CITY OF PORT ORCHARD
Planning Commission
216 Prospect Street, Port Orchard, WA 98366
(360) 874-5533 planning@cityofportorchard.us

PLANNING COMMISSION MEETING AGENDA

Tuesday, September 1, 2020
6:00 pm

This meeting will be held remotely via telephone and Zoom video conferencing pursuant to the Governor's "Stay Home, Stay Healthy Proclamation" No. 20-25, as amended.

Zoom: https://us02web.zoom.us/j/85172614656

Meeting ID: 851 7261 4656
Dial-in: +1 253 215 8782

1. **Call to Order: 6:00 p.m.**
   Pledge of allegiance

2. **Audience Comments – Not on the Agenda**
   Please limit comments to **3 minutes.**

3. **Approval of Minutes from August 4, 2020**

4. **Business Items**

(a) Downtown and County Government Campus Subarea Plan – Scoping Meeting/Request for Comments (GGLO/Heartland/EA Consultants)
(b) Continued Public Hearing/Recommendation: Ruby Creek Neighborhood Subarea Plan and Development Regulations
(c) Shoreline Master Program Update: Impacts of Sea Level Rise on City's Shoreline (Herrera Environmental Consultants)

5. **Adjourn**

CITY OF PORT ORCHARD
Planning Commission Minutes
216 Prospect Street, Port Orchard, WA 98366
Phone: (360) 874-5533 • Fax: (360) 876-4980

Planning Commission Meeting Minutes
August 4, 2020
Zoom Teleconference

COMMISSIONERS:
Present: Stephanie Bailey, Phil King, Joe Morrison, Suanne Martin Smith, Annette Stewart, Trish Tierney, Mark Trenary
Absent: Dave Bernstein

STAFF PRESENT:
Community Development Director Nick Bond, Long Range Planner Keri Sallee, Planning Intern Josie Rademacher

1. CALL TO ORDER:

Chair Stewart called the meeting to order at 6:00 p.m., and read the "Stay Home, Stay Healthy" remote meeting protocol into the record. Stewart then led the Pledge of Allegiance.

2. PUBLIC COMMENTS: There were no public comments from the audience.

3. APPROVAL OF MINUTES FROM JUNE 2, 2020: Commissioner Tierney made a motion to approve the minutes of the June 2, 2020 Planning Commission meeting, as presented. Commissioner Bailey seconded the motion. The motion passed unanimously.

4. BUSINESS ITEMS:

A. Ruby Creek Neighborhood Subarea Plan and Development Regulations.

i. **Public Hearing and Discussion: Ruby Creek Neighborhood Subarea Plan.** Community Development Director Bond gave an overview of the Ruby Creek Neighborhood Subarea Plan, and the planning process and objectives that led to its preparation. Bond noted that an informational community open house had been planned, which had to be canceled because of the covid-19 pandemic, but the City had provided an online website and survey, had provided notices to residents, and had discussed the plan at numerous public City meetings.

Chair Stewart opened the public hearing on the draft subarea plan. Dick Brown said that he had been working on a project on his properties since the early 1990s. He had it included in the City's urban growth area, he obtained the zoning, and had it annexed into the City. He was surprised that the City prepared this plan without asking what he or his partners had planned to do with their properties. He has been paying taxes for over 20 years and wants it to stay 100% commercial. There are 35 acres involved, and Brown's property is the Tallman piece. The Krieger piece should probably be saved for retail. Bond clarified that Brown is

referencing properties C, D and E in the plan. Brown asked that the City respect their property rights, and not design plans without finding out if they're interested in selling their properties for that purpose. He and Ron Rice started talking years ago with John Clauson, Executive Director of Kitsap Transit, about putting a park and ride at this location, but a roundabout is needed at the Lowe's light to provide a "pressure relief valve" for the intersection. The City needs to make sure traffic can get through here, especially since there will be traffic from about 1,000 new houses coming through the intersection from McCormick Woods and Berry Lake Drive. He also has concerns about how water and sewer will be brought in to the area.

Jake Hancock, speaking on behalf of his mother Sharon Wheeler, said that they would be in favor of a park and ride, a Target or other large retail center. A lot of small shops seems like a risky investment. No amount of road widening short of a freeway will help the traffic. He expressed concern that more people in the area could result in more security issues. His property is located next to the Church of the Nazarene.

Chair Stewart closed the public hearing. Commissioner Tierney asked if the City talked with property owners while developing the subarea plan. Bond said that the City sent out notices asking property owners to take a survey about what they wanted for the subarea but didn't get much response. There are only about 20 or 30 property owners in the subarea. The City also sent notices to everyone who lives in the Sidney and Sinclair apartments, but got little response, possibly because the apartment residents don't really have roots in the area. With covid-19, the City was limited in public forum options such as an open house, so it was decided to bring the plan forward for a public hearing and get comment at this time. The Planning Commission may decide that more public hearings are needed. Stewart asked if, when there is a renter in a property, if the notice is sent to the renter, the property owner, or both. Long Range Planner Sallee said that the notices are sent to the property owner, based on mailing addresses provided by the Kitsap County Assessor's office. Bond said that for the Sidney and Sinclair apartments, notice was provided to the management and was requested to be distributed to the residents. Sallee said that the survey notices went to every property owner within the subarea boundary, and the area for the Notice of Hearing distribution was expanded to the subarea boundary plus 800 feet outside of it.

Bond said that regarding the traffic concerns, the subarea plan proposes to widen Sidney Rd, and this is also in the City's adopted Transportation Improvement Program (TIP). The City will also widen Sedgwick Rd West between Sidney and SR-16 with additional lanes and sidewalks. WSDOT also plans to redo the SR-16 interchange at Sedgwick so that the overpass will handle more traffic. The City did consider building a roundabout or traffic signal at Lowe's that would tie into Hovde or Sidney, but bridging Blackjack Creek would result in a $20 million project, and the City doesn't feel that it would result in a more effective solution than the proposed widening projects. Bond said that Ron Rice contacted him about two weeks prior to the hearing to discuss concerns about the critical areas maps and figures in the plan. As a result of this conversation the City added a disclaimer at the front of the plan that indicates that the plans are using best available data, but actual wetland and stream delineations will be required at the time of a development proposal to determine

what portion of a property is or isn't developable, or to what extent mitigation would be required, based on the location of critical areas and buffers.

Dick Brown said that when Target was interested in his property, he and his partners spent about $100-150,000 on wetland delineations and drainage. He doesn't want to turn the property into a park after spending all that money. Bond said that the park is actually shown further north, on the Krieger property, at the confluence of Blackjack and Ruby Creeks where significant buffers are required. Part of preparing a subarea plan, according to the requirements of the Puget Sound Regional Council (PSRC), is fulfilling the requirement that the subarea be a cohesive neighborhood that provides all the amenities that residents would want for daily living, such as parks and open space. The exact location of the park will end up being based on where mapped floodplains are located. The park may periodically flood but only certain facilities such as restrooms would need to be located outside the floodplain.

Commissioner King asked how the plan would affect Brown's ability to build smaller commercial projects, such as auto parts stores or restaurants. Bond said that both would be allowed in the mixed-use zones. Actual auto repair would not be allowed except in the Commercial Heavy zone. Commissioner Trenary asked when the SR-16 interchange improvements would take place. Bond said that this is a state legislative funding matter. Trenary then asked Brown if he agreed with his property becoming a park and ride, and Brown said yes, he and his partners agreed that the lower portion of the property could be sold to Kitsap Transit for that purpose. Otherwise, there are other possibilities for the floodplain such as mitigation area. Access to the site will be an issue. Bond said that the zoning currently does not allow a Target or other big-box store on Brown's property, and the property is so constrained by critical areas it is unlikely that there would be enough buildable area to make it worthwhile. The subarea plan actually offers more building height and allows development setbacks to extend closer to Sidney Road.

The Planning Commission continued the public hearing on the subarea plan to the September 1 meeting.

ii. **Discussion: Ruby Creek Neighborhood Development Regulations.** Bond said that the new and amended development regulations to implement the subarea plan include amendments to the City Zoning Map and Self-Storage Overlay District Map, a new Ruby Creek Overlay District (RCOD) map, and new standards for block frontage street design and landscaping, land uses and building height in the RCOD. The development regulations will be addressed at the continued Ruby Creek Subarea Plan public hearing on September 1. Sallee said that another Notice of Hearing would be sent out to the subarea plus 800 feet to inform property owners of the continued hearing for the subarea plan and the development regulations.

B. Discussion/Public Hearing/Recommendation: ADU Code Revisions. Sallee gave a summary of the proposed changes to the accessory dwelling unit (ADU) code (Chapter 20.68 POMC) that were intended to clarify the ADU permitting process and make it easier for homeowners to apply for and build ADUs. These include: a revision to clarify that a property owner may rent out a room(s) in his/her legal residence (i.e. have a roommate) while also renting out the ADU;

removal of the requirement preventing a property owner from having separate utility meters and billing for the ADU; clarification on how lot coverage is calculated; removal of the prohibition against having any accessory buildings over 200 feet other than an ADU.

Chair Stewart opened the public hearing. No comments were made. Chair Stewart closed the public hearing. Commissioner Tierney made a motion to recommend that the City Council approve the proposed revisions to the ADU code requirements in Chapter 20.68 POMC. Commissioner Martin Smith seconded the motion. The motion passed unanimously.

C. **Discussion/Public Hearing/Recommendation: Fireworks Code Revisions.** Sallee gave a summary of the proposed changes to the land use table in Chapter 20.39.040 POMC affecting the locations where fireworks sales could be located. Currently, the commercial sale of fireworks is allowed only in the Commercial Heavy (CH) and Industrial Flex (IF) zones. The City Council wishes to allow civic and institutional organizations such as churches and other religious groups, fraternal organizations, youth groups and schools to sell fireworks as an accessory use on properties where a civic and institutional use has already been established conforming to zoning. Therefore, the City Council directed staff to prepare revisions to the Chapter 20.39.040 use table to add fireworks sales as an accessory use to an existing civic and institutional use, in accordance with POMC 5.60 (fireworks sales permit requirements), on properties zoned Civic & Institutional (CI). Bond said that updating the code requirements now will give fireworks vendors plenty of time to find a new site before the next season. He noted that the City does not limit how many fireworks stands may be located within the City.

   Chair Stewart opened the public hearing. No comments were made. Chair Stewart closed the public hearing. Commissioner Trenary made a motion to recommend that the City Council approve the proposed revisions to the fireworks code requirements in Chapter 20.39.040 POMC. Commissioner Martin Smith seconded the motion. The motion passed unanimously.

D. **Introduction to the Port Orchard Downtown Subarea Economic Analysis.** Bond said that the City has kicked off the process to prepare a downtown and county government campus subarea plan. The City has hired a Seattle consultant, GGLO, to prepare the plan and they have provided an initial market analysis to inform the planning process. The boundary of the study area includes the designated Downtown and County Government Campus centers as provided in the current City Comprehensive Plan, but includes nearby areas as well. The City will be doing environmental analysis and an Environmental Impact Statement on several planned growth alternatives – baseline, high capacity residential, and high capacity commercial. Either high-capacity alternative would include 1,000-1,300 new residential units. A scoping notice for the environmental review will be going out in September.

ADJOURN: Chair Stewart adjourned the meeting at 7:21 pm.

Annette Stewart, Chair

Nick Bond, Community Development Director

DETERMINATION OF SIGNIFICANCE (DS)
AND REQUEST FOR COMMENTS ON SCOPE OF EIS

Project Name: Downtown and County Government Campus Subarea Plan

Proponent: City of Port Orchard

Lead Agency[1]**:** City of Port Orchard

Project Location: The project includes the existing Downtown and County Campus centers, as designated in the City Comprehensive Plan, as well as other adjacent areas, for a total of approximately 329 acres. The western portion of the project area (Waterfront and Uphill Area) is generally bordered by Sinclair Inlet on the north, the right-of-way of West Avenue (undeveloped) on the west, Melcher Street on the south, and Harrison, Taylor, Seattle and Kitsap Streets on the east. The eastern portion of the project area (Bethel Corridor and Mitchell Corridor) is generally bordered by Sinclair Inlet on the north, Maple Avenue and Bethel Avenue on the west, Stockton Street, Decatur Avenue, Guy Wetzel Street, Tracy Avenue and the South Kitsap High School on the east, and Mile Hill Road on the south. Project location and study area maps are available for review at: https://www.cityofportorchard.us/downtown-and-county-government-campus-subarea-plan/

Description of the Proposal: The City proposes to develop and adopt a subarea plan for the Downtown and County Government Campus Centers, as designated in the City's Comprehensive Plan, along with adjacent areas, pursuant to RCW 36.70A.080(2). These areas have land uses and conditions that are unique to the City, and would benefit from the subarea planning process as they are anticipated to accommodate a share of the City's future growth. The completed subarea plan, which will be incorporated into the Comprehensive Plan, will provide long-range goals and policies to form a framework for redevelopment as well as specific goals and policies for land use, housing, environmental protection, and transportation. Additionally, the subarea plan will address the Puget Sound Regional Council (PSRC) regional centers criteria to support the City's potential future designation as an Urban Growth Center.

Environmental Impact Statement (EIS) Required: The City of Port Orchard, as the SEPA lead agency, has determined that this proposal may have significant adverse environmental impacts on the environment. An EIS is required under RCW 43.21C.030 (2)(c) and will be prepared. The EIS will address probable significant adverse environmental impacts of the proposed Downtown and County Government Campus Subarea Plan.

Elements of the Environment: The lead agency has *preliminarily* identified the following elements for analysis in the EIS:

- **Land Use/Relationship to Existing Plans and Policies**
- **Population/Employment**
- **Housing**
- **Aesthetics/Visual Resources**
- **Utilities**
- **Transportation**
- **Public Services**

[1] This is the agency that is responsible for compliance with the procedural requirements of the State Environmental Policy Act (SEPA) for this project.

Alternatives: The lead agency has *preliminarily* identified four alternatives that will be analyzed in the EIS. Alternatives 1 through 3 are based upon a preferred subarea configuration that combines the existing Downtown and County Government Campus designated centers, and includes additional adjacent areas.

- **Alternative 1 – No Action**
  No action would be taken to adopt new development policies. The existing Downtown and County Campus subareas would each be retained in their present configurations; no combination or expansion of these subareas would take place; no changes to zoning or other land use regulations would be made.
- **Alternative 2 – Higher Capacity Residential Focus**
  This alternative assumes a mostly residential development with commercial development only occurring in standalone buildings in commercial only zones. The maximum building height and densities would be consistent with the existing land use code but would assume greater mix of structured parking to achieve greater density than the existing baseline development patterns. Potential zoning changes would focus on increasing residential capacity in existing commercial only zones.
- **Alternative 3 – Higher Capacity Mixed-Use Focus**
  This alternative assumes increase in mixed-use residential, commercial retail, and office development. Some standalone commercial development in mixed-use zones plus commercial development in commercial only zones. The maximum building height and densities would be consistent with the existing land use code but would assume a greater mix of structured parking to achieve greater density than the existing baseline development patterns. Potential zoning changes would focus on increasing residential capacity in both existing commercial and residential only zones.

Scoping: Agencies, affected tribes, and members of the public are invited to comment on the scope of the EIS. You may comment on alternatives, mitigation measures, probable significant adverse impacts, and permits other approvals that may be required. Methods for presenting your comments are described below. **All comments are due no later than 4:00 PM, September 4, 2020**, and may be submitted:

- **Via e-mail to:** planning@cityofportorchard.us
- **By mail to:** Nick Bond, Community Development Director, City of Port Orchard, 216 Prospect Street, Port Orchard, WA 98366
- **Verbally at the EIS Public Scoping Meeting, to be held remotely by Zoom:** The EIS Public Scoping meeting, which will be a business item on the City Planning Commission's September 1 regular meeting agenda, will provide an opportunity for the public to learn more about the project and proposed actions, and to provide input on the environmental review process.

  In accordance with Governor Inslee's "Stay Home-Stay Healthy" Order, the Planning Commission meeting will be held remotely by Zoom teleconference. Information on how to participate via internet or phone connection is provided below:

  Meeting Date/Time: September 1, 2020 6:00 pm
  Zoom Link: https://us02web.zoom.us/j/85172614656
  or
  Dial-in (audio only): +1 253 215 8782
  Meeting ID: 851 7261 4656

Date: August 14, 2020 **Signature:** Nicholas Bond

Nick Bond, AICP, Community Development Director
SEPA Responsible Official

	A	B	C	D
1	**DOWNTOWN & COUNTY CAMPUS SUBAREA PLAN - SCOPING COMMENTS RECEIVED**			
2				
3	**Subject**	**Comment**	**Commenter**	**Date**
4	Potential rezoning of 719 and 807 Sidney	Do not want properties rezoned from Neighborhood Mixed Use/Medium Density Residential to Commercial as it would preclude the building of single family detached homes and hence be detrimental to our use and enjoyment of our properties	Shahbaz and Elizabeth Naftchi	8/18/2020
5	Potential view blockage affecting 840 Prospect Alley	I live in Prospect Alley with a magnificent view of the bay and mountains. I still object to any development along Bay Street or the waterfront that would obstruct my view which I have enjoyed for over 30 years.	Marge Gissberg	8/18/2020
6	Perry Ave north	Properties between Bay St and Perry are mixed residential and business. Everything on the uphill side of Perry is residential. Seems it should stay that way…if not this will likely impact property values adversely and stymie residents improving their homes as is constantly being done now. I believe it would be a long term mistake to categorize the homes on the uphill side of Perry as being in a mixed use area.	Lindon Onstad	8/19/2020
7	Alternative 3 - Higher Capacity Mixed Use Focus	My comment is that I would prefer Alternative 3 - Higher Capacity Mixed-Use Focus. I also believe that it is better to fill in already developed areas and keep wild lands wild, than to let urban sprawl ruin our environment.	Christine Thompson	8/20/2020
8				

STUDY AREA | EXISTING CENTERS

CITY OF PORT ORCHARD CENTERS

- County Campus
- Downtown

STUDY AREA

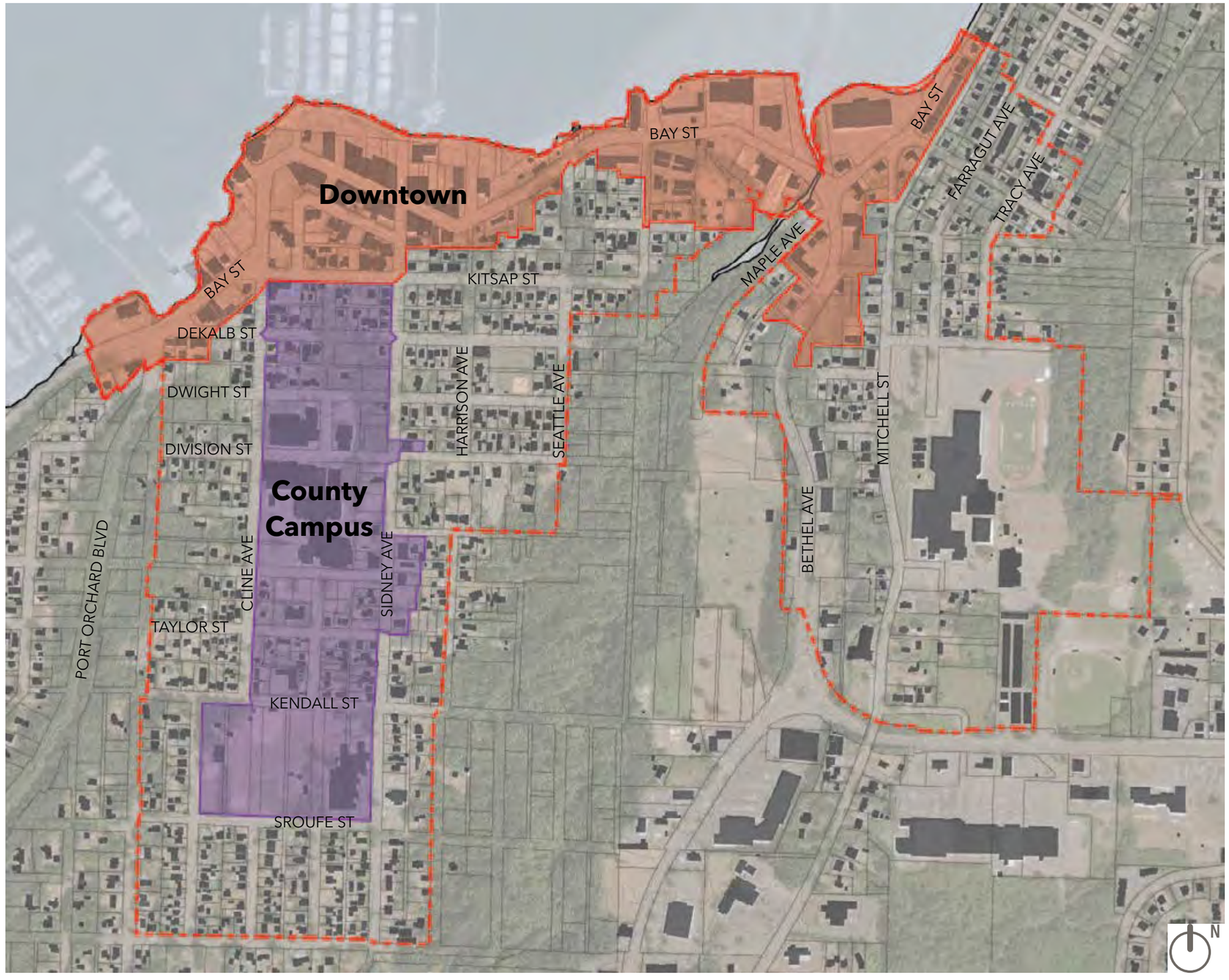
329-acres

PRINCIPLE ARTERIALS

- Bay Street & Bethel Ave
- Port Orchard and Mitchell Streets
- Sidney Ave and Cline Ave

EXISTING LAND USES

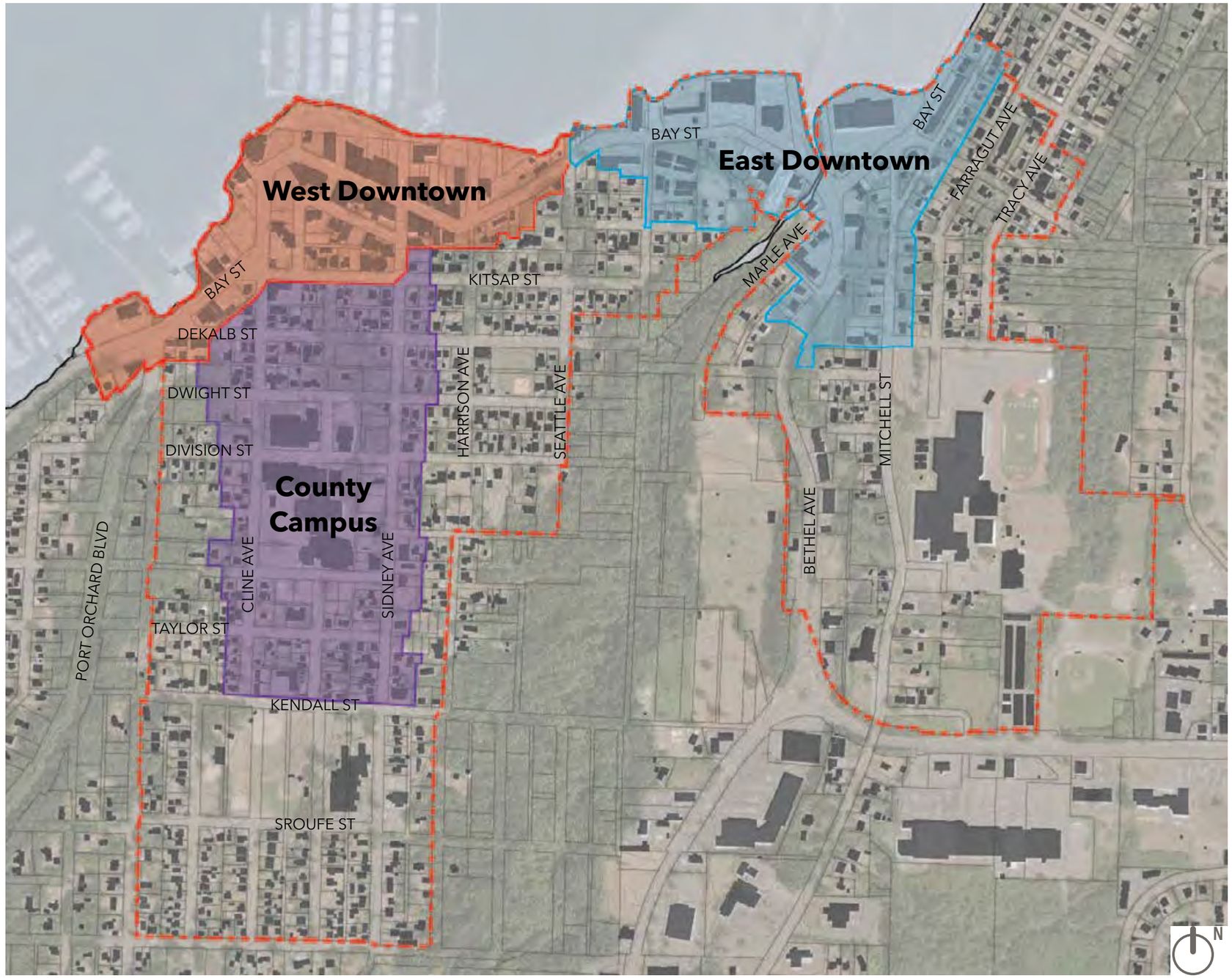
- Neighborhoods - Residential
- Private Property / Commercial Uses
- Government - City / Kitsap County
- South Kitsap High School
- Marina Waterfront



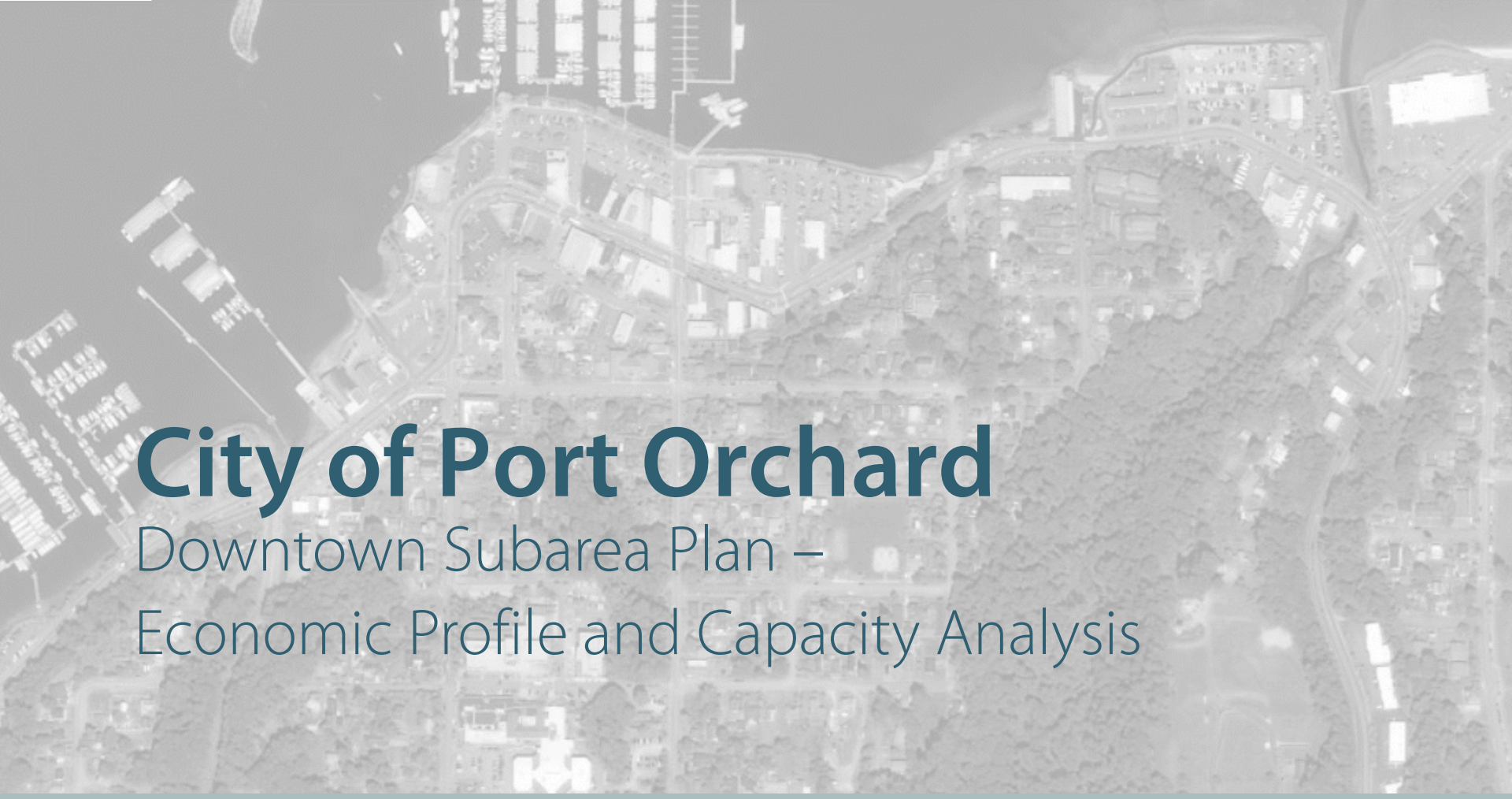
TARGETED DEVELOPMENT AREAS

TARGETED REDEVELOPMENT AREAS

- West Downtown Waterfront
- East Downtown Waterfront
- County Campus



GEOGRAPHIC DISTRICTS



City of Port Orchard

Downtown Subarea Plan – Economic Profile and Capacity Analysis

June 17, 2020

HEARTLAND

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Introduction

Project Background

Heartland is supporting the City of Port Orchard ("the City") in its development of a Downtown Subarea Plan. Leading the consulting team is GGLO alongside EA, who will be responsible for development of a Planned Action Ordinance in conjunction with adoption of the new Subarea Plan.

The City seeks an analysis to better understand current conditions in the City and Subarea Plan boundary ("Study Area"). In addition, the City has tasked Heartland with estimating current development capacity both now and in the future. Ultimately, the City and the consulting team will leverage the analysis to inform development of the Subarea Plan and associated Planned Action EIS.

Project Approach and Methodology

Baseline Economic Profile. The economic profile will help the team to better understand the likely future demand for development of various types within the Subarea and better understand trends impacting current and future residents. This includes an overview of:

- existing baseline socio-economic data
- an inventory of existing housing in the study area
- job conditions in the immediate market area
- real estate trends for residential and commercial development types in Port Orchard and the region

Development Capacity. The development capacity analysis will help the team to better understand future development opportunities within the subarea and ensure alignment with PSRC growth center requirements. The analysis includes:

- an assessment of vacant and redevelopable lands by zone (within the subarea boundary)
- analysis of net developable lands accounting for critical areas, required public infrastructure and other factors impacting net developable area
- an estimate of overall development capacity based on current zoning
- estimated capacity scenarios within the subarea over the planning period (20 years) showing built square footage estimates at high and low development thresholds, based on variations on market absorption/conditions.

Population and Housing

The following section explores population, housing and demographic indicators related to Port Orchard and surrounding communities. The analysis utilizes a comparison City framework, wherein Port Orchard is analyzed within a framework of several neighboring communities, including:

Comparison City Framework– City of Port Orchard
Comparisons: *Bremerton, Kitsap County, Gig Harbor, Poulsbo, Silverdale*

Below is an outline of exhibits included in this section:

Population growth

- Current and Historical (Source: Washington OFM) *flag years with annexations
- Forecasted (PSRC Forecasts)

Demographics

- Composition (family households vs nonfamily)
- Housing tenure
- Age
- Gender
- Race and ethnicity
- Household income
- Educational attainment

Housing inventory in the study area (assessor)

- Housing growth in the City
- Number of housing units by Type (single, multifamily, mobile, group quarters)

Exhibit 1: Map of the Study Area

Population and Housing

Population Growth

The following exhibit Illustrates historic and current population across communities in Kitsap County

- Overall Port Orchard has added over 3,200 residents since 2010
- The City's growth rates was higher than other Kitsap County communities and the County as a whole. *

Exhibit 2. Current and Historical Population, Port Orchard, 2010-2019

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Net Change	Cagr
Port Orchard	11,157	11,440	11,780	12,870	13,150	13,510	13,810	13,990	14,160	14,390	3,233	2.9%
Bremerton	37,729	38,790	39,650	37,850	38,180	39,410	40,500	40,630	41,500	42,080	4,351	1.2%
Gig Harbor	7,126	7,200	7,340	7,670	7,985	8,555	9,065	9,560	10,320	10,770	3,644	4.7%
Poulsbo	9,200	9,245	9,360	9,585	9,775	9,950	10,210	10,510	10,850	11,180	1,980	2.2%
Kitsap County	251,133	253,900	254,500	254,000	255,900	258,200	262,590	264,300	267,120	270,100	18,967	0.8%

Source: Washington Office of Financial Management, 2020.

* Note: population increases reflect annexations from 2010-2012, which added 53 residents in 2010 and 904 residents in 2012.

Population and Housing

Forecasted Population growth

Exhibits 3 and 4 illustrate the population forecast development by the Puget Sound Regional Council (PSRC).

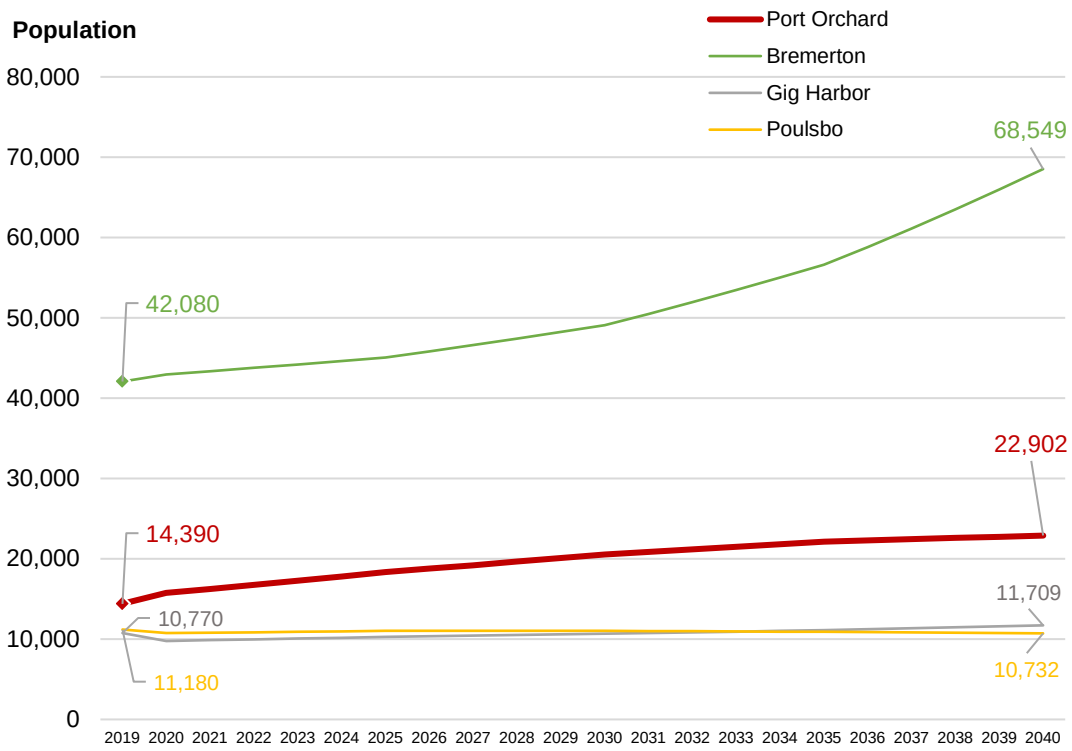
- Currently available forecasts produced by the Puget Sound Regional Council (PSRC) call for an additional 7,146 residents in Port Orchard by 2040.
- Neighboring Bremerton is anticipated to add more than 25,000 new residents during the same time period.

Exhibit 3. Forecasted Population Growth Rate, Port Orchard, 2019-2040

	Pop Cagr 2020-2040	Net Change Pop 2020-2040
Port Orchard	1.9%	7,146
Bremerton	2.4%	25,600
Gig Harbor	0.9%	1,943
Poulsbo	0.0%	-11
Kitsap County	1.4%	93,951

Source: PSRC, 2020.

Exhibit 4. Forecasted Population, Port Orchard, 2019-2040



Source: PSRC, 2020.

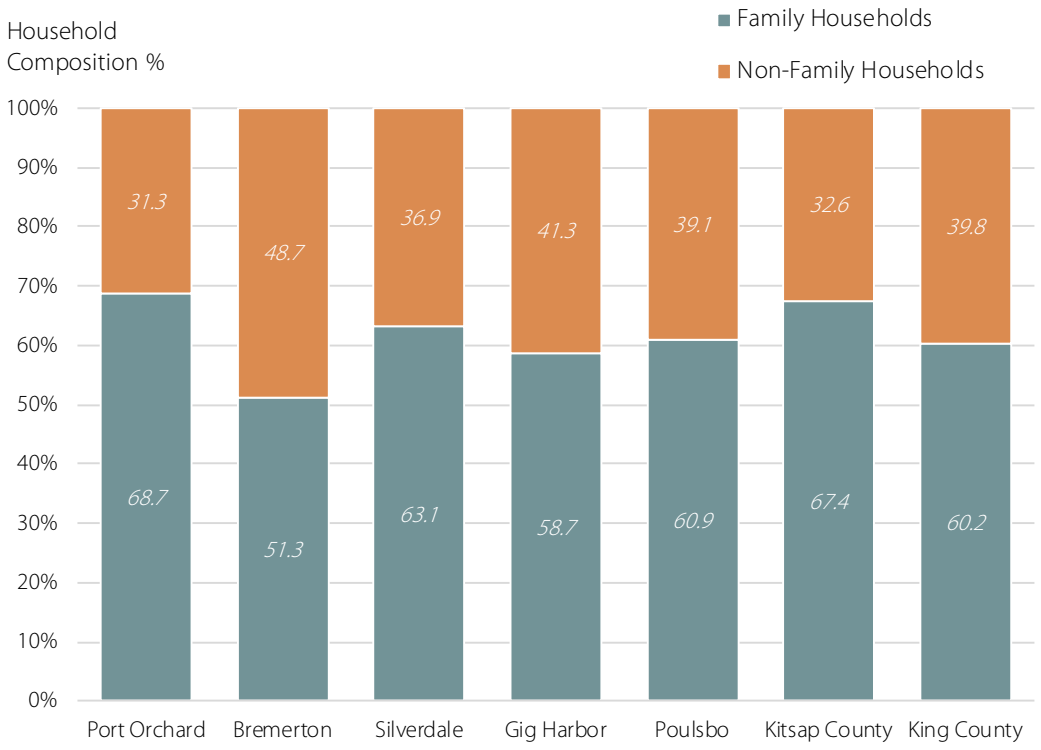
Population and Housing

Household Composition

The chart to the right segments the total number of households by family and non-family types.

