CHAPTER 2.
BACKGROUND

As part of the requirements for establishing a UGA, this Sewer Facility Plan was prepared to evaluate alternatives for developing a sewer system in the Port Hadlock/Irondale area. The goal of this Sewer Facility Plan is to assist the county in planning for growth in the area in accordance with the county’s comprehensive planning efforts; to satisfy RCW 36.94 concerning county’s sewerage, water, and drainage system responsibilities; and to gain approval from the Washington State Department of Ecology and the Washington State Department of Health.

Figure 2-1 shows a vicinity map of Port Hadlock. The proposed extent of sewer service is described later in this chapter.

JEFFERSON COUNTY VISION STATEMENT

The Jefferson County Comprehensive Plan contains the following vision for the area:

• Maintain and preserve the natural beauty, rural character, and variety of life styles that make up the intrinsic character of this community.

• Support a healthy, diversified, and sustainable local and regional economy by recognizing existing local businesses, making prudent and appropriate infrastructure investments, and encouraging new business start-ups and recruitment which are compatible with and complementary to the community.

• Protect and conserve the local natural resource base, balancing both habitat and economic values.

• Reinforce and enhance the historic sense of "place" or "community" around traditional population centers.

• Prevent the inappropriate or premature conversion of undeveloped land in favor of infill and the strengthening of local communities.

• Provide a degree of flexibility and autonomy for local communities to address their own unique needs.

• Encourage yet unrealized opportunities in community education, technology, transportation alternatives, habitat restoration and economic diversification.
Figure 2-1. Vicinity Map
SEWER PLANNING AREA AND URBAN GROWTH AREA (UGA)

This facility plan identifies two distinct areas as related to urban planning and sewer system development within the Port Hadlock/Irondale area. These are the Port Hadlock Urban Growth Area (PHUGA) and the Port Hadlock Sewer Planning Area (PHSPA) sewer planning area. The PHUGA is the planned urban growth area as identified by the Jefferson County Department of Community Development and represents the existing urban planning element for the Port Hadlock/Irondale area within the county’s Comprehensive Plan through the year 2024. The PHSPA is coincident with the PHUGA and provides for sewer service availability by the year 2024. A more detailed discussion regarding sewer planning horizons and the planning horizon used in the county’s Comprehensive Plan is presented in Chapter 4 of this document.

The coincident PHUGA and PHSPA are shown in Figure 2-2.

The sections below describes these areas and their important distinguishing characteristics as related to urban planning and sewer facility planning.

Port Hadlock Urban Growth Area (PHUGA)

The PHUGA is an unincorporated UGA, located approximately six miles south of the City of Port Townsend, adjacent to Port Townsend Bay. This unincorporated UGA is subject to the Jefferson County Comprehensive Plan (CP) and implementing regulations. Figure 2-2 shows anticipated 6-year and 20-year sewer service area boundaries within the PHUGA. These boundaries represent the near term plan and the long term plan to provide sewer service availability within the sewer planning area.

PHUGA Land Use and Zoning

Per the Jefferson County Comprehensive Plan, the PHUGA encompasses approximately 1290 acres. Population projections in this document are based on the 2000 census which showed a residential population of 2,553 persons. The existing land use pattern is characterized by commercial development concentrated along the major highway corridors (Rhody Drive, Ness’ Corner Road, and Chimacum Road) and existing developed single-family neighborhoods northeast and south of the commercial core area. There are scattered multi-family apartment complexes mostly located at the fringe of the Port Hadlock commercial core area.

Land use in the PHUGA includes commercial, public and quasi-public uses. These include facilities such as churches, the County Library and Chimacum Creek Elementary School, the Jefferson County Sheriff’s Office and Jail, Jefferson County Public Works Department Maintenance Yard, and the PUD’s Sparling Well facility along Rhody Drive and the Kively Well along Chimacum Road. In addition, there are several neighborhood parks and open space areas.

