

**COMPREHENSIVE
SEWER SYSTEM PLAN**

**BIRCH BAY WATER AND SEWER DISTRICT
WHATCOM COUNTY, WASHINGTON**

May 2009

CHS ENGINEERS, LLC

This report was prepared under the supervision of a
Registered Professional Engineer.

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COMPREHENSIVE SEWER SYSTEM PLAN

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SUMMARY AND RECOMMENDATIONS

BACKGROUND

The subject of this report is the public sewer collection system and wastewater treatment plant (WWTP) owned, operated and maintained by Birch Bay Water and Sewer District. The District is a municipal corporation in the form of a special purpose district, under RCW 56 and 57. The District provides public water and sewer service to an unincorporated portion of northwestern Whatcom County. This area has been designated as the "Birch Bay Urban Growth Area" in the Whatcom County Comprehensive plan.

Birch Bay Water and Sewer District is located immediately south of the City of Blaine (see Figure 1.1). The District is bordered on the west by Birch Bay and Semiahmoo Bay and on the north by the Blaine City limits and Drayton Harbor. The eastern boundary line is irregular ranging from a minimum of 1,000 feet to over one and one half miles east of Birch Bay. The southern boundary is also irregular from Alderson Road south to Grandview Road. The District presently includes approximately 6,700 acres. The sewer service area and District boundary are shown on Figure 1.2.

The District was formed as Whatcom County Water District No. 8 in 1968. The first wastewater engineering report was completed in 1970 and the WWTP went into service in December, 1976. The District office and WWTP are located at 7096 Point Whitehorn Road, Birch Bay, Washington 98320-96745, telephone 360-371-7100, facsimile 360-371-2806. The WWTP discharges to the Strait of Georgia under NPDES Permit WA 002955-6 (see Appendix D) and per the terms of an aquatic lands lease (see Appendix G).

The following paragraphs present a condensed review of the Comprehensive Sewer System Plan, summarizing the principal features of this report. Specific recommendations are presented in this summary based on findings and conclusions reached during the study of the sewer system.

SEWER SERVICE AREA

The sewer service area for this plan is all the area within the current District boundary, with the following exceptions: the area inside the District but outside the Birch Bay UGA along Birch Bay-Lynden Road east of Blaine Road; the area inside the District but outside the Birch Bay UGA at Birch Point; and the District wastewater treatment plant site east of Point Whitehorn Road. The service area also includes the following portions of the Blaine or Birch Bay UGA currently outside of the District boundary: south of Dakota Creek and Portal Way; east of Blaine Road and south of California Creek and along Arnie Road.

The District also provides domestic wastewater service for the BP Cherry Point Refinery by agreement. The refinery is located outside the District boundary and sewer service area.

POPULATION

The annual growth rate of sewer connections within Birch Bay Water and Sewer District since 1998 has averaged about 3.1%. This compares with recent projected growth figures for the entire Whatcom County of about 1.5% per year. Assuming variable growth as the economy regains strength, the permanent population in the District sewer service area is expected to reach 6,400 by 2010 and 11,307 by 2029.

DESIGN CRITERIA

The design criteria used in this comprehensive plan is based on "Criteria for Sewage Works Design" established by the State of Washington Department of Ecology, District historical design criteria, actual usage records and other accepted standards for wastewater system design and construction.

SEWER SYSTEM

Birch Bay Water and Sewer District has been providing sewer service for the Birch Bay area since the fall of 1976 when the District's 0.5 MGD wastewater treatment plant went into operation. The plant capacity was expanded to 1.0 MGD in 1986 and again to 1.28 mgd in 1999. The peak summer daily flow through January 2009 was 966,000 gallons per day (2008) and the maximum month average daily flow through January 2009, was 1,204,000 gallons per day (January, 2006).

The collection system is composed of approximately 56 miles of gravity and pressure sewers including 11 pump stations. The pump stations along Birch Bay Drive are the backbone of the collection system.