- Port Orchard has the highest percentage of family households of the comparison geographies.
- Family households make up 68% of households in Port orchard, which is slightly higher than Kitsap County.
- Non-family households make up almost half of Bremerton's household composition.

Exhibit 5. Household Composition (%) , Kitsap County 2018



Source: ACS 5-year Estimates

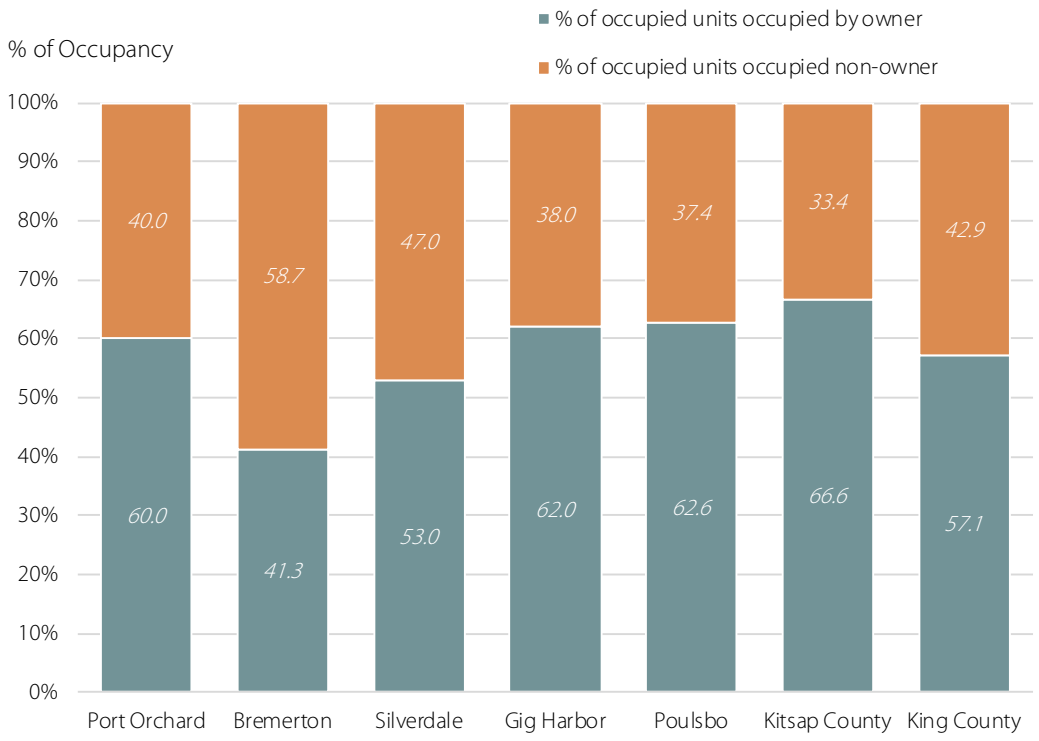
Population and Housing

Housing Tenure

The Chart to the right compares Port Orchard's housing tenure as a percentage of owner-occupied units by non-owner occupied.

- Owners occupy 60% of the housing units in Port Orchard.
- In Bremerton, just over 41% of homes are occupied by the owner.
- Owner-occupied housing in Port Orchard is below Kitsap County as a whole.

Exhibit 6. Housing Tenure (%), Kitsap County 2018



Source: ACS 5-year Estimates

Population and Housing

Population By Age Group

Exhibit 7. Total Population by Age (%), Kitsap County, 2018

	Port Orchard	Bremerton	Silverdale	Gig Harbor	Poulsbo	Kitsap County	King County
Under 5 years	8.9	6.3	5.0	5.8	4.4	5.8	5.9
5 to 14 years	10.8	7.7	11.5	13.5	12.8	11.4	11.3
15 to 24 years	12.8	18.7	17.1	8.8	12.8	13.7	11.7
25 to 34 years	16.8	19.5	15.8	9.0	11.5	14.1	17.7
35 to 44 years	13.9	10.2	12.2	15.1	14.2	11.4	14.9
45 to 54 years	11.1	11.8	12.8	11.2	10.8	12.6	13.7
55 to 64 years	11.3	11.6	11.7	13.1	11.7	14.1	12.2
65 to 74 years	7.6	7.8	8.7	12.1	11.6	10.7	7.6
75 to 84 years	4.3	3.5	3.4	6.2	7.3	4.5	3.4
85 years and over	2.5	3.0	1.8	5.2	2.9	1.7	1.7
MEDIAN AGE (Years)	**35.7**	**33.4**	**35.5**	**44.0**	**40.7**	**39.0**	**37.1**

Source: ACS 5-year Estimates

- Just under 20% of Port Orchard's population is under the age of 15. This is higher than Kitsap County.
- Children under five years of age make up almost 9% of Port Orchard's total population. This percentage is higher than any other geography in the comparison.
- The percentage of people over the age of 65 in Port Orchard is slightly lower than Kitsap County
- Percentage of population from 24 – 44 years of age is higher in Port Orchard than Kitsap County, Bremerton, Silverdale, Gig Harbor, and Poulsbo.

Population and Housing

Total Population by Race

The chart to the illustrates the racial composition of Port Orchard and the Comparison Geographies.

- Port Orchard's population is more racially diverse than Kitsap County
- Port Orchard, Bremerton, and Silverdale share similar levels of racial diversity.

Exhibit 8. Population by Race (%), Kitsap County, 2018

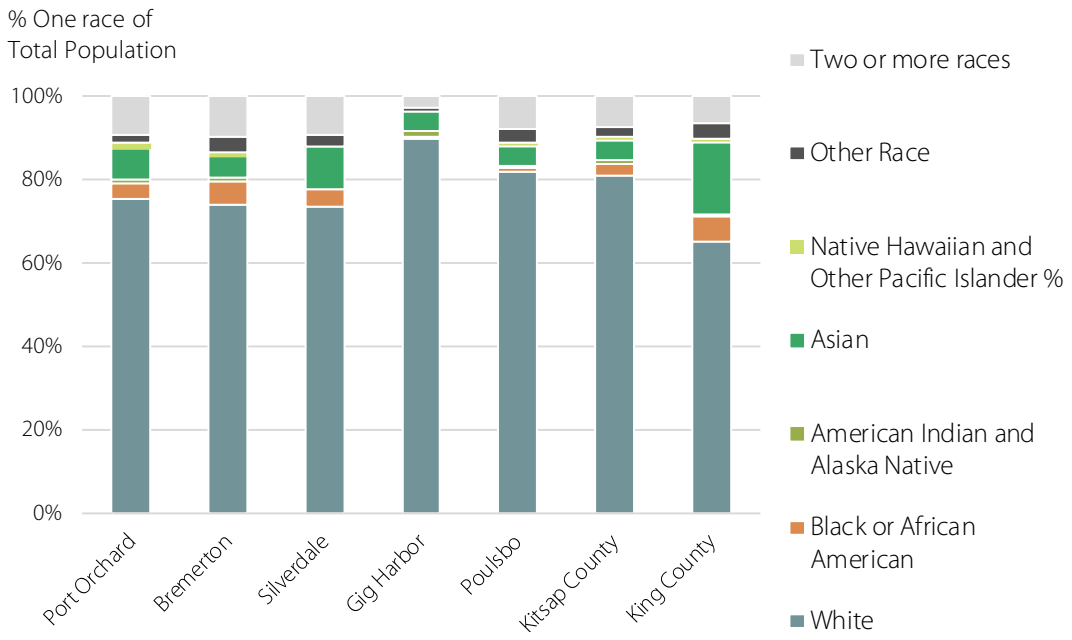


Exhibit 9. Population by Race (%) Table, Kitsap County, 2018

	Port Orchard	Bremerton	Silverdale	Gig Harbor	Poulsbo	Kitsap County	King County
White	75.3	73.9	73.7	89.8	81.9	81.2	64.9
Black or African American	3.9	5.7	3.9	0.7	1.0	2.5	6.3
American Indian and Alaska Native	0.7	1.0	0.2	1.0	0.3	1.0	0.6
Asian	7.6	4.8	10.0	4.8	5.0	4.8	17.1
Native Hawaiian and Other Pacific Islander %	1.2	1.1	0.4	0.0	0.6	0.8	0.8
Other Race	2.1	3.7	2.6	1.1	3.6	2.1	3.9
Two or more races	9.2	9.7	9.2	2.6	7.7	7.6	6.3

Source: ACS 5-year Estimates

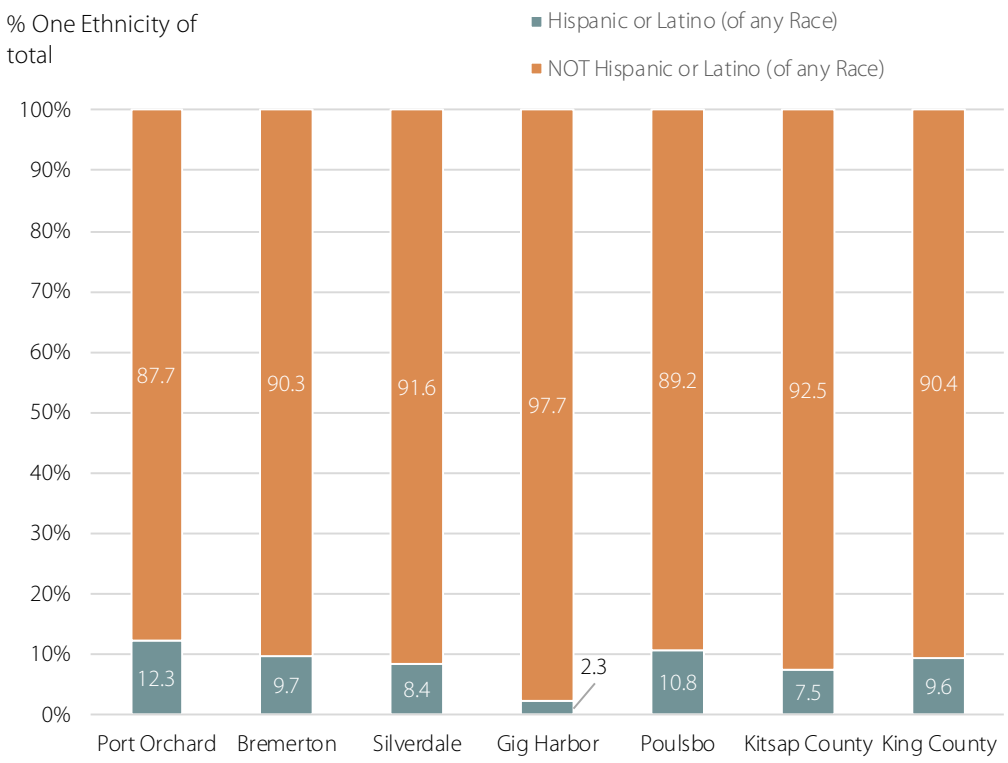
Population and Housing

Total Population by Ethnicity

The chart to the right illustrates the ethnic composition of Port Orchard and comparison geographies.

- Hispanic or Latinos comprise over 12% of Port Orchard's total population
- The percentage of Port Orchard's Hispanic or Latino population is greater that any of the comparison geographies.

Exhibit 10. Population by Ethnicity (%), Kitsap County, 2018



Source: ACS 5-year Estimates

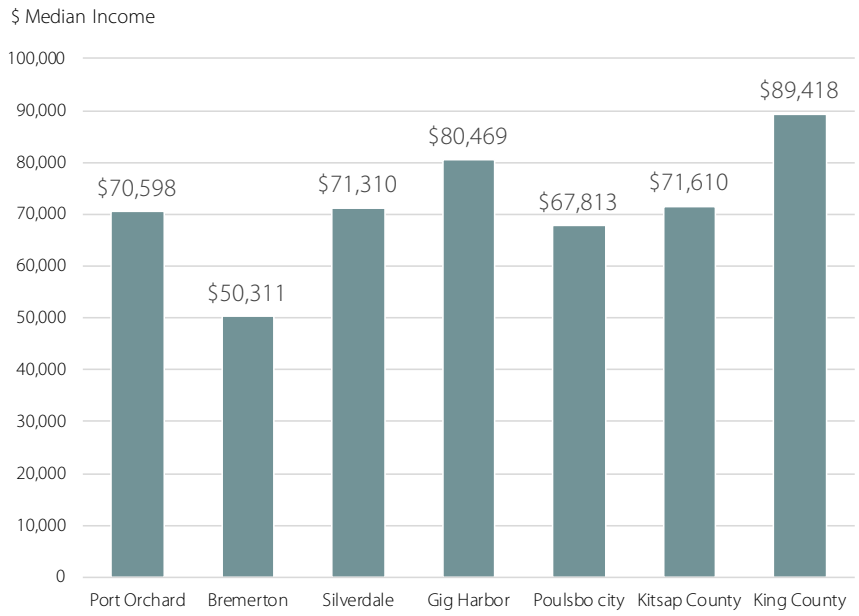
Population and Housing

Median Household Income

The chart to the right compares the median income of Port Orchard to those of the comparison geographies.

- Port Orchard has a median household income of over $70,000
- Port Orchard's median income is slightly lower than the median income for Kitsap County, but exceeds that of neighboring Bremerton.

Exhibit 11. Median Household Income (2018 INFLATION-ADJUSTED $ DOLLARS), Kitsap County 2018



Source: ACS 5-year Estimates

Population and Housing

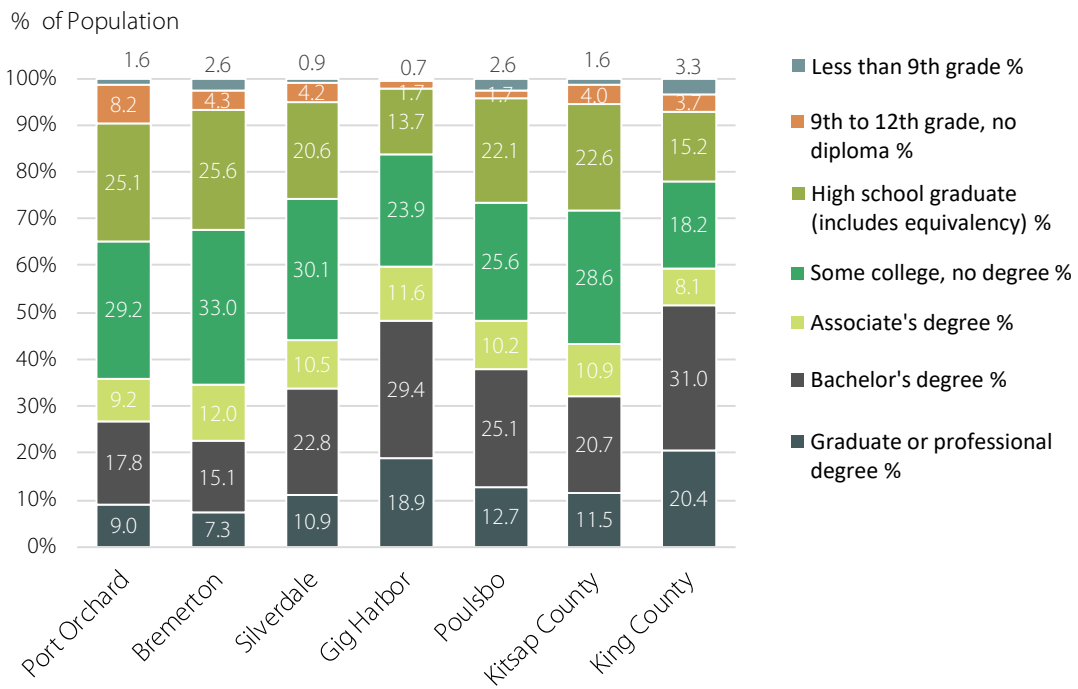
Educational Attainment

The chart to the right segments the educational attainment of the population for Port Orchard and the comparison geographies.

- Over one-third (36%) of Port Orchard's population has college degree (Associate's, Bachelor's or Graduate/Professional). This is five percentage points below Kitsap County as a whole.

- Just under 10% of the total population of Port Orchard has not graduated high school. This is higher than all the comparison geographies.

Exhibit 12. Population Educational Attainment (%), Kitsap County 2018



Source: ACS 5-year Estimates

Population and Housing

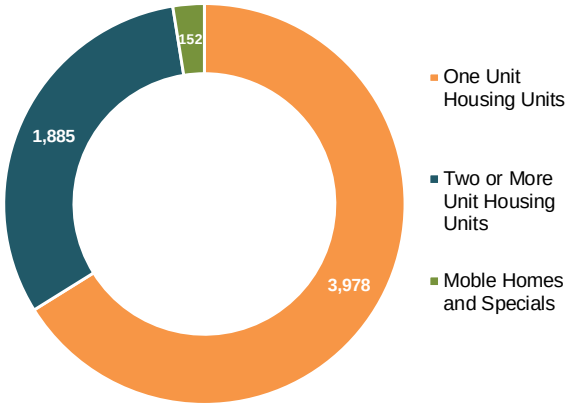
Housing Supply (OFM)

- The following exhibits illustrate the total number of housing units by year across the comparison geographies
- Port orchard has added 1,379 housing units since 2010, an average of over 150 units per year

Exhibit 13. Housing Units by Year, Port Orchard, 2010-2019

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Net Change
Port Orchard	4,636	4,780	4,888	5,375	5,527	5,695	5,791	5,862	5,911	6,015	1,379
Bremerton	17,273	16,915	17,090	17,240	17,281	17,194	17,535	17,612	17,991	17,998	725
Gig Harbor	3,560	3,614	3,669	3,853	4,028	4,303	4,488	4,665	5,025	5,182	1,622
Poulsbo	4,115	4,152	4,189	4,279	4,349	4,440	4,529	4,651	4,776	4,939	824
Kitsap County	107,367	107,364	107,858	108,449	109,136	109,474	110,385	111,145	112,344	113,145	5,778

Exhibit 14. Housing Units by Type, Port Orchard, 2019



Source: Washington Office of Financial Management

Population and Housing

Housing Supply Inventory

The map and table illustrate the current housing inventory and relative locations within the study area.

- Single family housing is the predominant existing land use in the study area (38% of land)
- Single family housing represents 62% of total housing inventory (by unit)
- There are 742 housing units in the study area

Exhibit 15. Map of Housing Uses

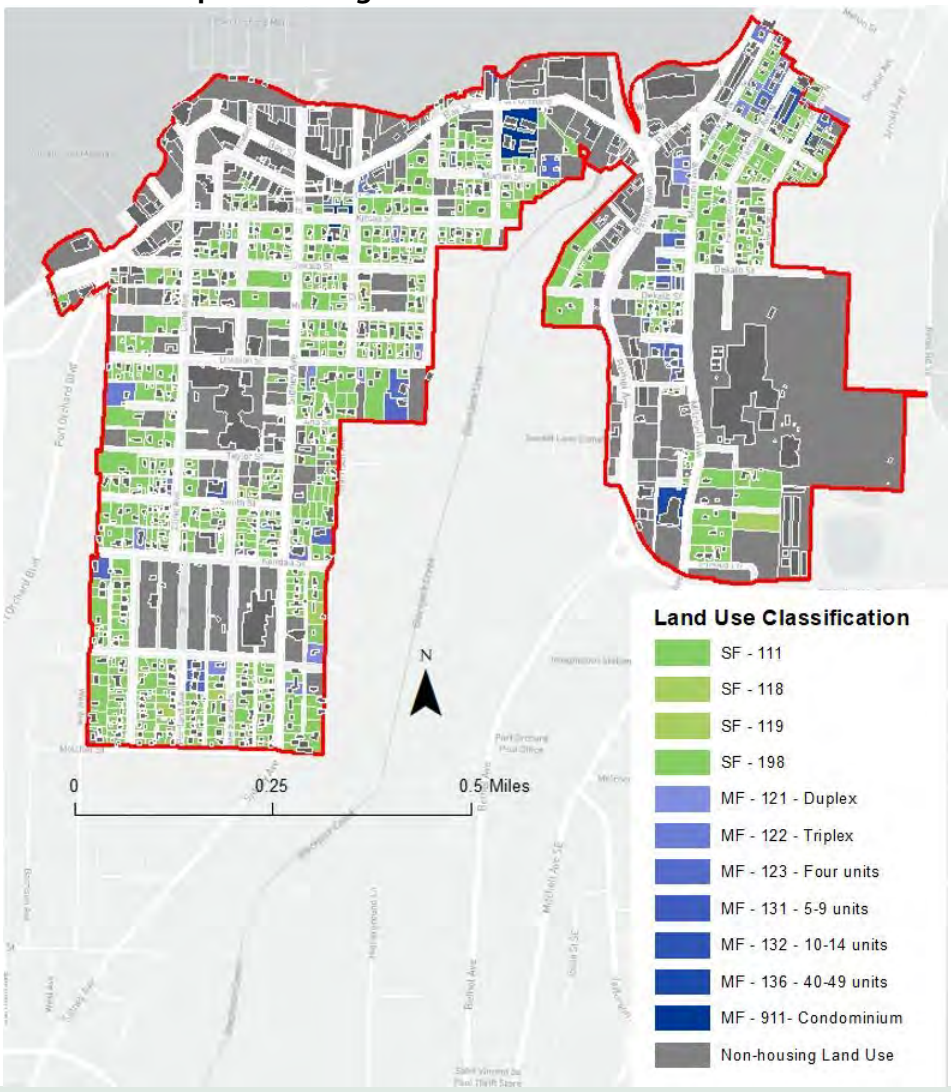


Exhibit 16. Map of Housing Uses

Land Use	Number of Parcels	Acreage	% of Total Area	Number of units	% of Total	Avg. Unit/Acre
Single Family	460	93.6	38%	460	62%	4.9
Multifamily Apartments	4	2.4	1%	74	10%	30.4
Condominiums	4	2.6	1%	60	8%	23.0
Four-plex	18	5.4	2%	72	10%	13.4
Duplex	20	3.9	2%	40	5%	10.4
Triplex	12	2.7	1%	36	5%	13.3
Non-Housing	249	133.0	55%	0	0%	0.0
Total	***518***	***243.6***		***742***		

Source: Kitsap County Assessor 2019

Population and Housing

Housing inventory in the study area

Exhibit 17 illustrates the number of housing units by Zone and type (single family versus non single family..

Exhibit 17. Housing by Zoning Designation

Zone	Number of Single Family Units	Acreage**	Number of Non-Single Family Units*	Acreage**
Business Professional Mixed Use	52	7.73	18	0.92
Civic and Institutional	0	0.00	0	0.00
Commercial Corridor	0	0.00	0	0.00
Commercial Heavy	0	0.00	0	0.00
Comercial Mixed Use	10	4.97	21	0.90
Downtown Mixed Use	3	0.34	3	0.28
Gateway Mixed Use	2	0.32	0	0.00
Greenbelt	2	0.59	0	0.00
Neighborhood Mixed Use	4	0.82	0	0.00
Parks and Recreation	1	0.05	0	0.00
Public Facilities	4	1.02	0	0.00
Residential 1	15	6.52	4	0.59
Residential 2	294	57.51	60	5.29
Residential 3	64	11.76	78	5.18
Residential 4	9	1.95	98	3.81
TOTAL	***460***	***93.6***	***282***	***17.0***

** any thing that is not single-family housing, including condos, multi-plexes, multifamily.*
*** Acreage is only for the parcels that have units on them. This does not necessarily equal total parcel area in zone.*

Source: Kitsap County Assessor 2019

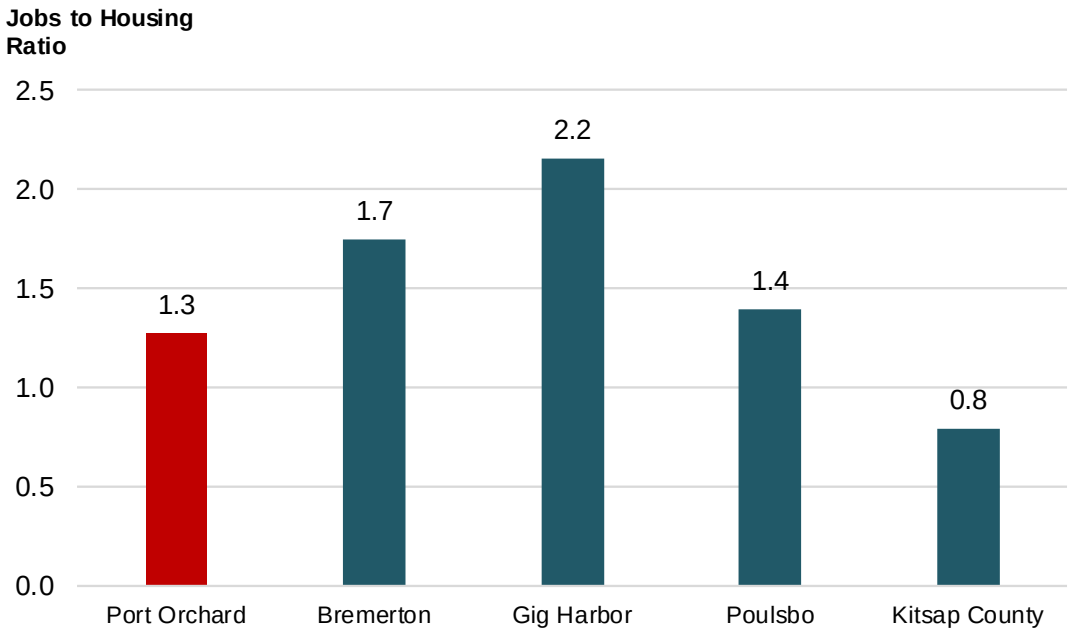
Employment and Workforce

Port Orchard Employment and Occupations

Exhibit 18 illustrates the jobs to housing ratio in Port Orchard compared to other cities in the region.

- Jobs to housing ratio is the measure of the number of jobs in a city compared to the number of housing units
- It is indicative of whether a City serves as an employment center or bedroom community or has a balance of both
- Port Orchard is relatively balanced at 1.3, with more jobs than housing units in the City

Exhibit 18. Jobs to housing ratio, Kitsap County, 2018



Source: PSRC 2019; OFM 2019.

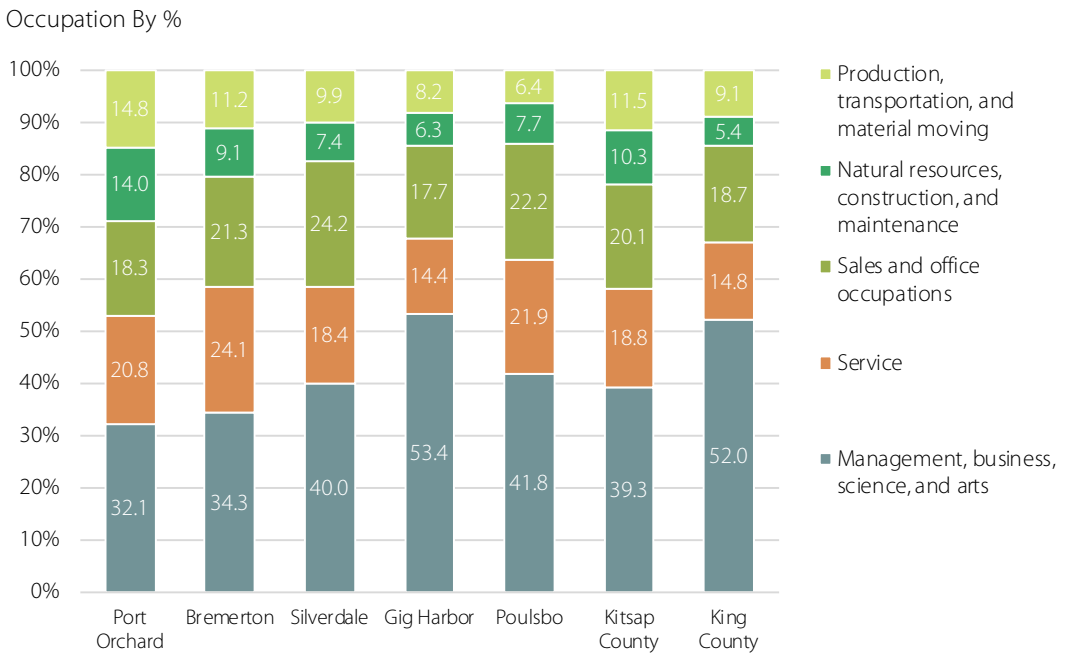
Employment and Workforce

Occupations Of Residents

The chart to the right broadly segments the resident population by occupation type for Port Orchard and the comparison geographies.

- When compared to the other geographies, Port Orchard has the highest percentage of its population working in production, transportation and material moving (14.8%).
- When compared to the other geographies, Port Orchard also has the greatest percentage of its population working in Natural Resources, Construction, and maintenance (14%).

Exhibit 19. Occupations of Residents (%), Kitsap County, 2018



Source: ACS 5-year Estimates

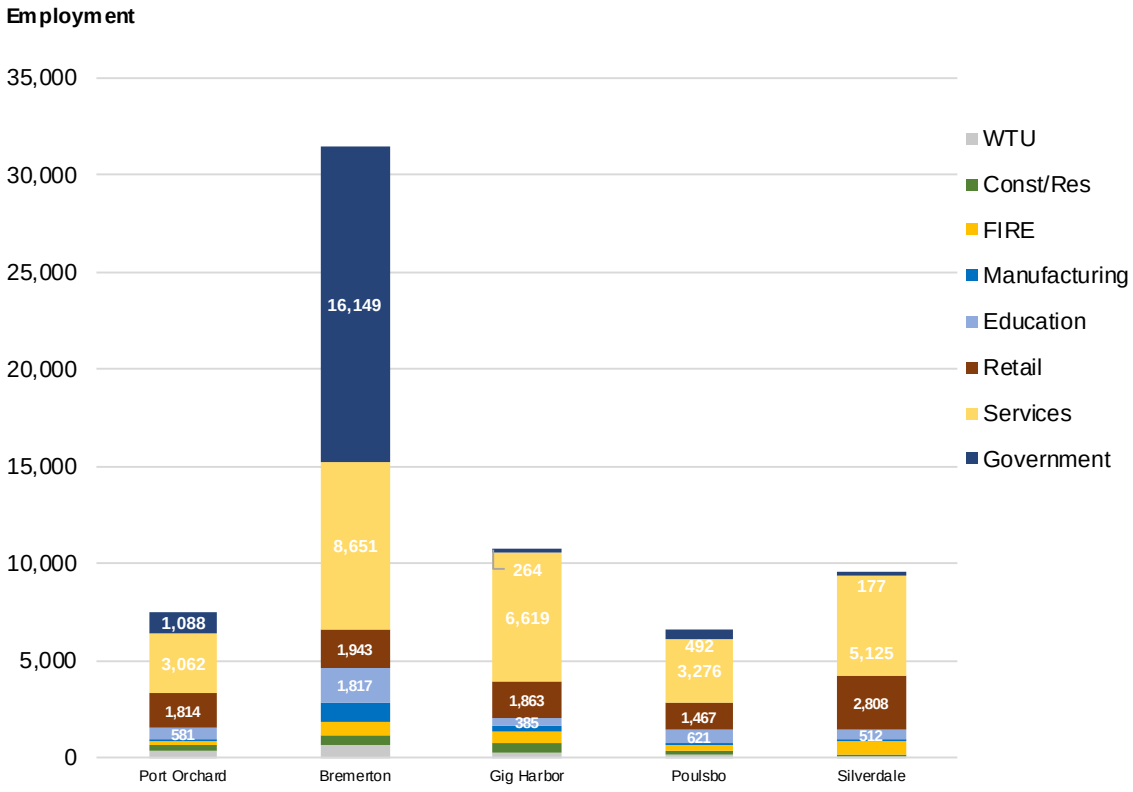
Employment and Workforce

Port Orchard Employment by Industry

Exhibit 20 provides a breakdown of covered employment by industry in Port Orchard and the comparison city framework.

- Total covered employment in 2018 in Port Orchard was 7,518
- The three largest sectors were FIRE (Finance, Insurance and Real Estate), Retail and Services
- Bremerton, is the major employment center in Kitsap County
- Almost half of all jobs in Bremerton are government, with many directly related to Naval Base Kitsap and the Bremerton Shipyard

Exhibit 20. Covered Employment by Industry, Kitsap County, 2018



	Const/Res	FIRE	Manufact.	Retail	Services	WTU	Gov.	Edu.	Total
Port Orchard	304	207	93	1,814	3,062	369	1,088	581	7,518
Bremerton	485	644	1,038	1,943	8,651	691	16,149	1,817	31,418
Gig Harbor	505	589	321	1,863	6,619	266	264	385	10,811
Poulsbo	223	308	110	1,467	3,276	154	492	621	6,650
Silverdale	118	742	49	2,808	5,125	49	177	512	9,580
Kitsap County	4,561	2,759	2,623	10,944	32,717	2,385	25,678	7,070	88,737

Source: PSRC, 2020.

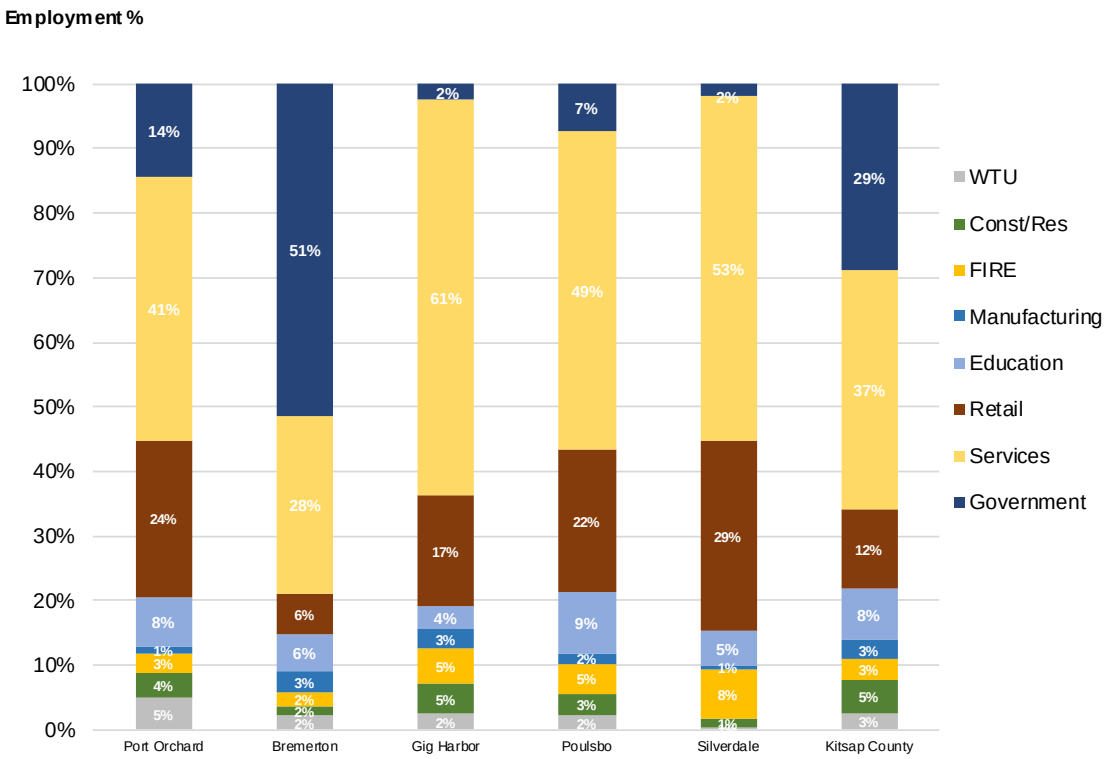
Note: WTU stands for Wholesale Trade, Transportation and Utilities; FIRE stands for Finance, Insurance and Real Estate

Employment and Workforce

Port Orchard Employment by Industry

Exhibit 21 illustrates the proportion of total jobs by industry in Port Orchard and comparison geographies

Exhibit 21. Covered Employment % by Industry, Kitsap County, 2018



Source: PSRC, 2020.

Note: WTU stands for Wholesale Trade, Transportation and Utilities; FIRE stands for Finance, Insurance and Real Estate

Employment and Workforce

Port Orchard Employment and Occupations

Exhibits 22 and 23 summarizes the PSRC employment forecast for Kitsap County, Port Orchard and comparison communities.

