts.



Standard AP-2 Aria Water Treatment System with Six Modules



Overview of Aria Systems for Small Communities

Pall Aria water treatment systems for small communities are highly flexible, production scale, membrane filtration systems, designed to filter a wide range of feed streams. Standard systems are available in three skid-mounted configurations.

Standard Filtration Skid Specifications

Model Number	Maximum Number of Modules	Filtered Water Capacity (gpm [m³/hr])	Dimensions (L x W x H : ft [m]) Shipped*	Installed	Standard Equipment
AP-2	6	10-50 [2.3-12]	8 x 2.8 x 6.5 [2.4 x 0.9 x 2.0]	8 x 3.9 x 10 [2.4 x 1.2 x 3]	Modules, one feed tank & pump; one recycle/RF tank & pump; automatic & manual valves; flow, pressure, & temperature monitoring; bag filter; PLC controls & short-term data acquisition; automatic integrity test
AP-3	10	25-175 [6-40]	(1) 10 x 4.5 x 7.5 [3 x 1.4 x 2.3]	(3) 10 x 5.5 x 10 [3 x 1.7 x 3]	
AP-3x	24	25-175 [6-40]	(1) 10 x 4.5 x 7.5 [3 x 1.4 x 2.3]	(1) 10 x 4.5 x 10 [3 x 1.4 x 3]	
			(2)	(4) 11 x 2.4 x 11 [3.4 x 0.7 x 3.4]	
AP-4	40	70-350 [15-80]	(1) 10 x 5.5 x 7.5 [3 x 1.7 x 2.3]	(1) 10 x 5.5 x 10 [3 x 1.7 x 3]	
			(2)	(4) 13 x 2.4 x 11 [4 x 0.7 x 3.4]	

Notes: (1) Control skid only; (2) Module rack shipped as parts kit; (3) Control skid w/attached module rack; (4) Free standing module rack.
* Crating adds 0.5 ft. [0.15m] to each dimension.

Typical Applications

The Aria water treatment system is used to filter ground and surface waters for drinking water supply and industrial uses, and secondary wastewater effluent for reuse.

Ground Water

- Removes turbidity and microbial pathogens from ground water under the influence of surface water.
- Removes iron and manganese after oxidation and precipitation.
- Removes arsenic after oxidation and coagulation.

Surface Water

- Removes turbidity and microbial pathogens from raw water drawn from rivers, streams, lakes, and reservoirs.
- Treats a wide range of feed water quality to produce excellent quality filtered water.

Secondary Wastewater Effluent

- Removes suspended solids, and reduces SDI prior to RO treatment and reuse.
- Removes bacteria and other pathogens, and suspended solids to produce water suitable for landscape irrigation and similar reuse applications.

Optional and Auxiliary Equipment

Optional equipment includes:

- Modem for Remote Access
- Auto Dialer for Alarms
- Dedicated Data Recorder
- PC for Operator Interface Terminal
- High Pressure System (150 psi /10 bar)
- Feed or Filtered Water Turbidimeters
- Automatic Backwashable Strainer

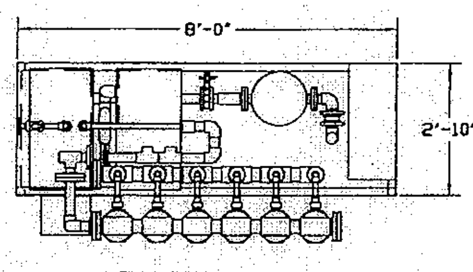
Auxiliary equipment to improve treatment capabilities is available on separate skids, which are equipped with distributed controls that can be integrated into the main control system on the filtration skid to provide optimal, automatic system operation.

Aria System Auxiliary Equipment

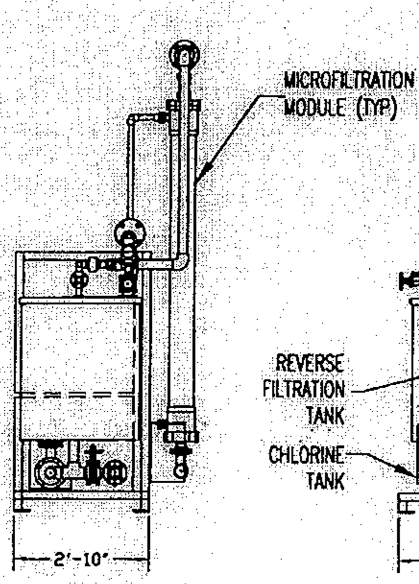
The principal small system components include the standard filtration skids as well as additional auxiliary equipment to create a water treatment system that meets the specific needs of each customer's application.