Future land use and zoning designations for the PHUGA are shown in Table 2-1 and are illustrated in the Irondale & Port Hadlock UGA Zoning Map (Figure 2-2). Land use districts correspond to the CP general urban land use designations and zoning districts illustrate the site-specific designations implemented by the Irondale & Port Hadlock UGA Implementing Regulations adopted as Title 18 of the Jefferson County Code.
Figure 2-2. Irondale & Port Hadlock UGA Sewer Service Area and Zoning Map
TABLE 2-1.
IRONDALE AND PORT HADLOCK UGA LAND USE AND ZONING DISTRICTS

<table>
<thead>
<tr>
<th>Land Use Designation</th>
<th>Zoning District</th>
<th>Total (Gross) Acres</th>
<th>Net Developable Acres&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Net Developable Acres Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban Residential</td>
<td>Urban Low Density Residential</td>
<td>801</td>
<td>449</td>
<td>56%</td>
</tr>
<tr>
<td></td>
<td>Urban Moderate Density Residential</td>
<td>66</td>
<td>50</td>
<td>86%</td>
</tr>
<tr>
<td></td>
<td>Urban High Density Residential</td>
<td>50</td>
<td>31</td>
<td>62%</td>
</tr>
<tr>
<td>Urban Commercial</td>
<td>Urban Commercial</td>
<td>263</td>
<td>161</td>
<td>61%</td>
</tr>
<tr>
<td></td>
<td>Visitor-Orientated Commercial</td>
<td>14</td>
<td>8</td>
<td>57%</td>
</tr>
<tr>
<td>Urban Industrial</td>
<td>Urban Light Industrial</td>
<td>25</td>
<td>15</td>
<td>60%</td>
</tr>
<tr>
<td>Public</td>
<td>Public</td>
<td>72</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>TOTALS</td>
<td></td>
<td>1,290</td>
<td>715</td>
<td>55%</td>
</tr>
</tbody>
</table>

Source: Jefferson County Central Services, Jefferson County Department of Community Development

<sup>a</sup> Net developable area is the total area on which development, residential or commercial, can take place. It is the Total (Gross) Acres minus critical areas (environmentally sensitive areas), market factor area (land under private ownership which is assumed to remain undeveloped by the owner’s choice), and roads and reduction factor area (area for roads, buffers, easements, etc., that will not be built upon).

Port Hadlock Sewer Planning Area (PHSPA)

As mentioned above, the PHSPA is coincident with the PHUGA. The proposed capital facility plan outlined in this document will demonstrate the availability of sewer service throughout the sewer planning area within the county’s Comprehensive Plan’s 20-year planning horizon (i.e.), by the year 2024.

Sewer Planning Area Land Use and Zoning

The predominant land use type by area in the sewer planning area is single-family residential development. It accounts for close to one-half of the existing land area. Most of the residential neighborhoods south of Irondale Road are largely built-out, although there are a significant number of pre-existing platted lots (from early in the 20th century) that remain undeveloped. In fact, vacant lands constitute about one-third of the UGA—most of which are concentrated north of Irondale Road and south of Chimacum Creek. Many of these lots are “substandard”—meaning that they cannot meet minimum lot size requirements for on-site septic systems—and therefore must be combined through restrictive covenant or lot consolidation in order to build upon. Under current regulations, the county may authorize single-family home development on pre-existing platted lots provided they meet Jefferson County Environmental Health Department standards for on-site septic systems and drainfields—usually requiring a minimum 12,500 square foot lot (if served by a public water system). Current developed single-family residential lots in the UGA range from 2,500 to 20,000 square feet in size and average about 13,000 square feet.
Summary of Land Use and Zoning

Figure 2-2 and Table 2-1 summarize the land use designations and area totals for the PHUGA and sewer planning area. Also presented below are descriptions of the various land use designations identified.

**Urban Residential.** The Urban Residential land use designation accounts for the largest share of land use in the UGA. The Urban Low Density Residential (ULDR) zone will allow housing density from four (4) to six (6) dwelling units per acre, except, as previously noted, for parcels both outside the planned sewer service area and within a designated Critical Aquifer Recharge Area where the maximum density may not exceed 3.5 units per acre. This zone accounts for more than 800 acres although only about one-third of those acres are undeveloped (including mostly vacant platted lots). Moderate Density Residential (MDR) zoning will allow housing at a density of 7-14 units per acre and accounts for 66 total acres within the UGA. The High Density Residential zone will allow housing at a density of 14-24 dwelling units per acre.

**Urban Commercial.** Almost one-quarter of the total UGA is designated for commercial land use. Several different commercial zoning districts may implement this land use designation. The Urban Commercial (UC) zone is the largest constituting approximately 263 acres. It covers both the existing and planned future commercial development in the Port Hadlock core area and along Rhody Drive between Ness’ Corner and the “Dogbone.” The Visitor-Oriented Commercial (VOC) zone is applied to the tourism-oriented potential development area around the Old Alcohol Plant.