CAPITAL IMPROVEMENT PLAN

This Comprehensive Sewer System Plan identifies projects that will be necessary to extend sewer service throughout the urban growth area around Birch Bay. Several of the projects are recommended for completion over the next ten years, as summarized in Table S.1

**Table S.1
10-YEAR CAPITAL IMPROVEMENT PLAN**

ID	Capital Improvement	Project Description (See Table 7.2 for detailed description)	Estimated Project Cost (2009)	Estimated Year of Completion
I. WWTP				
T-1a	WWTP	Headworks	\$ 2,000,000	2010
T-1b	WWTP	New Process Water PS	\$ 41,000	2010
T-2a	WWTP	2 New Oxidation Ditches	\$ 3,591,000	2014
T-2b	WWTP	New Flow Split Structures (Allowance)	\$ 103,000	2014
T-2c	WWTP	Upgrade Aerobic Digesters	\$ 385,000	2014
T-2d	WWTP	Convert AB to Digestion (Allowance)	\$ 309,000	2014
T-2e	WWTP	Gravity Belt Thickener	\$ 1,504,000	2014
T-2f	WWTP	New Dewatering and Class A (Allowance)	\$ 3,248,000	2014
Subtotal for WWTP Projects			\$ 11,181,000	
II. PUMPING				
P-1a	PS #1 Replacement 8" FM	Relocate and increase station capacity.	\$ 762,000	2009
P-1b	5" FM	Add separate force main for State Park PS discharge.	\$ 216,000	2009
P-1c	14", 16" & 18" FM	Complete force mains to WWTP, add flow meters & valve vault to PS #3.	\$ 4,717,000	2009
P-2a	16" & 18" FM	Continue force mains from PS #3 to PS #4.	\$ 1,066,000	2010
P-2b	PS Upgrade	Increase station capacity.	\$ 2,850,000	2010
P-3	PS Upgrade & 12" FM	Increase station capacity and replace force main.	\$ 344,000	2011
P-4	PS Upgrade & 18" FM	Upgrade station force main, increase station capacity.	\$ 1,318,000	2011
P-5	PS Upgrade & 10" FM	Increase station capacity.	\$ 341,000	2015
P-6	Building	Replace electrical system.	\$ 365,000	2010
P-7	PS Upgrade & 16" FM	Upgrade station force main, increase station capacity.	\$ 336,000	2015
P-8	PS Upgrade & 10" FM	Increase station capacity and replace force main.	\$ 359,000	2017
P-9	PS Upgrade & 18" FM	Modify pump station, construct force main.	\$ 1,252,000	2012
P-13	PS C & 3" FM	Construct submersible pump station and construct force main.	\$ 1,169,000	2010
Subtotal for Pumping Projects			\$ 15,095,000	