Aria System Auxiliary Equipment

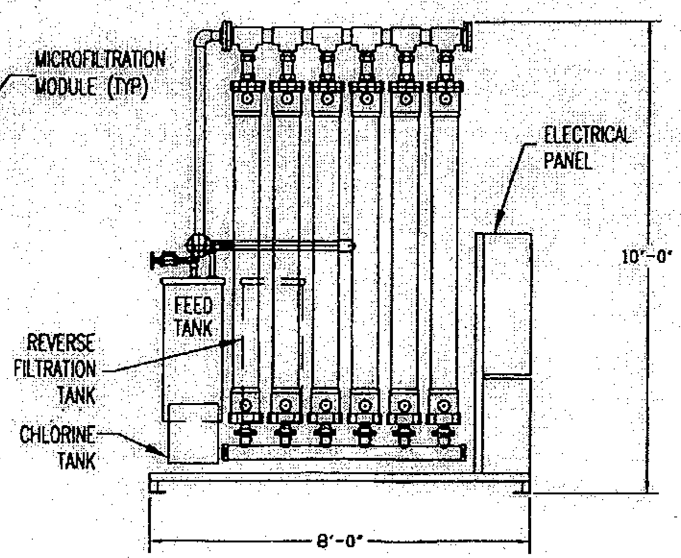
Model Number	Identification	Maximum Unit Capacity	Approximate Dimensions L x W x H (ft [m])	Equipment
ACA-06	Compressed Air	Up to 6 modules	3.3 x 3 x 6 [1 x 0.9 x 1.8]	Compressor, receiving tank, air dryers, PLC connections
ACA-12		Up to 12 modules	6 x 4 x 6 [1.8 x 1.2 x 1.8]	
ACA-20		Up to 20 modules	8 x 4 x 6 [2.4 x 1.2 x 1.8]	
ACA-36		Up to 36 modules	10 x 4 x 7 [3 x 1.2 x 2.1]	
ACF-3	Chemical Feed/ Preoxidation	Up to 175 gpm / 40 m³/hr	5 x 2.5 x 5.5 [1.5 x 0.8 x 1.7]	Day tank; metering pumps
ACF-4		Up to 350 gpm / 80 m³/hr	6 x 2.5 x 6.5 [1.8 x 0.8 x 2]	



Plan Elevation

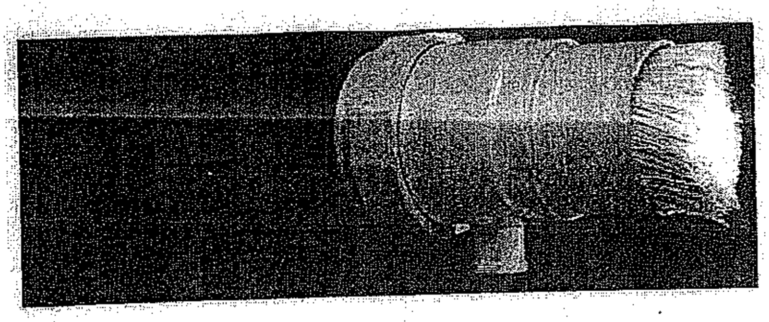


Side Elevation



Front Elevation

Aria AP-2 Microfiltration System



Specifications

Standard Scope of Supply
A standard filtration skid consists of 1 to 40 membrane modules, one feed tank and pump, one reverse filtration tank and pump, manual and automatic valves, flow meter, pressure and temperature sensors, PLC control, electrical panel and a painted carbon steel frame. Other items can be added on request. Separate auxiliary skids are available for compressed air and chemical feed/ preoxidation.

Standard Components
- Painted Carbon Steel Frame
- 316 SST Pumps w/TEFC Motors and VFDs as required
- PVC or Stainless Steel Piping
- Keystone Butterfly Valves (Manual and Air Operated)
- Metering Pumps
- Bag Filter
- PE Tanks
- PLC Controls and Software
- Instrumentation (4-20 ma signal)
- NEMA 4 electrical enclosures

Operating Conditions
- Maximum Inlet Pressure: 44 psi (3 bar) [150 psi (10 bar) Optional]
- Maximum Operating Temperature: 40°C (104°F)

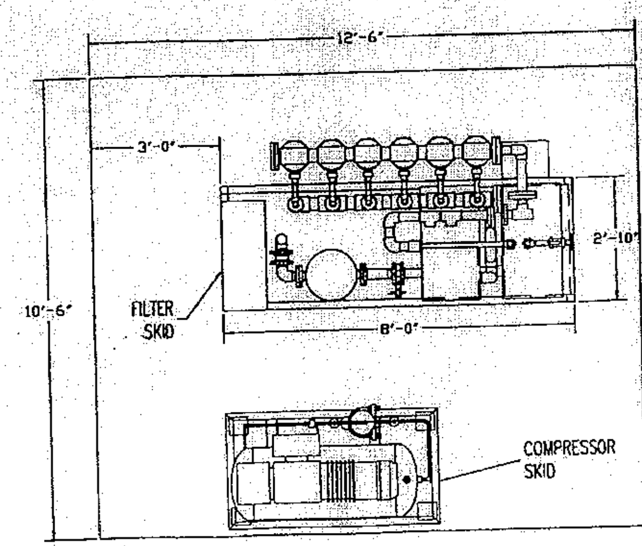
Utility Requirements
Electrical Connection: AP 2: 1 ph, 230v, 30 A or
3 ph, 230v, 20 A or
3 ph, 460v, 15 A
AP 3/3x: 3 ph, 230v, 40 A or
3 ph, 460v, 20 A
AP 4: 3 ph, 460v, 30 A

Water Supply for CIP: 25-35°C (75-95°F); maximum Total hardness 150 mg/L as calcium carbonate

Microza Hollow Fiber Microfiltration Module
- Membrane Material: PVDF
- Pore Rating: 0.1 micron (μm)
- Fiber OD / ID: 1.3 mm/0.7 mm
- Active Filter Area: 538 ft²
- Module Size: 6" diam x 79" long
- Housing/Gasket: PVC/NBR
- Potting Material: Epoxy

NSF System Listing
Pall's family of hollow fiber membrane systems were the first "full systems" to be listed in accordance with ANSI/NSF 61 specifications. The Aria system is manufactured from NSF approved materials and meets all requirements for potable water service.

