

**Water System**

Shelter Bay Community owns and operates a private water distribution system. Water is supplied through a single 8-inch water main from the Town of La Conner to the east. La Conner receives its water from the Anacortes Transmission main, which supplies treated Skagit River water. In the 2011 Water Supply Agreement with the Town of La Conner, an annual volume of 75 million gallons per year is committed to Shelter Bay. The Town of La Conner is not obligated to provide fire flows to Shelter Bay, should their ability to provide normal service to their other customers on their distribution grid be compromised in such a situation. There is also a manually-operated intertie with the Swinomish Indian Tribal Community's water distribution system to the north, which can either supply or receive water. Shelter Bay also supplies/purveys water to the Eagle's Nest Community.

**Distribution System**

The water distribution system consists of 57,165 lineal feet (approximately 11 miles) of piping of various sizes and materials, four hydrants, and 77 standpipes. Currently, the water distribution system operates in two (2) pressure zones. The 195 Zone serves all of the lower elevation areas and supplies water to Shelter Bay's Primary Booster Pumps located adjacent to the maintenance shop. The Booster Pumps increase the pressure to create a 295 Zone that serves the remaining areas of Shelter Bay. In 2012 a new Water Booster Pump Station was installed to replace the old system, providing improvements in system functionality and efficiency.

**Water Storage**

The 147,000-gallon storage tank is situated on Muckleshoot Circle and is capable of serving a portion of Shelter Bay with adequate pressure via gravity. The storage tank configuration is such that it results in the tank filling and then remaining on standby under normal operations. Booster pumps are housed in a pump room located at the base of tank. When pressure falls below a specified setting, the booster pumps will come on, draw from the tank, and restore system pressure. The current system is not configured to allow the existing storage to be fed to the lower pressure zone. To allow this, pressure reducing valves would need to be installed to allow storage from the upper zone to be fed to the lower areas.

Based on Washington State Department of Health (DOH) sizing criteria, Shelter Bay Community should have a total of 350,000 gallons of available storage (for Residential Demand only), or approximately 200,000 gallons more than is currently available. Secondly, the storage needs to be configured in a manner that will provide service to all of Shelter Bay. Shelter Bay relies on the capacity of La Conner's water reservoir for supplying extended water service to the community during shutdowns from the Anacortes system (the primary water supplier).

**Fire flow**

When the Shelter Bay water system was originally constructed, it was not intended to provide the level of fire protection typically found in urban areas. Fire flow requirements vary

according to the regulating agency, zoning and use. A typical rate for residential neighborhoods is 1,000 gpm for 60 minutes, with no system pressure falling below 20 psi. The level of fire flow desired will also establish the storage volume required to supply the flow (1,000 gpm x 60m = 60,000 gal). To be valid, the storage has to be available during system power outages.

Shelter Bay's existing water system includes four 5-inch fire hydrants, in addition to 77 standpipes. The 2-inch standpipes are primarily intended to be used for flushing the water distribution system and are used in system repairs. To provide/increase fire protection, a significant amount of undersized piping would need to be replaced, hydrants and zone valves added, and upgrades to both the system pumping and storage would be required.

### **Water Loss**

A principal indicator of the condition of any water system is the amount of water that is lost to leakage, inaccurate metering, and unscheduled repairs. Typically this is done by comparing the amount of water purchased with the amount of water sold. All of the water meters on the water distribution grid are read every other month. This schedule allows Shelter Bay to regularly estimate system water losses throughout the year. For the calendar years 2016, 2017 and 2018, the water losses in the Shelter Bay water distribution system were less than 6.0%. The water loss goal is 5% or less. For the calendar year 2019, the estimated water loss was 8%. It is suspected that this higher rate of loss is due to the more frequent failures due to aging water distribution system components.

### **Sewer System**

Shelter Bay operates its own sanitary sewer system, comprised of a network of buried piping for wastewater collection and an on-site wastewater treatment plant (WWTP). The plant is located within the Community just south of the Swinomish Veteran's Cemetery on Samish Way.

### **Sanitary Sewer System Description**

#### **Wastewater Collection**

There is a network of sewer collection piping and four lift stations located in various places in Shelter Bay. The lift stations augment the power of gravity to pump the sewage to the treatment plant. The collection system serves 870 connections and has a total of 56,921 lineal feet (approximately 11 miles) of 8", 10", 12", and 15" gravity collection piping. The collection system was originally constructed in the early 1970's.

The means of evaluating buried piping primarily includes inspection of video records, smoke testing and other indications of excessive inflow and infiltration, and the frequency of back-ups or overflows. The collection system was cleaned and video-inspected in 2007, complete with video inspection records. The inspection revealed over 50 locations in the sewer collection system piping in need of some level of repair or replacement. In the spring of 2010, fifteen areas of the sewer collection system were prioritized and repaired via in-situ Perma-Liner™ point repair technology. The remaining piping was cleaned and inspected/videoed in 2012, revealing a few areas needing corrections/repairs. There are rough indicators of excess inflow and infiltration entering the sewage system as seen at the WWTP, however without adequate data, the degree of excess inflow and infiltration cannot be determined. In 2008 Shelter Bay upgraded the controls at the four lift stations and added backup generators in 2016.

## **Wastewater Treatment Plant (WWTP)**

The wastewater treatment plant is located on Samish Way, just south of the Swinomish Veteran's Cemetery. The plant treats an average of 130,000 gallons of residential sewage per day, but can peak at 250,000 gallons per day. The treatment process involves screening the raw sewage to remove grit and foreign materials; extended aeration and clarification; then transporting the sludge by truck to the City of Anacortes' treatment plant for final treatment and disposal. The remaining WWTP liquid waste is chlorinated for disinfection, then neutralized and discharged to the Swinomish Channel, under a National Pollutant Discharge Elimination System (NPDES) permit, issued by the US EPA. The WWTP runs 24 hours a day, 365 days per year.

The WWTP disinfection process currently incorporates the use of both liquid and gaseous chlorine and Vita-D-Chlor Neutral to treat and then neutralize the chlorine in the effluent wastewater. The percent removal of biochemical oxygen demand (BOD) and total suspended solids (TSS) must meet a minimum of 85 percent, according to the NPDES discharge permit standards. The 85% target is a standard requirement for most treatment plants. A review of the WWTP's daily monitoring reports indicate that the plant is functioning well within the requirements of the NPDES and has the capability to continue to serve Shelter Bay for the foreseeable future.

The plant also includes a slab on grade, wood framed building, with the majority of the roof in composite roofing material, and the remaining smaller portion in tar and gravel. The building houses the WWTP control center, backup generator, analytical laboratory, office with document/drawing storage space, and a bathroom and emergency shower wash facility. The laboratory is equipped with equipment including, but not limited to, a vacuum pump, incubator, drying oven, pH meter, dissolved oxygen meter, scale, refrigerator, sink/dishwasher, and peripheral testing supplies. The entire WWTP complex is enclosed by a 6-foot chain link fence and locking gate. The treatment plant was last expanded in 1993.