**Table S.1
10-YEAR CAPITAL IMPROVEMENT PLAN**

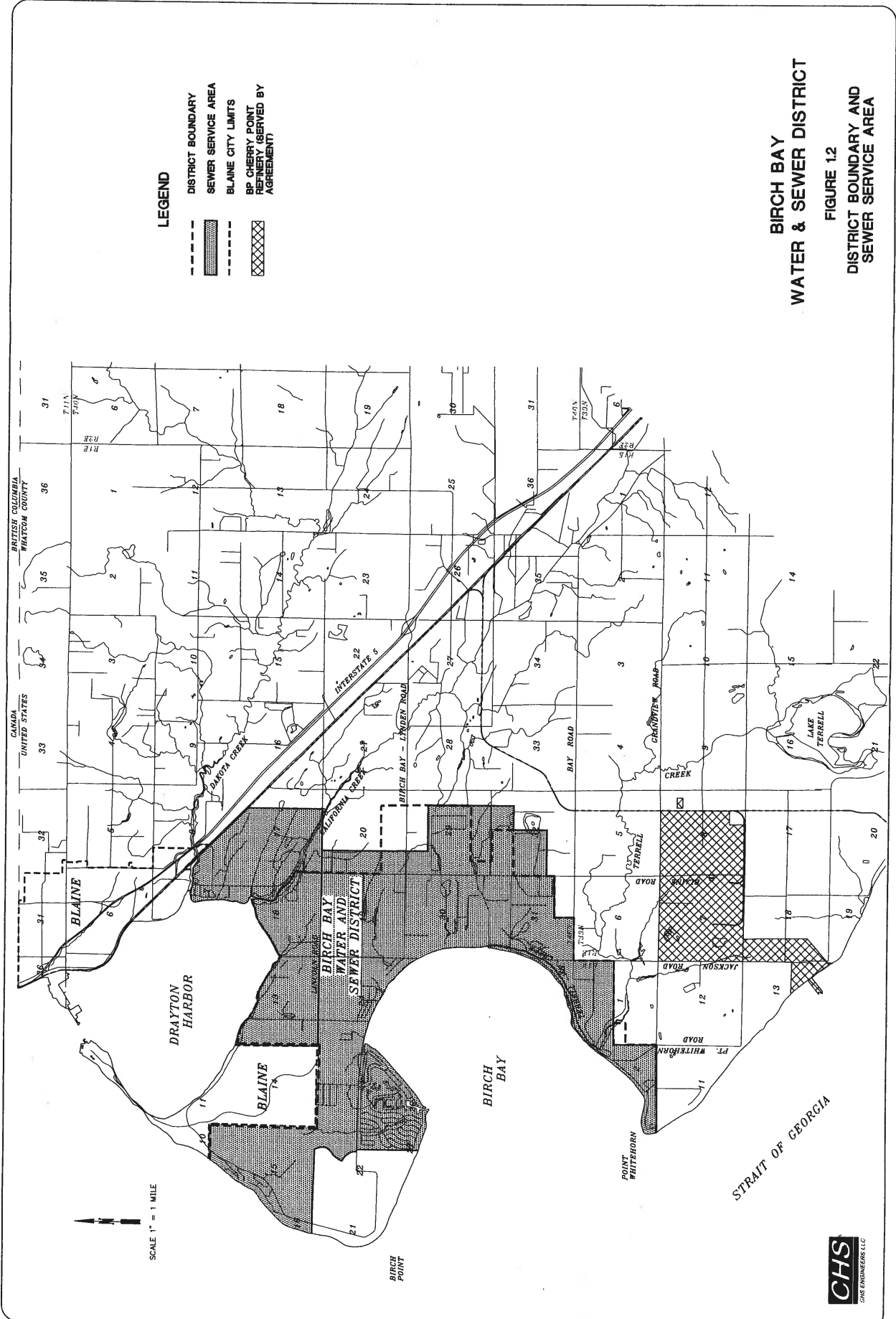
ID	Capital Improvement	Project Description (See Table 7.2 for detailed description)	Estimated Project Cost (2009)	Estimated Year of Completion
III. COLLECTION				
1	Collection System Evaluation & Repair - I/I	Continue evaluation of sanitary sewer system and continue remediation program.	\$ 350,000	2009-2019
2	27"	Install 2900 LF parallel sewer and modify existing piping.	\$ 1,305,000	2011
3	24"	Install 2890 LF parallel sewer.	\$ 1,272,000	2011
4	21"	Install 3180 LF parallel sewer and modify existing piping.	\$ 1,336,000	2015
5	21"	Install 3770 LF parallel sewer.	\$ 1,583,000	2015
12	24"	Construct 1476 LF parallel sewer.	\$ 649,000	2012
13	15"	Construct 1600 LF parallel sewer.	\$ 576,000	2012
20	10"	Construct 1650 LF sewer.	\$ 545,000	2011
23	15" & 18"	Construct 1400 LF sewer.	\$ 522,000	2010
24	12"	Construct 1300 LF sewer.	\$ 442,000	2010
Subtotal for Collection Projects			\$ 8,580,000	
IV. OTHER				
0-1	N/A	Acute and Chronic Toxicity Testing	\$ 5,000	2010
0-2	N/A	Outfall Evaluation	\$ 15,000	2010
0-3	N/A	Effluent Mixing Study	\$ 35,000	2011
0-4	N/A	Application for NPDES Permit Renewal	\$ 6,000	2012
0-5	N/A	Engineering Report Update	\$ 60,000	2013
0-6	N/A	Comprehensive Sewer Plan Update	\$ 80,000	2013
0-7	N/A	Water Reclamation Engineering Report	\$ 60,000	TBD
Subtotal for Other Projects			\$ 201,000	

Grand Total \$ 35,057,000

RECOMMENDATIONS

On the basis of the information presented in this report, it is recommended that Birch Bay Water and Sewer District:

1. Conduct a public hearing to receive input on the plan; specifically, the Capital Improvement Plan. Review and update the Capital Improvement Plan annually, including public hearings.
2. Adopt the Comprehensive Sewer System Plan for improvements as set forth herein.
3. Submit copies of this report to appropriate regulatory agencies for approval.
4. Complete the recommended wastewater treatment plant and collection system improvements.
5. Continue evaluation of the sewer collection system for excessive inflow and infiltration and implement measures to eliminate such flows.
6. Periodically review the Plan and update it to conform to actual growth patterns and population levels and to remain consistent with land use designation.



**BIRCH BAY
WATER & SEWER DISTRICT**

FIGURE 1.2

**DISTRICT BOUNDARY AND
SEWER SERVICE AREA**

- LEGEND**
- DISTRICT BOUNDARY
 - ▨ SEWER SERVICE AREA
 - - - - - BLAINE CITY LIMITS
 - ⊗ BP CHERRY POINT REFINERY (SERVED BY AGREEMENT)

SCALE 1" = 1 MILE