ISO 9000 Certification
Pall's North American manufacturing, engineering, sales and marketing operations have received ISO 9001 registration from Lloyd's Register of Quality Assurance Limited. ISO 9001, which also covers design and development functions, represents the highest, most comprehensive level of ISO 9000 Certification. The quality system and procedures are regularly audited to assure compliance and proper record keeping before the certification is renewed.



Typical Layout of Aria AP-2 Microfiltration System

Aria System Operations

Filtration (Normal Production)

Feed water enters the bottom of the module and is distributed uniformly to the outside of the fibers. Since it is under pressure, the water passes through the hollow fiber membranes and filtered water exits from the top of the module. Under normal conditions, all of the feed water flows through the membranes and exits as filtered water for 100% recovery. Depending on feed quality, a small amount of the feed water may be circulated past the outside of the hollow fibers. This flow prevents the accumulation of foulants and debris on the surface of the membrane and helps evenly distribute flow though the module.

Reverse Filtration (RF)

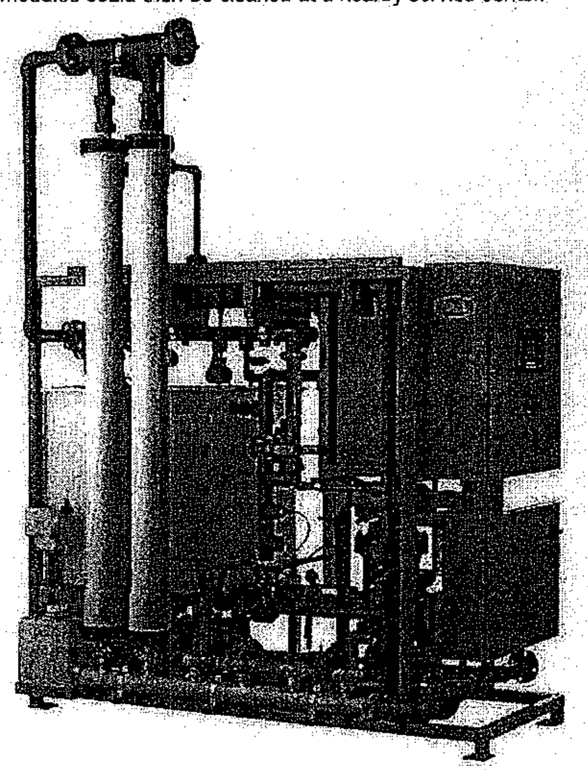
As water is filtered, a film of rejected particles accumulates on the surface of the membranes and gradually impedes the filtration rate. To maintain stable flow between chemical cleanings, a periodic cleaning cycle is introduced by pumping filtered water through the membrane in the reverse direction, inside/out. This operation, which typically takes place every 15-30 minutes (depending on feed quality) and uses about 3-5% of the filtered water production, serves to remove debris from the module and to maintain high filtration rates. To aid in cleaning the module, and particularly to control biological growth on the membrane surfaces, chlorine, in the form of sodium hypochlorite, may be injected into the reverse filtration flow stream. The level of chlorine in the reverse filtration flow is typically 10-25 mg/L.

Air Scrub (AS)

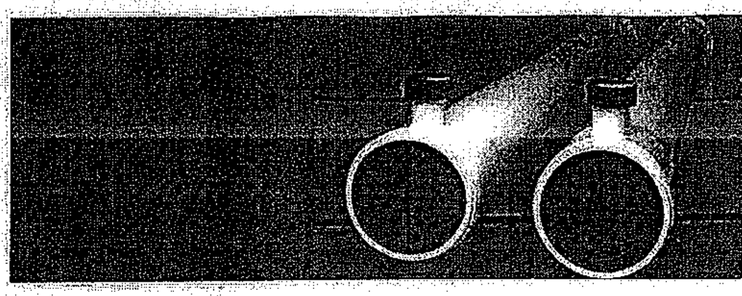
Air scrubbing is another technique to remove foulants from the surface of the membrane. During air scrubbing, the feed flow is off or reduced, and air is introduced through the feed line to the outside of the hollow fiber membranes. The air bubbles very effectively shake the fiber bundle and remove debris. It should be noted that the air used in this step exits the module through the upper circulation port and does not pass through the fibers. When airflow is stopped, feed water is used to flush the outside surface of the fibers and remove debris that was loosened from the membrane surface. This process has the advantage of cleaning the membranes without the use of filtered water.

Clean-in-Place (CIP)