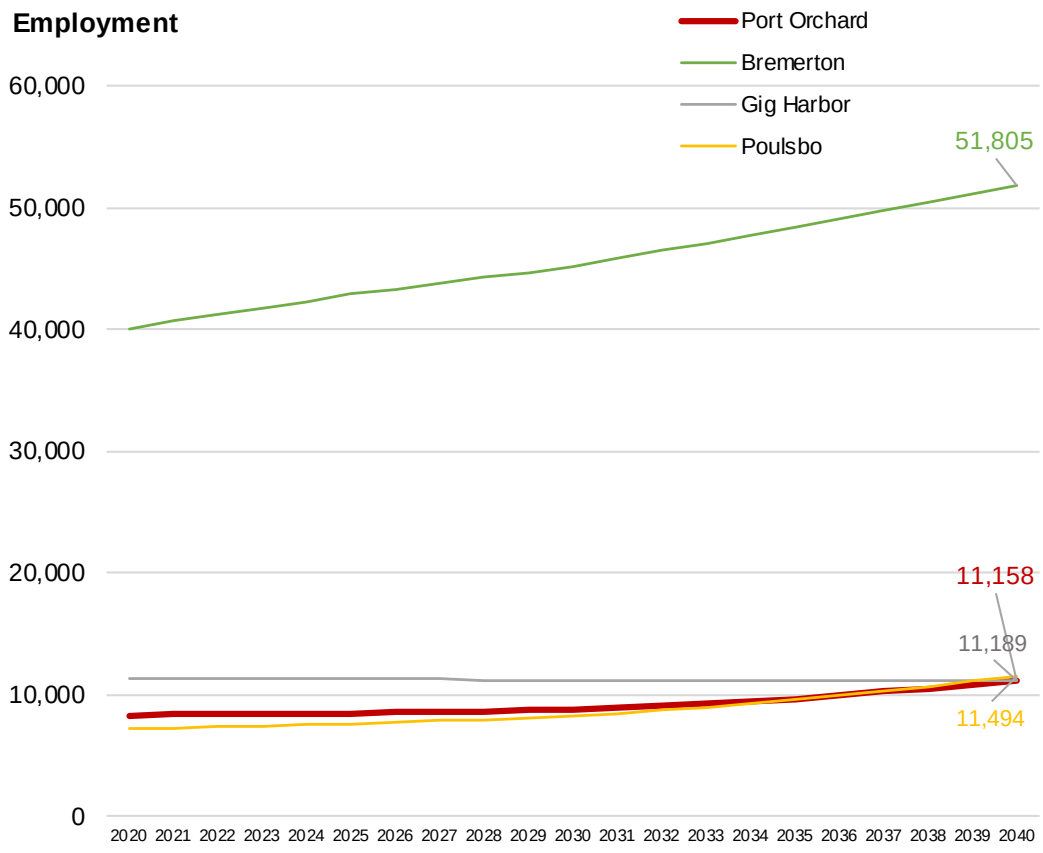
- Port Orchard is forecasted to add more than 2,800 jobs by 2040 according to the PSRC forecast.

Exhibit 22. Forecasted Employment Growth Rate, Port Orchard, 2019-2040

	Emp Cagr 2020-2040	Net Change Emp 2020-2040
Port Orchard	1.5%	2,835
Bremerton	1.3%	11,715
Gig Harbor	-0.1%	-175
Poulsbo	2.4%	4,321
Kitsap County	1.6%	39,719

Source: PSRC, 2020.

Exhibit 23. Forecasted Covered Employment, Kitsap County, 2020-2040



Source: PSRC, 2020.

Real Estate Conditions

The following section provides an overview of key real estate indicators and existing conditions related to improvement and housing.

Selected Geographies

- Port Orchard
- Bremerton
- Kitsap County

Indicators

- Vacancy and Lease Rates for Office, Retail and Multifamily
  Historical (2015-2019)
- Single family conditions
  Price trend over last five years (YoY),
  Median home price compared to Kitsap, Pierce and King counties

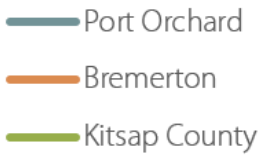
Existing Conditions

- Parcel level analysis:
  - Current housing inventory (see page 15)
  - Improvement Ratio: a measurement expressing a property's assessed improvement value as a ratio to total assessed value (land and improvements).
  - Improvement value on a lot square foot basis.

Real Estate Conditions

Vacancy by Product Type

These charts show vacancy over time for different product types. These charts compare Port Orchard to Bremerton and Kitsap County.



Source: Costar, 2020

Exhibit 24. Office Vacancy, Kitsap County, 2007-2019

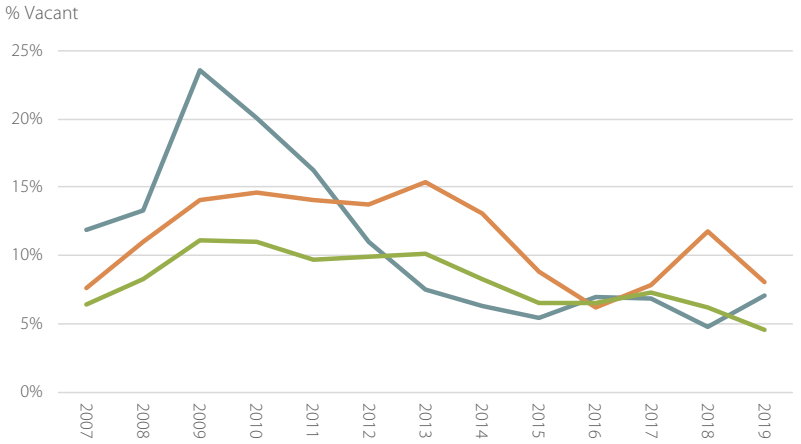


Exhibit 25. Multifamily Vacancy, Kitsap County, 2007-2019

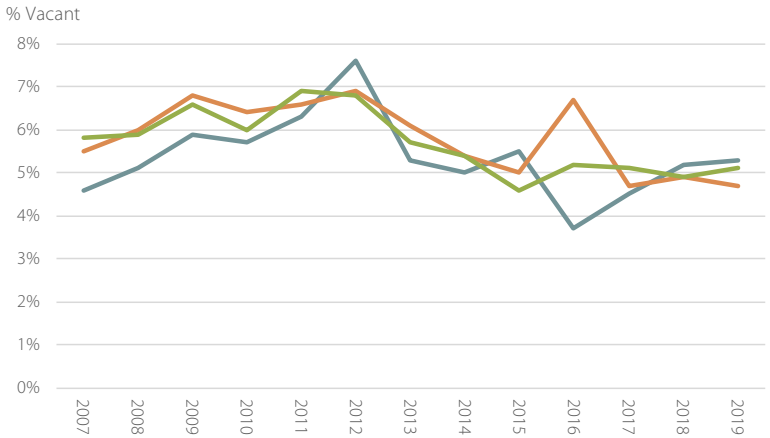
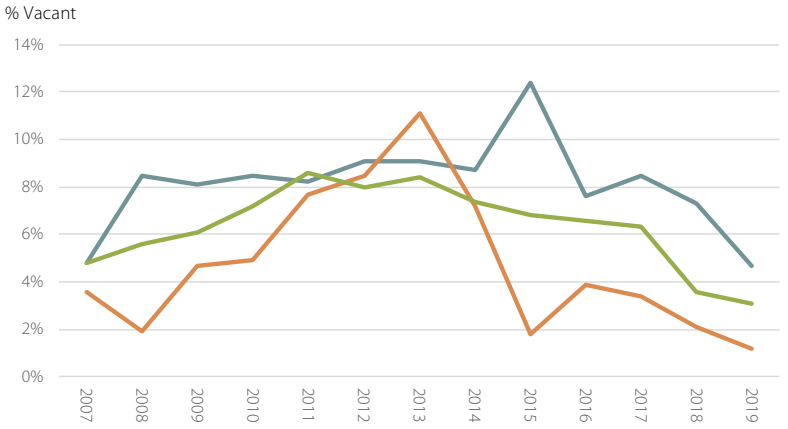


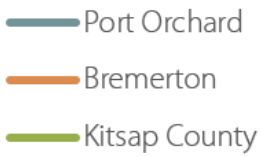
Exhibit 26. Retail Vacancy, Kitsap County, 2007-2019



Real Estate Conditions

Rents by Product Type

These charts show rents over time for different product types. These charts compare Port Orchard to Bremerton and Kitsap County.



Source: Costar, 2020

Exhibit 27. Office Rents, Kitsap County, 2007-2019

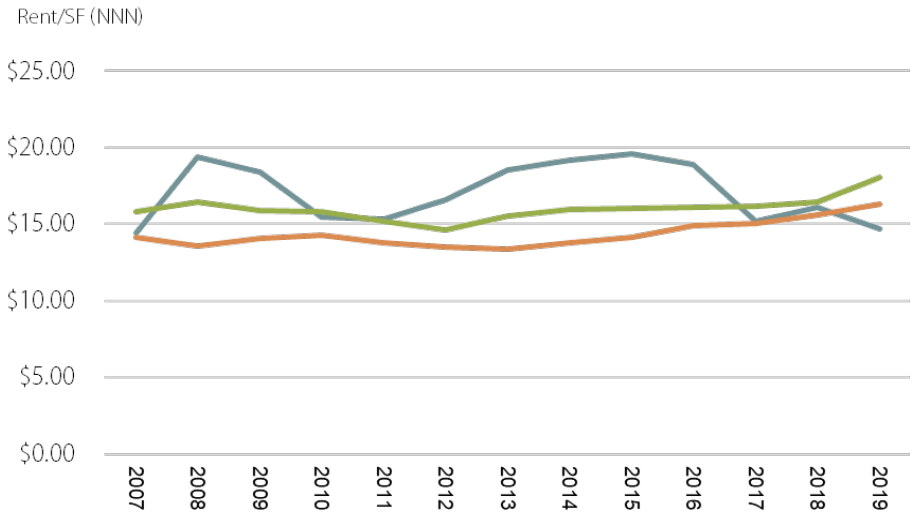


Exhibit 28. Multifamily Rents, Kitsap County, 2007-2019

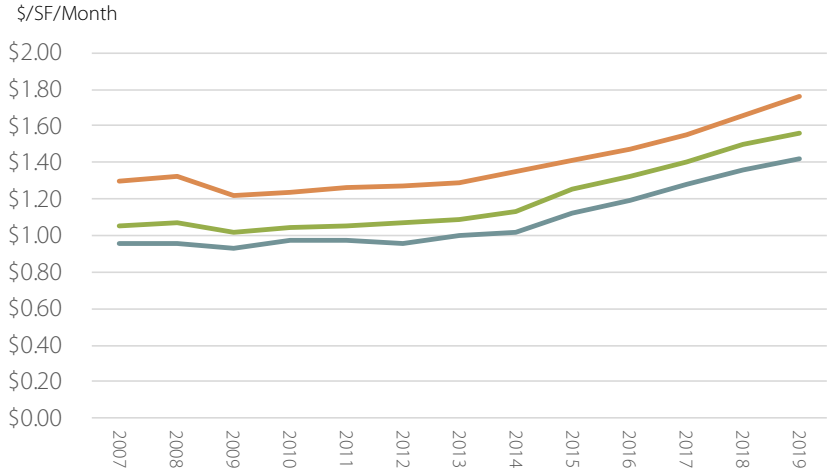
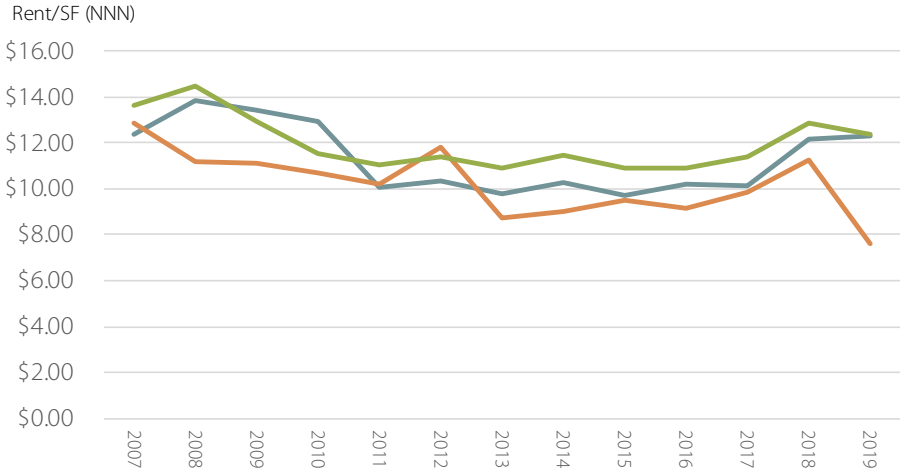


Exhibit 29. Retail Rents, Kitsap County, 2007-2019

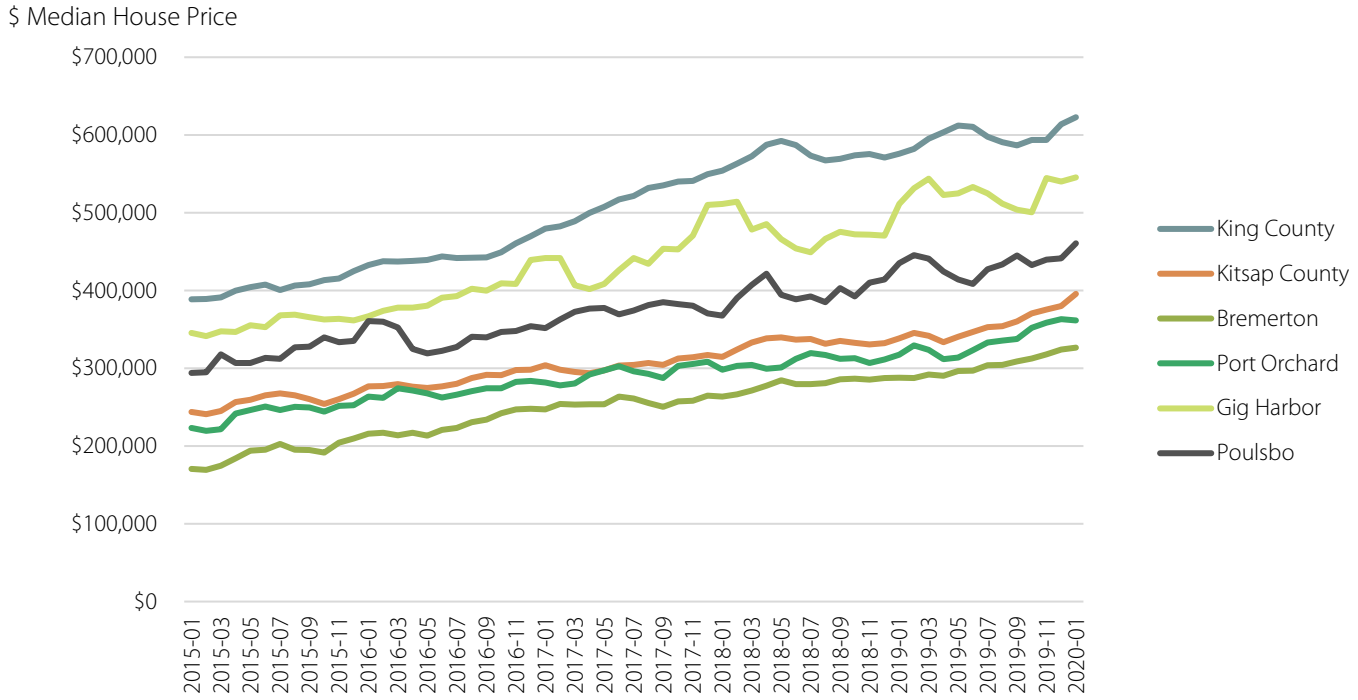


Real Estate Conditions

Median Home Price

Exhibit 30 illustrates median home prices in Kitsap County and the region over the last five years.

Exhibit 30. Median Home price, Kitsap County, 2015-2019



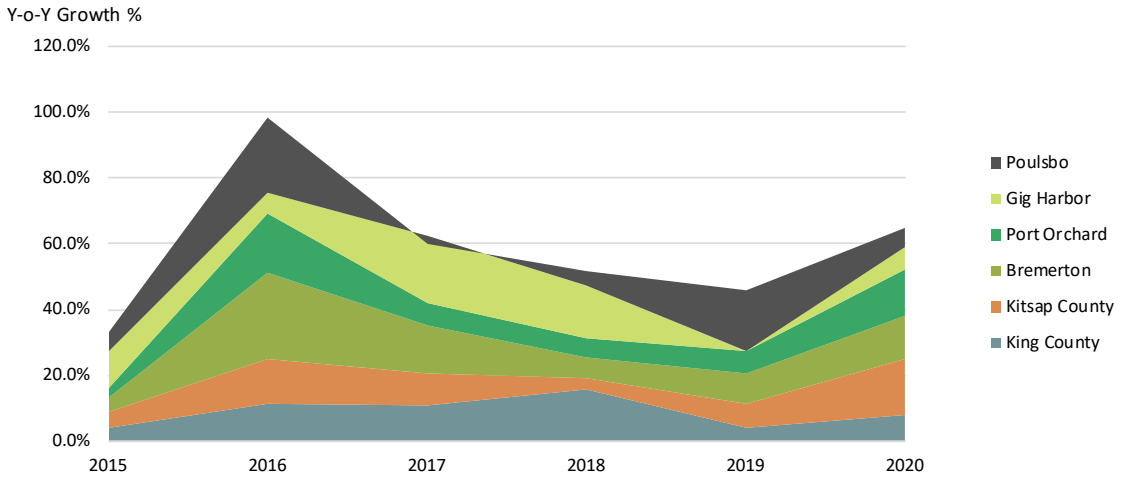
Source: Zillow

Real Estate Conditions

Home Price Trends

Exhibit 31 illustrates year over year growth since 2015 in median home price.

Exhibit 31. Year over Year Growth to Median Home price, Kitsap County, 2015-2019



RegionName	2015	2016	2017	2018	2019	2020
King County	4.2%	11.3%	10.8%	15.5%	3.9%	8.2%
Kitsap County	5.0%	13.5%	9.8%	3.6%	7.6%	16.8%
Bremerton	4.3%	26.4%	14.6%	6.6%	9.3%	13.3%
Port Orchard	2.7%	18.0%	6.9%	5.8%	6.6%	13.9%
Gig Harbor	11.2%	6.1%	20.4%	15.7%	0.0%	6.7%
Poulsbo	5.9%	22.7%	-2.5%	4.6%	18.3%	5.9%

Source: Zillow

Real Estate Conditions

Improvement Ratio Analysis

Improvement Ratio: a measurement expressing a property's assessed improvement value as a ratio to total assessed value (land and improvements).

The map and table on this page show the level of improvement in the study area and generally where building improvements and past investment are concentrated.

- Properties with no assessed values are generally excluded from this analysis. Predominantly, this exclusion is a result of public ownership and excludes parks and other public facilities.

- 10% of the Study area is vacant

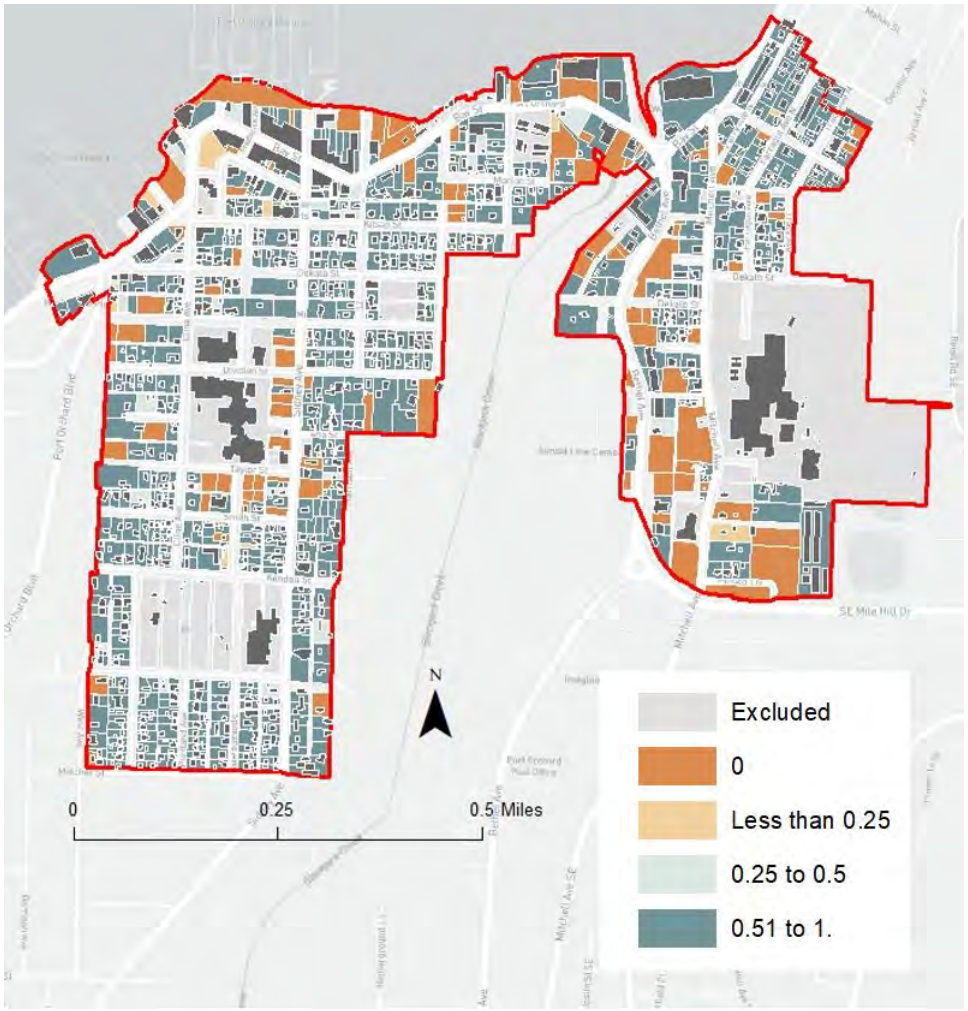
Exhibit 32. Improvement Ratio Summary Table

Improvement Ratio Summary

	Number of parcels	Acres	% of Study Area
0 (vacant)	100	36.2	15%
Less than0.25	10	2.7	1%
0.25 to 0.5	21	4.6	2%
0.51 to 1.0	581	135.2	55%
Excluded	55	64.9	27%
TOTAL	767	243.6	100%

Source: Kitsap Assessor, 2019

Exhibit 33. Improvement Ratio, Port Orchard Study Area, 2019



Real Estate Conditions

Value of Improvements per Land SqFt

This is an alternative method to illustrate how improvements/investment is dispersed over the study area. This comparison takes the assessed improvement value and divides it by the total lot size in square feet.

- Properties with no assessed values are generally excluded from this analysis. Predominantly, this exclusion is a result of public ownership and excludes parks and other public facilities.

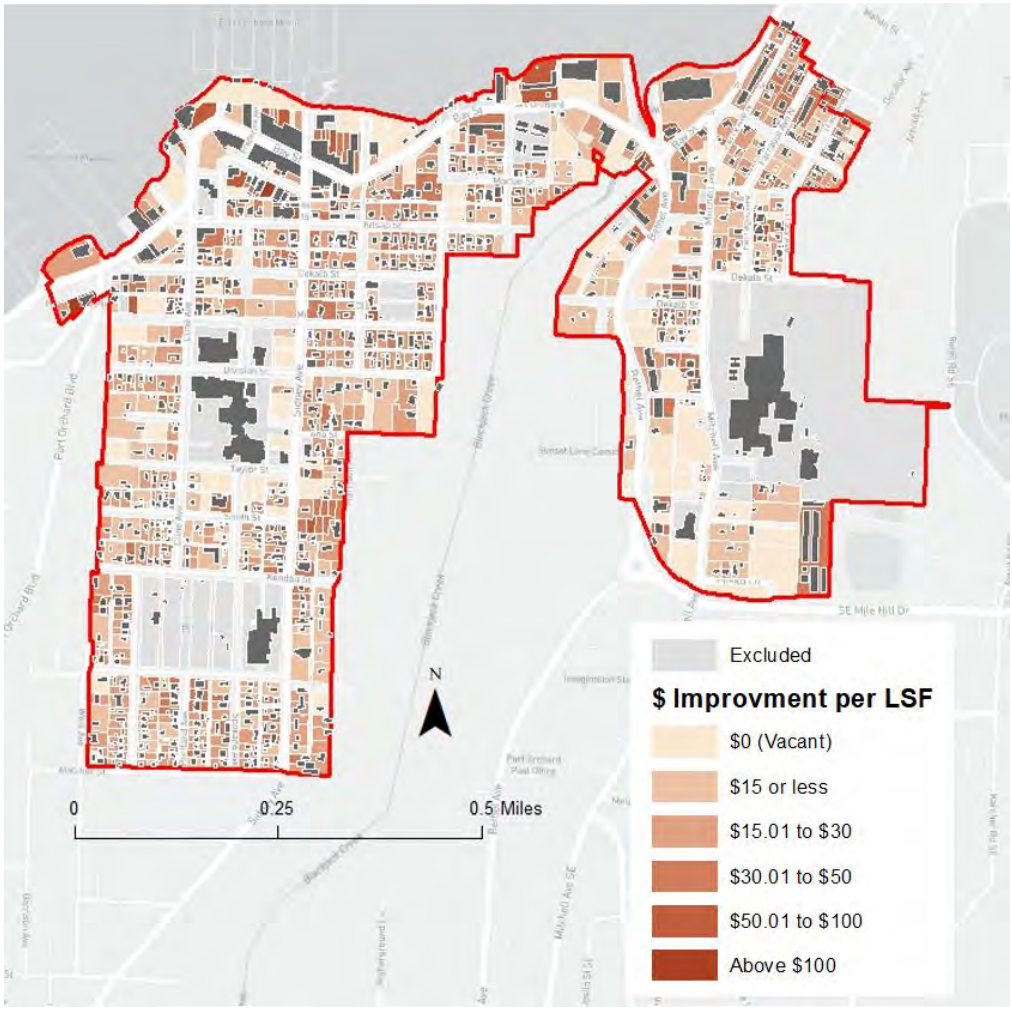
Exhibit 34. Improvement Value Summary Table

Assessed Improvement Value ($) per Lot Square Foot

	Number of parcels	Acres	% of Study Area
$0 (Vacant)	100	36.2	15%
$15 or Less	132	46.3	19%
$15.01 to $30	256	54.1	22%
$30.01 to $50	159	31.2	13%
$50.01 - $100	54	9.5	4%
Over $100	11	1.2	1%
Excluded	55	64.9	27%
TOTAL	767	243.6	100%

Source: Kitsap Assessor, 2019

Exhibit 35. Improvement $/Lot Sq. Ft., Port Orchard Study Area, 2020



Capacity Analysis

Capacity Analysis

The following section describes the methodology, data sources and results of the capacity analysis conducted for the Downtown Port Orchard Subarea. The capacity analysis aligns with methodologies used in the previous buildable lands analysis by Kitsap County while incorporating additional inputs and analyses tailored to better suit the conditions found within the subarea boundary.

Overall Methodology

The steps outlined to the right provide an overview of the methodology used for the capacity analysis. Key data sources include:

- Kitsap County Parcel and Assessor data
- Kitsap County GIS (for critical areas)
- City of Port Orchard zoning code
- CoStar for property and market conditions

Study Limitations

This capacity analysis conducted for the City of Port Orchard represents a theoretical estimate of development within the designated study area as defined in this report. The capacity analysis and related modeling outputs do not represent an appraisal of property values and should only be used for the intended purposes of estimating potential development scenarios and their potential impact on future capacity within the identified study area.

Step 1: Calculate Gross Buildable Area

- All vacant and redevelopable lands less excluded parcels (parks, essential public facilities, etc.)

Step 2: Calculate Net Developable Land Area

- Deduction for critical area, rights of way, other public facilities and unavailable lands

Step 3a: Segment the Study Area

- Assign development capacity based on zoning

Step 3b: Identify Potential Capacity By Zone

- Identify factors influencing the range of potential Capacity by zone.

Step 3c: Add Current Development Pipeline

- Add the development capacity from parcels in the pipeline

Step 4: Future Capacity Scenarios

- Calculate Capacity beast on the following scenarios:
  - Baseline density
  - High-growth residential focus
  - High-growth commercial focus

Capacity Analysis

Current Activity Units

Exhibit 36 provides a summary of the current level of employment and population within the subarea boundary, estimated by the Puget Sound Regional Council (PSRC). Several alternative subarea boundaries were explored, with the preferred alternative (subarea boundary) having a population of 1,806 and a total level of covered employment at 2,150 (covered jobs) in 2018. The following analysis illustrates the estimated remaining capacity with the preferred alterative boundary.

Exhibit 36. Activity Units, Port Orchard Subarea Boundary

Alternatives	Total Population	Covered Employment	Total Acres*	Activity Units/Acres
Alternatives Downtown County Center				
- Option 0	733	1,607	120	20
- Option 1	1,275	2,113	259	13
- Option 2	1,163	2,018	208	15
- Option 3	1,424	1,697	223	14
Preferred Alternative Down County Center	1,806	2,150	329	12

Source: PSRC, 2020.

**TOTAL ACRES: PSRC references the total acreage of the Study Area, which includes the gross parcel and public right of way acreage. Analysis contained later in the report referencing gross and net buildable lands does not include existing public right of way.*

Capacity Analysis

Approach and Methodology

STEP 1: GROSS BUILDABLE LAND AREA

The gross buildable land area is the sum of all land area for all parcels meeting one or more of the criteria listed to the right. *This does not include existing public right of way which accounts for approximately 85 acres of land within the Study Area*. Certain parcels were excluded from this calculation to improve the accuracy of the analysis (see Parcel Exclusions).

City of Port Orchard Review. In addition, the City of Port Orchard conducted a detailed review of the study area to inform designation of vacant and redevelopments parcels and to better reflect known parcel level conditions in the City.

PARCEL EXCLUSIONS

Properties with zero total assessed value were manually reviewed for ownership, land use and were visually inspected. Properties that were significantly improved or public facilities, including city owned beach-front parks, were excluded. *All the parcels in the pipeline were also excluded including the current phased expansion of the County Courthouse. The development capacity in the pipeline is re-incorporated in Step 3c.*

Examples of Exclusions:

- Government Services (Prop Class)
- Parks (Prop Class)
- Cemeteries
- Educational Services
- Utilities
- Condominiums

Gross Buildable Lands Criteria

VACANT

Using data from the Kitsap County Assessor, this analysis identifies vacant parcels using the assessed values of the improvements. Lots with zero improvement value are then compared against other factors such ownership and property class descriptions to determine vacancy.

UNDERUTILIZED

Using Kitsap County Assessor data, this analysis calculates an improvement ratio by dividing the assessed improvement value by the total assessed value.

This ratio of assessed improvement value to total assessed value is a commonly used indicator for a property's level of improvement. A ratio less than 0.5 indicates the land is worth more than the improvements. This analysis uses an improvement ratio of 0.5 as the threshold. Any parcels with an improvement ratio under this threshold are considered underutilized.

SINGLE-FAMILY

Any Single-Family use, as defined by assessor property class field, in a high-density base-zone, is deemed to be redevelopable.

Capacity Analysis

Approach and Methodology

STEP 2: NET DEVELOPABLE LAND AREA

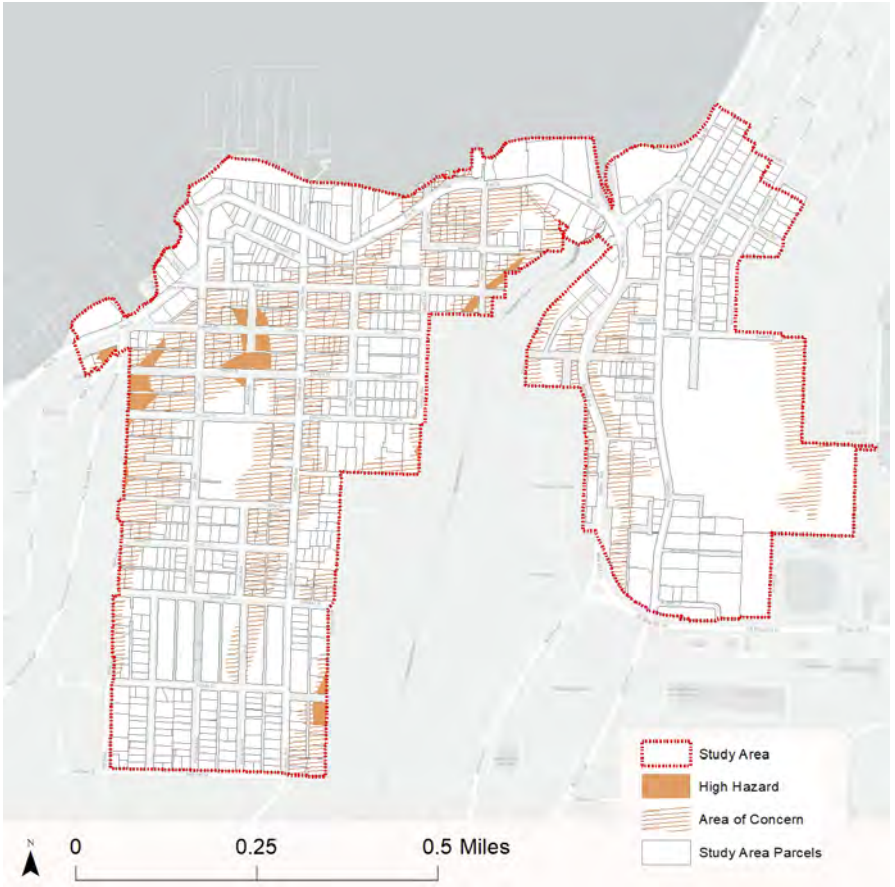
The sum of the gross buildable area was adjusted to reflect lands that will not contribute to the capacity. The deducted areas include critical areas, future roads and right-of-way (ROW), public facilities and infrastructure, and unavailable lands that will not be developed for reasons such as irregular shape, or alternative intentions by property owners.

Deducting the aforementioned areas from the total gross buildable land area gives us the net developable land area, which is used to calculate development capacity.

Exhibit 37. Net Calculation Assumptions

DEDUCTION	AMOUNT	REASON
Critical Areas	75%	Based on Kitsap County LCA 2014
High Hazard	75%	Based on Kitsap County LCA 2014
Areas of Concern	50%	Based on Kitsap County LCA 2014
Roads/ROW (future)	5%	Reflects King County Report
Public Facility (future)	5%	Reflects King County Report
Unavailable Lands		
Vacant land	5%	Reflects a portion of vacant land That will not redevelop for whatever reason
Underutilized	10%	Reflects a portion of underutilized,, but improved land that will also not sell in the market

Exhibit 38. Critical Area, Downtown Subarea



Capacity Analysis

Approach and Methodology

STEP 3a: SEGMENTING STUDY AREA

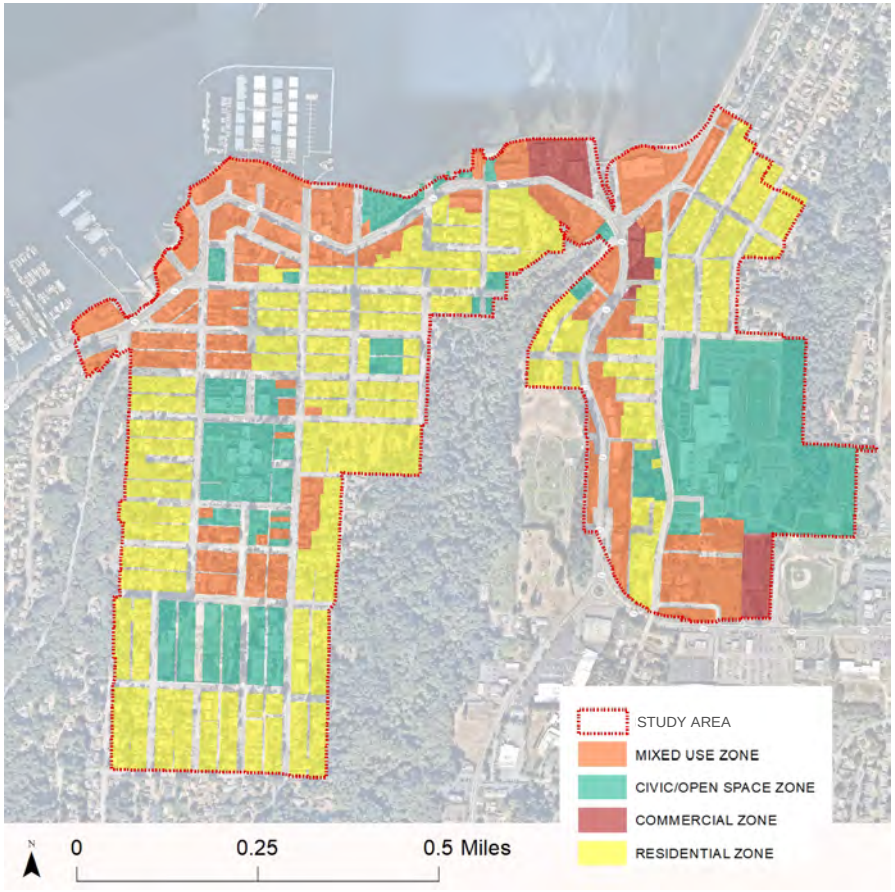
Development capacity is assigned to the net developable land area calculated in Step 2 by using density assumptions attributed to each zone. To capture the mixed-use component of the commercial and mixed-use zones, it was necessary to categorize the zones into four main land-use categories as shown in Exhibit 39.

CIVIC AND OPEN SPACE	RESIDENTIAL ZONES
Greenbelt (GB)	Low Density (R1)
Public Facilities (PF)	Medium Density Residential (R2)
Parks and Recreations (PR)	Medium Density Residential (R3)
Civic and Institutional (CI)*	High Density (R4)*

COMMERCIAL	MIXED USE
	Business Professional Mixed Use (BPMU)*
Commercial Corridor (CC)*	
Commercial Heavy (CH)*	Commercial Mixed Use (CMU)*
	Downtown Mixed Use (DMU)*
	Gateway Mixed Use (GMU)*
	Neighborhood Mixed Use (NMU)*

* *HIGH DENSITY - the R4 and CI zones are specifically highlighted as high density because single-family parcels in these zones are considered redevelopable.*

Exhibit 39. Land Use Categories



Capacity Analysis

Approach and Methodology

STEP 3b: DEVELOPMENT CAPACITY ASSUMPTIONS

Development capacity was calculated independently for each zone reflecting the regulations and requirements found within the City's zoning code. Some zones, specifically mixed-use zones, offer more flexibility for development. Other zones like Greenbelt (GB) and Public Facilities (PF) are more restrictive in terms of allowed uses.

Exhibit 40. Residential Zones

ZONES	ASSUMED DENSITY (UNITS PER ACRE)
Low Density (R1)	7
Medium Density Residential (R2)	7
Medium Density Residential (R3)	10
High Density (R4)	24

Source: Kitsap Buildable Lands, Analysis 2014

Exhibit 41. Civic and Open Space Zones

ZONES	ASSUMED DENSITY
Greenbelt (GB)	*Assumed no Capacity*
Public Facilities (PF)	*See Pipeline*
Parks and Recreations (PR)	*Excluded in Step 1*
Civic and Institutional (CI)	*FAR estimates provided in Mixed-use /Commercial estimates from GGLO**

MIXED USE & COMMERCIAL ZONES

All combinations of commercial and mixed-use zones and overlay districts are assigned a floor area ratio (FAR) based on an analysis of zoning requirements by GGLO. These FARs depend on two main factors: (1) whether the project is Mixed-use or commercial only; and (2) whether the parking required is provided by structured or surface parking. Exhibit 42 summarizes the FAR ranges utilized in the analysis. More details on the range of FARs are found in the appendix*.

