

COMPLETE BIRCH BAY WATER AND SEWER COMPREHENSIVE **SEWER** SYSTEM PLAN UPDATE CAN BE FOUND AS FOLLOWS:

Sewer Plan – without appendices: <https://chs.egnyte.com/dl/VNqap0SKFo>

Sewer Plan – appendices only: <https://chs.egnyte.com/dl/pHhXhJDXhD>

# BIRCH BAY WATER & SEWER DISTRICT COMPREHENSIVE SEWER SYSTEM PLAN UPDATE SUMMARY AND RECOMMENDATIONS

**COMPREHENSIVE  
SEWER SYSTEM PLAN**



June 2019  
Revised April 2020



# SUMMARY AND RECOMMENDATIONS

## BACKGROUND

The subject of this report is the public wastewater 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, subject to RCW 57. The District provides public water and sewer service to an unincorporated portion of northwestern Whatcom County. Much of this area has been designated as the Birch Bay Urban Growth Area (UGA) 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 6,670 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 E).

This plan has been prepared in the context of the following land use planning documents.

- September 2004 (revised May 2009) *Whatcom County Birch Bay Community Plan (BBCP)*
- *Whatcom County Population and Employment Projection and Urban Growth Area Allocations Phase I Technical Report* (revised November 1, 2013, BERK)
- November 2015 *Whatcom County 2016 Comprehensive Plan and Development Regulations Update and Urban Growth Areas Review Environmental Impact Statement*
- *Whatcom County Comprehensive Plan (2016)*

The following is a summary of the *Comprehensive Sewer System Plan*, presenting the principal findings and recommendations of this report.

## **SEWER SERVICE AREA**

The sewer service area designated in this plan is all the area within the Birch Bay UGA as designated by Whatcom County, and plats and parcels outside of the present UGA already served by the District sewer system. The sewer service area does not include all area within the current District boundary. The service area includes the following areas outside of the District boundary: a parcel in Blaine south of the Semiahmoo development, the Loomis Trail development and golf course area, an area northeast of the intersection of Blaine Road and Birch Bay – Lynden Road and an area southeast of the intersection of Alderson Road and Blaine 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 direct sewer service area.

## **POPULATION**

The annual population growth rate within the Birch Bay UGA increased an average of 1.56% per year from 2010 to 2013. The projected annual growth rate from 2013 through 2036 in the Birch Bay UGA is 2.3353%. In the sewer service area outside the UGA, the population growth rate varies by select study area. In addition, there are several miscellaneous rural parcels currently being served. These parcels are assumed to have no growth over the planning period. Collectively the effective annual growth rate outside the UGA is forecast to be 0.41%. The population in the District sewer service area is forecast to reach 9,386 in 2020 and 13,643 in 2038.

The baseline for the forecast is 2013, based on the County's detailed analysis. The forecast population for the end of 2018 is 8,982. Based on actual growth in sewer connections for 2013-2018, the estimated sewer service area population is about 8,350, 630 persons or about 7.0% below the forecast. This can be interpreted that growth is lagging the forecast by about three and one-half years.

## **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 million gallon per day (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. With the completion of aeration system improvements in 2016, the permitted capacity increased to 1.44 mgd. For the

period 2009 through 2017, the maximum daily flow was 3.351 mgd (December 2010) and the maximum month average daily flow was 1.276 mgd (January 2018).

The collection system is composed of nearly 63 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 Birch Bay Urban Growth Area. Several of the projects are recommended for completion over the next ten years, as summarized in Table S.1.

## **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.
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. Review and update the sewer general facilities charge based on the adopted Capital Improvement Plan.
5. Complete the recommended wastewater treatment plant and collection system improvements.
6. Continue evaluation of the sewer collection system for excessive inflow and infiltration and implement measures to eliminate such flows.
7. Periodically review the Plan and update it to conform to actual growth patterns and population levels and to remain consistent with land use designations in the sewer service area.