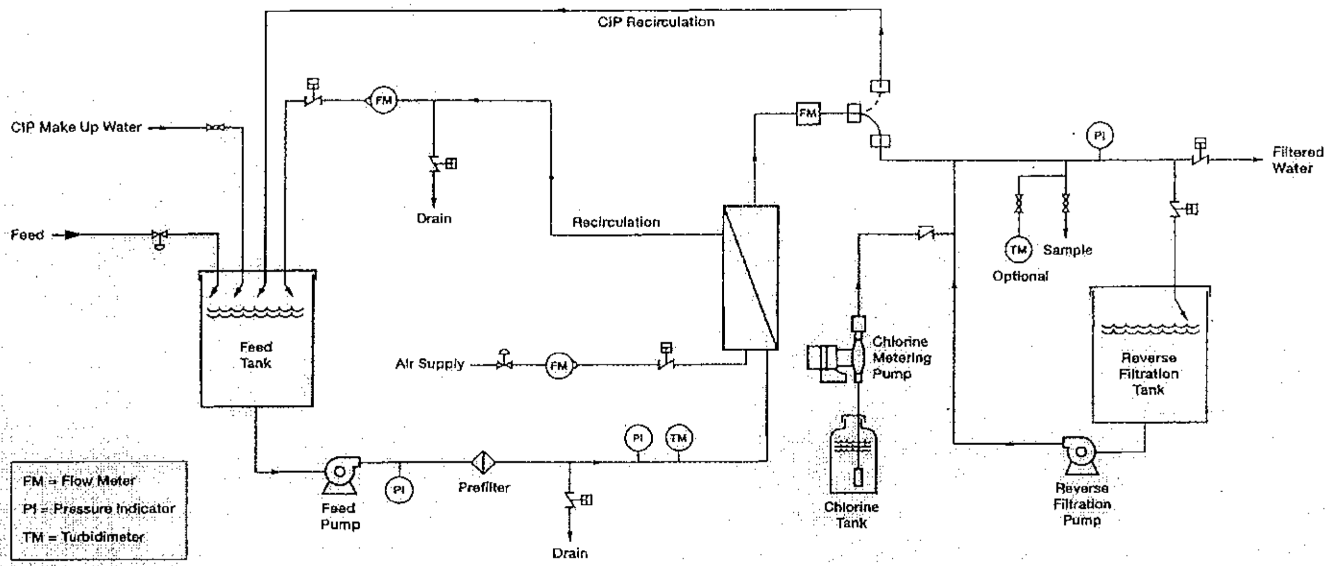
RF and AS cycles leave some residue on the module fibers, which is removed by occasional chemical cleaning. The clean-in-place (CIP) process requires scheduled down-time – an entire skid will be taken off line for several hours. The CIP cycle is initially scheduled every one to three months. If flow or contaminant levels are higher than anticipated, the CIP frequency is likely to increase accordingly. The CIP process is done manually on the Aria system. The system is drained, and then refilled with filtered water. A water temperature of 25-35°C (75-95°F) is recommended. Sodium hydroxide and sodium hypochlorite are added to the filtered water, which is then circulated through the system for 45-60 minutes. The solution is drained and rinsed. The system is filled a second time with 25-35°C (75-95°F) filtered water to which citric acid is added. This solution is also circulated for 45-60 minutes, drained, and rinsed. The Aria system is now ready to go back on-line. Another cleaning option is to remove and replace fouled modules with clean modules. The fouled modules could then be cleaned at a nearby service center.



Aria AP-2 Water Treatment System with 2 Modules



Standard System Process Flow Schematic



Aria Water Treatment System Performance

Pall microfiltration membrane systems have been approved for supply of drinking water based on testing at a number of sites including:

- Aqua 2000 (San Diego, CA)
- University of New Hampshire
- Croton Reservoir (New York, NY)
- Highland Reservoir (Pittsburgh, PA)
- Meeteetse (WY) Reservoir

The tests confirmed these systems meet or exceed EPA guidelines for safe drinking water, as established in the December 16, 1998 amended Surface Water Treatment Rule.

The Aria system has been approved for potable water filtration in many states including California, Pennsylvania, Oregon, and Texas.

Pall Membrane Microbial and Particulate Removal

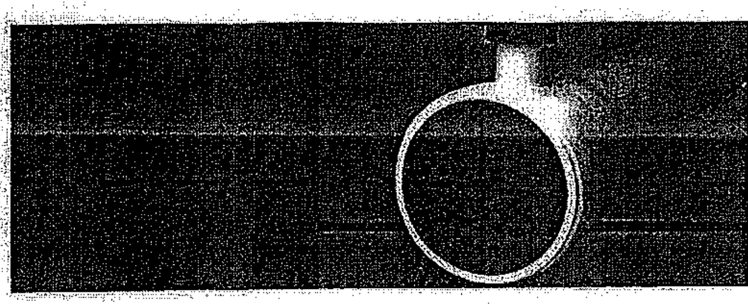
Parameter	**Typical Removal**	
	Microfiltration (MF)	Ultrafiltration (UF)
Giardia	>6 (log)	>6 (log)
Cryptosporidium	>6 (log)	>6 (log)
MS-2 Virus	0.5-3 (log)	4.5-6 (log)
Turbidity	< 0.1 ntu	< 0.1 ntu

Application Guidance

Design Parameter	Ground Water (GW) Under the Influence of Surface Water	Ground Water (GW) High Iron & Manganese	Surface Water Low TOC or Turbidity	Surface Water High TOC or Turbidity	Secondary Wastewater Effluent
Contaminants	Turbidity & Microbial Pathogens	Iron & Manganese	Turbidity & Microbial Pathogens		Suspended Solids & Pathogens
Pretreatment	None	Oxidation & Precipitation	Strainer	Strainer, Oxidation, or Coagulation	Disinfection & Strainer
Flux (gal/sf/day)	45-50	50-60	40-50	45-60 with Pretreatment	25-35
Cleaning Cycle	4-8 weeks	8-12 weeks	3-6 weeks	4-6 weeks with Pretreatment	3-5 weeks
Filtered Water Quality	Turbidity < 0.05 ntu No Detectable *Giardia & Crypto*	Turbidity < 0.05 ntu Iron & Manganese < 0.05 mg/L	Turbidity < 0.05 ntu No Detectable *Giardia & Crypto*		SDI 2-4 Turbidity < 0.05 ntu