Exhibit 42. Floor Area Ratio Assumptions by Zone

Zone	Assumed FAR Range
NMU-3	.52 - 1.21
CMU-3	.53 - 1.22
CMU-4	.56 - 1.37
CMU-5	.56 - 1.47
DMU-3	1.2 - 2.85
DMU-4	1.22 - 3.42
GMU-3	0.6 - 1.45
GMU-4	0.67 - 1.70
BPMU-3	0.5 - 1.21
BPMU-4	.53 - 1.39
CC-3	.38 - .92
CH-3	.48 - .98
CH-4	.42 - .84
CI-3	.50 - 1.01

** See Appendix for full range of FARs provided by GGLO*

Capacity Analysis

Approach and Methodology

STEP 3c: CURRENT DEVELOPMENT PIPELINE

Exhibits 43 and 44 illustrate the development pipeline, representing projects that are known to be in planning or permitting stages of development. All parcels in the development pipeline were excluded in the gross buildable land area calculations in Step 1. The capacity planned in the pipeline is considered future capacity and is added back to the projected development capacity found in Exhibit 52-57.

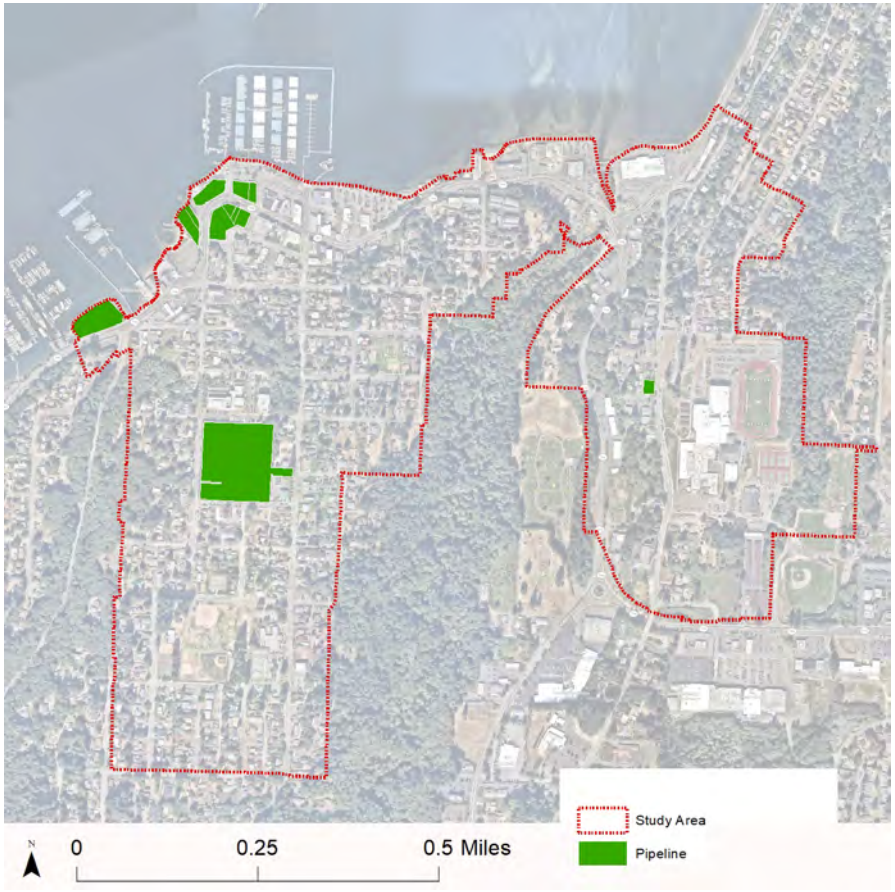
Exhibit 43. Development Pipeline Summary

Project Name	Address	Res Sqft	Res Units	Comm. SF*
W2 Mixed Use Residential	619 Bay St	54,400	62	6,900
W3A Mixed Use Residential	625 Bay St	51,500	57	5,200
W1 Community Center	567 Bay St			24,000
B1 Mixed Use Office	620 Bay St	80,000	88	71,900
429 Bay Mixed Use Residential	429 Bay St	Unknown	39	500
County Courthouse	614 Division St			238,500
4-Plex	420 Mitchell Ave		4	
TOTALS		*185,900*	*250*	*347,000*

* For the Purpose of this analysis, the civic space under construction (Community Center and Courthouse) is considered Commercial.

Source: City of Port Orchard, 2020; CoStar, 2020.

Exhibit 44. Development Pipeline



Capacity Analysis

Approach and Methodology

Net Redevelopable Lands

Exhibit 45 summarizes gross developable land by land use category, while exhibit 46 shows the net developable area calculation and resulting acreage by land use category. The net developable acreage is estimated to be 41.8 acres, including pipeline parcels.

The maps on the following page, (Exhibits 47-48) highlight both the net vacant and redevelopable lands along with the planned development pipeline. These maps indicate where future development capacity is located within the Study Area.

Exhibit 45. Gross Redevelopable Lands Summary

ZONE CATEGORY	TOTAL PARCEL AREA	VACANT	UNDER-UTILIZED	SINGLE-FAMILY IN HIGH DENSITY	GROSS BUILDABLE AREA	
	(Acre)	*(Acre)*	*(Acre)*	*(Acre)*	*(Acre)*	*(% of Total)*
CIVIC AND OPEN SPACE	67.1	3.5	3.2	0.0	6.6	10%
RESIDENTIAL ZONES	106.4	10.4	3.0	1.8	15.2	14%
COMMERCIAL ZONES	7.8	1.7	1.7	0.0	3.4	44%
MIXED USE	62.5	14.0	10.5	11.2	35.7	57%
TOTAL	**243.9**	**29.5**	**18.4**	**13.0**	**61.0**	***25%***

Exhibit 46. Net Redevelopable Lands Calculation

ZONE CATEGORY	TOTAL PARCEL AREA	GROSS BUILDABLE LAND AREA	(-) Total Deduction	Pipeline	Net Developable Area	
	(Acre)	*(Acre)*	*(Acre)*	*(Acre)*	*(Acre)*	*(% of Total)*
CIVIC AND OPEN SPACE	67.1	6.6	3.1	6.8	10.3	15%
RESIDENTIAL ZONES	106.4	15.2	7.3	0.2	8.1	8%
COMMERCIAL ZONES	7.8	3.4	0.9	0.0	2.6	33%
MIXED USE	62.5	35.7	15.2	4.2	24.7	39%
TOTAL	**243.9**	**61.0**	**26.5**	**11.2**	**45.7**	***19%***

Capacity Analysis

Approach and Methodology

Exhibit 47. Capacity Map By Land Use Category

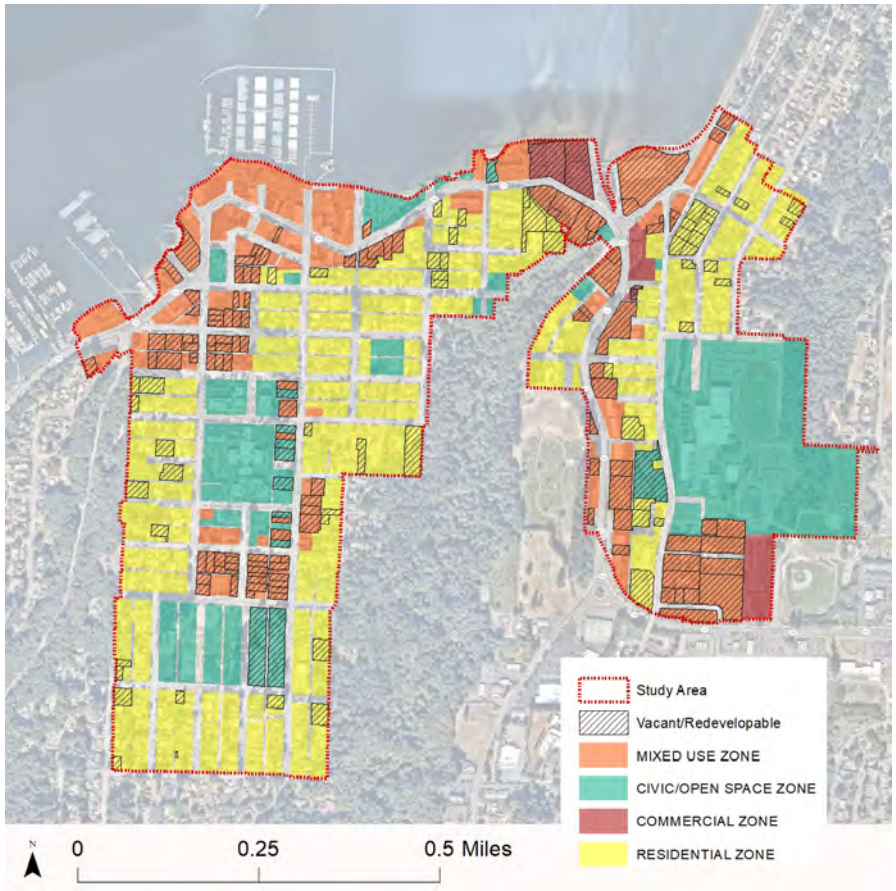


Exhibit 48. Capacity Map By Vacant and Redevelopable

Capacity Analysis

Approach and Methodology

STEP 4: FUTURE CAPACITY SCENARIO ANALYSIS

Using the zoning assumptions and FAR ranges detailed in step 3b, the analysis leverages variation in development densities to simulate different market conditions impacting the range of capacity across the subarea. The three scenarios, presented to the right, reflect the following:

> The impact of surface versus structured parking on capacity -- serving as a reflection of different market conditions (for example, structured parking would require more favorable market conditions).

> The concentration of commercial development as a standalone product as well as a share of mixed-used developments.

> The overall range of capacity within the subarea.

The tables on the following page (Exhibit 49-51) provide details on each scenario in terms of assumptions for the proportion of structured versus surface parking and the proportion of commercial uses in mixed-use development. *A detailed breakdown of FAR assumptions by zone and scenario is provided in the appendix*.

Scenario 1: Baseline Capacity

- Mostly residential development
- Standalone commercial development only in commercial only zones. Some commercial incorporated into mixed-use developments
- Majority surface parking meaning lower density development

Scenario 2: High Capacity, Residential Heavy

- Mostly residential development
- Standalone commercial development only in commercial only zones. Some commercial incorporated into mixed-use developments.
- Majority structured parking, meaning higher density development

Scenario 3: High Capacity Commercial Heavy

- More balanced mix of residential and commercial
- Some standalone commercial development in mixed-use zones plus commercial development in commercial only zone. Increased commercial incorporated into mixed-use developments
- Majority structured parking meaning higher density development

Capacity Analysis

Mixed Use and Commercial FAR Assumptions

Exhibit 49. FAR Allocation Assumed in Zones Permitting Commercial & Residential Building Forms for Each Scenario

	Commercial Only		Residential Mixed-Use	
Scenarios	**Structured Parking**	**Surface Parking**	**Below Grade Parking**	**Surface Parking**
1 - Baseline	0%	0%	25%	75%
2 - High Capacity, Res Heavy	0%	0%	75%	25%
3 - High Capacity, Comm Heavy	10%	10%	60%	20%

Exhibit 50. FAR Allocation Assumed in Zones Permitting Only Commercial Building Forms for Each Scenario

	Commercial Only	
Scenarios	**Structured Parking**	**Surface Parking**
1 - Baseline	25%	75%
2 - High Capacity, Res Heavy	75%	25%
3 - High Capacity, Comm Heavy	70%	30%

Exhibit 51. Commercial Use & Res Uses permitted

	Commercial Capacity Percent (%) Of Total By Base Zone		
BASE ZONES	**SCENARIO 1**	**SCENARIO 2**	**SCENARIO 3**
NMU	5%	5%	24%
CMU	25%	25%	40%
DMU	25%	25%	40%
GMU	25%	25%	40%
BPMU	20%	20%	36%
CC	25%	25%	40%
CH	100%	100%	100%
CI	100%	100%	100%

Capacity Analysis

Scenario 1 – Baseline Capacity

The *Baseline Capacity* scenario more closely reflects near term market conditions in Port Orchard. In this scenario housing is the predominant highest and best use in mixed use zones. In addition, a large majority of development is assumed to be surfaced park, thus reducing overall densities achieved.

- Mostly residential development
- Standalone commercial development only in zones prohibiting residential building form.
- Some commercial incorporated into mixed use developments.
- Majority surface parking meaning lower density development

Exhibit 52. Scenario 1 (Baseline) Summary Table

CATEGORY/ZONE	Net Devlopable Area	Commercial Capacity	Residential Capacity	Residential Capacity
	(Acre)	*(SF)*	*(SF)*	*(Units)*
CIVIC AND OPEN SPACE	3.5	351,400	0	0
RESIDENTIAL ZONES	7.9	0	UKN	120
COMMERCIAL ZONES	2.6	65,200	0	0
MIXED USE	20.5	206,200	566,200	954
TOTAL *with Pipeline*	**34.5**	**622,800**	**566,200**	**1,074**
Pipeline	*11.2*	*347,000*	*NA*	*246*
Total without Pipeline	*23.3*	*275,800*	*566,200*	*828*

Capacity Analysis

Scenario 2 – High Capacity, Residential Heavy

The *High Capacity ,Residential Heavy* capacity scenario reflects more favorable economic conditions in Port Orchard and the broader Kitsap County market area. In this scenario housing is still the predominant highest and best use in mixed use zones. Alternatively, a larger proportion of development is assumed to incorporate structured parking, thus increasing overall densities achieved.

- Mostly residential development
- Standalone commercial development only in commercial only zones. Some commercial incorporated into mixed use developments.
- Majority structured parking meaning higher density developments

Exhibit 53. Scenario 2 Summary Table

CATEGORY/ZONE	Net Devlopable Area	Commercial Capacity	Residential Capacity	Residential Capacity
	(Acre)	*(SF)*	*(SF)*	*(Units)*
CIVIC AND OPEN SPACE	3.5	362,900	0	0
RESIDENTIAL ZONES	7.9	0	UKN	120
COMMERCIAL ZONES	2.6	92,100	0	0
MIXED USE	20.5	278,600	800,900	1,247
TOTAL *with Pipeline*	**34.5**	**733,600**	**800,900**	**1,367**
Pipeline	*11.2*	*347,000*	*NA*	*246*
Total without Pipeline	*23.3*	*386,600*	*800,900*	*1,121*

Capacity Analysis

Scenario 3 – High Capacity, Commercial Heavy

The *High Capacity , Commercial Heavy* capacity scenario reflects more favorable economic conditions in Port Orchard and broader Kitsap market area, with an emphasis on commercial and office development. In this scenario a significant share of development in mixed use zones is assumed to be commercial. As in Scenario 2, a larger proportion of development is assumed to incorporate structured parking, thus increasing overall densities achieved.

- More balanced mix of residential and commercial
- Some standalone commercial development in mixed use zones plus commercial development in commercial only zone. Increased commercial incorporated into mixed use developments.
- Majority structured parking meaning higher density development

Exhibit 54. Scenario 3 Summary Table

CATEGORY/ZONE	Net Developable Area	Commercial Capacity	Residential Capacity	Residential Capacity
	(Acre)	*(SF)*	*(SF)*	*(Units)*
CIVIC AND OPEN SPACE	3.5	361,800	0	0
RESIDENTIAL ZONES	7.9	0	UKN	120
COMMERCIAL ZONES	2.6	89,400	0	0
MIXED USE	20.5	418,200	596,155	991
TOTAL *with Pipeline*	**34.5**	**869,400**	**596,155**	**1,111**
Pipeline	*11.2*	*347,000*	*NA*	*246*
Total without Pipeline	*23.3*	*522,400*	*596,155*	*865*

Capacity Analysis

Scenario Comparison

The following exhibits provide a comparison of the three scenarios modeled along with the development pipeline in terms of capacity for residential units and overall commercial square footage.

Exhibit 55. Residential Capacity – Scenario Comparison

SCENARIO	NUMBER OF UNITS	SF COMMERCIAL
Scenario 1 - Baseline	1,074	622,800
Scenario 2 - High Capacity, Residential Heavy	1,367	733,600
Scenario 3 - High Capacity, Commercial Heavy	1,111	869,400

Exhibit 56. Residential Capacity – Scenario Comparison

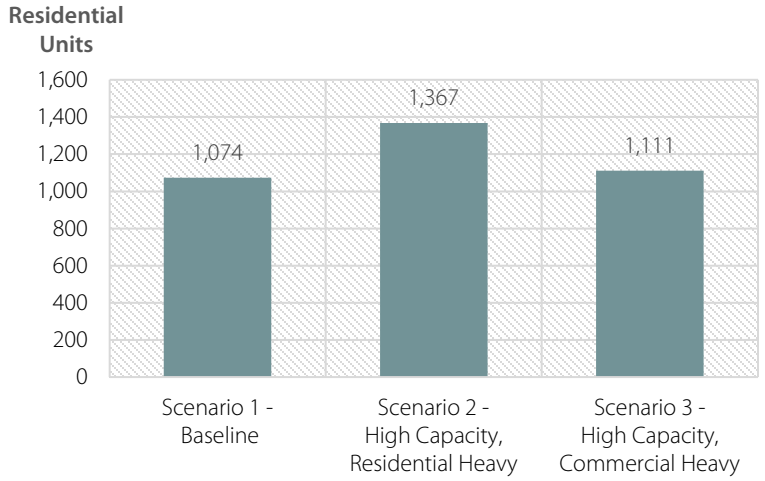
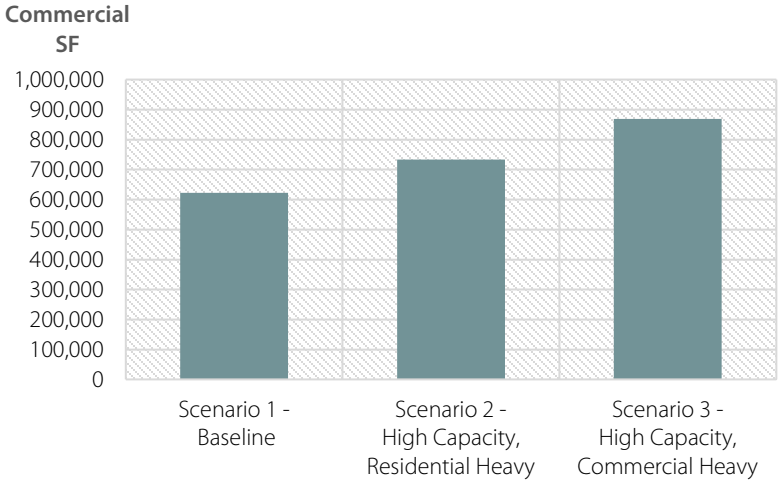


Exhibit 57. Commercial Capacity – Scenario Comparison



Appendix

Appendix –

Gross Land Area, Full zone, table

CATEGORY/ZONE	STUDY AREA TOTAL (SF)	VACANT (SF)	UNDER-UTILIZED (SF)	SINGE-FAMILY IN HIGH DENSITY (SF)	TOTAL REDEVELOPABLE (SF)	(% of Total)
CIVIC AND OPEN SPACE						
Greenbelt (GB)	43,169	0	0	0	0	*0%*
Public Facilities (PF)	2,335,917	64,463	138,270	0	202,733	*9%*
Parks and Recreations (PR)	460,938	12,415	0	0	12,415	*3%*
Civic and Institutional (CI)	83,677	74,068	0	0	74,068	*89%*
Subtotal	*2,923,701*	*150,946*	*138,270*	*0*	*289,216*	*10%*
RESIDENTIAL ZONES						
Low Density (R1)	345,334	14,007	10,158	0	24,165	*7%*
Medium Density Residential (R2)	3,060,375	221,038	97,725	0	318,763	*10%*
Medium Density Residential (R3)	807,990	45,825	14,698	0	60,523	*7%*
High Density (R4)	423,008	172,278	5,944	78,780	257,002	*61%*
Subtotal	*4,636,707*	*453,148*	*128,525*	*78,780*	*660,453*	*14%*
COMMERCIAL ZONES						
Commercial Corridor (CC)	137,582	5,664	0	0	5,664	*4%*
Commercial Heavy (CH)	202,719	68,292	75,305	0	143,596	*71%*
Subtotal	*340,302*	*73,956*	*75,305*	*0*	*149,261*	*44%*
MIXED USE						
Business Professional Mixed Use (BPMU)	557,271	59,248	44,173	282,141	385,563	*69%*
Commercial Mixed Use (CMU)	1,205,853	468,980	347,257	146,180	962,417	*80%*
Downtown Mixed Use (DMU)	691,085	41,184	47,090	14,914	103,189	*15%*
Gateway Mixed Use (GMU)	173,636	8,273	13,642	10,180	32,095	*18%*
Neighborhood Mixed Use (NMU)	96,020	31,061	7,164	35,701	73,926	*77%*
Subtotal	*2,723,866*	*608,747*	*459,325*	*489,117*	*1,557,189*	*57%*
TOTAL	**10,624,576**	**1,286,796**	**801,425**	**567,897**	**2,656,118**	***25%***

Appendix –

Critical Areas Deductions and Net developable by zone, Full table

CATEGORY/ZONE	Gross Area (SF)	Critical Areas (SF)	Areas of Concern (SF)	Right of Way (SF)	Public lands (SF)	Unavailable Lands (SF)	Total Deductions (SF)	Net Area (SF)
CIVIC AND OPEN SPACE								
Greenbelt (GB)	0	0	0	0	0	0	0	0
Public Facilities (PF)	202,733	0	52,301	10,137	10,137	30,410	102,984	99,749
Parks and Recreations (PR)	12,415	0	0	621	621	1,862	3,104	9,311
Civic and Institutional (CI)	74,068	0	10,306	3,703	3,703	11,110	28,823	45,245
Subtotal	*289,216*	*0*	*62,606*	*14,461*	*14,461*	*43,382*	*134,910*	*154,305*
RESIDENTIAL ZONES								
Low Density (R1)	24,165	0	4,566	1,208	1,208	3,625	10,607	13,558
Medium Density Residential (R2)	318,763	33,576	78,595	15,938	15,938	47,814	191,861	126,902
Medium Density Residential (R3)	60,523	0	295	3,026	3,026	9,078	15,426	45,097
High Density (R4)	257,002	97	34,108	12,850	12,850	38,550	98,455	158,547
Subtotal	*660,453*	*33,673*	*117,564*	*33,023*	*33,023*	*99,068*	*316,349*	*344,103*
COMMERCIAL ZONES								
Commercial Corridor (CC)	5,664	0	0	283	283	850	1,416	4,248
Commercial Heavy (CH)	143,596	0	0	7,180	7,180	21,539	35,899	107,697
Subtotal	*149,261*	*0*	*0*	*7,463*	*7,463*	*22,389*	*37,315*	*111,946*
MIXED USE								
Buisness Professional Mixed Use (BPMU)	385,563	22,448	126,359	19,278	19,278	57,834	245,198	140,365
Commercial Mixed Use (CMU)	962,417	0	85,589	48,121	48,121	144,363	326,193	636,224
Downtown Mixed Use (DMU)	103,189	0	19,487	5,159	5,159	15,478	45,284	57,905
Gateway Mixed Use (GMU)	32,095	0	2,244	1,605	1,605	4,814	10,268	21,827
Neighborhood Mixed Use (NMU)	73,926	0	18,815	3,696	3,696	11,089	37,297	36,629
Subtotal	*1,557,189*	*22,448*	*252,494*	*77,859*	*77,859*	*233,578*	*664,240*	*892,949*
TOTAL	**2,656,118**	**56,121**	**432,664**	**132,806**	**132,806**	**398,418**	**1,152,815**	**1,503,303**

Appendix –

FAR APPENDIX

CIVIC AND OPEN SPACE

ZONES:	
Greenbelt (GB)	Assumed no Capacity
Public Facilities (PF)	*See Pipeline*
Parks and Recreations (PR)	*Excluded in Step 1*
Civic and Institutional (CI)	*Included in Mixed-use Commercial, GGLO provided FAR estimate*

RESIDENTIAL ZONES

ZONES:	Assumed Density (Units/Acre)
Low Density (R1)	7
Medium Density Residential (R2)	7
Medium Density Residential (R3)	10
High Density (R4)	24

Summary of density by zone – from GGLO

Range of Possible FARs

Source: GGLO

	NMU-3	CMU-3	CMU-4	CMU-5	DMU-3	DMU-4	GMU-3	GMU-4	BPMU-3	BPMU-4	CC-3	CH-3	CH-4	CI-3
Assumed FAR Range	.52 - 1.21	.53 - 1.22	.56 - 1.37	.56 - 1.47	1.2 - 2.85	1.22 - 3.42	0.6 - 1.45	0.67 - 1.70	0.5 - 1.21	.53 - 1.39	.38 - .92	.48 - .98	.42 - .84	.50 - 1.01
Commercial Only														
with below grade parking	1.00	1.01	1.06	1.12	2.39	2.43	1.20	1.30	1.00	1.08	0.76	0.98	0.84	1.01
surface parking	0.52	0.53	0.56	0.56	1.20	1.22	0.60	0.67	0.50	0.53	0.38	0.48	0.42	0.50
Residential Mixed-Use														
with below grade parking	1.21	1.22	1.37	1.47	2.85	3.42	1.45	1.70	1.21	1.39	0.92	-	-	-
surface parking	0.60	0.61	0.70	0.70	1.57	1.75	0.73	0.83	0.60	0.69	0.46	-	-	-
Average	**0.83**	**0.84**	**0.92**	**0.96**	**2.00**	**2.20**	**0.99**	**1.13**	**0.83**	**0.92**	**0.63**	**0.73**	**0.63**	**0.76**

Appendix –

Building Forms and Uses by Zone

NMU	Allows 100% Commercial, however, primary building forms limit naturally limit the number of commercial square feet for any Mixed use residential. In a residential heavy scenario, this Zone is mostly residential.
CMU	Permitted building forms allow for more commercial space as part of a mixed-use development. More commercial focused, assumes all mixed-use has ground floor commercial.
DMU	Permitted building forms allow for more commercial space as part of a mixed-use development. More commercial focused, assumes all mixed-use has ground floor commercial.
GMU	Permitted building forms allow for more commercial space as part of a mixed-use development. More commercial focused, assumes all mixed-use has ground floor commercial.
BPMU	Permitted building forms allow for more commercial space as part of a mixed-use development. Lower commercial Percentages here due to Lot Size minimums.
CC	Permitted building forms allow for more commercial space as part of a mixed-use development. More commercial focused, assumes all mixed-use has ground floor commercial.
CH	Permitted forms do not allow for Residential or mixed use.
CI	Permitted forms do not allow for Residential or mixed use.

Appendix –

FAR Assumption by Zone – Scenario 1 - Baseline Scenario

BASE ZONE	OVERLAY	WEIGHTED AVG FAR	FAR Commercial Only Below Grade parking	Commercial Only Surface Parking	Residential Mixed-Use Below Grade Parking	Residential Mixed-Use Surface Parking
NMU	DHOD 3	0.75			1.21	0.60
NMU	NONE	0.75			1.21	0.60
NMU	VPOD	0.75			1.21	0.60
CMU	DHOD 3	0.76			1.22	0.61
CMU	DHOD 4	0.87			1.37	0.70
CMU	DHOD 5	0.89			1.47	0.70
CMU	NONE	0.76			1.22	0.61
CMU	VPOD	0.76			1.22	0.61
DMU	DHOD 3	1.89			2.85	1.57
DMU	DHOD 4	2.17			3.42	1.75
DMU	NONE	1.89			2.85	1.57
DMU	VPOD	1.89			2.85	1.57
GMU	DHOD 3	0.91			1.45	0.73
GMU	DHOD 4	0.83			1.30	0.67
GMU	NONE	0.91			1.45	0.73
GMU	VPOD	0.91			1.45	0.73
BPMU	DHOD 3	0.75			1.21	0.60
BPMU	DHOD 4	0.87			1.39	0.69
BPMU	NONE	0.75			1.21	0.60
BPMU	VPOD	0.75			1.21	0.60
CC	DHOD 3	0.58			0.92	0.46
CC	NONE	0.58			0.92	0.46
CC	VPOD	0.58			0.92	0.46
CH	DHOD 3	0.61	0.98	0.48		
CH	DHOD 4	0.53	0.84	0.42		
CH	NONE	0.61	0.98	0.48		
CH	VPOD	0.61	0.98	0.48		
CI	DHOD 3	0.63	1.01	0.50		
CI	NONE	0.63	1.01	0.50		
CI	VPOD	0.63	1.01	0.50		

Appendix –

FAR Assumption by Zone – Scenario 2 – High Capacity, Heavy Residential

			FAR			
			Commercial Only		Residential Mixed-Use	
BASE ZONE	OVERLAY	WEIGHTED AVG FAR	Below Grade parking	Surface Parking	Below Grade Parking	Surface Parking
NMU	DHOD 3	1.06			1.21	0.60
NMU	NONE	1.06			1.21	0.60
NMU	VPOD	1.06			1.21	0.60
CMU	DHOD 3	1.07			1.22	0.61
CMU	DHOD 4	1.20			1.37	0.70
CMU	DHOD 5	1.28			1.47	0.70
CMU	NONE	1.07			1.22	0.61
CMU	VPOD	1.07			1.22	0.61
DMU	DHOD 3	2.53			2.85	1.57
DMU	DHOD 4	3.00			3.42	1.75
DMU	NONE	2.53			2.85	1.57
DMU	VPOD	2.53			2.85	1.57
GMU	DHOD 3	1.27			1.45	0.73
GMU	DHOD 4	1.14			1.30	0.67
GMU	NONE	1.27			1.45	0.73
GMU	VPOD	1.27			1.45	0.73
BPMU	DHOD 3	1.06			1.21	0.60
BPMU	DHOD 4	1.22			1.39	0.69
BPMU	NONE	1.06			1.21	0.60
BPMU	VPOD	1.06			1.21	0.60
CC	DHOD 3	0.81			0.92	0.46
CC	NONE	0.81			0.92	0.46
CC	VPOD	0.81			0.92	0.46
CH	DHOD 3	0.86	0.98	0.48		
CH	DHOD 4	0.74	0.84	0.42		
CH	NONE	0.86	0.98	0.48		
CH	VPOD	0.86	0.98	0.48		
CI	DHOD 3	0.88	1.01	0.50		
CI	NONE	0.88	1.01	0.50		
CI	VPOD	0.88	1.01	0.50		

Appendix –

FAR Assumption by Zone – Scenario 3 – High Capacity, Heavy Commercial

			FAR			
			Commercial Only		Residential Mixed-Use	
			Below Grade parking	Surface Parking	Below Grade Parking	Surface Parking
BASE ZONE	OVERLAY	WEIGHTED AVG FAR				
NMU	DHOD 3	1.00	1.00	0.52	1.21	0.60
NMU	NONE	1.00	1.00	0.52	1.21	0.60
NMU	VPOD	1.00	1.00	0.52	1.21	0.60
CMU	DHOD 3	1.01	1.01	0.53	1.22	0.61
CMU	DHOD 4	1.12	1.06	0.56	1.37	0.70
CMU	DHOD 5	1.19	1.12	0.56	1.47	0.70
CMU	NONE	1.01	1.01	0.53	1.22	0.61
CMU	VPOD	1.01	1.01	0.53	1.22	0.61
DMU	DHOD 3	2.38	2.39	1.20	2.85	1.57
DMU	DHOD 4	2.77	2.43	1.22	3.42	1.75
DMU	NONE	2.38	2.39	1.20	2.85	1.57
DMU	VPOD	2.38	2.39	1.20	2.85	1.57
GMU	DHOD 3	1.20	1.20	0.60	1.45	0.73
GMU	DHOD 4	1.11	1.30	0.67	1.30	0.67
GMU	NONE	1.20	1.20	0.60	1.45	0.73
GMU	VPOD	1.20	1.20	0.60	1.45	0.73
BPMU	DHOD 3	1.00	1.00	0.50	1.21	0.60
BPMU	DHOD 4	1.13	1.08	0.53	1.39	0.69
BPMU	NONE	1.00	1.00	0.50	1.21	0.60
BPMU	VPOD	1.00	1.00	0.50	1.21	0.60
CC	DHOD 3	0.76	0.76	0.38	0.92	0.46
CC	NONE	0.76	0.76	0.38	0.92	0.46
CC	VPOD	0.76	0.76	0.38	0.92	0.46
CH	DHOD 3	0.83	0.98	0.48		
CH	DHOD 4	0.71	0.84	0.42		
CH	NONE	0.83	0.98	0.48		
CH	VPOD	0.83	0.98	0.48		
CI	DHOD 3	0.86	1.01	0.50		
CI	NONE	0.86	1.01	0.50		
CI	VPOD	0.86	1.01	0.50		

CITY OF PORT ORCHARD

DEPARTMENT OF COMMUNITY DEVELOPMENT
216 Prospect Street, Port Orchard, WA 98366
Ph.: (360) 874-5533 • FAX: (360) 876-4980

PLANNING COMMISSION STAFF REPORT

Agenda Item No:	4b	**Meeting Date:**	September 1, 2020
Subject:	Ruby Creek Subarea Plan and Development Regs– Continued Public Hearing and Recommendation	**Prepared by:**	Nick Bond, Development Director

The Planning Commission opened a public hearing on the Ruby Creek Neighborhood Subarea Plan at its regular meeting on August 4, 2020, took public testimony, and continued the public hearing to the September meeting to receive and consider additional public testimony. The continued public hearing also includes the Ruby Creek Neighborhood development regulations.

An additional transportation goal and policy has been added on page 27 to address vehicular and pedestrian connectivity to areas to the north of the Ruby Creek neighborhood. Staff is also requesting that the Planning Commission provide feedback on whether the plan should include an additional goal directing the development of design requirements for main street lighting and street furniture, to enhance the neighborhood with a coordinated appearance and to provide additional pedestrian and bicycle amenities along the primary street frontage.

Background: In 2016, the City of Port Orchard completed its periodic update to the Comprehensive Plan. The 2016 Plan included for the first time, a "centers" (subarea planning) approach to the City's major residential and commercial areas as provided in Vision 2050, the regional plan completed by the Puget Sound Regional Council, and in the Countywide Planning Policies adopted by all jurisdictions in Kitsap County. In 2016, Port Orchard identified center locations, but did not have the resources to complete subarea plans at that time, and instead identified goals for subarea planning to be completed in the future. The draft Ruby Creek Neighborhood Plan is a result of that goal.

In late 2019, Port Orchard set out to complete a subarea plan for the area located near the intersection of Sidney Road SW and SW Sedgwick Road, which had been known as the "Sidney/Sedgwick Center". The new name "Ruby Creek Neighborhood Center" was selected to highlight this significant environmental feature located in the neighborhood. The Ruby Creek Neighborhood is located near the intersection of Sidney Road SW and SW Sedgwick Road. Its boundaries are generally SR-16/Blackjack Creek to the east, Birch Road to the north, the City limits to the south, and a critical area complex to the west. The Ruby Creek Neighborhood measures 166.45 acres in land area. Of these 165.45 acres, critical areas (including wetlands and flood plains) associated with Blackjack Creek and Ruby Creek occupy approximately 52 acres, leaving approximately 70 acres of developed land and 45 acres of vacant or underutilized land. The center is primarily designated as Commercial on the Comprehensive Plan land use map and contains commercial heavy (CH), Commercial Corridor (CC), Commercial Mixed Use (CMU), Downtown Mixed Use (DMU), and Greenbelt (GB) zones. Currently, the neighborhood contains 464 residents in 232 apartments and 8 houses, and 371 jobs in approximately 213,638 existing square feet of commercial space.

Potential Additional Goal for Ruby Creek Neighborhood Subarea Plan:

Goal LU-6: Adopt standards for street furniture, street trees and other public amenities, to establish a coordinated, consistent and attractive visual appearance along the "Main Street" corridor of Sidney Road SW, high visibility street corners, and public parks, plazas and other community gathering spaces.

ORDINANCE NO. __ -20

AN ORDINANCE OF THE CITY OF PORT ORCHARD, WASHINGTON, ADOPTING THE RUBY CREEK NEIGHBORHOOD SUBAREA PLAN; ADOPTING AN AMENDMENT TO THE CITY COMPREHENSIVE PLAN PURSUANT TO RCW 36.70A.130(2)(a)(i); ADOPTING AN AMENDMENT TO THE CITY ZONING MAP; ADOPTING AMENDMENTS TO CHAPTERS 20.38 AND 20.127 OF THE PORT ORCHARD MUNICIPAL CODE; PROVIDING FOR SEVERABILITY AND CORRECTIONS; AND ESTABLISHING AN EFFECTIVE DATE.

WHEREAS, with the passage of the Washington State Growth Management Act in 1990 (GMA), Chapter 36.70A RCW, local governments are required to adopt and maintain a comprehensive plan; and

WHEREAS, in June 1995, the City Council adopted a Comprehensive Plan for the City of Port Orchard and its urban growth area pursuant to the requirements set forth in the GMA; and

WHEREAS, the City of Port Orchard completed its most recent periodic update of its comprehensive plan in June 2016, as required by the GMA; and

WHEREAS, the Ruby Creek Neighborhood is a designated Countywide Center in the comprehensive plan, and Section 2.7.5.8 of the comprehensive plan directs the city to develop a subarea plan for the Ruby Creek Neighborhood prior to the next periodic update, and the City has prepared the Ruby Creek Neighborhood Subarea Plan ("Subarea Plan") to satisfy this requirement; and

WHEREAS, the City most recently adopted annual amendments to the City's Comprehensive Plan pursuant to RCW 36.70A.470 and 36.70A.106 on July 14, 2020; and ****

WHEREAS, RCW 36.70A.130(2)(a)(i) allows the initial adoption of a subarea plan outside of the annual amendment process if the plan clarifies, supplements or implements jurisdiction-wide comprehensive plan policies, and the cumulative impacts of the plan are addressed by appropriate environmental review under chapter 43.21C RCW; and

WHEREAS, an update to the City Zoning Map has been prepared to provide consistency between the Map and the zoning changes provided in the Subarea Plan, and

WHEREAS, amendments to Chapters 20.38 and 20.127 of the Port Orchard Municipal Code (POMC) have been prepared to provide appropriate development regulations for the

Ruby Creek subarea, to provide consistency between the POMC and the Subarea Plan, and to implement the Subarea Plan, per the requirements of RCW 36.70A.040(3), and

WHEREAS, on July 6th, 2020, the City Council's Land Use Committee reviewed the Subarea Plan and the amendments to the Zoning Map and to Chapters 20.38 and 20.127 POMC, and recommended that they be forwarded to the full City Council for review and approval; and

WHEREAS, on July 8th, 2020, the City submitted the Subarea Plan, and the amendments to the Zoning Map and to Chapters 20.38 and 20.127 POMC, to the Department of Commerce along with a 60-day request for review; and

WHEREAS, on July 23, 2020, the City's SEPA official issued a determination of non-significance for the Subarea Plan and the amendments to the Zoning Map and to Chapters 20.38 and 20.127 POMC, and there have been no appeals; and

WHEREAS, on August 4, 2020 and September 1, 2020, the City's Planning Commission held duly-noticed public hearings on the Subarea Plan and the proposed amendments to the Zoning Map and to Chapters 20.38 and 20.127 POMC, and ******, and the Planning Commission recommended approval of the proposed revisions;

WHEREAS, the City Council, after careful consideration of the recommendation from the Planning Commission, all public comment, and the Ordinance, finds that this Ordinance is consistent with the City's Comprehensive Plan and development regulations, the Growth Management Act, and Chapter 36.70A RCW, and that the amendments herein to the City's Comprehensive Plan, Zoning Map, and Chapters 20.38 and 20.127 POMC are in the best interests of the residents of the City; **NOW, THEREFORE,**

THE CITY COUNCIL OF THE CITY OF PORT ORCHARD, WASHINGTON, DO ORDAIN AS FOLLOWS:

SECTION 1. Findings and Recitals. The recitals set forth above are hereby adopted and incorporated as findings in support of this Ordinance.