TABLE S.1

10-YEAR CAPITAL IMPROVEMENT PLAN (2019-2028)

ID	Capital Improvement	Project Description	Estimated Project Cost (2019 \$)	Recommended Year of Completion
<b>I. WWTP</b>				
T-1	Toxicity Testing	Acute and Chronic Toxicity Testing	\$ 12,000	2024
T-2	Evaluation	Outfall Evaluation and Effluent Mixing Study	\$ 25,000	2024
T-3	NPDES	NPDES Permit Renewal	\$ 1,000	2024
T-4	WWTP Eng. Report	Engineering Report Update, including evaluation in support of Projects T-7, T-8 and T-9	\$ 60,000	2020
T-5	UV Upgrade	Replace UV Modules with high output modules (4 total) and replace appurtenances	\$ 373,000	2019
T-6	Headworks Odor Control Upgrades	Implement upgrades, per findings of Project T-4, for odor and moisture containment and additional blower with scrubber (see note 1)	\$ 170,000	2020
T-7	Biosolids Management Upgrade	Implement first phase of upgrades, per findings of Project T-4, for improved solids thickening, digester cover and replacement south basin diffusers (see note 1)	\$ 200,000	2019 & 2020
T-8	WWTP Site Work	Misc. site improvements to address paving and drainage deficiencies (Consider coordinating timing to follow access road water main work)	\$ 84,000	2021
T-9	WWTP Upgrades	Aeration/Clarification Upgrades based on 2012 WWTP Engineering Report, as refined by Project T-4 (see note 1)	\$ 6,800,000	2022-2024
<b>Subtotal for WWTP Projects</b>			<b>\$ 7,725,000</b>	

TABLE S.1

10-YEAR CAPITAL IMPROVEMENT PLAN (2019-2028)

ID	Capital Improvement	Project Description	Estimated Project Cost (2019 \$)	Recommended Year of Completion
<b>II. PUMPING</b>				
P-1	PS #8 Structure	Replace top slab of generator vault.	\$ 268,000	2019
P-2	PS #3 Pump Upgrade Phase 1	Evaluate/replace ex. pumps to restore to nameplate capacity/increase capacity to 3,800 gpm, for full use of 16" force main, including replacement generator (approx. 10 years of growth capacity, anticipated to be accommodated in ex. structures and piping)	\$ 520,000	2020-2021
P-3	PS #4 and FM Upgrade Phase 1	Upgrade PS #4 to 3,400 gpm (approximately 10 years of growth capacity), including 16" replacement force main crossing of Terrel Creek and replacement generator (Configuration to be confirmed with Project O-1 but additional wet well and generator vault not anticipated)	\$ 556,000	2021-2022
P-4	PS BR Upgrade	Upgrade PS BR to 1,000 gpm capacity (upgrades will require larger generator and motor controls centers, but upgrade is anticipated to be accommodated in ex. structures and piping)	\$ 312,000	2022-2023
P-5	PS #5 and FM Upgrade	Upgrade PS #5 to 2,600 gpm, including replacement 12" force main split to two interceptors. Include manual transfer switch and receptacle for portable standby power connection.	\$ 337,000	2024
P-6	PS #6 and FM Upgrade	Upgrade PS #6 to 2,200 gpm, including replacement generator and replacement 12" force main split to two interceptors.	\$ 480,000	2026
P-7	PS #7 and FM Upgrade	Upgrade PS #7 to 1,600 gpm, including replacement 10" force main and split to two interceptors.	\$ 303,000	2028
<b>Subtotal for Pumping Projects</b>			<b>\$ 2,776,000</b>	