**Urban Industrial.** Approximately 25 acres of land are designated as an Urban Light Industrial (ULI) zone in the UGA. These uses are located in the southwest corner of the UGA well buffered from the bulk of the residential neighborhoods in the community.

**Public Facilities.** Public facilities (P) comprise 72 acres, including public park and open space areas, the Library and Chimacum Creek Elementary School, the Jefferson County Sheriff’s Office and Jail, Jefferson County Public Works Department Maintenance Yard, and the PUD’s Sparling Well facility along Rhody Drive and the Kively Well in Port Hadlock.

**POPULATION**

This section describes countywide population; population within the proposed Port Hadlock UGA area is described in Chapter 4. The Office of Financial Management (OFM) publishes population projections for cities and counties for use with planning under GMA. OFM published *Population Trends* in April 2001 as Washington State’s official population figures. These estimates are cited in numerous statutes using population as a criterion for fund allocations, program eligibility, or program operations and as criteria for determining county participation in the Growth Management Act.

The City of Port Townsend and Jefferson County developed a population projection and urban population allocation for the City of Port Townsend, Irondale/Hadlock UGA, and the Port Ludlow MPR based on the OFM projections. The county passed Resolution #55-03 on September 22, 2003, adopting the Updated Population Forecast. The population forecast is summarized in Table 2-2.
TABLE 2-2.
JEFFERSON COUNTY AND CITY OF PORT TOWNSEND
20-YEAR POPULATION PROJECTION AND DISTRIBUTION

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Port Townsend UGA (incorporated)</td>
<td>8,344</td>
<td>4,985</td>
<td>13,329</td>
<td>36%</td>
<td>1.97%</td>
</tr>
<tr>
<td>Irondale/Hadlock UGA (unincorporated)</td>
<td>2,553</td>
<td>2,353</td>
<td>4,906</td>
<td>17%</td>
<td>2.76%</td>
</tr>
<tr>
<td>Port Ludlow MPR (unincorporated)</td>
<td>1,430</td>
<td>2,353</td>
<td>3,783</td>
<td>17%</td>
<td>4.14%</td>
</tr>
<tr>
<td>Unincorporated Rural &amp; Resources Areas</td>
<td>13,972</td>
<td>4,149</td>
<td>18,121</td>
<td>30%</td>
<td>1.09%</td>
</tr>
<tr>
<td>County-wide Total</td>
<td>26,299</td>
<td>13,840</td>
<td>40,139</td>
<td>100%</td>
<td>1.78%</td>
</tr>
</tbody>
</table>


The only incorporated city in the county is Port Townsend. Approximately thirty percent of the county’s population is incorporated, with the remaining areas unincorporated.

UTILITY SERVICES

Nearby Water Systems

There are several water purveyors in eastern Jefferson County. The large Group A Systems include: Cape George Colony Club, Inc.; Kala Point Water System; Ludlow Water Company; the Jefferson County PUD; and the City of Port Townsend.

Jefferson County Public Utility District No. 1 (PUD) provides water to customers in the PHUGA. The supply is from ground water wells located within the PHUGA. The Sparling Well is located near the intersection of Rhody Drive and Kennedy Road, while the Kively Well is located just east of Chimacum Road.

The PUD wells have annual water rights equivalent to 1.14 million gallons per day (mgd). Current average day water demands are approximately 0.72 mgd for the entire area served by the PUD wells. This includes contracted amounts of approximately 0.114 mgd for Indian Island and 0.057 mgd for Marrowstone Island customers (Fort Flagler and a federal fish hatchery). Current peak day demands are approximately 1.56 mgd.
Nearby Wastewater Facilities

Currently, there is no public sewer service within the PHUGA. All wastewater treatment is provided by either individual on-site septic systems or small community-based on-site systems.

Existing sewer systems within approximately 20 miles of the planning area include: the Naval facility at Indian Island, City of Port Townsend, City of Sequim, and Port Ludlow resort area. The Port Ludlow facility is privately owned and is not available for municipal service. The City of Port Townsend treatment facility is located approximately eight miles north of the PHUGA, while the City of Sequim treatment plant is located more than 15 miles from the PHUGA.