SECTION 2. Adoption of the Ruby Creek Neighborhood Subarea Plan. The Ruby Creek Neighborhood Subarea Plan is hereby adopted into the City of Port Orchard Comprehensive Plan. (Exhibit 1)

SECTION 3. **Adoption of Amended City of Port Orchard Zoning Map.** The City of Port Orchard Zoning Map is hereby adopted, as amended. (Exhibit 2)

SECTION 4. **Adoption of Ruby Creek Overlay District and Development Regulations.** The following new sections are hereby added to Chapter 20.38 POMC (Overlay Districts):

20.38.300 Ruby Creek Overlay District Boundary.

A Ruby Creek Overlay District is hereby established with boundaries as shown below:

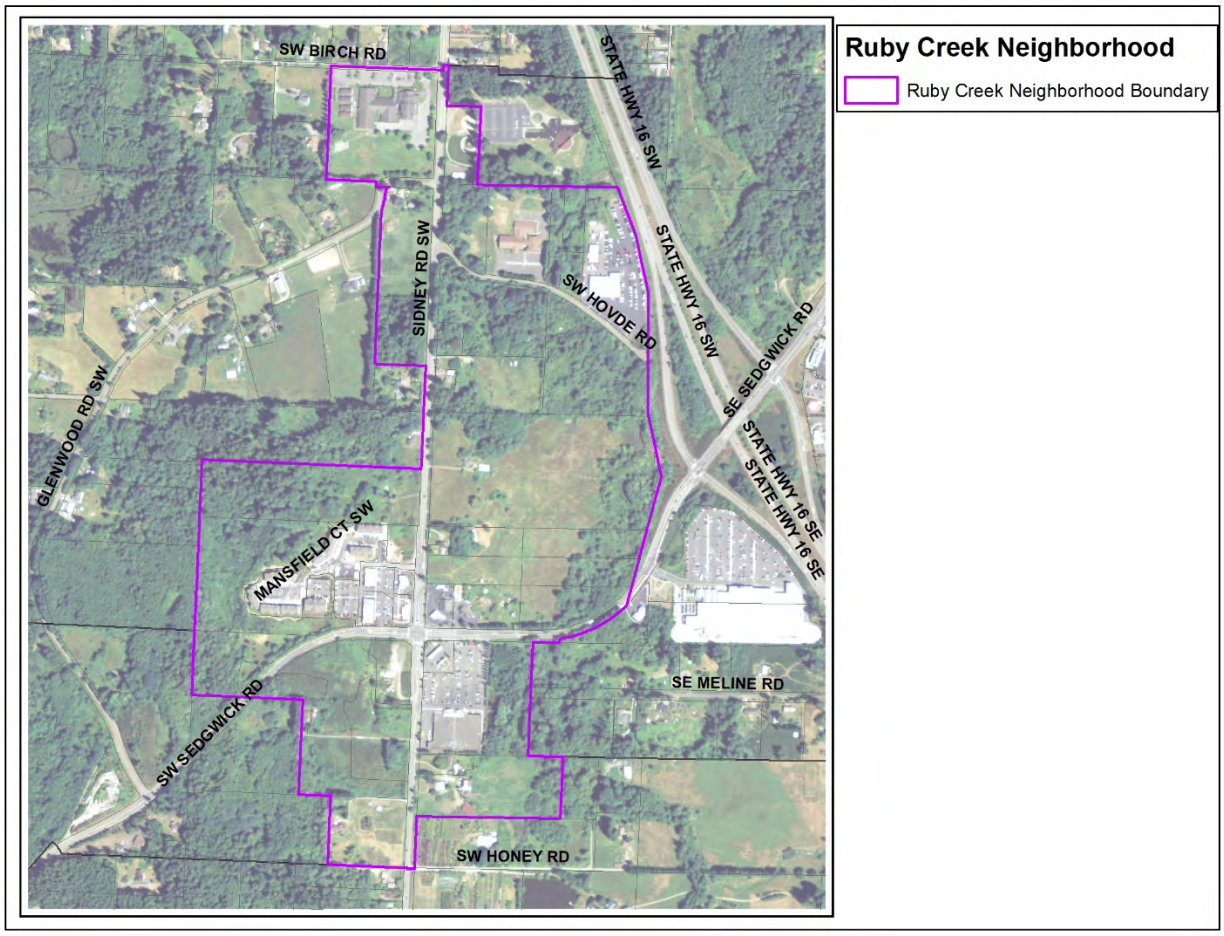


Figure 20.38.300. The Ruby Creek Overlay District Boundary.

20.38.305. Purpose.

The purpose of the Ruby Creek Overlay District (RCOD) is to implement the goals and policies of the Ruby Creek Subarea Plan as adopted in the City's Comprehensive Plan.

20.38.310 Applicability.

The standards of the RCOD shall apply to lands within the RCOD boundary as shown on the map in section 20.38.300.

20.38.315. Conflicts. The RCOD utilizes the city's existing zoning and development regulations framework except as specified in sections 20.38.320 to 20.38.330. The standards of the RCOD shall control when there is a conflict with other code sections.

20.38.320 Land Use.

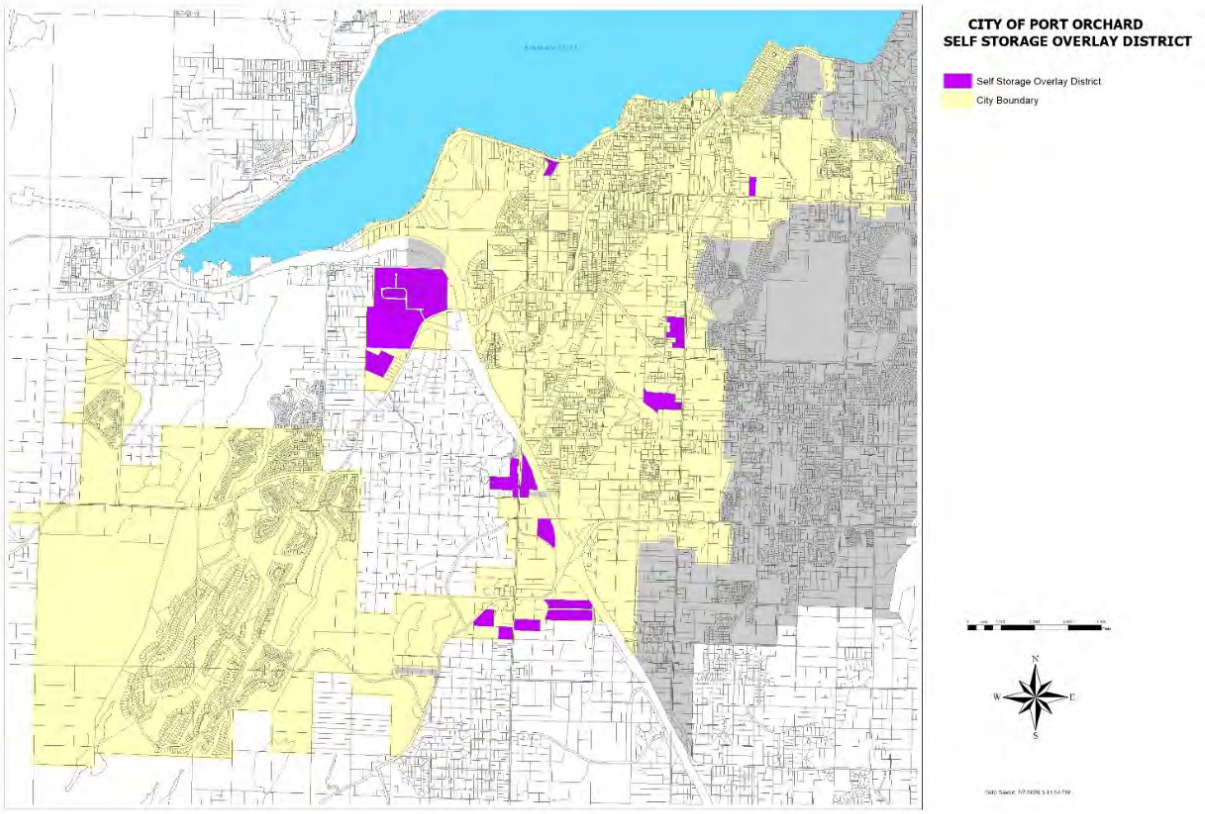
The land use table and restrictions in POMC 20.39 shall control for allowed uses in the RCOD except that the uses in the following table shall be permitted or conditionally permitted as follows:

Specific Use	R1	R3	GB	CMU	DMU	CC	CH	PR	CI
Transit Park and Ride Lot	--	--	--	C	--	C	C	--	C
Surface Parking: Commercial Parking, commuter lease parking or park and ride, remote parking.	--	--	--	--	--	--	--	--	--
Commercial parking garage - standalone	--	--	--	--	--	--	--	--	--
Brewery, distillery under 5,000 square feet.				C	P				
Brewery, distillery 5,001-15,000 square feet.				C	C				
Drive Through Facility (principal or accessory use)	--	--	--	--	--	P	P	--	--
Low impact outdoor storage (accessory use)	--	--	--	--	--	--	P	--	--

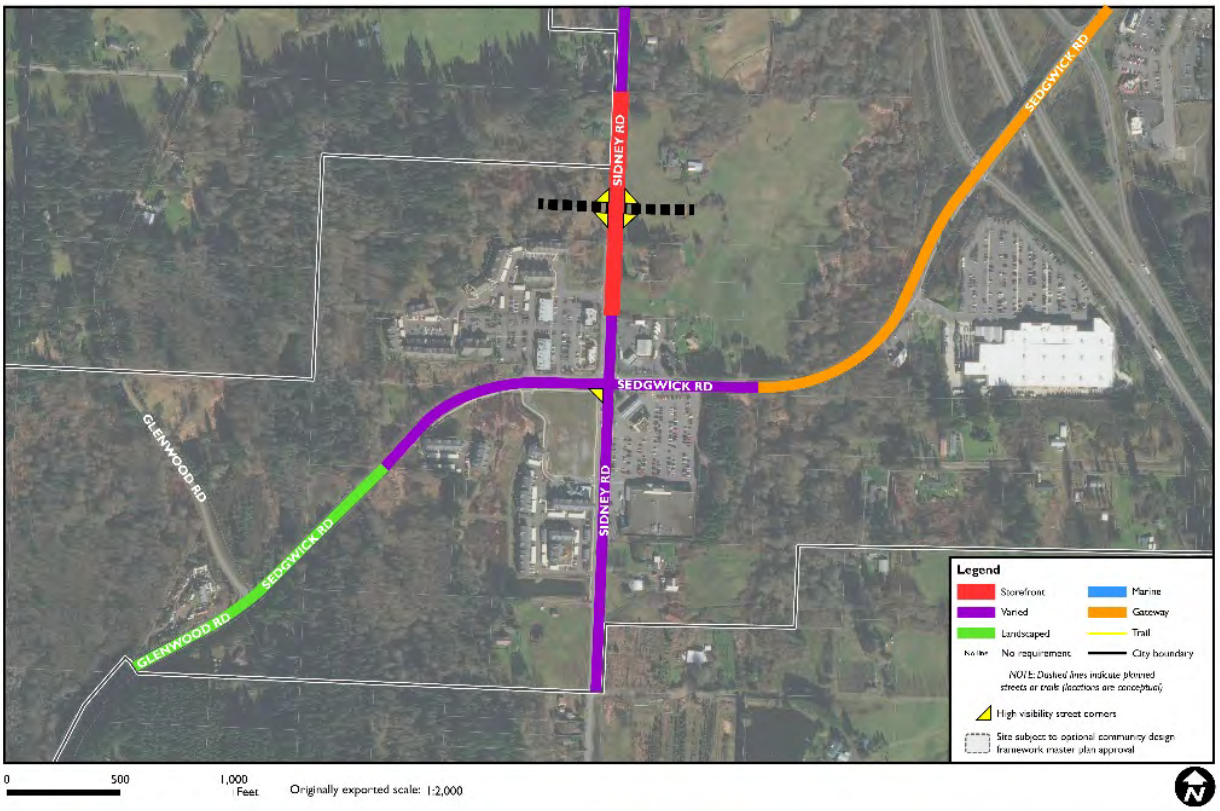
20.38.330 Building Height.

Building Heights in the Ruby Creek Overlay District shall not exceed 55 feet (5 stories) except when height bonuses are granted in accordance with POMC 20.41.

SECTION 5. Figure 2 in POMC 20.38.700 (Self-Storage Overlay District) is hereby amended as follows:



SECTION 6. Figure 20.127.130(15), a Community Design Framework map, is amended as follows:



SECTION 7. Corrections. Upon the approval of the city attorney, the city clerk and/or code publisher is authorized to make any necessary technical corrections to this ordinance, including but not limited to the correction of scrivener's/clerical errors, references, ordinance numbering, section/subsection numbers, and any reference thereto.

SECTION 8. Severability. If any section, subsection, paragraph, sentence, clause, or phrase of this ordinance is declared unconstitutional or invalid for any reason, such decision shall not affect the validity of the remaining parts of this ordinance.

SECTION 9. Effective Date. This ordinance shall be published in the official newspaper of the city and shall take full force and effect five (5) days after the date of publication. A summary of this ordinance in the form of the ordinance title may be published in lieu of publishing the ordinance in its entirety.

PASSED by the City Council of the City of Port Orchard, APPROVED by the Mayor and attested by the City Clerk in authentication of such passage this **th day of ** 2020.

Robert Putaansuu, Mayor

ATTEST:

Brandy Rinearson, MMC, City Clerk

APPROVED AS TO FORM:

Charlotte A. Archer, City Attorney

Sponsored by:

Scott Diener, Council Member

PUBLISHED:

EFFECTIVE DATE:

EXHIBITS:
1. Ruby Creek Subarea Plan
2. Amended City Zoning Map

City of Port Orchard, WA

Ruby Creek Subarea Plan

July 7th, 2020

Acknowledgements

Mayor
Robert Putaansuu

City Council Members

Bek Ashby
John Clauson
Fred Chang
Cindy Lucarelli
Scott Diener
Jay Rosapepe
Shawn Cucciardi

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Consultant – Makers Architecture and Urban Design
(Graphics and renderings)
Bob Bengford
Scott Bonjukian

Disclaimer:

The user of this Plan should be aware that although the City has taken great care to use the most current mapping and environmental data available to produce the information contained herein, the maps, illustrations and calculations of potential critical areas, buildable areas and redevelopment potential are based on existing data sources, not on field surveys. This Plan and its contents are provided for planning purposes only, and cannot substitute for field surveys to determine the locations of critical areas or buffers, to determine critical areas typing or classification, or the development potential of any parcel.

Chapter 1. Introduction.

In 2016, the City of Port Orchard completed its periodic update to the Comprehensive Plan. This 2016 Plan included for the first time, a "centers" approach to planning (See section 2.7 of the Port Orchard Comprehensive Plan). The centers approach to planning is provided in Vision 2050, the regional plan completed by the Puget Sound Regional Council, and in the Countywide Planning Policies adopted by all jurisdictions in Kitsap County. In 2016, Port Orchard identified center locations, but did not have the resources to complete subarea plans at that time, and instead identified goals for subarea planning to be completed in the future. This plan is the result of that goal.

In late 2019, Port Orchard set out to complete a subarea plan for the area located near the intersection of Sidney Road SW and SW Sedgwick Road. At the time that the planning work began, this neighborhood did not have a name or much of an identity. The name "Ruby Creek Neighborhood" was selected to highlight a significant environmental feature located in the neighborhood. Ruby Creek is a major tributary to Blackjack Creek and has been the focus of significant habitat restoration projects just outside of the City limits in Kitsap County. Highlighting the name of this stream in the neighborhood name will have the effect of raising awareness of this sensitive environmental feature, and was chosen as a way of ensuring that future residents, businesses, and developers are conscious of their surroundings and can be good stewards of the environment.

This plan was also developed during the unprecedented challenges presented by the coronavirus pandemic. Public outreach was initiated in the weeks before large parts of the nation were closed to prevent the spread of the virus, including Kitsap County and Port Orchard. This resulted in the cancellation of the City's plans to conduct in person workshops with neighborhood residents and property owners. The City has instead relied on online surveys and public hearings before the Planning Commission that were held remotely.

The City hired a consultant to help explore design alternatives for the subarea. Due to the critical area constraints found in the neighborhood, these alternatives contained only small differences. The main variable considered in the subarea plan was whether to locate a Kitsap Transit park and ride facility within the neighborhood. This variable was prompted by a parallel study being conducted by consultants hired by Kitsap Transit to identify possible sites for park and ride facilities in the South Kitsap area. The alternatives considered are as follows:

1. Concept 1: Mixed use neighborhood with no park and ride facility.
2. Concept 2: Mixed use neighborhood with park and ride facility on the east side of Sidney.
3. Concept 3: Mixed use neighborhood with park and ride facility on the west side of Sidney.

Ultimately, the Kitsap Transit study eliminated Concept 3 early in their analysis due to critical area and space constraints. The preferred alternative selected here was a hybrid between Concepts 1 and 2. The preferred alternative preserved the mixed use feel of the Sidney Road SW corridor while allowing for flexibility in areas further to the east along Sidney Road SW. This flexibility meant that under the plan framework, either apartments, commercial uses, mixed uses, or a park and ride facility would be permissible in areas located in the neighborhood core but off the Sidney Road SW "Main Street".

Chapter 2. Vision and Preferred Alternative.

2.1 Vision. The Ruby Creek Neighborhood is a thriving and attractive walkable neighborhood with easy access to goods and services, a variety of housing types, and convenient access to employment via Kitsap Transit and its proximity to SR-16 and SR-160. Residents can walk to the neighborhood grocery store, restaurants, and businesses providing other goods and services, as well as to Sidney Glen Elementary School and Cedar Heights Middle School. The Ruby Creek central business district consists of walkable shopfronts along Sidney Ave SW. Natural environmental features and park and recreation amenities along Ruby Creek and Blackjack Creek along with this central business district form the heart of the neighborhood. Bicycle paths run through the neighborhood and connect to other areas of the City.

2.2 Preferred Alternative. The preferred alternative requires the development of storefronts along Sidney Road SW but allows the development of a Kitsap Transit park and ride to the east of the neighborhood core in lieu of apartments or commercial development. A park and ride concept is shown in Figure 4. This park and ride facility would reduce the population capacity for the neighborhood slightly, but would help drive economic activity in the neighborhood at certain times of the day, would reduce the traffic impacts resulting from plan implementation, and would provide for the sharing of parking facilities for the proposed public park and for residential units which would likely have peak parking demands (nights and weekends) which differ from those of commuters (weekdays). In the following sections of the plan, the subarea is broken into 3 parts for discussion: the neighborhood core in the center of the neighborhood, the north end (north of Ruby Creek), and the Sidney/Sedgwick crossroads (south end).

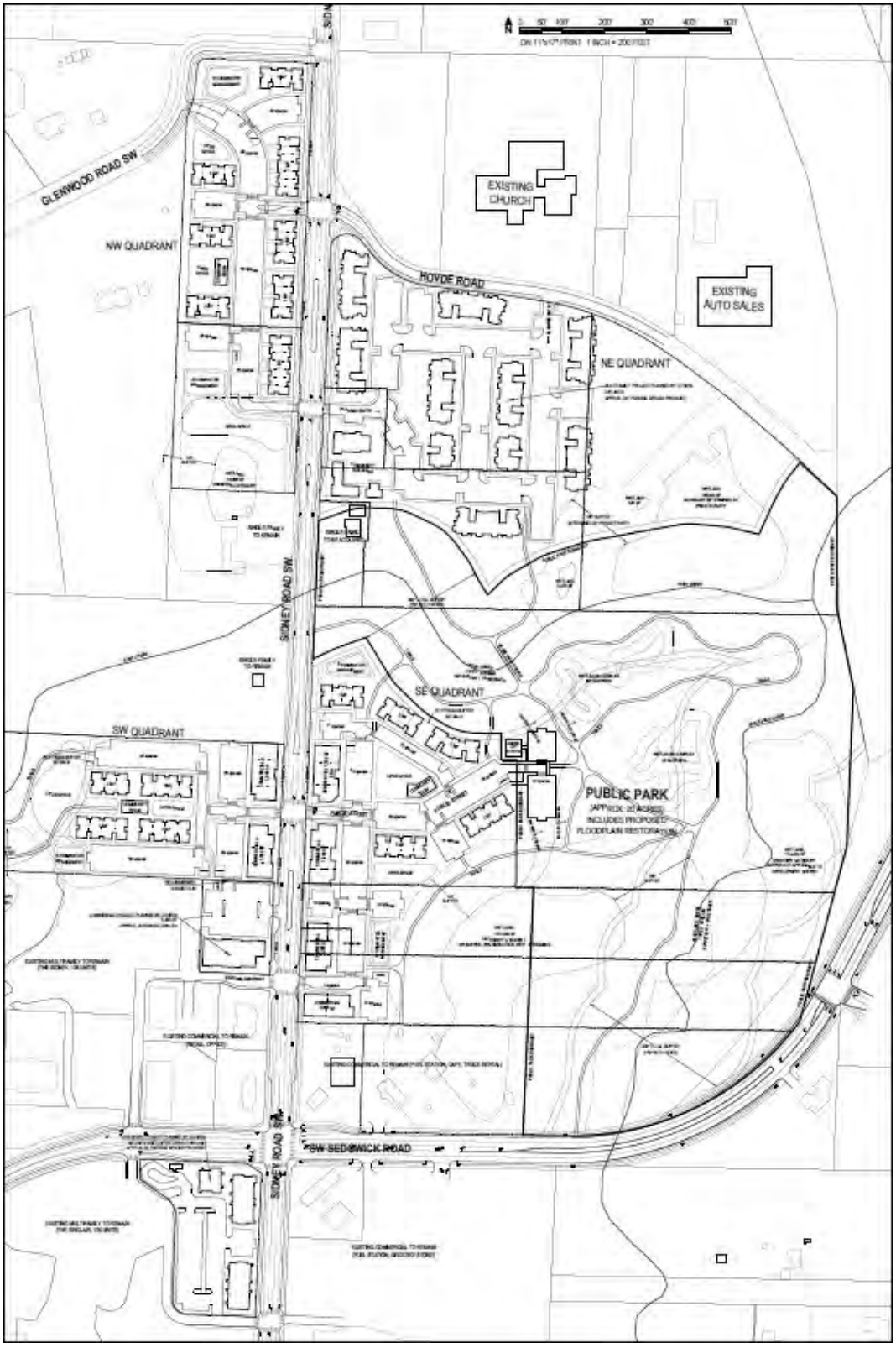

Figure 1: Preferred Alternative Ruby Creek Neighborhood.

2.3 Neighborhood Core. The preferred alternative seeks to develop a new neighborhood core along Sidney Road SW. The center of the neighborhood is located approximately halfway between Ruby Creek and SW Sedgwick Road, and is marked by a new intersection that provides access to properties on the east and west of Sidney Road SW. The buildings near this intersection consist of single-story shopfront and mixed-use shopfront building types, with storefronts that face Sidney Road SW. Off-street parking and secondary access to ground floor shopfronts is provided to the rear of these buildings, out of sight from Sidney Road SW. Sidney Road SW is characterized by wide pedestrian oriented sidewalks, street trees and on-street parking. The center of the neighborhood has a small-town downtown feel. To the west of this new intersection, access is provided to new commercial and/or residential development. To the east of this development, flexibility is provided to allow either commercial and/or residential development, or a park and ride facility. The center of the neighborhood is also anchored by a new public park that has helped to enhance the natural amenities provided by Blackjack and Ruby Creeks. This new park has provided restoration of habitat, informational and educational opportunities, and opportunities for low impact recreation.

Figure 2: The heart of the Ruby Creek Neighborhood as seen from the southwest.

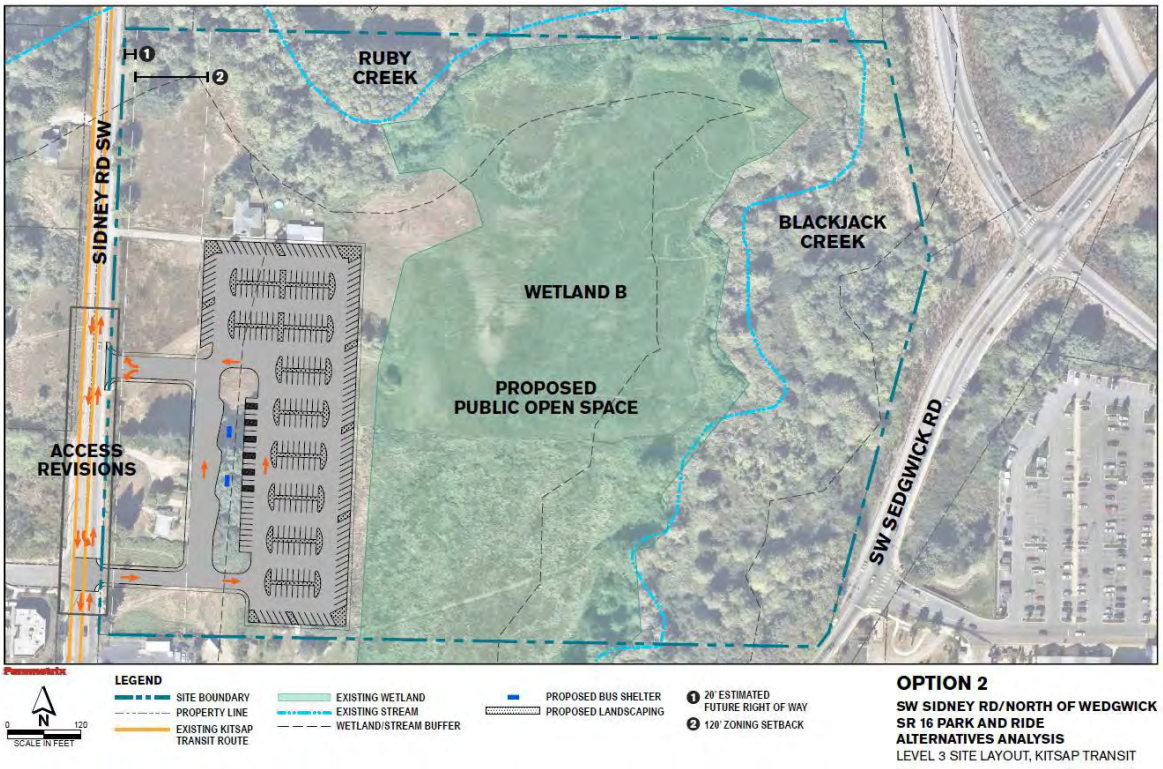

Figure 3: Neighborhood Center Park and Ride Alternative. This alternative preserves Downtown Mixed Use (DMU) zoned development pads along Sidney to ensure storefront development.

Figure 4: Neighborhood Center Site Plan Illustration. This illustration does not include a possible park and ride facility located to the east of the Sidney Road SW storefronts.

2.4 North End. To the north of the neighborhood core is a residential area characterized by landscaping along the street, sidewalks, bicycle lanes, landscape islands in the street, and street trees. Although mixed use commercial development is permitted along this section of Sidney Road SW, it is seen as less viable due to the distance from SW Sedgwick Road and because it is separated from the commercial neighborhood core by Ruby Creek and its large protective buffers. Apartment development is permissible and anticipated in these locations. Sidewalks and bicycle lanes now connect this neighborhood to the Sidney Glen Elementary School, the Little League fields, and places of worship located to the north of the neighborhood, as well as to the commercial core to the south which includes the neighborhood's main grocery store. These new residents can utilize transit service in the corridor for access to jobs throughout the region. Walking paths along Ruby Creek allow for recreation and access to a new city park.

Figure 5: The north end of the Ruby Creek Neighborhood as seen from the northwest.

Figure 6: North End Site Plan Illustration.

2.5 Sidney/Sedgwick Crossroads. The area near the crossroads of SW Sedgwick Road and Sidney Road SW is already characterized by significant development. There is a large grocery store, two gas stations, restaurants, shopping, and apartments in this area. One vacant development pad remains at this intersection. At this location, the City seeks the development of mixed-use shopfront buildings, or live work ground floor units in an apartment building, to help make the area feel more urban. Parking for this pad is provided behind these buildings and out of view of the intersection. In addition, the project has provided public amenity spaces near the prominent street corner at this intersection. Other properties in the neighborhood may eventually develop, but redevelopment is not expected in the near term.

Figure 7: The south end of the Ruby Creek Neighborhood as seen from the northeast, showing the crossroads of Sidney Road SW and SW Sedgwick Road.

Figure 8: South End (Sidney Road SW and SW Sedgwick Road) Site Plan Illustration.

2.6 Centers. Countywide Center – PSRC Criteria

The Ruby Creek Neighborhood Center is planned as a Countywide Center as described in the Puget Sound Regional Council Regional Centers Framework. As a designated Countywide Center, the Ruby Creek Neighborhood:

1. Is a local priority for investment. This plan includes transportation, water, sewer, stormwater, electrical, and park projects to support center development.
2. Is planned for more than 10 activity units (jobs + housing units) per acre. The center is planned to include 14.82 activity units per acre.
3. Is planned for a mix of residential and employment uses. The center is planned to consist of 73% residential and 27% commercial at full buildout.
4. Has capacity for additional growth. The center has capacity for an estimated 1,352 additional persons and 281 additional jobs at full build out.
5. The center supports multimodal transportation (including pedestrians, bicycles, transit, and automobiles).

Chapter 3. Land Use

3.1 Introduction. The Ruby Creek Neighborhood is located near the intersection of Sidney Road SW and SW Sedgwick Road. Its boundaries are generally SR-16/Blackjack Creek to the east, Birch Road to the north, the City limits to the south, and a critical area complex to the west. The center is primarily designated as Commercial on the Comprehensive Plan land use map and contains commercial heavy (CH), Commercial Corridor (CC), Commercial Mixed Use (CMU), Downtown Mixed Use (DMU), and Greenbelt (GB) zones. The area is also subject to overlay district regulations which aim to implement the preferred alternative as depicted in the maps and figures in Chapter 2.

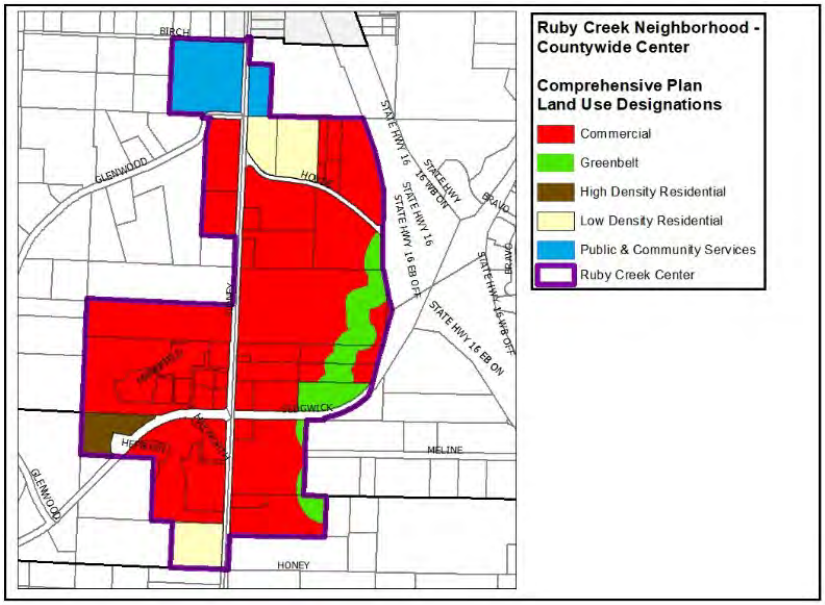

Figure 9: The Comprehensive Plan Land Use Designations for the Ruby Creek Center.

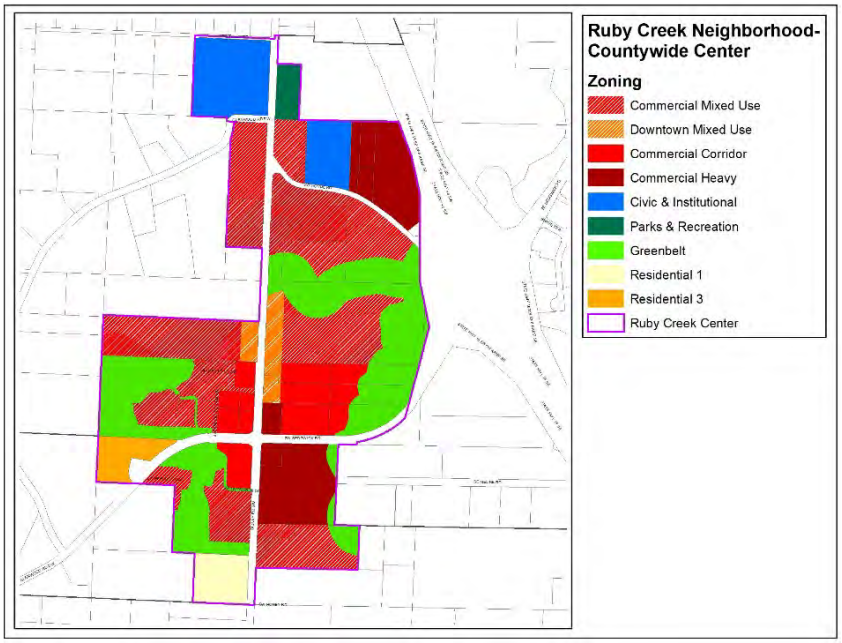

Figure 10: The Zoning Designations for the Ruby Creek Center.

As of the writing of this plan, there is an abundance of vacant and underutilized land within the center. Vacant and underutilized parcels are either zoned DMU, CMU or CC, depending on whether apartments are permitted outright in the absence of a commercial component within future buildings, and depending on the percentage of lot frontage along Sidney Road SW intended to be storefronts. The CMU zone allows apartments as a building type under POMC 20.32, whereas the CC and DMU zones do not. It is anticipated that large areas of the CMU zone will develop as apartments; however, commercial retail type uses are allowed and if constructed would be most likely to locate along the Sidney Road SW street frontage. The CC and DMU properties are intended for a "main street" development pattern, and have strict build-to-zone requirements to ensure that the Sidney Road SW corridor is developed with storefronts that are located close to the street. The DMU zone requires a higher percentage of the Sidney Road frontage to contain buildings, as compared to the CC zone. The GB zone is only applied along the streams, dedicated open space, and areas encumbered by flood plains.

3.2 Ruby Creek Center Land Area and Development Potential. The Ruby Creek Neighborhood measures 166.45 acres in land area. Of these 165.45 acres, critical areas (including wetlands and flood plains) associated with Blackjack Creek and Ruby Creek occupy approximately 52 acres, leaving approximately 70 acres of developed land and 45 acres of vacant or underutilized land.

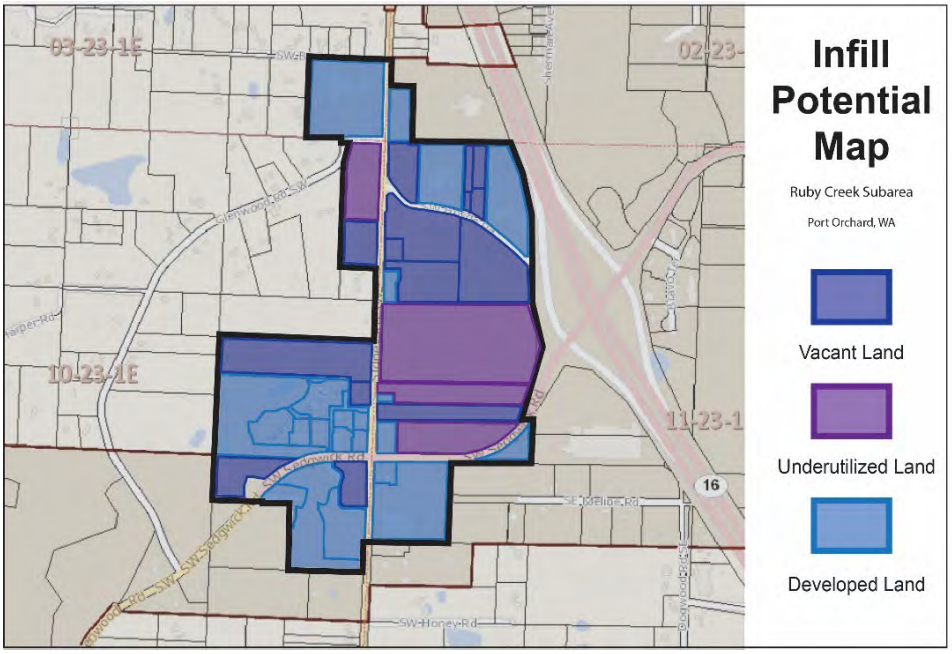

Figure 11: Infill Potential Map.