**TABLE S.1**  
**10-YEAR CAPITAL IMPROVEMENT PLAN (2019-2028)**

ID	Capital Improvement	Project Description	Estimated Project Cost (2019 \$)	Recommended Year of Completion
<b>III. COLLECTION</b>				
C-1	Collection System Evaluation & Repair I/I	Continue evaluation of sanitary sewer system to identify sources of extraneous wastewater flow and continue program for remediation	\$ 315,000	2020-2038
C-2a	24" - PS #3 to #4 - Ph I	Install 2,201 ft. of 24" parallel gravity sewer interceptor from MH743-040 to 743-034 (consider 36" diameter to support feasibility of gravity bypass of PS #4 from Alderson Rd. interceptor, to be confirmed by Project O-1)	\$ 1,363,000	2020-2021
C-3a	18" - PS #4 to #5 - Ph I	Install 1,242 ft. of 18" parallel gravity sewer interceptor from MH 743-117A to 743-095. Modify piping at PS #5 to allow gravity overflow from wet well to new interceptor	\$ 703,000	2023
C-4a	15" - PS #5 to #6 - Ph I	Install 1,931 ft. of 15" parallel gravity sewer interceptor from MH 743-126 to 743-121	\$ 966,000	2025
C-5a	15" - PS #6 to #7 - Ph I	Install 1,551 ft. of 15" parallel gravity sewer interceptor from MH 742-050A to 742-037. Modify piping at PS #7 to allow gravity overflow from wet well to new interceptor	\$ 776,000	2027
C-6	12" - PS #8 to MH 742-105	Install 1,742 ft. of 12" parallel gravity sewer between PS #8 and MH 742-105. Alternatively extend PS #8 force main to MH 742-105 and upgrade pumps to maintain adequate capacity	\$ 819,000	2028
C-7	12" - Alderson Road (Parallel)	Install 2,401 ft. of 12" parallel gravity sewer between MH 743-080 to MH 743-042 (or as adjusted to integrate with the findings of Project O-1). May omit 492 ft. along existing steep segments, if diameter restriction is acceptable.	\$ 1,128,000	2028



TABLE S.1

10-YEAR CAPITAL IMPROVEMENT PLAN (2019-2028)

ID	Capital Improvement	Project Description	Estimated Project Cost (2019 \$)	Recommended Year of Completion
C-9	15" Alderson Rd.	Construct 850 ft. of 15" gravity sewer from MH 743-080 east along Alderson Road to replace the temporary gravity tightline receiving discharge from the Blaine Road PS force main and provide local service.	\$ 425,000	2020
C-10	12" Alderson Rd.	Construct 850 ft. of 12" gravity sewer from Project C-9 continuing east along Alderson Road, to replace the temporary gravity tightline receiving discharge from the Blaine Road PS force main and to provide local service.	\$ 400,000	2024
<b>Subtotal for Collection Projects</b>			<b>\$ 6,895,000</b>	
<b>IV. OTHER</b>				
O-1	PS #4 Pre-design Update	PS #4 and Alderson Rd. Gravity Sewer Bypass Pre-design Evaluation Update	\$ 25,000	2020
O-2	SCADA	SCADA System Upgrades	\$ 45,000	2019
O-3	Phones	Phone System Upgrades	\$ 15,000	2019
O-4	Vehicles	Replacement Vehicles	\$ 298,000	2019, 2022, 2023, 2024, 2027, 2028
O-5	CSP	Comprehensive Sewer Plan Update	\$ 150,000	2027
O-6	Reclaim Water ER	Water Reclamation Engineering Report	\$ 60,000	TBD, before 2029
O-7	Record	Digital Records Project	\$ 9,000	2019
O-8	Facility	Facility Upgrade/Building Upgrades	\$ 29,000	2019
O-9	Financial Management Policy	Update Financial Management Policy	\$ 7,500	2019
<b>Subtotal for Other Projects</b>			<b>\$ 638,500</b>	
<b>Grand Total</b>			<b>\$ 18,034,500</b>	

<sup>1</sup> Estimated project cost is a preliminary estimate for budget purposes. Project cost is subject to refinement of project objectives, scope and more detailed cost estimate.