TOPOGRAPHY, SOILS AND HYDROGEOLOGY

Topography

Ground elevations in the Port Hadlock area range from zero to approximately 100 feet above sea level. The terrain consists of the relatively flat Chimacum Creek valley, incised areas immediately adjacent to the Creek, and upland areas surrounding the valley reaching elevations of over 400 feet above sea level. Some areas near the coastline and valley walls have slopes greater than 15 percent. Figure 2-3 shows a topographic map of the area.

Soils

Per Simonds, et al. (2004) Gayer (1975) and Grimstad (1981), most of the study area is underlain by Quaternary Vashon Recessional Outwash, which generally consists of loose, clean, stratified sands and gravels deposited by meltwater streams emanating from retreating glaciers. Recessional outwash was not glacially overridden, and has lower densities than advance outwash or lodgement till. Typically outwash deposits exhibit moderate to high permeabilities and infiltration rates depending on silt content.

There is some Quaternary Vashon Till in the southern portion of the study area, west of the southern cove in Port Townsend Bay. Vashon till deposits generally consist of a compact unsorted mixture of clay to boulder size particles, deposited at the base of the Cordilleran ice sheet during the latest glaciation. Occasional sand and gravel lenses may be present. Till is commonly referred to as “hardpan” due to its cement-like texture. Till does not provide a favorable infiltration medium. Till acts as an aquitard that inhibits the flow of ground water, perches water on top of it in the recessional outwash, and also confines water below it in the advance outwash. In general, the permeability of till ranges from low in weathered surficial deposits to relatively impermeable in very dense non-weathered materials.

A geologic map provided by Jefferson County (1995) also indicates Vashon Recessional Outwash over much of the study area, with a large area of Vashon Lacustrine Deposits in the area bounded by the northern reach and mouth of Chimacum Creek and the coastline (Jefferson County, 1995). Lacustrine deposits are typically fine-grained (silt and clay) lake-bottom deposits.
...2. BACKGROUND

Figure 2-3. Topography Map
Figure 2-4 shows an excerpt of the soil survey map for the study area (McCreary & Raver, 1975). Soil maps indicate much of the study area is underlain by three major soil types: Cassolary sandy loam, Dick loamy sand, and Hoypus gravelly sandy loam. The Cassolary series consists of well-drained soils on upland terraces, formed in reworked glacial and marine sediments. The Dick series consists of somewhat excessively drained, sandy soils, formed in glacial outwash on plains and terraces. The Hoypus series consists of somewhat excessively drained, gravelly soils, formed in glacial outwash on terraces.

Preliminary review of selected well logs in the study area on file at the Washington State Department of Ecology suggest sand and gravel deposits near the surface over most of the study area, although some well logs indicate clay or “hardpan.”

**Hydrogeological Evaluation**

A hydrogeological data review was conducted by HWA Geosciences Inc. to evaluate general hydrogeologic and soil conditions throughout the area for potential land application or rapid rate percolation sites for reclaimed water discharge. The study found that much or all of the study area is underlain by relatively well-drained, granular soils, with few areas of steep slopes or wetlands. Based on this information and other factors, such as property availability and distance to wastewater infrastructure, several potential sites may be selected. Hydrogeological testing was conducted on a site south of the service area boundary. The report is included as Appendix A.

**HAZARD AREAS**

Some geologically hazardous areas are also present in the PHUGA. These are areas particularly susceptible to erosion, sliding, earthquakes, or other geological events. Steep slopes and marine bluffs adjacent to Port Townsend Bay and lower Chimacum Creek are prone to impacts related to erosion, seismic events and landslides. Protection of these areas is regulated under UDC Section 3.6.7 (Geologically Hazardous Areas).

**Erosion and Landslide Hazard**

Erosion hazard areas contain soils that, according to the SCS Soil Classification System, may experience severe to very severe erosion. The erosion hazard for any given soil type increases as slope increases. Erosion hazard includes the transport of soil by wind and water. The susceptibility of soil to erosion depends on the size of the soil particles, the amount of precipitation, topography, and the type and density of vegetation. Slopes greater than 15 percent are found along the coastline, and are generally not suitable for percolation sites. Percolation near steep slopes may impact slope stability, or may cause undesirable discharge (daylighting) at the base of the slope or on slope faces. These steep slopes (mostly along the coastline) are shown on Figure 2-5. Slopes less than 15 percent predominate within the area of interest and will generally be suitable for percolation sites provided that adequate erosion control measures be taken during construction and site use.