To further illustrate development potential in the Ruby Creek Neighborhood, the map below (Figure 12) has combined potential critical areas and zoning to illustrate how much land area is available for redevelopment. The vacant and underutilized parcels have been assigned letter designations based on current ownership groupings. Later in this plan, these letters as shown on this map will help to show the land capacity within the center for both employment and population. This map is not based on site visits or a critical areas delineation, and reporting and actual development potential may be more or less than what is shown here. In addition, the City's critical areas code can allow buffer reductions through a variance, provided that these reductions are mitigated. Likewise, flood plain development requires flood elevation certificates to be prepared by a surveyor to certify that buildings are elevated to reduce flooding risk. The true development potential for any of these sites cannot be determined without preparing a critical areas report that meets the standards of the Port Orchard Municipal Code.

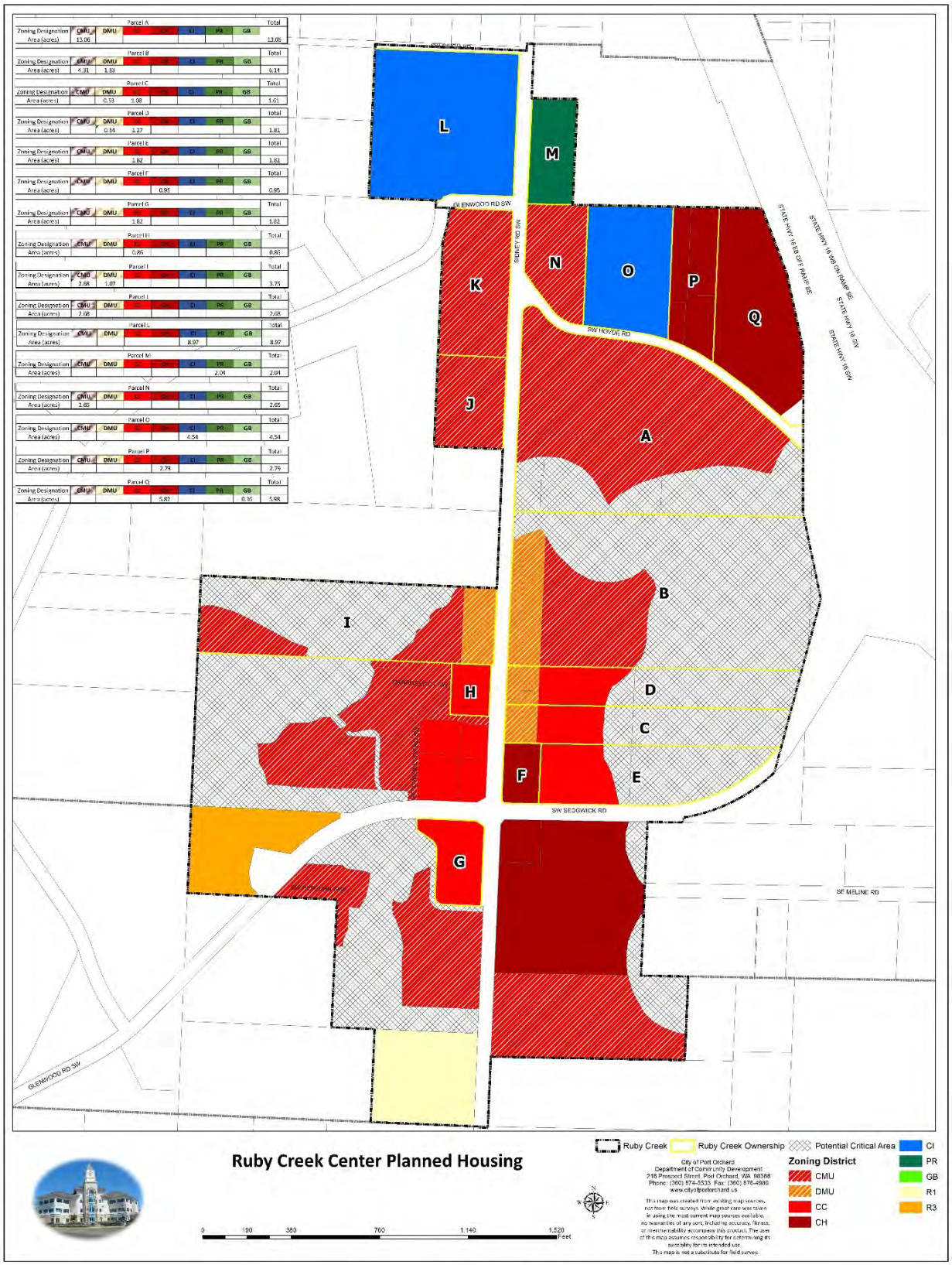

Figure 12: Estimated Developable Land Map.

3.3 Population and Employment.

As of June 24, 2020, the Ruby Creek Neighborhood contained 464 residents and 371 jobs. This equates to 5 activity units per acre under the PSRC Regional Centers Framework. Current population is accommodated in 232 existing apartments and 8 existing houses within the center. Current employment is provided in approximately 213,638 existing square feet of commercial space. The plan envisions adding 647 additional housing units and 100,400 additional square feet of commercial space. The expected future level of activity units equates to 14.82 activity units per acre, above the PSRC threshold of 10 activity units per acre.

(1,816 persons + 652 jobs) / 166.45 acres = 14.82 activity units per acre

Ruby Creek Center Population and Employment Capacity: With approximately 45 acres of vacant and underutilized, and unencumbered (critical area free) land remaining in the neighborhood, it is estimated that the total population and employment capacity in the center is 1,816 persons and 652 jobs. Actual growth will vary depending on a variety of factors, including whether the DMU and CC zones develop with single story shopfront buildings vs. mixed-use shop front buildings, and whether a park and ride facility occupies some of the land within the center.

Table 1: Activity Units – Population and Employment – Existing and Future	
Existing Population	464
Planned Population	1352
Total Population at Build Out	1816
Existing Employment	371
Planned Employment	281
Total Employment at Build Out	652
Existing % Activity Units Dedicated to Housing	56%
Planned % Activity Units Dedicated to Housing	73%

3.4 Land Use Goals for the Ruby Creek Neighborhood Center (these goals are in addition to existing goals found in other sections of the Comprehensive Plan):

Goal LU-1: Accommodate enough residential development in the Ruby Creek Countywide Center to ensure a thriving business district.

> Policy LU-1: Allowed uses, building types, and height limits should accommodate at least 1,800 residents in the Ruby Creek Countywide Center.

Goal LU-2: Encourage the development of a Ruby Creek Central Business District along Sidney Ave SW, between SW Sedgwick Road and the Ruby Creek stream buffer.

> Policy LU-2: Provide storefront uses on the ground floor in the form of a “Main Street” along Sidney Ave SW, between SW Sedgwick Road and Ruby Creek. Regulations for the Ruby Creek District shall ensure that buildings line the street without landscape setbacks and with pedestrian entrances oriented towards the street as shown in Figure 13 below:

Figure 13: Block Frontage Map for Ruby Creek Neighborhood (Core and South End).

Policy LU-3 Require a build-to-zone along the storefront area shown in Figure 13 in accordance with the DMU and CC zoning designations as shown on the Zoning Map (Figure 10), but provide exceptions for public plazas between buildings and at significant street corners.

Goal LU-3: Provide opportunities to extend the Ruby Creek "Main Street" feel between Ruby Creek and Hovde Road.

Policy LU-4: Provide greater flexibility in building types and land uses between Ruby Creek and Hovde Road using a commercial mixed-use zone and varied block frontage as shown on Figures 10 and 14.

Figure 14: Block Frontage Map North End.

Goal LU-4: Ensure that development in the Ruby Creek Neighborhood is attractive and provides variety and visual interest.

Policy LU-5: Designate high visibility street corners as defined in the City's design guidelines in strategic locations along the Sidney Road SW corridor and establish requirements in these locations to accentuate building or plaza design with special design features.

Policy LU-6: Require façade articulation when any proposed building exceeds 120 feet in length in the center.

Policy LU-7: Ensure that there is at least 60% facade transparency on the ground floor of single-story shopfront and mixed-use shopfront buildings with a Sidney Road SW facing facade.

Goal LU-5: Allow for the development of a park and ride transit facility within the center, provided that it be located at least 120 feet from the planned Sidney Road SW right of way (additional ROW needed for the Sidney Road SW project) and located behind future development sites as viewed from Sidney Road SW. See Figure 3.

Policy LU-8: Ensure that park and ride facilities are a permitted or conditional use in the CMU zone within the Ruby Creek Center.

Chapter 4. Housing.

4.1 Introduction. Existing housing in the Ruby Creek Neighborhood consists of two large existing apartment complexes built around 2013, and a handful of small farmstead type homes which are mostly vacant pending redevelopment. There are 232 apartment units and 8 houses in the Ruby Creek Center as of the writing of this plan. Dwelling units in the center contain about 1.9 residents per household (PSRC analysis). According to the Washington State Office of Financial Management, multifamily projects containing 5 or more units in Port Orchard contain on average 2.09 persons per household, whereas detached houses contain 2.68 persons per household. No other housing types currently exist in the center. There is a large single-family neighborhood (Stetson Heights) under development to the west of the Ruby Creek Center, containing 299 single-family residential lots with future phases planned. This project is eventually projected to contain 450 to 600 housing units. It is expected that residents of this neighborhood will regularly visit this center seeking goods and services. These single-family areas should be considered part of the neighborhood walkshed even if they are located outside of the center boundaries. There also exists rural large lot development just beyond the City boundary to the northwest and south. A population of a few hundred County residents could also be characterized as being part of this new neighborhood although rural roads make pedestrian access to the center difficult.

4.2 Ruby Creek Center Planned Housing. For planning purposes, most future housing expected within the subarea would occur in the CMU zone. This plan encourages development of mixed-use shopfront buildings in the DMU and CC zones which could contain a significant number of housing units. Estimated housing development is provided in Table 2 below, based on parcel characteristics as shown in Figure 12 in Section 3.2. The housing unit and population shown in table 2 is only an estimate and actual development yields may vary.

Table 2: Housing and Population Projections					
Property Grouping (See figure 12)	Zoning	Total Acreage	Developable Acres (Estimated)	Projected New Housing Units	Estimated New Population (2.09 PPH) Per OFM 2020
A	CMU	18.5	13.06	235	491
B	DMU/CMU	19.49	6.14	100	209
C	DMU/CC	4.58	1.61	0	0
D	DMU/CC	4.79	1.81	0	0
E	CC	5.14	1.82	0	0
F	CH	0.95	0.95	0	0
G	CC	1.82	1.8	54	113
H	CC	0.86	0.86	0	0
I	DMU/CMU	9.67	3.75	45	94
J	CMU	2.68	2.68	25	52
K	CMU	4.24	4.24	108	226
L	CI	8.97	8.97	0	0
M	PR	2.04	2.04	0	0
N	CMU	2.65	2.65	80	167
O	CI	4.54	4.54	0	0
P	CH	2.79	2.79	0	0
Q	CH	5.82	5.82	0	0
Total				**647**	**1352**

4.3 Goals and Policies. (Additional goals and policies beyond those already in the Comprehensive Plan)
Goal H-1: Provide for a mix of housing types including but not limited to apartments (apartment buildings or apartments in a mixed-use shopfront building), townhomes, and live-work units.

> Policy H-1: Ensure that the development regulations allow the development of the building types described in Goal H-1 in the center, pursuant to the Zoning Map in Figure 10.

Goal H-2: Provide housing serving a mix of income levels that may be owner occupied or rental housing.

> Policy H-2: Offer 12-year multifamily tax exemptions throughout the center in support of affordable housing.

Chapter 5 Economic Development.

5.1 Introduction. The Ruby Creek Neighborhood Center currently contains a variety of businesses, goods, and services. The center is currently anchored by a 60,000+ square foot grocery store. A small strip mall, medical complex, and two gas stations also provide goods and services near the intersection of Sidney Road SW and SW Sedgwick Road. Non-residential square footage in the center is currently 213,638 square feet and supports 371 existing jobs. This figure includes an elementary school and a church. That equals 1 job per 575 square feet of nonresidential space in the center. The assumption for new commercial square footage in the center is 1 job per 300 square feet, as the expected uses would be retail, restaurant, and bars, which have a higher number of jobs per square foot of space compared to the existing uses in the center.

The Ruby Creek Center plan envisions the establishment of a new central business district along Sidney Road SW between the existing development at the intersection with SW Sedgwick Road and Ruby Creek. This new central business district is intended to take the form of a “Main Street” with shopfronts on the ground floor abutting yet to be constructed sidewalks. Parking is to be provided on-street along Sidney Road with supplemental parking behind or below these shop fronts, or as on-street parking on new yet to be developed public and/or private streets. It is critical to the success of a new business district to ensure that there are a sufficient number of dwellings within walking distance to support these businesses. This will lower parking demands and increase activity in the area. The minimum residential threshold for the Ruby Creek Neighborhood Center should be 1,800 residents within walking distance (1/2 mile) of the central business district. Nonmotorized improvements, transit, on- and off-street parking, gathering spaces, and an active streetscape will all contribute to a vibrant business district.

5.2 Ruby Creek Center Planned Employment. For planning purposes, most future employment expected within the sub area would occur in the CC, CH, and DMU zones. Some employment is expected in the CMU zones, but this is expected to be limited to jobs that support the leasing, recreation, and maintenance of multifamily housing. Expected employment per 1,000 square feet of future commercial square footage is shown in Table 3 below. The letters in the property group column correspond to the map (Figure 12) in section 3.2. The employment estimates shown in Table 3 below is only an estimate and actual development yields may vary.

Table 3: Square Footage and Employment Projections						
Property Grouping	Zoning	Total Acreage	Developable Acres (Estimated)	Acreage Designated CC, DMU, CH	Expected New Commercial Square Footage	New Jobs (1 Job Per 300 square feet)
A	CMU	18.5	13.06	0	1500	5
B	DMU/CMU	19.49	6.14	1.83	15500	52
C	DMU/CC	4.58	1.61	1.61	5800	19
D	DMU/CC	4.79	1.81	1.81	6200	21
E	CC	5.14	1.82	1.82	0	0
F	CH	0.95	0.95	0.95	0	0
G	CC	1.82	1.8	1.8	5000	17
H	CC	0.86	0.86	0.86	9000	30
I	DMU/CMU	9.67	3.75	1.07	14900	50
J	CMU	2.68	2.68	0	0	0
K	CMU	4.24	4.24	0	1500	5
L	CI	8.97	8.97	0	0	0
M	PR	2.04	2.04	0	0	0
N	CMU	2.65	2.65	0	1000	3
O	CI	4.54	4.54	0	0	0
P	CH	2.79	2.79	2.79	40000	80
Q	CH	5.82	5.82	5.82	0	0
Total		99.53	65.53	20.36	**100,400**	**281**

Total employment in the Ruby Creek Neighborhood Center is projected to be 652 (371 existing + 281 new) jobs once the center is fully developed.

5.3 Goals and Policies.

Goal ED-1: Provide zoning for ground floor shopfront development and retail, service, restaurant, and other compatible uses along Sidney Road SW.

> Policy ED-1. Require ground floor shopfront development along Sidney Road SW from SW Sedgwick Road north to Ruby Creek, through either single-story shopfront or mixed-use shopfront building types.
>
> Policy ED-2. Allow ground floor shopfront development along Sidney Road SW and SW Sedgwick Road.
>
> Policy ED-3. Allow residential uses above shopfront development where shopfront development is required.

Policy ED-4: Encourage mixed-use shopfronts on CC zoned properties by offering multifamily tax exemptions for the multifamily portion of the project.

Goal ED-2: Ensure that uses which are not compatible with building a walkable neighborhood center are prohibited.

Policy ED-5. Prohibit additional drive through businesses, gas stations, storage facilities, or other commercial uses that don't contribute to a walkable neighborhood center.

Chapter 6 Parks.

6.1 Introduction. It is critical to consider the availability of parks and recreational amenities when planning countywide centers. Parks provide a gathering place for neighborhood residents, and recreational facilities contribute to public health and provide connections within the neighborhood. Within the existing apartment complexes in the Ruby Creek Center there are private park and recreation facilities maintained by the apartment owners. This type of private open space is required for all development per the design standards found in the City's municipal code. No public parks currently exist in the center, although there are school recreation facilities at Sidney Glen Elementary School consisting of grass fields, covered basketball hoops, and playground equipment. There are also two Little League owned baseball fields located in the north end of the center along Sidney Ave SW. The development of public parks and recreation facilities in the Ruby Creek Center is critical to developing a successful neighborhood center.

The preferred alternative depicts a public park to be constructed to the southwest of the confluence of Blackjack Creek and Ruby Creek. This proposed park plans to use pockets of developable land, critical area buffers, and floodplain areas to provide recreational amenities. Amenities would include parking, restrooms, playground equipment, walking paths along and over Ruby Creek via a pedestrian bridge, and other public amenities. Due to the degraded nature of these critical areas and flood plains, and the desire to provide public access (walking paths) along and across Ruby Creek, it is expected that critical areas variances will be needed to allow for park construction. Any variance will require significant habitat restoration and enhancement. All active recreation and parking areas will be constructed outside of critical areas but walking paths and a pedestrian bridge would be constructed within these buffers. Due to the significant opportunities to complete restoration work, it is expected that the park would include a landscape that is adaptive to flooding and that significant education and interpretive opportunities could occur in the park. For more information on this planned park, please see the City's Parks, Recreation and Open Space Plan.

Goal P-1: Encourage the development of a public neighborhood park in the Ruby Creek Neighborhood.

Policy P-1: The neighborhood park should incorporate natural or environmental features.

Policy P-2: Provide walking paths along Ruby and/or Blackjack Creeks and (a) pedestrian crossing(s).

Goal P-2: Encourage the development of public plazas and other gathering spaces along Sidney Road SW.

Policy P-3: Designate significant street corners on the block frontage standard maps as shown on Figures 13 and 14 to encourage the development of public gathering spaces along the central business district corridor.

Policy P4: Provide extra sidewalk width in the central business district as part of the Sidney Road SW road section.

Goal P-3: Provide recreational paths and trails, public and private sidewalks, and public bike lanes and paths within the center.

Policy P-5: Provide bicycle lanes on Sidney Road SW through the center.

Policy P-6: Ensure that sidewalks are constructed along all public and private roads within the center.

Chapter 7 Natural Systems.

7.1 Introduction. The Ruby Creek Center and the lands adjacent to the center contain critically important habitats, especially creeks and wetlands. Blackjack Creek runs along the eastern boundary of the center. Ruby Creek, an important tributary to Blackjack Creek, flows through the center and crosses under Sidney Road SW. This watershed is a critical habitat to a variety of species including summer and fall Chum Salmon, Coho and Chinook Salmon, Steelhead, and Cutthroat. Of these species, Steelhead are currently listed under the endangered species act. Fish barriers exist along both Blackjack and Ruby Creek. WSDOT has plans to replace the partial barrier located under SR-16. The City is seeking grant funding to replace the Ruby Creek culvert under Sidney Road SW. Sidney Road currently lacks pedestrian improvements and will likely need to be widened. This widening will likely require some mitigation for impacts to the Ruby Creek corridor which could occur in conjunction with the park project described in Chapter 7. Although the Ruby Creek Center is planned as urban development, it is critical to take a sensitive approach to design to ensure compatibility between new development and these natural features.

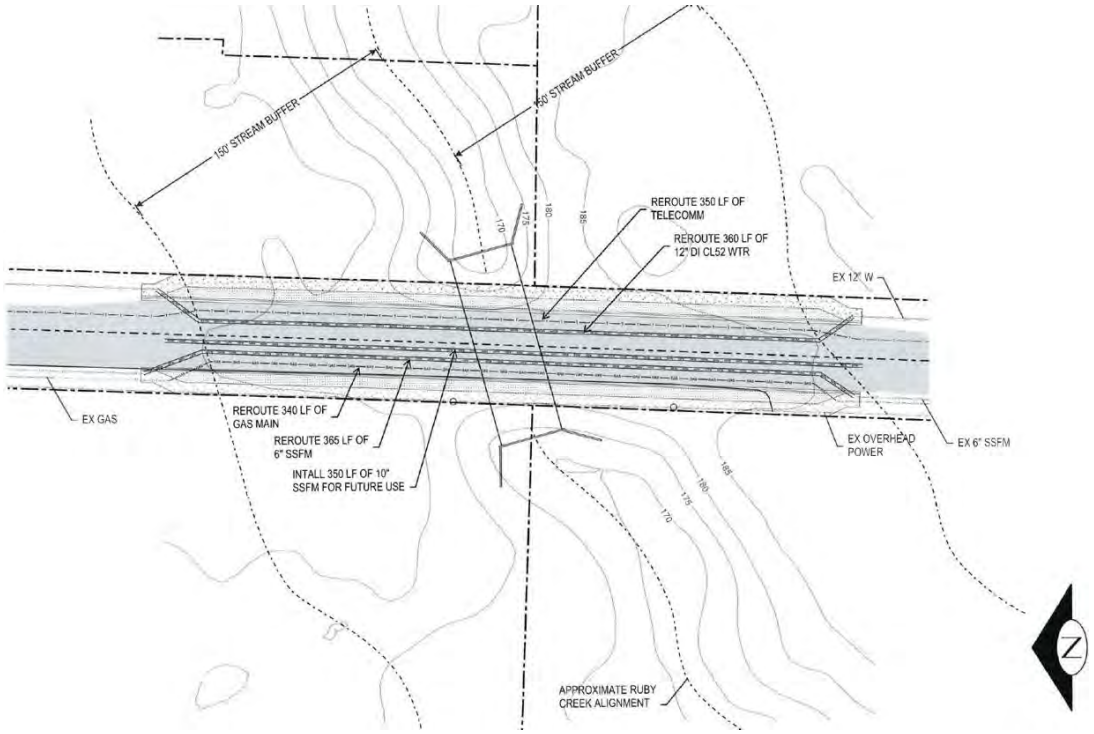

Figure 15: The City has developed preliminary culvert replacement plans for the Ruby Creek culvert under Sidney Road SW and is seeking grant funding for this project.

7.2 Goals and Policies. (Additional Goals beyond those already in the Comprehensive Plan).

Goal NS-1: Encourage the protection of Ruby and Blackjack Creeks and provide educational and interpretive opportunities to residents about the critical functions that these features serve.

Policy NS-1: Provide wildlife viewing areas and interpretive signage.

Policy NS-2: Ensure that wetland buffers and fish and wildlife habitat buffers are provided consistent with critical areas regulations.

Policy NS-3: Ensure that minimum flood plain elevations are observed.

Goal NS-2: Ensure that all critical habitats, especially anadromous fish habitats in the Ruby Creek Neighborhood, are protected, restored, and enhanced.

Policy NS-4: Seek opportunities to enhance and restore wetlands, streams, and buffers in the Ruby Creek Neighborhood.

Policy NS-5: Provide for extensive use of low impact development in project and street design.

Policy NS-6: Remove City owned fish passage barriers within the subarea.

Goal NS-3: Allow for the development of low impact walking paths and trails along Ruby Creek and Blackjack Creek to encourage protection, education, and stewardship.

Policy NS-7: Permit walkway, trail, and pedestrian bridge construction, provided that habitat mitigation is provided in accordance with the critical areas code.

7.3 Natural Systems Project List. The following are projects to improve natural systems that have been identified for completion within the subarea:

Table 4: Natural Systems Project List			
Project Name	Agency	Project Cost	Funding Source
SR-16 Blackjack Creek Culvert Replacement	WSDOT	11,200,000	State
Sidney Road SW Ruby Creek Culvert Replacement	City of Port Orchard	$1,800,000	Grant/Stormwater Utility
Blackjack/Ruby Creek Stream and Floodplain Restoration	City of Port Orchard	$500,000	Grant/Parks Impact Fees

Chapter 8 Utilities.

8.1 Introduction. The Ruby Creek Center is served by City water, sanitary sewer, and stormwater, Puget Sound Energy (electric and gas), Comcast, Wave, Century Link, and KPUD (cable, phone, and/or internet). Significant utility upgrades are required to support the development and buildout of the Ruby Creek Center. Water source and storage, sewer lift station, force main, and gravity main improvements, stormwater improvements, and extension of underground power, gas, and telecommunication infrastructure are all necessary to support development.

Although the City's water and sewer system plans will contain the most up to date information, several projects are currently identified to support the level of development identified in this plan. Those projects are listed in Table 5. Some of the projects listed in Table 5 have their locations indicated on Figures 4, 6, or 8. Other projects may be located outside of the center boundary but are needed to support center build out.

Table 5: Utilities Project List		
Water/Sewer	Project Name	Project Description
Water	Well 13	Well 13 increases available water source in the 390 pressure zone.
Water	390 Booster Pump	Some areas in the 390 zone (outside of the Ruby Creek Area) could see pressures below the minimum 30 PSI if additional connections in the 390 zone are made. A booster pump will increase pressure to these properties.

Sewer	Albertson's Lift Station Capacity Upgrades	The wet well at the Albertsons lift station is undersized for anticipated development.
Sewer	North Ruby Creek Lift Station	A sewer lift station is needed to support growth in the sub area to the north of Ruby Creek.
Sewer	South Ruby Creek Lift Station	A second South Ruby Creek lift station may be needed if the Albertson's lift station cannot be upgraded sufficiently. This project would support growth in the center and west of the center and south of Ruby Creek.
Sewer	Sidney Road SW Second Force Main	A second sewer force main will be needed to support the full buildout of the Ruby Creek Neighborhood Center running from the Albertson's lift station to the Cedar Heights Lift Station.
Electric PSE	Sidney Ave undergrounding and transmission relocation	Underground local power service and move transmission poles (Schedule 74).

Goal U-1: Encourage a comprehensive and collaborative approach between the City and developers to improving utility systems in the Ruby Creek basin.

Policy U-1: The City should facilitate meetings between private developers and encourage the use of all legally available financing mechanisms for building out utilities in the center.

Policy U-2: The City's water, sewer, and stormwater system plans should identify needed improvements in the center and determine which projects are in support of development vs. projects needed to correct existing deficiencies.

Policy U-3: The City should ensure the costs and benefits for system improvements are equitable between all landowners and existing rate payers.

Goal U-2: Ensure that adequate operational water supply and fire flow are available to support development in the Ruby Creek Center.

Policy U-4: Provide employment and population assumptions for the center as contained in this plan to the City's water system manager for inclusion in the next water system plan update.

Goal U-3: Ensure that sanitary sewer facilities are available to support development in the Ruby Creek Center.

Policy U-5: Secure the needed property and/or easements to expand the Albertson's lift station, or, identify a site for a new sewer lift station in the center.

Policy U-6: Extend gravity sewers throughout the center to support development.

Policy U-7: Ensure the sanitary sewer force main leaving the center is adequately sized for full build out of the center.

Goal U-4: Ensure that adequate stormwater facilities exist to serve the public streets and sidewalks in the Ruby Creek Center.

Policy U-8: Build low impact development (LID) stormwater facilities to manage stormwater created by new public and private streets within the center.

Figure 16: Low Impact Development Stormwater Management Techniques incorporated into street design. This sort of design is encouraged in the Ruby Creek neighborhood.

Goal U-5: Ensure that telecommunication facilities are adequate to support 21st century users.

Policy U-9: Ensure that KPUD has access to trenches as roads and utilities are installed.

Policy U-10: Provide for integration of 5G wireless facilities in the streetscape along Sidney Road SW.

Chapter 10 Transportation.

10.1 Introduction. The Ruby Creek Center is established along the Sidney Road SW corridor near the intersection of SW Sedgwick Road. Historically, Sidney Road SW was a primary north-south route through Kitsap County connecting Purdy and Gig Harbor to the south with Port Orchard (Town of Sidney). This road's role was changed with the construction of SR-16. Access to SR-16 and SR-160 is provided at an interchange to the southeast of the Center. Kitsap Transit provides transit service to the center and is evaluating the possibility of a park and ride in or near the center. SR-160 provides access to the Southworth Ferry Terminal, with ferry service continuing on to Vashon Island, West Seattle, and Downtown Seattle via WSDOT and Kitsap Transit Ferries. As part of center development, improvements are envisioned for both Sidney Road SW and SW Sedgwick Road along with other new public or private roads.

Sidney Road SW is classified as a Minor Arterial. Pursuant to the City's Public Works and Engineering Standards, Sidney is planned to be improved as a complete street through the center. To achieve Countywide Center requirements, the standard road section has been modified to ensure wider

sidewalks, required bicycle lanes, and low impact development landscape treatments. The Sidney Road section in the "main street" core of the center is designed to slow traffic, facilitating a safe walking and shopping environment as well as street parking. The Sidney Road SW streetscape is a critical public infrastructure facility required to transport this neighborhood into a Countywide Center. The Sidney Road SW section drawings are shown in Figures 17, 18, and 19.

SW Sedgwick Road is classified as a Principal Arterial. Pursuant to the City's public works and engineering standards, SW Sedgwick Road is planned to be improved as a complete street that provides access to the Ruby Creek neighborhood and allows significant throughput. This road is significantly constrained due to critical areas between Sidney Road SW and SR-16, and experiences regular backups. Widening this road may require some sacrifices such as sidewalks on one side of the roadway to ensure that critical environments are protected. To the west of Sidney Road SW, a developer plans to install a non-motorized pedestrian pathway along the north side of SW Sedgwick Road west to the city boundary to provide access to a single-family residential development to the west of the Ruby Creek Neighborhood.

Although the City will not be making improvements to the SR-16/SR 160 interchange, it is important encourage the state to make improvements to this facility. Improved access to these state highways from the Ruby Creek Center will be needed as the City grows.

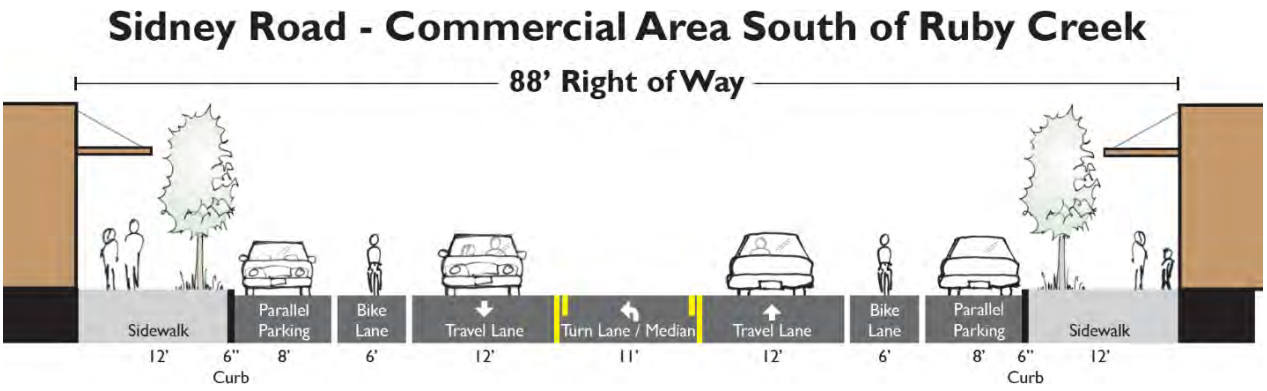

Figure 17: Sidney Road SW – Storefront Road Section. This road section corresponds with the section of Sidney Road SW designated as a storefront street in Figure 13.

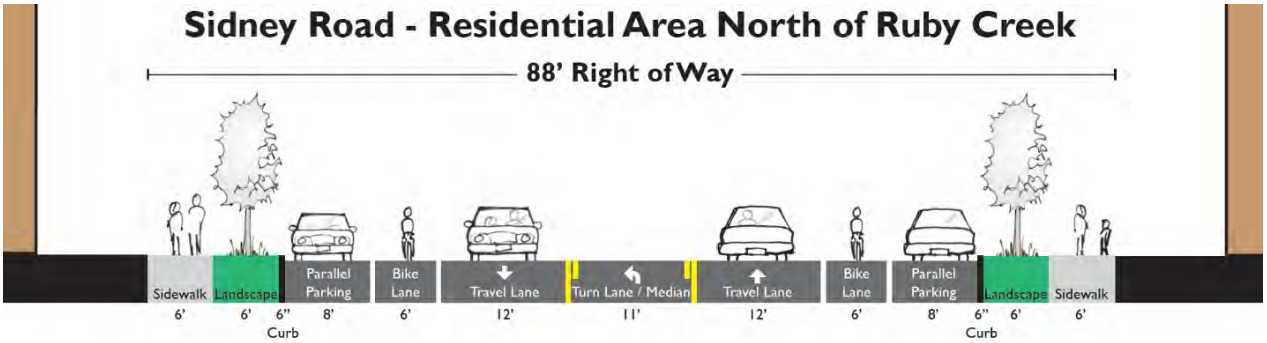

Figure 18: Sidney Road SW. This road section would be used in the center to the north of the Ruby Creek crossing.

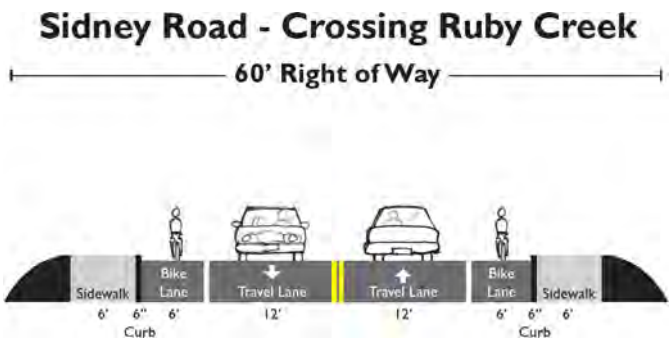

Figure 19: Sidney Road SW. Where Sidney Road SW crosses Ruby Creek, the road will narrow and taper to the above standard. This will minimize impacts to Ruby Creek while providing for nonmotorized connectivity. This section requires culvert replacement.

Goal T-1: Improve Sidney Road SW between SW Sedgwick Road and Hovde Road generally in accordance with Figures 17, 18, and 19 above.

Policy T-1: Provide pedestrian crossings across Sidney Road SW at regular intervals through the corridor.

Policy T-2: Ensure that driveways and roads to the north and south of Ruby Creek are aligned across Sidney Road SW to facilitate safe pedestrian crossings of Sidney Road SW.

Figure 20: Align driveways to facilitate pedestrian crossings throughout the Sidney Road SW corridor.

Policy T-3: Provide on street parking through the center along Sidney Road SW.

Policy T-4: Minimize pedestrian crossing distances through the corridor using bulb-outs.

Policy T-5: Design Sidney Road SW in a way to reduce vehicle speed and increased pedestrian safety.

Policy T-6: Integrate urban low impact development stormwater management features in the roadway design, including landscaped infiltration galleries between the on-street parking lanes and sidewalks. Ensure that the infiltration galleries allow ample opportunities for access between parking areas and sidewalk. (See Figure 16.)

Goal T-2: Improve SW Sedgwick Road between Sidney Road SW and SR-16 to ensure that traffic can flow freely through this constrained road segment.

Policy: T-7: Continue to work with and lobby WSDOT to improve SR-160 and the interchange at SR-160 and SR-16.

Policy: T-8: Improve SW Sedgwick Road as a complete street and add additional lanes if warranted. (SW Sedgwick Road should be evaluated to determine whether widening is warranted or whether the deficiency in this corridor is caused by WSDOT facilities.)

Goal T-3: Improve connectivity between the Ruby Creek Neighborhood and areas to the north, including SW Berry Lake Road, Cedar Heights Middle School, and the Tremont Street corridor.

Policy T-9: Coordinate City improvements to Sidney Road SW between Tremont Street and SW Sedgwick Road with intersection improvements at Berry Lake Road, to enhance pedestrian and bicycle connectivity and safety throughout this north-south corridor.

Goal T-4: Discourage private surface parking lots in favor of on-street parking, under building parking, and structured parking.

Policy T-10 Consider offering multifamily tax exemptions to projects that do not use surface parking lots.

Policy T-11: Provide an exemption to surface parking standards for parks and park and ride facilities.

Goal T-5: Encourage the development of storefronts along the frontage of Sidney road SW.

Policy T-12: Designate Sidney Road SW as “storefront block frontage” in the city’s design standards and require a build-to-zone along this frontage.

Goal T-6: Support expanded and more frequent transit service in the Ruby Creek Center.

Policy T-13: Adjust transit stop locations for maximum convenience as Sidney Road SW corridor develops.

5 Sidney

Weekday

FROM	TO	EVERY	RUNTIME
06:30	17:30	60 min	25.0 min

Saturday

FROM	TO	EVERY	RUNTIME
10:00	17:00	60 min	25.0 min

Sunday

FROM	TO	EVERY	RUNTIME
00:00	00:00	0 min	0.0 min

Figures 21 and 22: Kitsap Transit map and schedule showing current Route 5 location, stops, and frequency.

Policy T-14: Support the development of a park and ride in or near the Ruby Creek Center.

Policy T-54: Support increased transit frequency for transit service in the Ruby Creek Center.

Goal T-7: Support bicycle infrastructure and provide bicycle amenities in the Ruby Creek Center.

Policy T-16: Provide bike lanes or grade separated pathways running east/west and north/south through the Ruby Creek Center. These may be in the SW Sedgwick Road and Sidney Road SW right of way or running parallel to the ROW.

Policy T-17: Ensure that bicycle parking is provided in the Ruby Creek Center.

Goal T-8: Provide pedestrian Infrastructure throughout the Ruby Creek Center.

Policy T-18: Ensure that existing and proposed streets in the Ruby Creek Center are constructed with sidewalks on both sides of the street and landscape strips for pedestrian vehicle separation.

Policy T-19: Provide pedestrian connectivity between and within development projects in addition to that which is provided along public and private streets.

Goal T-9: Provide safe multimodal access to the schools located along Sidney Road SW and Pottery.

Policy T-20: Ensure that sidewalks are provided between the center and Sidney Glen Elementary School and to Cedar Heights Elementary School.

Goal T-10: Coordinate electrical transmission and power pole relocation and undergrounding with road projects on Sidney Rd SW.

Policy T-21: Undergrounding of power lines should be required through the storefront section of the Sidney Road SW corridor.