Installations

Location	Purpose	Capacity	Number of Modules	Feed Water	Pretreatment
Oregon Parks Department					
-Beverly Beach Park	Drinking Water	70 gpm	6	Stream	Strainer
-Bullards Beach Park	Drinking Water	50 gpm	6	High Iron GW	Preoxidation
N. Slope Borough, AK					
-Point Hope	Pre-Nanofiltration for Drinking Water	240 gpm	26	High TOC Lake Water	Heating & Strainer
-Wainwright		240 gpm	26		
-Nuisquit		240 gpm	26		
-Point Lay		85 gpm	12		
-Atqasuk		85 gpm	12		
Meeteetse, WY	Drinking Water	210 gpm	14	Reservoir	Strainer
Youngs River, OR	Drinking Water	310 gpm	24	River	Strainer
Toppan Inc., CA	Pre RO for Reuse	200 gpm	20	Tertiary Efflluent	Bag Filter
Panel Rey, Mexico	Pre RO for Reuse	200 gpm	20	Secondary Effluent	Strainer
Peterborough, England	Pre RO for Reuse	200 gpm	20	Secondary Effluent	Strainer



Installation Guidance

Instrumentation and Controls

The controls included as part of the Aria system have capacity to accept input from and to control other equipment, such as feed pumps, chemical feeders, and downstream flow controls. Contact Pall to obtain details about the capabilities of the standard control equipment.

Pretreatment Requirements

Aria water treatment systems provide reliable, low maintenance performance. A 400 µm bag filter or strainer is required on the feed water line to prevent debris from clogging small passages in the system. A bag filter is included as standard equipment. A strainer may be located in a surface water body, at the intake, or just before the unit. Self-cleaning units, such as an automatic backwashable strainer are recommended. Pall can provide the strainer as optional equipment.

Enclosures

A heated structure is required where freezing temperatures are expected. A roof may be required in other areas to prevent damage from sunlight and high temperatures. A pre-engineered metal or wood frame building is acceptable and can be designed to meet many aesthetic concerns.

Seismic Design

The skids and anchoring recommendations can be modified for use in Seismic Zone 4 areas (highest hazard). A foundation and anchoring plan will be furnished on request.

CIP Conditions

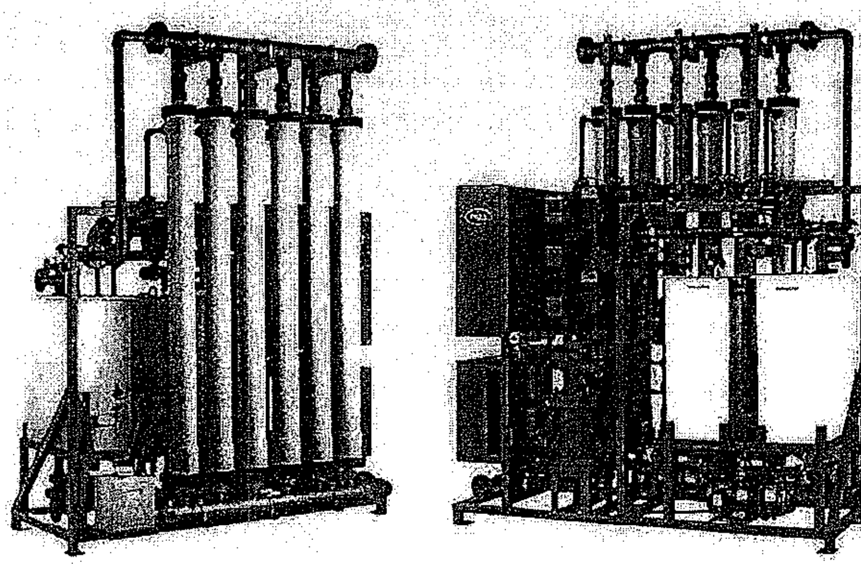
Pall recommends that all chemicals for treatment and CIP be purchased in solution form. Water for CIP should be heated to 25-35°C (75-95°F) and should have a total hardness less than 150 mg/L as calcium carbonate. Contact Pall to obtain the recommended CIP procedures and specifications for chemicals.

Wastewater Disposal

The RF and AS wastewater and CIP wastes can be discharged to a sanitary sewer if available. In areas without sanitary sewers, the RF and AS wastewater can be discharged to a settling pond to remove suspended solids. The clarified supernatant may be discharged to a local receiving stream or recycled to the plant feed water. Pilot testing may be required before recycling the supernatant. If sanitary sewers are unavailable, CIP wastes should be combined and neutralized prior to collection and disposal by a waste hauler. These wastes have little or no hazard, and can be disposed of like septic system sludge. The customer is responsible for contacting the local regulatory agencies and obtaining the appropriate permits and approvals before initiating any discharge of process wastewater.

Support

Remote on-line monitoring of system performance by Pall water specialists and membrane maintenance contracts are available from Pall. Contact your local Pall representative or Pall to obtain more information.



Standard AP-2 Aria Water Treatment System

Glossary of Terms

The following glossary of common terms used by Pall and the membrane filtration industry may be of use to the reader. Abbreviations for many terms are included.

Air Scrub (AS)
A method of cleaning membrane modules which uses compressed air injected into the modules to 'scrub' the fibers - dislodging and removing particles from the upstream side of the filter membrane and discharging them out of the system (to drain).

Clean - In - Place (CIP)
A method of cleaning membrane modules that involves the circulation of chemicals through the filter membrane modules. Caustic chemicals are used for dissolving and removing accumulated organic materials from the membrane. Acidic chemicals are used for dissolving and removing accumulated mineral deposits from the membrane.

Operator Interface Terminal (OIT)
The Operational Control by which the filter system is started, stopped and regulated. This 'front end' system control provides a convenient graphical interface for the operator of the system.