Landslide hazard areas are areas potentially subject to landslides based on geologic, topographic and hydrological factors, including bedrock and soil characteristics and stratigraphy, slope, and hydrology. Areas with significant slopes in the PHUGA are located along the coastline and moderate slopes near the northern boundary of the area are also indicated on Figure 2-5.
Figure 2.4. Soils Map of the Port Hadlock Area
Seismic Hazard

Seismic hazard areas are areas associated with active faults and earthquakes. The potential for ground-shaking, differential settlement, or soil liquefaction in these areas poses significant, predictable hazards to life and property. Seismic-induced events also include tsunamis, surface faulting or seiches. Jefferson County and all of Western Washington is at risk of seismic activity.

The International Building Code (IBC) requires that a structure be designed for “site-specific” earthquake motions, and is no longer given a seismic zone value as in older code such as the Uniform Building Code (UBC). A particular project site is assigned a seismic design category which determines the severity of the design earthquake. This category is based on both the short period and one-second period response accelerations for that particular site determined by a geotechnical engineer, and its seismic use group based on occupancy of the facility. The Jefferson County Area is located in a region of historically high seismic risk; therefore the seismic design category would be expected to reflect a more severe earthquake occurrence. Figure 2-6 shows seismic hazard areas within the PHUGA.

CLIMATE

The climate of the Port Hadlock area is mid-latitude “West Coast Marine,” a climate influenced by moist air originating from the Pacific Ocean. The high summer temperatures in the area are in the range of 60 to 70º Fahrenheit (F). Low winter temperatures are in the range of 30 to 40ºF. The greatest amount of days in a year that have been recorded as having sub-freezing maximum temperatures is 20, or approximately three weeks.

Due to the “rain-shadow” effect from the Olympic Mountain Range, annual rainfall averages approximately 30 inches per year, while average potential and actual evapotranspiration are approximately 25.2 and 17.7 inches per year, respectively.

SURFACE WATER/WETLANDS

Percolation near surface water drainages or wetlands may increase stream base flows or wetland water levels. Increased base flows may have negative impacts on stream or wetland hydrology, including: increased flow volume, decreased time to reach receiving water, increased frequency and duration of high stream flows, and greater stream velocities (Ecology, 2005).

No major surface water bodies other than Chimacum Creek and Port Townsend Bay are present within the study area.

Figure 2-7 illustrates the wetlands within the PHUGA.

GROUNDWATER

The entire UGA is served by a public water system now owned and operated by Public Utility District No. 1 (PUD) of Jefferson County. The water source is groundwater acquired by two separate wells. The primary source is the Sparling Well located at the intersection of Rhody Drive and Kennedy Road on the western border of the PHUGA. A secondary well, the Kivley Well, is located just southeast of the Port Hadlock core area.
Figure 2-6. Seismic Hazard Areas
...2. BACKGROUND

Figure 2-7. Wetlands and Environmentally Sensitive Areas
Criteria which should be evaluated for potential wastewater infrastructure sites, include:

- Nearby domestic or multiple use water wells
- Nearby municipal wells, and associated wellhead protection areas
- Designated critical aquifer recharge areas
- Contaminated sites.

Portions of the PHUGA are vulnerable to groundwater pollution and are designated as a Critical Aquifer Recharge Area (CARA) due to their hydrogeologic soil characteristics and the presence of public water supply wellheads. The Jefferson County Public Utility District owns the water system that serves the UGA. The water system relies on groundwater wells. There is a designated wellhead protection area around the PUD’s Sparling Well and the Kivley Well. Figure 2-8 shows wellhead protection areas, from the Washington State Department of Ecology Facility/Site Identification System. Figure 2-9 shows critical aquifer recharge areas (CARA), from the Jefferson County GIS database. The treatment method selected will impact the degree to which receptor water quality issues are considered.

The CARA is subject to enhanced wastewater treatment standards which, among other requirements, limit land use activities; establish minimum lot sizes for uses dependent upon on-site septic systems for wastewater treatment and disposal; and requires “best management practices” for siting such development—according to Jefferson County UDC Sections 3.6.5 (Critical Aquifer Recharge Areas); 6.18 (On-Site Sewage Disposal Best Management Practices in CARAs); and Jefferson County Code Chapter 8.15 (On-Site Sewage Disposal Systems).

RELATED STUDIES

The following plans, studies, and other documents were reviewed as background for the current study:

- Jefferson County Unified Development Code (UDC) Section 3.6.7 (Geologically Hazardous Areas).
2. BACKGROUND

Figure 2.8. Wellhead Protection