CITY OF PORT ORCHARD

DEPARTMENT OF COMMUNITY DEVELOPMENT

216 Prospect Street, Port Orchard, WA 98366

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PLANNING COMMISSION STAFF REPORT

Agenda Item No:	4c	**Meeting Date:**	September 1, 2020
Subject:	SMP Update: Impacts of Sea Level Rise on Port Orchard Downtown Shoreline	**Prepared by:**	Nick Bond, Development Director

Background: The City is currently updating its Shoreline Master Program (SMP) according to the timeline and requirements of the Washington State Department of Ecology. One area of concern for the City is its downtown shoreline, and how it might be impacted by climate change and rising sea levels over the next few decades. Kitsap County recently prepared a countywide analysis of potential climate change impacts, which included a Port Orchard-specific appendix. Based on those identified concerns. the City contracted with Herrera Environmental Consultants to prepare a more detailed evaluation of the City's shoreline and areas where the SMP may need to be modified to address sea level rise. Herrera has provided a baseline scientific analysis which will be used to formulate policy and planning recommendations for the SMP update, with regard to addressing sea level rise along Sinclair Inlet and the estuarine (mouth) portion of Blackjack Creek. Herrera will give a brief presentation to the Planning Commission on its findings and recommendations, and take questions to explain its evaluation process.

Attachments: Advisement on Impacts of Sea Level Rise on City of Port Orchard Shoreline; Kitsap County Climate Change Resiliency Assessment Port Orchard Appendix

KITSAP COUNTY

Climate Change Resiliency Assessment

JUNE 2020 | FINAL REPORT

Kitsap County Climate Change Resiliency Assessment

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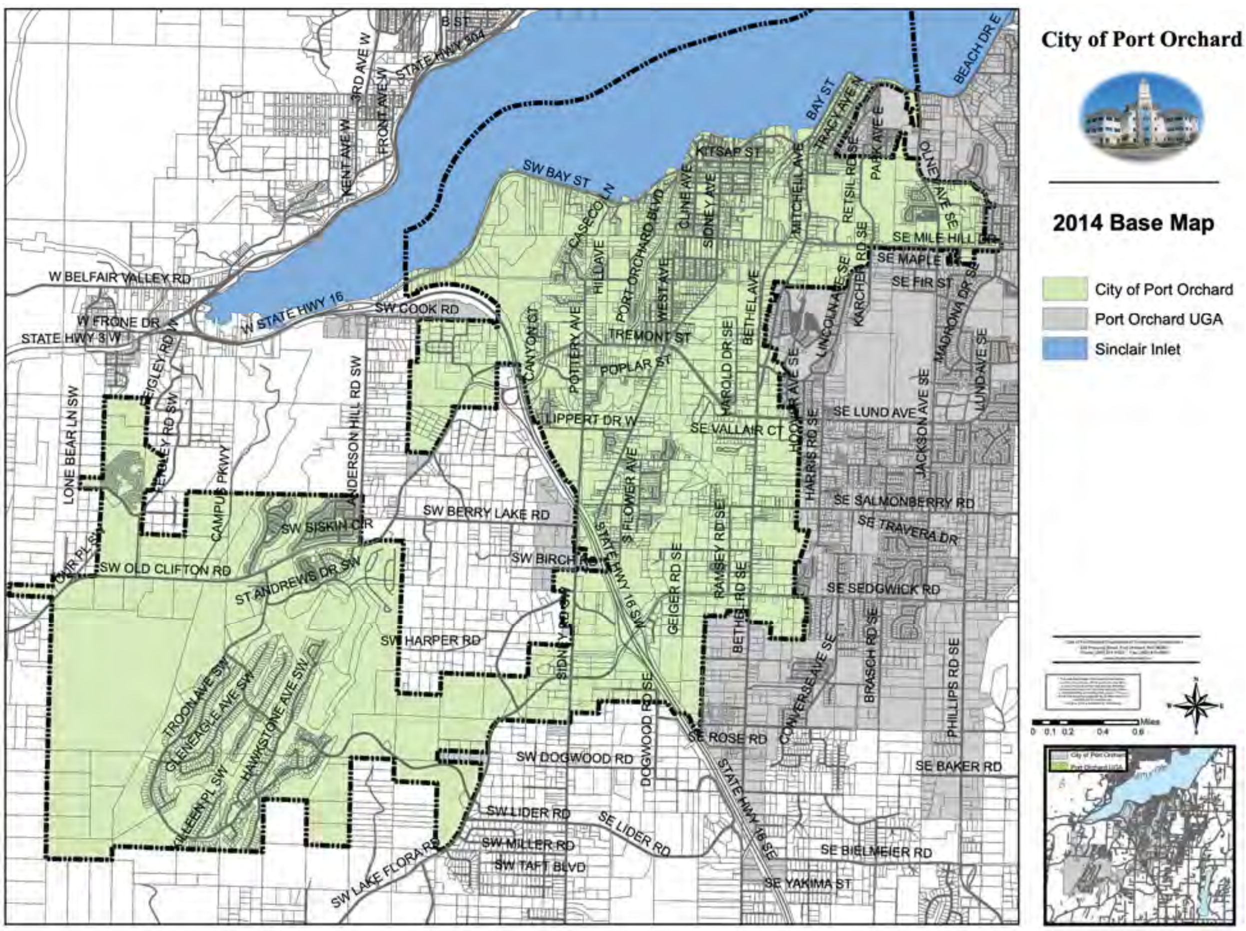
Appendix A. Port Orchard Climate Impacts

Introduction

This appendix highlights projected impacts of climate change for the City of Port Orchard. Port Orchard is a small but growing city in Kitsap County that is located near other major urban centers in the Puget Sound region. The small city has a strong community spirit and maritime history. This appendix is organized to mirror the organization of the main assessment report, with specific impacts to Port Orchard highlighted.

Figure A-1. Map of Port Orchard



Future Climate Change Projections

Sea Level Rise

Under the low-emissions scenario (RCP4.5), Port Orchard will as likely as not (50% likelihood) experience sea level rise of 0.4 feet by 2030, 0.8 feet by 2050, and 2.2 feet by 2100. Port Orchard is virtually certain (99% likelihood) to experience sea level rise of 0.05 feet by 2050 and 0.3 feet by 2100. Under the high-emissions scenario (RCP8.5), Port Orchard will as likely as not (50% likelihood) experience sea level rise of 0.35 feet by 2030, 0.75 feet by 2050, and 2.15 feet by 2100 and virtually certain (99% likelihood) to experience sea level rise of 0.1 feet by 2050 and 0.45 feet by 2100. These rising sea levels are expected to exacerbate the city's existing challenges with saltwater in its downtown area, which the City is currently seeking to address through updates to its Shoreline Master Program and downtown area plan.

Table A-1. Probabilistic Sea Level Rise Projections for Port Orchard[914]

Emissions Scenario	Likelihood	Location		Year (sea level rise, ft)			Location Notes
		Lat.	Long.	2030	2050	2100	
RCP4.5 Low Emissions Scenario	50%	47.6°N	122.7°W	0.4	0.8	2.2	West Port Orchard
	90%	47.6°N	122.7°W	0.2	0.4	1.3	West Port Orchard
	95%	47.6°N	122.7°W	0.2	0.3	1.1	West Port Orchard
	99%	47.6°N	122.7°W	0.1	0.2	0.6	West Port Orchard
	50%	47.6°N	122.6°W	0.3	0.7	1.7	Port Orchard and Bremerton
	90%	47.6°N	122.6°W	0.1	0.3	0.7	Port Orchard and Bremerton
	95%	47.6°N	122.6°W	0	0.2	0.5	Port Orchard and Bremerton
	99%	47.6°N	122.6°W	-0.1	-0.1	0	Port Orchard and Bremerton
	50%			0.35	0.75	1.95	Average sea level rise
	90%			0.15	0.35	1	Average sea level rise
	95%			0.1	0.25	0.8	Average sea level rise
	99%			0	0.05	0.3	Average sea level rise
RCP8.5 High Emissions Scenario	50%	47.6°N	122.7°W	0.4	0.8	2.2	West Port Orchard
	90%	47.6°N	122.7°W	0.2	0.4	1.3	West Port Orchard
	95%	47.6°N	122.7°W	0.2	0.3	1.1	West Port Orchard
	99%	47.6°N	122.7°W	0.1	0.2	0.6	West Port Orchard
	50%	47.6°N	122.6°W	0.3	0.7	2.1	Port Orchard and Bremerton
	90%	47.6°N	122.6°W	0.1	0.3	1.1	Port Orchard and Bremerton
	95%	47.6°N	122.6°W	0.1	0.2	0.8	Port Orchard and Bremerton
	99%	47.6°N	122.6°W	-0.1	0	0.3	Port Orchard and Bremerton
	50%			0.35	0.75	2.15	Average sea level rise
	90%			0.15	0.35	1.2	Average sea level rise
	95%			0.15	0.25	0.95	Average sea level rise
	99%			0	0.1	0.45	Average sea level rise

[914] See all Kitsap County sea level rise projections in Appendix D. Sea Level Rise Projections, Likelihood Maps, and Graphs.

Other Future Climate Projections

In addition to localized sea level rise projections, Port Orchard is likely to experience climate impacts comparable to other parts of the Puget Sound region. These impacts include:

- **Warmer surface and subsurface marine waters**. Regional models project a 2.2°F temperature increase by mid-century (2030-2059) under moderate emissions scenarios.
- **More acidic oceans** and **more intense and frequent low dissolved oxygen events** and dead zones.
- **Warmer air temperatures**, with expected warming of 4.9°F by end of century under RCP4.5 and 8.5°F by end of century under RCP8.5.
- An **increase in the number of extreme heat days** during the summer and **decrease in freeze-free days** during the winter.
- **Increased intensity of maximum 24-hour precipitation events**.
- **Changes in seasonal precipitation patterns,** with **increased winter precipitation** and **decreased summer precipitation**.

Climate Impacts

Public Health

Many of the public health impacts associated with future climate change in Port Orchard are likely to reflect countywide health impacts. Health impacts include:

- **More heat-related illnesses and deaths** from more frequent heat waves. This will particularly affect **outdoor laborers, elderly people, and youth**.
- **More acute and chronic respiratory illnesses** with air quality degradation from regional wildfires and longer pollen seasons.
- **More acute injuries directly associated with extreme events**, such as flooding, winter storms, and landslides. There may also be additional injuries or deaths associated with disruption of medical services and communication channels.
- **Increased prevalence of vector-borne diseases**, such as West Nile virus, Lyme diseases, paralytic shellfish poisoning, and *C. gattii*.
- **Increased food insecurity**, especially for those who are reliant on natural resources for jobs and wages.
- **Potential increases in mental health illnesses** (e.g., post-traumatic stress disorder, anxiety, depression). Children and people dependent on natural resources face a higher risk of mental health illnesses linked to climate change.
- Children, elderly people, Tribal and Indigenous peoples, outdoor laborers, homeless people, people with chronic illnesses, and low-income people will be **disproportionately at risk of climate-related health risks.**
- Long-term climate impacts will likely continue **stress the regional health and social safety net**.

Economy

Port Orchard's industries are diverse, and include retail trade, healthcare, educational services, manufacturing, construction, accommodation and food services, public administration, and construction. The most common occupations from Port Orchard residents include construction and extraction occupations, sales and related occupations, office and administrative support occupations, management occupations, and food preparation and service occupations.[915] People working in the natural resource economies, such as logging, mining, fishing, and agriculture, are likely to experience future impacts to business revenue. Outdoor laborers are likely to experience lost labor hours due to extreme heat and poor air quality during the summer. This is particularly salient for Port Orchard, which has a large workforce in construction. Lost labor hours from future climate change is the biggest economic damage from future climate change across the Pacific Northwest.

Climate change may also affect housing values and buildable land for Port Orchard, especially for many of its low-lying coastal residences. The average housing sales value for Port Orchard is $291,390 (reported in 2019).[916] Future sea level rise, storm surges, and flooding events could lead to decreased values for these properties.

Cultural Resources

There are 21 nationally registered historic places and 201 archaeological sites in Kitsap County. In Kitsap County, places and districts listed in the National Register of Historic Places in Port Orchard include the Masonic Hall (also known as Sidney Museum, at 202 Sidney Avenue, shown in Figure A-2) and Hotel Sidney (also known as Navy View Apartments, at 700 Prospect Street). Both places are near the Port Orchard waterfront, which may face future damages from flooding, storm surges, and sea level rise. Maintenance costs and operations of these historical buildings may be affected due to future climate change. Similarly, recreational opportunities, parks, and monuments may face similar impacts.

Figure A-2. Historic Masonic Hall in Port Orchard[917] *(photo from Kitsap County Historical Society & Museum)*

[915] https://datausa.io/profile/geo/port-orchard-wa.

[916] Kitsap County Assessor Single Family Residence Sales History. 2020

[917] Kitsap County Historical Society & Museum. Kitsap County Register of Historic Places. https://kitsapmuseum.org/research-archives/kitsap-county-register-of-historic-places/.

Public Infrastructure

Climate impacts to public infrastructure in Port Orchard could include:

- **Potential disruption of transportation routes and damage to ferry terminals**. This may affect the Bremerton/Port Orchard ferry operations as well as Port Orchard's connection to other parts of Kitsap County and Puget Sound.
- Potential **overload and damage of stormwater and wastewater infrastructure** from flood inundation and/or saltwater intrusion.
- More **frequent flooding of low-lying coastal infrastructure**, including roads, structures, and public facilities.
    - Downtown Port Orchard, which is built largely on piers and on pilings, may experience a higher risk of impacts from flooding events and storms surges.
    - This could also disrupt access for Port Orchard residents. For example, State Route 3 through Gorst frequently floods during heavy rain events and storms.
- **Degradation of public infrastructure** from flooding, saltwater intrusion, and extreme heat.
- **Disruption of power and energy** to residents and businesses during extreme events.

Land Use and Development

Climate change is likely to affect future land use development. For example, the mixed-use development of Port Orchard's waterfront may be affected by future sea level rise, storm surges, and flooding. Future climate change may also affect buildable land, zoning, land cover types, and vegetation cover for Port Orchard. However, land use decisions can worsen or mitigate future climate change. For example, increasing green spaces can offset heat island effects and provide natural flood control.

Agriculture

Port Orchard has several working farms and nurseries. Any negative impact of climate change will have detrimental effects for agricultural economics and livelihoods. Future climate change impacts to crops, nurseries, and livestock include the following:

- Potential competing interests of future irrigation demand and limited summer water availability.
- Benefits to some crops that will thrive in warmer temperatures and increased carbon dioxide concentrations, which could extend growing seasons.
- Expansion of pest and disease ranges, which could lead to decreased agricultural productivity.
- More frequent flooding, which could lead to decreased yields.

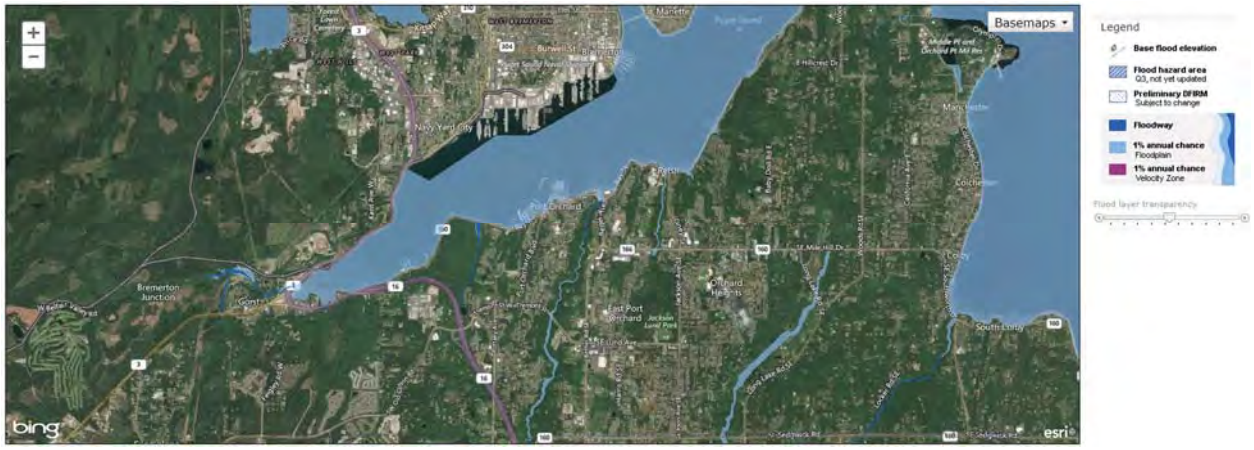
Local Government Finance

Insurance premiums could increase in the future due to climate change. In particular, insurance costs for structures and buildings within the flood zone is likely to increase as the risk of damages from flooding will increase due to sea level rise and storm surges (Figure).

Although municipal bonds for Kitsap County and Puget Sound are relatively resilient compared to other urban areas in the U.S., municipal bonds for Kitsap County localities may also be adversely affected in the future, especially if future extreme weather events increase in frequency and intensity. Furthermore, tax revenue

may be affected from future climate change and regional growth trends, especially if developers and potential residents are deterred from investing in Port Orchard area properties due to perceived climate-related risks.

Figure A-3. FEMA Flood Insurance maps for the 1% annual chance floodplain for Port Orchard.
(Flood insurance rate maps outline flood hazards in a community and includes flood insurance risk zones, 1% and 0.2% annual chance floodplains.)



Geologic and Natural Hazards

There is a range of geologic and natural hazards that will increase due to future climate change. Landslide risk will likely increase due to heavier rain events, soil erosion and destabilization, and sediment transport patterns. There have been 3 LIDAR-defined landslides in Port Orchard, affecting about 0.54 square miles. An estimated 1,031 people, or about 9.4% of Port Orchard's population, live in landslide hazard areas. Additionally, about 11% of Port Orchard's building stock, or 739 structures, and 39 critical facilities are located within the landslide hazard area.[918]

Furthermore, there is very high likelihood that coastal flooding from sea level rise and storm surges will increase in frequency and intensity. From FEMA and U.S. Census data, flood damages and insurance claims have totaled $6.8 million for Port Orchard (dollar year not reported).[919] Future flooding will result in more damages, which will subsequently affect insurance rates and property values.

[918] Kitsap County Department of Emergency Management. 2015.

[919] FEMA. 2015. Risk Report: For Kitsap County, including the Cities of Bremerton, Bainbridge, Port Orchard, Poulsbo, the Port Gamble S'Klallam Indian Reservation, the Suquamish Tribe, and Unincorporated Kitsap County. https://fortress.wa.gov/ecy/gispublic/AppResources/SEA/RiskMAP/Kitsap/Kitsap_Project_Docs/Risk%20Report%20-%20Kitsap%20County%20-%20Final.pdf.

Hydrology and Hydrogeology

Port Orchard is likely to see similar climate impacts to hydrologic and hydrogeologic systems as Kitsap County. Key impacts could include:

- **Groundwater recharge** may be affected by hydrologic changes, including from increasing water temperatures, sea level rise, and declining summer flows.
- **Stream and riverine flooding** will become more frequent, which can have widespread health, infrastructure, and habitat impacts.
- **Regional hydropower production** will decrease in the summer months, which may create a mismatch in energy supply and demand with expected increases in energy demand during the summer due to cooling demands.
- **Summer water availability** may affect irrigation capacity for agriculture.

Habitat

Climate change will affect all types of habitat in Kitsap County. Key climate impacts include:

- **Terrestrial habitats**
  - Some impacts to vegetation distribution and composition, forest growth and productivity and wildfire regimes are expected to change in lower elevation areas in the Puget Sound region.
  - Prevalence of invasive species and pests will increase, altering habitat types and vegetation distribution.
- **Freshwater and aquatic habitats**
  - Regionally, warmer stream temperatures and lower spring and summer flows will affect cold-water fish species across multiple life-cycle stages.
  - Wetland habitats are likely to contract, threatening habitats for a variety of species and shelter for juvenile fish.
  - Climate impacts to aquatic benthic invertebrates, amphibians, and salmonids will have downstream ecosystem and food-web impacts.
- **Marine and coastal habitats**
  - Marine waters around Kitsap County will likely experience increased acidification, more frequent growth of harmful algal blooms (HABs), and more frequent low dissolved oxygen events and dead zones. These changes will have impacts to shellfish populations, reduce benthic invertebrate and crustaceans, and alter marine food webs.
- **Increased prevalence of invasive species and diseases** across all habitat types. Novel and new species and diseases could emerge in the future. Currently known invasive species and diseases known include the following:
  - Invasive tunicates
  - European green crabs
  - New Zealand mud snail
  - Varnish clams
  - Giant hogweed
  - Tansy ragwort
  - Purple loosestrife
  - Hydrilla
  - Parrotfeather
  - *Ichthyophonus hoferi*
  - Harmful algae
  - *Alexandrum catanella*
  - Mountain pine beetle
  - Spruce beetle
  - Swiss needle cast

Fire

Kitsap County's wildland-urban interface (WUI) area has not been linked to future increased wildfire risk. However, warmer and drier conditions coupled with population growth and development will likely increase relative wildfire risk for Kitsap County. WUI expansion increases the risk of wildfires to rapidly spread across the wildland-to-urban landscape, potentially resulting in significant costs and damages to infrastructure and result in the loss of human life.[920,921] The increased risk is often due to the land use changes associated with increasing population growth and development as well as higher probability of fires spreading across a landscape due to the additional fuel loads from residences.[922,923] Although there has been no scientific studies in the Puget Sound area on WUI expansion and fire risk, regional and national trends are suggesting that there is an association between WUI growth and fire risk due to compounding impacts of climate change, development, and individual residents' choices.[924,925] For example, **parts of Port Orchard has been defined as "at-risk" areas because it is considered to be part of the WUI, as defined by the Healthy Forest Restoration Act**.[926,927] Expanding development and WUI areas are partially correlated to increasing fire suppression and response costs, suggesting that Kitsap County and its municipalities may carry additional cost burden of firefighting in the future.[928,929]

Kitsap County already has a robust capacity to respond to fires. Kitsap County has multiple fire districts and staffed firefighters based out of 29 fire stations and multiple other volunteer firefighting units that covers most County area.[930] South Kitsap Fire and Rescue provides services to the Port Orchard area.

[920] Bar Massada *et al.* 2009. Wildfire risk in the wildland-urban interface: A simulation study in northwestern Wisconsin. *Forest Ecology and Management*. 258: 1990-1999.
[921] Bar Massada *et al.* 2014.
[922] Bar Massada *et al.* 2014.
[923] Warziniack *et al.* 2019. Responding to Risky Neighbors: Testing for Spatial Spillover Effects for Defensible Space in a Fire-Prone WUI Community. *Environmental and Resource Economics*. 73: 1023-1047. Doi:10.1007/s10640-018-0286-0.
[924] Liu *et al.* 2015. Climate change and wildfire risk in an expanding wildland-urban interface: a case study from the Colorado Front Range Corridor. *Landscape Ecology*. 30(10): 1943-1957. Doi: 10.1007/s10980-015-0222-4.
[925] Morgan *et al.* 2019.
[926] Silvis Lab. Wildland-urban interface (WUI) change 1990-2010. University of Wisconsin-Madison. Accessed 9 January 2020. http://silvis.forest.wisc.edu/data/wui-change/.
[927] Bainbridge Island Fire Department. 2010.
[928] Bainbridge Island Fire Department. 2010.
[929] Gude *et al.* 2013. Evidence for the effect of homes on wildfire suppression costs. *International Journal of Wildland Fire.* 22: 537-548. https://doi.org/10.1071/WF11095.
[930] Kitsap County Department of Information Services. Kitsap County Fire Districts and Stations. Geographic Information System (GIS) Division, Kitsap County Department of Information Services. www.kitsapgov.com/dis/Documents/fire_districts_stations.pdf.

ADVISEMENT ON IMPACTS OF SEA LEVEL RISE ON CITY OF PORT ORCHARD SHORELINE

PORT ORCHARD SHORELINE MASTER PROGRAM UPDATE

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DRAFT
June 26, 2020

Note:
Some pages in this document have been purposely skipped or blank pages inserted so that this document will copy correctly when duplexed.

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INTRODUCTION

Cascadia Consulting Group (CCG) partnered with Herrera Environmental Consultants (Herrera) to evaluate and provide advisement to inform the Shoreline Master Program (SMP) Periodic Updates for the City of Port Orchard (City). The City is tasked with providing advisement on the existing SMP with specific focus on the impacts that sea level rise will have on the downtown marine shorelines and related infrastructure and to identify potential vulnerabilities and opportunities for improved management and code revisions. This report documents the results of the analysis.

GEOGRAPHIC SETTING

Port Orchard is located on the south shore of Sinclair Inlet, on the Kitsap Peninsula, west of Seattle, Washington (Figure 1). This relatively small coastal community has a long history dating back to the 1850s and was the first town to be incorporated in Kitsap County in 1890. Shortly thereafter the Puget Sound Naval Shipyard was installed on the north shore of Sinclair Inlet, in the town of Bremerton.

Shoreline conditions in Port Orchard and much of the Puget Lowland have been heavily influenced by the region's glacial legacy. The repeated advance and recession of the Puget Lobe of the Cordilleran Ice Sheet carved the north-south trending basins that make up the regions' inlets, straits and passages. As glaciers receded and melted, they left behind an incredible volume of glacially derived sediment, much of which makes up the regions surface geology. As sea levels rose to modern levels, this glacially geology has been shaped into our modern shorelines.

The shores of Port Orchard have incurred substantial modification over the course of the town's development. Almost all the City's marine shoreline is armored and nearshore fill is abundant. Several overwater structures that pre-date the SMP are found along the marine shoreline, some of which are in very poor condition. Many roads are near the marine shoreline. Shoreline development ranges from residential and commercial development, to parks, parking lots, public infrastructure, and water-dependent facilities, including marinas and docks.

Considerable fill has been placed over historical beaches and wetlands to reclaim additional low elevations shore (Figure 2). In some areas this has resulted in substantial changes to nearshore conditions, particularly where fill has been placed waterward of coastal bluffs. Several ravines and embayments, such as Blackjack Creek, contain considerable fill in addition to being heavily altered by major road crossings, wetland loss and reduced tidal flushing.

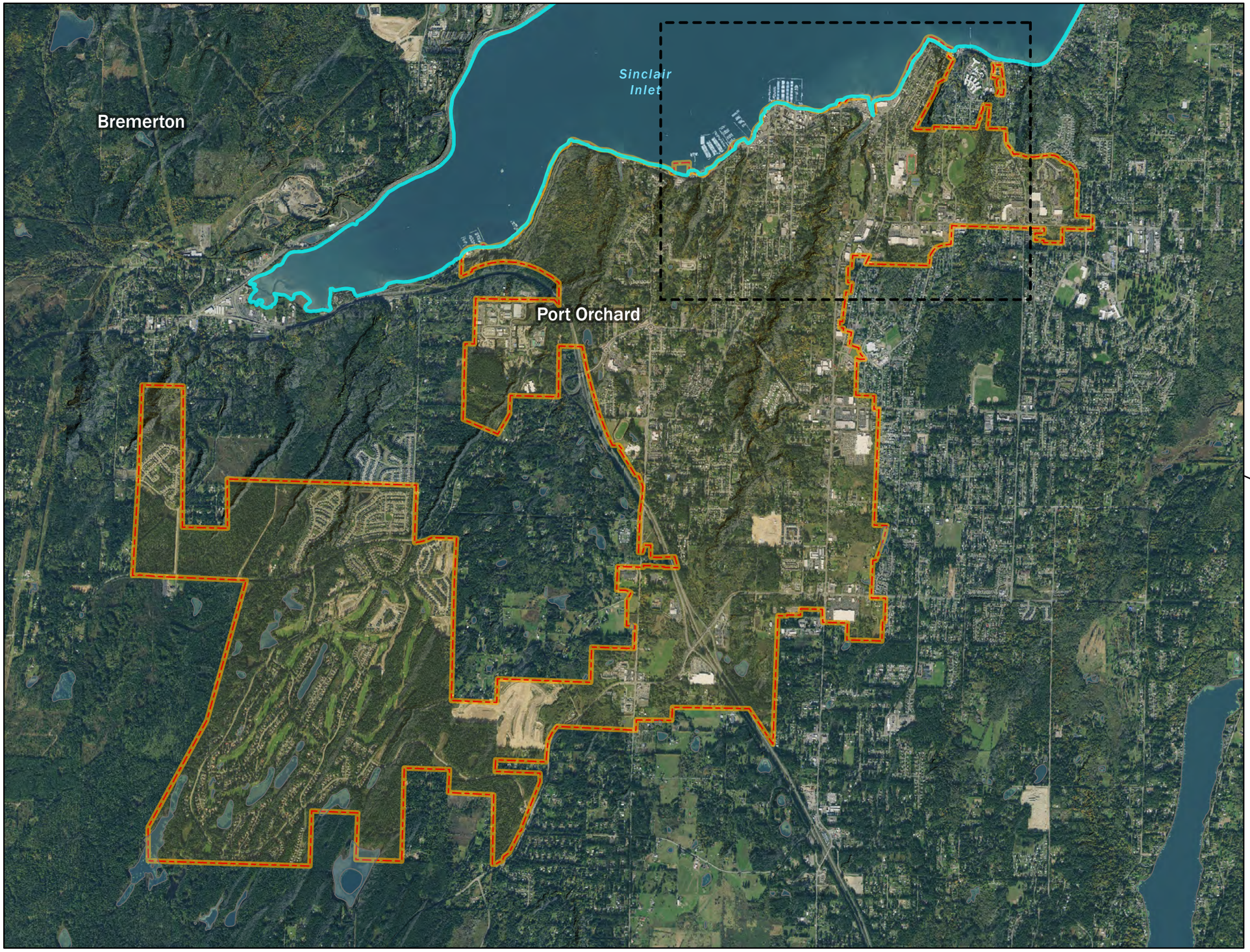
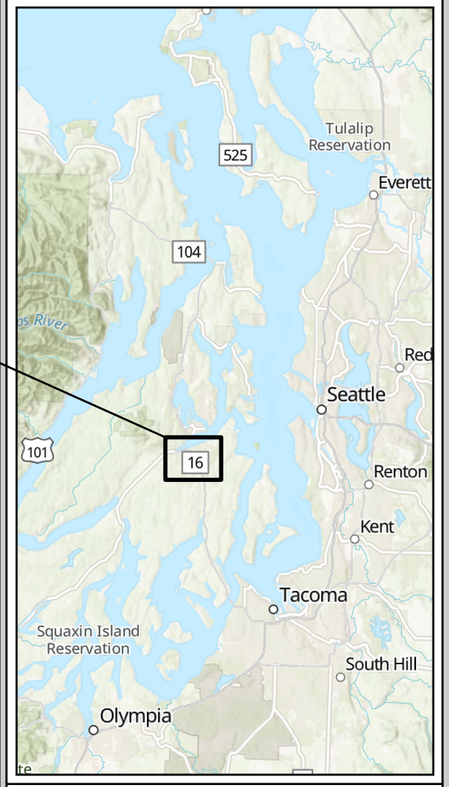


Figure 1
Vicinity Map

Legend

- Waterbodies
- Port Orchard
- Study Area



0 0.25 0.5 1 Miles

HERRERA

Coordinates:

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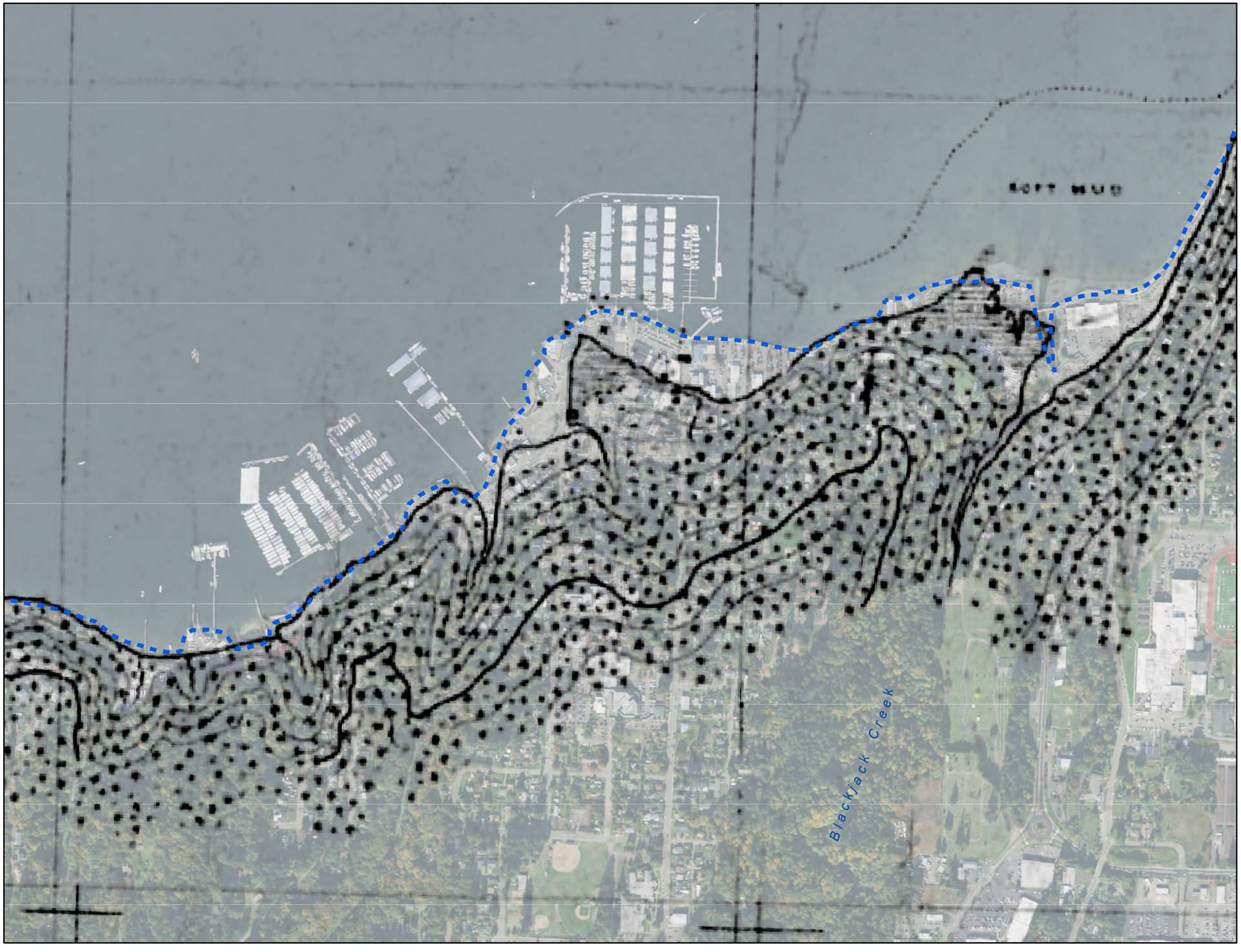

Figure 2
T-sheet 1637 and Shoreline

Legend

- DNR ShoreZone Shoreline

0 250 500 1,000
Feet

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Coordinates:

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SEA LEVEL RISE ANALYSIS

Sea level rise described here is based on recent guidance developed by Washington State (hereafter referred to as the guidance) to estimate the risk of inundation at various points in time in the future, and with varying levels of statistical certainty (Miller et al. 2018). This assessment primarily focused on the projected relative sea level rise for the City of Port Orchard through the year 2040. Rise projections associated with later planning horizons increase with increasing time (Table 1, Figure 3).

There are four components to inundation by sea water: eustatic change (global sea level rise), vertical elevation change of the land of interest (as relates to geologic processes), storm surge, and wave runup and setup. For the purposes of this analysis, the storm surge hazard is assumed to be statistically independent from global sea level rise, but completely statistically dependent on wave runup and setup.

There are four categories of inundation hazard, which relate to the frequency of inundation. Regular inundation is associated with everyday tidal motion. The annual inundation area is the area expected to be inundated at least once per year along the coast. The 100-year inundation area is an area along the coast that is expected to have a 1% chance of being inundated in a given year. The fourth inundation hazard that we evaluated is an "extreme" inundation area. This hazard is reflective of those areas which have an expected probability of inundation less than 1% in a given year but could be inundated due to the statistical limits of known inundation components, given the limits of current knowledge. Since there is a great deal of uncertainty in the statistical dependence and magnitude of the inundation components, it is recommended that these areas be considered at risk of inundation in the future.

Eustatic Change

Eustatic sea level is the technical description for the sea level averaged throughout the globe. This encompasses all additions to the global ocean, including primarily melting of land-based ice (glaciers)and thermodynamic expansion of the ocean. This is the basis for most of the probabilistic element of the guidance. Eustatic sea level rise is strongly dependent on future greenhouse gas emissions. The International Panel on Climate Change (IPCC) has identified a number of scenarios that relate to future greenhouse gas emissions. For the purposes of this analysis, the "business as usual" case is used (i.e., RCP 8.5), particularly in light of the lack of current policy worldwide to reduce carbon emissions and the relatively short periods of interest in this study. Eustatic sea level rise projections reported by the IPCC were downscaled for the northeast Pacific Ocean and adapted to local conditions in Washington State by Miller et al. (2018). These locally adapted projections describe the absolute sea level change for the State of Washington (Table 1).

Table 1. Sea level rise estimates (feet) from Miller et al. (2018)			
Time Period	**Expected value**	**10% probability of exceedance**	**1% probability of exceedance**
2040-2050	0.7	1.0	1.3
2050-2100	2.0	3.1	4.8

Vertical Land Movement

A key component to any sea level rise analysis is determination of the vertical movement of the land due to tectonics (Miller et al. 2018). Vertical land movement (VLM) across Washington State was recently updated by (Miller et al. 2018) integrating VLM measurements collected using three different methods, including: leveling, water-level differencing, and continuous GPS (CGPS). Vertical land movement for Sinclair Inlet was measured at -0.1 feet/century, +/- 0.5 feet/century (negative value represents subsidence).

Relative Sea Level Rise (RSLR)

Vertical land movement is combined with the state's absolute sea level rise projections to determine relative sea level rise (RSLR) projections for the selected range of planning horizons (Table 2). The planning horizon for this assessment is 2040, which is when the next comprehensive Shoreline Master Program is required by Washington Department of Ecology. Sea level rise is projected to accelerate after 2050 resulting in additional coastal flooding and erosion (Figure 3), however the extent of additional sea level rise and the rate at which that rise will occur are both uncertain. Based on our current understanding of the science, there is a 1% chance that amount of relative sea level rise will meet or exceed 1.1 feet by 2040. Similarly, there is a 50% chance that 0.5 feet or more of sea level rise will occur by 2040. These projections will be added to various water levels to better understand the frequency of inundation, the upper limits of current flood hazards, and the spatial extent of future flood vulnerability.