Microza MF/UF Modules
The brand name for Pall Corporation's MF/UF modules. These modules are manufactured by Asahi Chemical Company and sold by Pall Corporation under an exclusive agreement with Asahi.

Filtered Water / Permeate / Filtrate
The treated, or clean water produced by the membrane modules.

Reverse Filtration (RF)
A cleaning method used by Pall to keep module flux high. Similar to "backflushing" or "backwashing" where membrane flow is reversed. The reverse flow removes the particles trapped in and on the membrane and carries the particles away from the membranes.

Trans-Membrane Pressure (TMP)
Defined as average pressure drop across the module fibers. In practice, TMP is calculated by averaging the Inlet and Outlet Pressures, then subtracting the Permeate Pressure. TMP increases with increasing flux and accumulating particle build-up on the membrane. TMP decreases with effective membrane cleaning and reduced flow.

Microfiltration (MF)
Microfiltration is a size-exclusion, pressure-driven membrane process that operates at ambient temperature. It is usually considered an intermediate between UF and multi-media granular filtration. It is an effective barrier for particles, bacteria and protozoan cycts. The systems operate at pressures between 5 and 45 pounds per square inch (psi).

Ultrafiltration (UF)
Ultrafiltration membrane systems retain particles, bacteria, protozoa, viruses and organic molecules greater than their rated molecular weight cut-off. They operate at pressures between 10 and 50 psi.

Feed Recirculation
This refers to a small amount of flow (up to 10% of the raw water volume) which circulates through the Microza modules, continuously flushing across the upstream (dirty) side of the membrane. Feed Recirculation does not pass through the membranes.

TREATMENT EQUIPMENT CO.
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PALL Water Processing

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*Filtration. Separation. Solution.*SM

WP300

APPENDIX H

BURLINGTON MUNICIPAL CODE: SEWER RATES

Chapter 13.08
SEWER RATES

Sections:

13.08.010 Definitions.

A. "Biochemical oxygen demand (BOD)" means the quantity of oxygen utilized in the biochemical oxidation of organic matter under standard laboratory procedure in five days at 20 degrees Celsius, expressed in milligrams per liter (mg/l).

B. "Chargeable water" shall be measured by the water consumed on the premises and which subsequently enters the sanitary sewer system, whatever the source of such water; and the same will be metered either by public utility meter or one installed and maintained by the owner of the premises at his own expense and approved by the city. Where the use of water is such that a portion of all the water used does not flow into the sewer system, but is lost by evaporation, irrigation, sprinkling, or is used in a manufactured product, and the person in control provides proof of this fact and

installs a meter or other measuring device approved by the city to measure the amount of water so used and so lost, this water may be deducted from the actual water consumption used in calculating the sewer charge. The sewer charges for residential users during the irrigation season shall be computed on the average consumption during the previous nonirrigation season, unless the user elects to install, at his own expense, an approved measuring device to measure water not entering the sewer system.

C. "High strength" means wastewater discharged from commercial accounts with Standard Industrial Classification Codes 5812, 5147, 5093, or wastewater discharged to the sewer system containing a BOD between 700 to 1,050 mg/l or total suspended solids of 700 to 1,050 mg/l.

D. "Low strength" means wastewater discharged to the sewer system containing less than 350 mg/l BOD or less than 350 mg/l total suspended solids.

E. "Medium strength" means wastewater discharged from commercial accounts with Standard Industrial Classification Codes 2051, 5411, or 7833, or wastewater discharged to the sewer system containing a BOD of 350 to 700 mg/l and less than 700 mg/l total suspended solids, or wastewater discharged to the sewer system containing total suspended solids of 350 to 700 mg/l and BOD less than 700 mg/l.

F. "Total suspended solids (TSS)" means total suspended matter that either floats on the surface of, or in suspension in, water, wastewater or other liquids, and that is removable by laboratory filtering as prescribed in "Standard Methods for the Examination of Water and Wastewater" and referred to as nonfilterable residue expressed in milligrams per liter (mg/l).

G. "Very high strength" means wastewater discharged to the sewer system in which the average of the BOD and total suspended solids

$$\frac{\text{BOD mg/l} + \text{TSS mg/l}}{2}$$

exceeds 1,050 mg/l. (Ord. 1386 § 2(1), 1999; Ord. 1305 § 2(1), 1995; Ord. 1119 § 2, 1988; Ord. 1061 § 2, 1985; Ord. 1009 § 1, 1982; Ord. 451 § 4, 1947).

13.08.020 Established.
In order to take care of the costs of maintenance and operation, bond and warrant principal and interest, reserve fund requirements, and other costs incidental to the sewer and refuse collection and disposal systems, the sewer rates set forth in BMC 13.08.030 through 13.08.070 shall apply. (Ord. 1009 § 1, 1982; Ord. 451 § 4, 1947).

13.08.030 Single-family residences, duplexes and triplexes – Within the city.
Effective January 1, 2008, the monthly rate charged for all chargeable water discharged into the city system shall be:

Up to 500 cubic feet	$28.81/month (minimum)
All over 500 cubic feet	$4.11/100 cubic feet
	Plus state taxes

Effective January 1, 2009, the monthly rate charged for all chargeable water discharged into the city system shall be:

Up to 500 cubic feet	$29.67/month (minimum)
All over 500 cubic feet	$4.23/100 cubic feet
	Plus state taxes

Effective January 1, 2010, the monthly rate charged for all chargeable water discharged into the city system shall be:

Up to 500 cubic feet	$30.56/month (minimum)
All over 500 cubic feet	$4.36/100 cubic feet
	Plus state taxes

The above schedules shall be in effect November through April based upon PUD water meter or sewage flow meter readings as follows:

Bimonthly Billing

For Billing Period	You will be billed during the month of:
November – December	January
January – February	March
March – April	May
May – June	July
July – August	September
September – October	November

The average monthly meter reading for the previous six months (November through April) shall be used for billing purposes from May through October. (Ord. 1641 § 3, 2007; Ord. 1518 § 1, 2003; Ord. 1386 § 2(2), 1999; Ord. 1305 § 2(2), 1995; Ord. 1152 § 2, 1989; Ord. 1119 § 2, 1988; Ord. 1061 § 2, 1985; Ord. 1009 § 1, 1982; Ord. 451 § 4(a)(1), 1947).