Table 2. Relative Sea Level Rise Projections for Port Orchard.			
Year	**99% probability of exceedance**	**50% probability of exceedance**	**1% probability of exceedance**
2040	0.0	0.5	1.1
2100	0.3	2.1	5.0

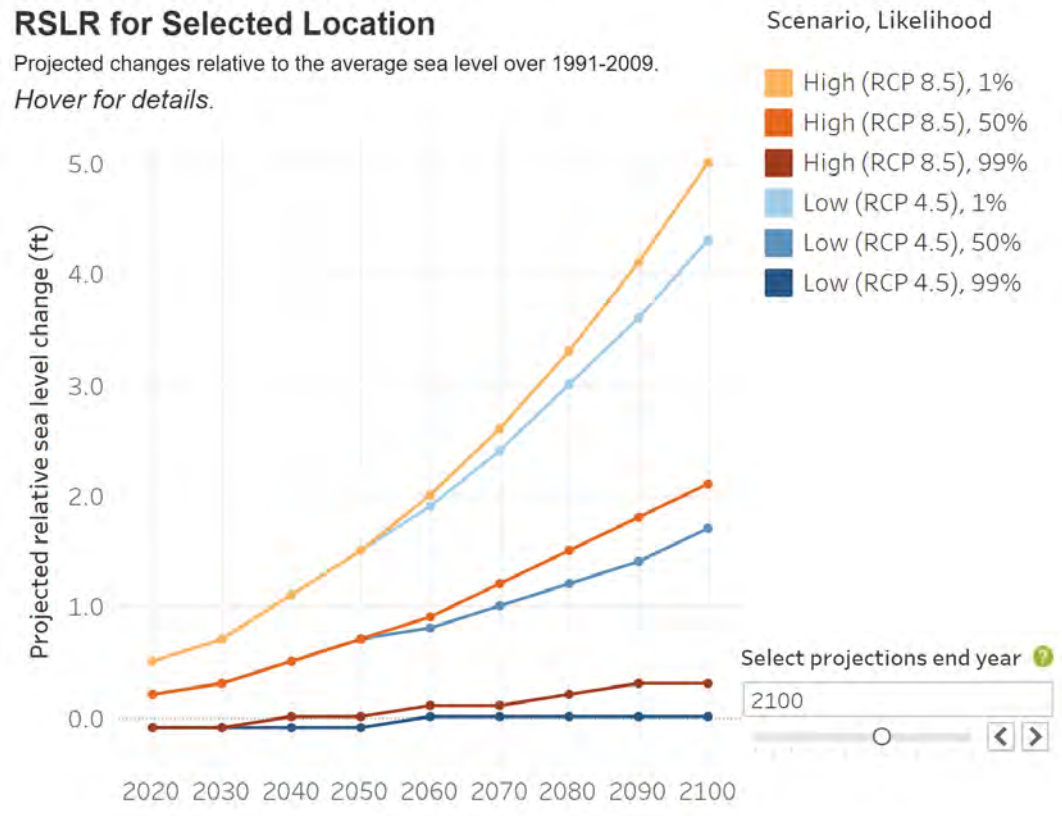

Figure 3. Relative sea level rise scenarios, probabilities and planning horizons showing accelerated rate of SLR between 2020 and 2100

Storm Surge

Coastal flooding from storm surge is one of the most damaging environmental hazards, responsible for great loss of life, property and long-term effects on municipal services and economic health (Buchanan et al. 2017). Low lying coastal towns, such as Port Orchard, with considerable shoreline development are no exception. Coastal flooding can occur as the result of exceptionally astronomical high tides, often referred to as "King Tides" or as a result of a storm surge, which is when high water is amplified by low pressure storm events and wind forcing. King Tides are the highest tides that occur each year, while the highest astronomical tide (HAT) is the highest tide across the entire tidal datum epoch or lunar node cycle (18.6 years). For the City of Port Orchard HAT measures approximately 11.28 feet NAVD88. These elevations are limited to coastal waters only and do not account for additional water elevation from upland drainage/stormwater.

The highest observed water level (HOWL) is a high tide event that is combined with a storm surge that has occurred in the past. HOWL is a still water level and does not include wave run-up. The highest observed water level (in the current tidal epoch) for the nearby City of Seattle

(NOAA Benchmark Sheet No 9447130) measured 12.54 feet (NAVD-88) and occurred on January 27, 1983.

Flood mapping is slightly different, and like sea level rise projections, entails a probabilistic approach. The 1% exceedance probability flood, is also referred to as the 100-year flood. To determine the local elevation of the 1% exceedance probability flood, we first compared the elevations of mean higher high water (MHHW) from Seattle and the Bremerton NOAA Benchmark Sheet (No 9445958). The ratio between the two values was then applied to the Seattle 1% exceedance probability flood elevation. The resulting estimated tidal elevation of the 100-year flood for Bremerton and Port Orchard is 12.77 feet NAVD88. To conservatively measure the potential impacts of coastal flooding and sea level rise in the Port Orchard study area, maps were developed to show the full extent of both 100-year flood elevation, the 1% probability relative sea level rise projections for Port Orchard. These combined flood and SLR elevations are shown in Table 3 and Figures 4-7. LIDAR elevations were ground-truthed in the field and later compared to the LIDAR data to document the accuracy of the LIDAR mapping. Measured elevations were consistently lower than the LIDAR data, with a difference of 0.15-0.3 feet.

FEMA recently updated coastal flooding mapping in 2017 within Kitsap County and the Port Orchard area. The new mapping is consistent with NOAA's 100-year flood elevation converted from the Seattle tide gauge. Mean higher high water for the Seattle tide gauge with adjustments for the City of Bremerton is 9.22 feet (NAVD88).

Table 3. Coastal Flood Elevations Plus Sea Level Rise (feet, NAVD88)

Year	100-Year Flood Elevation	50% probability of exceedance	1% probability of exceedance
2040	12.77	13.27	13.87
2100	12.77	14.87	-

*converted to MLLW by adding 2.53 feet

Waves

Like much of the Puget Sound region, the shores of Port Orchard are considered a low wave energy environment. The complex, crenulated nature of the shoreline results in limited fetch (overwater distance across which waves develop), which is one of the fundamental controls on wave development. The sheltered wave environment results in slower rates of sediment transport, erosion, and very little beach change outside of large storm events.

Boat wakes contribute considerable wave energy along the shores of Sinclair Inlet and Port Orchard. Some of the largest waves that occur in the area are from ships moving from and around the Bremerton naval base, tugboats, and the Bremerton-Seattle ferry. Additional foot ferry and recreational boaters also contribute to boat wakes in the study area.

Figure 4.
Projected 100 Year Marine Flood Extent Under Sea Level Rise Scenarios:
Port Orchard Marina

Legend

- Outfalls
- DNR Shoreline

Flood Scenarios

- 100 Year Marine Flood 2020
- 100 Year Marine Flood + 50% Probability SLR Projection 2040
- 100 Year Marine Flood + 1% Probability SLR Projection 2040
- 100 Year Marine Flood + 50% Probability SLR Projection 2100

Un-inundated Stormwater Structures

- Catch Basin
- Other Stormwater Structures

Inundated Stormwater Structures

- Catch Basin - Isolated from Coast
- Catch Basin - Connected to Coast
- Other Stormwater Structure

N

0 100 200 400 Feet

HERRERA

Coordinates:

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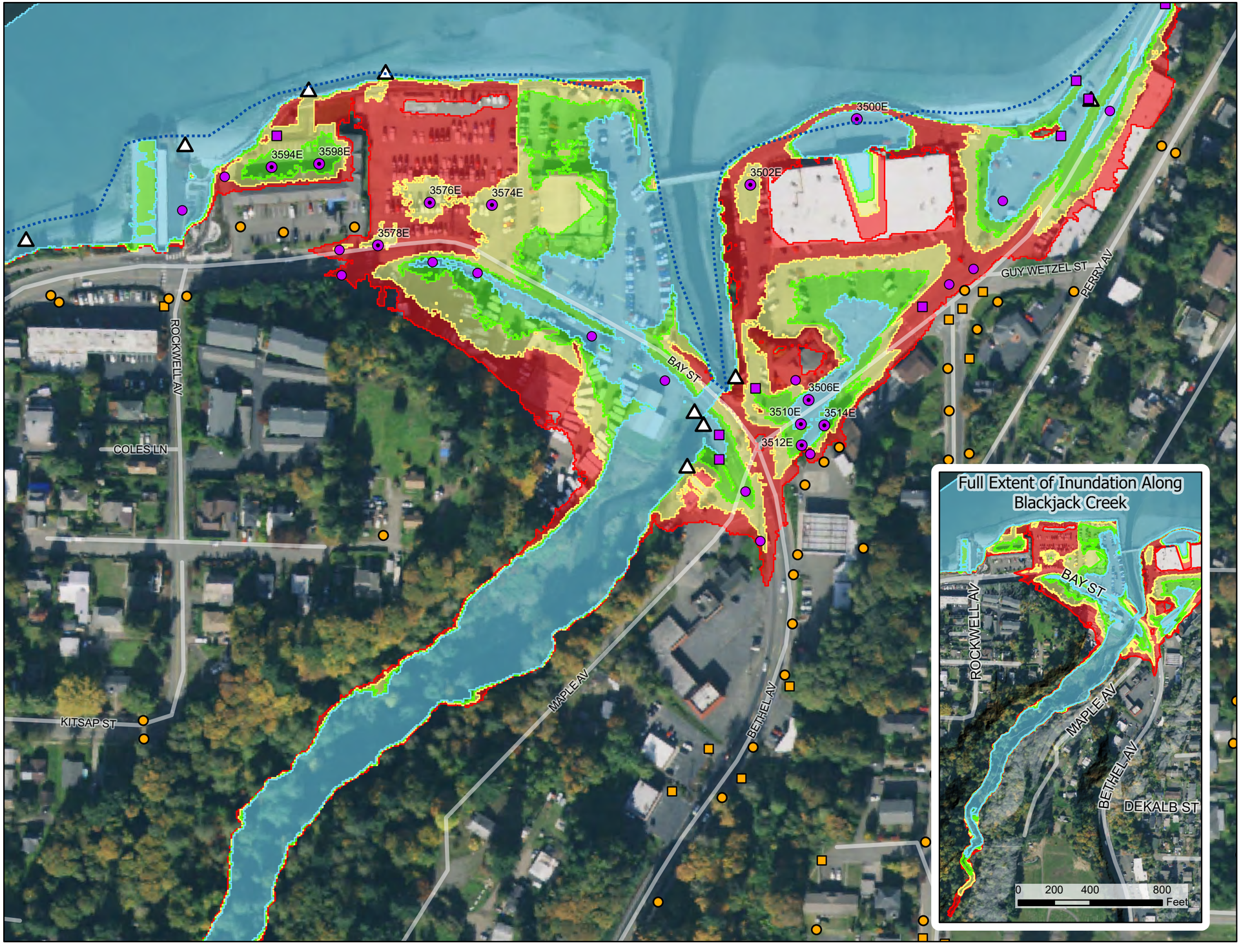

Figure 5.
Projected 100 Year Marine Flood Extent Under Sea Level Rise Scenarios: Blackjack Creek

Legend

- Outfalls
- DNR Shoreline

Flood Scenarios

- 100 Year Marine Flood 2020
- 100 Year Marine Flood + 50% Probability SLR Projection 2040
- 100 Year Marine Flood + 1% Probability SLR Projection 2040
- 100 Year Marine Flood + 50% Probability SLR Projection 2100

Un-inundated Stormwater Structures

- Catch Basin
- Other Stormwater Structures

Inundated Stormwater Structures

- Catch Basin - Isolated from Coast
- Catch Basin - Connected to Coast
- Other Stormwater Structure

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0 100 200 400 Feet

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Figure 6.
Projected 100 Year Marine Flood Extent Under Sea Level Rise Scenarios: Annapolis to Foot Ferry Terminal

Legend

- Outfalls
- DNR Shoreline

Flood Scenarios

- 100 Year Marine Flood 2020
- 100 Year Marine Flood + 50% Probability SLR Projection 2040
- 100 Year Marine Flood + 1% Probability SLR Projection 2040
- 100 Year Marine Flood + 50% Probability SLR Projection 2100

Un-inundated Stormwater Structures

- Catch Basin
- Other Stormwater Structures

Inundated Stormwater Structures

- Catch Basin - Isolated from Coast
- Catch Basin - Connected to Coast
- Other Stormwater Structure

N

0 100 200 400 Feet

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Figure 7.
Projected 100 Year Marine Flood Extent Under Sea Level Rise Scenarios: Wastewater Treatment Facility

Legend

- Outfalls
- DNR Shoreline

Flood Scenarios

- 100 Year Marine Flood 2020
- 100 Year Marine Flood + 50% Probability SLR Projection 2040
- 100 Year Marine Flood + 1% Probability SLR Projection 2040
- 100 Year Marine Flood + 50% Probability SLR Projection 2100

Un-inundated Stormwater Structures

- Catch Basin
- Other Stormwater Structures

Inundated Stormwater Structures

- Catch Basin - Isolated from Coast
- Catch Basin - Connected to Coast
- Other Stormwater Structure

N

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GEOMORPHIC RESPONSE OF DIFFERENT SHOREFORMS TO SLR

Sea level rise will produce a range of impacts from increased erosion of coastal bluffs, the inundation of low-lying coastal areas, and the landward translation of beach profiles, among other impacts (Huppert et al. 2009). The shores of Port Orchard were historically comprised of a range of geomorphic shoretypes (also referred to as coastal landform types or shoretypes), which respond to the rise in sea level in different ways. Certain shoretypes are more vulnerable to erosion, others to inundation, and some are vulnerable to both. Bedrock shores are less likely to incur considerable impacts outside of a vertical rise in the mean highwater mark. The geomorphic response of each of the shoretypes found in the City of Port Orchard are included below.

Barrier Beaches/Accretion Shoreforms

These shores include low lying depositional beaches and spits that are often associated with landward coastal wetlands. The natural response of these shores is to build additional elevation and translate landward through repeated overwash during high water events. These areas are vulnerable to coastal flooding, beach erosion, loss of dune and backshore habitats, and landward wetland loss.

Coastal Bluffs/Feeder Bluffs

Coastal bluffs, commonly described regionally as feeder bluffs, contribute most of the sediment found on Puget Sound beaches. Bluff recession rates and mass wasting are expected to accelerate due to sea level rise and increased precipitation, for which there is a documented threshold for when Puget Sound landslides are known to occur (Chleborad et al. 2006). The combined results of the added erosion is likely to contribute additional sediment to littoral drift cells, which will enable down-drift shores to naturally adapt or translate landward.

Embayments

There are several small stream mouths and embayments located within the City of Port Orchards shores, the largest of which is Blackjack Creek. In many cases, these areas include a waterward spit or shoal, and landward coastal wetlands, estuaries, and lagoons. Sea level rise will affect stream mouths and embayments by expanding their tidal prism and the landward extent of inundation (salt wedge). This expansion is likely to result in additional changes in riparian conditions such as adjacent flood areas, coastal wetlands, mortality of less salt tolerant marine riparian vegetation, bank toe erosion, and additional mass wasting. Mass wasting is likely to be further exacerbated by increased precipitation due to climate change.

Armored and Artificial Shores

Armored shores are any kind of shore with shoreline armor, including riprap, bulkheads, seawalls and other similar structures designed to mitigate wave-induced coastal erosion. Artificial shores include shoreline armor as well as considerable fill that likely entails changes to landward elevations. These altered shores represent static shorelines in which the natural geomorphic response of the shoreline is precluded. When sea levels rise along a static shoreline, beaches and the habitats found therein, narrow in a process referred to as the 'coastal squeeze'. Along artificial shores the coastal squeeze will continue as sea levels rise until intertidal areas are entirely inundated and the rise and fall of the tide is observed as only vertical change along the face of the structure.

Filled, armored shore near the boat ramp in downtown Port Orchard.

In most cases, armored and artificial shores are engineered for current sea levels and sea level rise results in their frequent inundation or overtopping, which can lead to structure failure. Many filled, armored shores do not include sufficient drainage to effectively drain water during overtopping, which can lead to additional problems. In most areas, for the fill and armor to persist the rise in sea level, additional elevation or "freeboard" needs to be added to existing coastal structures. Inundated fill can contribute to additional issues such as settling, scour, sink holes and subsidence, particularly where fill is placed over salt marshes.

POTENTIAL IMPACTS OF SLR ON INFRASTRUCTURE

The impacts of sea level rise will be visible throughout most of the City of Port Orchard's marine shoreline but is likely to be more dramatic in three different regions, which are described in greater detail below. Some of these impacts are already apparent during flood events and each location is well within the existing 100-year flood mapping.

Annapolis

Several houses were built on a large fill prism of variable elevation in Annapolis. Most of the structure are well below the current 100-year flood elevations and will be inundated in the future due to sea level rise, as early as 2040. However, the fourplex located at 1833 Bay Street, appeared to have a higher floor elevation placing it outside the flood zone and may not be inundated in the near future (but perhaps after 2040).

Flood mapping shows that Bay Street will be inundated from the nearby foot ferry parking lot to the west and then to the south for roughly 400 feet of roadway. Coastal flooding along Bay Street is intermittent and then continuous as the road reaches the shore just north of Blackjack Creek.

Failing armor on Bay Street near Annapolis Creek.

At least 8 public stormwater outfalls are encompassed within flood mapping at Bay Street near Annapolis. The terminal end of at least one outfall has not been located. The seawall beneath Bay Street near the mouth of Annapolis Creek, is both failing and regularly overtopped, such that the road prism landward of the sea wall is being eroded. Road repairs are planned to take place when the Annapolis Creek culvert is replaced (designs are currently in development; Reid Middleton, 2018) .

The parking lot east of the Whiskey Gulch restaurant is showing signs of failure and the landward fill material is apparently contaminated. If the armor fails before the fill and armor are removed, those contaminants will end up in Sinclair Inlet. Long-term planning should address

contaminated sediments that are subject to flooding and assure that they area effectively managed.

Blackjack Creek

Sea level rise will affect effect the Blackjack Creek estuary by expanding the extent of salt water in the ravine, which will indirectly result in additional changes to nearshore conditions in the marine shoreline, creek channel, and adjacent lands. Changes to the marine shoreline will likely begin to occur with coastal flooding occurring with increasing frequency along the west shore of the estuary. Much of this area has been filled and was historically intertidal. The LIDAR data shows that the armor elevations are lower than 100-year flood elevations. As sea levels rise, flooding will extend further to the west and cover a more expansive area of the historical stream delta. As this area is known to include contaminated sediment, the contaminated sediment should be adequately contained behind structurally sound shoreline armor to assure that contaminants do not mobilize during flood events. Inundated areas around Blackjack Creek also include extended stretches of Bay Street, both east and west of the intersection at Bethel Avenue.

Bridge over confluence of Blackjack Creek with Sinclair Inlet; looking upstream

The added inundation of salt water up Blackjack Creek will likely affect fringing wetlands in the estuary, vegetation assemblages in the ravine, and exacerbate mass wasting along the steep bluffs that line the stream channel. Several deep-seated landslide complexes are mapped along the banks of Blackjack Creek (WA DNR). Tension cracks, J-ed trees, cracked and repaired pavement were all observed in close proximity to the bluff crest on Rockwell Avenue. These steep slopes are considered "High Hazard" areas as mapped in the GeoHazards in Kitsap Counties Critical Areas Ordinance. Mass wasting is likely to be further exacerbated by increased precipitation due to climate change.

Downtown Area

Early maps show that historically, much of the downtown shoreline, was low elevation shore, including large coastal wetlands near the mouth of Blackjack Creek and landward of the marina.

Although much of this area is armored and filled, it is also mapped within the 100-year flood areas and inundation is likely to occur due to SLR by 2040 for both the 50% probability and 1% probability projections.

Considerable public infrastructure is found within this vulnerable part of the City including approximately 18 outfalls, one public and one private drain, and considerable stormwater infrastructure including the marina pump-station. The marina pump station is responsible for pumping wastewater from the downtown area to the West Sound Water Treatment facility located just east of the City limits.

Considerable parking area is found either directly adjacent to or in extremely close proximity to the marine shoreline. Nearshore conditions would be improved by planting a narrow riparian buffer in any of these shores.

Outfalls

Many of the City's stormwater facilities are located well below 100-year flood elevation and will therefore be compromised by coastal flooding (Table 4). The number of outfalls that will be inundated during coastal floods will dramatically increase as sea levels rise in the City. Many private structures are also encompassed within the 100-year flood areas.

Some structures are directly connected to marine waters, while others are found in topographic lows were sea water may seep through fill and armor and collect. These areas will likely have additional problems and required pumps to drain.

These catch-basins present opportunities to improve drainage in the City of Port Orchard, by installing tide gates and/or pinch valves. It should be noted that the flood elevations used to identify vulnerable structures consider only marine flooding and do not account for additional stormwater from precipitation.

Table 4. Outfalls Inundated Due to Coastal Flooding Plus Sea Level Rise (feet, NAVD88)

Horizon	Total Outfalls	Isolated from marine waters	Connected to marine water	Publicly owned and managed
100-yr Flood Event	16	0	16	9
2040 SLR (50%)	24	0	24	13
2040 SLR (1%)	98	49	49	63
2100 SLR (50%)	145	58	87	81

Water Treatment Facility

Sea level rise mapping showed that the West Sound Utility District wastewater treatment facility (WSUD-WWTF) will not be inundated until after 2040 (Figures 6 and 7). However, some inundation of the property will occur via Olney Creek (Cartcher Creek) and over the Beach Road, directly east of the facility. Additional detailed surveying of the facility should be conducted to

inform the full adaptation of the facility to sea level rise, particularly related to the elevation of the tide gate, channel banks and surrounding infrastructure.

The Marina Pump Station, located near the downtown marina is also in the process of being updated and will deliver wastewater to the WSUD-WWTF (RH2 2020). The hydraulic design should consider sea level rise at the WSUD-WWTF to the structure's design lifetime.

Roads

Many roads within Port Orchard are likely to be flooded as a result of SLR, some of which are currently flooded during high water events. It is likely that some elevation of the roadway alignment will need to be made. Washington State Department of Transportation (WSDOT) did a climate change vulnerability assessment of the State's roads (Figure 8). SR 116 was mapped as being of "high" vulnerability to climate impacts in their high climate change scenario. WSDOT will likely be adding additional elevation to SR-116 in the coming years. Outreach to WSDOT could be conducted to coordinate long term planning and fill elevations to avoid future problems.

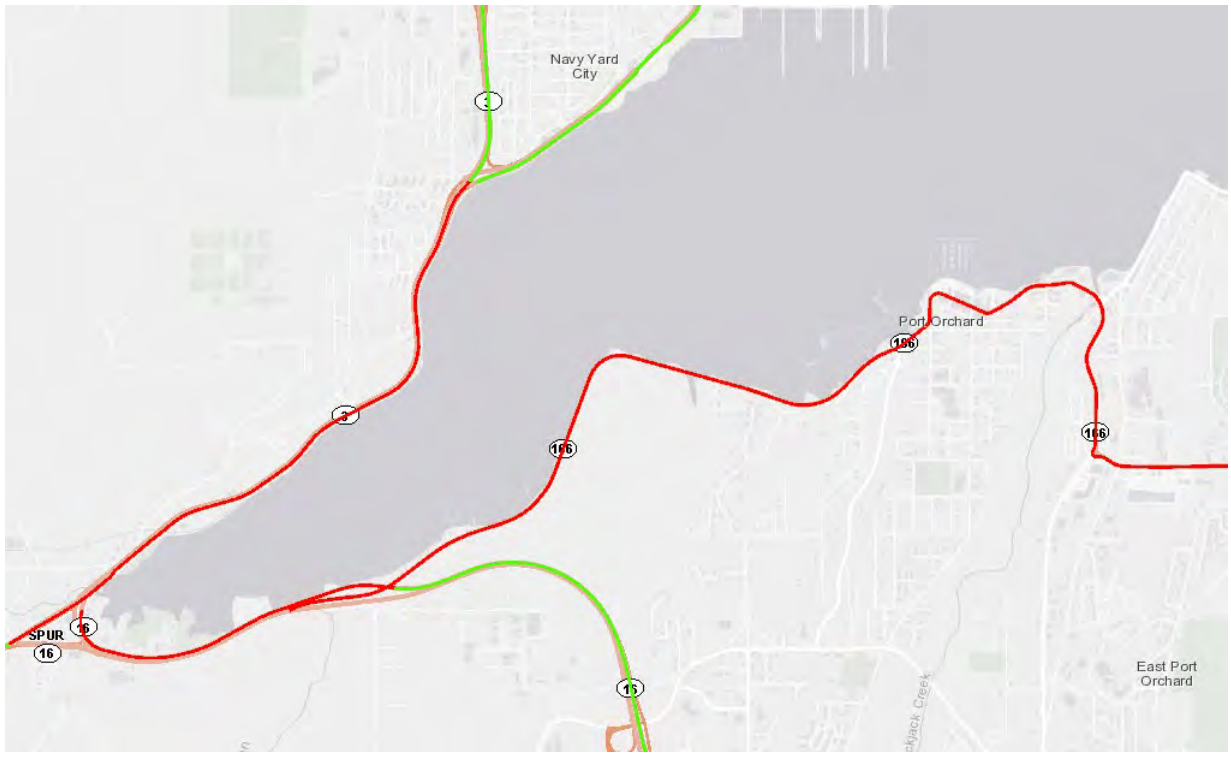

Figure 8. Washington State Department of Transportation Climate Impact Vulnerability Assessment

RECOMMENDATIONS

Formally Adopt New Flood Mapping

Coastal flooding in the City of Port Orchard is an existing problem that will continue to get worse with sea level rise. Existing flood regulations [City of Port Orchard's Municipal Code (COPO MC) 20.170.060], referenced "The Flood Insurance Study for the Kitsap County, Washington and Incorporated Areas," dated November 4, 2010. The COPO MC states that this document should be the basis for new regulation until a new FIRM is issued. A new FIRM was developed in 2017, but the new mapping has yet to be formally adopted. Existing regulations interpret the base flood as the 100-year flood. Coastal flood mapping depicts the spatial extent of flooded areas from marine waters only and does not account for additional flooding from heavy precipitation or stormwater.

Revise Coastal Hazard Language in the Code

According to the existing COPO MC,

> "Coastal high hazard area" means an area of special flood hazard extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources".

Current and past flood mapping of the City of Port Orchard is largely mapped as A (or AE in the past (2010) mapping method), which does not qualify as a high coastal hazard area. Code language currently includes the V-zone for coastal high hazard areas, which is not mapped anywhere within the City, and is therefore irrelevant.

It is recommended that all the City's marine shoreline be designated a coastal high hazard area due to the frequency and spatial extent of coastal flooding, the abundance of nearshore fill, and the risk of tsunamis. Coastal flooding will increase in frequency over a relatively short period of time with additional implications associated with mass wasting, coastal roads, and other heavily utilized public areas. The mapping developed for this effort does not include flooding from stormwater. Recent research has documented the projected increase in the frequency of 100-year floods. In Seattle, with 1.6 feet of SLR the 10% 1% and 0.2% annual chance of floods are expected to recur 108, 335 and 814 times as often (Buchanan et al. 2017).

The spatial extent of nearshore fill also contributes to the recommendation to consider all shores coastal high hazards areas in Port Orchard. Although there is not substantial wave energy in Sinclair Inlet, shorter frequency waves can do considerable damage when sustained over longer duration, particularly in flooded areas.

The threat of wave action from tsunamis, contributes to the recommended coastal hazard status of the Port Orchard shoreline. According to the Washington Department of Geology and Earth Resources, much of the City of Port Orchard's downtown shore is considered to be within areas

mapped as having "High Liquefaction Susceptibility" due to the extent of nearshore fill (Figure 9). The Seattle-fault zone earthquake that occurred in 900-930 resulted in at least 9.8 feet (3 meters) of uplift near Gorst, located at the head of Sinclair Inlet (Arcos 2012). Tsunami and debris flow deposits in the salt marsh sediment at Gorst further document this historical occurrence of Tsunamis from a large Seattle fault earthquake in Sinclair inlet. Arcos (2012) confirmed paleotsunami modeling of a Seattle fault earthquake by Koshimura et al. (2002). Model results showed that a Tsunami wave measuring up to 13.1 feet (4 meters) in height would develop in Sinclair Inlet (Figure 10), which had some of the largest tsunami wave heights resulting from a Seattle fault earthquake in the Puget Sound region.

Stormwater Management

Improving stormwater management in anticipation of more frequent flooding is recommended. A comprehensive stormwater management plan would enable larger scale vision and a cohesive plan to address stormwater issues, opportunities and improved management.

Support Additional Analysis and Develop Partnerships

- Consider applying for funding to mitigate flood impacts, there are several unique resources for climate change impacts as well as small cities.
    - Mitigate Floods and prepare for Climate Impacts https://mcusercontent.com/ec9c20819838d6547c69401b2/files/1253f254-be8c-4425-a9fd-7fd397e2e359/AFC_small_cities_funding_guide_FINAL_042820_20_DIGITAL.pdf
- Consider developing a stormwater comprehensive plan
- Consider evaluating all locations in which there are know contaminated sediments that are within coastal flooding areas and develop a long-term plan to address those in need of attention.
- Form partnerships in the Sea Level Rise adaptation community
- Reach out to WSDOT regarding long-term plans for threatened roads and adding elevation to roadways
- Create standards for sea level rise for the downtown waterfront redevelopment based on design lifetimes and offering leadership for other small coastal cities

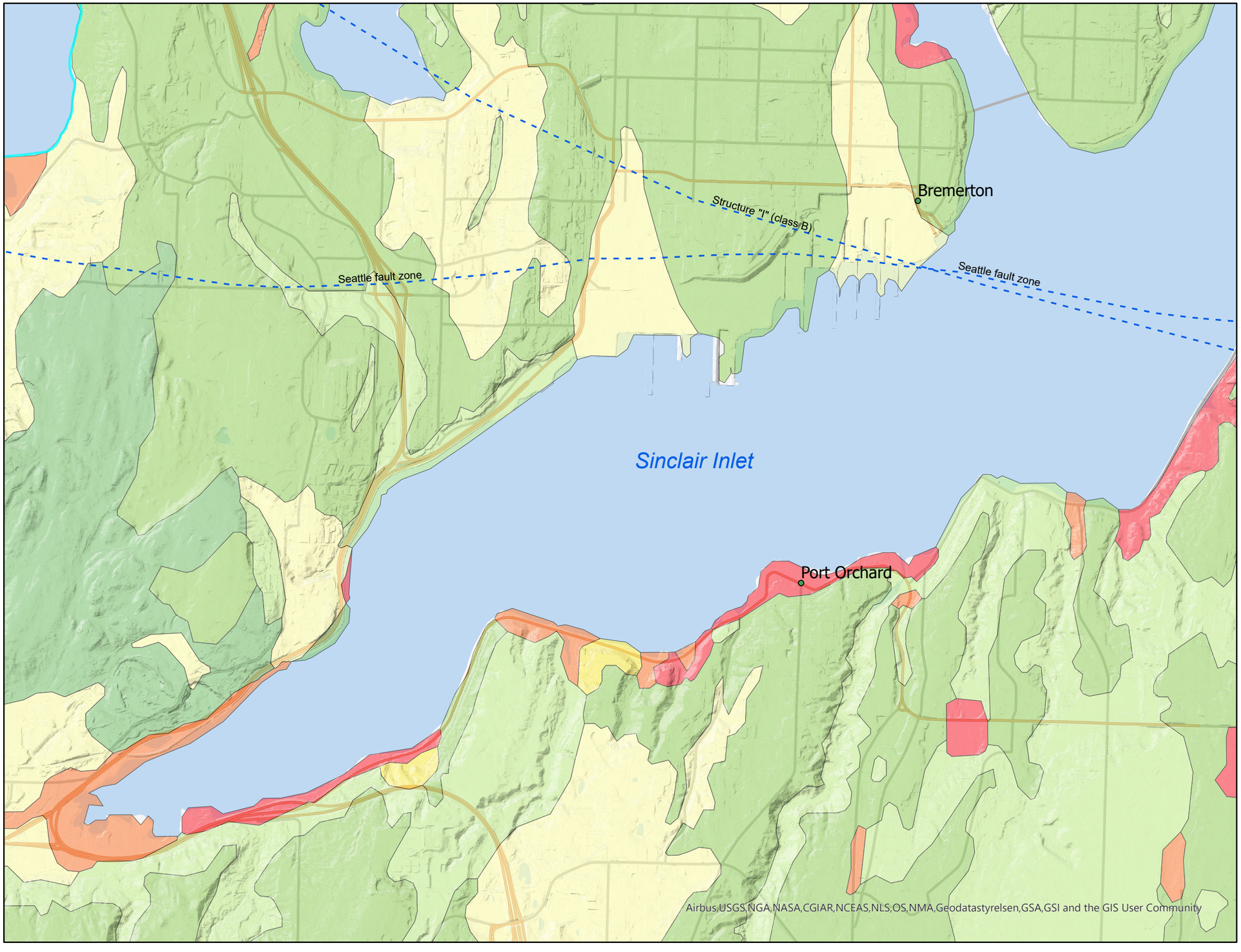

Figure 9.
Liquefaction hazard mapping and Seattle fault shown crossing Sinclair Inlet.

Legend

- Cities

Active Fault Zones

- Visible fault trace
- Inferred fault trace
- Concealed fault trace

Liquefaction Zones

- N/A (bedrock)
- high
- low
- low to moderate
- moderate
- moderate to high
- very low
- very low to low

N

0 1,000 2,000 4,000 Feet

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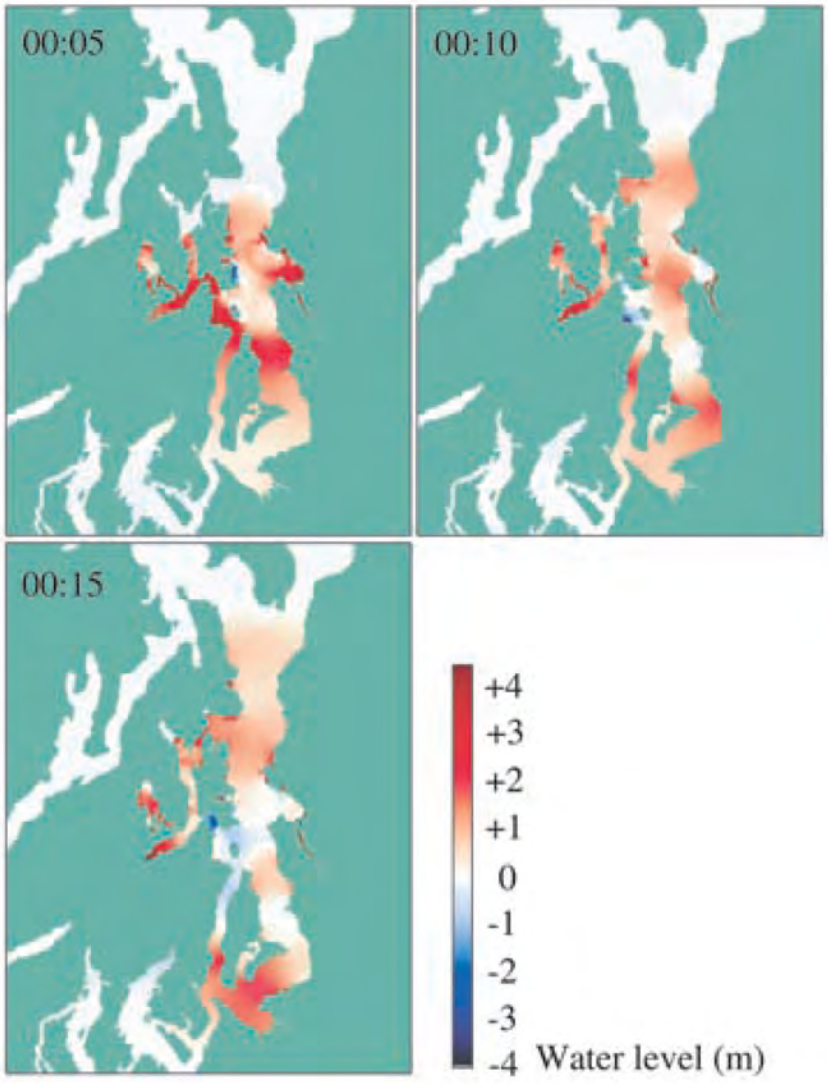

Figure 10. Snapshot of Tsunami Propagating within Central Puget Sound from a Seattle Fault Earthquake, from Koshimura et al. 2002.

REFERENCES

Arcos, M. E. M. 2012. The A.D. 900-930 Seattle-Fault-Zone Earthquake with a Wider Coseismic Rupture Patch and Postseismic Submergence: Inferences from New Sedimentary Evidence. Bulletin of the Seismological Society of America, Vol. 102, No. 3, pp. 1079-1098.

Buchanan, M. K., M. Oppenheimer and R. Kopp. 2017. Environmental Research Letters. 12. 064009.

Chleborad, A. F., R. L. Baum, and J. W. Godt, 2006. Rainfall Thresholds for Forecasting Landslides in the Seattle, Washington, Area—Exceedance and Probability. U.S. Geological Survey Open-File Report 2006 1064. Huppert, D. A. Moore, and K. Dyson. Impacts of Climate Change on the Coasts of Washington State. School of Marine Affairs College of Ocean and Fishery Science, University Washington, Seattle, Washington.

Koshimura, S., H. O. Mofjeld, F. I. Gonzalez, A. L. Moore. 2002. Modeling the 1100 bp paleotsunami in Puget Sound, Washington. Geophysical Research Letters, Vol. 29, No. 20, 1948.

Miller, I.M., H. Morgan, G. Mauger, T. Newton, R. Weldon, D. Schmidt, M. Welch, and E. Grossman. 2018. Projected Sea Level Rise for Washington State – A 2018 Assessment. A Collaboration of Washington Sea Grant, University of Washington Climate Impacts Group, Oregon State University, University of Washington, and US Geological Survey. Prepared for the Washington Coastal Resilience Project.

RH2 Engineering, Inc. 2020. Marina Pump Station Improvements Predesign Report. Prepared for the City of Port Orchard, Washington. 156p.

Reid Middleton, Inc. 2018. 2018 Annapolis Creek Culvert Replacement: 30% Design & Permit Coordination Report. Public Works Project No. PW2018-004. 1074 p.

Washington State Department of Transportation. 2011. Climate Impacts Vulnerability Assessment. Prepared by the Washington State Department of Transportation for submittal to the Federal Highway Administration.