13.08.040 Residential – Exceptions.

Should there be no PUD water meter or sewage flow meter reading available (such as private water system, new customer, no previous history for the six-month summer period) or should rates based upon water meter readings be judged unreasonable as confirmed by mutual written agreement between customer and the city, the following rates shall apply until such time as the normal residential schedule could be implemented:

Effective January 1, 2008

Family Size (# people living in residence)	Monthly Rate
2	$28.81
3 to 4	$43.21
5 or more	$57.62
	Plus state taxes

Effective January 1, 2009

Family Size (# people living in residence)	Monthly Rate
2	$29.67
3 to 4	$44.51
5 or more	$59.35
	Plus state taxes

Effective January 1, 2010

Family Size (# people living in residence)	Monthly Rate
2	$30.56
3 to 4	$45.85
5 or more	$61.13
	Plus state taxes

(Ord. 1641 § 4, 2007; Ord. 1518 § 1, 2003; Ord. 1386 § 2(5)(a), 1999; Ord. 1305 § 2(5)(a), 1995; Ord. 1152 § 2, 1989; Ord. 1119 § 2, 1988; Ord. 1061 § 2, 1985; Ord. 1009 § 1, 1982; Ord. 451 § 4(b)(1), 1947).

13.08.045 Minimum service charge for residential units not connected to the sewer system. Any person failing to connect his or her residential unit to the city sewer system in compliance with BMC 13.04.020 and 13.04.400 shall pay a penalty to the city in an amount equal to the minimum charge that would be made for sewer service if the residential property was connected to such system. All penalties collected shall be considered revenue of the system. The minimum service charge will be based on the location of the residential property whether it is inside the city limits or is located outside of the city limits per BMC 13.08.030 and 13.08.065. (Ord. 1518 § 2, 2003).

13.08.050 Commercial accounts and residential accounts containing more than three living units – Inside city limits.
A. Low Strength Commercial Accounts and Residential Accounts Containing More Than Three Living Units – Inside the City Limits. Effective January 1, 2008, the monthly rate charged for all chargeable water discharged into the city system shall be:

Up to 500 cubic feet	$28.81/month (minimum)
All over 500 cubic feet	$4.11/100 cubic feet
	Plus state taxes

Effective January 1, 2009, the monthly rate charged for all chargeable water discharged into the city system shall be:

Up to 500 cubic feet	$29.67/month (minimum)
All over 500 cubic feet	$4.23/100 cubic feet
	Plus state taxes

Effective January 1, 2010, the monthly rate charged for all chargeable water discharged into the city system shall be:

Up to 500 cubic feet	$30.56/month (minimum)
All over 500 cubic feet	$4.36/100 cubic feet
	Plus state taxes

B. Medium Strength Commercial Accounts – Inside the City Limits. Effective January 1, 2008, the monthly rate charged for all chargeable water discharged into the city system shall be:

Up to 500 cubic feet	$40.98/month (minimum)
All over 500 cubic feet	$6.55/100 cubic feet
	Plus state taxes

Effective January 1, 2009, the monthly rate charged for all chargeable water discharged into the city system shall be:

Up to 500 cubic feet	$42.21/month (minimum)
All over 500 cubic feet	$6.75/100 cubic feet
	Plus state taxes

Effective January 1, 2010, the monthly rate charged for all chargeable water discharged into the city system shall be:

Up to 500 cubic feet	$43.48/month (minimum)
All over 500 cubic feet	$6.95/100 cubic feet
	Plus state taxes

C. High Strength Commercial Accounts – Inside the City Limits. Effective January 1, 2008, the monthly rate charged for all chargeable water discharged into the city system shall be:

Up to 500 cubic feet	\$52.73/month (minimum)
All over 500 cubic feet	\$8.89/100 cubic feet
	Plus state taxes

Effective January 1, 2009, the monthly rate charged for all chargeable water discharged into the city system shall be:

Up to 500 cubic feet	\$54.31/month (minimum)
All over 500 cubic feet	\$9.16/100 cubic feet
	Plus state taxes

Effective January 1, 2010, the monthly rate charged for all chargeable water discharged into the city system shall be:

Up to 500 cubic feet	\$55.94/month (minimum)
All over 500 cubic feet	\$9.43/100 cubic feet
	Plus state taxes

D. Very High Strength Commercial Accounts – Inside the City Limits. Effective January 1, 2008:

A volume charge, in dollars per 100 cubic feet, for wastewater where the average of the mg/l BOD_5 and TSS concentration exceeds 1,050 mg/l would be as follows:

Volume charge, \$/ccf =
1.90 + (0.00662 x [ ] mg/l average
of BOD_5 and TSS concentration)

Effective January 1, 2009:

A volume charge, in dollars per 100 cubic feet, for wastewater where the average of the mg/l BOD_5 and TSS concentration exceeds 1,050 mg/l would be as follows:

Volume charge, \$/ccf =
1.96 + (0.00682 x [ ] mg/l average
of BOD_5 and TSS concentration)

Effective January 1, 2010:

A volume charge, in dollars per 100 cubic feet, for wastewater where the average of the mg/l BOD_5 and TSS concentration exceeds 1,050 mg/l would be as follows:

Volume charge, \$/ccf =

2.02 + (0.00702 x [ ] mg/l average
of BOD_5 and TSS concentration)

E. The above schedules shall be in effect from January through December based upon PUD water meter or sewage flow meter readings as follows:

Bimonthly Billing

For Billing Period	You will be billed during the month of:
November – December	January
January – February	March
March – April	May
May – June	July
July – August	September
September – October	November

(Ord. 1641 § 5, 2007; Ord. 1518 § 1, 2003; Ord. 1386 § 2(3), 1999; Ord. 1305 § 2(3), 1995; Ord. 1152 § 2, 1989; Ord. 1119 § 2, 1988; Ord. 1061 § 2, 1985; Ord. 1009 § 1, 1982; Ord. 451 § 4(a)(2), 1947).

13.08.060 Commercial – Exceptions.
If by mutual written agreement between customer and city, meter control is determined unreasonable, the following rates shall apply:

Effective January 1, 2008: $39.47/month per toilet, plus state taxes.

Effective January 1, 2009: $40.65/month per toilet, plus state taxes.

Effective January 1, 2010: $41.87/month per toilet, plus state taxes. (Ord. 1641 § 6, 2007; Ord. 1518 § 1, 2003; Ord. 1386 § 2(5)(b), 1999; Ord. 1305 § 2(5)(b), 1995; Ord. 1152 § 2, 1989; Ord. 1119 § 2, 1988; Ord. 1061 § 2, 1985; Ord. 1009 § 1, 1982; Ord. 451 § 4(b)(2), 1947).

13.08.065 Service outside city limits – Rates.
The rates and charges for sewer service to property located outside the city limits, if sewer service is allowed, shall be one and one-quarter times the applicable rate specified for property located inside the city limits, plus state taxes. (Ord. 1386 § 2(4), 1999; Ord. 1305 § 2(4), 1995).

13.08.070 Irrigation season.
The sewer charges for residential users during the irrigation season shall be computed on the average consumption during the previous nonirrigation season, unless the user elects to install, at his own expense, an approved measuring device to measure water not entering the sewer system. When a user has a swimming pool or an air conditioner discharging to the storm sewer, he must install an approved meter to determine the amount of water exempt from sewer charges during the irrigation season. The irrigation season shall be defined as the period of May through October. (Ord. 1152 § 2, 1989; Ord. 1119 § 2, 1988; Ord. 1061 § 2, 1985; Ord. 1009 § 2, 1982; Ord. 451 § 4, 1947).

13.08.075 Annual rate review.

The city council may direct an annual review of the revenue requirements of the city sewer utility for the purpose of determining whether adjustments in the rates are necessary. (Ord. 1386 § 2(6), 1999; Ord. 1305 § 2(6), 1995).

13.08.080 Payment – Due date – Delinquency penalty.

All of the foregoing charges for sewerage services and those hereafter fixed by the council shall be paid on or before 30 days after the date of billing as shown upon the city's billing statement, and if not so paid, a penalty of $5.00 per month will be made on each delinquent account. Additionally, interest shall be charged against each delinquent account at a rate of eight percent per annum. (Ord. 1182 § 1, 1991; Ord. 1163 § 1, 1990; Ord. 1064 § 1, 1985; Ord. 1062 § 4, 1985; Ord. 451 § 6, 1947).

13.08.090 Charges deemed lien when – Recordation notice.

All delinquent and unpaid rates and charges, including interest and penalty thereon for sewerage service, shall be a lien against the premises to which the same has been furnished, and the rate of interest on such delinquency is fixed at 10 percent. Such lien shall be effective for a total of not to exceed six months' delinquent charges without the necessity of any writing or recording, but if the lien is for more than six months' charges, the city clerk-treasurer or official charged with the administration of the affairs of such utility shall cause to be filed for record in the office of the county auditor of Skagit County a notice in substantially the following form:

> Sewerage Lien Notice
>
> City of Burlington, Wash.,__________
> –VS –
> _________________, Reputed owner,
>
> Notice is hereby given that the city of Burlington has and claims a lien for sewer charges against the following described premises, situated in Skagit County, Washington, to-wit:
>
> (Legal description)
>
> Said lien is claimed for not exceeding six months such charges and interest now delinquent, amounting to $____, and is also claimed for future sewerage charges against said premises.
>
> Dated________
>
> City of Burlington
> By________________

(Ord. 451 § 1, 1947).

13.08.100 Lien foreclosure procedures.

The lien described in BMC 13.08.090 may be foreclosed and any of the tracts or premises subject to said lien proceeded against and all parties of record as owning or claiming to own, having or claiming to have, any interest in, or lien upon said tracts or premises shall be made defendants thereto, together with all parties personally liable for any charges involved, including court costs, interest and attorney's fees, all as provided in Chapter No. 193 of the Session Laws of the State of Washington, 1941, as amended. (Ord. 451 § 8, 1947).

13.08.110 Changes to rates or charges – Council resolution required.

The council of the city may, from time to time as necessity therefor arises, change any of the rates and charges set forth in this chapter, or fix rates and charges for sewerage service by resolution, for all classes of buildings, structures and properties not provided for in this chapter. (Ord. 451 § 5, 1947).